OLYMPUS PHOTOMICROGRAPHIC SYSTEM CAMERA

MODEL

PM-10-A

INSTRUCTION MANUAL

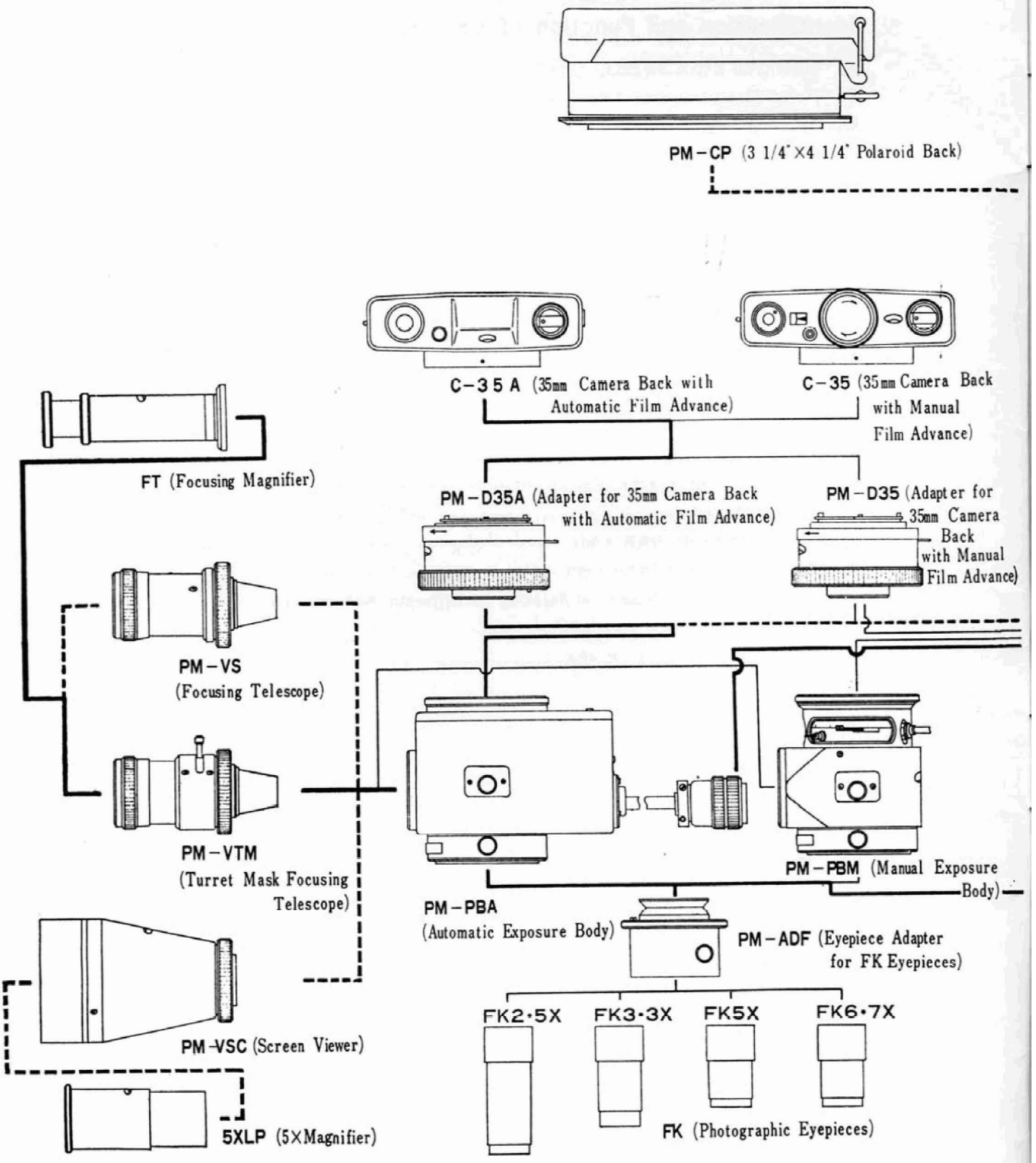
OLYMPUS

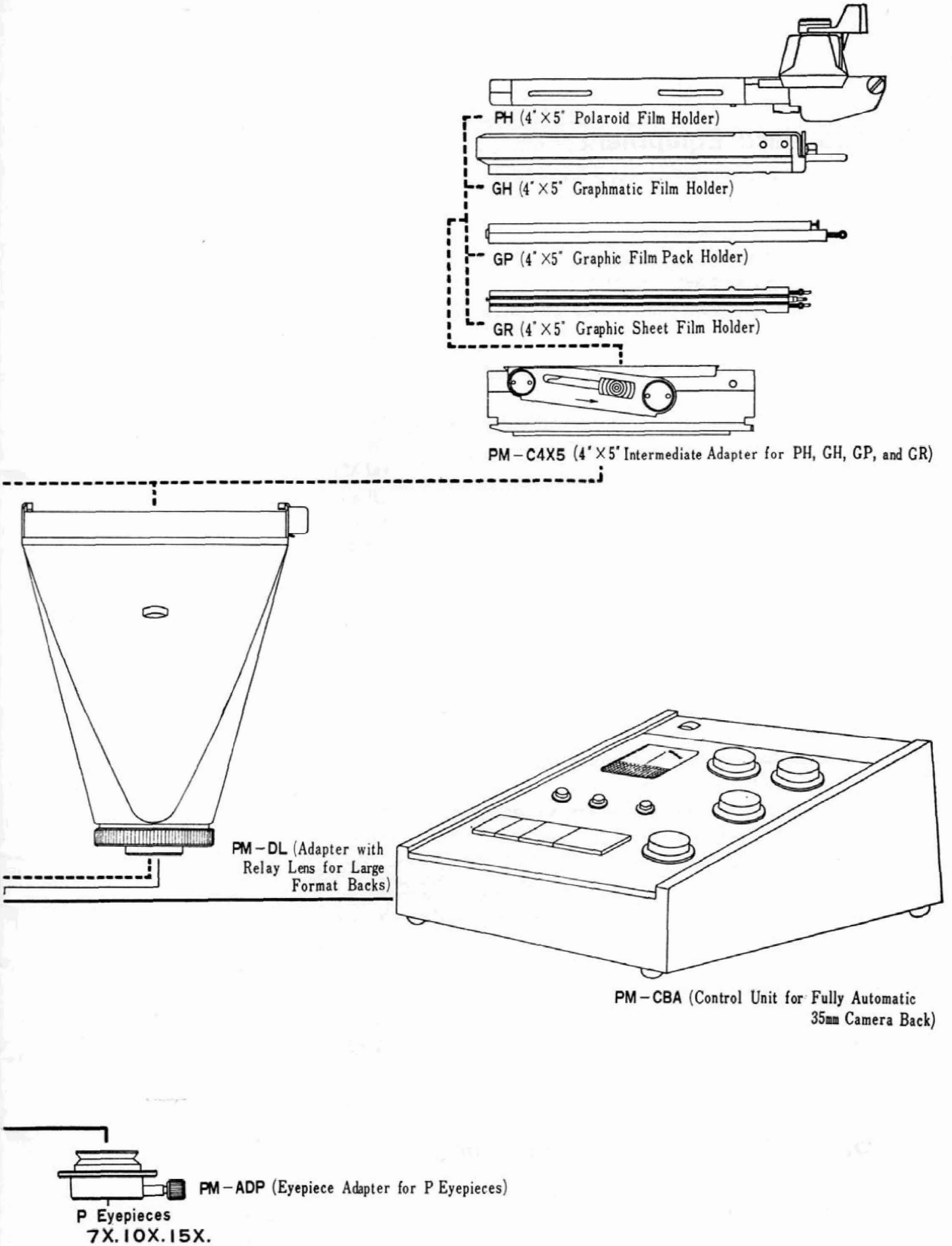
Table of Contents

I System Chart of Modular Camera Units

The photomicrographic camera system listed below is based on a modular concept of interchangeable accessories for a wide range of applications. The entire camera system is called PM-10.

The model PM-10-A features fully automatic exposure and film advance facilities and can be furnished with the standard components linked by bold lines, as well as with optional accessories linked by dotted lines, as outlined in the chart below.




PH (4"×5" Polaroid Film Holder)
GH (4"×5" Graphmatic Film Holder)
GP (4"×5" Graphic Film Pack Holder)
GR (4"×5" Graphic Sheet Film Holder)
PM-C4X5 (4"×5" Intermediate Adapter for PH, GH, GP, and GR)
PM-DL (Adapter with Relay Lens for Large Format Backs)
PM-CBA (Control Unit for Fully Automatic 35mm Camera Back)
PM-ADP (Eyepiece Adapter for P Eyepieces)
P Eyepieces
7X.10X.15X.

II Standard Equipment

Before assembly, please check your standard outfit PM-10-A, which comprises the following items:

Automatic Exposure Body	PM-PBA	1
Turret Mask Focusing Telescope	PM-VTM	1
Focusing Magnifier	FT	1
Adapter for 35mm Camera Back with Automatic Film Advance	PM-D35A	1
35mm Camera Back with Automatic Film Advance	C-35A	1
Data Inserts		10
Control Unit for Fully Automatic 35mm Camera Back	PM-CBA	1
Eyepiece Adapter for FK Eyepieces	PM-ADF	1
Eyepiece Adapter for P Eyepieces	PM-ADP	1
Color Temperature Compensation Filter	LB 45	2
	LBD	1
Neutral Density Filters	ND 6	1
	ND 12	1
	ND 50	2
Storage Case		1

Optional Accessories

Focusing Telescope	PM-VS
Screen Viewer	PM-VSC
5X Magnifier	5XLP
Adapter with Relay Lens for Large Format Back	PM-DL
3 1/4"X4 1/4" Polaroid Back	PM-CP
4"X5" Intermediate Adapter (for 4"X5" Polaroid film pack, Graphmatic film holder, Graphic film pack holder, Graphic sheet film holder)	PM-C4X5
Photo Eyepieces FK (2.5X,3.3X,5X,6.7X)	
Orthochromatic Filter Green	G-533
〃 〃 Yellow	Y-48

III Specification and Performance

* Automatic exposure range: 32 min. to 1/100 sec. With pilot lamp indicating correct exposure and pilot lamp indicating open shutter.
The light measuring device is calibrated to read within a central circular area comprising approx. 30% of the field photographed with 35mm film.

* Automatic shutter release system with push-button switch and vibration-proof electric shutter.
* ASA rating: B & W and color: 6~3,200.
  Fine adjustment, graduated in 5 steps(0.75,0.85,1,1.2,1.5)

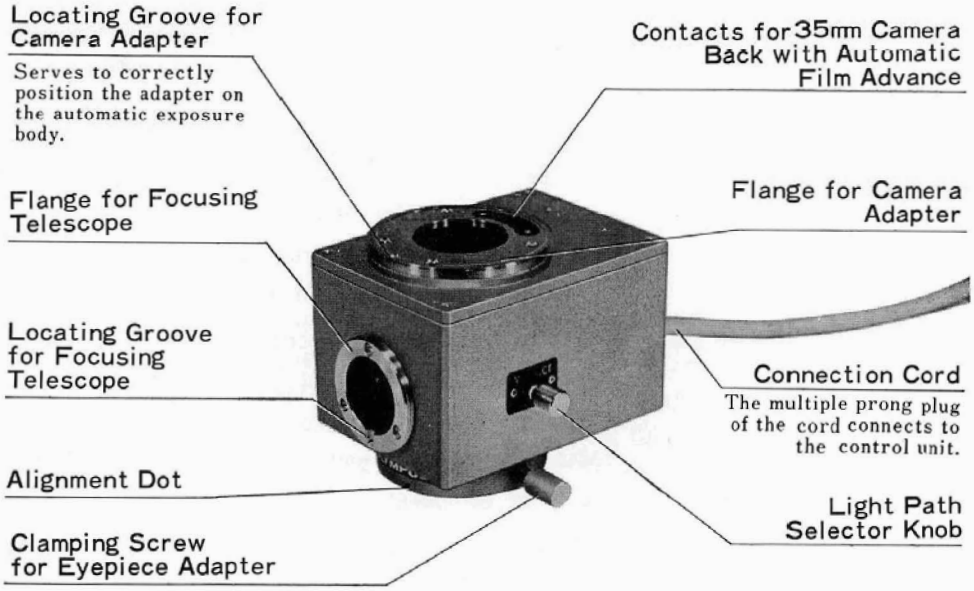
* Color temperature adjustment unit:
  Adjustment range: Color temp regulation scale is divided into two parts; One for tungsten type film, and the other for daylight type film. Color temperature indicating meter, zero method of indication.
* Reciprocity law failure compensation unit:
  Reproduceable color rendition can be obtained by adjusting for constant exposure time with a check button, a check area within the meter and a combination of ND filters.
* Automatic exposure body: A sliding prism incorporated into the Automatic Exposure Body PM-PBA permits selective deviation of the light to either the focusing telescope (100%), the film plane, the focusing telescope and the photocell (64%/16%/20%),or the color temperature meter(100%). A built-in electronic lock permits shutter release only when the sliding prism is in camera/focusing position (CVE).
* 35mm camera back with automatic film advance:
  Mounting: bayonet type. With electric contacts and self-operating, light excluding shutter. Film size 24X36mm.
  Provided with data imprinting device.
* Magnification at film plane:
  With FK eyepiece: Objective magnification X FK eyepiece magnification
  With P eyepiece: Objective magnification X P eyepiece magnification X 0.5

From the foregoing, the magnifications as tabulated below may be obtained by combining the objectives and eyepieces available.

Objectve \ Eyepiece		FK2.5X	FK3.3X	FK5X	FK6.7X	P7X	P10X	P15X
Bio-logical Appli-cations	1.3X	3.3X	4.3X	6.5X	8.7X	4.6X	6.5X	9.8X
	2X	5X	6.6X	10X	13.4X	7X	10X	15X
	4X	10X	13.2X	20X	27X	14X	20X	30X
	10X	25X	33X	50X	67X	35X	50X	75X
	20X	50X	66X	100X	134X	70X	100X	150X
	40X	100X	132X	200X	270X	140X	200X	300X
	100X	250X	330X	500X	670X	350X	500X	750X
Metallo-graphical Appli-cations	1.3X	3.3X	4.3X	6.5X	8.7X	4.6X	6.5X	9.8X
	2.5X	6.3X	8.3X	12.5X	16.8X	8.8X	12.5X	18.8X
	5X	12.5X	16.5X	25X	33.5X	17.5X	25X	37.5X
	6X	15X	20X	30X	40X	21X	30X	45X
	10X	25X	33X	50X	67X	35X	50X	75X
	20X	50X	66X	100X	135X	70X	100X	150X
	40X	100X	132X	200X	270X	140X	200X	300X
	50X	125X	165X	250X	335X	175X	250X	375X
	100X	250X	330X	500X	670X	350X	500X	750X

Ⅳ Identification and Function of Various Units

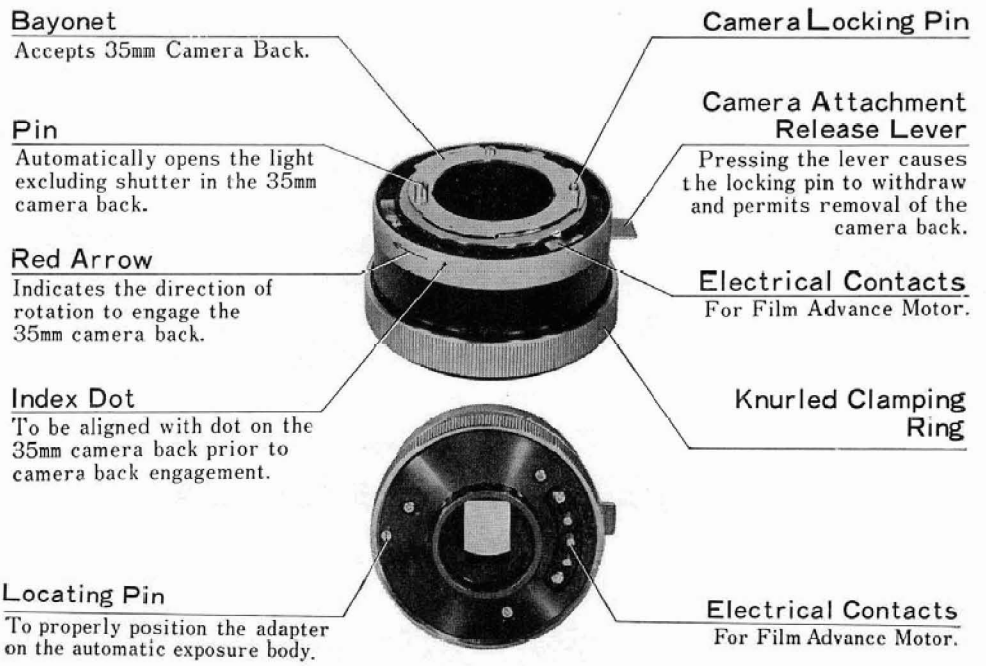
A. Automatic Exposure Body (PM-PBA)



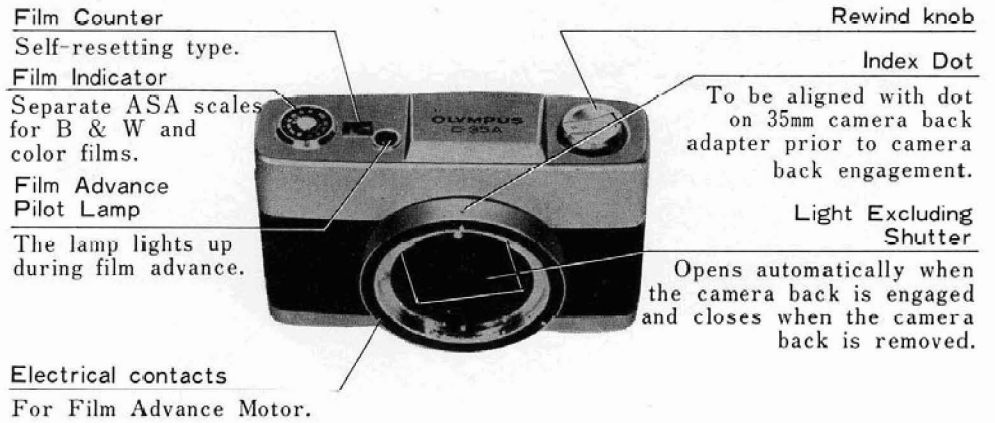
B. Turret Mark Focusing Telescope (PM-VTM)

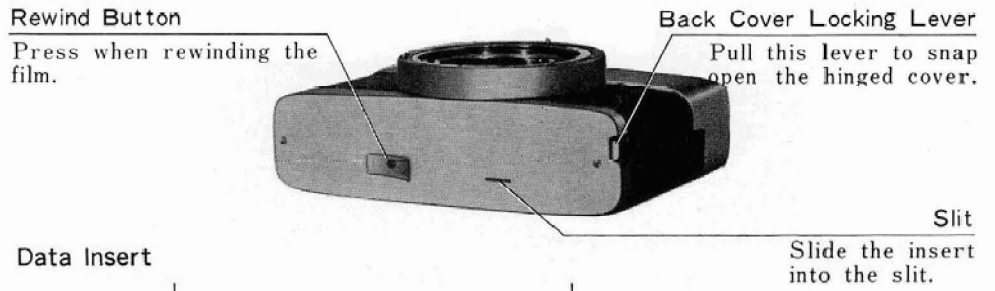
C. Focusing Magnifier (FT)

D. Adapter for 35mm Camera Back with Automatic Film Advance (PM-D35A)

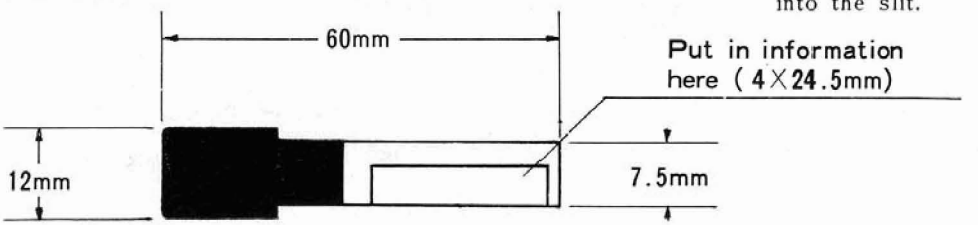


E. 35mm Camera Back with Automatic Film Advance (C-35A)



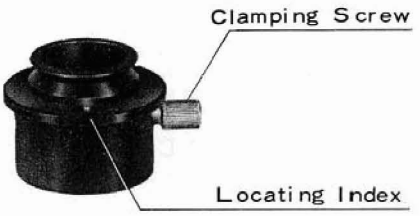


Data Insert

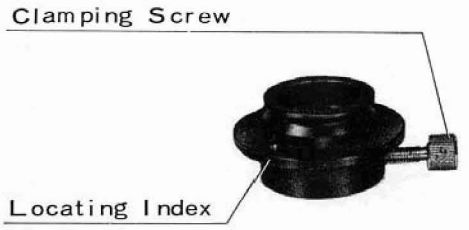


F. Eyepiece Adapters (PM-ADF & PM-ADP)

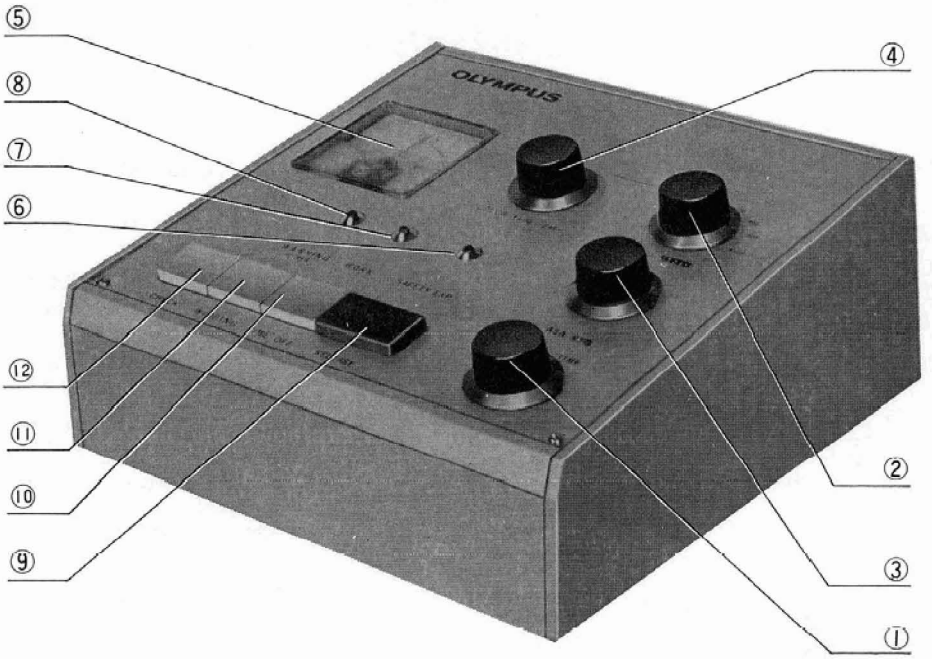
1. PM-ADF

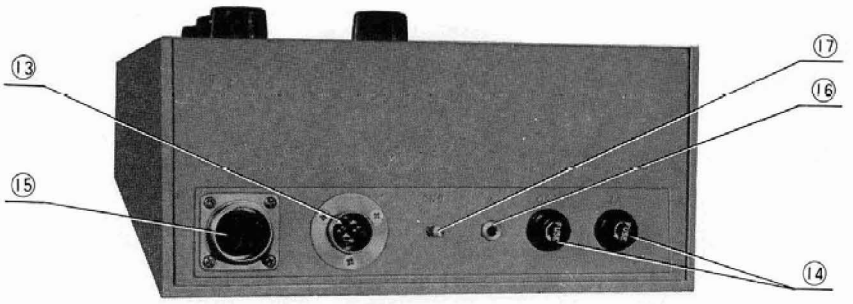


2. PM-ADP



G. Control Unit for Fully Automatic 35mm Camera Back (PM-CBA)





※ Ascertain that the line voltage selector switch at the bottom of the control unit (PM-CBA) is set to conform with the local mains voltage.

H. Function of Various Parts of PM-CBA

(1) Selector Switch

"OFF" —power turns off. "AUTO & CTR" —power turns on; automatic exposure and color temperature measurement are available.

"TIME" —automatic exposure circuit is by-passed, manual exposure is available.

"X" —synchronized flash photography is available: Fixed shutter speed of approximately 1/30 sec.

(2) ASA Speed Selector Dial (ASA SPEED)

On the dial, "35" denotes 35mm camera back and "L" large-format camera backs.

(3) ASA Fine Regulation Dial (ASA REG)

Permits fine regulation of the ASA rating. For details, consult subsequent paragraphs.

(4) Color Temperature Regulation Dial (COLOR TEMP REG)

Permits selection of daylight or tungsten type film and sets to the desired color temperature of the film used.

(5) Color Temperature Meter (serves also as check meter)

The meter permits light balancing to obtain correct color temperature by means of zero point alignment. Also, photography using the same shutter speed can be made by means of the check meter.

(6) Safety Light (SAFETY EXP.)

Green pilot light, indicating safe light levels, when on. The shutter can be released with the green light off, but the film will be overexposed.

(7) Working Light (WORK)

Orange Pilot Light. Lights only while the shutter is open.

(8) Warning Light (WARN)

Red pilot light. Comes on after the last frame of the 35mm film is exposed.

(9) Shutter Release Button (RELEASE)

Activates the shutter.

(10) Time Off Button (TIME OFF)

Closes the shutter. Used either to interrupt automatic exposure or for manual exposure (TIME).

(11) Film Advance Button (WINDING)

Permits advancing the film one frame each time the button is pushed.

(12) Check Button (CHECK)

Activates the check meter.

(13) Input Receptacle

Receives the line cord.

(14) Fuse Holders

One holder contains a 0.5A fuse for the power source protection, and the other contains a 2A fuse for the circuit protection; screw-in type and easy to replace.

(15) Output Receptacle

Receives the connection cord from the automatic exposure body.

(16) "X" Contact

For synchronized flash photography.

(17) Grounding terminal

V Assembly

1. Attaching The Turret Mask Focusing Telescope

   Attach to the automatic exposure body by aligning locating pin with locating groove, and clamp with the knurled ring. (Fig.1)
   This procedure applies also for the focusing telescope (PM-VS) and screen viewer (PM-VSC).

2. Attaching the Adapter for 35mm Camera Backs

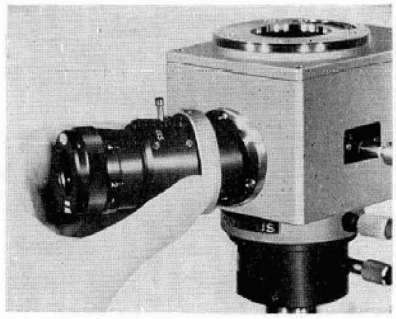
   Attach to the automatic exposure body by aligning the locating pin with the locating groove, and clamping the adapter with the knurled clamping ring. (Fig.2)
   This procedure applies also for the adapter for large-format camera backs.

3. Mounting the 35mm Back with Automatic Film Advance

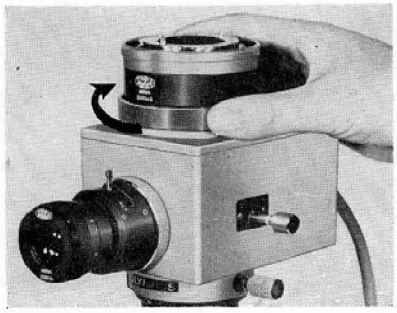
   Attach by first aligning the index dots on both camera back and camera adapter and rotating the camera back in the direction of the red arrow until the camera locking pin engages with an audible click. (Fig.3)
   At the same time the light excluding shutter in the camera back automatically opens.
   * Removing the Camera Back
   Rotate the camera back in the direction opposite to the red arrow while pressing the release lever at the back of the camera adapter. The camera back can be removed when the two index dots are aligned (Fig.4). Prior to removal, the light excluding shutter closes to prevent light from reaching the film.

4. Mounting the Eyepiece Adapters

   * The FK eyepiece adapter (PM-ADF) is used in combination with the FK photo eyepieces.
   Place the adapter over the straight photo tube of the microscope and clamp it, with the red index dot facing forward. Insert the FK eyepiece, place the automatic exposure body on the eyepiece adapter, with its index dot in line with the one of the eyepiece adapter, and clamp. (Fig. 5,6,7)

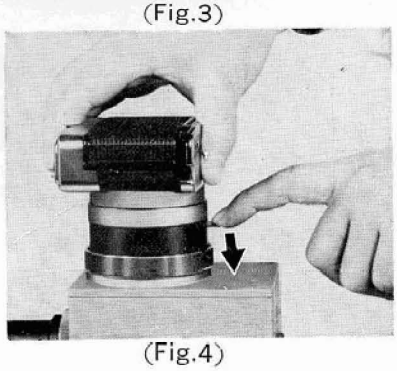


(Fig.1)

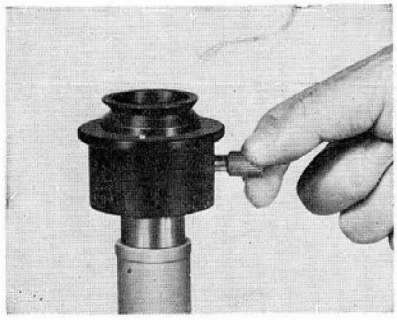


(Fig.2)

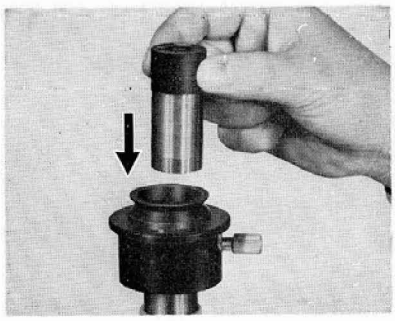
(Fig.3)



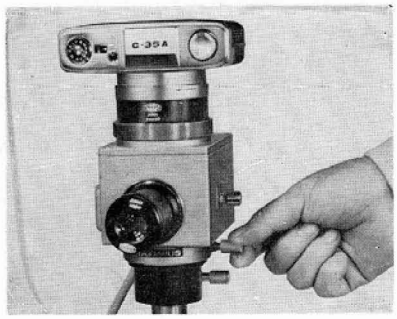
(Fig.4)



(Fig. 5)



(Fig.6)

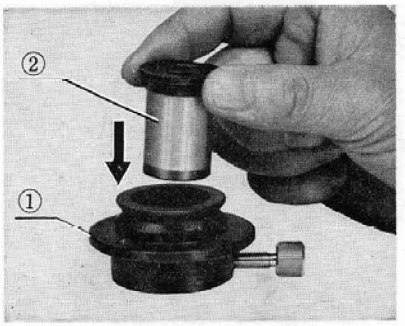


(Fig.7)

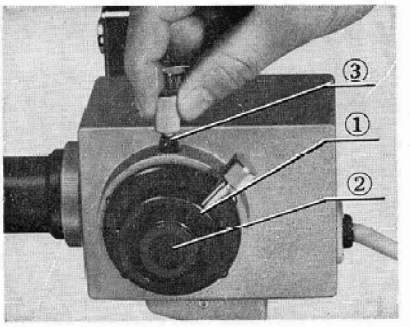
To replace the eyepiece, remove only the automatic exposure body by loosening the clamping screw and lifting the body. The adapter need not be detached.

* The P eyepiece adapter (PM-ADP) is used in combination with the P photo eyepieces.

1) Insert the P eyepiece ② of your choice into the eyepiece adapter ① and clamp the assembly on the automatic exposure body ③. (Fig.8,9)



(Fig.8)



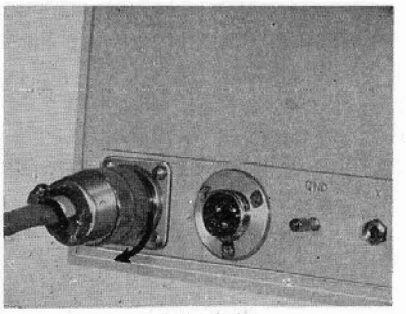
(Fig.9)

2) Slide the entire camera unit over the photo tube of the microscope and clamp.

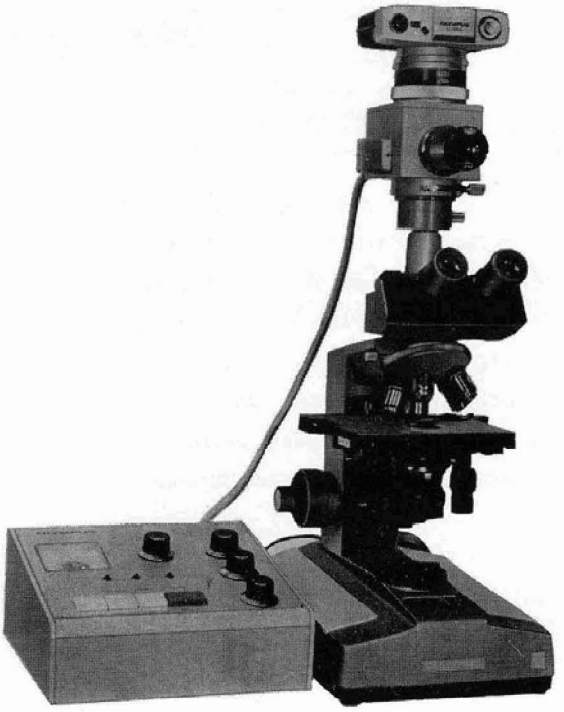
5. Connect the Cord

1) Insert the multiple prong plug of the connecting cord from the exposure body into the receptacle at the back of the control unit. Clamp with the knurled clamping ring. (Fig.10)

2) Insert the round plug of the line cord into the receptacle at the back of the control unit and clamp it with the knurled clamping ring. Connect the line cord to a suitable mains outlet (100V AC, 110V AC, 120V AC, 220V AC, or 240V AC).



(Fig.10)



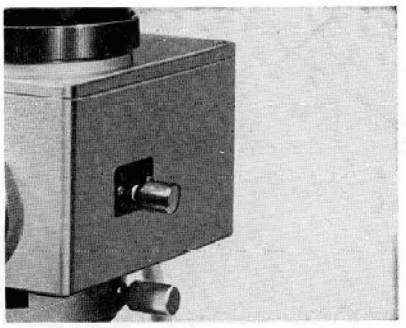
BHA+PM-10-A

VI Operation

A. Changing the Light Path

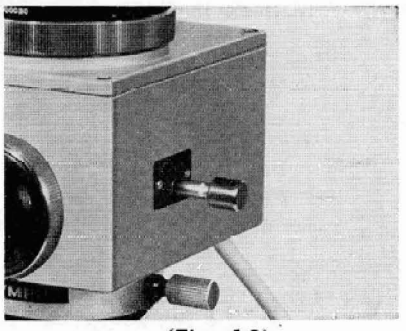
The light path selector knob provides three steps of path change:

1. The knob is pushed in all the way (white band). (Fig. 11)
   100% of the light goes into the turret mask used when focusing on dim specimens, as in dark-field, polarized light or fluorescent light.
   When ready to photograph, the knob is pulled out one step and brought to the green band.



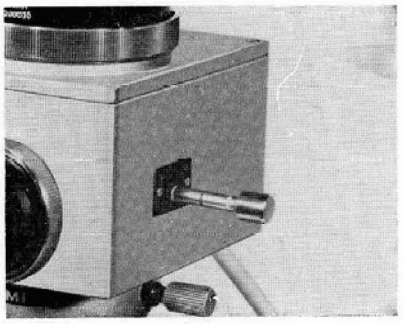
(Fig. 11)

2. The knob is pulled out one step (green band). (Fig. 12)
   In this position the light coming from the photo eyepiece is divided to the focusing telescope, the photocell and the film plane. Generally, focusing is done in this position. Also, the shutter can be released while observing the specimen.



(Fig. 12)

3. The knob is pulled out all the way (yellow band). (Fig. 13)
   100% of the light goes into the color temperature measuring unit. This device permits measurement of the color temperature of the light in order to achieve correct color balance compatible with the color film used.

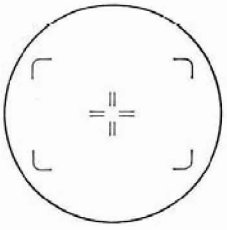


(Fig. 13)

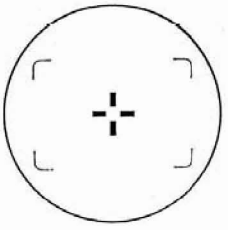
B. Focusing

In photomicrography, the ability to bring the specimen into sharp focus is an important aspect of obtaining good photomicrographs. Particularly when employing objectives 4X or lower, accurate focusing is fairly difficult because of their considerable depth of focus. In such a case, use of either the screen viewer (PM-VSC) or the focusing magnifier (FT) is recommended, because it permits sharp focusing with one simple operation.

1. Focusing with the Turret Mask Focusing Telescope (PM-VTM)
   1) Turn the diopter adjustment ring of the focusing telescope in such a manner that the double cross line within the field of view can be clearly recognized as two lines.



Double cross line in focus.



Double cross line out of focus.

Since the focusing telescope with the double cross line in focus, and the film plane are in precise alignment, the image focused through the focusing telescope and the image on the film plane are in focus at the same time. Therefore, unless the adjustment just described is perfect, blurred pictures will result no matter how well the specimen may be brought in focus.

* The reticles in the field of view indicate the different camera formats. For details, please refer to the next paragraph.

2) Use the coarse and fine adjustment controls of the microscope to bring the specimen in focus. Check again if both the double cross line and the specimen are equally sharp in focus.

2. Focusing with the Screen Viewer (PM-VSC)

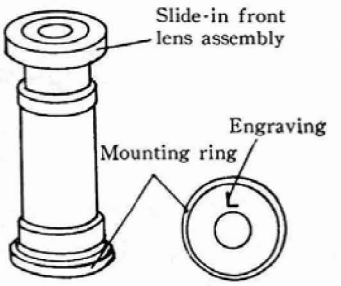
Using the screen viewer will considerably help in sharply focusing when using objectives 4X or lower.

1) Detach the focusing telescope and attach the screen viewer instead.
2) Place the 5X magnifier, an accessory, on the frosted glass and slide its front lens assembly back and forth to focus on the cross hairs on the frosted glass of the screen viewer.

3. Focusing with the Focusing Magnifier (FT)

More accurate specimen focus is achieved by using the FT in conjunction with the focusing telescopes. To make it compatible with all Olympus attachment cameras three interchangeable mounting rings are available. These mounting rings are engraved on the inside in accordance with the following table:

Engraving	Photographic Apparatus
L	PM-10, VANOX
7	PM-7, PMS-II
6	PM-6



The mounting ring fits exactly over the outside diameter of the focusing telescope. The front lens assembly can be moved laterally for focusing on the double cross line.

Focusing Procedure

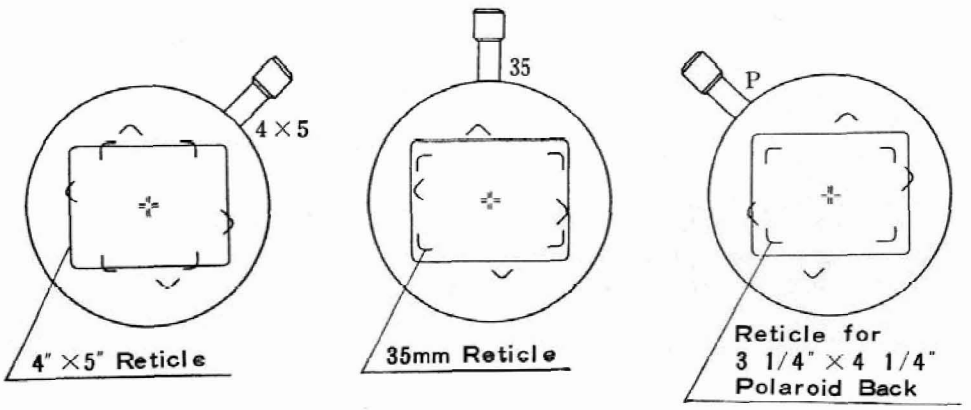
1) At first use the diopter adjustment ring of the focusing telescope to focus on the double cross line. Then operate the coarse and fine adjustment knobs of the microscope to bring the specimen in focus.
2) Place the FT over the focusing telescope and move the front lens assembly of the FT in or out to focus on the double cross line in the field of view.
3) Lastly, use the fine adjustment control of the microscope to again focus sharply on the specimen. Specimen and double cross line should be in focus at the same time.

C. Format Indication

Four frame reticles can be seen when looking through the turret mask focusing telescope or on the frosted glass of the screen viewer. These reticles indicate the frame sizes for the different camera backs and represent approximately 90% of the actual picture area.

Select the frame reticle inside the turret mask focusing telescope by means of the mask selector lever, in accordance with the camera back in use, as per the following illustrations.

Please note, that the reticle indicating the 4″X5″ frame is fixed in the focusing telescope and cannot be rotated with the mask selector lever.



As illustrated above, moving the lever to the respective positions engraved on the focusing telescope rotates the corresponding reticles into horizontal position in the field of view.

D. Check the Photographic Equipment

Before actual photomicrography familiarize yourself thoroughly with the operation of all components.

It is particularly important to check the proper operation of the control unit once the light path selector knob is pulled out one step (green band) and the selector switch of the control unit moved to the "AUTO & CTR" position:

The following points should be checked.

1. The safety light (SAFETY EXP) is on.
2. The working light (WORK) illuminates when the shutter release button is pressed. (The light will go on only during the time the shutter is open.)
3. The meter needle should move to the right when the check button (CHECK) is pressed.

The following steps are recommended in case one or more points as listed above cannot be satisfied :

Malfunction	Possible Causes	Remedies.
Points 1~3 cannot be met.	Cords improperly connected.	Check electrical connections.
	Blown fuse.	Replace fuse.
Safety light does not go on.	Illumination is too bright.	Reduce intensity.
	Bulb defective.	Replace bulb.

Working light does not go on.	Difficult to see if illumination is too bright and shutter speed too fast.	Reduce intensity.
	Bulb defective.	Replace bulb.
Meter needle does not move.	Illumination is too dark.	Increase intensity.

4. The film is advanced one frame immediately after the shutter closes. The red pilot light on the camera back lights up during the film advance process. At this time, a slight humming sound caused by the film advance motor can be heard.
Instruction on Photographic Equipment

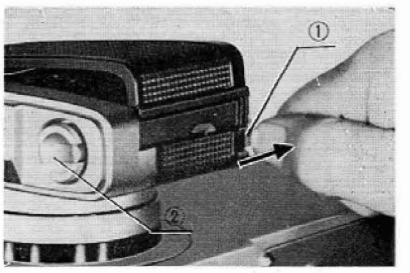
* When using the 35mm camera back with automatic film advance, the warning light (WARN) lights up after completion of the last exposure. At this time, the film advance pilot light on the camera back lights up for several seconds, until the warning light goes on. Then the red pilot light on the camera back goes off. The shutter does not operate while the film advance pilot light is on even if the release button is pressed.
* Never release the shutter when the working light (WORK) goeson. The shutter can be released when the working light goesoff, and the safety light (SAFETY EXP) is on.
* Sometimes, when a camera back is removed, reloaded and attached again, it is possible that the warning light will remain on. Pushing the film advance button once will cause the warning light to go out.
* The warning light is always on when large format camera backs are in use. Disregard it in this case. It operates only when the 35mm camera back with automatic film advance (C-35A) is attached.
* The safety light (SAFETY EXP) may occasionally wink on and off during the shutter release process or film advance. This does not affect the proper operation of the PM-10.
* The bulbs for the pilot light (SAFETY EXP, WORK, WARN) are interchangeable. Bulb rating, 6V 60mA.

E. Loading the Film

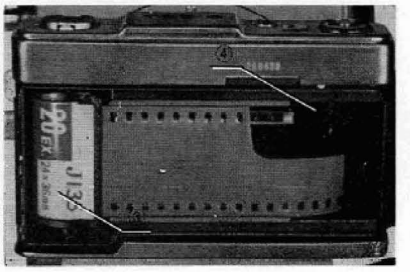
Loading the camera back with a 35mm cartridge can be done with the back removed or attached to the PM-10-A, without outside light hitting the film. It is advisable to keep the back on the camera attachment, however, because this way the motorized film advance can be used to wind the film onto the take-up spool.

1) Pull the back cover operating lever ① and open the cover (hinged cover). (Fig. 14)
2) Lift up the crank ② folded into the rewind knob and pull the knob all the way out. (Fig. 14)
3) Put the cartridge ③ in the film chamber and push the rewind knob back into position. (Fig. 15)
If the rewind knob does not slide home, it will enter easily if pushed in while rotating it to the right and left slightly.
4) Insert the film end into a groove on the take-up spool ④. Any groove may be used. Because of the easy loading system, you only have to insert the end portion of the film.

* If the film was loaded with the camera back detached, attach the camera back to the adapter at this stage.

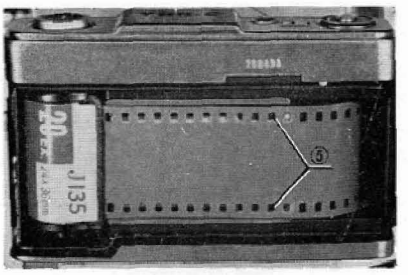


(Fig. 14)



(Fig. 15)

5) Press the film advance button (WINDING) of the control unit and advance the film until the film perforations ⑤ engage the sprockets on both sides. (Fig. 16)
The film advance pilot light (red) is on while the film is advanced.
The film is advanced by one frame each time the advance button is pressed.



(Fig. 16)

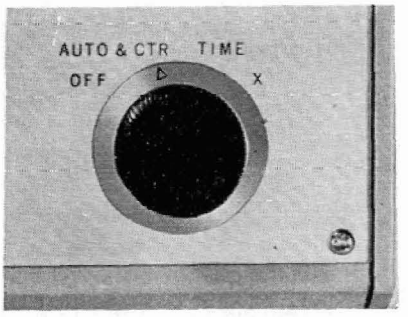
6) Close the back cover securely.

7) Press the film advance button again to advance the film (2 to 3 frames) until the number 1 appears in the film counter.

8) Set the film indicator (ASA scale) of the camera back to the ASA rating of the film used.

F. Photography with B&W Film

1) Make sure that the selector switch of the control box is in the "AUTO & CTR" position. (Fig. 17)
Make sure that the safety lamp (green) is on.



(Fig. 17)

2) Set the ASA dial.
Set the mark "35" on the ASA dial to the ASA rating of the film used. (Fig. 18)
Fig. 18 represents the use of ASA 50 film.

* The mark "L" is used for large-format camera work.

(Fig. 18)

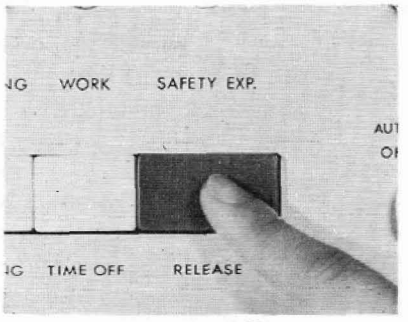
3) Check the specimen focus.

4) Make sure that the light path selector knob on the body is positioned to the green band.

5) Make sure again that the green safety light (SAFETY EXP) is on. If it is off, reduce illumination intensity.

6) Release the shutter by depressing the release button (RELEASE) of the control box. (Fig. 19)
After release, the "WORK" light (orange) will go on while the shutter is open. After the exposure is completed (closing of the shutter), the "WORK" light goes out and immediately afterwards the film advances automatically by one frame.

* While the film is being transported, the film advance pilot light on the camera back lights up and the humming of the film advance motor can be heard.



(Fig. 19)

* Indication and operation after completion of the film roll

(1) As soon as the last frame is exposed the film advance motor stops and the pilot light on the camera back lights up. The "WARNING" light on the control unit also goes on several seconds later. At this moment, the camera pilot light will go out.

(2) Press the black rewind button at the bottom of the camera back and rewind the film with the rewind crank.

This operation can be performed with the camera back still on the PM-10 or removed from the assembly.

* The "WARNING" light indicates correctly only when the 35mm camera back with automatic film advance (C-35A) is used.

The "WARNING" light goes on only when the film cannot be advanced, i. e., when all frames have been exposed, or if the force necessary to advance the film becomes excessive due to film jamming. In the latter case the motor circuits are automatically interrupted to prevent burning out of the motor and the "WARNING" light will go on several seconds later. A look at the film counter will verify if the "WARNING" light is on because the film roll is exposed or because it is jammed.

G. Photography with Color Film

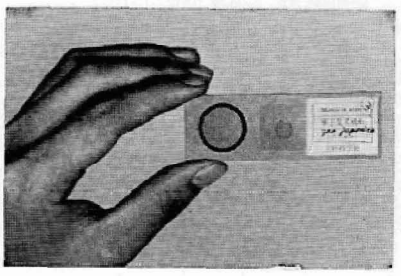
For photography with color film, the color temperature of the light source should be the same as the color temperature for which the specific film was manufactured, in order to obtain best color reproduction. This operation is known as color temperature regulation. It is indispensable whenever color film is used.

How to Effect Color Temperature Regulation

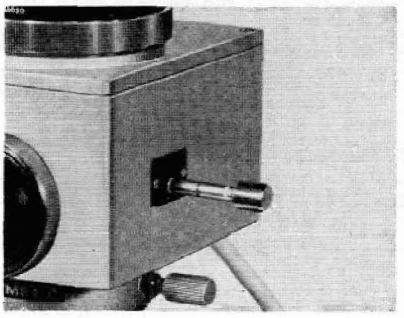
1) First focus on the specimen and then move the specimen slide until a portion of the slide without any specimen covers the field of view.

   * Accurate regulation of the color temperature is impossible when the specimen covers the field of view, therefore bring into the field the area circled in Fig. 20.

2) Pull out the light path selector knob of the body all the way, as far as the yellow band (Fig. 21). In this position all the light impinges on the color temperature measuring unit.



(Fig. 20)



(Fig. 21)

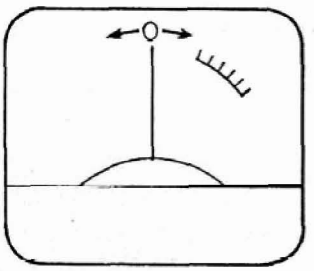
3) Move the selector switch of the control unit to the "AUTO & CTR" position.

4) Set the "COLOR TEMP REG" (CTR) dial to the orange zone (for the tungsten type film) or to the blue zone (for the daylight type film), according to the type of film used.

* The large dot in the center of the scale each zone assures the nominal color temperature of the film used, while the small dots are provided to render fine adjustment of the color temperature of the light source for constant color reproduction with different types of emulsion used on the film, or to your preference for particular color reproduction effect. Fig. 22 illustrates that in a atandard method the CTR dial is aligned with the large dot for the nominal color temperature of a daylight film.

* If a lower color temperature of the light source is required, turn the CTR dial to the small dots on the left side of the large one. In reverse, if a higher color temperature is required, turn the dial to the right side.

(Fig.22)



(Fig.23)

5) Place only the LBD filter in the filter holder at the microscope base for a tungsten film, or place the LBD and LB45 filters together for a daylight film, and regulate the voltage of the light source so that the meter on the control unit will read zero. (Fig.23)

* When the color temperature of the light source is lower than the color temperature designated by the CTR dial, the meter needle moves to the left side (red arrow). When the color temperature of illumination is higher, the needle moves to the right side (blue arrow). When the color temperature of the light source is lower, raise the voltage, until the meter reads zero. Proceed in reverse if the color temperature is higher.

* **If the meter fails to read zero even at the maximum voltage, due to the voltage variations from the AC power supply; age of bulb, bulb errors, etc., or although the meter reads zero, if it is necessary to avoid high voltage or subdue glare of light, insert one more LB45 into the light path to lower the voltage properly, without deviating the mete rfrom 0.**

6) Push the light path selector knob all the way in.

* An electrical interlock prevents the shutter from being released with the knob pulled out all the way.

7) The following steps are identical to the ones described for photography with black-and-white film.

* After the color temperature has been regulated, do not change the LBD and LB filters and the voltage of the light source anymore.

Use neutral density filter (ND) to regulate the light intensity, if necessary.

◎Transmission and Number of ND Filters.

Transmission %	Number of ND Filters			Transmission %	Number of ND Filters		
	ND-50	ND-12	ND-6		ND-50	ND-12	ND-6
100				3	1		1
50	1			1.5	2		1
25	2			0.72		1	1
12		1		0.36	1	1	1
6			1	0.18	2	1	1

COLOR TEMPERATURE AND REPRODUCTION OF COLOR FILM

In color photomicrography, a color film requires a specific color temperature under the different conditions from the general color photography, since in most cases of color photomicrography, a color temperature compensation filter is inevitably used with the microscope light source to give the color temperature required dy the film, and at the same time, the light emitted from the light source directly impinges on the emulsion of the color film. Considering these conditions peculiar to color photomicrography, the Model PM-10-A is provided with the LB45 and LBD filters for color temperature compensation. The LBD filter is a neutral interference filter that particularly excels in color conversion facilities.

The PM-10-A also incorporates a CTR dial graduated with a large dot and small dots on the scale as metnioned in PARA. 4). The large dot denotes the dial-setting position for the nominal color temperature of the color film in use. It is recommended, however, for a photographer to determine an optimum color temperature for each film in use by test shots, finely adjusting by means of the small dot indexes, for a color film has its own characteristics in color reproduction.

H. Maximum Shutter Speeds in Relation to Different ASA Ratings

The maximum shutter speeds obtainable with the automatic exposure device are tabulated below.

ASA Rating		Maximum Automatic Shutter Speed
35mm Camera Back	*Large-Format Camera Backs	
6	50	32 min.
12	100	16
25	200	8
50	400	4
100	800	2
200	1,600	1
400	3,200	30 sec.

*The large-format camera backs are optional accessories.

I. Special Applications

The special applications introduced here will serve to produce improved photomicrographs and can be utilized to advantage when more exact photography is desired.

1. Regulation of ASA Rating

   Fine regulation of the ASA rating

   Photomicrography in many cases is practiced under conditions different from those in general photography. Therefore, satisfactory photographic effects will not always result by the application of nominal ASA indexes and the possibility of setting intermediate ASA values is often very helpful.

   Settings on the fine regulation dial represent ASA ratings in terms of ASA dial scale x fine regulation dial scale. (Fig. 24 refers to 100x 0.85, or ASA 85.)

(Fig. 24)

(Example)

When ASA Index of Film is 100

Position of ASA Dial Scale	Position of Ratings Regulation Dial Scale	ASA Rating	Exposure Variation
100	0.75	75	Over
	0.85	85	Slightly over
	1	100	Standard
	1.2	120	Slightly under
	1.5	150	Under

Fine regulation of the ASA speed with the fine regulation dial is recommended in the following instances.

a. If the ASA speed of the film used is not engraved on the ASA dial scale.

b. If over- or underexposure is intentionally desired.

c. If overexposure of the specimen will result due to excessive brightness of the background.

For example :

If the specimen area in the field of view is very small, the film should be overexposed.

If there is an extreme brightness difference over the specimen area in the field of view, the film should be underexposed.

If there is even density of the specimen over the entire field of view, the film should be exposed normally.

* With the PM-10 and a 35mm camera back light covering about 30% of the film area is measured in the center of the frame.

(Example) If the specimen occupies about 70% of this portion and the remaining 30% is empty when photographed at ASA 100, then the fine regulation dial should be set to 0.75 to compensate for underexposure which could be caused by the empty area.

ASA 100 X 0.75 = ASA 75

2. Checking for Correct Exposure

Consistent color reproductions are obtained.

Extremely short or long exposures lead to film sensitivity variations due to reciprocity law failure. In order to obtain consistently satisfactory color reproductions, it is suggested to avoid using a wide range of exposure times and photograph with the same shutter speed whenever possible.

With increasing magnification of the microscope, the amount of light on the film surface decreases and the exposure time lengthens. Particularly when photographing on a single roll of film from very low to high magnifications, different color reproductions sometimes result even though the color temperature may be constant. This phenomenon is known as reciprocity law failure of the film.

In such an event it is necessary to work with a constant exposure time to obtain uniform color reproductions. The check mechanism can be used to provide such a constant exposure time.

For that purpose, the volume of light is reduced by neutral density filters (ND), supplied in the standard equipment, with which the light level on the film surface can be kept constant for all magnifications.

* How to Check

This is done by the "CHECK" button and by the check scale area (black scale) of the color temperature meter.

The check scale area consists of five steps, any one of which may be used. Choose that scale position which is deemed most suitable for the condition of the specimen, the illumination, etc. For the first check, it is suggested to choose the highest of the objective magnifications to be used for photography. If an initial check is made with a low-magnification objective, the light intensity may not be sufficient to maintain constant exposure time with higher power objectives.

Examples of Application

1) If the CHECK button is pressed after the specimen detail has been selected and made ready for photography, the meter needle moves to a certain point on the check scale area.

   Fig.25 shows the needle moved just to the third line from the right.

   * If the needle goes beyond the scale (Fig.26), put an ND filter in the filter holder to reduce the volume of light so that the needle returns into the check area.

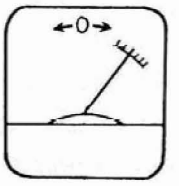


Fig. 25

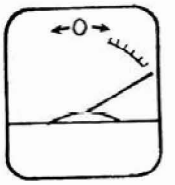


Fig. 26

   With high density specimens, the needle sometimes moves to the left of the check area. In this case, photography is still possible and correct exposure times will be computed unless the specimen is so dark that observation becomes impossible.

2) When changing objectives, place different density ND filters into the filter holder to keep the meter needle on the point determined initially. (Fig.25)
   Thus, photography with the shutter speed kept constant on a single roll of film will produce uniform color reproduction.

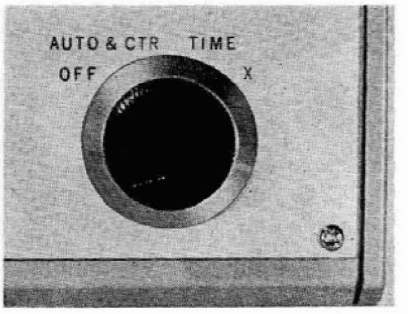
3. Manual Exposure with Timer Mechanism

   In this method, photomicrographs are made manually, at certain exposure times, without recourse to the automatic exposure mechanism.

1) Move the selector dial of the control unit to position "TIME" (Fig. 27). This means that the automatic exposure circuit is by-passed.

2) Release the shutter. The "WORK" light (orange) goes and the shutter opens.

3) After the desired exposure time, press the "TIME OFF" button.

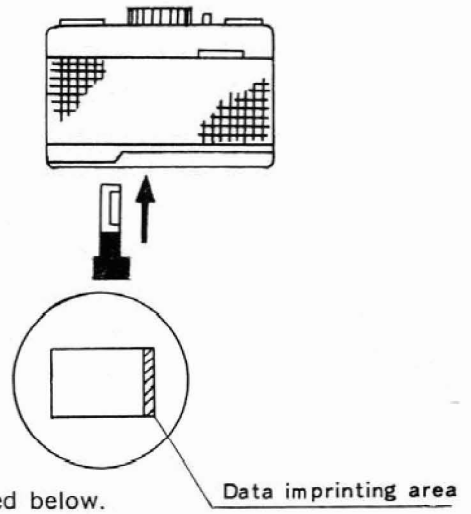


(Fig.27)

This terminates the exposure and the "WORK" light goes out.

* Pressing the "TIME OFF" button always causes the shutter to close. This is of advantage, for instance, if an automatic exposure is to be interrupted deliberately.

J 35mm Camera Back (C-35A)



Tha camera back is provided with data imprinting. facilities.

1) To imprint in a picture simultaneously with shutter release, use an insert provided, on which necessary information is written with a soft-point pen.
2) Slide the insert into the slit at the bottom of the camera back, with the written information facing the film plane.
3) Data Imprinting Position
   Data may be imprinted in the picture as illustrated below.

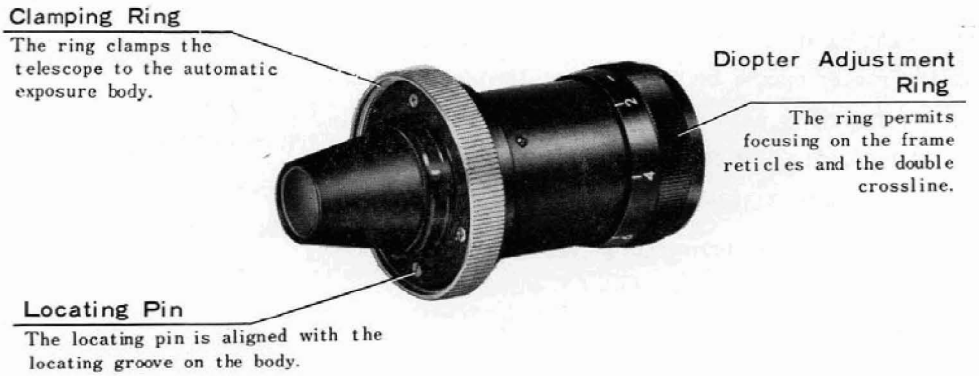
Other Points To Remember

1) When you imprint data, it is recommended to frame and trim your picture, so that the data may be imprinted against the white or transparent background.
2) The insert can be used repeatedly after wiping off written data with ether-xylene mixture.
3) Do not leave in a bright room the camera back with the insert slid. in the slit for hours.

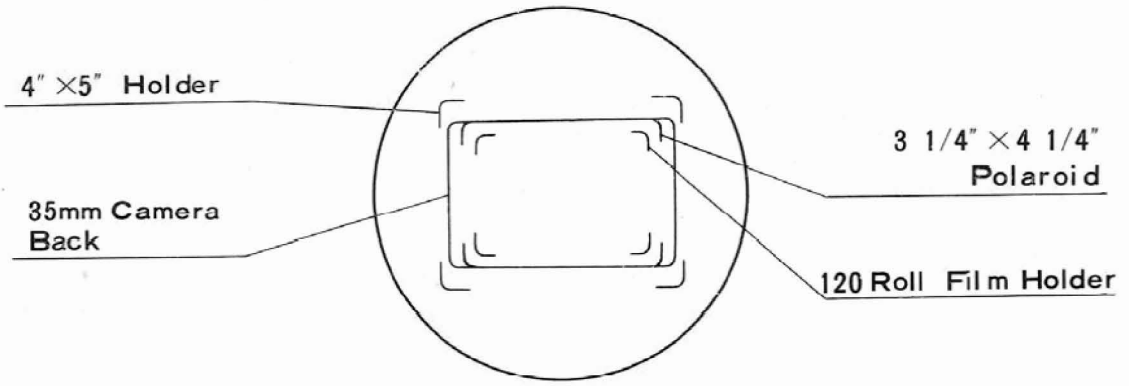
Ⅶ. Optional Accessories

* The focusing telescope and screen viewer are as illustrated below.

A. Focusing Telescope (PM-VS)

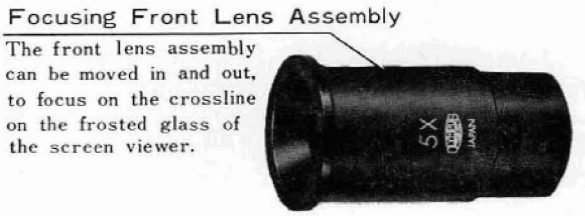


Select the reticle compatible with the camera back in use. Camera backs other than the 35mm camera back are optional accessories.

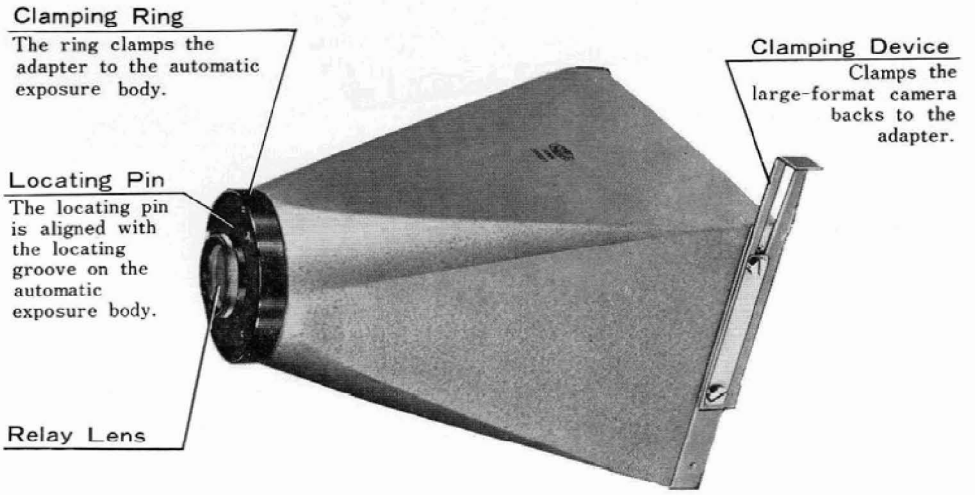


B. Screen Viewer (PM-VSC)

C. 5X Magnifier (5XLP)



D. Adapter for Large-Format Camera Backs (PM-DL)

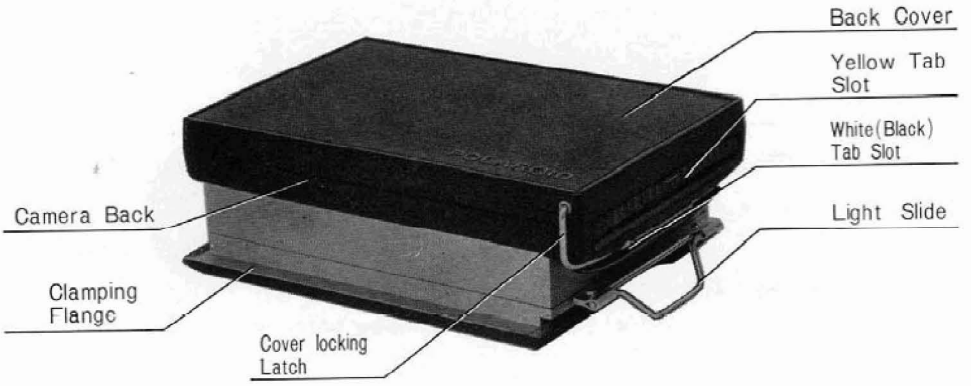


The adapter is required for all types of large-format camera backs.

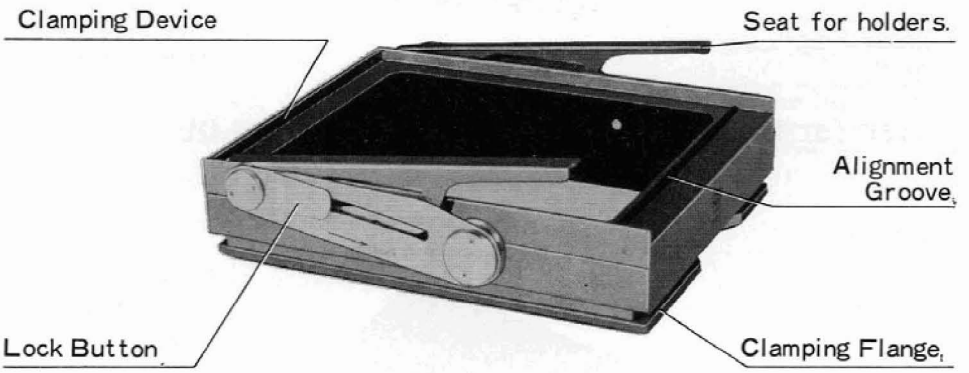
E. Large-Format Camera Backs

For individual applications, refer to the subsequent section on "Photography with Large-Format Camera Backs".

1. Polaroid 3¼″ X 4¼″ Back (PM-CP)



2. Intermediate Adapter for 4″ X 5″ Holders (PM-C 4 X 5)



Ⅷ Photography with Large-Format Camera Backs

you have only to remove the 35mm camera adapter, attach the large-format adapter instead and mount the large format camera back on it.

The picture size varies with the type of camera back used, but the magnification at the film surface remains the same for all, as follows :

* If FK eyepiece is used :
  Magnification of objective x magnification of FK eyepiece x 3
* If P eyepiece is used :
  Magnification of objective x magnification of P eyepiece x about 1.5

From the foregoing, the magnifications as tabulated below may be obtained by combining the objectives and eyepieces available.

Objective \ Eyepiece		FK2.5X	FK3.3X	FK5X	FK6.7X	P7X	P10X	P15X
Biological Applications	1.3X	9.8X	12.9X	19.5X	26X	13.7X	19.5X	29X
	2X	15X	20X	30X	40X	21X	30X	45X
	4X	30X	40X	60X	80X	42X	60X	90X
	10X	75X	100X	150X	200X	105X	150X	225X
	20X	150X	200X	300X	400X	210X	300X	450X
	40X	300X	400X	600X	800X	420X	600X	900X
	100X	750X	1000X	1500X	2000X	1050X	1500X	2250X
Metallographical Applications	1.3X	9.8X	12.9X	19.5X	26X	13.7X	19.5X	21X
	2.5X	18.8X	25X	37.5X	50X	26X	37.5X	56X
	5X	37.5X	50X	75X	100X	52.5X	75X	112.5X
	6X	45X	60X	90X	120X	63X	90X	135X
	10X	75X	100X	150X	200X	105X	150X	225X
	20X	150X	200X	300X	400X	210X	300X	450X
	40X	300X	400X	600X	800X	420X	600X	900X
	50X	375X	500X	750X	1000X	525X	750X	1125X
	100X	750X	1000X	1500X	2000X	1050X	1500X	2250X

The subsequent sections will describe standard applications based on automatic exposure. Special applications also are possible as in the case of 35mm camera (see Section I, page 19).

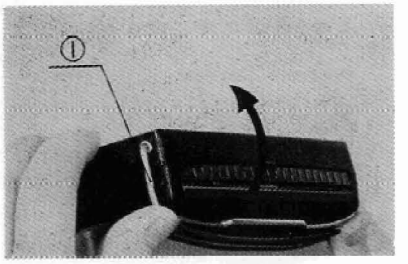
A. 3 1/4″ X 4 1/4″ Polaroid Camera Back (PM-CP)

Picture size: 3 1/4″ X 4 1/4″ (83mm X 108mm)

Film used: Polaroid Type 108 (color, ASA 75)
Polaroid Type 107 (B&W, ASA 3000)

1. Attaching the Camera Back
   * Attach the adapter for large format camera backs (PM-DL) to the top of the exposure body by aligning the locating pin of the adapter with the locating groove on the exposure body and clamping the adapter with its clamping ring.
   Pull the clamping device on the large format adapter towards you all the way. Slide the 3 1/4″ X 4 1/4″ Polaroid back with the cover locking latch facing you, onto the seat of the adapter, from right to left. Push back the clamping device until it firmly clamps the Polaroid back.
2. Loading the Camera Back with Polaroid Film
   * Read the instructions inserted in the film pack first and then take the following steps :

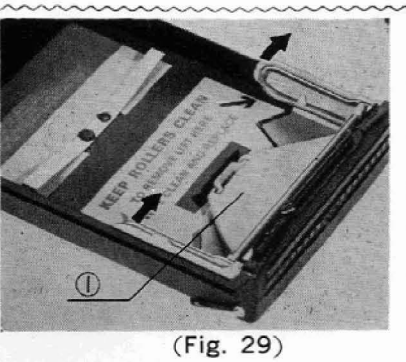
1) Open the film case and take out the film pack.
2) Push the Cover Locking Latch ① upwards with both hands. (Fig. 28)
3) Open the camera back cover all the way. (Handle with care not to break the cover.)



(Fig. 28)

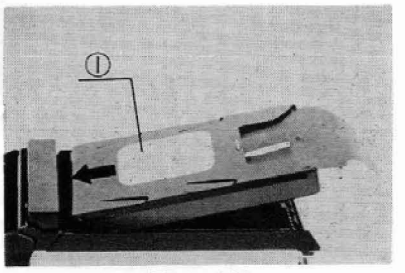
It is essential to keep the roller clean, for a dirty roller will produce irregularities on the picture.

1) To clean the roller, lift the roller unit ① upwards and remove. (Fig. 29)
2) Wipe the roller first with a wet cloth and then with a dry cloth.
3) After cleaning, place the roller unit in its original position.



(Fig. 29)

4) Next, holding the film pack only by its edges, so that the safety cover, bearing the SAFETY COVER·····THIS SIDE FACES LENS, faces into the camera, and insert the pack ① against the spring beneath the back cover.(Fig. 30)
5) Push the pack into the camera until it comes to a stop. You will feel it snap into place.
   * Make sure that the white tabs are not trapped between the pack and the camera body.



(Fig. 30)

6) Close the camera back cover by pressing both sides of the cover tightly. At this time, the black tab of the safety cover should be emerging from the small slot; if not, open the back cover once again and make sure the black tab is sticking out.
7) Hold the black cover removed, the white tab should come out frome the slot. Do not yet pull out this white tab.

This concludes the preparation for photography.

◎If the white tab is not visible;

If the white tab does not come out when the safety cover is pulled out, darken the room as much as possible and proceed as follows:

1) Open the camera back cover just slightly and take the end of the white tabs outside without moving the film pack. (Fig. 31)
2) With the white tab emerging from the slot, close the back cover by pressing it tightly on both sides.

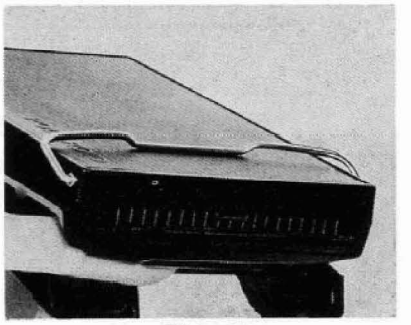


Fig. 31

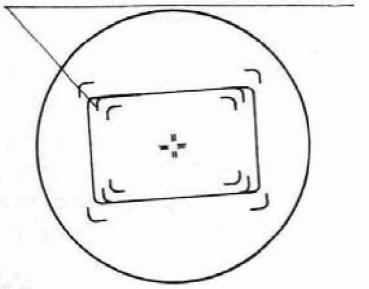
3. Focusing

1) Use the focusing telescope to focus accurately, in the same manner as with the 35mm camera back.
2) For framing, refer to the Polaroid reticle in the focusing telescope. Move the specimen detail to be photographed into this area.

4. Photography

1) Make sure that the selector switch of the control unit is in position "AUTO & CTR".
2) Set the ASA dial. Align with the "L" mark.
3) Check the specimen focus once again.
4) Make sure that the light path selector knob of the exposure body is in the green band position.
5) Make sure that the "SAFETY" light (green) is on.
6) Pull out the light slide of the camera back slowly all the way. If not pulled out completely, part of the picture may be obscured.

Reticle for 3 1/4" ×4 1/4" Polaroid Back



7) Use the release button (RELEASE) of the control unit to release the shutter. The "WORK" light (orange) lights up only while exposure is in progress. The "WARNING" light also lights up but ignore this since it does not affect large-format camera photography.
8) When the exposure is finished, push the light slide into the camera back.

5. Film Development

Develop the film in the following manner:

1. Hold the white tab emerging from the camera with thumb and index finger of the right hand and pull it out completely in one motion.
2. After the white tab is pulled out, a yellow tab emerges. If the yellow tab does not come out after the white tab is pulled out, do as mentioned on the next page: do not pull another white tab.

* If the yellow tab is in sight, do not pull the white tab. Pulling out the white tab does not mean commencement of development; it is a preparatory step for pulling the yellow tab.

3. Hold the center of the yellow tab and pull it out from the camera quickly in one motion.

   This is the beginning of development. It starts from the point where the yellow tab has been pulled out all the way.

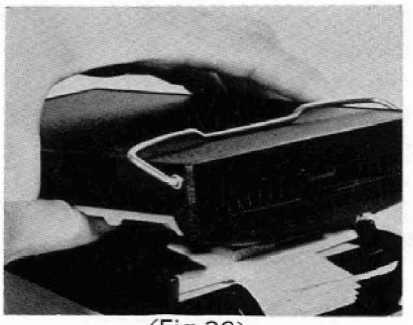
   The speed of pulling out is about equal to the time of saying "pull out".

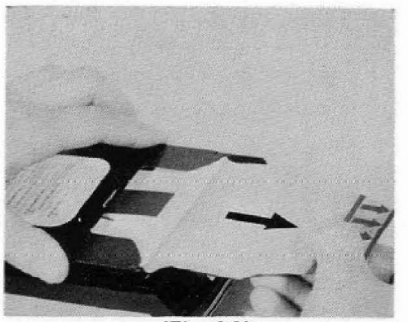
   If countless white spots appear in the picture, pull out a little more slowly.

4. The film can be developed in the following lengths of time (strict compliance with these time limits is recommended) :

Type 107	Type 108	
Development is available in 10~15 sec. Suitable time for development is 13~15 sec. when ambient temperature is low, and about 30 sec. when it is below 10 deg. C.	Temperature	Time
	27°C~32°C	55~45 sec.
	21°C~27°C	65~55 sec.
	16°C~21°C	90~70 sec.
Long time tends to produce strong contrast.	Short time gives reddish and long time bluish color.	

5. At the end of the specified development time, strip the picture from the brown paper, starting the corner nearest to the letters "PULL".
   Avoid touching the surface of the color picture for several minutes, and after drying, paste the picture on a color print mount.
   Also avoid touching the surface of the black and white picture and apply a coater to the picture to prevent fading and other changes.
   (Refer to the next section.)
6. Treatment after Development
   1) In the case of black and white pictures, be sure to spply a coater to all prints, within 2 hours if possible. The picture begins to fade within a few hours unless the coater is applied.
      Hold one corner of the print, turn the surface up, put on a flat place, and give 6~8 coats evenly all over the picture.
   * Be careful not to damage the picture with the coater edge.
     Also avoid stacking prints which were just coated.
     They will stick together.
   2) Do not apply a coater to color pictures. Instead, when the surface has dried, mount the prints on the mounts supplied.
   * If the yellow tab does not appear when the white tab is pulled out, take the following steps :
   1) Darken the room as much as possible, open the camera back cover just wide enough to receive a finger, and hold down the film pack with the finger tip. (Fig.32)
   2) While holding down the film pack, open the back cover fully and pull out the top yellow tab. (Fig.33)
      Pulling out that one tab, discard it. It is no use trying to save it. While the back cover is open, check whether the roller is dirty.
   3) After making sure that the next white tab is out from the slot, close the camera back cover.

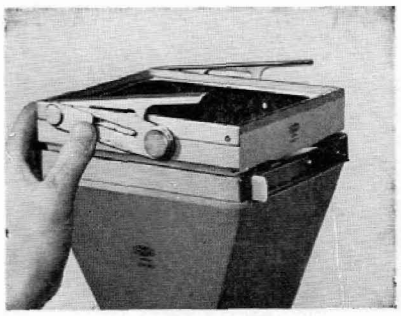

(Fig.32)


(Fig.33)

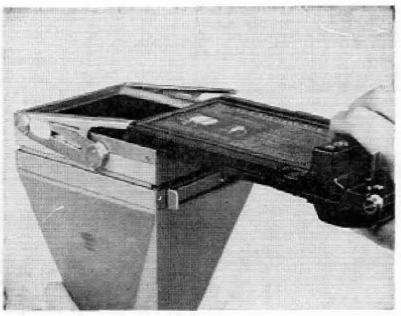
B. Intermediate Adaper for 4″ X 5″ Holders

Use of this unit permits photography with 4″ X 5″ film holders.
The film holders available are : Polaroid film holder, Graphmatic film holder, Graphic pack adapter, Graphic film holder (Rite Way), Linhof film holder. The above mentioned film holders are not Olympus products. They can be obtained either from our authorized distributors or from reputable camera dealers.

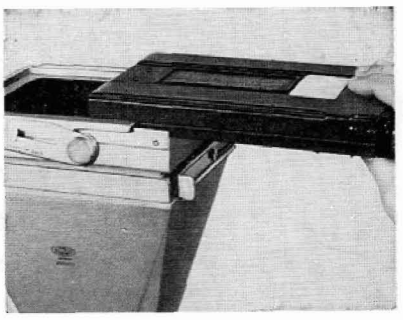
1. Attaching Large Format Adapter
   Attach in the same manner as for the 3 1/4″ X 4 1/4″ Polaroid back. (See page 26)
2. Attach the Film Holder
   1) Slide the lock buttons (both sides) of the intermediate adapter in the direction opposite to locking. At the end of their travel press the buttons. (Fig.34)
      The clamping device will lift up.
   2) Insert the film holder all the way. (Fig.35) This will engage a projection on the film holder with a mating groove on the intermediate adapter.
      In case of the graphmatic film holder, insert the holder into position without lifting up the clamping device. (Fig.36)
   3) Clamp the film holder down with the lock buttons.



(Fig.34)



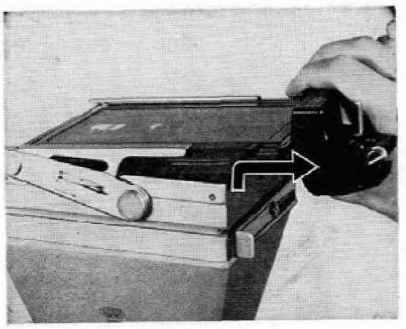
(Fig.35)



(Fig.36)

To detach the holder :

1) Slide the lock buttons on both sides in the direction opposite to locking.
2) Pull the holder out while lifting it lightly. (Fig.37) This way, it will slide out easily.

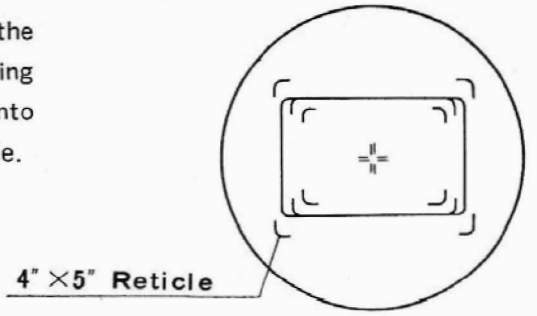


(Fig.37)

3. Focusing

1) Use the focusing telescope to focus on the specimen, in the same manner as with the 35mm camera.

2) For the film area indication, refer to the 4″ X 5″ frame reticle in the focusing telescope. Move the specimen detail into the area covered by the 4″ X 5″ reticle.



4. Photography

1) Make sure that the selector switch of the control unit is in the "AUTO & CTR" position.

2) Set the ASA dial. Align with the "L" mark.

3) Check the specimen focus again.

4) Make sure that the light path selector of the exposure body is in the green band position.

5) Make sure that the "SAFETY" light (green) is on.

6) After pulling out the light slide (or its equivalent) of the film holder, use the release button to release the shutter.
The "WORK" light (orange) goes on only while exposure is in progress.
The "WARNING" light also lights up, but ignore this since it does not affect large-format camera photography.
For instructions pertaining to the use of the different film holders, please refer to the literature supplied by the individual manufacturers.

MEMO

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OLYMPUS OPTICAL CO., LTD.

OLYMPUS TOKYO

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