TOPCON

INSTRUCTION MANUAL

VARIABLE ANGLE RETINAL CAMERA

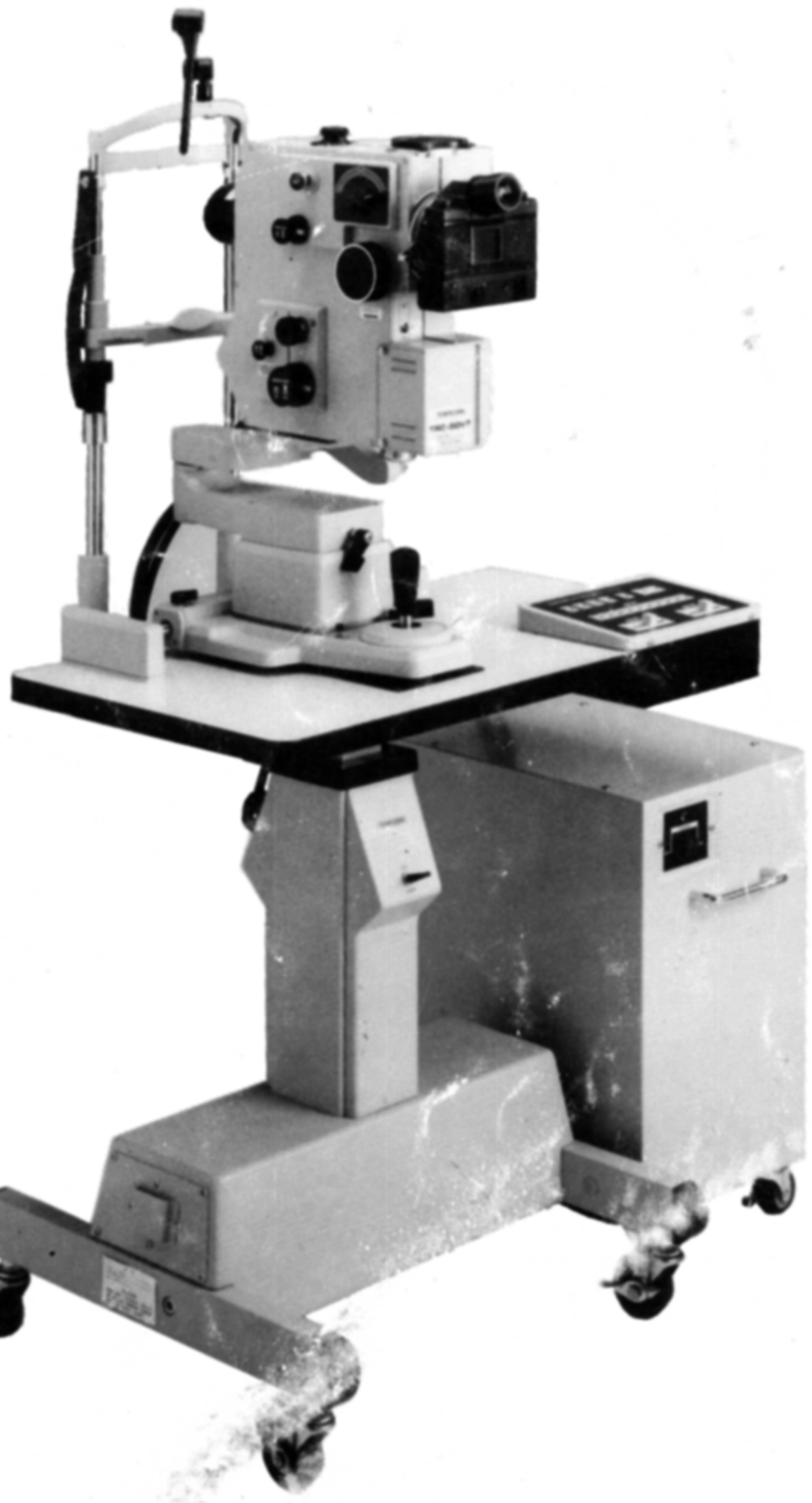
TRC-50V

TRC-50VT

TOPCON TRC-50VT
TOPCON TRC-50V
RETINAL CAMERA
FUNDUS CAMERA

For digital camera upgrades, parts, service, resale, and other information on this and other ophthalmic instruments, contact:

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TOPCON VARIABLE ANGLE RETINAL CAMERA TRC-50V/50VT

Congratulations on your choice of the TOPCON Variable Angle Retinal Camera, Model TRC-50V or Model TRC-50VT, as the case may be. The former model is supplied with the swing arm and has lateral swing movements only while the latter model also incorporates a tilting device and, therefore, has both lateral swing and vertical tilt movements.

Both models are, furthermore, supplied in two types, or one type in which the control console is fixed on the table and a second type in which the control console is fixed directly on the power supply unit.

The instructions, which follow, are basically for the Model TRC-50VT, with assembling instructions for both types, since there are no great differences between the models.

At the same time, it should be noted that the table surface supplied with both models should be installed directly on the elevating mechanism of the TOPCON Adjustable Instrument Table, Model AIT-10B, which should, therefore, also be purchased at the same time.

Please read the instruction manual carefully before you attempt to assembly and/or operate the instrument. You will only be able to obtain the full benefit of a superior precision optical intrument, if you, first, thoroughly familiarize yourself with the instrument and its operation. If you should have any questions which are not covered by this manual, please do not hesitate to write to either the authorized distributor or to TOPCON directly.

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1. NOMENCLATURE AND FUNCTIONS

1-1 Main Body

① Angle changing lever

② Diopter compensation knob
Used to compensate the dioptric power of strong myopia and hyperopia in the patient and also used for ocular anterior photography.

③ Astigmatic correction knob
Rotated for obtaining an uniform focus, when taking peripheral photographs.

④ Barrier filter
Can be detached, by unscrewing the guide screw.

⑤ Excitation filter
Can be detached, by unscrewing the guide screw.
When pushed in fully, the illumination for the observation system is automatically adjusted to the brightness set with the fluorescein angiography knob ⑥1 on the control panel.

⑥ Filter switching knob
Changed for different kinds of photography.
N : For normal 35mm color photography and fluorescein angiography.
PAG: POLAROID fluorescein angiography.
G : For red-free photography.
F1, F2 : For using filters required for specialized retinal photography.

⑦ Illumination diaphragm knob
Do not use this knob when dilation is satisfactory.
When dilation is not sufficient, set the angle to 35° or 20° and pull out this knob.

⑧ Focusing knob

⑨ Internal fixation target mount

⑩ Zero resetting lever
Push down for resetting the four digit electromagnetic timer to zero (0000).

⑪ Data plate insertion slot
For inserting the plastic data plate on which pertinent information is hand-written with a marker pen, for photographing together with the retinal image and the time or frame number.

⑫ Accessory mount

⑬ Illumination lamp socket

⑭ Illumination lamp locking ring
Must be loosened for exchanging the illumination lamp.

⑮ Output connector for accessories (Polaroid attachments and 1X Relay Lens Adapter)

⑯ Optical head locking lever

⑰ Omni-directional joystick

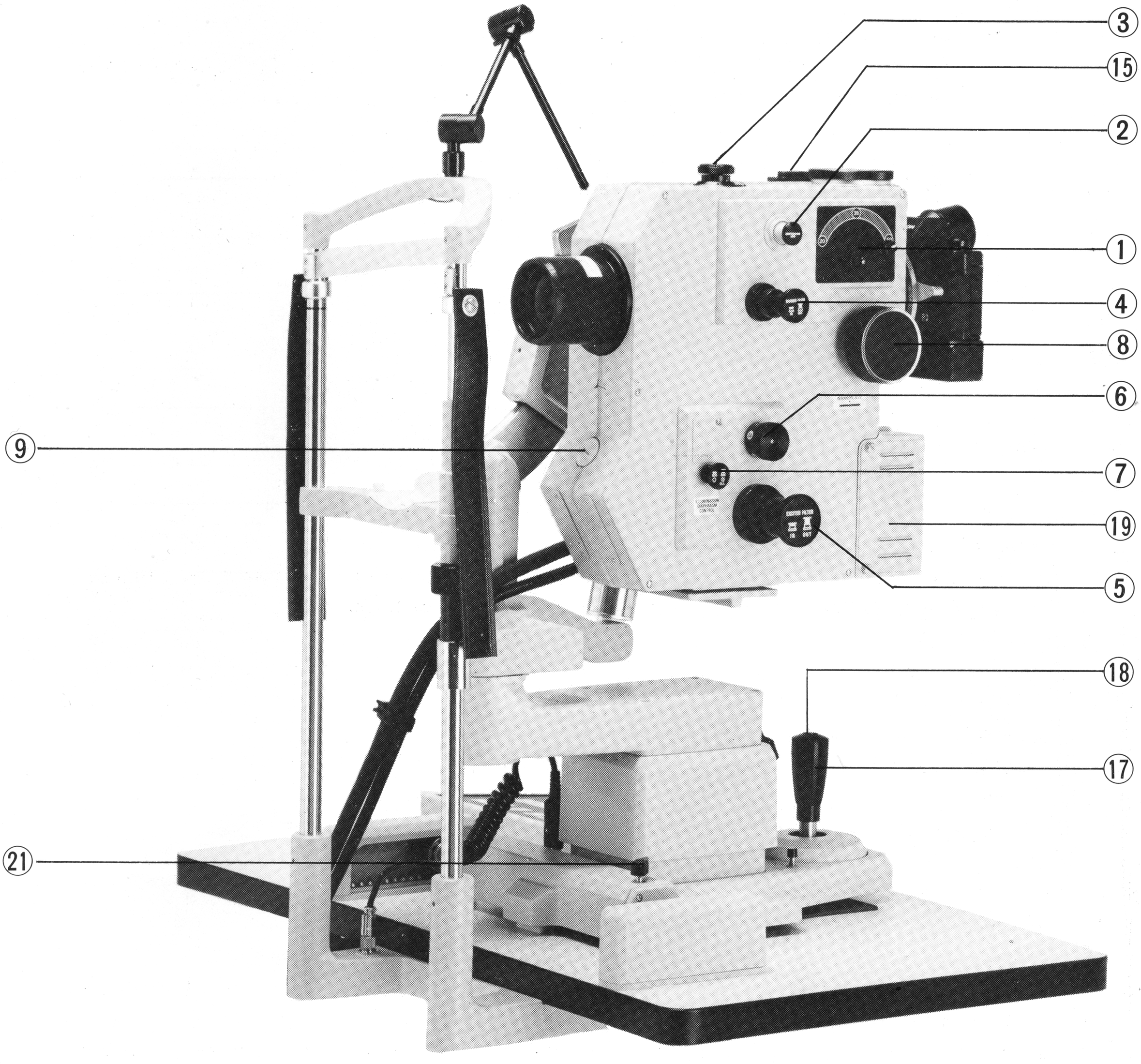
⑱ Shutter release button
Xenon lamp flashes upon depressing the shutter release button.

⑲ Xenonlamp house

⑳ Timer switch
Depressed to switch the counter to timing operations and shows the time from 0000 to 999.9 seconds, in 0.1 second increments.
The timer starts upon depressing once and stops when depressed a second time. When the counter is not used as a timer, the number of frames exposed is photographed in one frame increment each time the shutter is released.

㉑ Stereo photo locking lever
Stereo photography is possible by moving the base right and left after, first, tightening the lever.

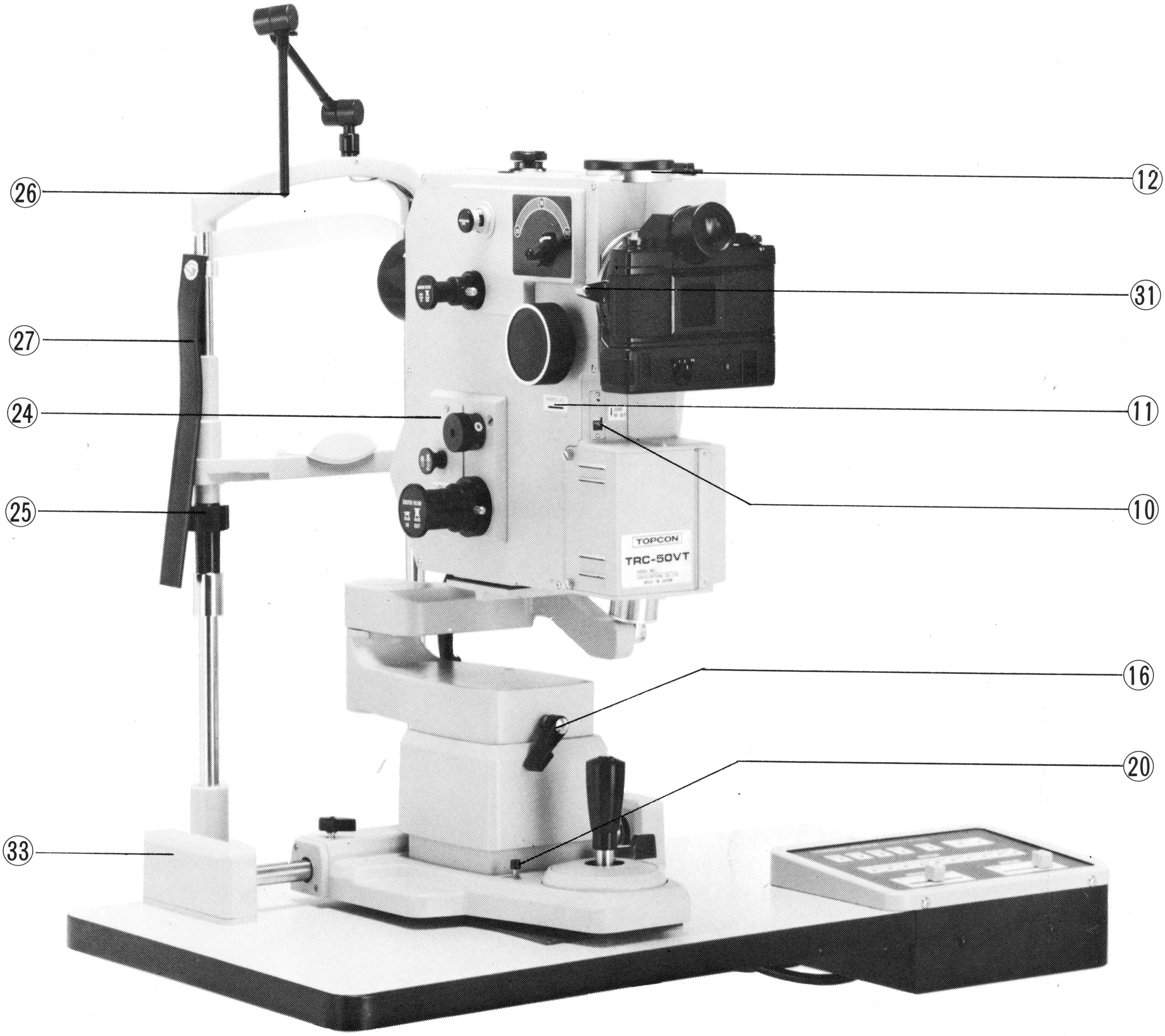
㉒ Base fixing knob
㉓ Shutter release connector cord
㉔ Filter changing cover
The cover is detached for installing special filters for photography. The filter is fitted into its frame and then pushed into the open settings of the filter turret.
㉕ Chin-rest adjusting knob
㉖ Annular fixation target
㉗ Head strap



㉘ Optical head control cord (J2)
㉙ Electronic flash connector cord (J1)
㉚ Accessory mount cap
㉛ 35mm camera body locking lever
㉜ Mount for 35mm camera body
㉝ Roller cover
㉞ Pilot lamp

Lights up when "35MM LOWER" of the mode switches ㊽ is depressed and indicates that the lower camera is in use.

㉟ Lower arm (TRC-50VT)



㊱ Tilt locking lever
Loosened for tilting the optical head up to 15°, up or down.

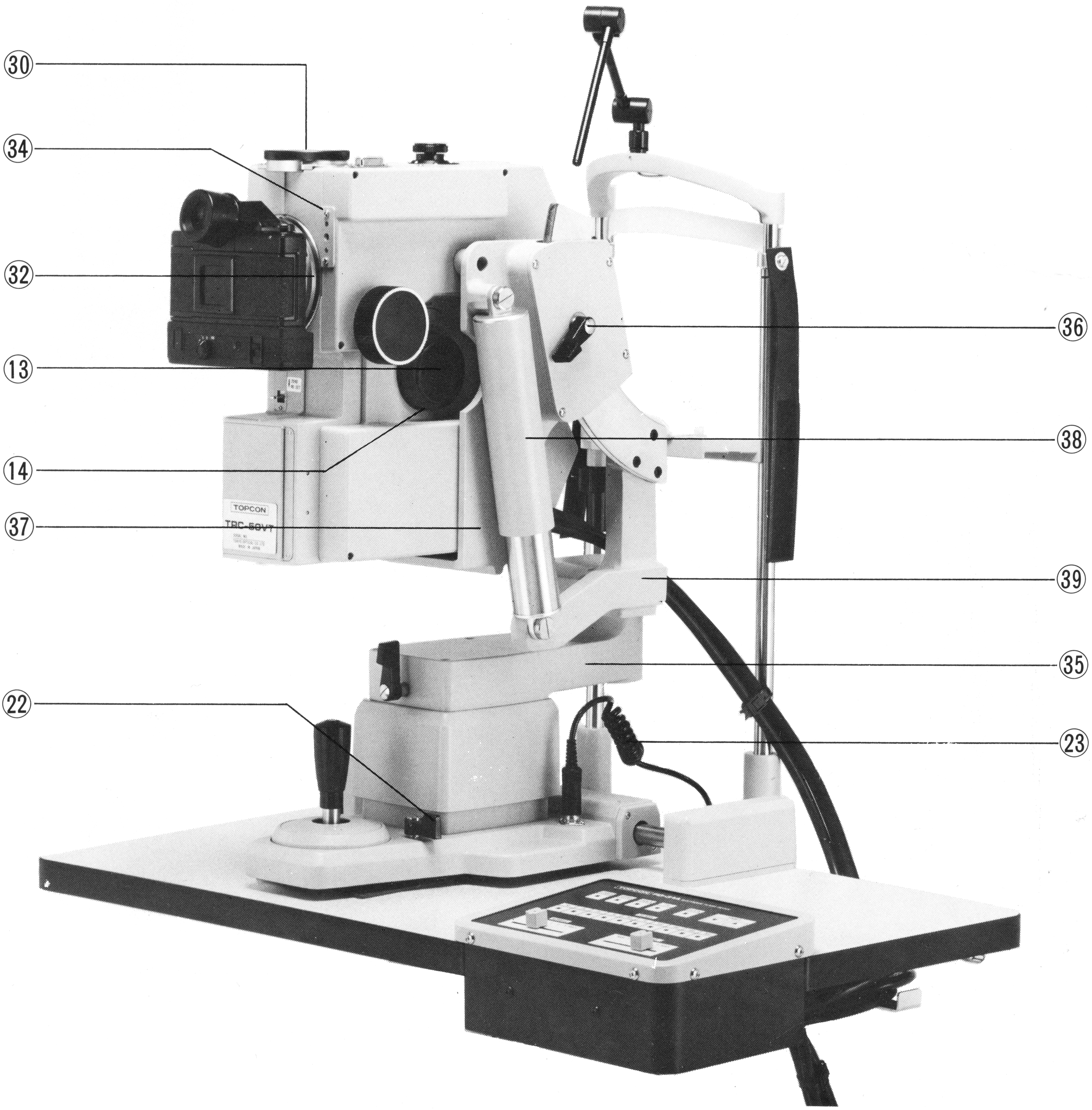
㊲ Attachment bracket (for optical head)

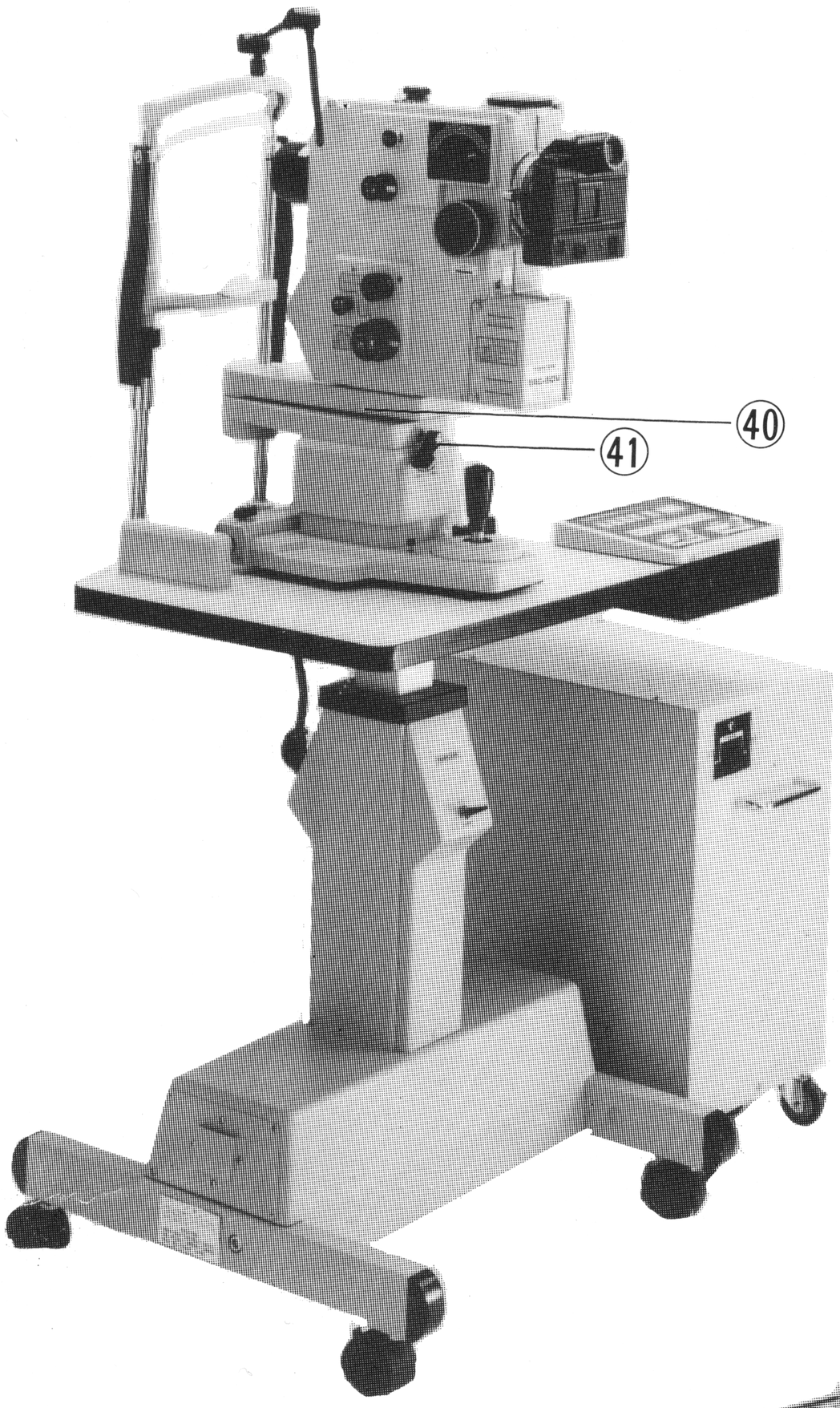
㊳ Damper

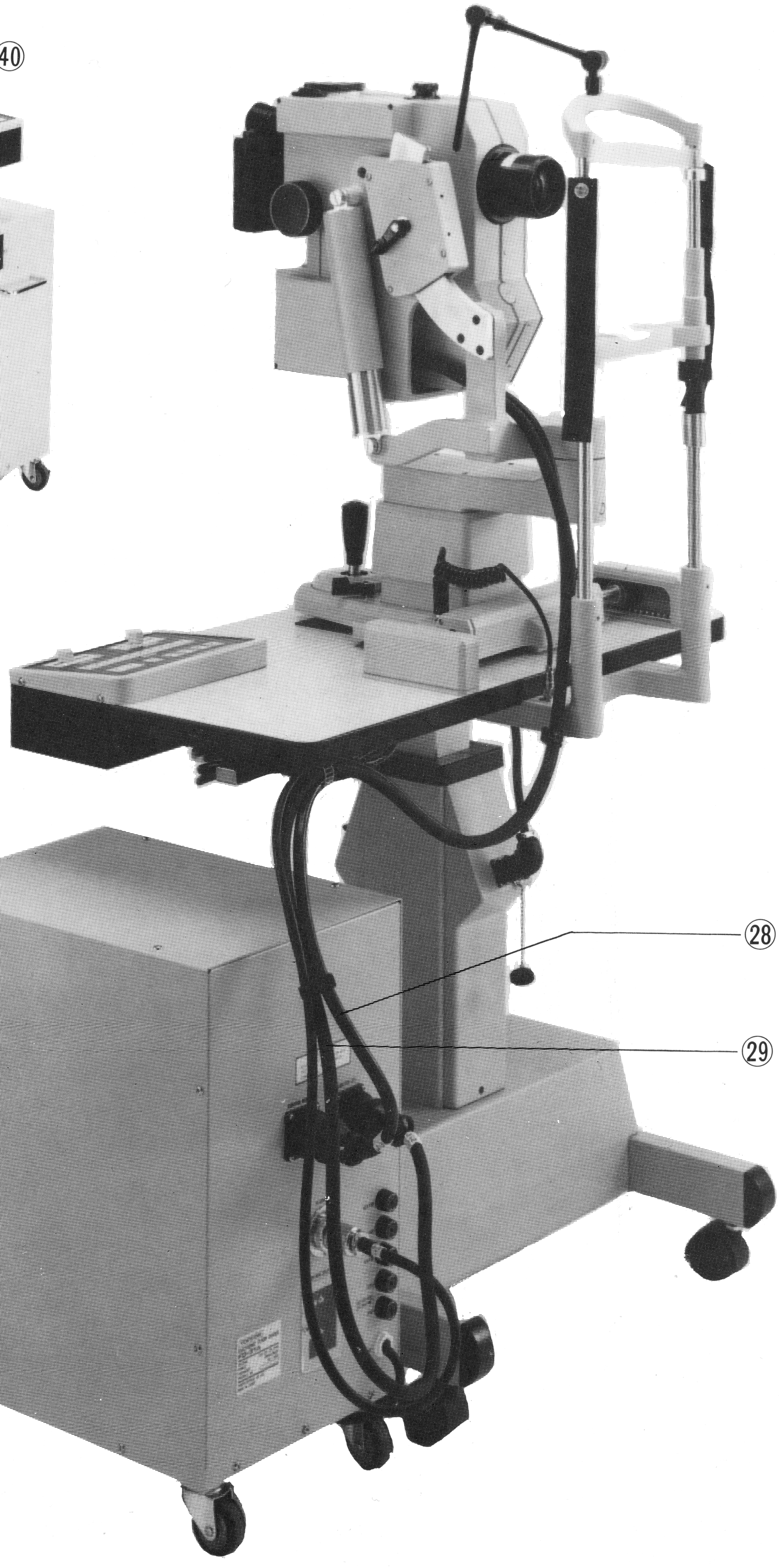
㊴ Upper arm (TRC-50VT)
Incorporates tilting device but can also be swung laterally, up to 30°, to the right and left.

㊵ Swing arm (TRC-50V)
Permits lateral swing only of the optical head, up to 30°, to the right and left, in the case of the TRC-50V.

㊶ Swing arm locking lever (TRC-50V)

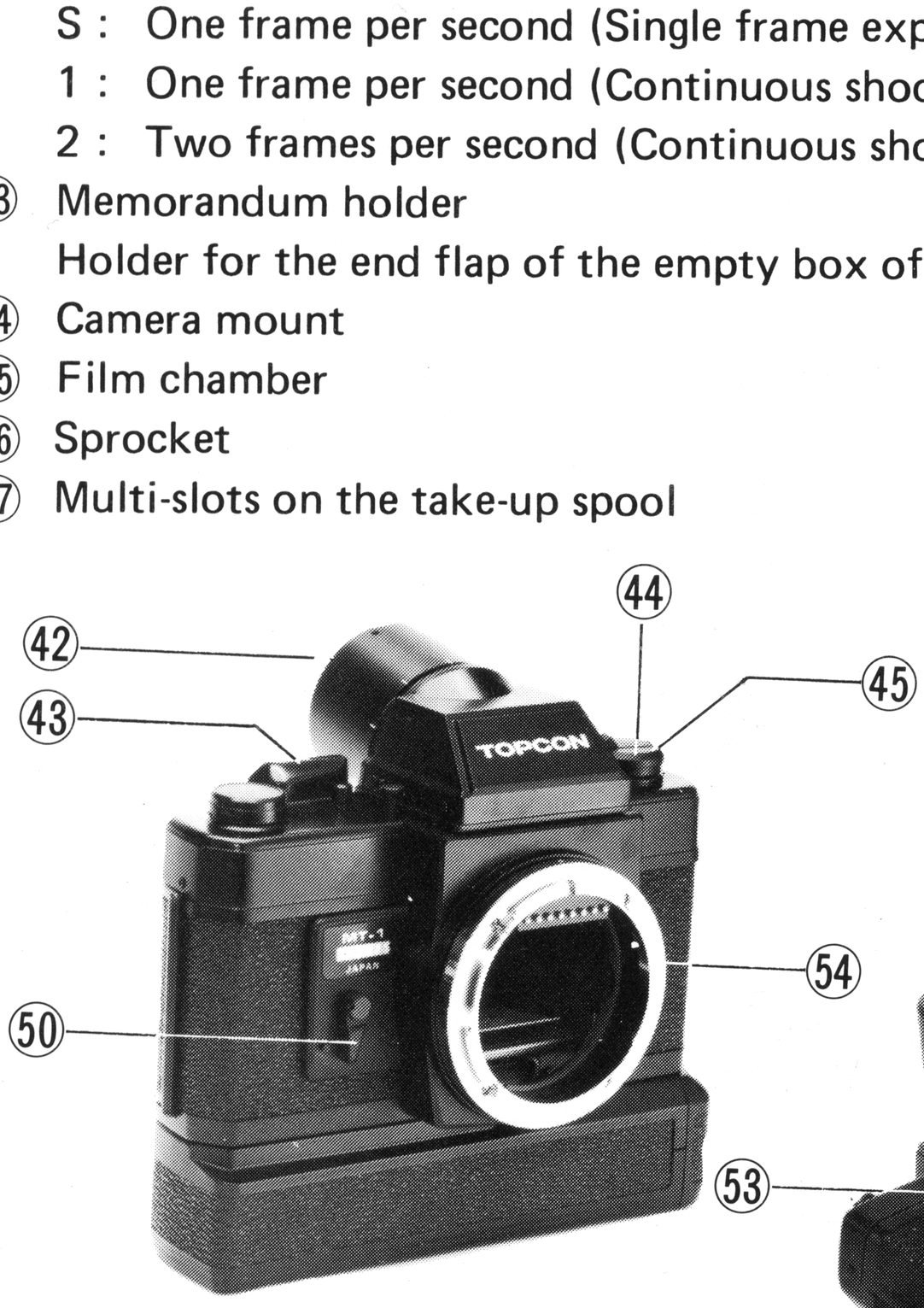


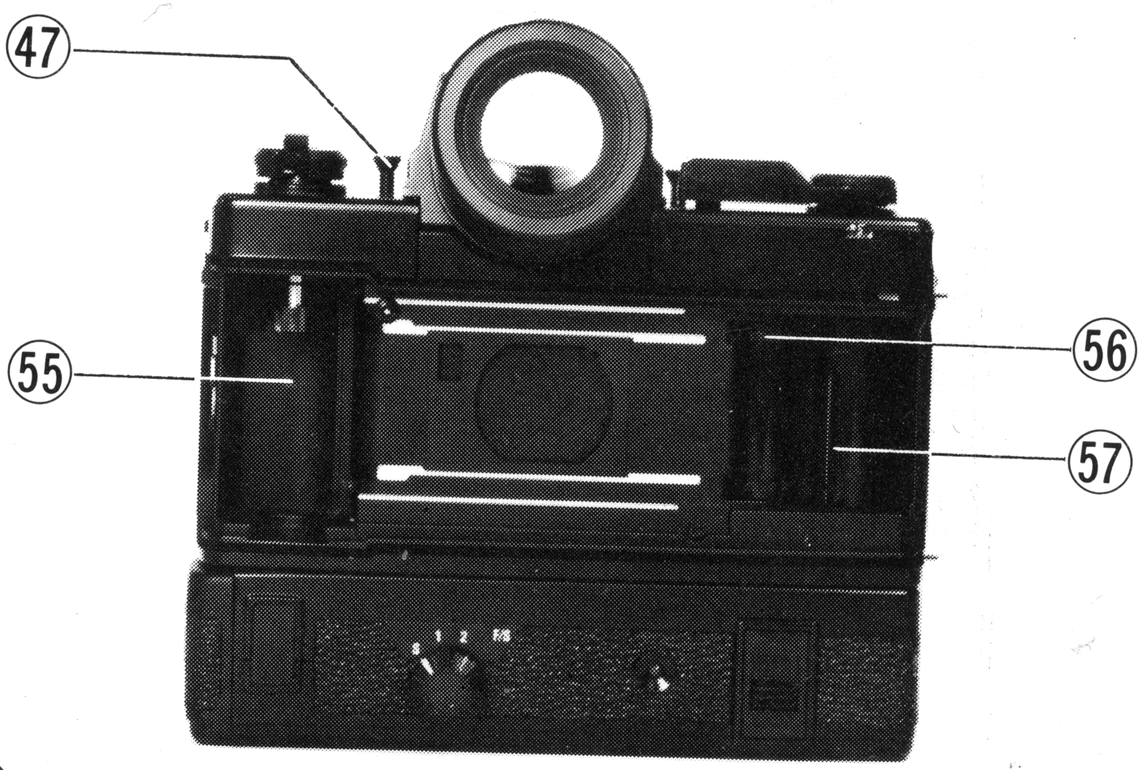

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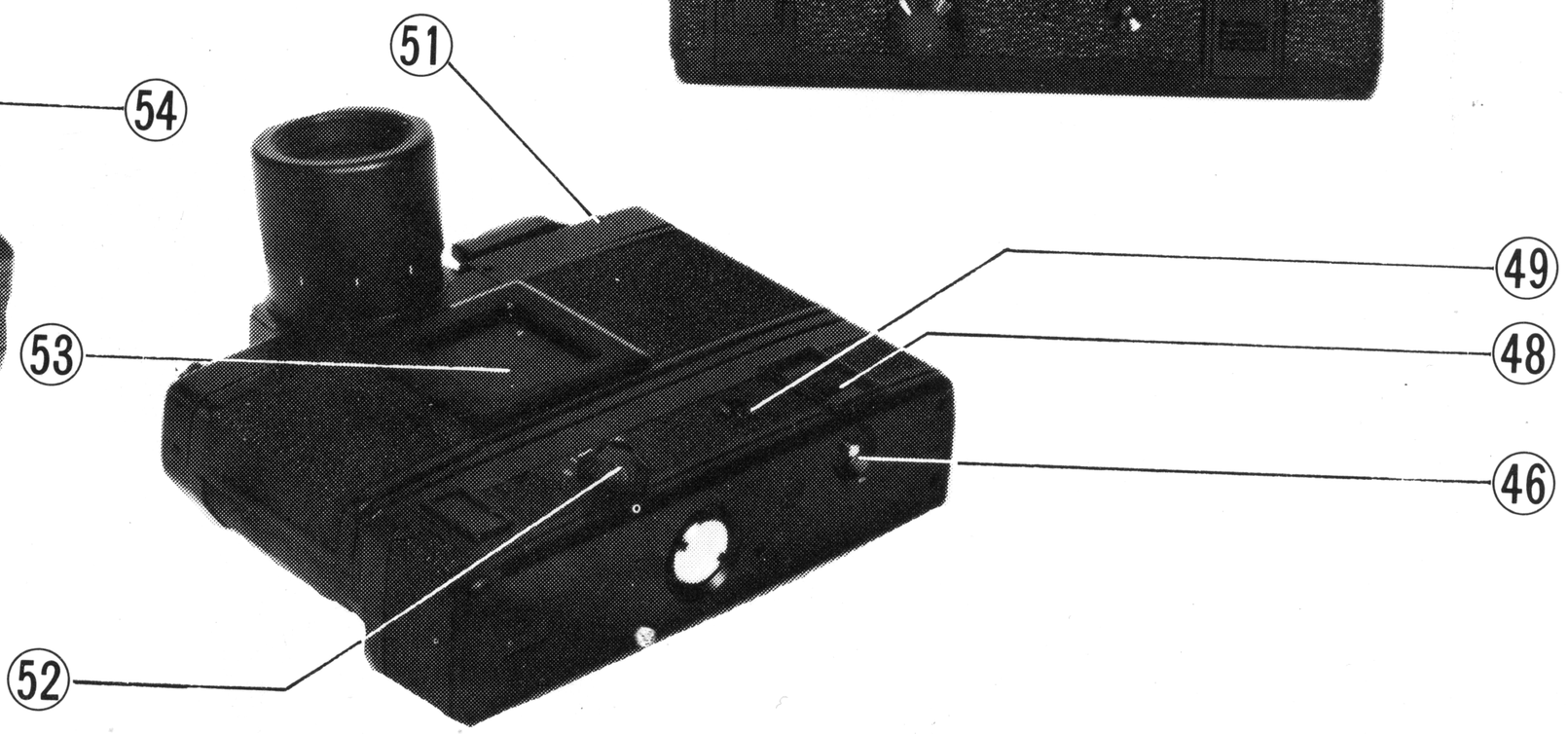

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1-2 35mm Motor Driven Camera Body

㊷ Eyepiece
Adjust to the user's eyesight by rotating eyepiece.
㊸ Film winding lever
㊹ Rewind crank
㊺ Back cover locking knob
Back cover is opened by pulling this knob up fully.
㊻ Rewind button (camera)
㊼ Finder catch
㊽ Motor drive switch
Should be switched OFF when auto-winding is sûspended midway in operation, with the red lamp ㊾ lighting up to warn that operation has been suspended. Further operations, winding or rewinding, should be continued manually, with the film winding lever.
㊾ Red lamp
Illuminates when auto-winding is suspended while in operation, usually indicating that there is no more film to advance, but may illuminate when film is catching and cannot be advanced. Anyway, the motor drive switch ㊽ should be switched OFF.
㊿ Shutter release lever
The lever is revolved in order to release the shutter when manual film winding is undertaken with the motor drive switch ㊽ set to OFF.
(51) Exposure counter
Shows the number of frames exposed. Automatically illuminated upon loading film in the camera.
(52) Timer knob
Used for setting the firing speed, as follows
S : One frame per second (Single frame exposure only)
1 : One frame per second (Continuous shooting)
2 : Two frames per second (Continuous shooting for use under 150WS)
(53) Memorandum holder
Holder for the end flap of the empty box of the loaded film.
(54) Camera mount
(55) Film chamber
(56) Sprocket
(57) Multi-slots on the take-up spool

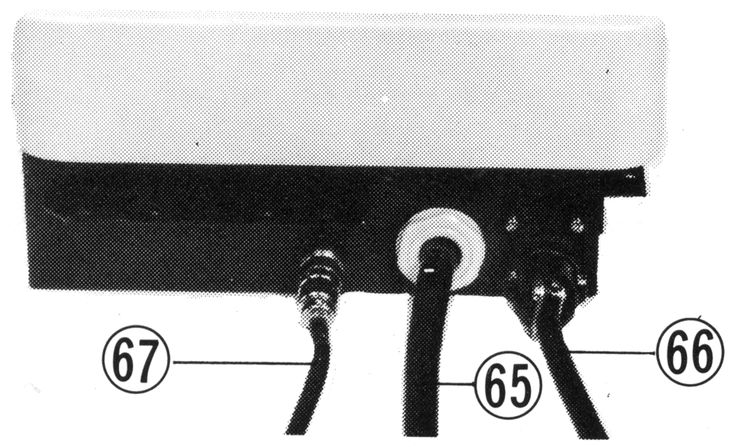


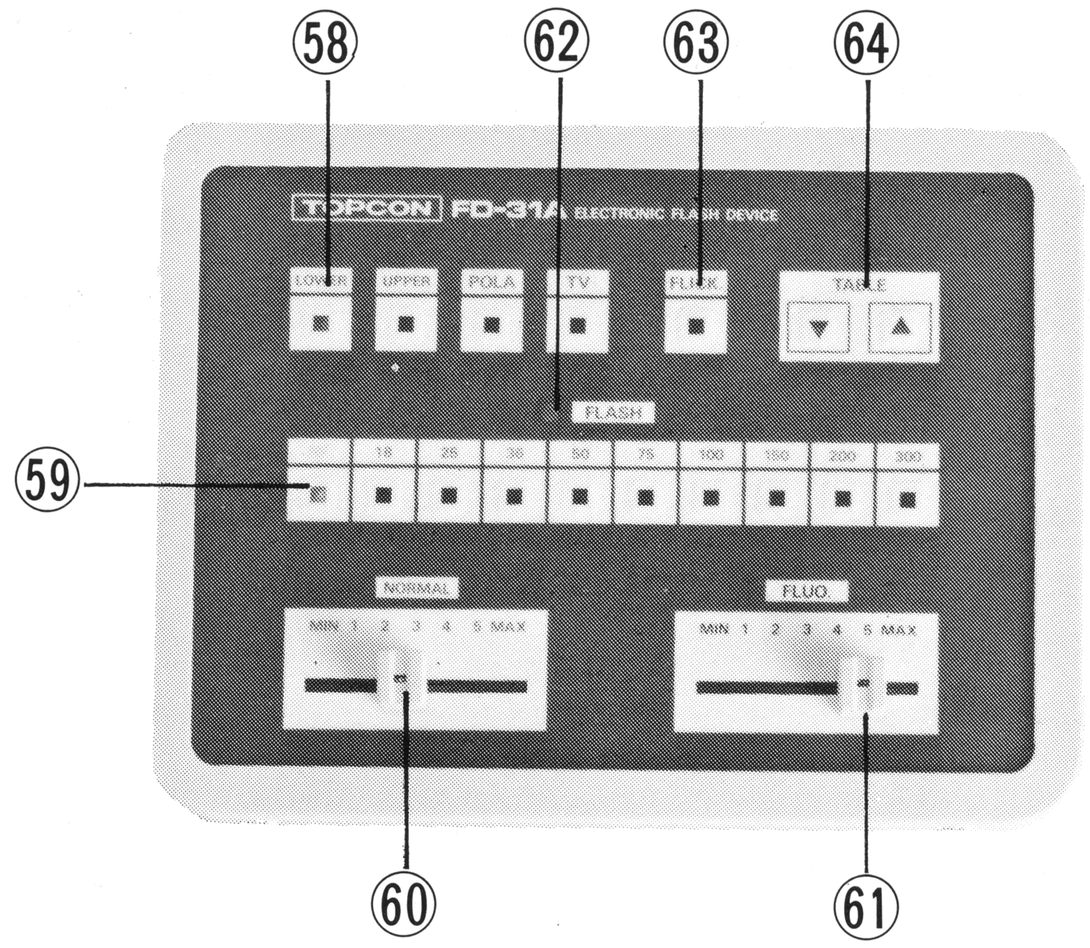




1-3 Control Console

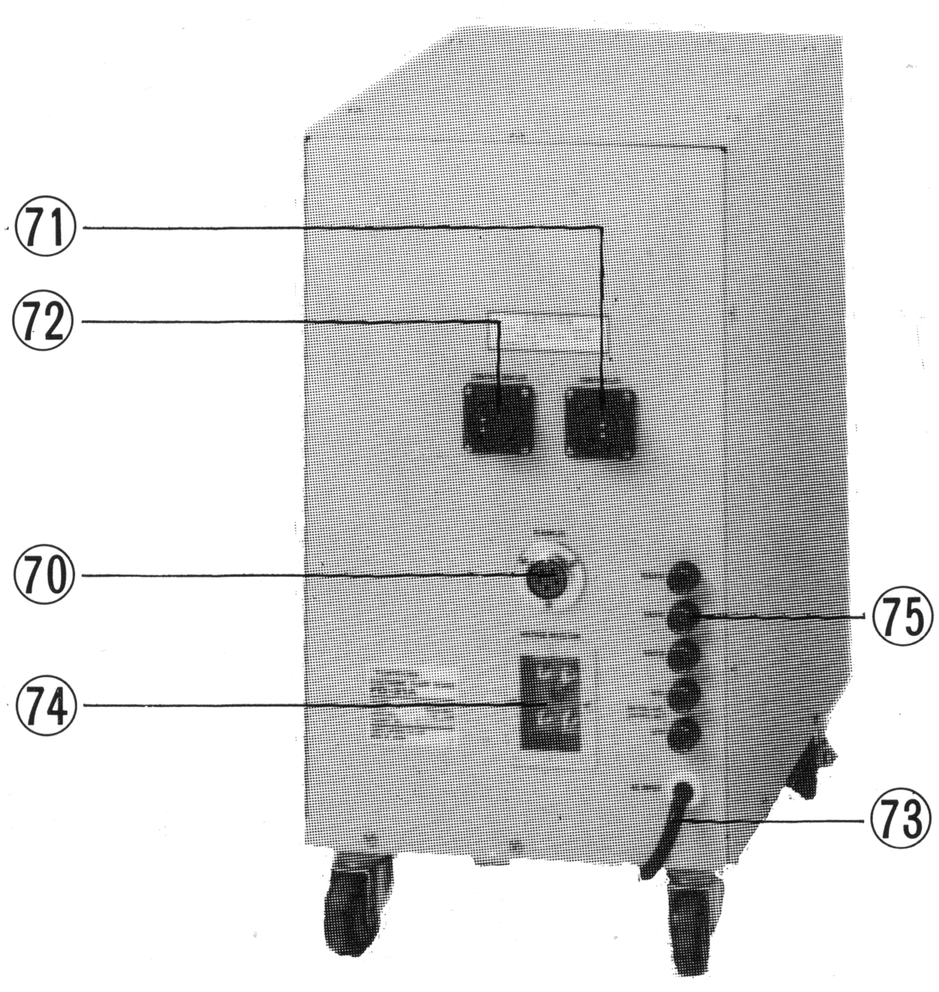
⑱ Mode switches
Shutter release action for photography is concentrated on the shutter release button, with simple mode switching operations for activating the required equipment.
⑲ Flash intensity switches
⑳ Normal color photography knob (Normal color photography illumination setting)
Illumination adjustment for color photography.
㉑ Fluorescein angiography knob (Fluorescein illumination setting)
Illumination adjustment for fluorescein angiography.
㉒ Readylight
Lights up when the electronic flash is fully charged for the next exposure.
㉓ Switch for fixation target
㉔ AIT up-down switch
㉕ Power supply unit control cord (J3)
㉖ AIT connector cord
㉗ Chin-rest connector cord

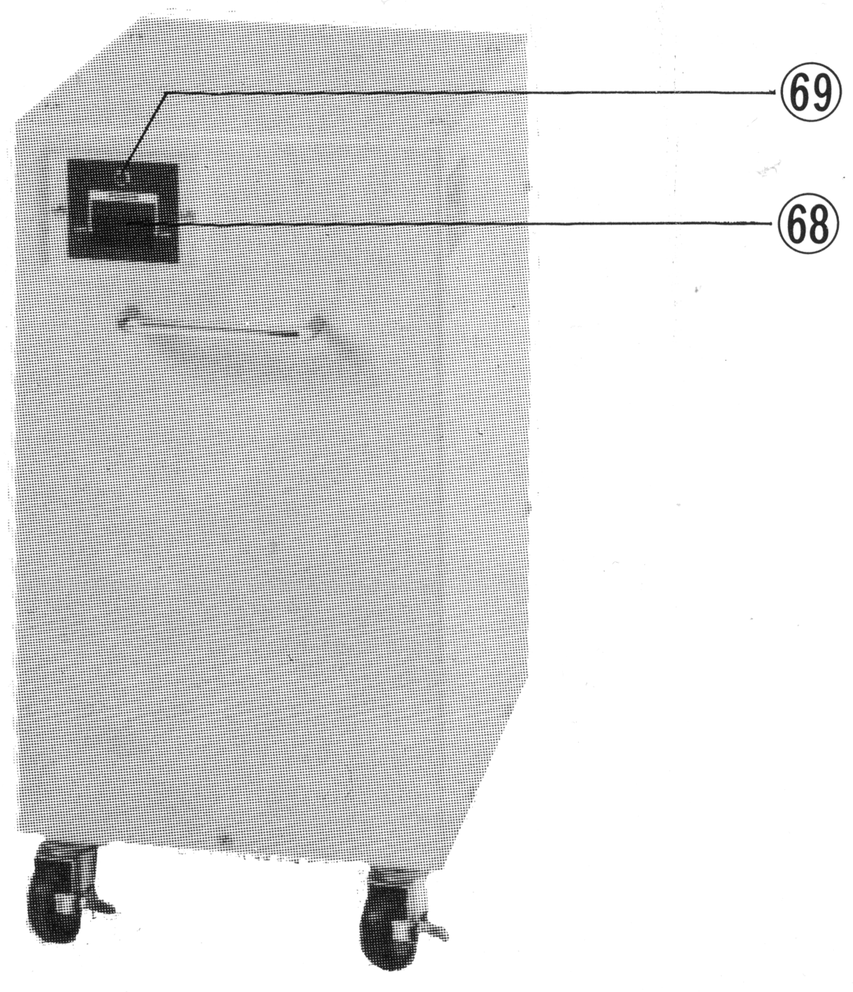




1-4 Power Supply Unit (Electronic Flash Device FD-31A)

* Front panel
㉘ Power switch
㉙ Power lamp
* Rear panel
㉚ Receptacle for electronic flash connector cord (J1)
㉛ Receptacle for optical head control cord (J2)
㉜ Receptacle for power supply unit control cord (J3)
㉝ Power cord
㉞ Voltage selector
㉟ Fuse holder





2. OUTSTANDING FEATURES

(1) Although the minimum pupil diameter which can be phographed is 5.5mm, it is possible to take photographs of pupils which can only be dilated from 4mm to 5mm, too, by changing the diaphragm and setting the angle of coverage to 35°.
(2) Photography at the 3.7X magnification of the 20° angle is very simple, because the depth of field is the same as that of the wider 35° angle.
(3) Build-in astigmatic compensation device makes peripheral photography very effective.
(4) The illumination for observation is automatically changed to that suitable for fluorescein observation, when the excitation filter is inserted into the optical path.
(5) Illumination can be preset exclusively for color photography and fluorescein angiography.
(6) The fixation target is easily changed from a steady illumination to a flickering one, with simple switching action.
(7) The camera body, as well as the optional 1X relay lens adapter and Polaroid attachment, are non-cord types, thus eliminating dangling cords.
(8) Auto-winding, in the single frame mode or continuous mode, at 1 frame per second or 2 frames per second, is possible by simple switching action.
(9) Greater ease of operations because the power supply unit and control console are separate, with the control console built into the table surface. (In the case of the Console on Table Top Type.)
(10) For easy panel operation in the dark room, a trasparent illumination is employed. The lamp of the switch depressed is lit, making it distinguishable from other underessed switches at a glance.
(11) Shutter release action for all types of photography is concentrated on the control lever, with simple mode switching operations for activating the required equipment.
(12) Manual film winding lever is also available on the camera body for use in film loading, with camera body detached from the optical head.
(13) The filter knob is illuminated and, therefore, easy to use, even in the dark.
(14) AIT up-down switch is also available on the control panel, for greater convenience in use.
(15) There are three changes in the angle of coverage, or 50°, 35° and 20°, which retain same magnifications as the TRC-W Series Retinal Camera, or 1.7X, 2.5X and 3.7X,with the first setting also having the same magnification as the TRC-WF.
(16) The film counter is automatically illuminated, upon loading film in the camera, for greater convenience in confirming film loading and the number of frames exposed.
(17) No light is emitted as long as the flash change-over switch is set to "NF". The patient will not be surprised while the film is being loaded.
(18) Polaroid Attachment
  (1) Non-cord type with shutter released by the release button on the control lever.
  (2) Uses Polaroid Time-Zero Super Color SX-70 film with the film automatically ejected when the shutter is released. (Model PA-9C)
  (3) A warning buzzer sounds when all films are photographed in the film pack, thus preventing photography without film. (Model PA-9C)
(19) 1X Relay Lens Adapter
  Used when attaching two camera bodies to the optical head, with for example, the top camera used exclusively for color photography and the bottom camera used for fluorescein angiography.
(20) Stereo photography is possible because a special parallel-slide stereo photography device is incorporated in the cross-slide base.
(21) Video Relay Lens Adapter
  (1) Three types are available, for single tube 1 inch, single tube 2/3 inch and three tube 2/3 inch video cameras.
  (2) If the release button on the control lever is depressed, while videotaping, the retinal view on the monitor at the time will also be photographed on the 35mm film.
(22) Special filters are easily inserted and removed from blank settings on the filter turret, for great ease when photographing with filtration.

(23) The complete set can be moved together, because the power supply unit and the adjustable instrument table can be locked together.

(24) The power supply unit takes it power from the adjustable instrument table, at the shortest distance possible, with extraneous power cord stored below the power supply unit. This means that unsightly and troublesome cords are eliminated from the floor.

[3] POINTERS IN ASSEMBLING THE INSTRUMENT AND FOR TAKING GOOD PHOTOGRAPHS

(1) Use a dark room.
The dark room is essential for proper focusing of the patient's retina.

(2) Use the instrument in a clean, dry and, preferably, air conditioned room, without direct sunlight. Use under undesirable conditions will cause rusting of the instrument, ghost image of the photograph and electric leakage. Keep the objective lens covered with its cap and the instrument protected with its plastic dust cover, when it is not actually being used.

(3) Because of the high voltage, ground the power supply unit in accordance with approved electrical standards in order to avoid electric shock.

(4) Use the instrument within ±10 percent of the rated voltage, as otherwise recycling will take longer.

(5) Do not touch the lens surface of the objective with your fingers or, for that matter, with any hard object.
Protect the lens surface from dust, dirt and finger-prints, at all times. Do not wipe roughly. When necessary, clean the lens surface by blowing away dust or dirt with a rubber-ball air blower. In order to remove fingerprints, prepare a mixture of 20% ethyl alcohol and 80% ether.
Moisten a lint-free clean cloth or a good quality lens tissue with the mixture.
Next, wipe the lens surface gently in ever-widening circles from the center out.
Wipe gently and do not rub under any condition.
If necessary, repeat as many times as required but do not rub.
Do not wipe dust on the lens surface or wipe the surface roughly, as it will cause scratches on the surface.

(6) Do not touch the reflex mirror of the camera body, especially with your finger or a hard object. If the mirror surface is found dirty, try blowing the surface clean with a rubber-ball air blower or resort to gentle brushing, but always blow or brush the dust or dirt out of the camera body instead of in. If absolutely necessary, clean the surface in the same manner as the lens.

(7) Do not disassemble the damper ㊳ .
Do not unscrew the screw used for attachment of the damper ㊳ , because there is a very strong spring inside it, which can lead to an accident.
Furthermore, do not unscrew or take off screws except those that are used for assembling.

(8) Fix the tilt locking lever ㊱ securely. When attaching or taking off the 35mm camera and other optional accessories to or from the optical head, always do it after securely fixing the tilt locking lever. Otherwise, there is danger of dropping or damaging the camera and other accessories.

(9) The AIT up-down switch ㊹ on the control console and the up-down switch on the AIT-10B should not be depressed at the same time, as the fuse will blow out.

[4] ASSEMBLING THE INSTRUMENT

4-1 Unpacking the Instrument

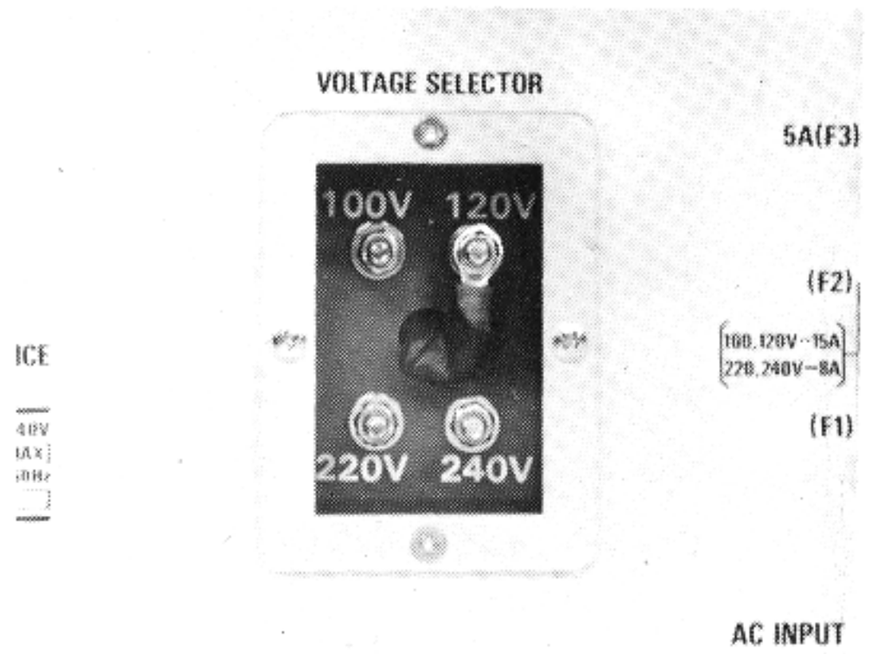
Models TRC-50V/50VT, is usually packed as follows in two packages (50V) or three packages (50VT) for shipment abroad, which means that the instrument is disassembled and packed carefully to protect the instrument from any damage.
Be extra careful when unpacking the cases. Open the case, take out the contents very carefully and do not drop them as they can be damaged beyond repair.

The following list will differ slightly with the model and the market, which please note.

(1)	Table	1 each
(2)	Cross-slide base	1 set
(3)	Roller covers	1 pair
(4)	Lower and upper arm assembly, with tilting device (TRC-50VT only)	1 set
(5)	Optical head	1 each
(6)	Chin-rest section	1 set
(7)	Control console for table (only for console on table top type)	1 each
(8)	Power supply unit with control console (for console on power supply unit type only)	1 each
(9)	Power supply unit without control console (for console on table top type only)	1 each
(10)	Power supply unit connecting brackets	1 pair
(11)	Swing arm and upper arm assembly (TRC-50V only)	1 set
(12)	Objective lens cap	1 each
(13)	Camera body mount cap	1 each
(14)	Type MT-1 35mm camera body with built-in motor drive	1 each (or 2 each)
(15)	Observation main lamp	1 each
(16)	Fuse (15A or 8A, as the case may be)	1 each
(17)	Plastic data plates	5 each
(18)	Chin-rest pads	1 pack (of 400 ea.)
(19)	Plastic dust cover	1 each
(20)	Internal fixation target (not supplied to all markets)	1 set
(21)	Filter frames	1 set (of 2)
(22)	Exposure guide and photographic procedure seal	1 each
(23)	Instruction manual	1 each
(24)	Electronic flash connector cord J1	1 each
(25)	Optical head control cord J2	1 each
(26)	Power supply unit control cord J3	1 each

4-2 Checking the Primary Voltage

Before assembling the instrument, first check whether the primary voltage of the instrument matches that of the line current. Check the voltage selector (74) on the Power Supply Unit, and see what voltage is set. If the voltage set is not suitable, reset it to the required voltage. Normally, the instrument is set for the required voltage, at the time of final inspection and, therefore, this adjustment should not be required.
If the instrument purchased has a fixed primary voltage of AC 120V, no adjustment will be possible.
Since a 15 ampere fuse is used for the 100 – 120 volt range and an 8 ampere fuse for the 200 – 240 volt range, check whether the fuse is also suitable when the above adjustment is made.



4-3 Checking the Plug of the Power Cord

Check whether the plug connected to the end of the power cord matches the receptacle from which the power is to be taken. If not, exchange it for a suitable one. Or, if the plug has not been attached because of special regional requirements, please connect a suitable one.
In the above cases, please note that of the three

wires in the power cord, the grounding (earthing) wire is either green-colored or a bias-striped yellow and green colored one.

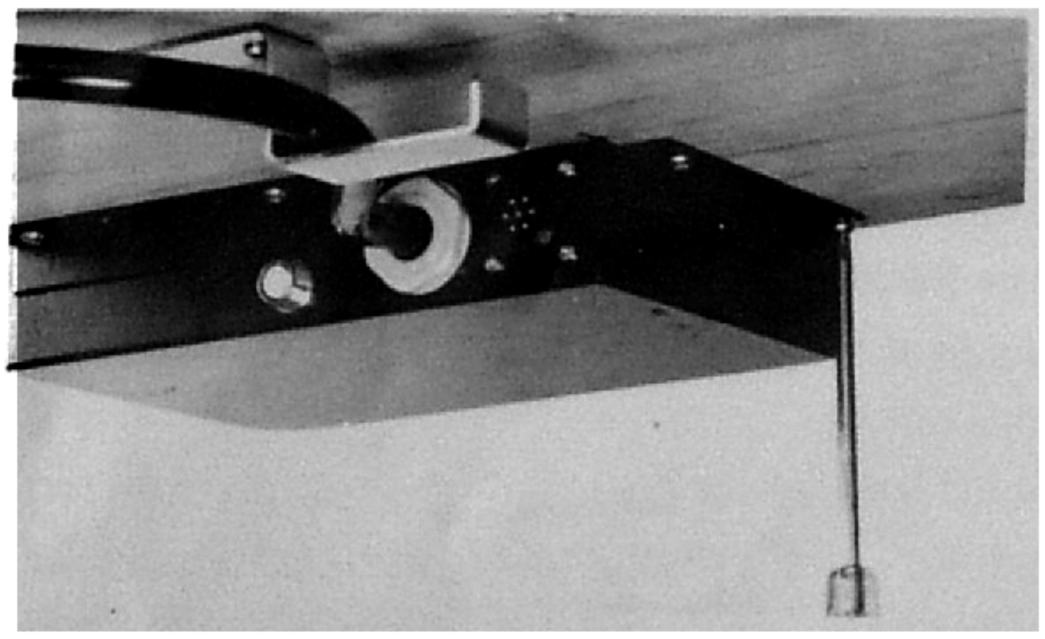
4-4 Assembling the TRC-50VT (Console on Table Top Type)

(1) Raise the elevating mechanism of the AIT-10B, as high as it will go, with the UP-DOWN switch of the adjustable instrument table.

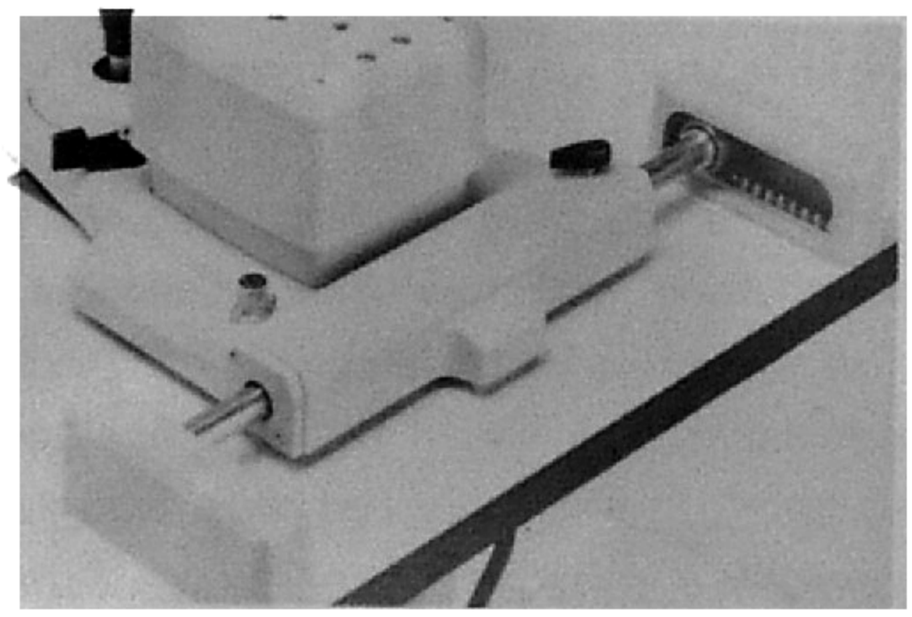
(2) Install the table on top of the attachement bracket of the elevating mechanism, using four attachment bolts unscrewed from the AIT-10B.



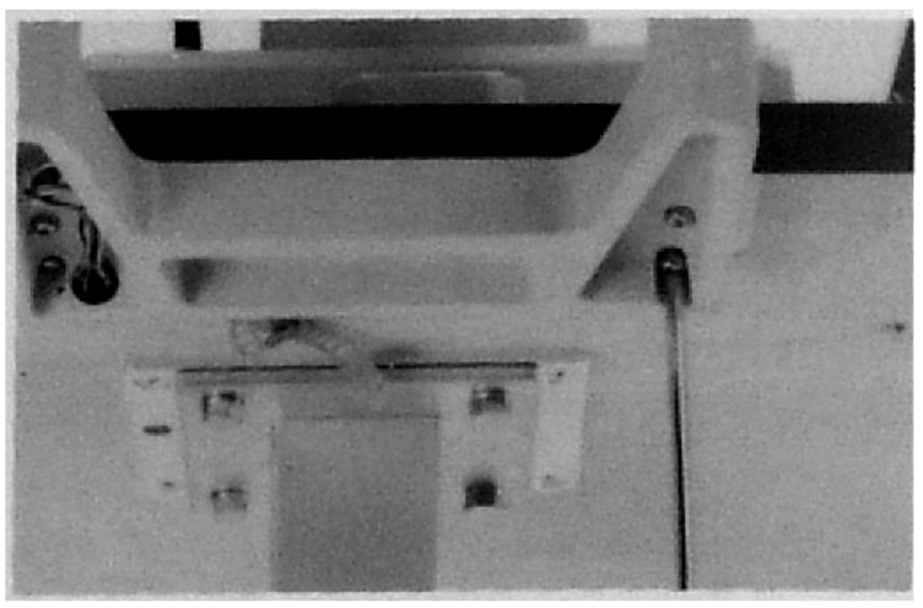
(3) Install the control console on the cut-out section of the table.

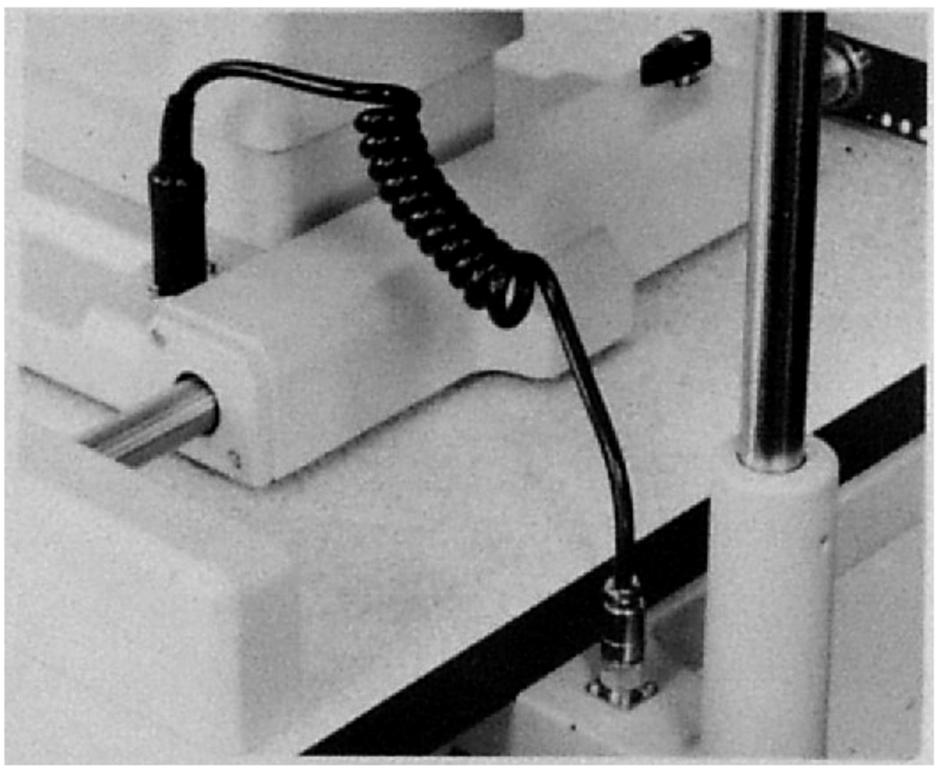


(4) Simply place the cross-slide base section on top of the table, with the outrigger rollers aligned on top of the toothed rails.
Next, fix the roller bars securely in place on the table surface, over the outrigger rollers, and then insert the roller covers ㉝ in place over the rails.

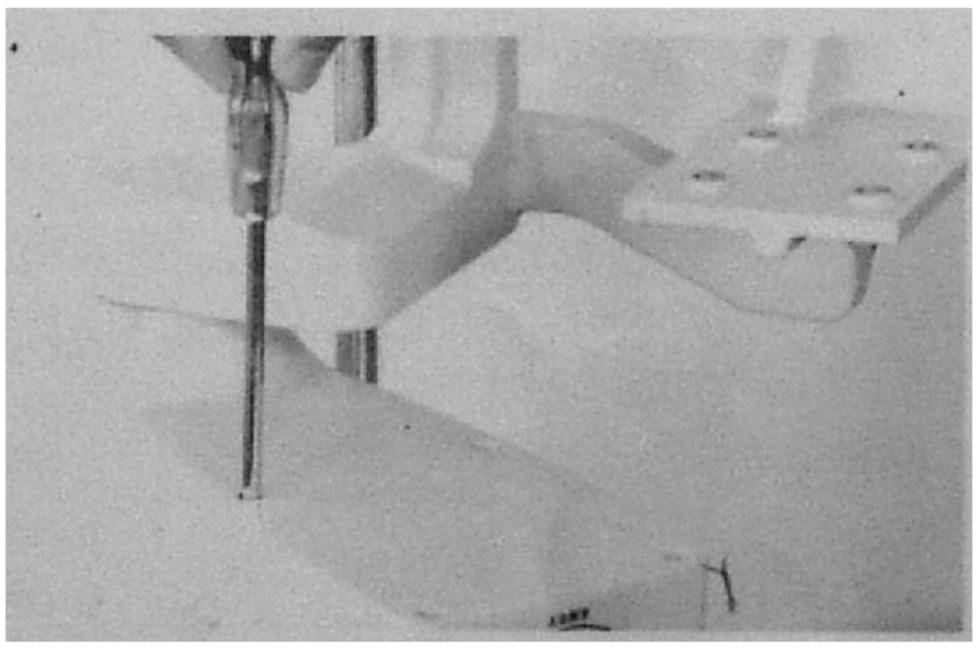


(5) Attach the chin-rest section to the table with three attachment screws. Next, connect the chin-rest section and the base with the shutter release connector cord.





(6) Attach the lower arm ㉟ to the base. First, loosen the optical head locking lever ⑯ and tilt locking lever ㊱ and then adjust the upper arm and tilting device so that attachment will be easier. Then, locate the lower arm over the column on the base, with four screwholes on arm and column aligned properly. Screw in four attachment screws, as well as one attachment screw on the side surface, while pressing the lower arm against the column.



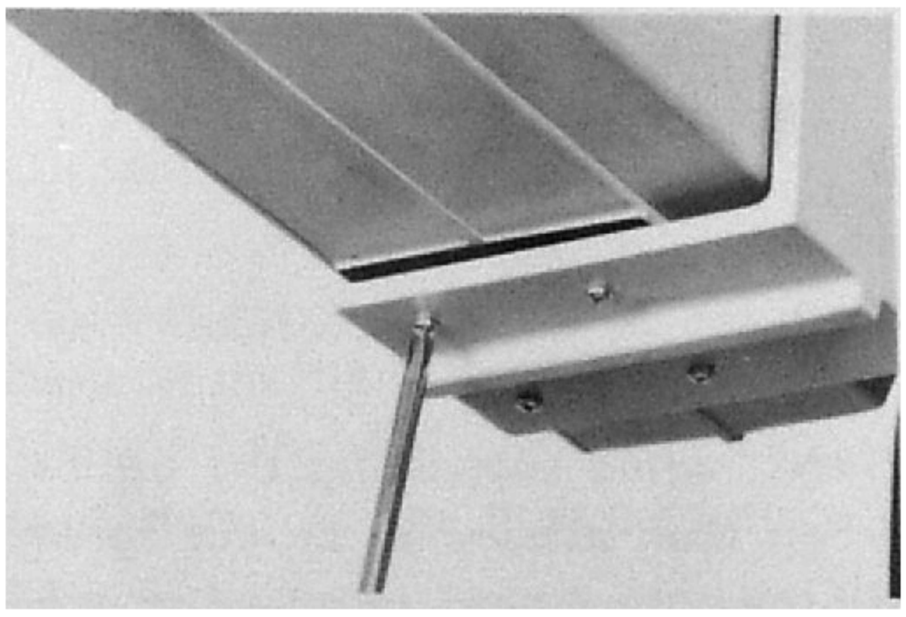
Next, while supporting the optical head, align four screwholes on the forward end of the optical head with four screwholes on the attachment bracket, which is con-

nected to the upper arm section. When aligned, fix securely with four attachment screws.

The screws should be lightly tightened at the beginning, and only tightened securely and with equal force after ascertaining that the attachment is properly aligned.

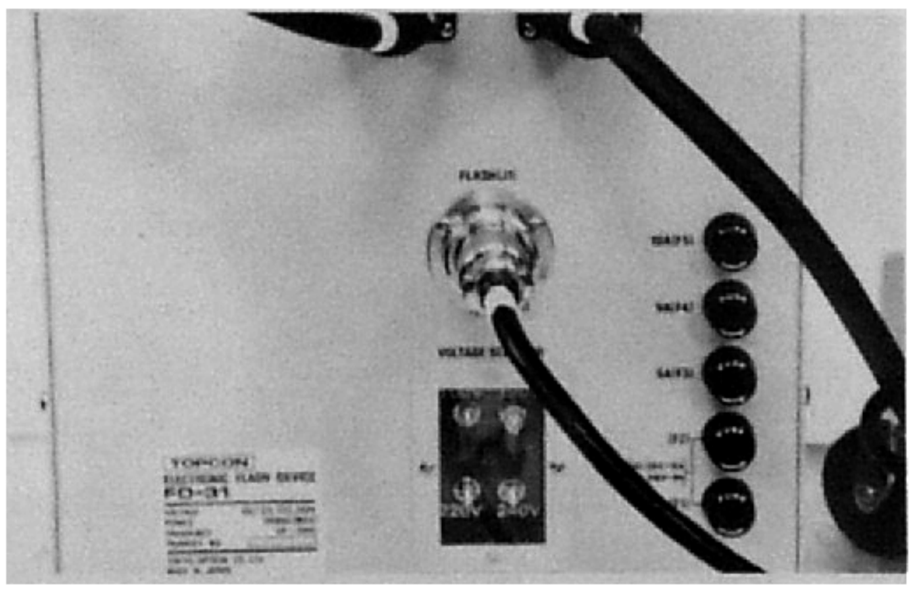
(7) Attach the connecting brackets for the Adjustable Instrument Table on the Power Supply Unit.

Wind the power cord (73) around the two cord winding fixtures on the bottom surface of the Power Supply Unit. Then, fix the cord with the cord clamp.



(8) Connect the power cord (73) with the receptacle (C) of the AIT-10B.

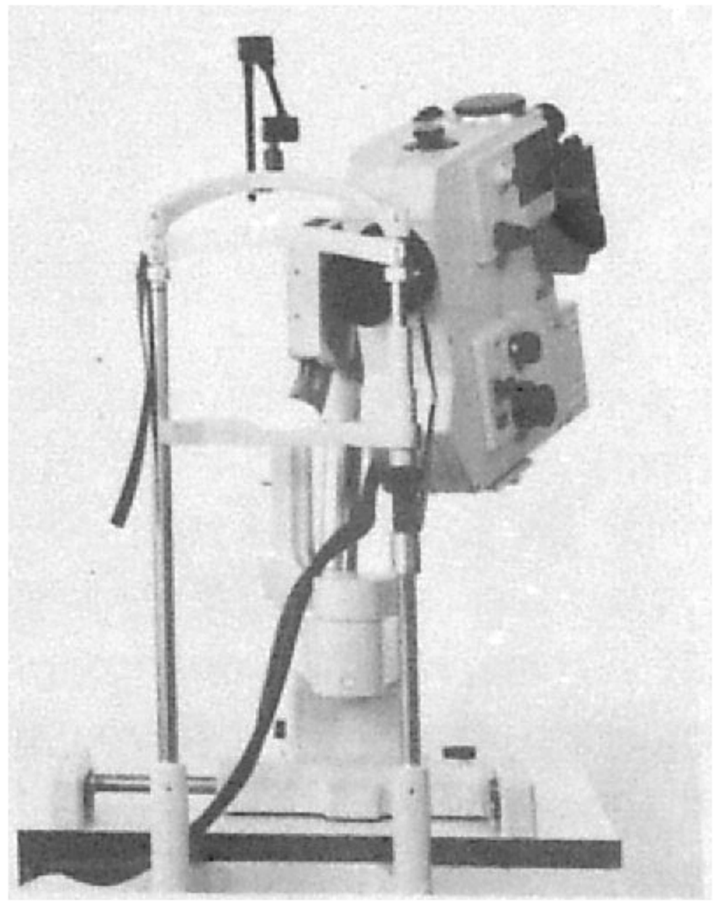
(9) Connect the Power Supply Unit and the Adjustable Instrument Table, with the connecting brackets on the former.



(10) Wind both AIT connector cord (66) and chin-rest connector cord (67) together around two cord winding fixtures.

Then, connect the cords to receptacle (E) of the AIT-10B and the receptacle on the lower part of the chin-rest respectively. Next, fix the AIT connector cord with the cord clamp on the bottom surface of the table.

(11) Raise the optical head as high as it will go, with the elevating wheel (19) Next, loosen both tilt fixing lever (36) and optical head fixing lever (16) Then, fix



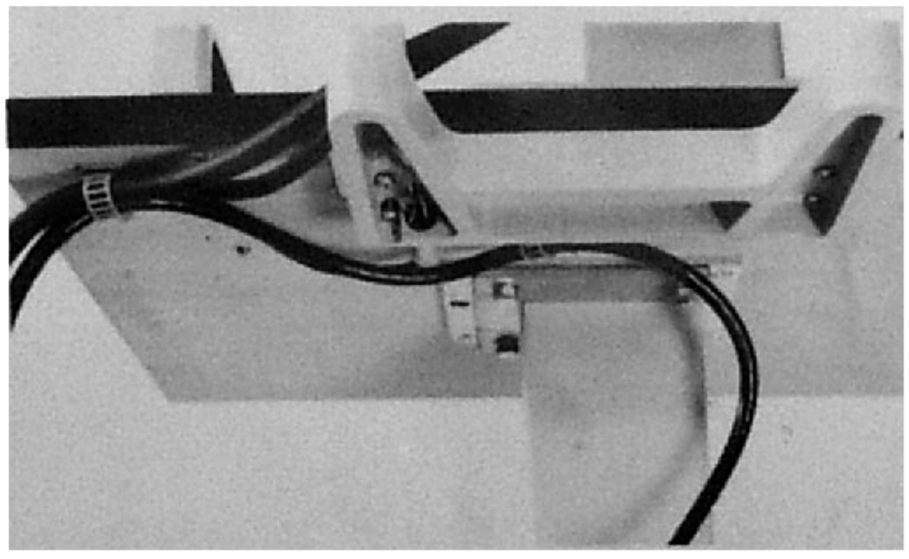
the optical head at a position farthest from the Power Supply Unit.

(12) Fix the electronic flash connector cord(J1), optical head control cord(J2) and power supply unit control cord(J3) with cord clamps.

Be sure to leave enough slack, in the above case, so that the optical head can be moved freely.

(13) Connect the preceding three cords to the Power Supply Unit.

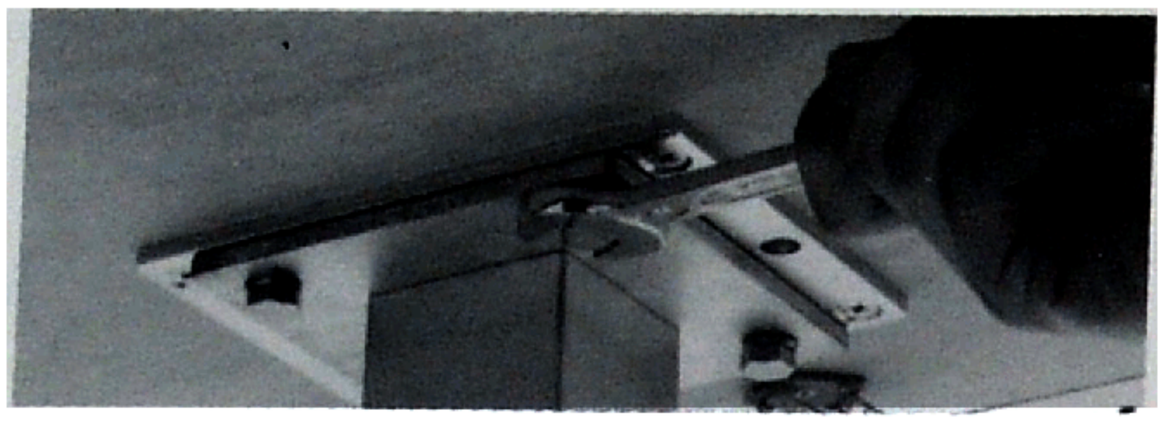
(14) Bundle electronic flash connector cord(J1) and optical head control cord(J2) with plastic cord clips. Next, bundle the power supply unit control cord(J3) with the first two cords (J1 and J2) with cord clips, too. Cut off any excessive length of the clips.



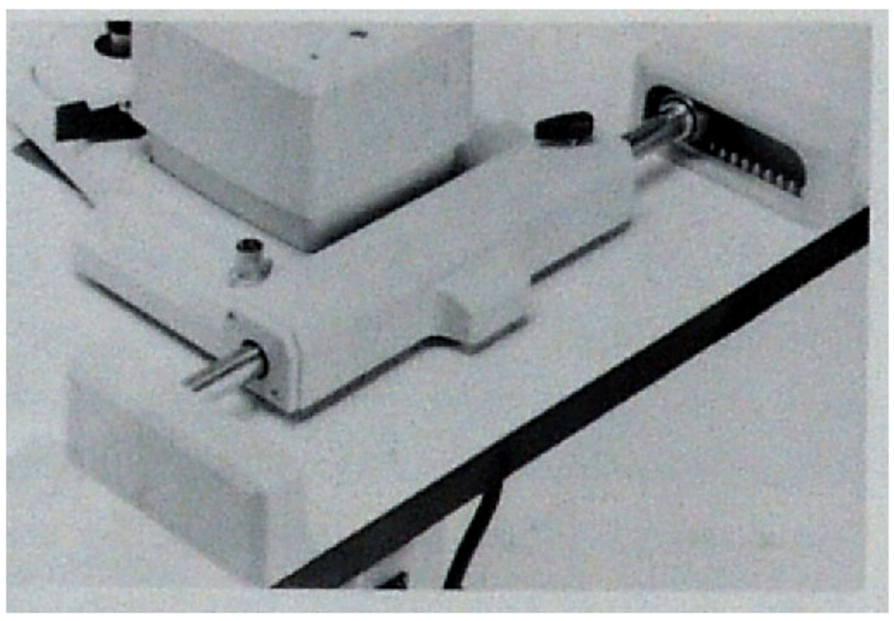
4-5 Assembling the TRC-50VT (Console on Power Supply Unit Type)

(1) Raise the attachment bracket (F) of the AIT-10B to its highest position, with the UP-DOWN switch (A) on the AIT-10B.

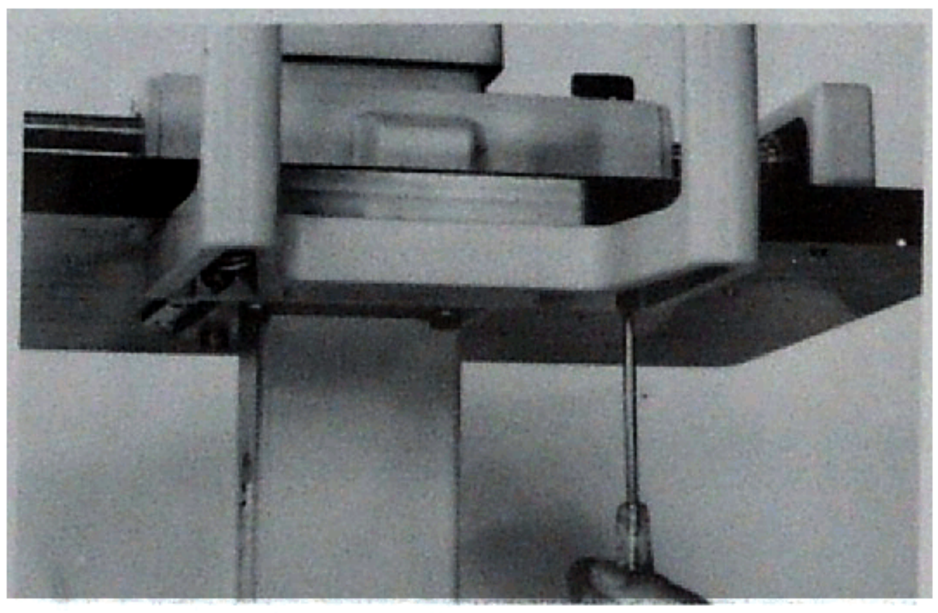
(2) Install the table on top of the attachment bracket with four attachment bolts, which should be unscrewed from the AIT-10B.

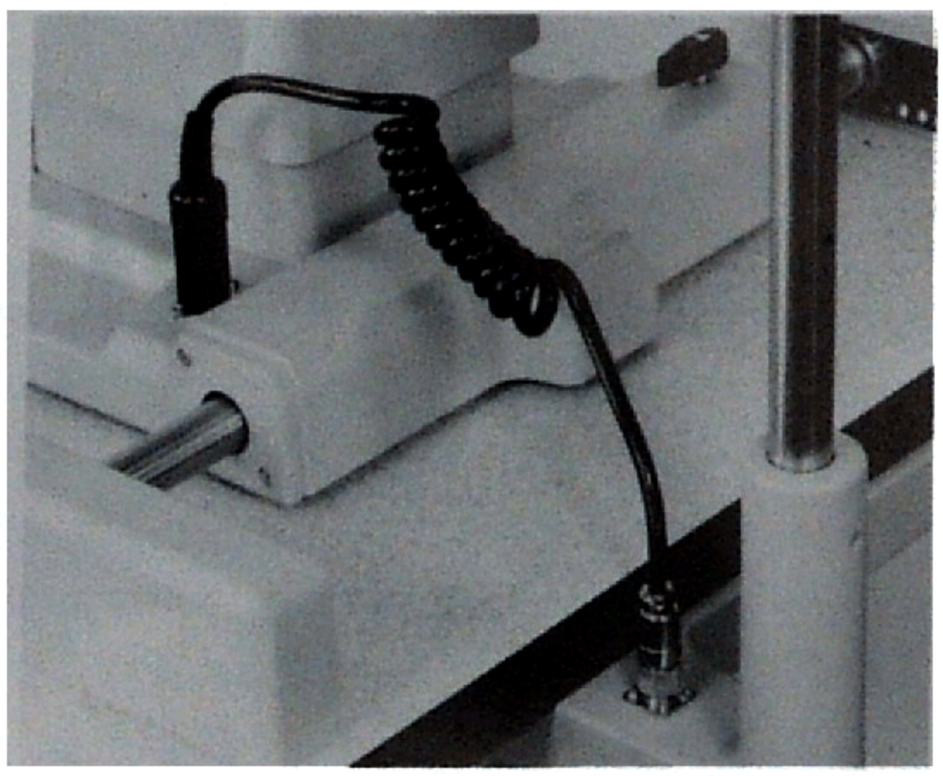


(3) Simply place the cross-slide base section on top of the table, with the outrigger rollers aligned on top of the toothed rails. Next, fix the roller bars securely in place on the table surface, over the outrigger rollers, and then insert the roller covers ㉝ in place over the rails.

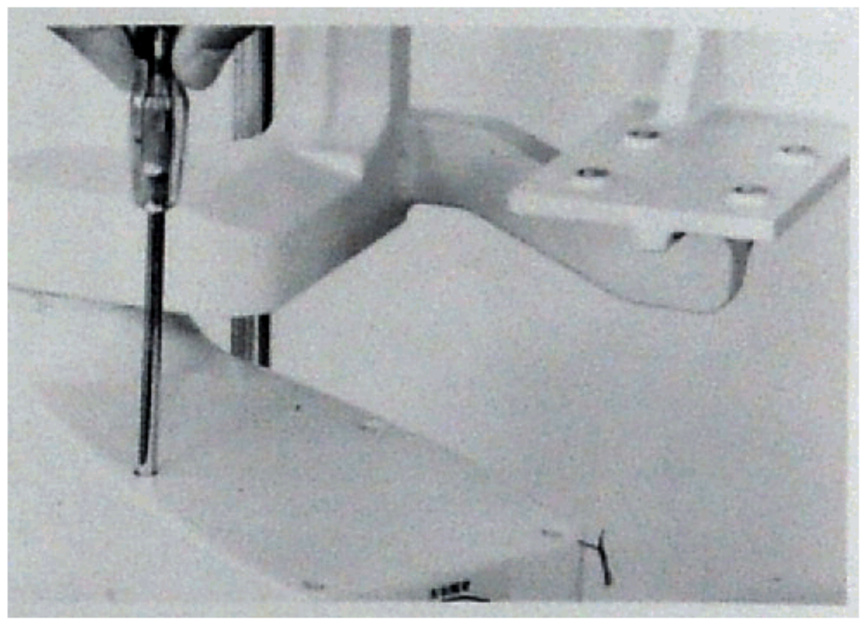


(4) Attach the chin-rest section to the table with three attachment screws. Next, fix the shutter release connector cord ㉓ to the optical head.



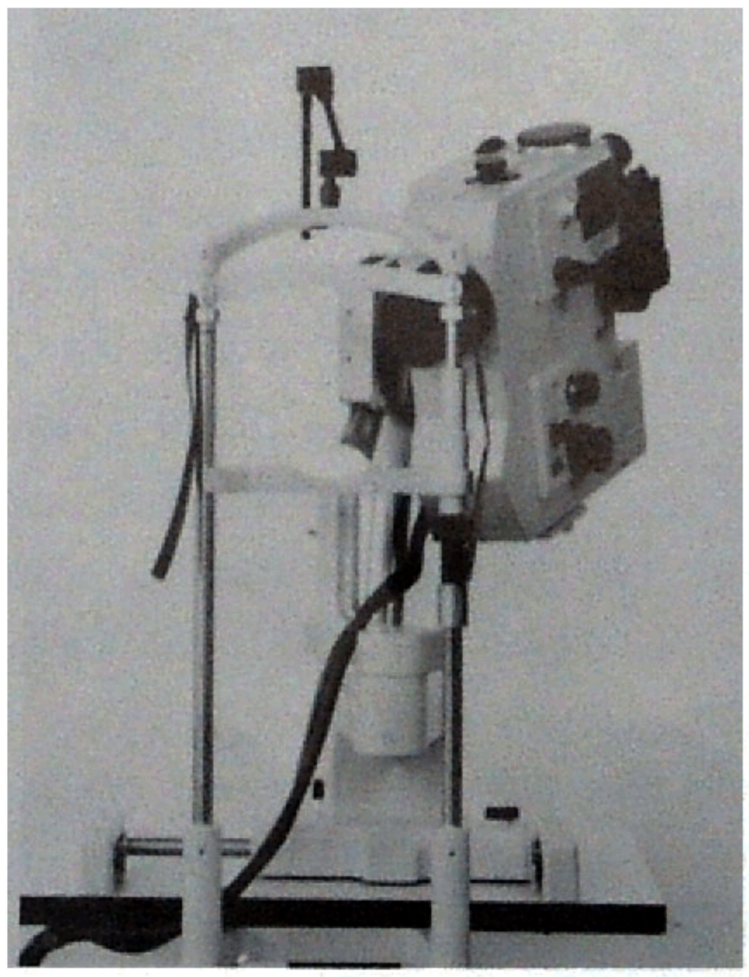


(5) Attach the lower arm ㉟ with four screws.
First, loosen the optical head locking lever ⑯ and tilt locking lever ㊱ and adjust the upper arm and tilting device so that attachment is easy. Then, locate the lower arm over the column on the base, with the four screwholes on the arm and column aligned properly. Screw in four attachment screws, as well as one attachment screw on the side surface, while pressing the arm and column together.



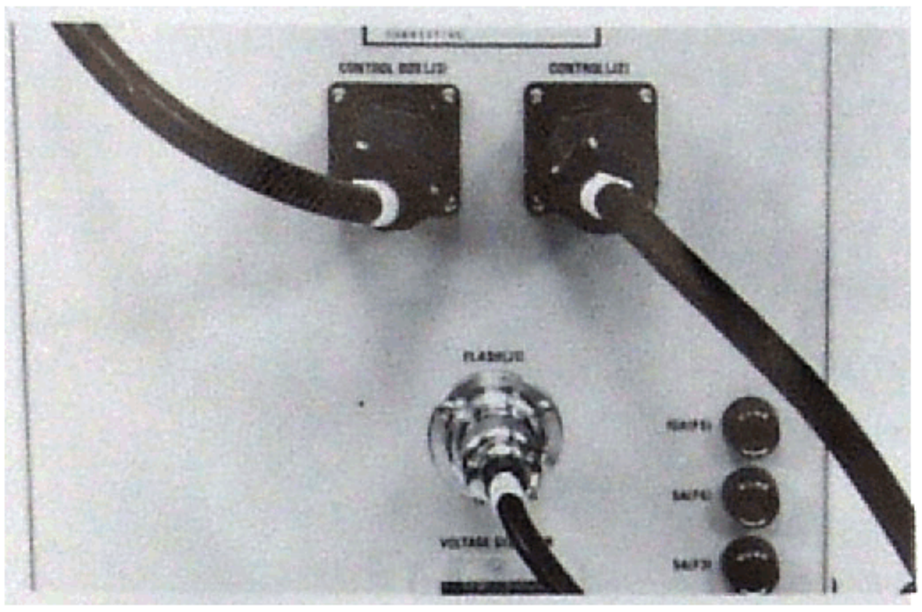
Next, while supporting the optical head, align four screwholes on the forward end of the optical head with four screwholes on the attachment bracket, which is connected to the upper arm section. When aligned, fix securely with four attachment screws. The screws should be lightly tightened at the beginning, and only tightened securely and with equal force after ascertaining that the attachment is properly aligned.

(6) Raise the optical head to its highest position by the rotating control lever ⑰ .
Next, loosen both the tilt locking lever ㊱ and the optical head locking lever ⑯ and

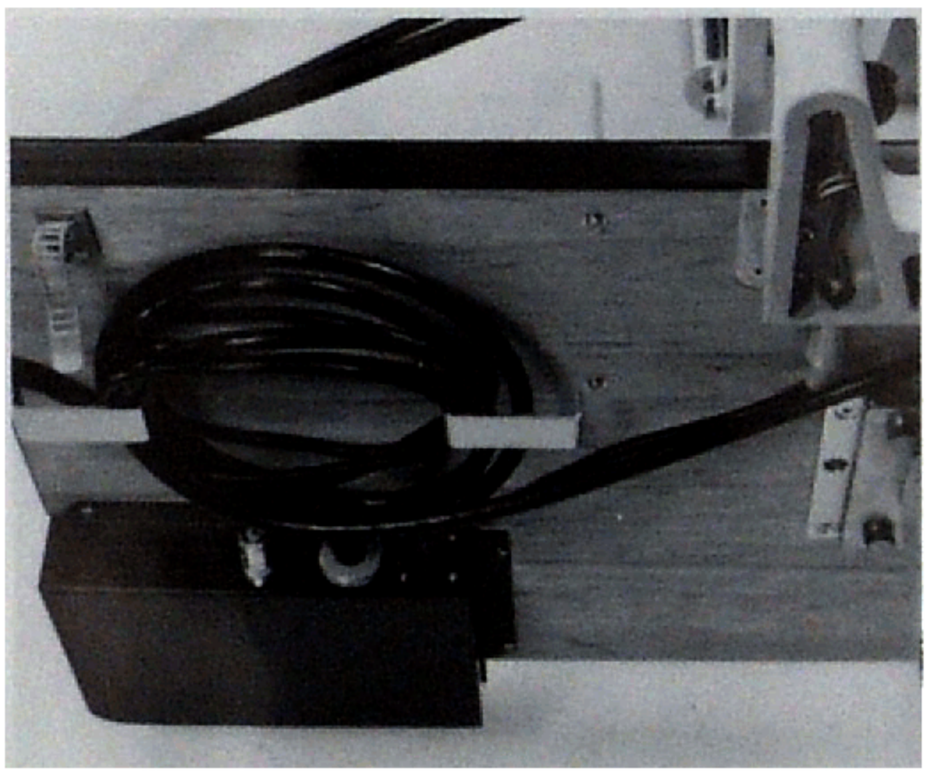


lock the optical head at a position farthest from the Power Supply Unit.

(7) Connect the three cords to the Power Supply Unit, or electronic flash connector cord (J1), optical head control cord(J2) and power supply unit control cord(J3), which are (29) , (28) and (65) respectively.

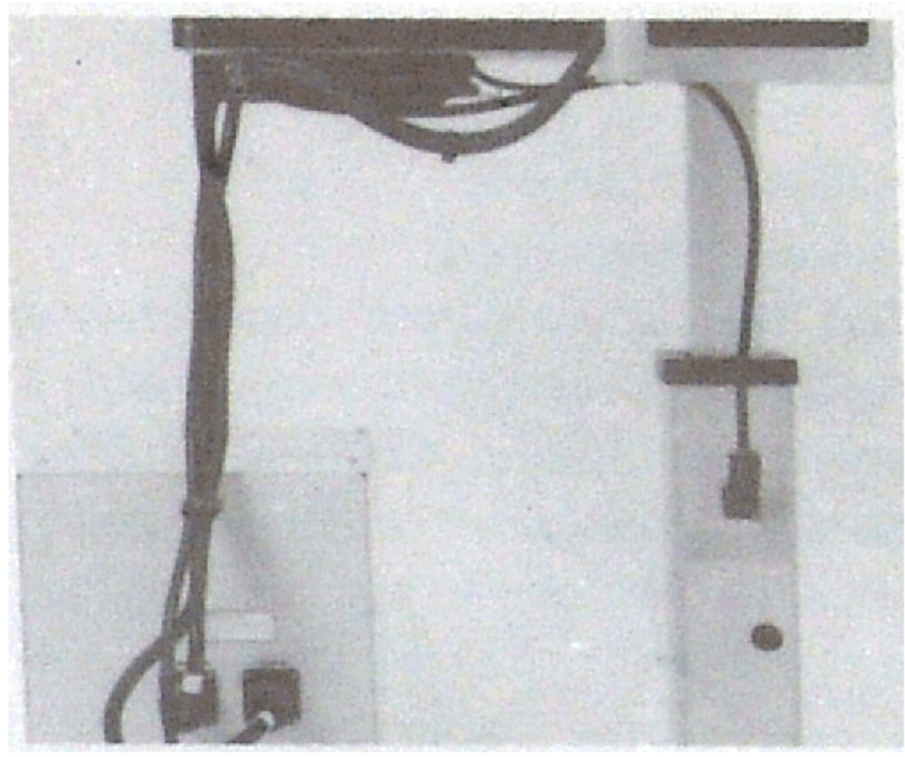


(8) Connect the AIT connector cord (66) to the receptacle (E) on the AIT-10B and the chin-rest connector cord (67) to its receptacle on the lower part of the chin-rest. Then, fix the AIT connector cord with a cord clamp on the bottom surface of the table.



(9) Bundle the optical head control cord(J2), electronic flash connector cord(J1), AIT connector cord (66) and chin-rest connector cord (67) , with cord clips. When doing so, however, leave sufficient play in order not to limit movement of the optical head.

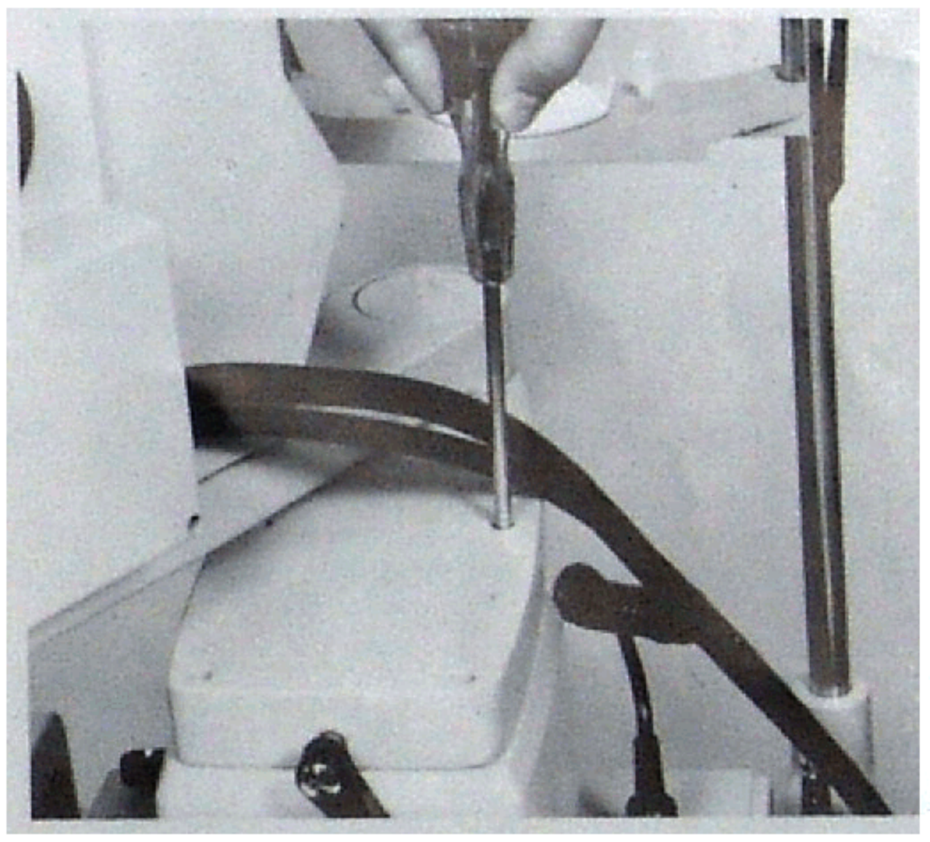
(10) Bundle the optical head control cord(J2) and electronic flash connector cord(J1), with plastic cord clips.



4-6 Assembling the Swing Arm of the TRC-50V

(1) Adjust the swing arm (40) so that it is in the proper position for attachment on the base and lock with the swing arm locking lever (41)

(2) Then, fix the swing arm (40) securely to the base, with four attachment screws.



(3) Except for the swing arm, the Model TRC-50V is assembled in the same manner as the TRC-50VT.

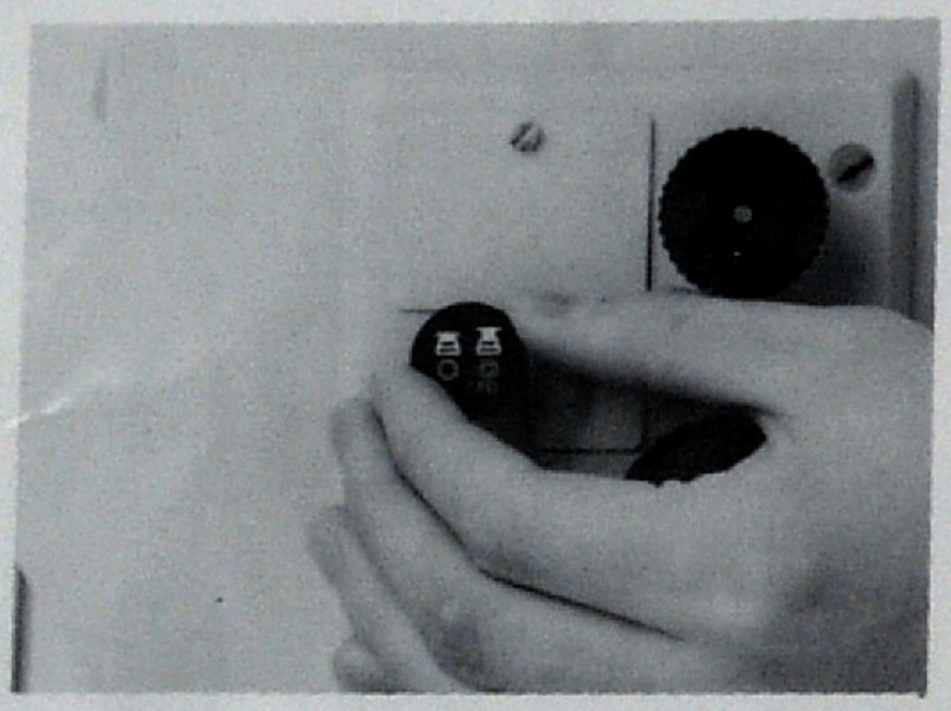
[5] PROCEDURES FOR TAKING RETINAL PHOTOGRAPHS

5-1 Preparation for Retinal Photography

1. General Preparation

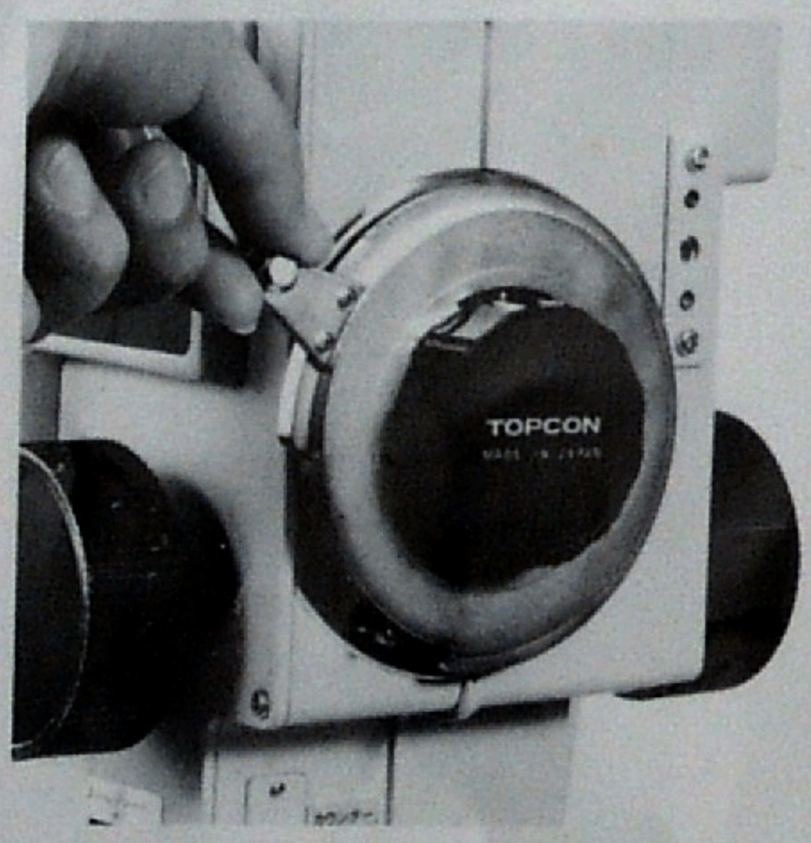
* Use a Dark Room

(1) Dilate the patient's pupil completely about 20 minutes before photography, with a few drops of Mydriatic. Confirm whether the patient's pupils are dilated more than 6.5mm. If the pupils are only dilated between 4.8mm to 6.5mm diameter, pull out the illumination diaphragm knob ⑦ and set the angle changing lever ① to 35° or 20° It should be noted that it will not be possible to eliminate flare, in the above case, when photographed at the 50° angle.



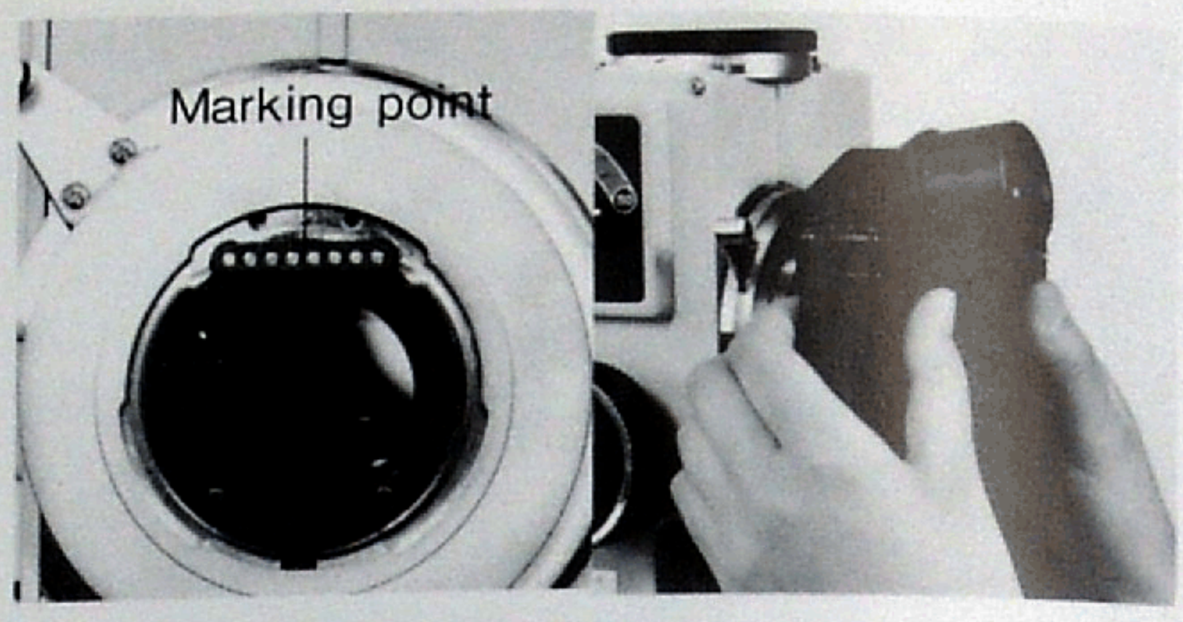
(2) Attachment and detachment of 35mm Camera Body to the Optical Head.

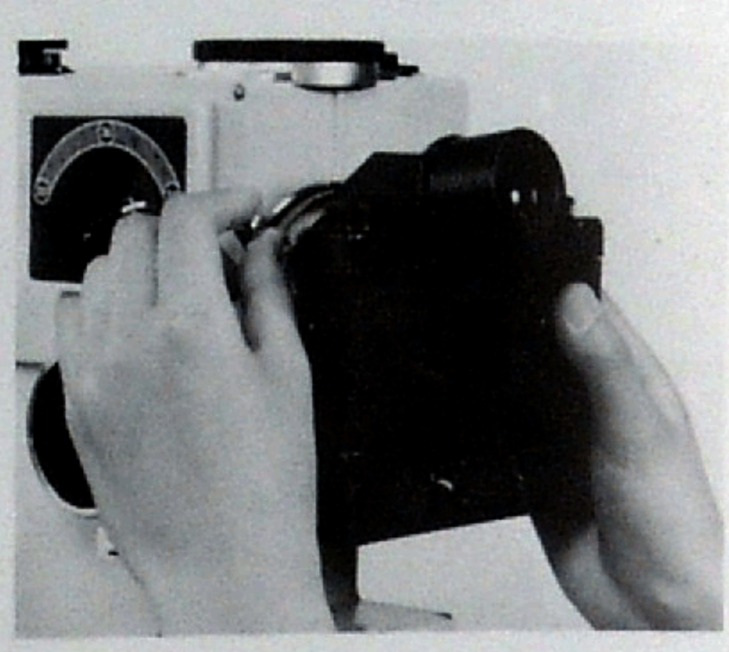
1) First, turn the 35mm camera body locking lever ㉛ .



2) Align the slot of the camera mount ㊹ with the marking point of the mount for the 35mm camera body ㉜ . Next, press the 35mm camera strongly against the optical head.

3) Turn the 35mm camera body locking lever ㉛ in the counter-clockwise direction and fix it.

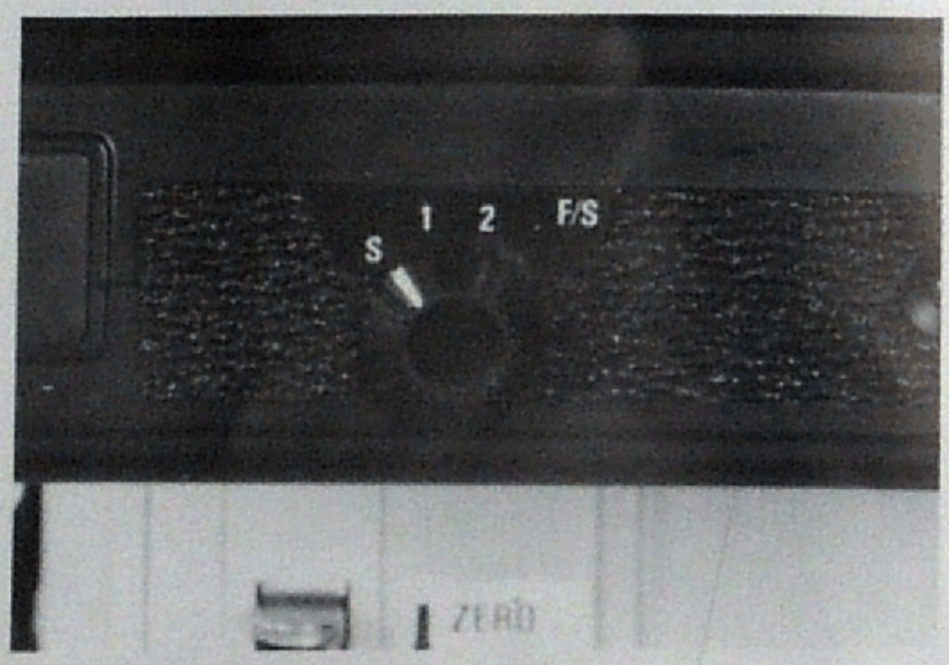




4) To detach of the camera body, hold the 35mm Camera Body in the right hand, and turn the lever ㉛ clockwise to the position of the stopper with the left hand. Then, pull out the 35mm Camera Body.

(3) Film Loading

See "2. Film Loading" on Page 17.





(4) Setting the Firing Speed

1) Taking Single Frame Exposures

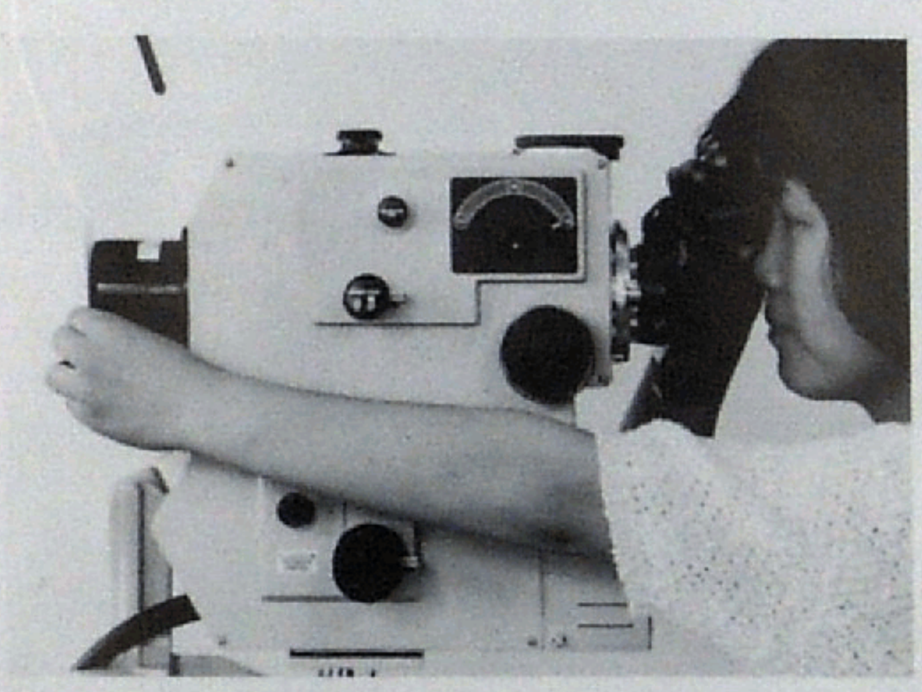
Set the timer knob ㊷ to "S" and depress the shutter release button ⑱ . A single frame will be exposed each time

the shutter release button is pressed, with the film advanced automatically to the next frame.

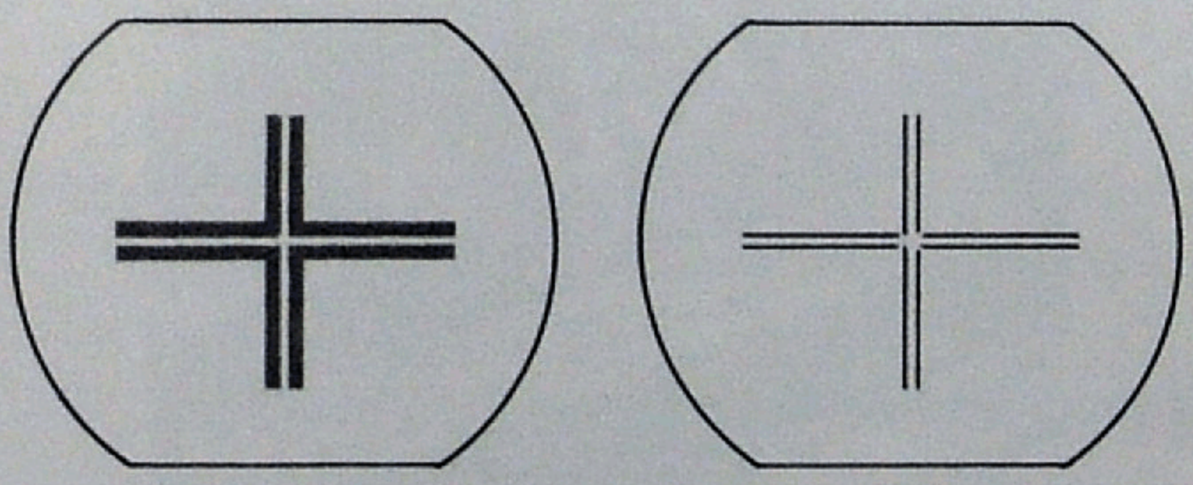
2) Taking Continuous Photographs
Set the timer knob ⑫ to "1" or "2", as the case may be, and keep pressing on the shutter release button. Photographs will be taken continuously at firing speeds of one frame per second or two frames per second, depending on the setting of the timer knob.

(NOTE) Photographs can be taken continuously at 2 frames per second, only when the flash intensity switch ⑲ is set to 150WS or less.

(5) Adjustment of the Eyepeice
The eyepiece ⑯ must always be adjusted for the user's eyesight, as otherwise the instrument will not be focused properly on the retinal surface. Place a white sheet of paper against the objective lens for this purpose.



First, draw out the eyepiece by rotating its adjustment ring in the counter-clockwise direction, which will make the cross-hairs appear completely blurred.
Next, rotate the adjustment ring slowly in the clockwise direction while checking the cross-hair image in the field of view. Stop when the image is sharply focused.

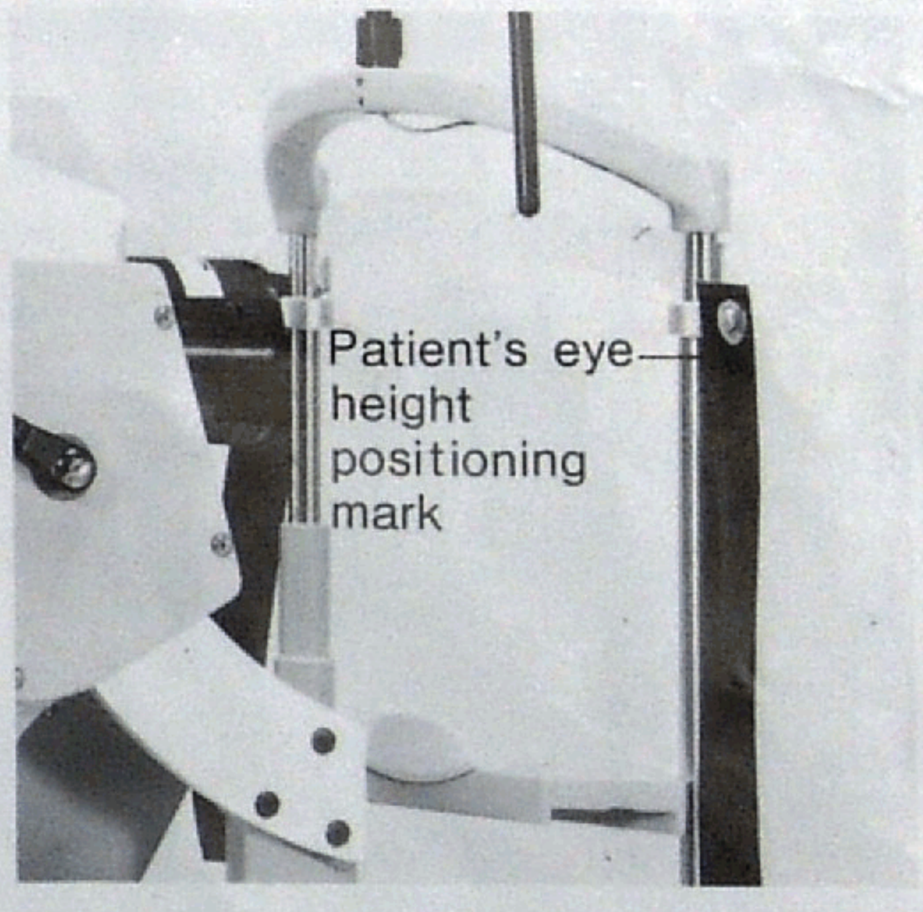


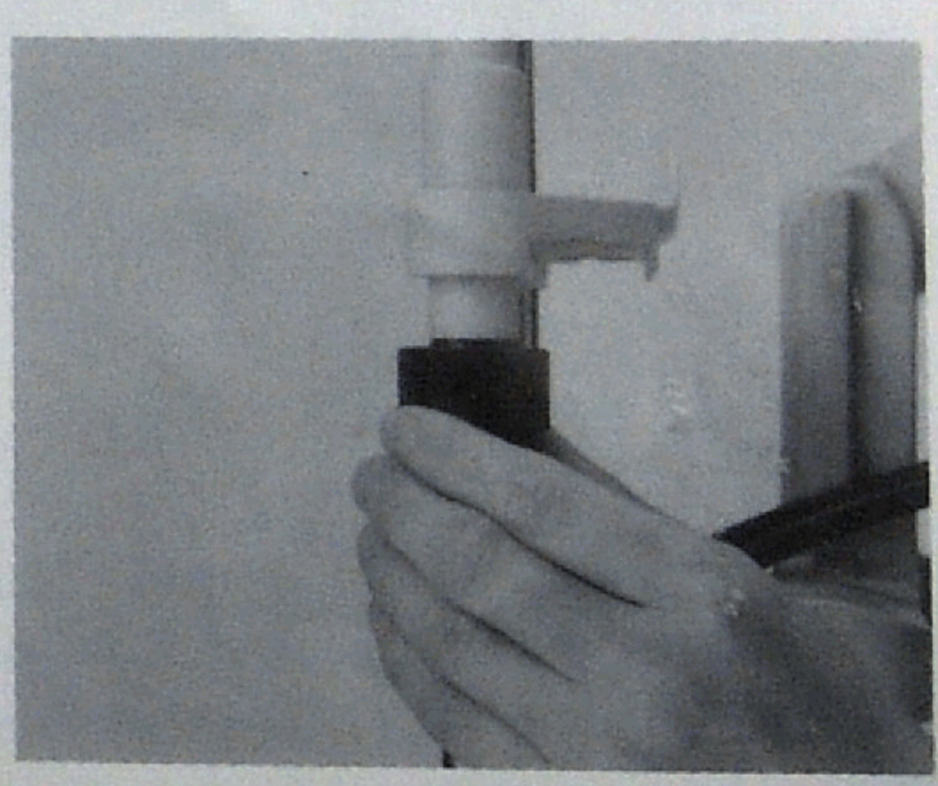
Out of focus　　In focus

(IMPORTANT) When properly adjusted, the cross-hairs must be seen distinctly as double cross-hairs. Furthermore, when focusing, both cross-hair image and retinal image must be seen distinctly at the same time.

(6) Seat the Patient Properly
Have the patient, with completely dilated pupil, sit down in front of the instrument. Adjust the height of the Adjustable Instrument Table in order to rest the chin properly on the chin-rest and the forehead against the head strap.

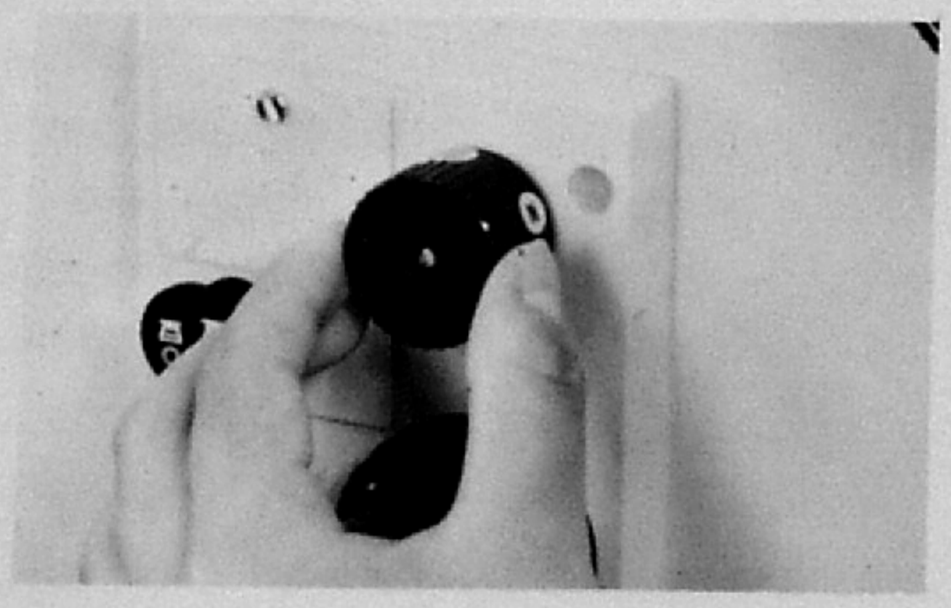
The AIT up-down switch ㉔ is very convenient for this purpose while the height of the chin-rest can be adjusted by rotating the chin-rest adjusting knob.





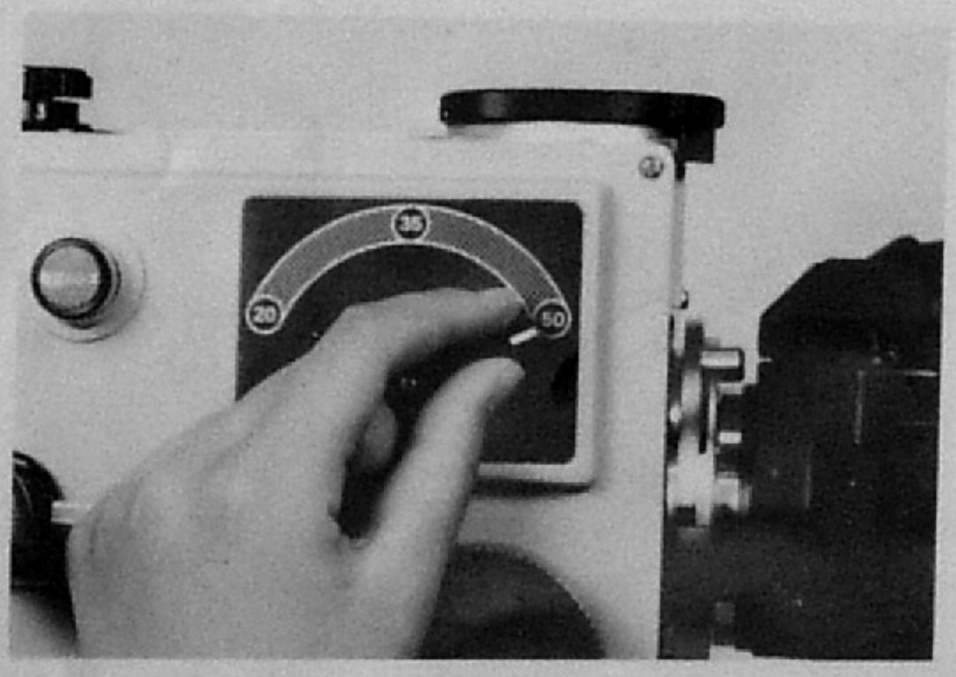
(7) Set the filter switching knob ⑥ to "N". "N" is suitable for normal 35mm color photography and fluorescein photography, while "G" is suitable for red-free photography. F1, F2 are black setting which can be used for inserting filters required for

specialized photography. "PAG" is for Polaroid fluorescein angiography.



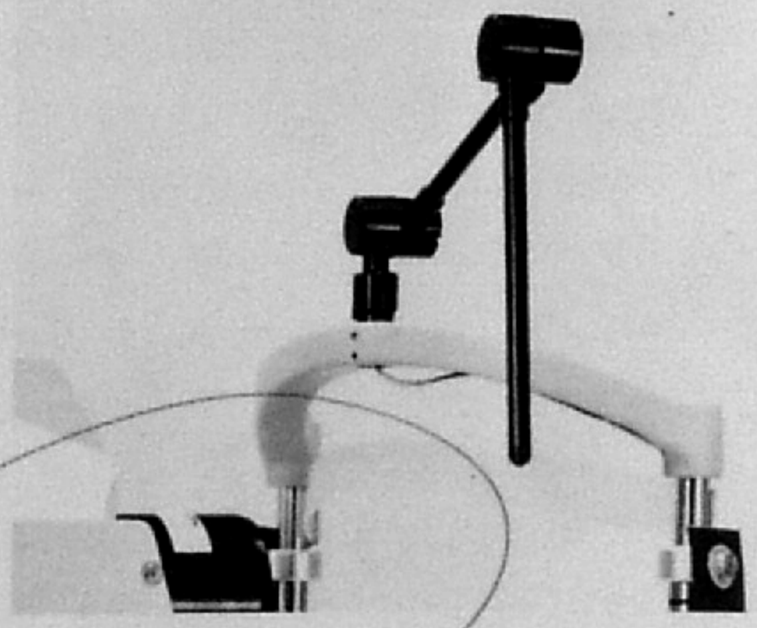
(8) Set the angle changing lever ① to the required angle of coverage. The angle changing lever must be properly positioned at the 50°, or 35° or 20° settings, which have click-stops, as intermediate positioning will result in image distortion and ghost image in the center of the picture.

The three angles of coverage, (50°, 35° and 20°) retain the same magnifications as with the TRC-W Series Retinal Cameras, (1.7x, 2.5x and 3.7x respectively) as well as 1.7x with the TRC-WF, for the 50° angle. This means that retinal photographs can easily be compared with those taken previously with the TRC-W Series.



(9) Patient's fixation

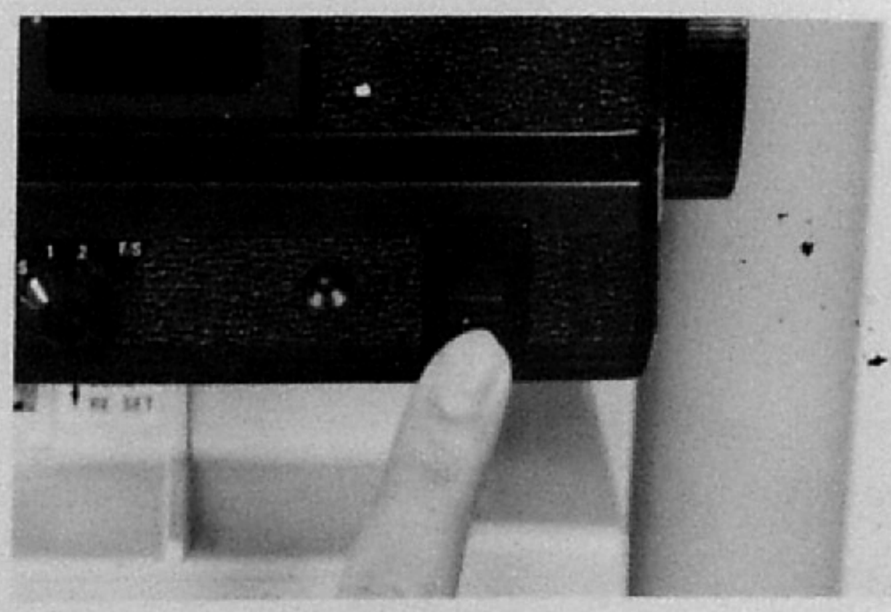
In order to have the patient fixate on the annular fixation target ㉖ properly, coincide the patient's line of sight to the fixation target by directing the light beam from the fixation target into the patient's pupil. The fixation target is easily changed from steady illumination to flickering illumination by means of a simple switching action. The flash device is very effective for myopic patients as well as the more difficult fixators.



2. Film Loading

*** When loading film in the 35mm Camera body attached to the optical head**

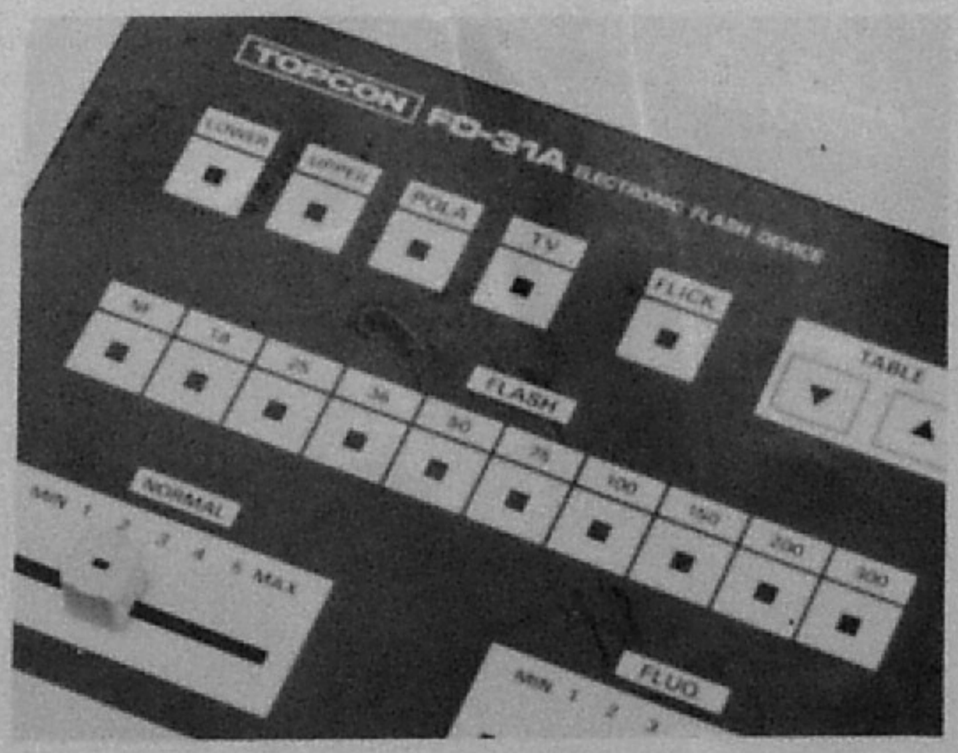
(1) Set the motor drive switch ㊽ to "ON".



(2) Press "35MM LOWER" of the mode switches ㊽ on the control console and current will be supplied to the motor drive of the 35mm camera body.

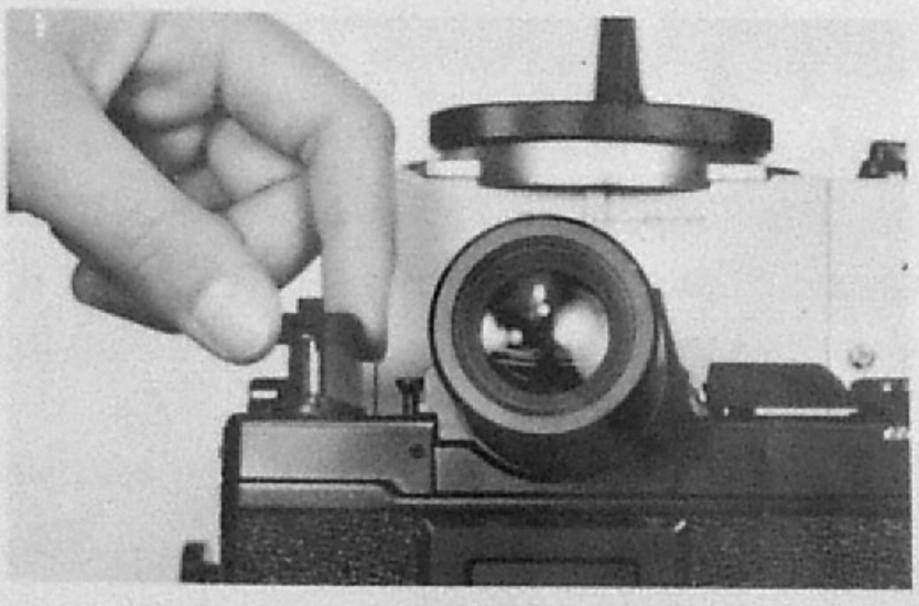


(3) The flash intensity switches ㊾ should be set on NF setting.

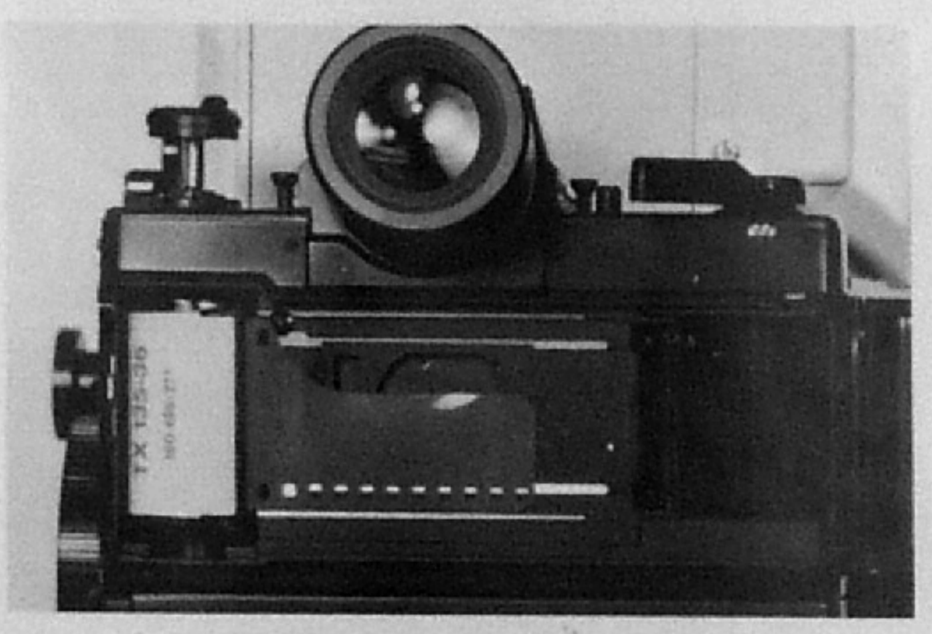


(**Note:** The flash intensity switches must be set off, as otherwise, electronic flash illumination will take place each time the shutter release button ⑱ is depressed, which will cause discomfort to the patient.)

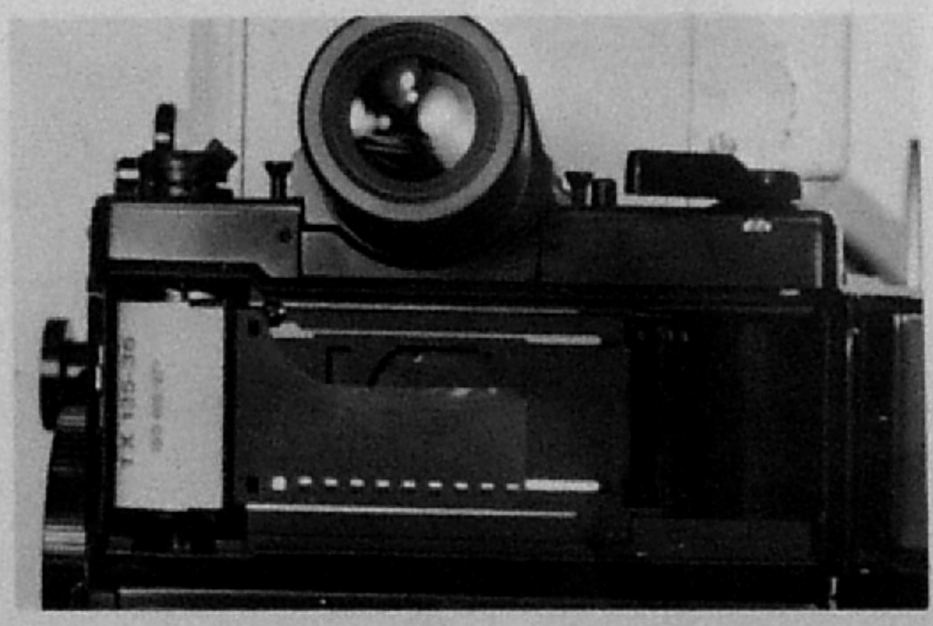
(4) Pull up the back cover locking knob ㊺ fully.
The back cover will open.



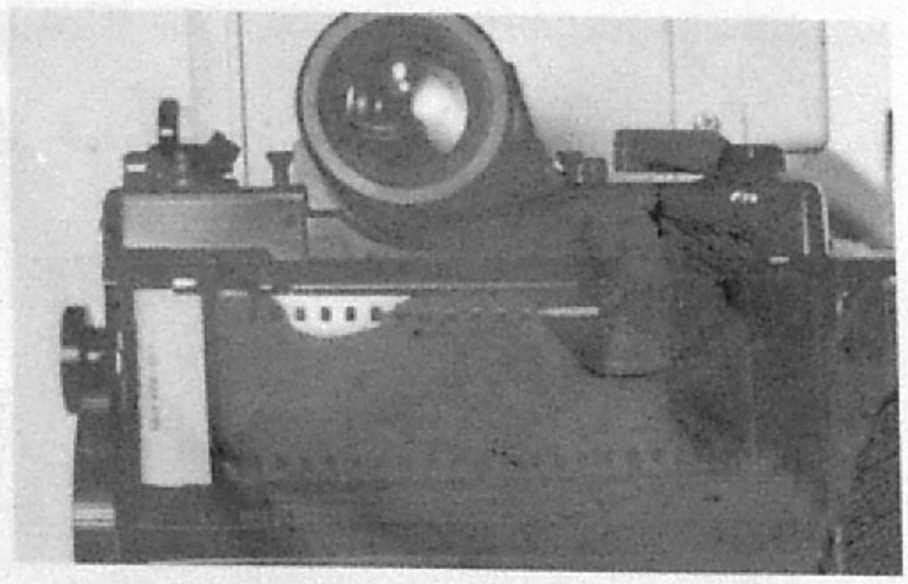
(5) Place a fresh film cartridge in the film chamber ㊺ .



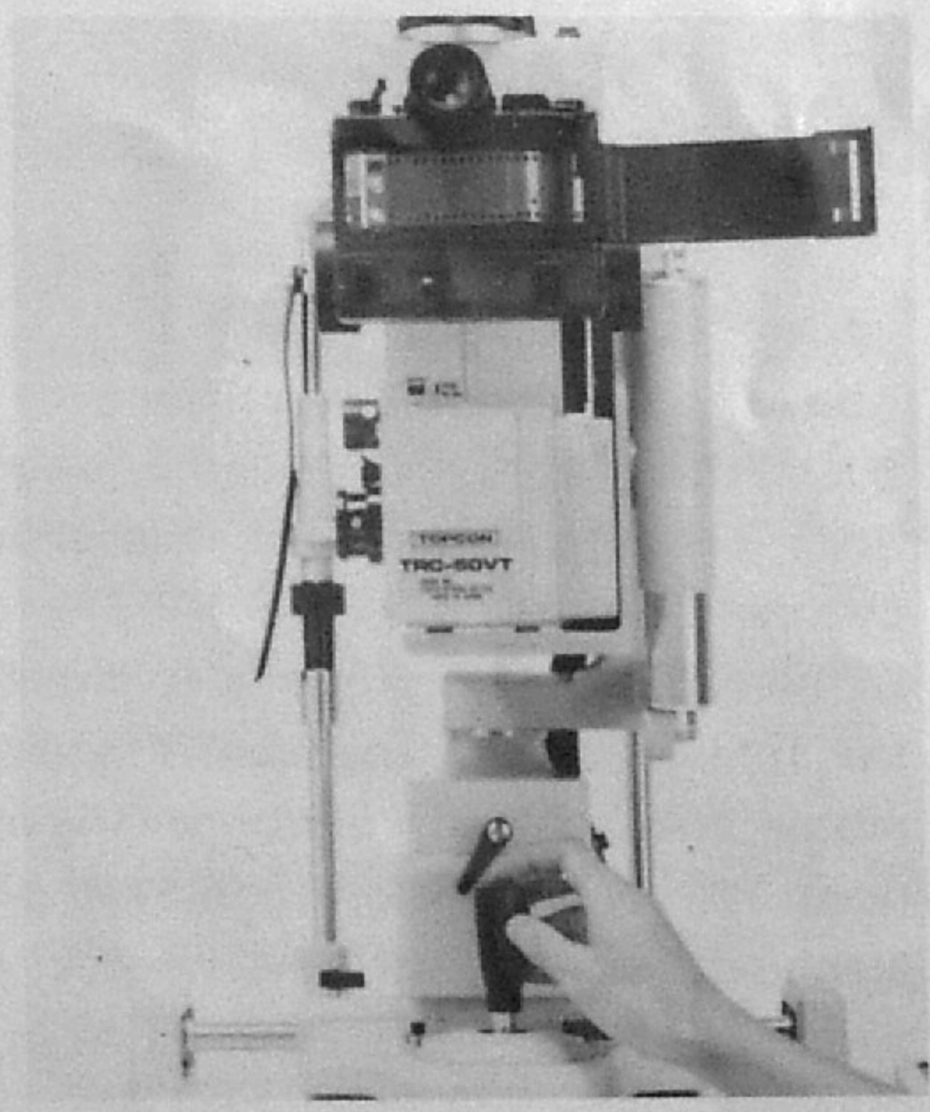
(6) Push the rewind knob back in to engage the film cartridge. If necessary, rotate the rewind knob slightly so that the two engage.



(7) Pull out the leading end of the film and insert it into one of the multi-slots on the take-up spool ㊼ .
(**Note:** Do not press the aperture mask of the film rail plate.)

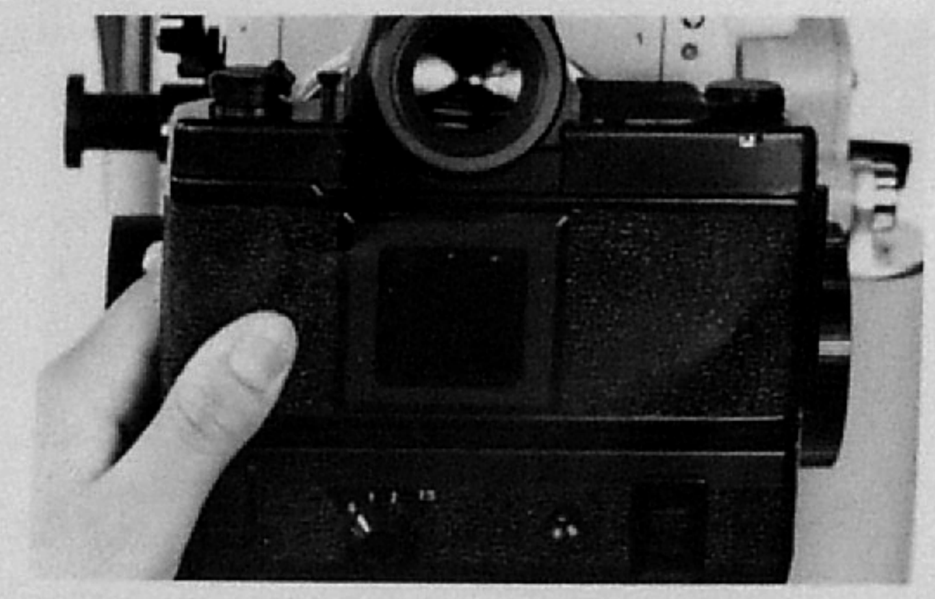


(8) Confirm that the film perforations at the top and bottom fully engage the film transport sprocket teeth. Set the timer knob ㊷ to "S" and depress the shutter release button ⑱ . In principle, do not wind the film manually. However, switch off the motor drive switch ㊽ if manual winding is to be undertaken. And, if the motor drive does not work, after manual winding has been undertaken, switch the motor drive switch OFF once and then switch it ON once more. The motor drive should operate in this case.



(9) Once the perforations are fully engaged, close the back cover, by pushing it in until it catches and is locked securely. Rotate the rewind knob in the arrow-indicated direction slowly, to take up any slack in the loaded film. Then, depress the shutter release button for winding the film. At the same time, check whether the rewind knob is rotating counter-clockwise which will show that the film is being

advanced properly. (If not, the film is not



caught on the take-up spool and operations must be repeated from (7) preceding.)

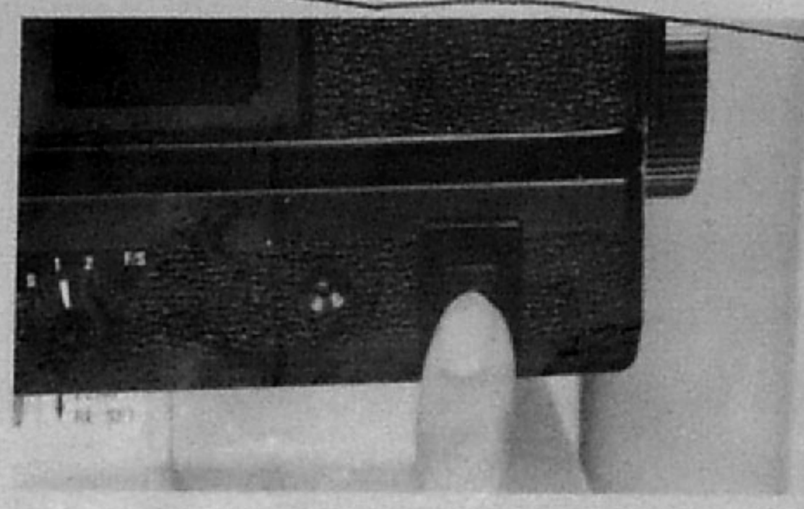
(10) The exposure counter is automatically illuminated, upon loading film in camera, for greater convenience in confirming film loading and the number of frames exposed.



(11) Depress the shutter release button until exposure counter ㊶ indicates "1".
The exposure counter indications are from S, and then 1, 2, ... 36 and E.

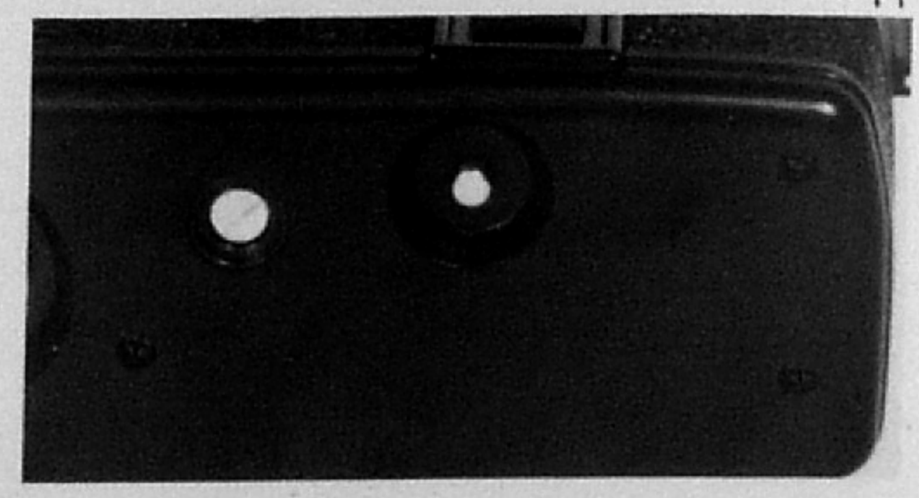
(12) Start photographing when, the exposure counter indicates "1".
If there are no more frames to expose on the film loaded in the camera body, the motor drive will stop motor-driving operations. When you must continue photographing, switch off the motor drive switch ㊽ and load new film in the camera body.
The exposure counter is no longer illuminated upon unloading the film.

(13) The red lamp ㊾ is illuminated when

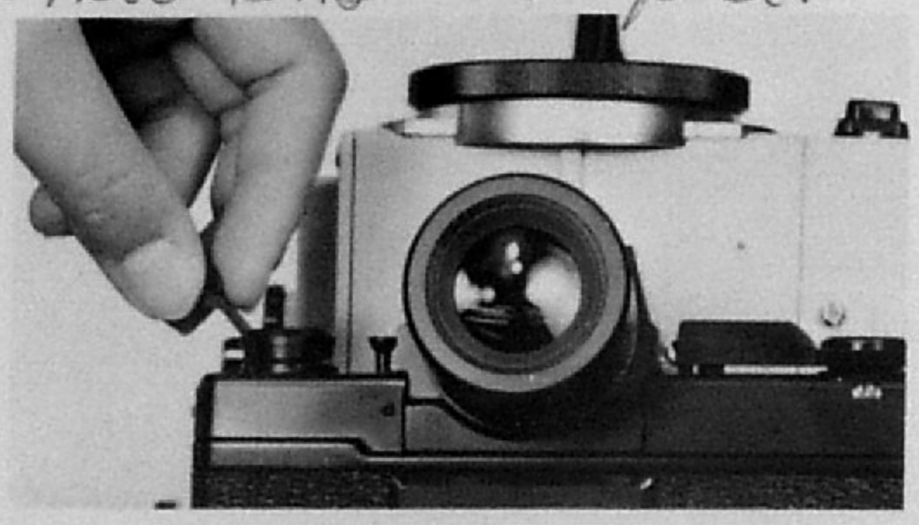


photography is completed. Therefore, turn off the motor drive switch.

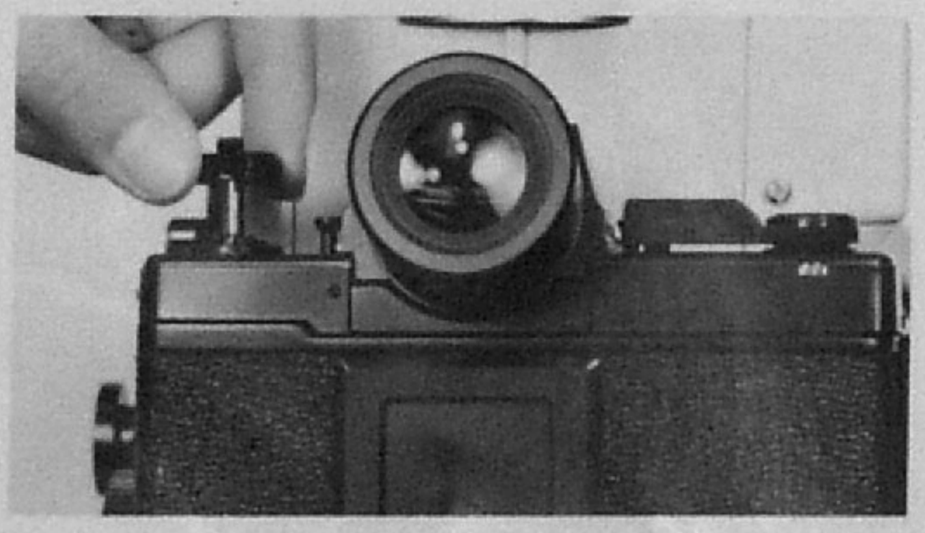
(14) Depress the rewind button ㊻.



(15) Unfold the rewind crank ㊹ and turn it in the counter-clockwise direction until tension decreases which will indicate that the film has slipped off the take-up spool.



(16) Pull up the back cover locking knob ㊺ fully.
The back cover will open.



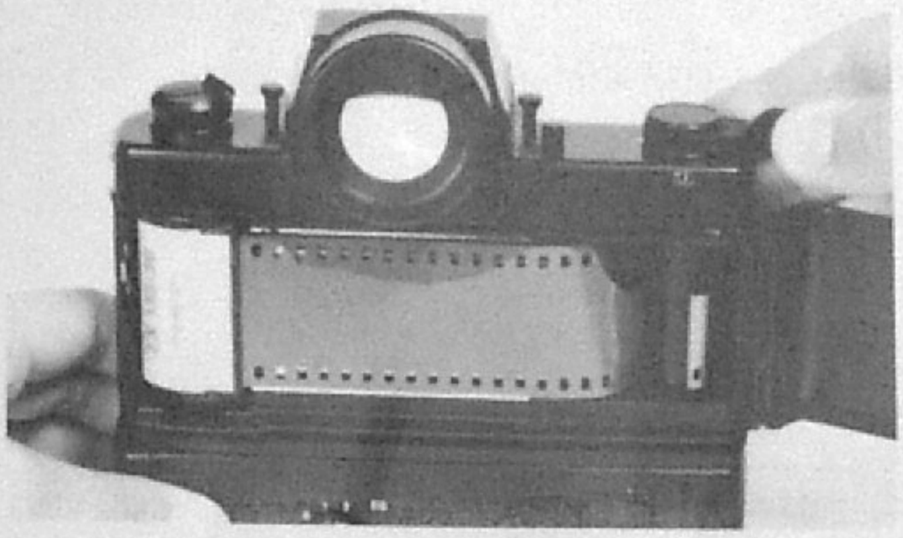
(17) Pull out the exposed film.

*** When Loading Film in the 35mm Camera Body which is detached.**

(1) Turn off the motor drive switch. After that, follow the same procedures described in (2) to (8) on Page 17 and 18.

(2) After checking that the film perforations fully engage the film transport sprocket teeth, stroke the film winding lever until it make a full stop.
After that, follow the same procedures described in (9) preceding. However, the exposure counter will not be illuminated even when film is loaded in the camera.

(3) Turn the film winding lever ㊸ and the shutter release lever ㊿ repeatedly until the exposure counter indicates "1".

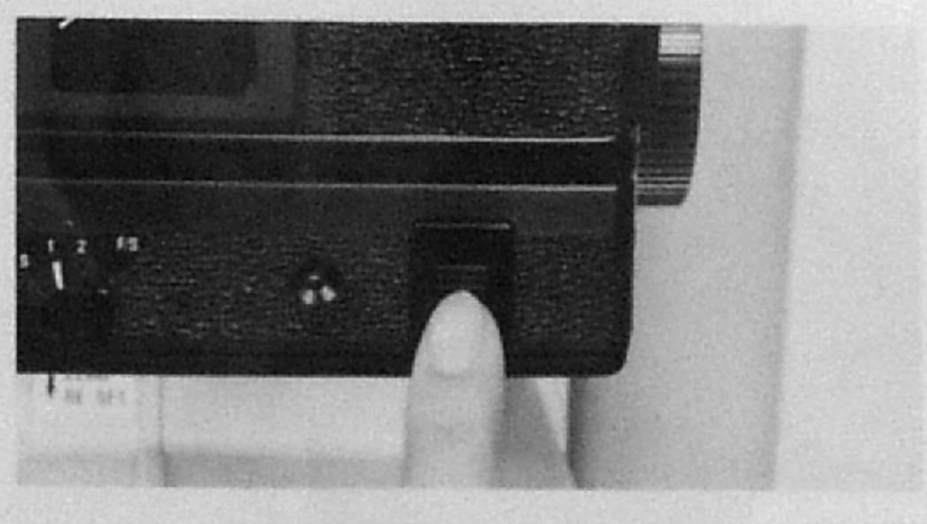


(4) Attach the 35mm camera body to the optical head.

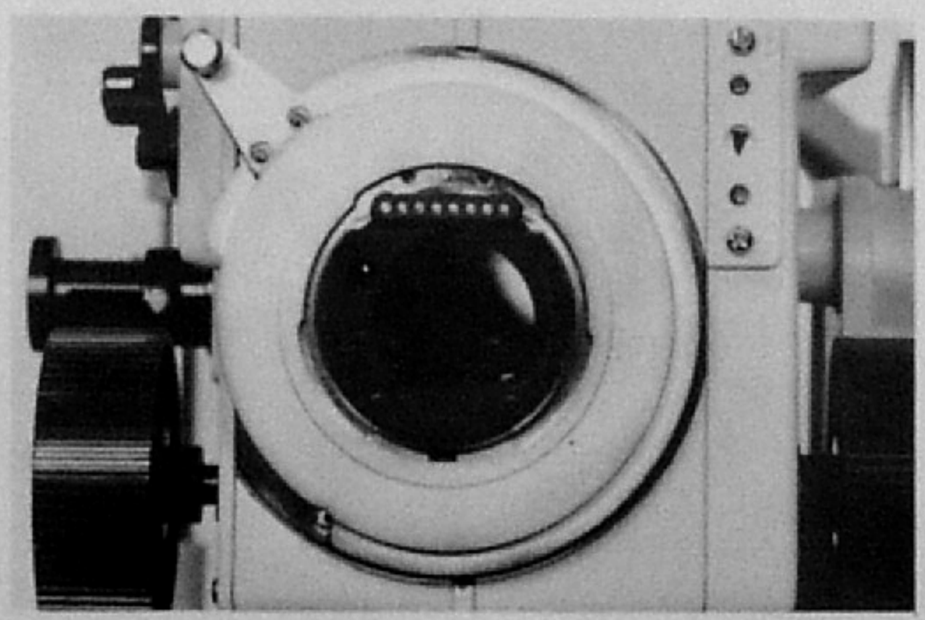
(5) Turn the motor drive switch "ON".

3. Pointers on the Use of the 35mm Camera

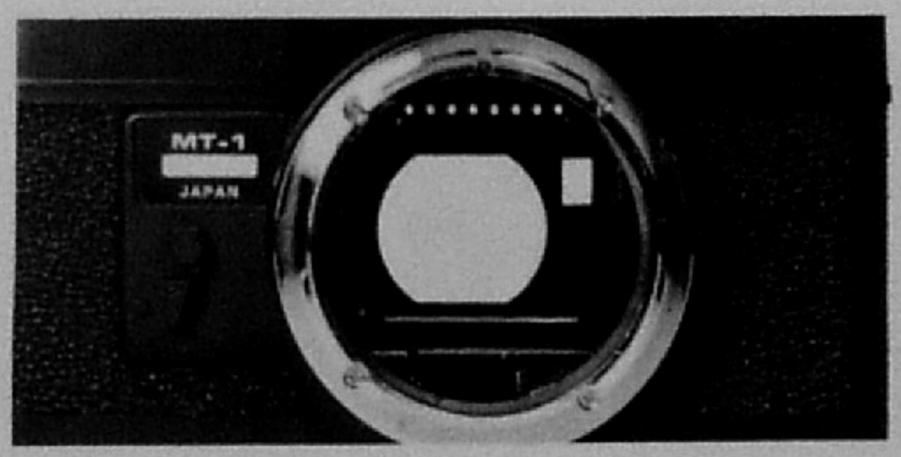
(1) Always switch off the motor dirve switch ㊽ when unloading the film.



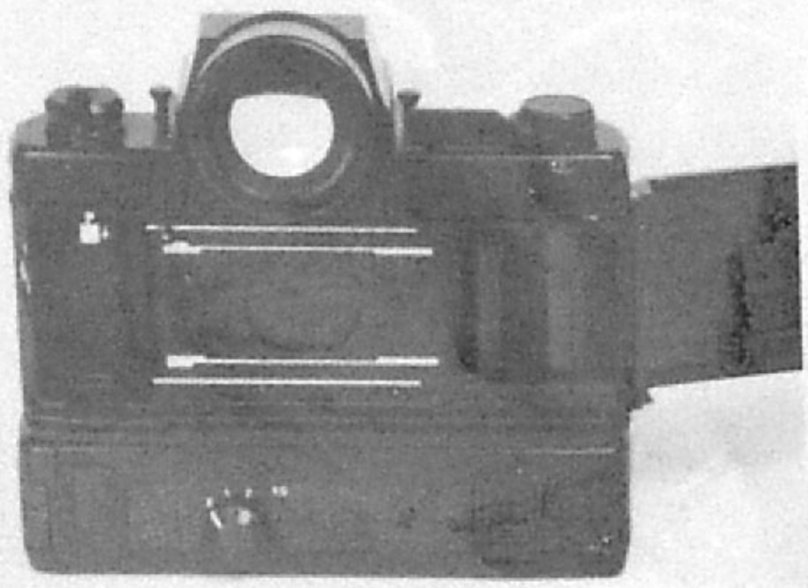
(2) Wipe the contacts on the camera mount ㊾ gently with a clean cloth, from time to time, in order to maintain good electrical connection.



(3) Do not touch the mirror surface and contacts.

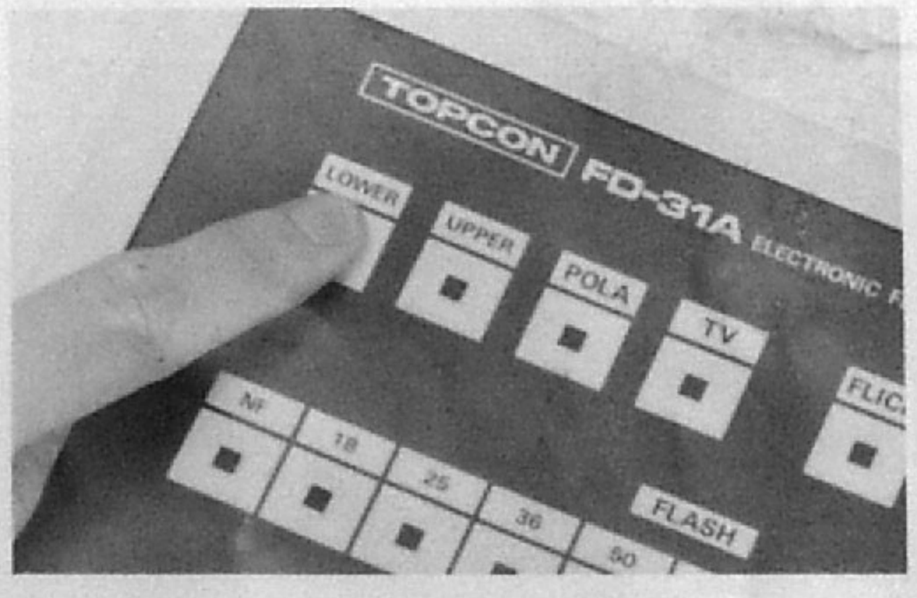


(4) Clean the film chamber ㊺ , sprocket ㊻ , multi-slots on the take-up spool ㊼ and film pressure plate, from time to time, in order to prevent scratches on the film.



5-2 Color Retinal Photography

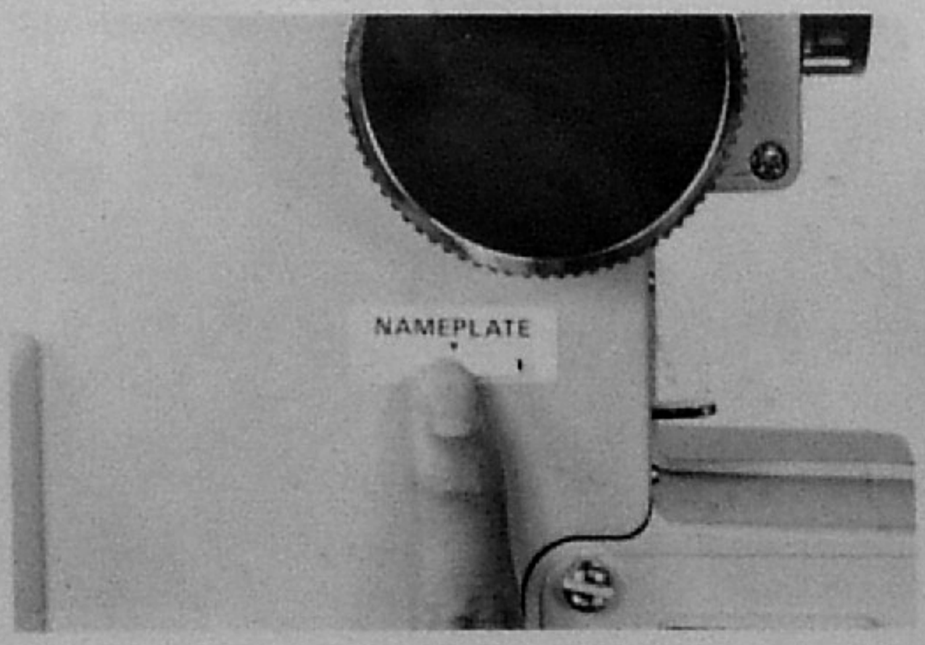
(1) Depress "35MM LOWER" of mode switches ㊽ and turn it on.



(2) As in the Table (Exposure Guide for Variable Angle Retinal Camera TRC-50V/50VT), adjust the flash intensity switch ㊾ based on the ASA film speed of the film loaded in the camera body.

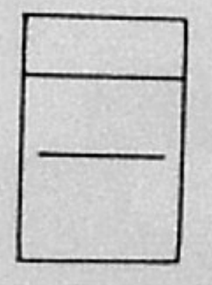
(3) Data Photography for the Patient

1) How to Photograph the Patient's Data on the Data Plate.
Write down the required information on the data plate and insert it in the data plate insertion slot ⑪ .

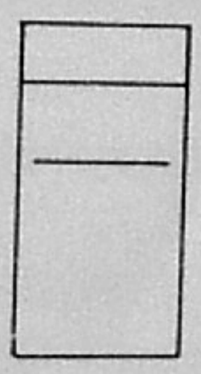


It will be photographed together with the retinal image. Three kinds of data plates are supplied, as follows:

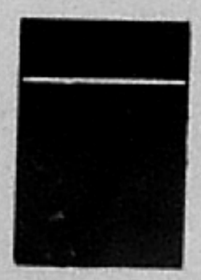
- Used for photographing the patient's name and counter simultaneously.



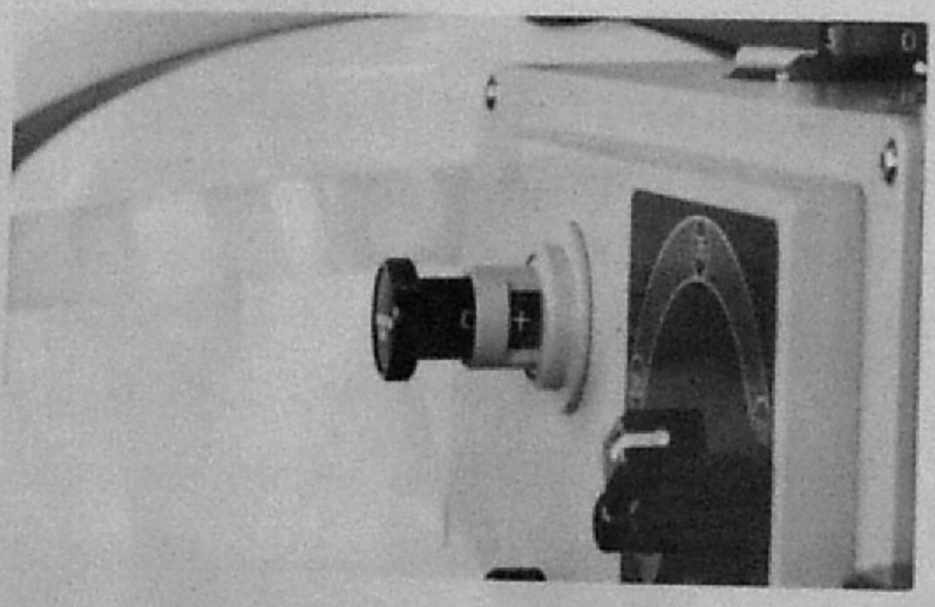
- Used for writing more information on the data plate; however the counter's numbers will not be photographed.



- Used for photographing counter numbers only, with no other information being photographed.

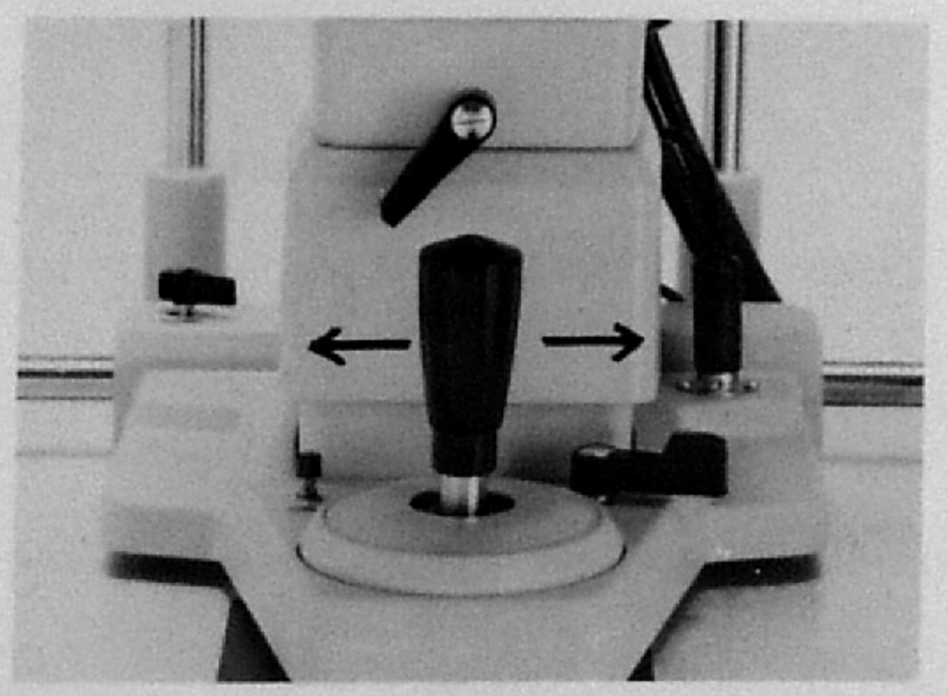


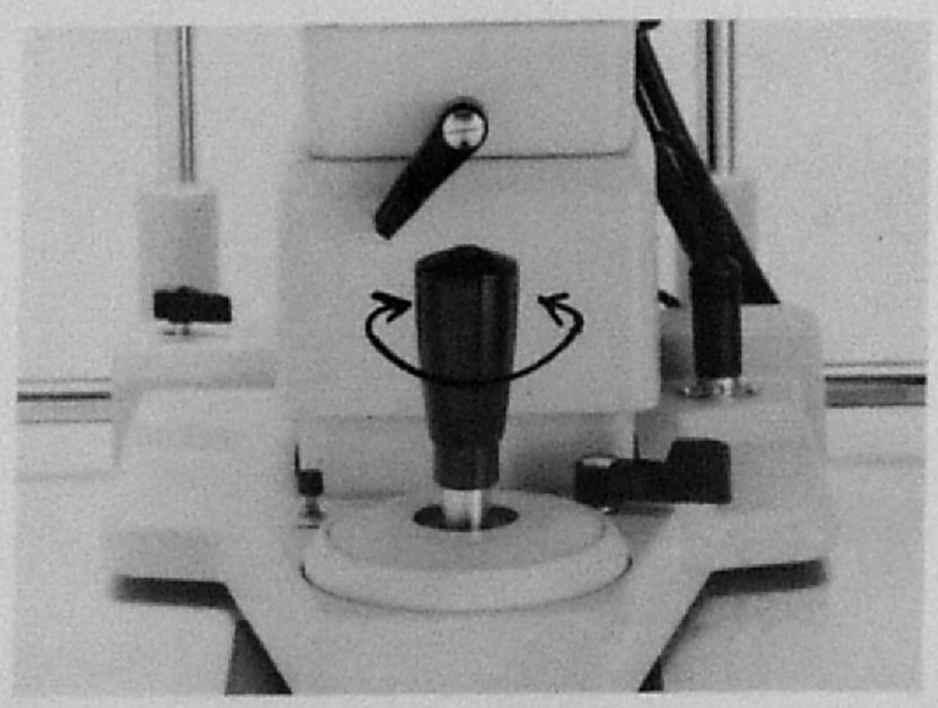
2) During ocular anterior photography. Write down the required data in a 30mm diameter field, set the diopter compensation knob ② to ⊕ or Ⓐ and take the photograph.



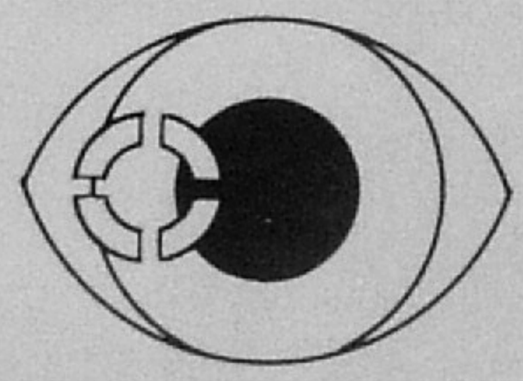
(4) Alignment of the Light Beam onto the Patient's Pupil.

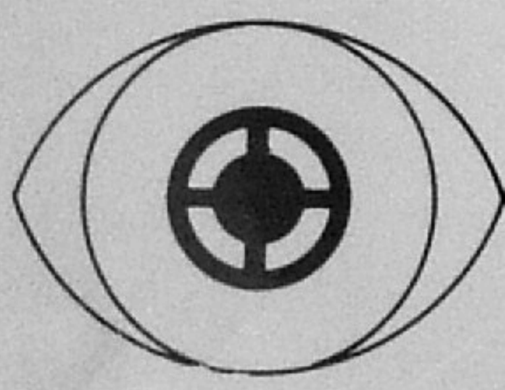
First look at the patient's pupil obliquely from the side of the instrument. To coincide the light beam properly to the patient's pupil, move the optical head in to a position 50mm in front of the patient's eye, with the control lever positioned straight. Then adjus the control lever to the right or left an rotate it to move the optical head up o down, until the light beam is coinciden with the patient's pupil. Then, finely adjus the control lever to focus the ring image o the cornea coincidentally with the patient' pupil.





Ring slit image on the cornea





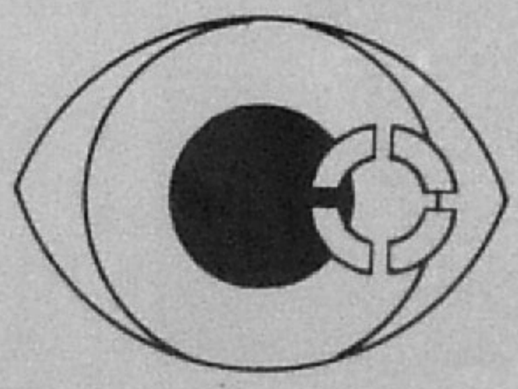
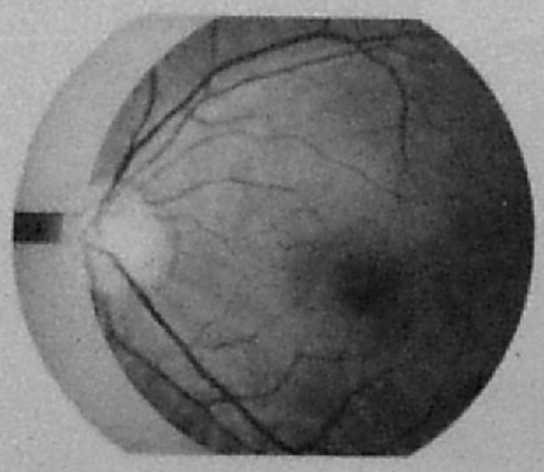
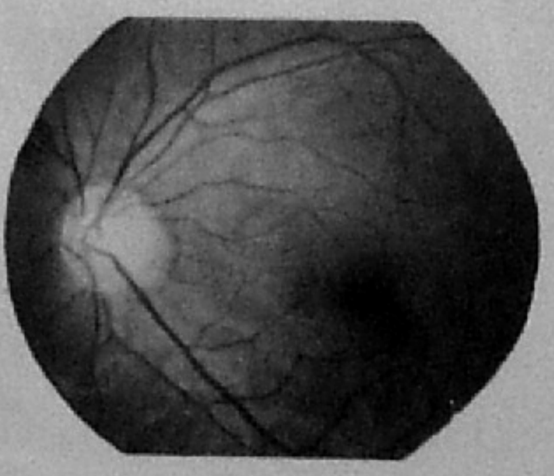


Image observed through finder





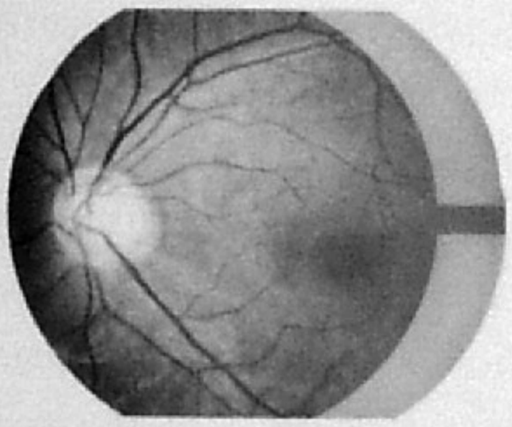
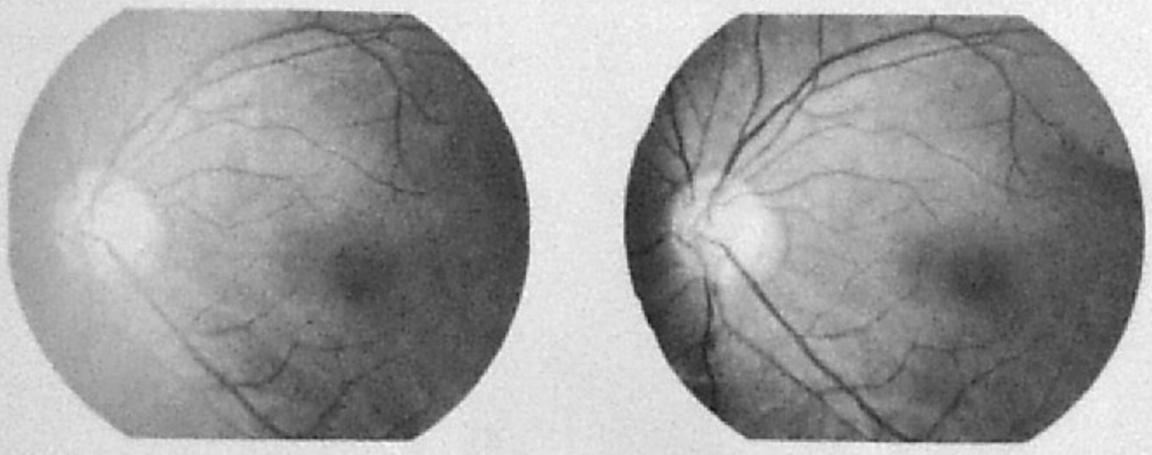
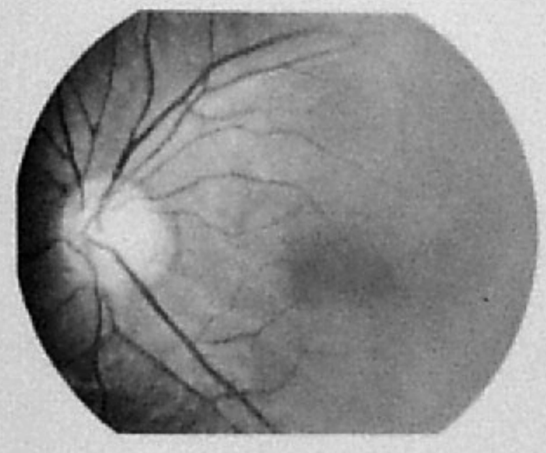


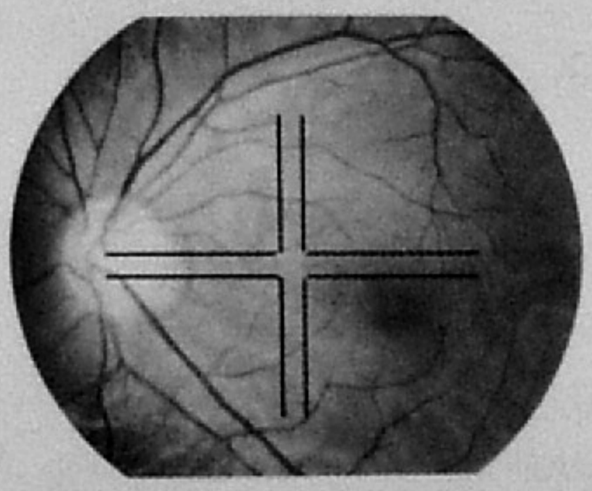
Image photographed on the film





(5) Finely adjust the optical head longitudinally for evenly illuminating the retina.

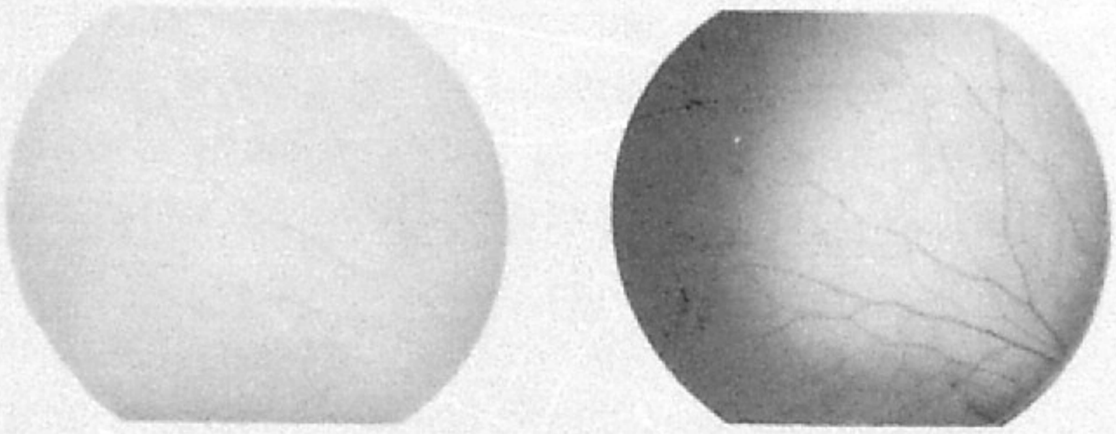
(6) When focusing the retinal image with the focusing wheels ⑧, it should be remembered that not only the retinal image but the cross-hairs must also be observed sharply and distinctly in the field at the same time. Otherwise, the retina will not be focused properly on the film plane.



(7) Photographing Retinal Peripheries

Move the annular fixation target ㉖ and





have the patient fixate it with the eye that is not being photographed, without moving the eye that is being photographed.

It will be possible to photograph the peripheries and other sections of the retina, by tilting and/or swinging the optical head. There will be instances when the focus is not uniform, when photographing the peripheries. In such cases, rotate the astigmatic correction knob ③ and obtain an uniform focus.

(8) When Changing the Angle of Coverage

a) It will not be necessary to refocus when changing the angle of coverage from 20° to either 35° or 50°, if the retinal image has already been properly focused at the 20° angle of coverage.

b) Flare will not occur when the angle of coverage is changed from 50° to either 35° or 20°, if the light beam has been properly coincided to the patient's pupil at the 50° angle of coverage.

(9) Depress the Shutter Release Button ⑱.

5-3 Fluorescein Photography

Fundamentally, make the same adjustments as noted for color retinal photography, and focus the retinal image properly.

The only difference is the insertion of the barrier filter ④ and excitation filter ⑤ into the optical path and the intravenous injection of fluorescein to the patient.

(1) Set the flash intensity switch ⑲ to "150".

(2) Adjust the fluorescein angiography knob

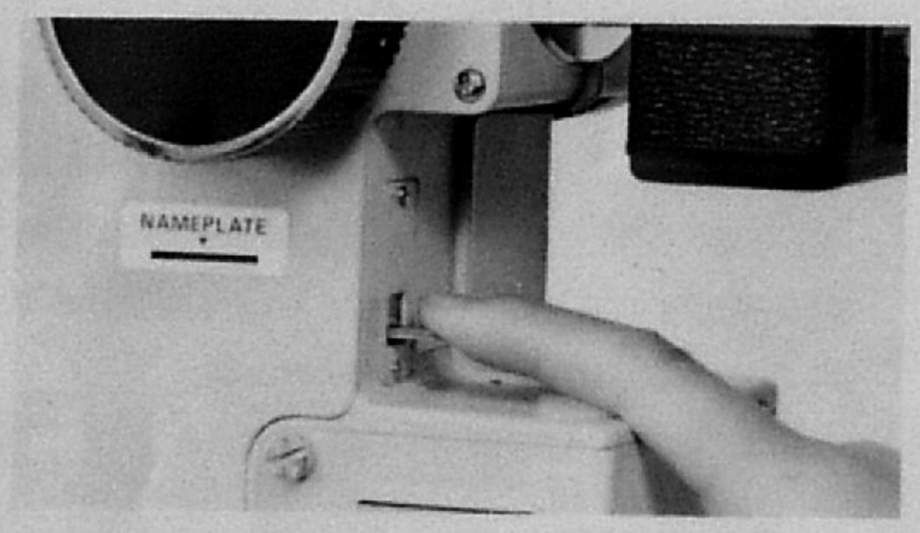


⑥① to the required illumination, which can be preset freely with its exclusive knob. The illumination is automatically changed to the preset intensity, when the excitation filter ⑤ is pushed in. However, if it is preset at the maximum intensity, it will usually be too bright for the patient, with the result that the patient may look away. Therefore, it is recommended that the knob normally be set to "4" or "5".

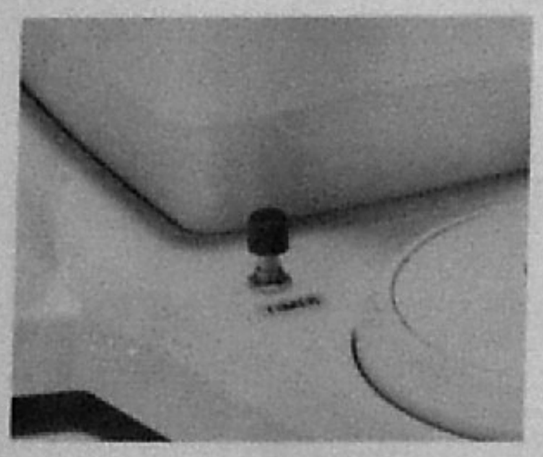
(3) Preparations for photography
Make the same adjustments, as noted for color retinal photography, and focus the retinal image properly.

(4) Then, prepare the intravenous injection, which should be injected quickly for the best effect.
If too much time is taken in giving the intravenous injection, the fluorescein will be diffused in the blood vessels and a good photograph will not be possible.

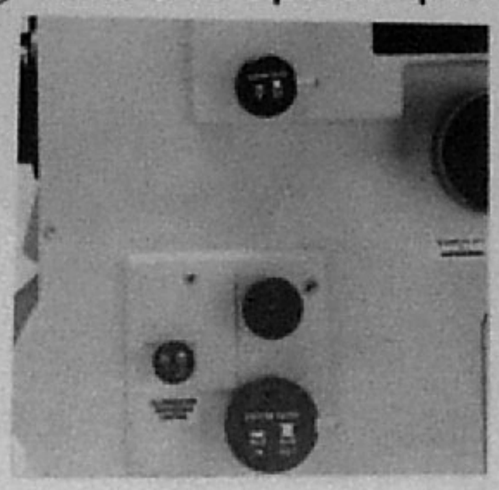
(5) Check the focus once more and return the counter to "0".



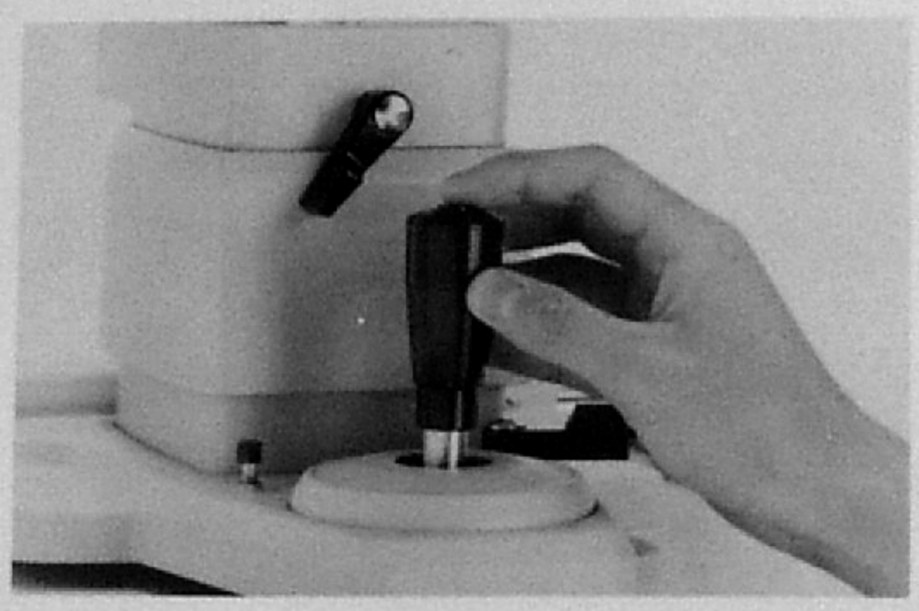
(6) Depress the timer switch ⑳ at the same time as an intravenous injection of fluorescein is given to the patient.



(7) Insert the barrier filter ④ and excitation filter ⑤ into the optical path.



(8) Depress the shutter release button ⑱ upon appearance of fluorescence on the retina.
The firing speed should be set, as required, since there is a choice of single frame exposure or continuous shooting in the motor drive action, with a choice of one frame per second or two frames per second, in the case of continuous shooting.
The following points should be considered, when determining the firing speed in the continuous mode:—



a) One frame per second — All flash intensities are usable.
b) Two frames per second — Only flash intensities from 150WS down can be used.

However, only one frame per second can be used at the 20° angle of coverage.



(9) The number of frames should be divided suitably for use in fluorescein angiography, since it is normal to divide photography into three stages, for covering the beginning, the middle and the ending stages of the fluorescein diffusion. The exposure counter ⑤① should be checked for this purpose, since it is automatically illuminated, upon loading film, and, therefore, makes it possible to easily check film loading and exposed frames.

(10) Develop the film.
Development of the film, in the case of fluorescein retinal photography, should differ according to conditions and, there-

fore, the film should be developed under inspection.

The following is a guide for developing films under average conditions:

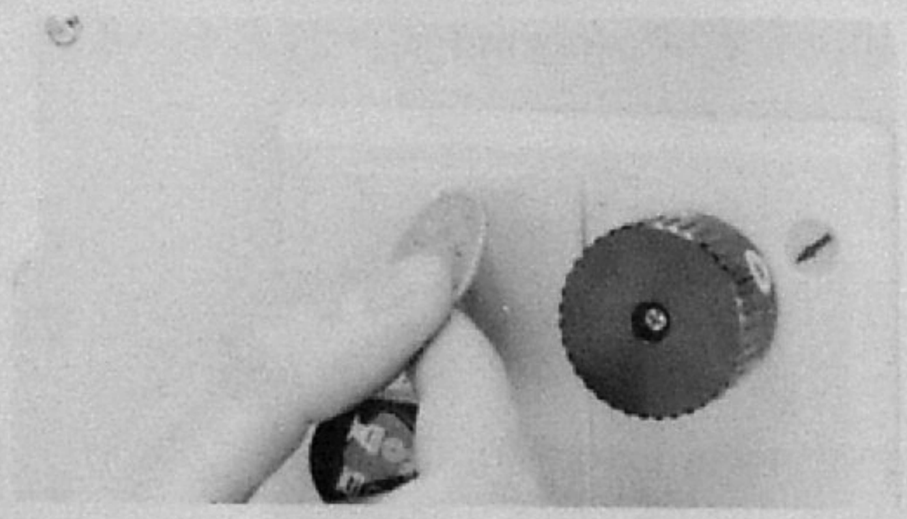
a) Film : Kodak Tri-X Pan (ASA 400)
b) Developer : D 76
c) Development: Tank development with developer temperature 22°C and 13 to 15 minutes of development.
d) Fixing time : 10 to 20 minutes.
e) Washing time: More than 30 minutes.

5-4 Photography with Optional Filters

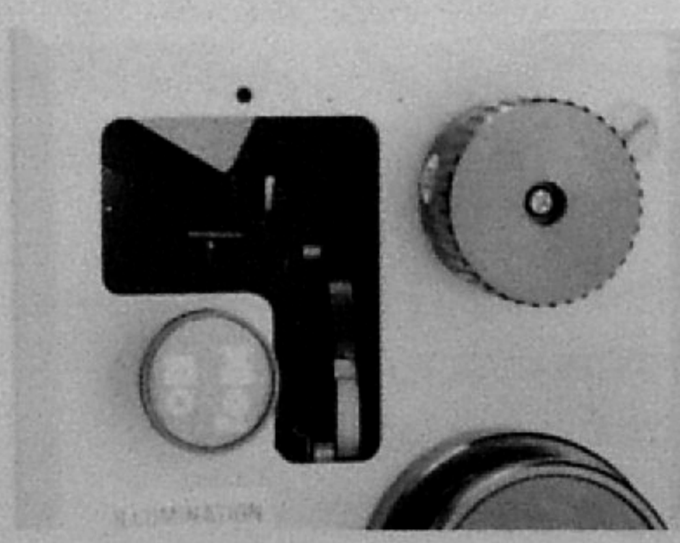
There are two blank settings, or F1 and F2 on the filter turret, with frames supplied for inserting filters which may be required for obtaining special photographic effects. Simply insert the filter in the frame and then insert the filter frame, in the following manner:—

1. Procedure for changing filters

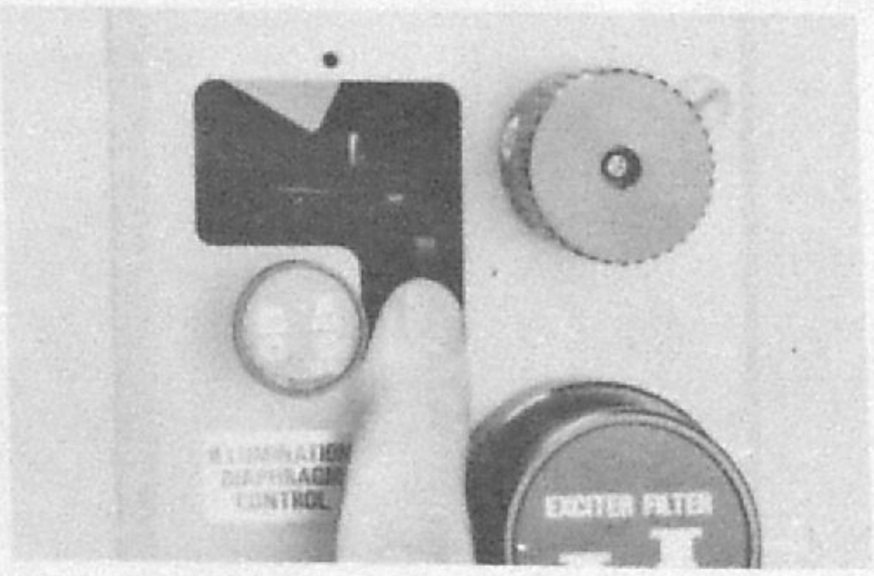
(1) Turn the screw of the filter changing cover in the counter-clockwise direction with a coin and take off the cover.



(2) Turn the filter switching knob ⑥.
(3) Set the filter turret at the click-stop position at which the guide of the turret is seen in the opening.



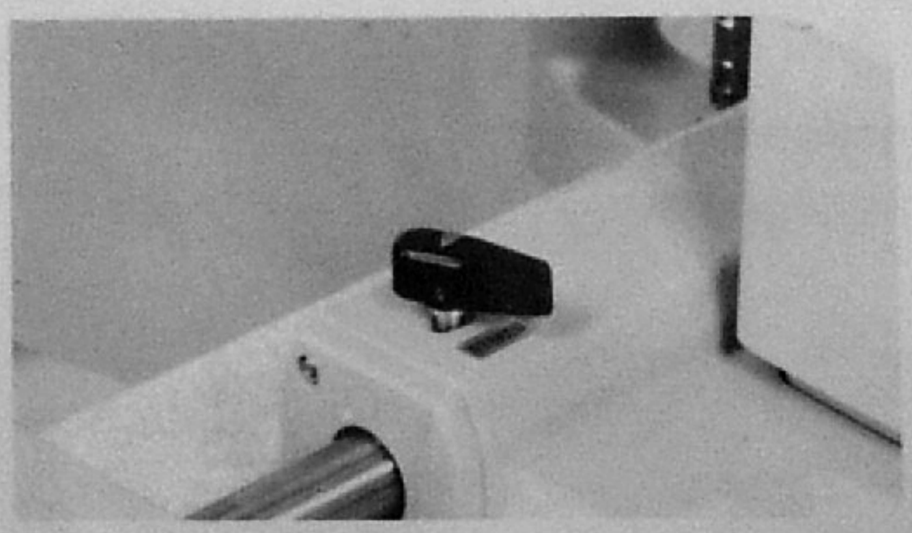
(4) Insert the required filter in the filter frame and push the filter frame fully into the filter turret.



(5) Attach the filter changing cover ㉔ and tighten its screws.
(6) To take out the filter frame, first, take off the filter changing cover. Then, align the required filter frame in the opening. Pull the filter frame out, while pushing it towards the left, at the same time.

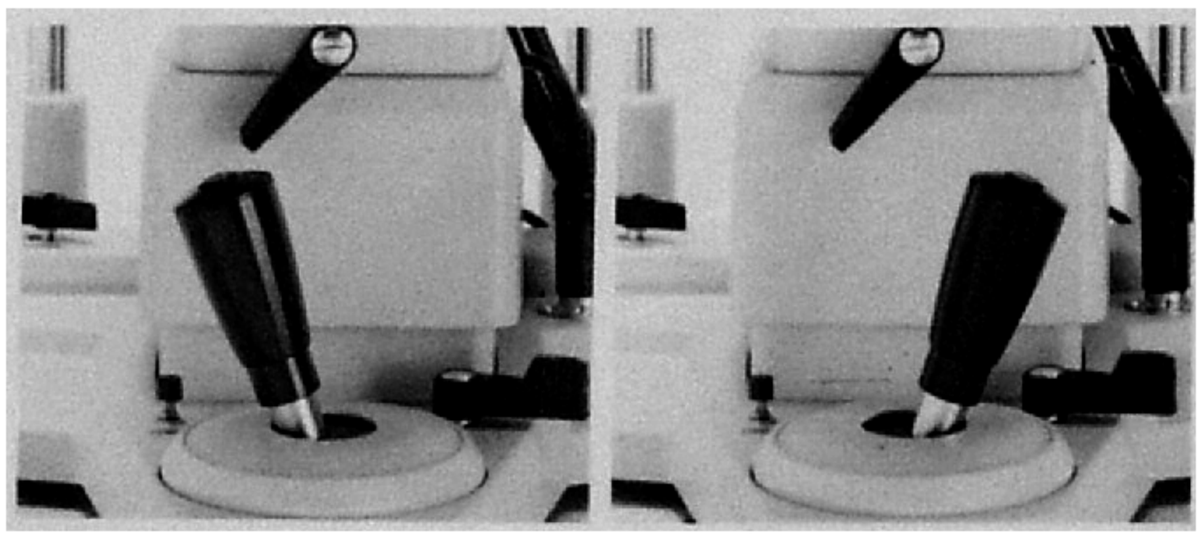
5-5 Stereo Photography

(1) Stereo photography is possible with a special base parallel sliding system, for moving the base 1mm to the right and left for taking two exposures. Align the light beam to the patient's pupil and move the base until the brightness of the retinal image is uniform. Basic procedures are same as for color retinal photography. Namely, set the patient's pupil and the optical head to the proper position. Coincide the light beam properly to the optical axis of the patient's pupil. If not, flare will occur on one side.
(See (4). How to Align the Light Beam to the Patient's Pupil on page 21.
(2) Tighten the stereo photo locking lever ㉑



(3) Move the base to its limit in both the right and left directions and release the shutter. If not moved fully, the stereoscopic effect will not be proper. When moving the base, always fix the arm to prevent movement. Furthermore, do not move the base strongly

when shifting, as the movement may exceed its limits.



[6] SPECIFICATIONS

Angle of coverage: . . . . . 50°, and 20° with manual switching.
Working distance: 45mm
Area photographed: . . . . . 26mm diameter (22mm on short side) on 35mm film.

Photographic magnifications:
With 35mm Camera at zero diopter . . . . . 1.7X at 50°, 2.5X at 35° and 3.7X at 20°
With Polaroid Attachment at zero diopter . . . . . 4.6X at 50°, 6.8X at 35° and 10.1X at 20°
Total observation magnification: . . . . . 11X at 50°, 16.4X at 35° and 24.4X at 20°
Diopter compensation range for patient's eye:
0 setting . . . . . -10 to +6 diopter
+ setting . . . . . +5 to +22 diopter
– setting . . . . . -22 to -9 diopter
A setting . . . . . Ocular anterior photography (+21.5 to +41 diopter)

Astigmatic correction range
3D rotating angle . . . . . 180°
6D rotating angle . . . . . 180°

Filters
Fluorescein photography . . . . . Spectrotech type interference filter
Red-free photography . . . . . Green filter
Other filters . . . . . Two blank settings for inserting filters of user's choice.

Illumination diaphragm: . . . . . Two step changing system for patient's pupil size.
Data photography: . . . . . Number and name can be photographed coincidentally. Four digit additive counter coupled to shutter action. Timer activated with push-button switch, shows time from 0000 to 999.9 seconds.

Base movements:
Coarse . . . . . 80mm longitudinally; 110mm laterally.
Fine . . . . . 15mm cross-slide adjustment
Optical head swing: . . . . . Up to ±30° of the arc lateral swing
Optical head vertical travel: . . . . . 30mm (15mm up; 15mm down)
Optical head tilt (Model TRC-50VT) . . . . . 15° up; 15° down
Base movement for stereo photography: . . . . . ±1mm laterally.
Chin-rest vertical travel: 80mm

Power Supply Unit (Electronic Flash Device)

Primary input: . . . . . AC 100, 120, 220 and 240 volts, adjustable with voltage selector and built in transformer; 50/60 Hz.

Output rating:

For observation . . . . . AC 8V max.; consecutively variable.
For photography . . . . . DC 280V; 18—300WS adjustable in 9 steps.
For electro-magnetic digital counter . . . . . DC 15V; 100mA
For annular fixation target lamp . . . . . DC 2V; 10mA
For motor-drive . . . . . DC 9V; 2A
For Polaroid attachment . . . . . DC 6.2V; 1.5A
For quick return mirror . . . . . DC 20V
For Polaroid attachment shutter . . . . . DC 24V

Flash recharging time (with 100V input voltage):

At 18—150WS, within 0.5 sec.
At 200—300WS, within 1 sec.

Dimensions:

Instrument (50V) . . . . . 730mm wide x 603mm high x 492mm deep
Instrument (50VT) . . . . . 730mm wide x 660mm high x 492mm deep
Control console . . . . . 230mm wide x 120mm high x 170mm deep
Power Supply Unit . . . . . 278mm wide x 529mm high x 398mm deep

Weights:

Instrument (50V) . . . . . 39 Kgs.
Instrument (50VT) . . . . . 42 Kgs.
Control console . . . . . 2.7 Kgs.
Power Supply Unit . . . . . 30.5 Kgs.

Power Consumption: . . . . . 1.5 KVA

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

[7] EXCHANGE OF LAMPS AND FUSES AND SPARE PARTS.

7-1 Exchange of Lamps and Fuses

1. Exchanging the Illumination Lamp

(1) At first, switch off the power switch ⑱ of the power supply unit, after which the power cord ⑦③ from the AC power supply should be disconnected. Then, exchange the lamp.

(2) Loosen the illumination lamp locking ring ⑭ and pull out the illumination lamp socket ⑬ . (Do not touch immediately after switching off, because the lamp will be very hot.)

(3) Insert the new illumination lamp straight in and fix securely with the illumination lamp locking ring ⑭ . (Do not touch the illumination lamp with bare fingers because the surface of the lamp will become dirty with fingerprints, etc. and these stains will lead to cloudiness of the lamp. Do not touch the lamp except for the illumination lamp locking ring ⑭ .)



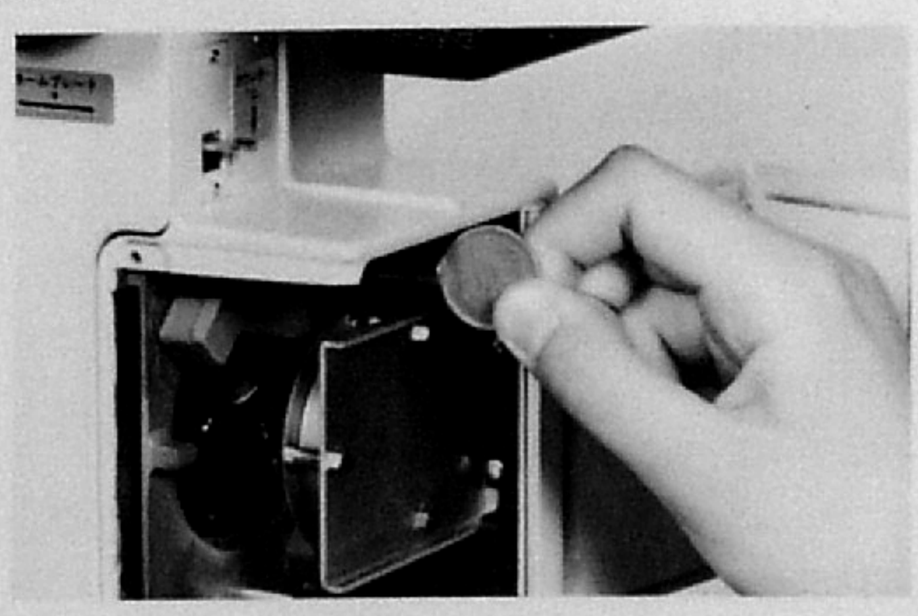
2. Exchanging the Xenon Flash Lamp

(1) After switching off the power switch ⑱ of the power supply unit, disconnect the power cord ⑦③ .

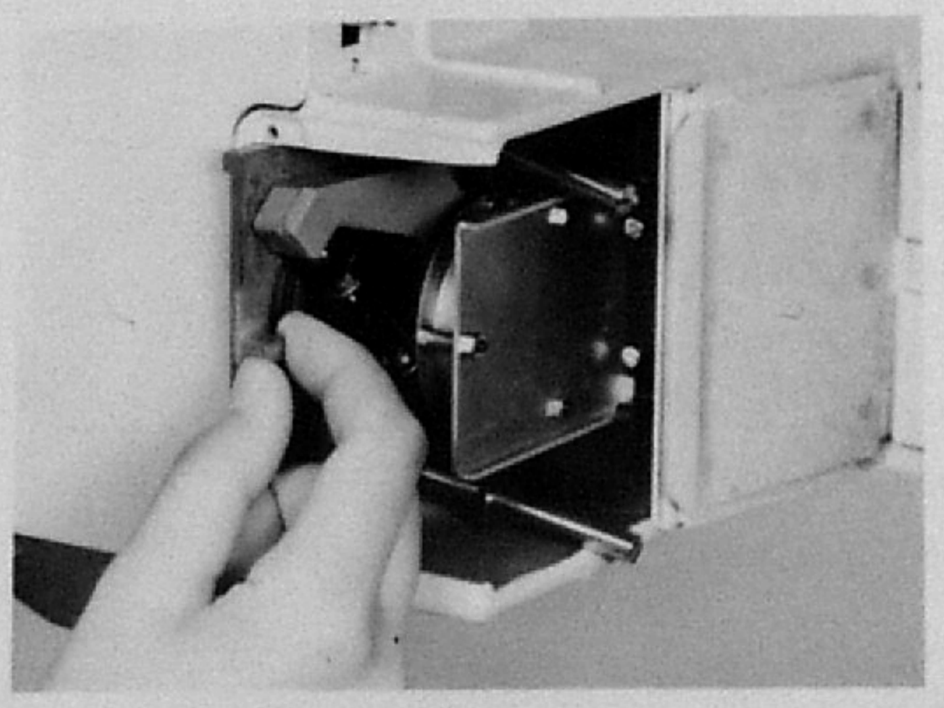
(2) Wait about five minutes for electric discharge. Loosen two screws of the Xenon lamp house cover in the counter-clockwise direction with a coin and take off the cover.



(3) Unscrew two setscrews of the Xenon lamp in the counter-clockwise direction with a coin.



(4) Pull the knob of the Xenon lamp straight out. (Do not touch the Xenon lamp immediately after switching off, as it is very hot. Pull out the Xenon lamp after discharging has taken place for five minutes.)



(5) Insert the new Xenon lamp straight in. (Do not touch the Xenon lamp with bare fingers as the surface of the lamp will be dirtied with fingerprints and other spots. Use gloves when exchanging the lamps, as otherwise, the lamp will become clouded.)

(6) Tighten two setscrews of the Xenon lamp with a coin in the clockwise direction.

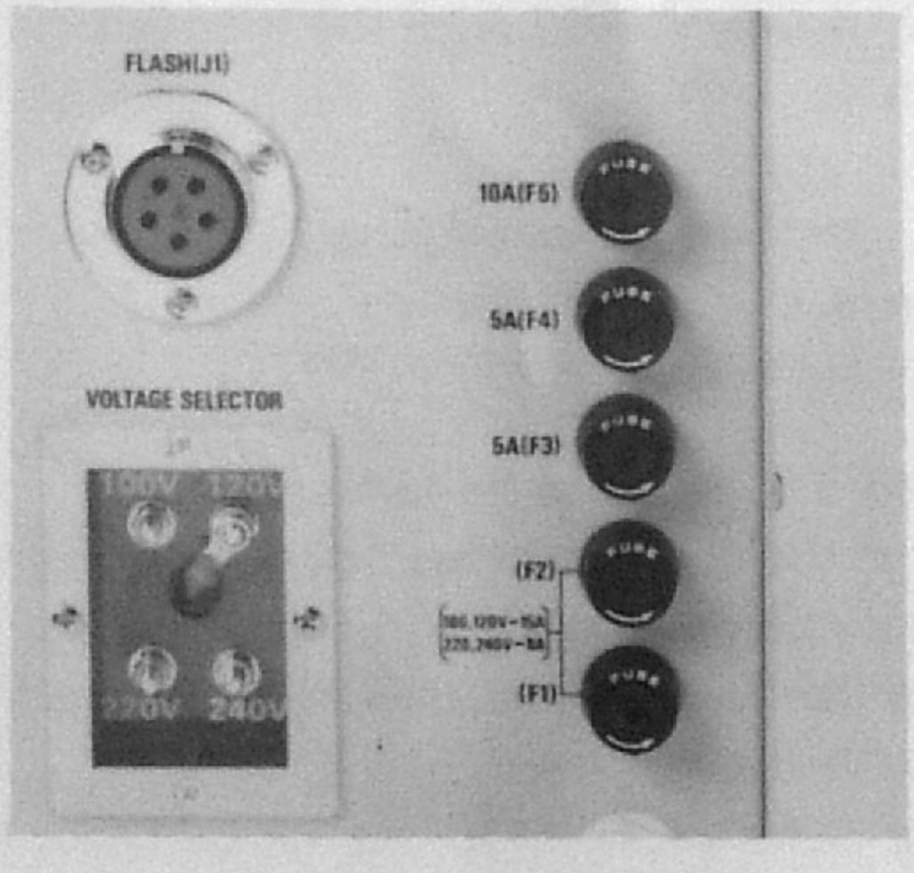
(7) Finally, screw in two screws of the Xenon lamp house cover with a coin in the clockwise direction.

3. Exchanging the Fuses

(1) At first, switch off the power switch ⑱ of the power supply unit, and disconnect the power cord ⑦③ from the AC power supply. After that exchange the fuse.

(2) Check the fuses on the rear of the power supply unit. Unscrew the fuse holder ⑦⑤ with a screwdriver in the counter-clockwise direction and exchange the fuses. At the same time, check whether the voltage selector is set to the required voltage.

Fuse for		Condition when fuse is blown
F5	Illumination Lamp	Not illuminated.
F4	35mm Camera Body	No operation.
F3	Control Circuit	Pilot lamp not lighted.
F2	Input Power Supply	No operation.
F1	Input Power Supply	No operation.



7-2 Spare Parts

When ordering spare parts, please indicate the part number and the quantity required, in addition to the description.

Description	Part Number
Xenon Lamp	405241810
Illumination Lamp	405241130
Chin-rest Pad	403104082
10A Fuses (F5)	405245434
5A Fuses (F4, F3)	411076005
15A Fuses (F2, F1)	405245432

5 name plates 40524-13385 $

[8] CHECK BEFORE REQUESTING REPAIRS

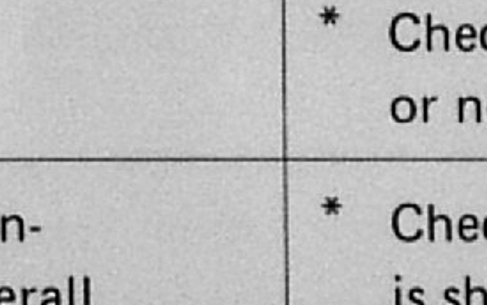
(1) If something is wrong with the instrument, please check the following points before contacting the authorized distributor for repair.
(2) When checking the instrument, do not forget to disconnect the power cord from the AC power supply.
(3) Please check whether the following cords are securely connected.
    Shutter release connector cord ㉓
    Optical head control cord (J2) ㉘
    Electronic flash connector cord (J1) ㉙
    Power supply unit control cord (J3) ㉟
    AIT connector cord ㊱
    Chin-rest connector cord ㊲
(4) Please check whether the power cord ㉝ is properly connected.

Troubles	Check Points
Illumination lamp does not light up.	* Have you checked clauses (3) and (4) preceding. * Check fuses F1 (15A), F2 (15A) and F5 (10A). * Check whether the illumination lamp locking ring ⑭ is tightly screwed in. * Check whether the lamp has been used for more than its normal service-life (100 hours).

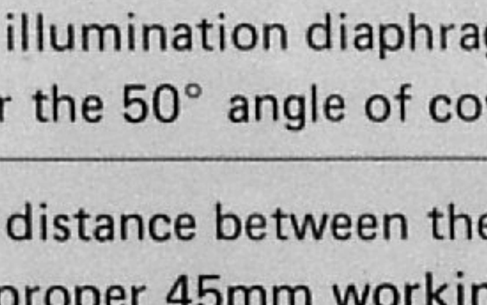
Troubles	Check Points
Xenon lanp does not flash.	* Recheck clauses (3) and (4). * Are the mode switches ⑱ and flash intensity switches ⑲ depressed. * Check fuses F1 (15A), F2 (15A), F3 (5A) and F4 (5A). * Check insertion of the Xenon lamp. * Has the Xenon lamp been used more than its normal service-life (10,000 flashes).
Annular fixation target ㉖ does not light.	* Check clauses (3) and (4). * Check fuses F1 (15A), F2 (15A) and F3 (5A).
35 mm Lower Camera does not work.	* Check clauses (3) and (4). * Check whether the motor drive switch is set to "ON". (If the camera does not work when set to ON, switch "OFF" once and then switch "ON" once more.) * Check fuses F1 (15A), F2 (15A) and F4 (5A). * Check whether "35MM LOWER" of the mode switches ⑱ is depressed. * Check whether the 35mm camera is securely attached.
35mm Upper Camera does not work.	* Check clauses (3) and (4). * Check fuses F1 (15A), F2 (15A), F3 (5A) and F4 (5A). * Check whether 35MM UPPER of the mode switches ⑱ is depressed. * Check whether the 1X relay lens adapter is attached firmly. * Check whether the 35mm lower camera is attached firmly to the relay lens. * Check whether the 35mm lower camera is fixed to the optical head.
Polaroid Attachment does not work	* Check clauses (3) and (4). * Check fuses F1 (15A), F2 (15A), F3 (5A) and F5 (5A). * Check whether "POLA" of the mode switches ⑱ is depressed. * Check whether the Polaroid Attachment is securely attached on the accessory mount ⑫ . * Check whether the 35mm lower camera is fixed on the optical head.
Although Polaroid Attachment works, photography is not possible.	* Check whether Polaroid film is loaded in the Polaroid Attachment. * Check whether the Xenon lamp flashes.
No image on monitor screen when TV relay lens is attached on the main body.	* Check clauses (3) and (4). * Check fuses F1 (15A), F2 (15A), F3 (5A) and F4 (5A). * Check whether "TV" of the mode switches is depressed. * Check whether the 35mm lower camera is securely attached to the optical head.
Exposure counter does not work	* Check clauses (3) and (4). * Check fuses F1 (15A), F2 (15A) and F3 (5A). * Check whether the Xenon lamp flashes.
Exposure counter does not illuminate.	* Check whether film is loaded.

Troubles	Check Points
Adjustable Instrument Table does not work.	* Check clauses (3) and (4). * Check whether the AIT connector cord ⑯ is accurately connected to the receptacle for up-down movement of the adjustable instrument table. * Check the 5A fuse of the Adjustable Instrument Table.
When flare cannot be eliminated at the 50° coverage.	* Check whether the angle changing lever is properly positioned at 50° or 35° or 20°. * Check whether the illumination diaphragm knob ⑦ is protruding. (It should be protruding.) * Check whether patient's eye and optical head are properly positioned. * Is the pupil's eye fully dilated.
Correct focus is not possible.	* Check whether the eyepieces ㊷ is properly adjusted for the user's eyesight. * Check whether the diopter compensation lever ② is properly adjusted for the patient's dioptric power. * Check whether the patient's eye is clouded, due to cataract or other diseases. * Check whether the patient's eye are filled with tear.
Operator cannot see the patient's eye.	* Check whether the illumination lamp is lighted or not. * Check whether the cap of the objective lens is on or not. * Check whether both barrier and excitation filters are properly inserted or not. * Check whether the "TV" of the mode switches ㊽ is depressed or not. * Check whether the angle changing lever is positioned between settings or not. * Check whether the astigmatic correction knob ③ is properly positioned. * Check whether diopter compensation knob ② is properly positioned.
Photograph of the retinal peripheries is dark.	* Check whether the distance between the patient's eye and objective lens is longer than the proper 45mm working distance. * Check whether the illumination diaphragm knob ⑦ is protruding or not, when set for the 50° angle of coverage.
Photograph is influenced by overall flare.	* Check whether the distance between the patient's eye and optical head is shorter than the proper 45mm working distance. * Check whether the illumination diaphragm knob ⑦ protrudes or not.
Vague white dots are seen through the finder and also photographed.	* Check whether there are tears and dirt on the objective lens surface. (**Note:** See, Clause 5 on page 9)

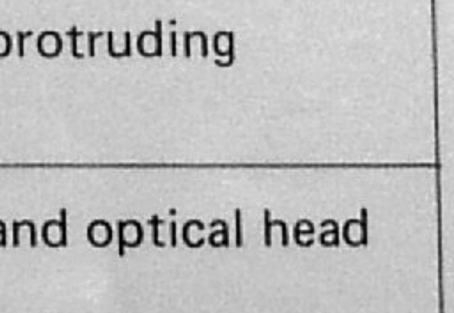
Photograph of the retinal peripheries is dark.



Photograph is influenced by overall flare.



Vague white dots are seen through the finder and also photographed.



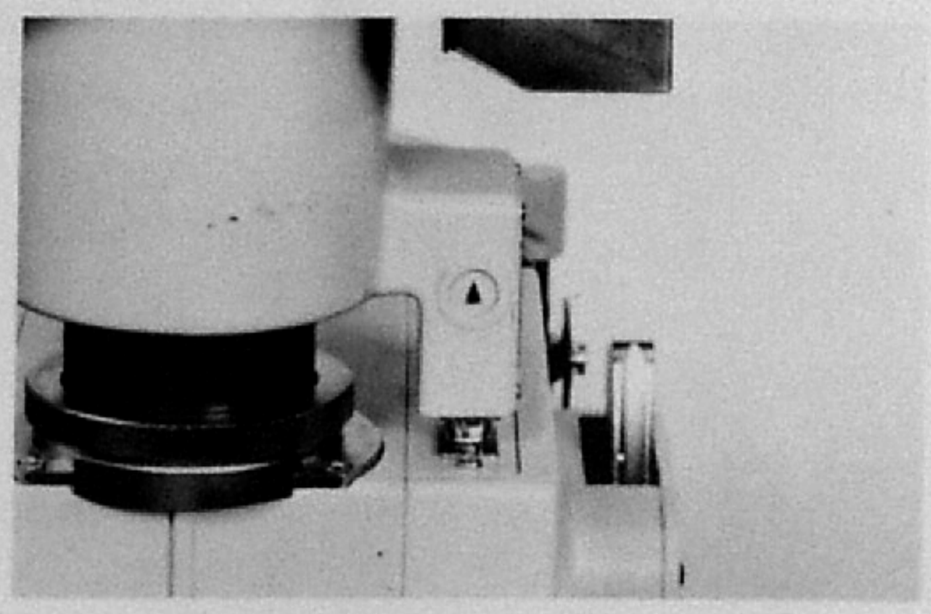
[9] OPTIONAL ACCESSORIES

TOPCON optional accessories increase the range of photography possible with the Models TRC-50V and TRC-50VT.

*** Pointers on Using Accessories**

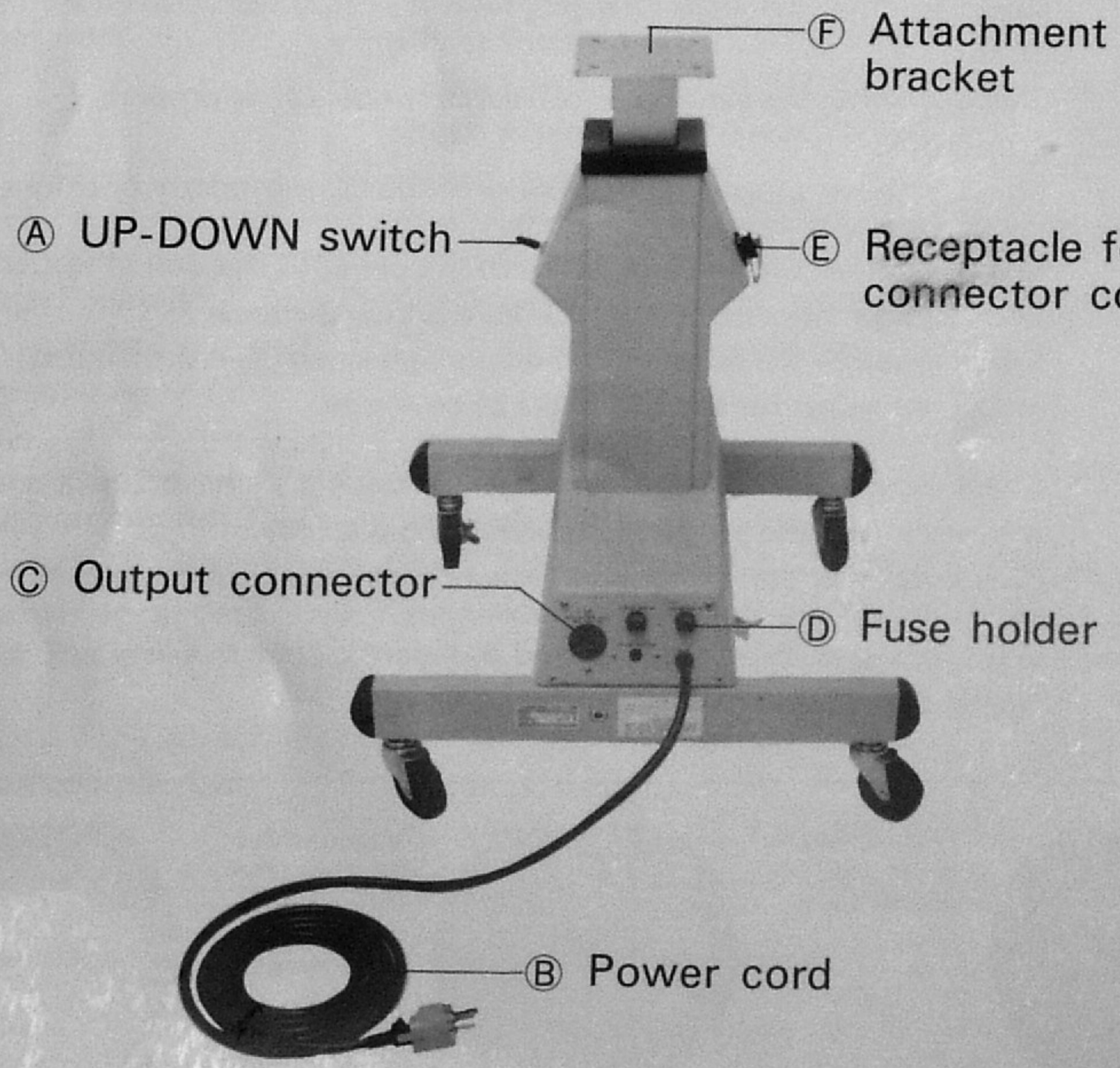
(1) When an accessory is not being used, cover it with its exclusive cap.
(2) Do not touch the lens surface or other important points directly with your fingers.
(3) Depress the correct mode switches.
There are triangular, green-colored pilot lamps on the Polaroid Attachment PA-9C, Polaroid Attachment PA-9F and 1X Relay Lens Adapter.
The pilot lamp lights up when the accessory is attached and the proper mode switch is depressed. In other words, the indicator lamp shows that the photograph is now taken by the accessory fixed to the accessory mount ⑫ and not the lower camera. If the pilot lamp does not light up, check whether the proper mode switch is depressed or not.





9-1 Adjustable Instrument Table AIT-10B

1. Nomenclature



2. Features

The TOPCON Adjustable Instrument Table AIT-10B is used for the mounting of table surfaces of the Models TRC-50V/50VT, although it can, of course, be used with other TOPCON Ophthalmic Instruments, too.

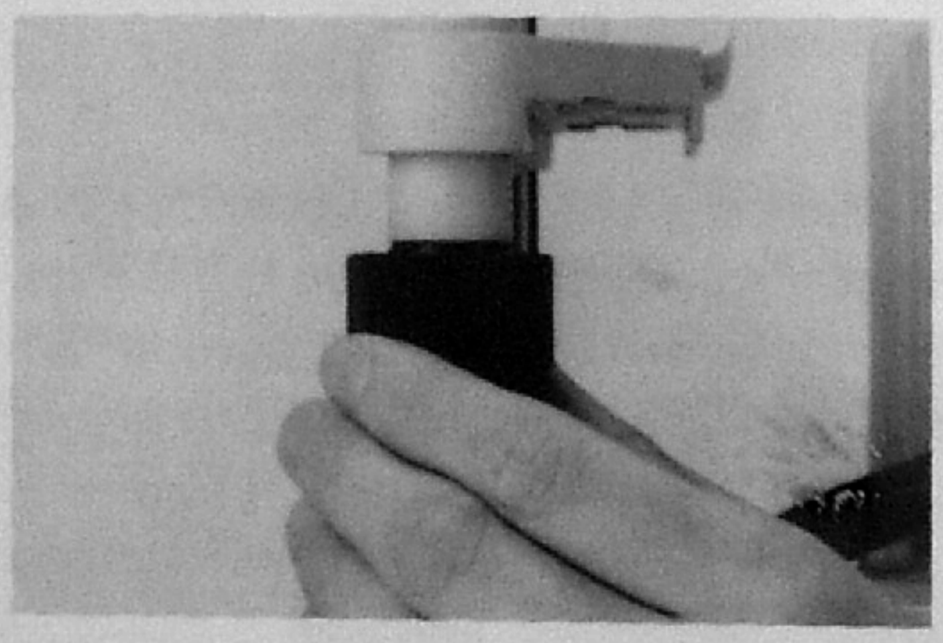
The adjustable instrument table provides a sturdy and stable support, with free-wheeling movements and motorized vertical adjustments, with the AIT up-down switch ⑭ on the Models TRC-50V/50VT used very conveniently for vertical adjustments.

Four large-size rubber casters provide smooth and easy movements for heavy loads up to 80 kgs., with stoppers preventing movements during measurements, but, at the same time, the power supply unit can be moved interlocked with the adjustable instrument table because the two can be interconnected.

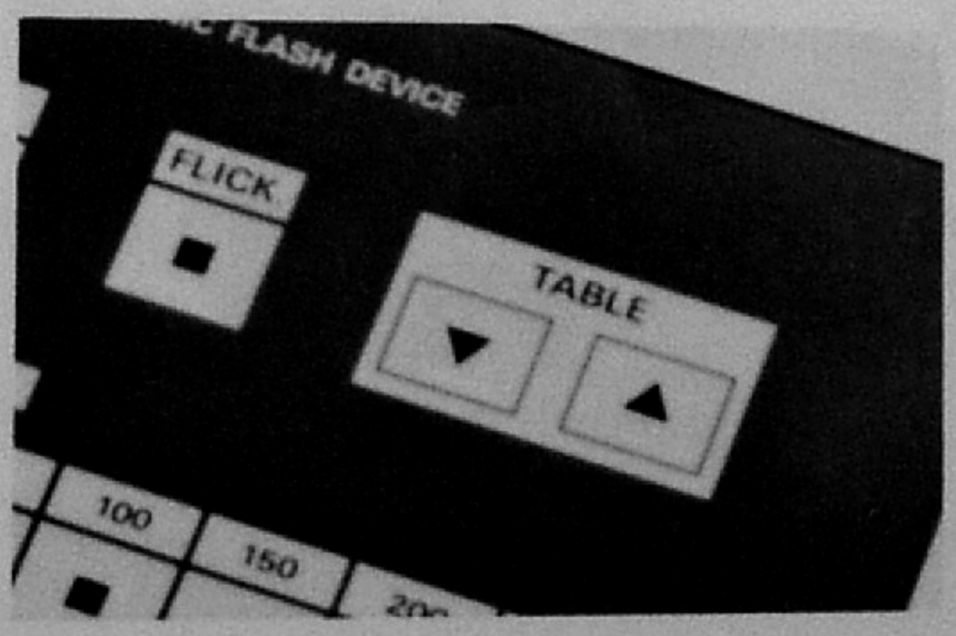
3. How to Operate the AIT-10B

(1) With the AIT up-down switch ⑭

1) Connect the power cord Ⓑ to a convenient receptacle.
2) Connect the AIT connector cord ⑯ to the receptacle for the AIT connector cord Ⓔ.



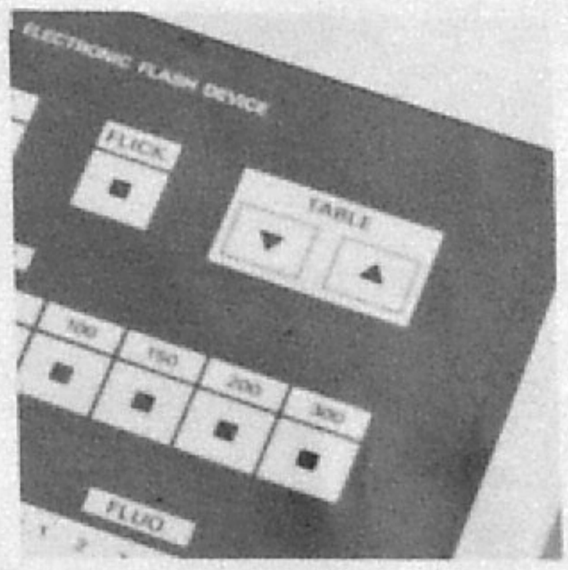
3) The attachment bracket can be raised or lowered with the AIT up-down switch ⑭, which should be pressed on the UP or DOWN side until the required height is attained.



(2) With the up-down switch of the AIT-10B Ⓐ.

1) Connect the power cord Ⓑ to a convenient receptacle.
2) The attachment bracket is raised or lowered with the UP-DOWN switch of the AIT-10B Ⓐ simply moved in the required direction.
Centering the switch will stop the operation instantly.

NOTE: Do not depress the AIT up-down switch on the console ⑭ and UP-DOWN switch of the AIT-10B Ⓐ simultaneously, as the fuses will blow out.





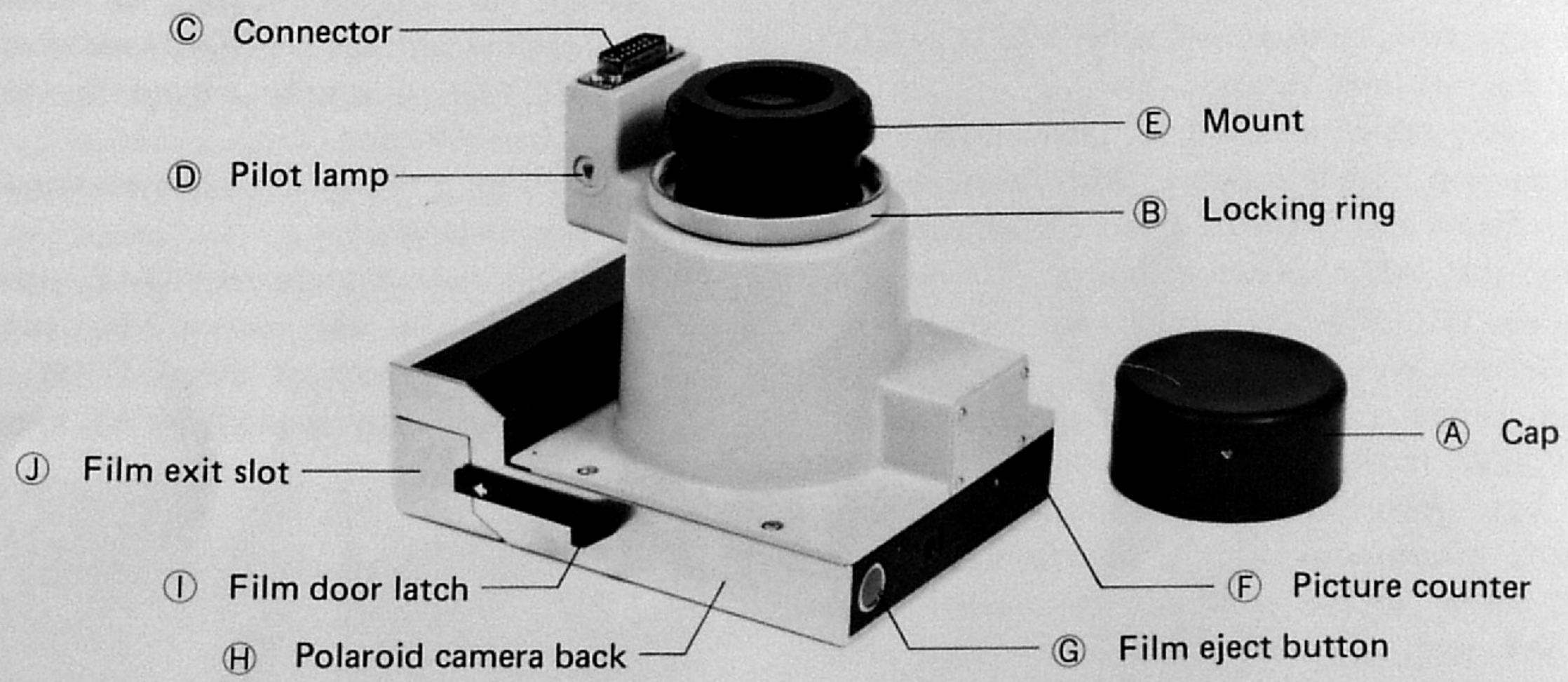
4. Specifications

Maximum table height:	902mm
Minimum table height:	652mm
Vertical adjustment range:	250mm
Maximum load:	55 Kgs.
Table sizes to be used:	408mm x 560mm, 408mm x 730mm
Overall dimensions (body only):	540mm (L) x 530mm (W) x 620mm (H)
Weight (body only):	30 Kgs.
Electricity:	AC 100, 120V, 220V or 240V, adjustable with built-in transformer and voltage selector.
Power consumption:	270VA
Frequency:	50/60 Hz.

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

9-2 Polaroid Attachment, Model PA-9C

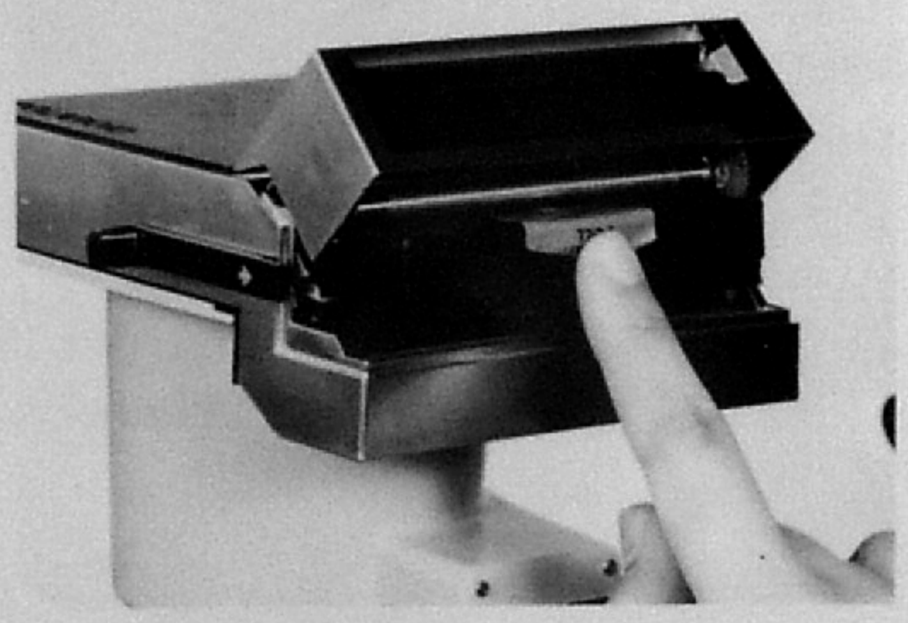
1. Nomenclature

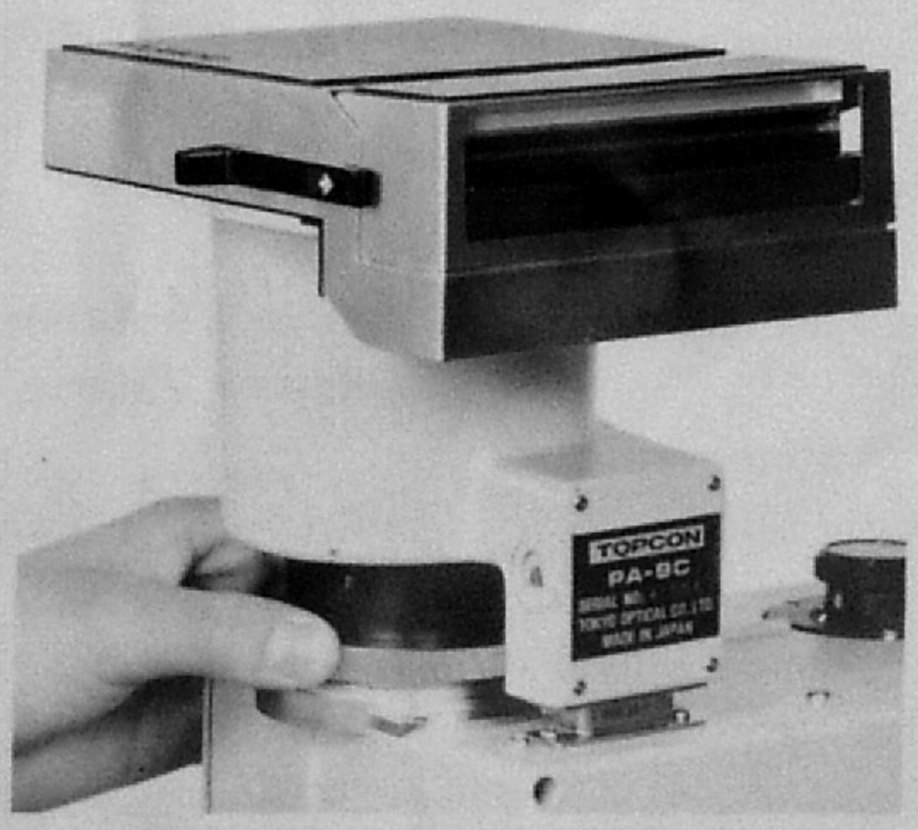


2. Attaching the Model PA-9C to the Optical Head

(1) Remove the accessory mount cap ㉚ .

(2) Attach the mount Ⓔ and the connector Ⓒ to the optical head and fix securely with locking ring Ⓑ .





* Depress the film eject button Ⓖ once and eject the backing paper. Do not use the shutter release button for this purpose but only the film elect button Ⓖ . Furthermore, depress the "NF" flash intensity switch ㊾ , because the flash may surprise the patient.

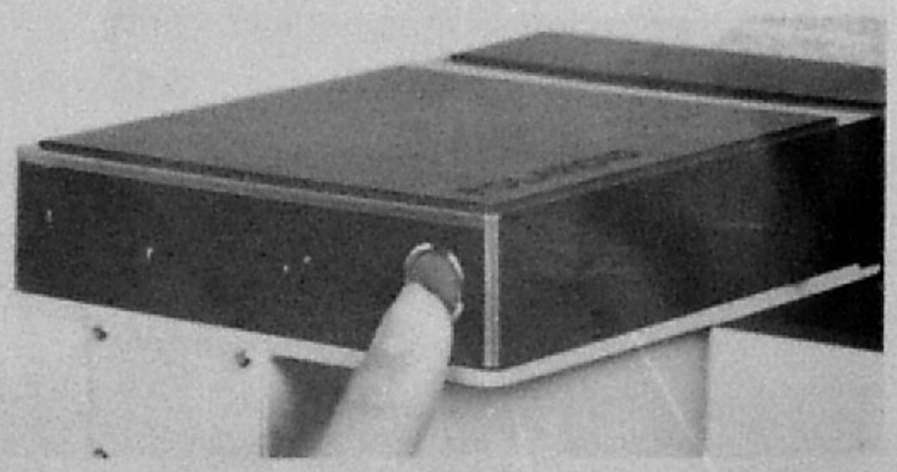
3. Procedures for Taking Polaroid Photographs

(1) Depress the "POLA" mode switch ㊽ on the control console.

(2) Load the Polaroid Land film pack.

* Push the film door latch Ⓘ , in the arrow-indicated direction, and the film exit slot will open.

* Insert the film pack fully, with the battery contacts on the film pack pointing upwards. Then, close the film exit slot. (If the film pack is not inserted properly, it will not be possible to close the film exit slot.)

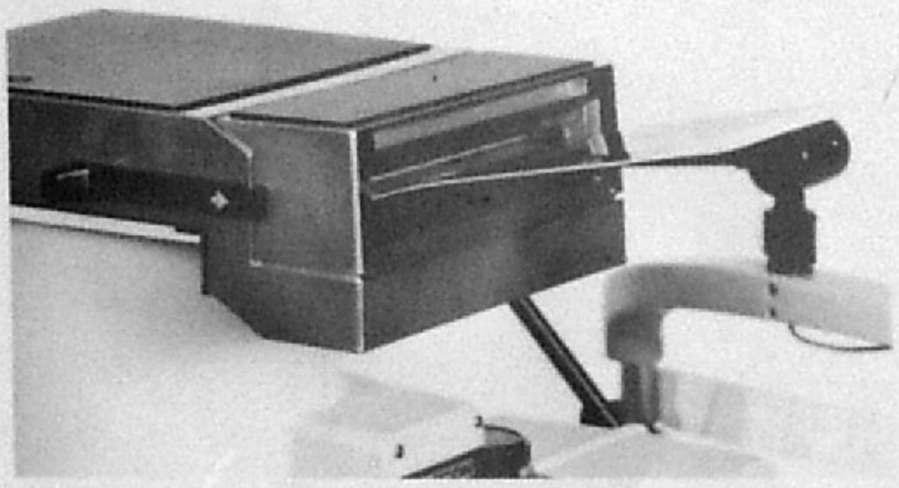


(3) Set the flash intensity switches ㊾ , based on the film being used and the structure being photographed.

Film	Flash Intensity
SX-70	200WS
Polaroid 600	50WS

(4) Turn the filter switching knob (6) to "N".

(5) Alignment and photography are same as for normal retinal photography. By depressing the shutter release button ⑱ of the control lever, the film is ejected automatically.



NOTE: It is not necessary to depress the film eject button Ⓖ except when ejecting the backing peper.

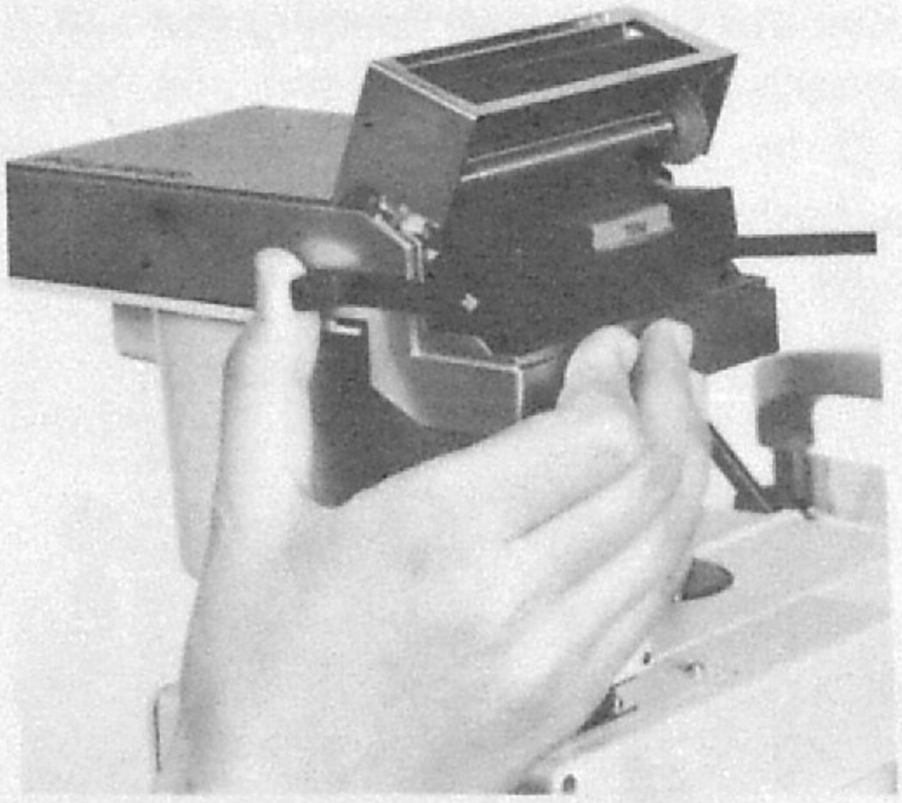
(6) Development of the Polaroid film takes from 3 to 5 minutes, although it can be viewed in about a minute.

(7) One Polaroid film pack contains 10 sheets of film. The number of unexposed sheets remaining is displayed by the picture counter Ⓕ.

NOTE: When the picture counter Ⓕ indicates "O", a warning buzzer will sound. In order to stop the warning buzzer, pull out the film pack or depress one of the other three mode switches except "POLA".

(8) To exchange the film pack, push the film door latch Ⓘ in the direction indicated by the arrow. The film exit slot Ⓙ will open and the empty film pack will be ejected.

Inserting for a fresh pack.



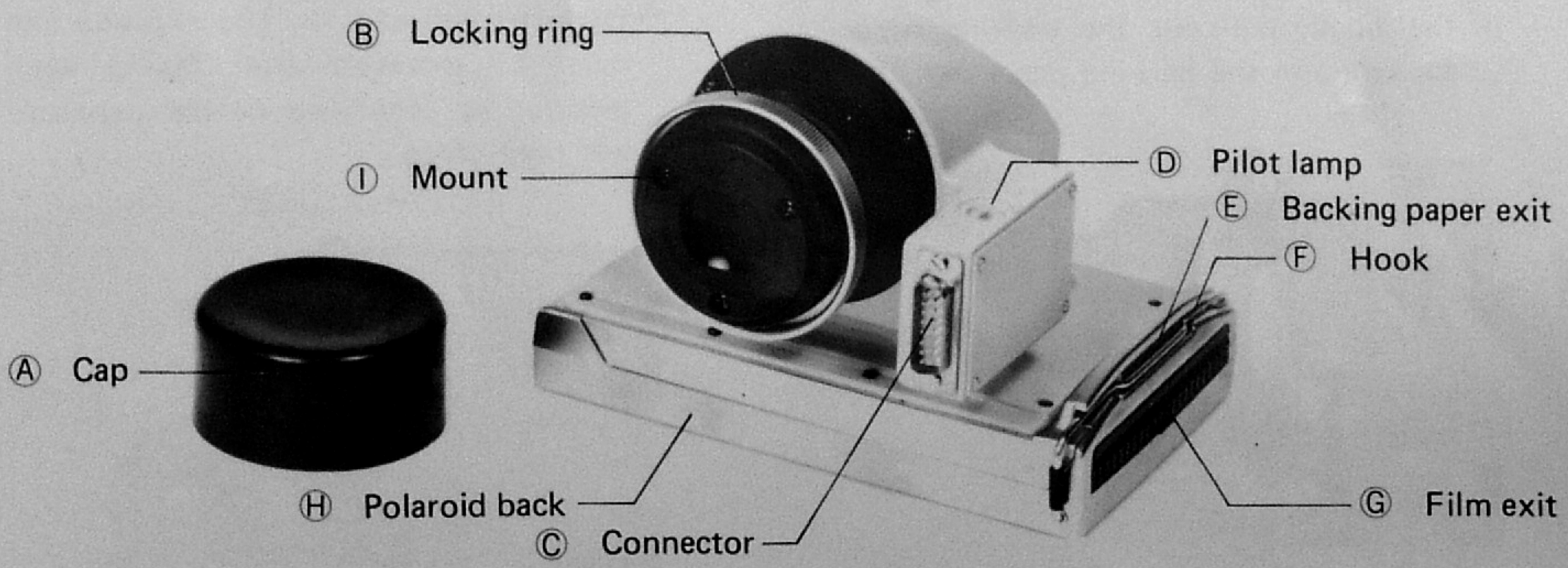
4. Specifications

* Angle of coverage	50°, 35° and 20°
* Area photographed on film	70mmϕX60mm
* Photographic magnifications	4.6X at 50°; 6.8X at 35°; 10.1X at 20°
* Film used	Polaroid SX-70 Land film; Polaroid 600
* Dimensions	158 (W) x 138 (H) x 125 (D) mm
* Weight	1.2 Kgs.

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

9-3 Polaroid Attachment, Model PA-9F

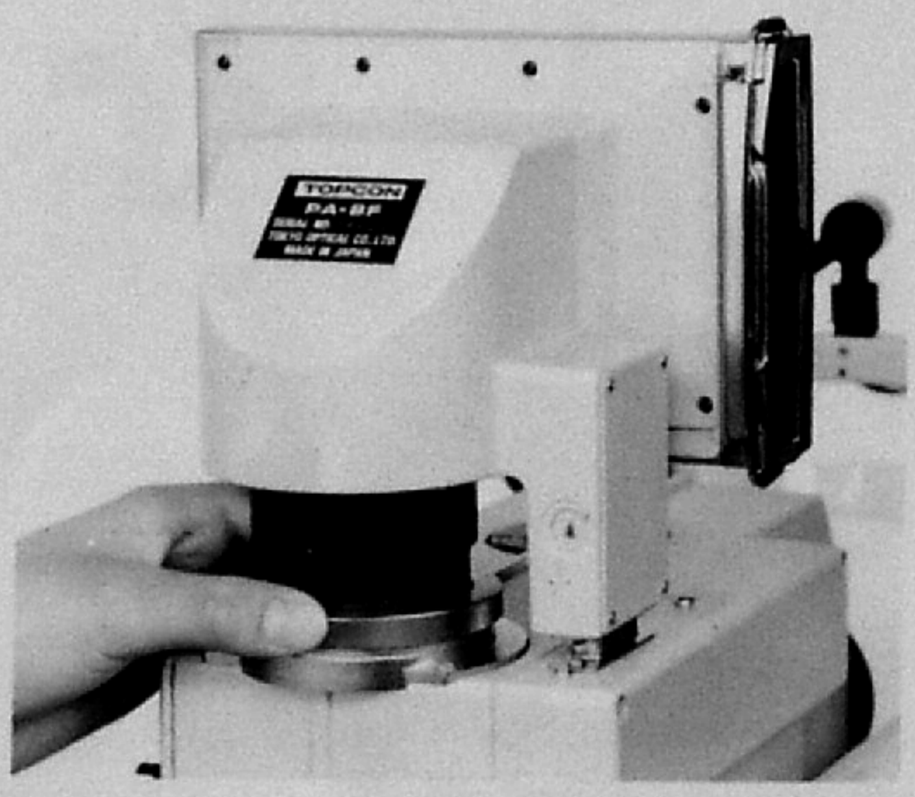
1. Nomenclature



2. Attaching the Model PA-9F to the Optical Head

(1) Remove the accessory mount cap ㉚ .

(2) Attach the mount Ⓘ and the connector Ⓒ to the optical head and fix securely with the locking ring Ⓑ .



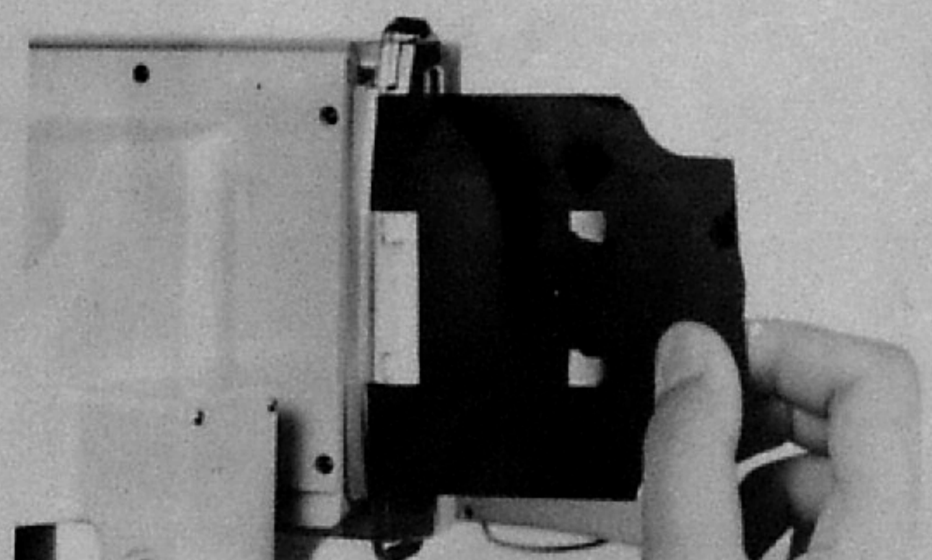
3. Procedures for Taking Polaroid Photographs

(1) Depress the "POLA" mode switch ㊽ on the control console.



(2) Load the Polaroid Land film pack.

* First, unlock the hook Ⓕ of the Polaroid back and open the cover. Then, load the film pack.
* After closing the cover and locking with the hook, pull out the backing paper appearing in the backing paper exit Ⓔ .



(3) Set the flash intensity switch ㊾ according to the film being used and the structure being photographed.

(4) For fluorescein angiography

Film	Flash Intensity
Type 667 (ASA 3000)	300WS

Turn the filter switching knob ⑥ to "PAG" and pull out the illumination diaphram knob ⑦.

Alignment and other operation are the same as for fluorescein photography with 35mm film.

(5) For normal Black-and-White Photography

Film	Flash Intensity	Filter
Type 667 (ASA 3000)	25WS	N(Normal)
	100WS	G(Green)

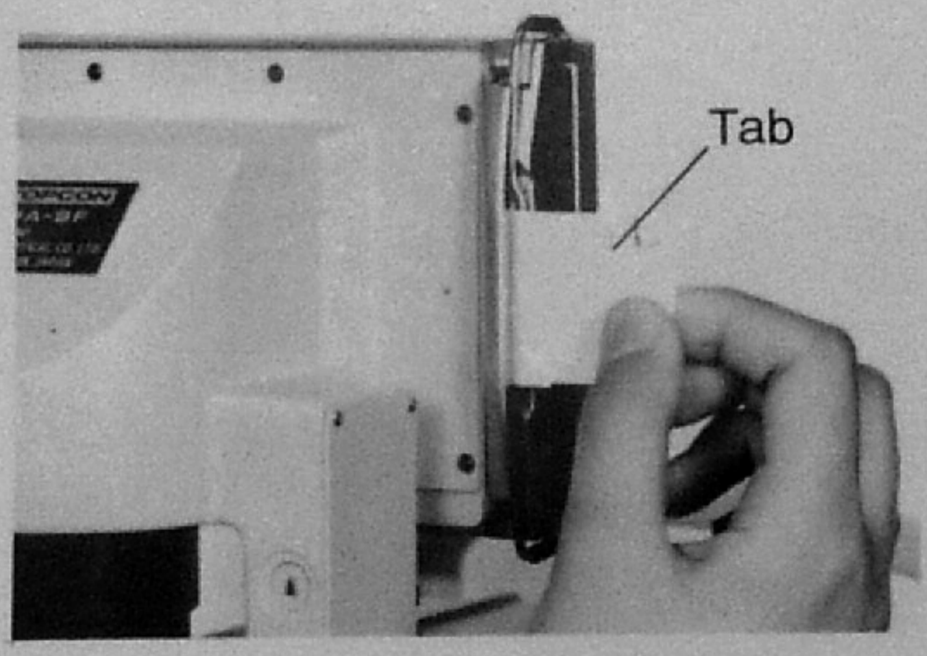
Procedures for photographing are the same as for normal fluorescein photography. Set the flash intensity switch ㊾ as per the table above.

And push in the illumination diaphram knob ⑦.

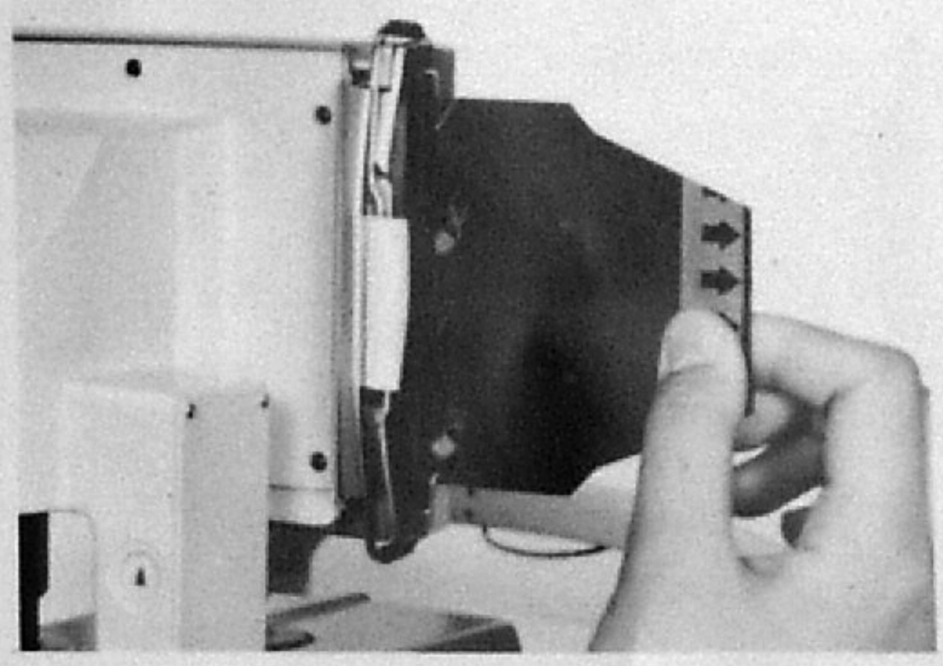
(6) Pull out the film.

NOTE

* With the Model PA-9F, the film is not ejected automatically. Pull strongly on the white tab sticking out from the backing paper exit Ⓔ and the yellow tab of the printing paper will come out from the film exit Ⓖ. The exposed film must be removed after taking each picture, as otherwise double exposure will take place.



* With the Model PA-9F, a warning buzzer will not sound, even when all the films are ejected.



(7) As the development time of the film will differ, depending on the ambient temperature, please follow the instructions supplied with the Polaroid Land pack film. Furthermore, the print should be coated, as per instructions.

(8) One Polaroid film pack contains 8 sheets of film.
For replacing the film pack, unlock the hook and open the cover, then insert a fresh pack.

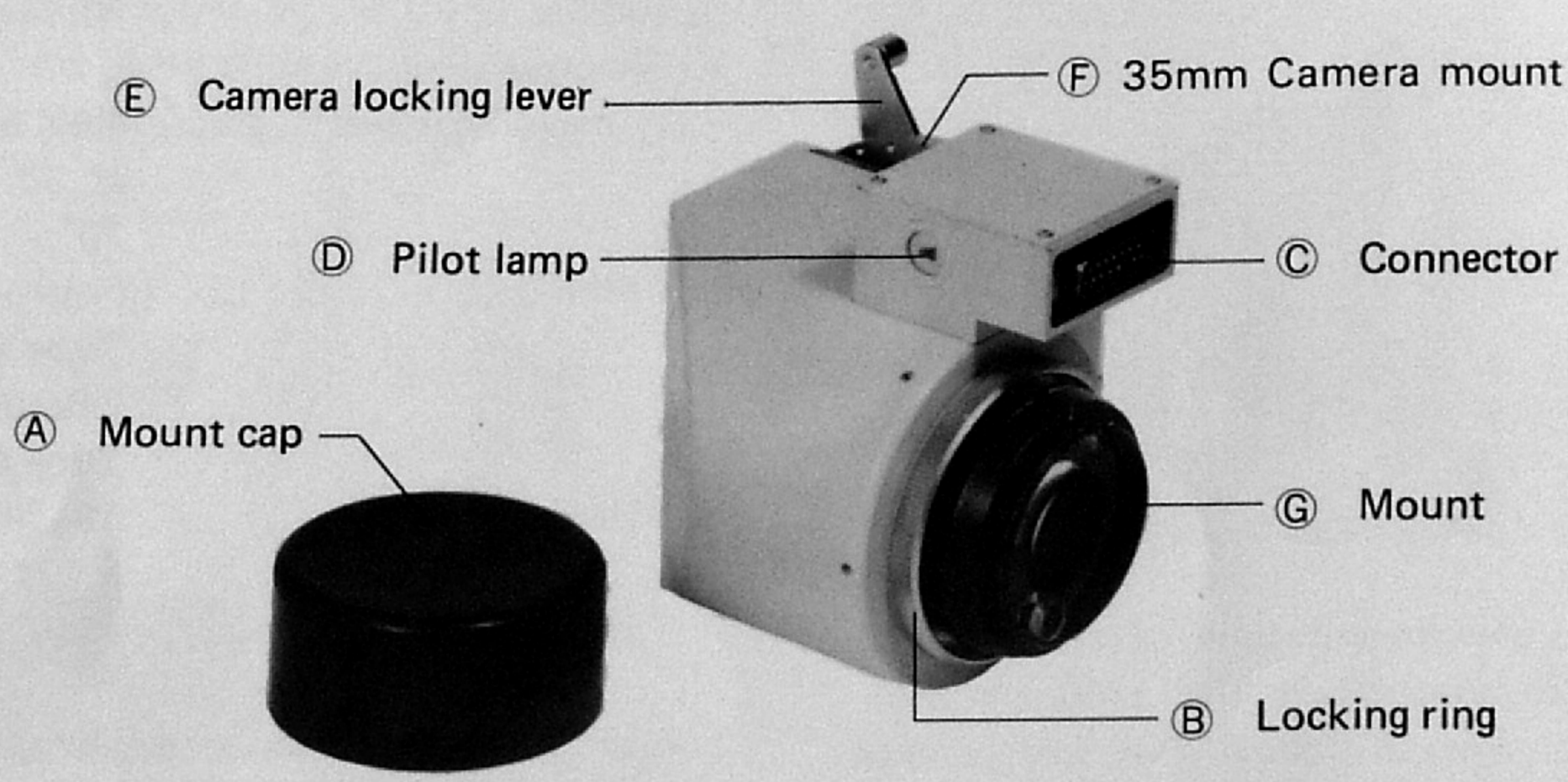
4. Specifications

* Angle of coverage	50°, 35° and 20°
* Area photographed on film	70mmϕ x 60mm
* Photographic magnifications	4.6X at 50°; 6.8X at 35°; 10.1X at 20°
* Film used	Polaroid Type 612; Polaroid Type 667
* Dimensions	167 (W) x 150 (H) x 121 (D) mm
* Weight	1.0 Kgs.

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

9-4 1X Relay Lens Adapter

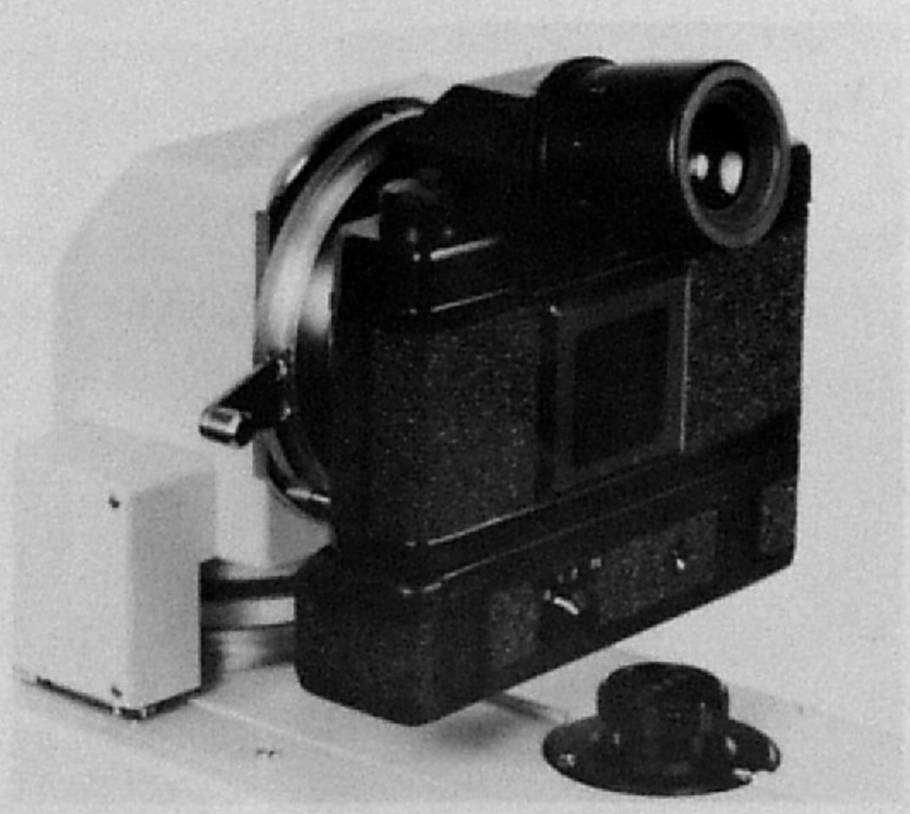
1. Nomenclature

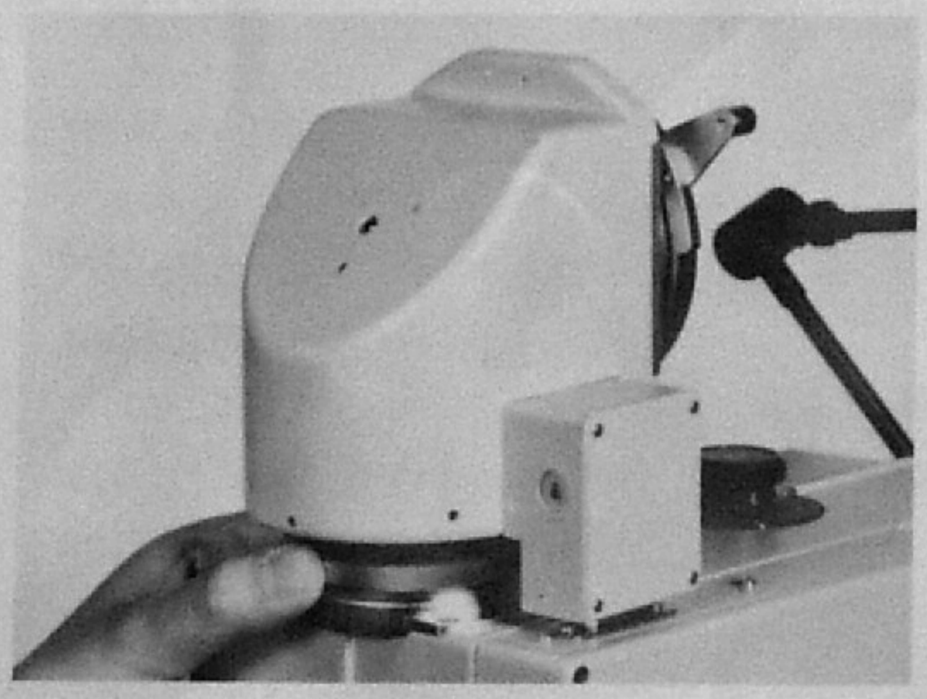


2. How to Attach the 1X Relay Lens Adapter to the Optical Head

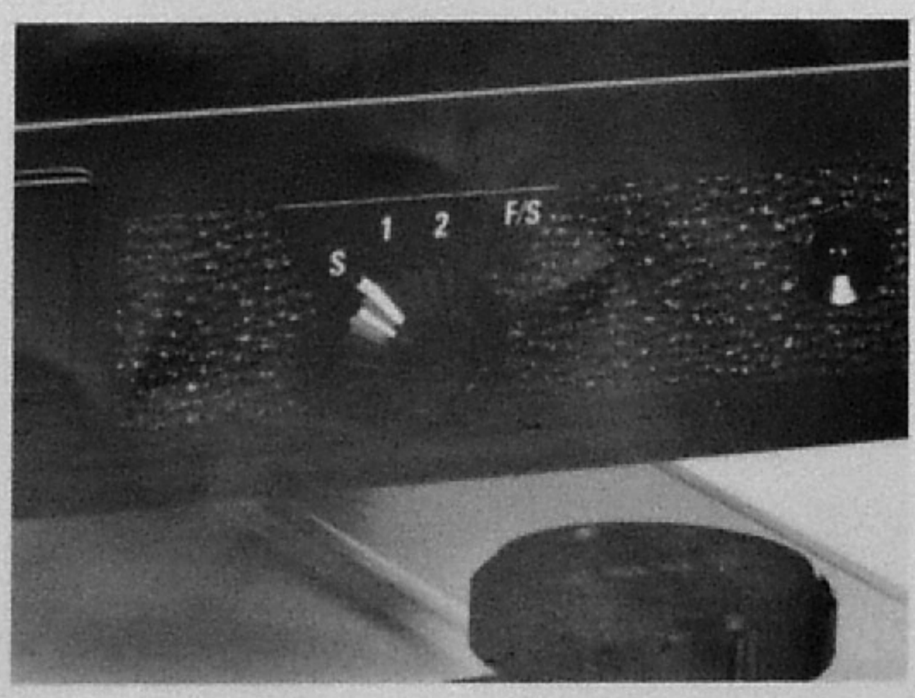
(1) Remove the cap ㉚ .

(2) Attach the 1X relay lens adapter to the optical head.
Align the mount Ⓖ and connector Ⓒ with corresponding points on the optical head.
Next, press the 1X relay lens adapter strongly against the optical head and screw in the locking ring Ⓑ until it is locked firmly.





(3) Attach the 35mm camera body to the 35mm camera mount Ⓕ .
Set the timer knob ㊷ to "S".
Turn the camera locking lever Ⓔ in the clockwise direction until it stops. Align the red mark of the camera mount ㊹ and the red mark of the 35mm camera mount Ⓕ , next press the 35mm camera against the 1X relay lens adapter and turn the camera locking lever Ⓔ in the counter-clockwise direction firmly and fix it.



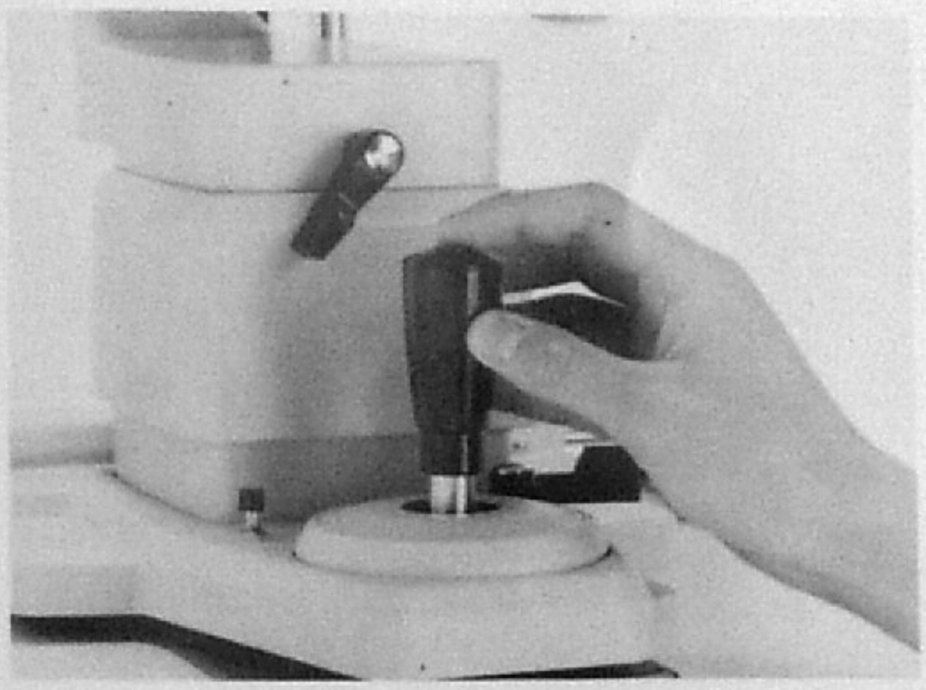
3. Procedures for Taking Photographs

(1) Depress "35MM UPPER" of the mode switches ㊽ .



(2) Depress the flash intensity switch ⑲ , suitable for the ASA film speed.

(3) Alignment and focusing of the retina is through the view finder on the 35mm lower camera. Procedures for photographing are the same as for normal color photography with the 35mm lower camera.
The 1X relay lens adapter cannot be used for rapid sequence photography but only for photography at a maximum speed of 1 frame per second. For photographing at 1 frame per second, set the timer knob ⑫ to "S" and depress the shutter release button ⑱ .



4. Specifications

* Angle of coverage . . . . . 50°, 35° and 20°
* Area photographed on film . . . . . 26mmϕ x 22mm
* Photographic magnifications at 0 diopter . . . . 1.7X at 50°
  2.5X at 35°
  3.7X at 20°
* Frame number can be photographed simultaneously.
* Dimensions . . . . . 115 (X) x 160 (H) x 120 (D) mm
* Weight . . . . . 1.2 Kgs.

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

9-5 Video Relay Lens Adapter

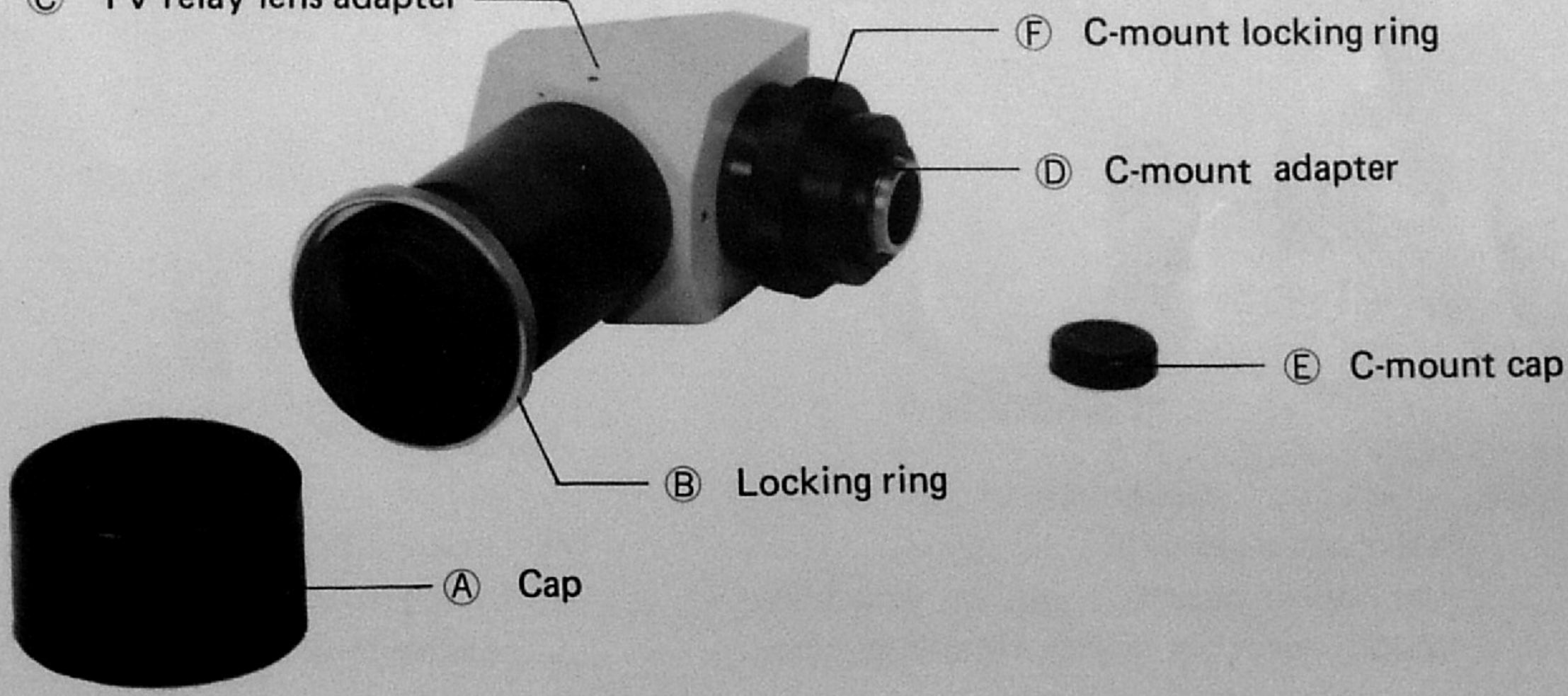
(1) Three types of video relay lens adapters are available for use with single tube 1 inch, single tube 2/3 inch or three tube 2/3 inch video cameras. Therefore, it is important that the right adapter be used with the video camera of your choice.
Both single tube video cameras have the same C-mount (whether with 1 inch or 2/3 inch tube) while the ikegami three tube 2/3 inch video camera has a P-mount.

(2) Among the recommended video cameras are:
Single tube 1 inch Hitachi HV 9017
Single tube 2/3 inch Sony DXC-1850
Tokyo Denshi VC 570
Three tube 2/3 inch Ikegami MK-309C-(P)

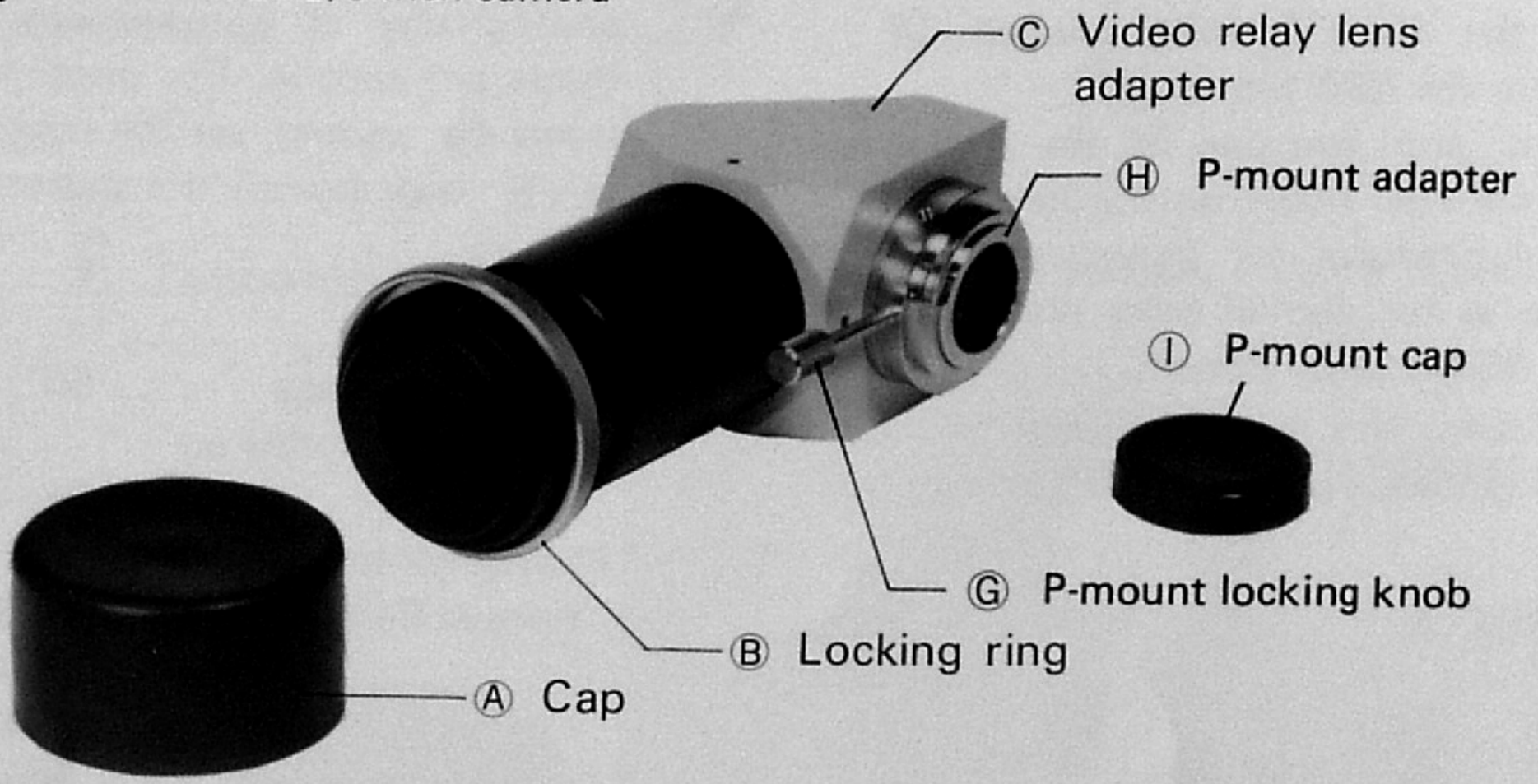
(3) If you use a single tube camera other than that listed above, select one that is smaller than the Hitachi HV 9017, which has dimensions of 74 x 90 x 210mm.

2. Nomenclature

(1) For single tube 1 inch and single tube 2/3 inch video cameras.



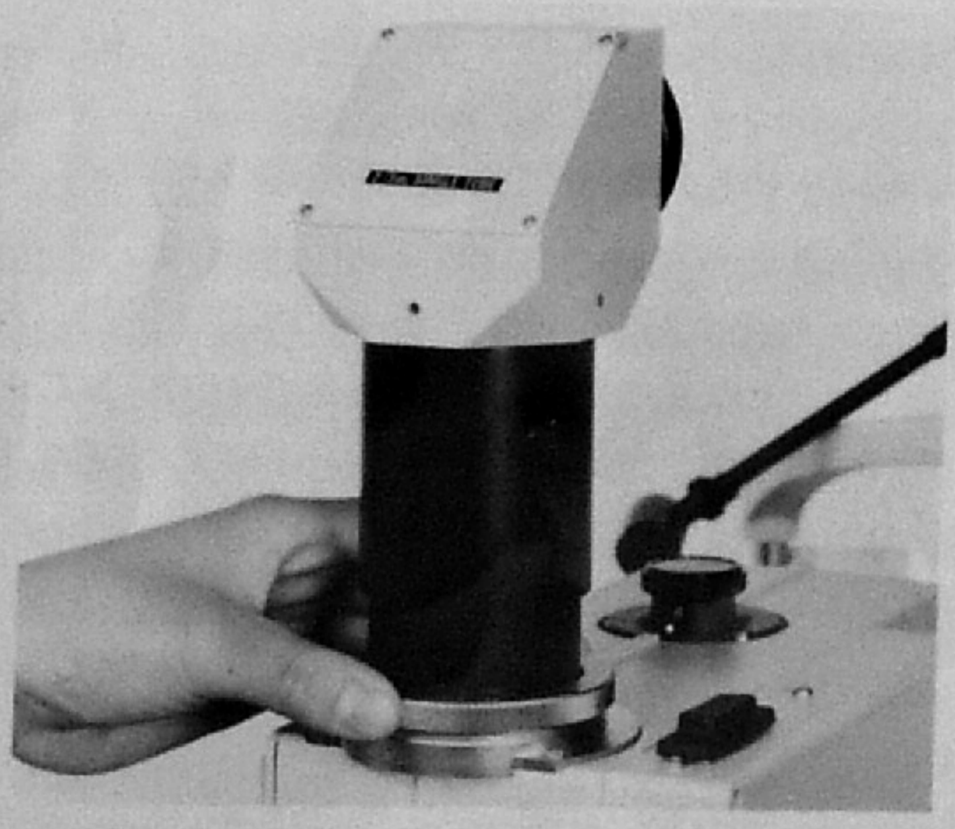
(2) For Ikegami three tube 2/3 inch camera



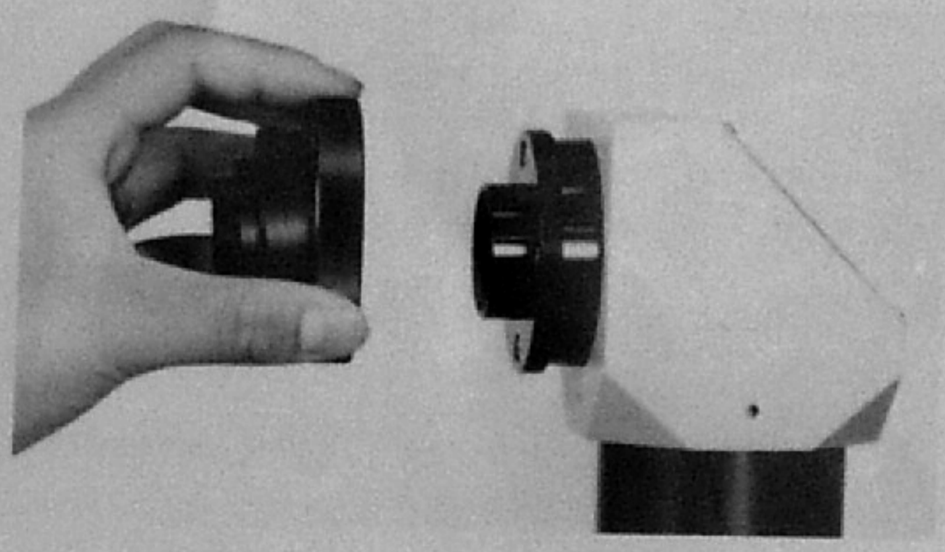
3. How to Attach the Video Relay Lens Adapter to the Optical Head

* For single tube 1 inch and single tube 2/3 inch video cameras.

(1) Remove the cap ㉚ and fix the video relay lens adapter Ⓒ with the locking ring Ⓑ .

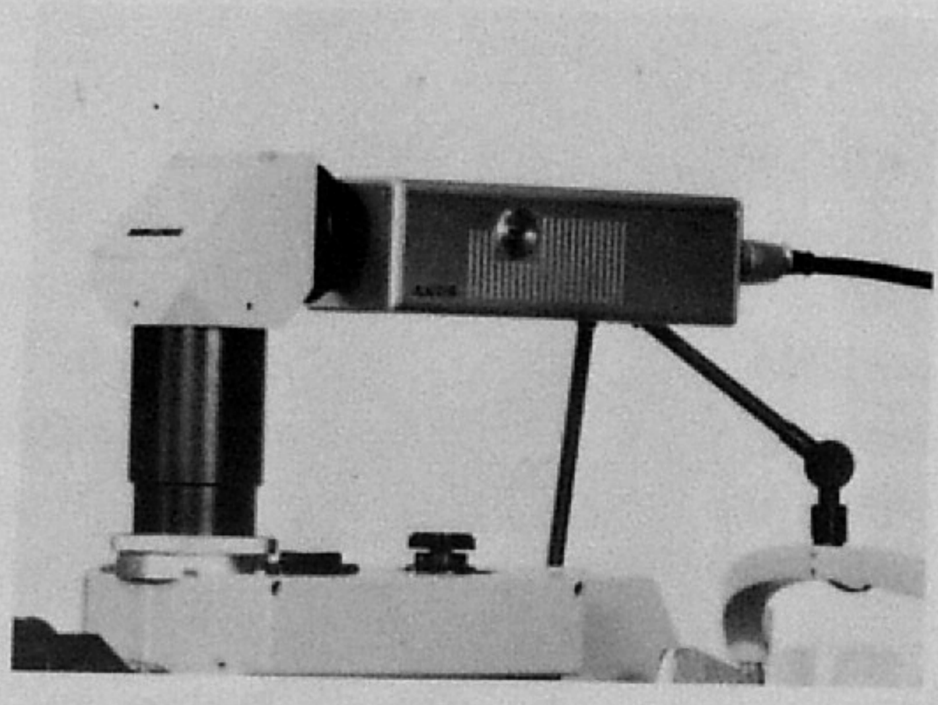


(2) Turn the C-mount locking ring Ⓕ and remove the C-mount adapter Ⓓ from the video relay lens adapter Ⓒ .



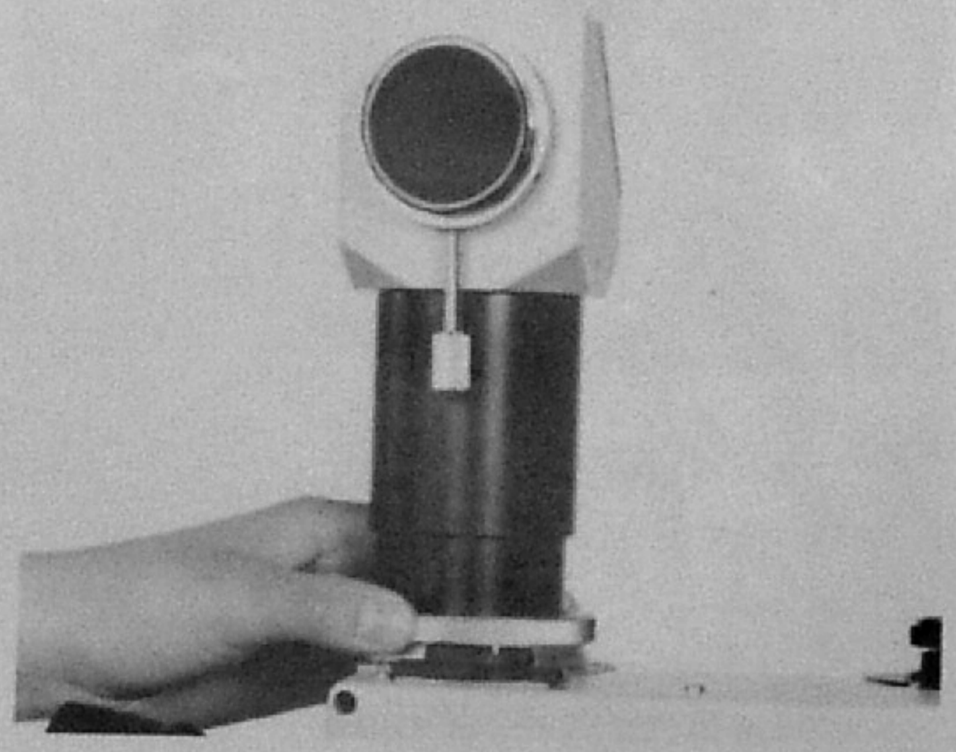
(3) Attach the C-mount adapter Ⓓ to the video camera mount.
The video camera must be attached upside down in which condition, the image on the monitor will be erect.

(4) Screw in the C-mount locking ring Ⓕ of the video relay lens adapter, while pressing the video camera with C-mount against the relay lens adapter, which will fix the two together.



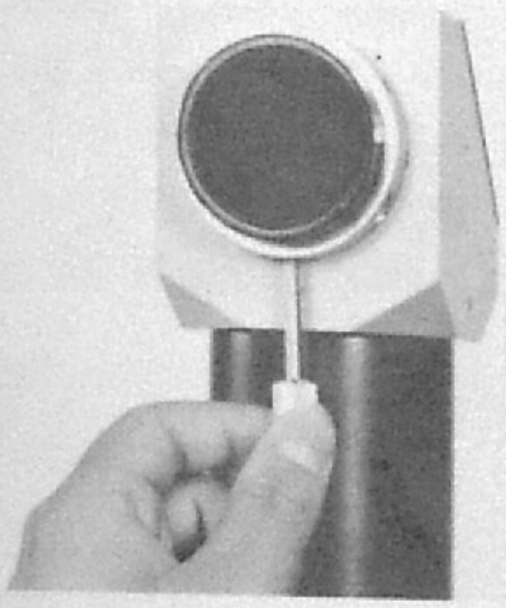
* For Ikegami three tube 2/3 inch camera

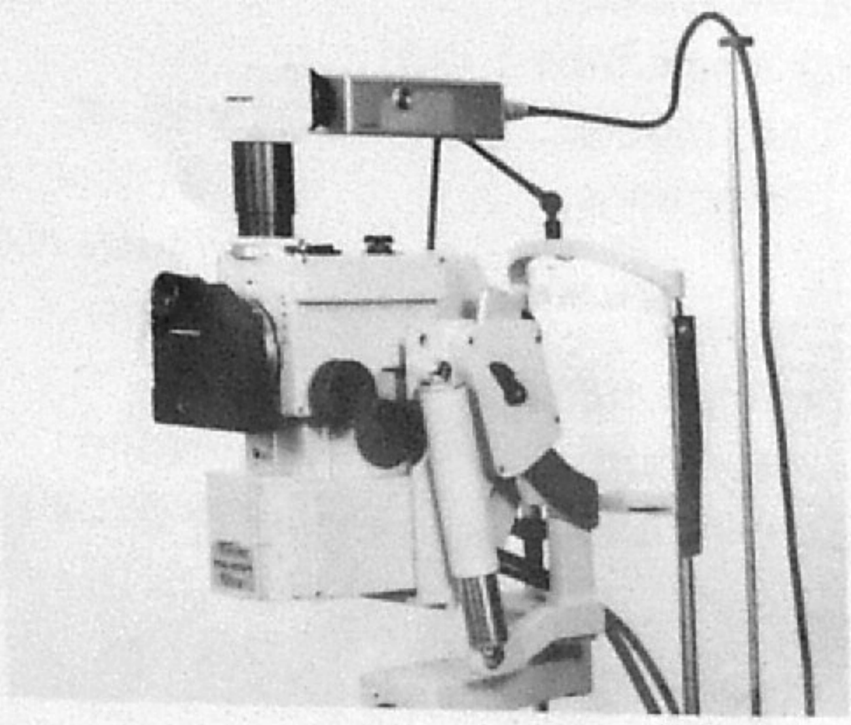
(1) Remove the cap ㉚ and fix the video relay lens adapter Ⓒ by turning the locking ring Ⓑ .



(2) Unscrew the P-mount locking knob Ⓖ of the video relay lens adapter Ⓒ and remove the P-mount adapter.

(3) Attach the P-mount adapter Ⓗ to the video camera mount.





(4) Screw in the P-mount locking knob Ⓖ, while pressing the video camera with P-mount against the relay lens adapter, which will fix the two together.
The video camera should be attached sideways, as illustrated, which will produce an erect image on the monitor screen.
The P-mounting locking knob should then be screwed into the screwhole which is located conveniently on the topside, since there are six screwholes located around the mount.



4. How to Attach the Cable Holder

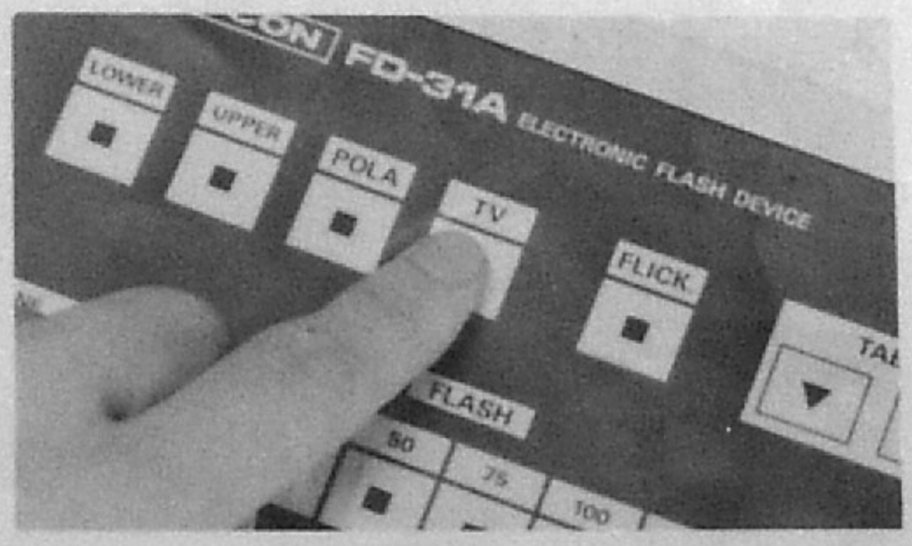
(1) Fix the cable holder base to the edge of the table surface, at a location which will not limit movements of the instrument, and insert the cable holder.

(2) Fix the video camera cable to the cable holder, with sufficient slack in order not to limit movement of the optical head.

5. Procedures

(1) Depress "35MM LOWER" of the mode switches and focus the retina through the finder.
NOTE: Do not forget to ground the power supply unit and video camera. If not, noise may appear on the monitor screen.

(2) Depress "TV" of the mode switches and the retinal image will appear on the monitor screen. When the shutter release button ⑱ is depressed, while the "TV" mode switch is depressed, a photograph of the retinal image will also be taken by the 35mm camera.



(3) A brighter illumination is required for video recording, in comparison with the normal illumination for observation. On the other hand, the illumination should not be made too bright, as this will overtax the patient and cause tears to appear in the patient's eye, with the result that a good retinal image will not be obtained. In other words, the brightness must be properly adjusted.

6. Specifications

(1) For single tube 1 inch

* Lens mount	C-mount
* Dimensions	108 (W) x 133 (H) x 64 (D) mm
* Weight	0.6 Kgs.

(2) For single tube 2/3 inch

* Lens mount	C-mount
* Dimensions	108 (W) x 169 (H) x 65 (D) mm
* Weight	0.8 Kgs.

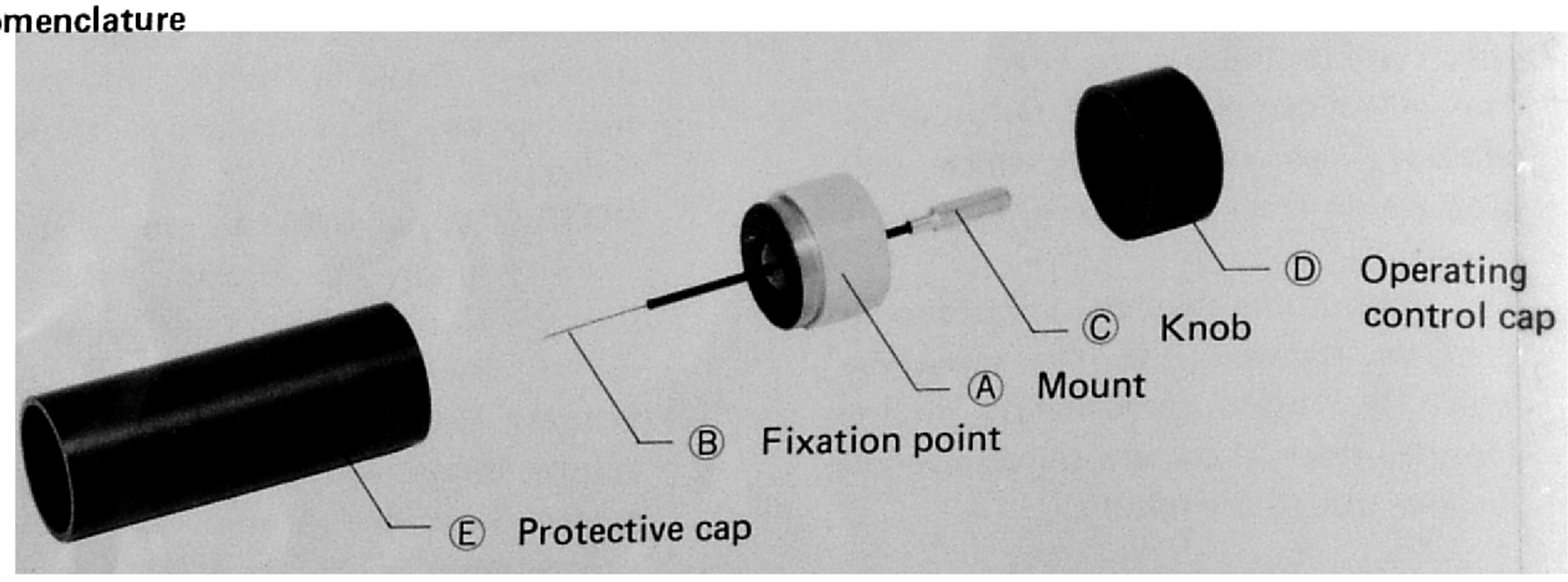
(3) For Ikegami three tube 2/3 inch

* Lens mount	P-mount
* Dimensions	83 (W) x 169 (H) x 64 (D) mm
* Weight	0.8 Kgs.

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

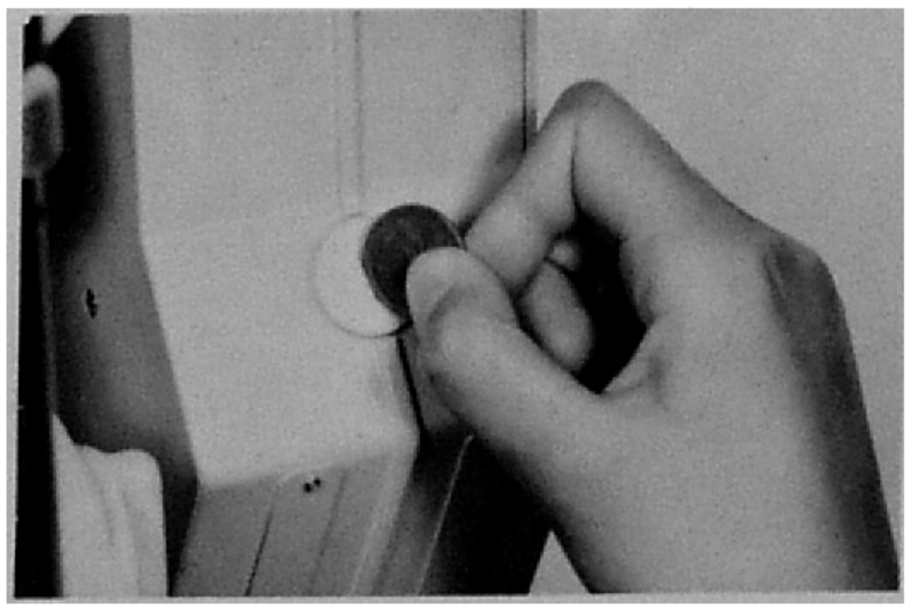
9-6 Internal Fixation Target

1. Nomenclature

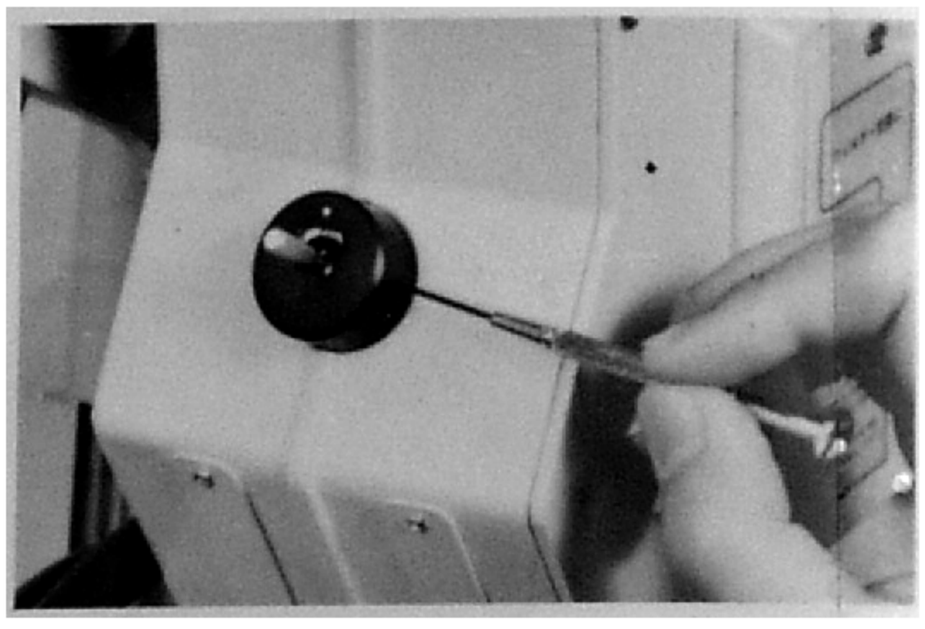


2. How to Attach the Internal Fixation Target

(1) Take off the cover of the internal fixation target mount ⑨ on the optical head.



(2) Screw in the mount Ⓐ of the internal fixation target and attach securely.
In the above case, great care must be exercised because the fixation point Ⓑ is slender and easily bent. For attachment, the fixation point should be pulled out as fully as possible, and the mount should be screwed in slowly and carefully, with the fixation point maintained vertically. And, until the operating control cap Ⓓ is attached, the fixation point should not be moved.

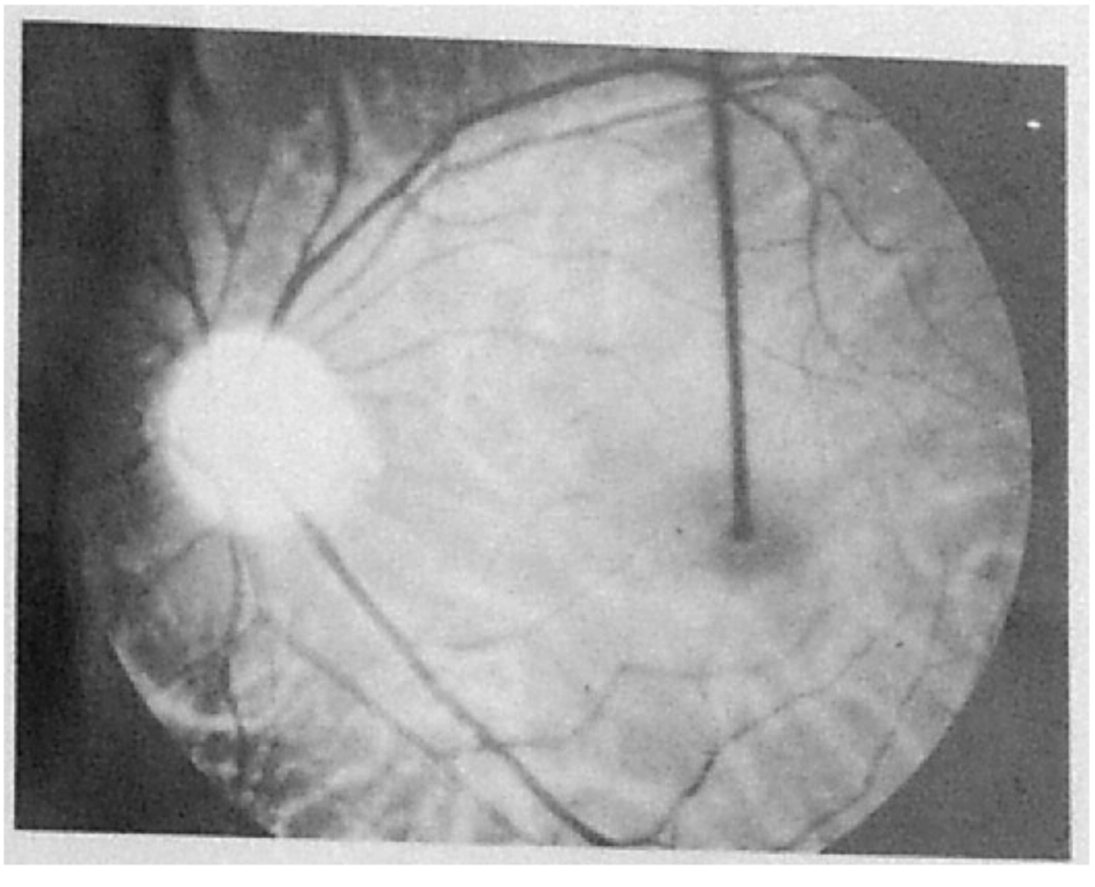


(3) Attach the operating control cap Ⓓ, with two setscrews with the white dot on the cap oriented at the topside.
Should the cap be attached with the white dot in the wrong direction, the fixation point may be bent, which will be the case when the cap is not attached, too.

3. Operating Procedures

(1) Move the knob Ⓒ and lead the patient's eye with the fixation point, while checking movement through the finder of the 35mm camera.

The knob moves in every direction. Up-and-down movement is used for obtaining proper focus, while right-and-left and back-and-forth movements are used to move the fixation point in the field of view. Movement should be done slowly, in order not to confuse the patient when leading the patient's eye.



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