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PACEMAKER

INSTRUCTION AND REFERENCE MANUAL

CROWN GRAPHIC

SPEED GRAPHIC FP

SPEED GRAPHIC 1000

23 • 34 • 45

PRICE, TWENTY FIVE CENTS

PACEMAKER GRAPHIC CAMERAS / 3 Sizes • 2 Models

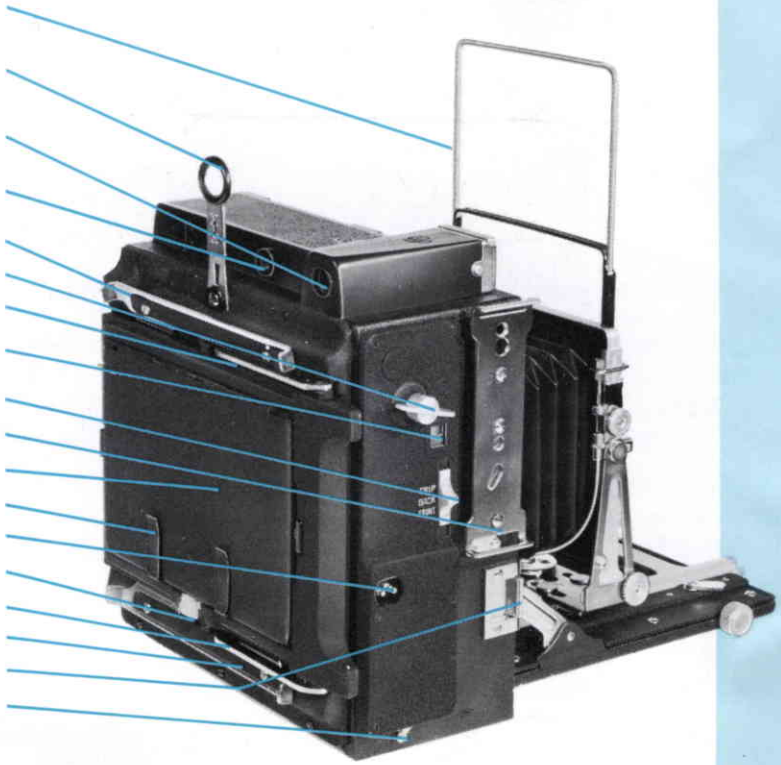
The instructions in this manual are applicable to all Pacemaker Graphic Cameras. *Speed* Graphic Model FP Cameras have a focal plane shutter while *Crown* and *Speed* Graphic Model 1000 Cameras do not. Although most illustrations are of the larger 45 size, the instructions are equally applicable to the smaller 23 and 34 Cameras. All directions, left and right, are from the operator's position behind the camera.

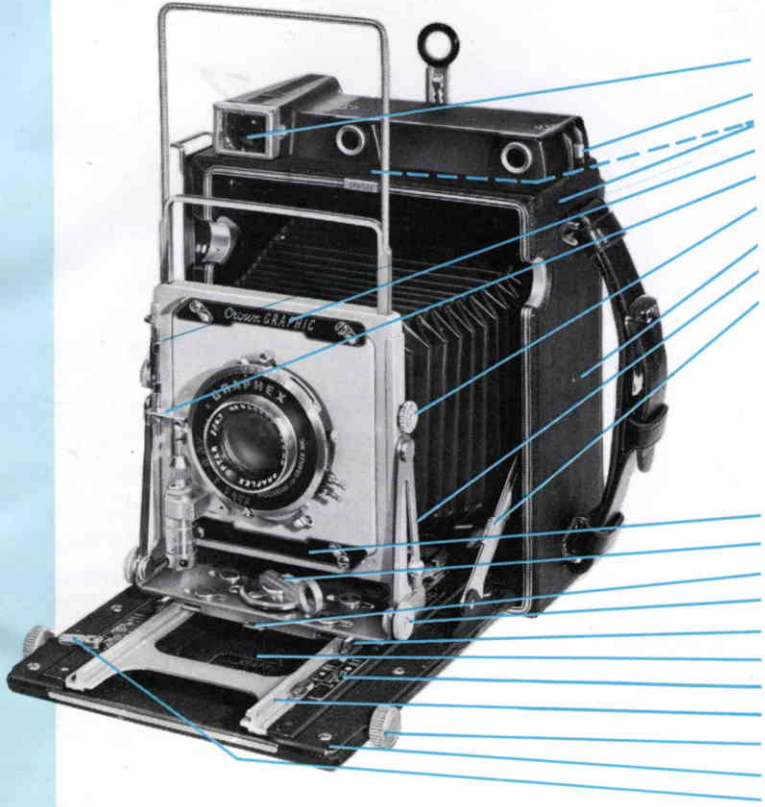
Most instructions apply to the Graflok Back and the Graphic accessories accepted by them. For information concerning the use of the Graflex Back and the Graflex film accessories accepted by them see Page 50.

Every effort has been made to make your camera dependable, convenient and easy to use. The following pages will review basic operation and will explain the purpose and use of the many features built into the camera.

For those who wish more detailed information on lighting, exposure and other areas of photography, a bibliography has been provided on Page 48.

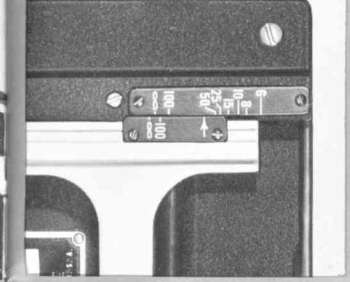
CONTENTS

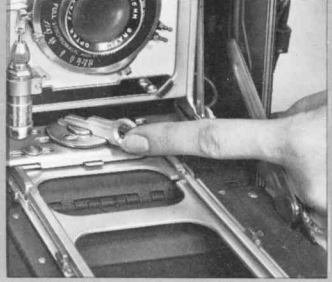



Viewfinder Window
Rangelite Switch
Bed Release Button
Lensboard Slide Lock
Body Release Arm
Rising Front Lock Nut
Tripod Socket
Front Standard
Bed Brace
Lensboard Slide Lock
Front Standard Lock Lever
Lateral Shift Release
Tilting Front Lock Nut
Infinity Stops
Serial Number on this plate
Focusing Scales
Track
Focusing Knobs
Camera Bed
Track Lock

OPENING THE CAMERA:

1. Press the bed release button at the top center or top left corner of the camera body (appears as a bump in covering).
2. Lower door or bed until it locks in a horizontal position.
3. Swing the front standard lock lever out straight and pull it outward on the track to the infinity stops; these stops are hinged and should be in an upright position. Fold the infinity stops down to move the front standard beyond the normal working position. (See Page 9 about additional stops for multiple lens use.)
4. Relock the front standard.
5. The sports viewfinder frame may be lifted by pinching inward against the side of the extendable frame and pulling upward as far as possible. Swing the sports viewfinder eyepiece to an upright position. Adjust parallax for 6′, 8′, 15′, or infinity. (See page 27 for use of optical viewfinder.) On 45 Cameras adjustment is on eyepiece —on 23 and 34 Cameras adjustment is on lower viewfinder frame.





CLOSING THE CAMERA:

1. Close the sports viewfinder frame. Press evenly on both sides or tap the top member with the flat of the hand.
2. Swing down the sports viewfinder eyepiece at the back of the camera.
3. If the front standard movements have been used, return them to normal as follows:
   a. Drop the lensboard to the lowest position and lock.
   b. Tilt the lensboard back to its normal, vertical position. Lock it.
   c. Bring the shift of the front standard to neutral.
4. *Rack the track back* to the limit of its movement.
5. Unlock the front standard and push it back into the camera body. Lock it.
6. Press down on the bed braces to release and close the bed. It will lock closed with a click.

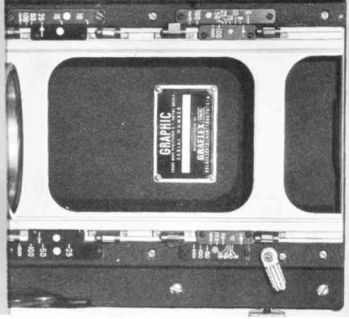
INTERCHANGEABLE LENSES

The long bellows extension of the Pacemaker Graphic permits a choice of lenses ranging from wide angle (short focal length) to telephoto (long focal length). These lenses are discussed on Page 47 A set of matching focusing scales and infinity stops should be installed for each lens; a rangefinder fitted to the camera must be adjusted for the lens normally used although the Graphic Rangefinder on the 45 models will accept cams matching all lenses normally used with the camera.

Lenses mounted on Super Graphic lensboard assemblies may be used on the Pacemaker Graphic 45 Cameras. Pacemaker Graphic 45 lensboards with raised bosses on the sides as well as the top and bottom will fit the front of the Super Graphic although they will not allow the use of the internal electrical system of that camera.

CHANGING LENSES

1. To remove the lens and its board: slide both lensboard slide locks laterally to the full out position. Lift the lens and shutter assembly out.
2. To install a lens: insert the lensboard assembly with the shutter release toward the side of the camera as shown. The body release arm should engage the shutter release lever as shown. Press lensboard firmly into the front frame and slide both lensboard slide locks to the full "in" position.



INFINITY STOPS

A set of infinity stops must be correctly positioned for each lens used on the camera.

If infinity stops have not been factory installed, they must be very carefully located square with the film plane and locked firmly in place.

LENS FITTING

Lens and shutter combinations may be mounted on lensboards by your local Service Dealer or Graflex Service Center. *Focusing scales* should be provided and properly located for each lens. For cameras equipped with a Graphic Rangefinder each lens must be measured optically for exact focal length so that a matching rangefinder cam can be supplied with the lens. Be sure to identify and record each lens, matching cam and set of infinity stops for future reference. Lensboards with 8 raised bosses will fit Super Graphic Cameras but must be tripped externally.

Lenses mounted on Pacemaker 45 Lensboards may be used on the Graphic View through the use of the special Graphic View lensboard adapter.

GRAFLEX 1000 (2B) SHUTTER

All controls are visible from the top and can be identified and set by touch, in any sequence desired. "Left" and "Right" directions are from the front of the shutter, as viewed in the accompanying photograph.

TO COCK

Turn the large ribbed ring ④, which also serves as a lens shade, clockwise as far as possible.

NOTE:

A. The shutter cannot be tripped unless the shutter is fully cocked.

B. The blades will not accidently open in the event the cocking ring is turned only part way and then allowed to return to its original position.

TO TRIP

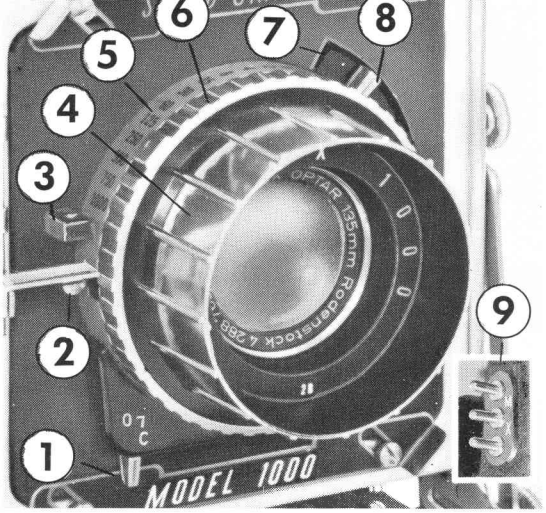
A. Press the red switch on the back of the Graflite battery case (when solenoid is installed), or:

B. Use a cable release, screwed into the tapped boss ③ just above the shutter release lever ②, or:

C. Squeeze the body release on the camera body or press the release lever ② at the side of the shutter.

TO SET THE DIAPHRAM

Set lever ⑧ at the top right of the shutter to the desired number on the Diaphragm Scale ⑦.



IDENTIFICATION NUMBERS in text correspond with numbers shown above. Arrow indicates location of Flash Contacts ⑨, shown enlarged in inset.

TO SET SHUTTER SPEEDS

Shutter speed may be set either before or after cocking. Turn the knurled ring ⑥ until the red dot on the raised knurl is opposite the desired speed on the Shutter Speed Scale ⑤.

BULB AND TIME EXPOSURES

Use a "locking type" cable release, screwed into the tapped boss ③. Set the Shutter Speed Ring ⑥ at "B".

GROUND GLASS FOCUSING

A. For quick check of focus and composition: Move the control lever ① at lower left corner of lensboard to "O" position. The shutter blades and diaphragm leaves will open fully. To close, return lever ① to "C" position.

B. To focus while adjusting diaphragm: Move knurled Shutter Speed Ring ⑥ until red dot on raised knurl is opposite "O" on Shutter Speed Scale ⑤. Cock and trip the shutter. The shutter will open fully and the diaphragm will remain at any pre-selected setting. This is useful when determining the diaphragm opening required for proper depth of field, when ground glass focusing and using front standard tilts and shifts. To close, move the Shutter Speed Ring away from "O" to any desired setting and re-cock the shutter.*

SYNCHRONIZATION

A. CLASS "M" BULBS • The three flash contacts ⑨ (located at the lower right corner of lensboard) control flash synchronization. When a standard ASA bi-post sync shutter cord is connected to the top two posts, the shutter is automatically synchronized for "M" type bulbs (20ms delay) at all speeds from ½ second to 1/750 second.

NOTE: The 1/1000 sec. setting is not synchronized for Class "M" bulbs.

B. ELECTRONIC FLASH (X) • Connect a standard ASA bi-post shutter cord to the lower two contact posts. Do not use a shutter speed faster than the flash duration of the unit being used. For instance, if the duration of the flash is 1/400 second, a shutter speed in excess of this will cut off part of the useful light output of the unit.

FILTERS

To install a filter, unscrew the large ribbed Shutter Cocking Ring ④, which also serves as a lens shade, by turning it counter-clockwise. Drop the filter into the exposed recess and screw the ring back into place. Use Series 6 filters.

SOLENOID OPERATION

A solenoid may be used *for tripping purposes only*. A Graflex Solenoid, complete with mount, special release arm and bracket (Cat. No. 2535) can be installed by Graflex Service Departments.

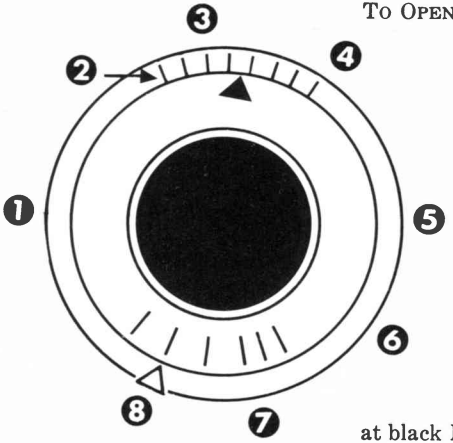
When using flash with the solenoid, set the Circuit Control on the back of the Graflite Flash Unit at "No. 1." Connect solenoid release with "SOLENOID" outlet, using a solenoid cord; connect shutter contacts with "SHUTTER" outlet on battery case, using a shutter cord.

To operate, press main switch (red button) on battery case, or press the switch on remote control cord attached to "REMOTE" outlet. When additional power is needed for extensions, add extension tubes. Extension cord can be attached to the "EXTENSION" outlet. (Do not attach extension cords to "REMOTE" or "BATTERY" outlets, since they will be 'hot' at all times.

**Do not recock the shutter without first moving the shutter speed ring away from "O."*

GRAPHEX (X) SHUTTER • Graphex Full Sync. • All Sizes

Cock: Move lever 4 to the right for all speeds including B & T.
Trip: Press lever 1 down.
Shutter Speeds: Revolve knurled ring 2 until desired shutter speed number is over the index arrow head. Extra effort is required to overcome the booster spring at 1/400.
B. Shutter will stay open as long as lever 1 is held down.
T. Press lever 1 to open shutter, press again to close.
Press Focus: Cock shutter (any speed setting).
TO OPEN: Pull down and in on lever 5.
TO CLOSE: Lift lever 5 up.
Diaphragm Settings: Set lever 8 opposite f- number desired.
Cable Release: Attach at 3. Use straight tip or Kodak All-Metal.
Flash Connection: ASA Bi-Post at 6. Use Graflite cords 2701, 2702, and 2810.



SYNCHRONIZATION • GRAPHEX (X)

Electronic Flash: Internal contacts operate every time shutter is cocked and released.
Bulbs: Use external synchronized solenoid for type M bulbs.

SYNCHRONIZATION • GRAPHEX FULL SYNC.

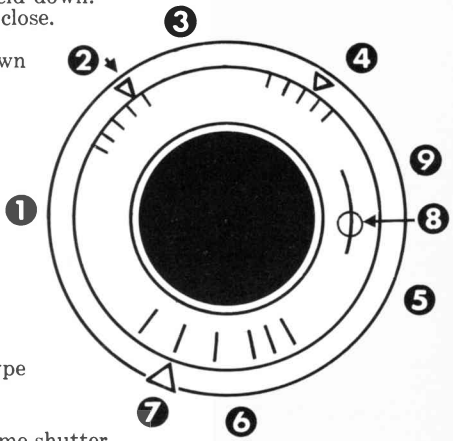
Electronic Flash: Set lever 7 at F-X. Cock and release. Use any shutter speed.
SM, SF, M-2 and M-25 Bulbs: Set lever 7 at F-X. Cock and release. Use red shutter speeds only.
Type M Bulbs: (Includes M-5 Bulbs). Set lever 7 at black M. Cock and release. Use black shutter speeds only.

Set lever 7 at red M. Cock and release. Use red shutter speeds. This permits use of slightly higher guide numbers because of more complete use of bulb output at these lower speeds.

Graphex fully synchronized shutter *can* be synchronized with solenoid. When so used, lever 7 *must be at "Off"*.

SUPERMATIC (X) SHUTTER • FLASH SUPERMATIC SHUTTER

Cock: Move lever 3 to right for all speeds including B and T.
Trip: Press lever 1 down.
Shutter Speeds: Revolve knurled ring until index arrow is over desired shutter speed number. Black arrow over black speeds. Red arrow over red speeds.
B: Shutter will stay open as long as lever 1 is held down.
T: Press lever 1 to open shutter. Press again to close.
Press Focus: Cock shutter (any speed).
TO OPEN: Press in on button 4 while pulling down lever 1.
TO CLOSE: Recock shutter.
Diaphragm Setting: Set lever 7 opposite f- number desired.
Cable Release: Attach in cable release socket behind lever 1. Generally filled with a small dust plug which can be removed.
Flash Connection: ASA Bi-Post at 5 on No. 2 shutters. At 6 on No. 3 shutters. Use Graflite cords 2701, 2702, 2810.



SYNCHRONIZATION • SUPERMATIC (X)

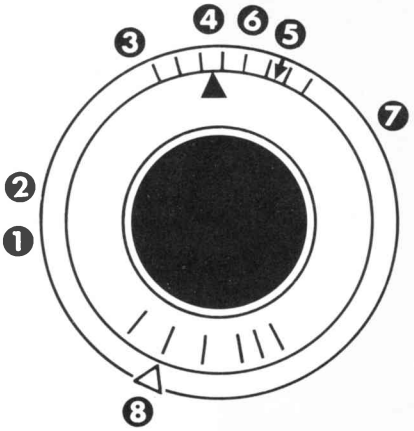
Electronic Flash: Internal contacts operate every time shutter is cocked and released.
Bulbs: Use external, synchronized solenoid for Type M bulbs.

SYNCHRONIZATION • FLASH SUPERMATIC SHUTTER

Electronic Flash: Internal contacts operate every time shutter is cocked and released.
SM, SF, M-2 and M-25 Bulbs: Set lever 8 at F. Cock shutter with lever 3. Additionally pull down cocking lever 9. (M-2, M-25 Bulbs use 1/50 sec. or slower.) Release with lever 1.
Type M Bulbs: (Includes M-5 Bulbs.) Set lever 8 at M. Cock with lever 3. Additionally pull down cocking lever 9 and trip with lever 1.
Flash Supermatic Shutter must *not* be used with solenoid.

WHEN USING FRONT SHUTTER

NOTE: When using Speed Graphic Cameras and the front shutter be sure the focal plane shutter is at "O"—(Open)—and selector slide is at the "FRONT" position. See Page



COMPUR SHUTTERS

Some Compur shutters (other than Graphic Compur) may not be solenoid synchronized unless the shutter is first converted to "X" sync only. This conversion may be accomplished at a Graflex Service Center.

See separate instructions for Compur MXCRO Shutter used on CF-904 and CF-905 Crown Graphic Special Camera.

Cock: Move lever 6 to the right for all speeds including B & T.

Trip: Press lever 1 down.

Shutter Speeds: Revolve knurled ring 5 until desired shutter speed number is over the index line. Extra effort is required to overcome the booster spring at 1/400.
B: Shutter will stay open as long as lever 1 is held down.
T: Press lever 1 to open shutter, press again to close.

Press Focus: Graphic Compur—Cock shutter (any speed setting).
To OPEN: Press down and in on lever 7.
To CLOSE: Lift lever 7 up.
Compur (other types)—Cock shutter (any speed setting).
To OPEN: Press back on lever 7 while tripping shutter.*
To CLOSE: Recock shutter (shutter blades will have to close before it can be fully recocked).

Diaphragm Setting: Set lever 8 opposite f- number desired.

Cable Release: Attach at 2. Use tapered tip type or Kodak All-Metal.

Flash Connection: ASA Bayonet at 4. Use Cat. No. 2808 Cord. DIN or PC Connector at 4. Use Cat. No. 2821 or 2721 Cord.

SYNCHRONIZATION:

Electronic Flash: Set lever 3 at X. Cock and release.

SM, SF, M-2 and M-25 Bulbs: Set lever 3 at X. Use shutter speed 1/100 or slower. (M-2, M-25 Bulbs 1/50 or slower.) Cock and release.

Type M Bulbs: (Include M-5 Bulbs.) Set lever 3 at M. Cock and release.

*SELF-TIMER: Compur (*not Graphic Compur*). Some of these shutters will not have the Press Focus lever described but will have a self-timer. When lever 7 is pressed back, lever 6 can be moved over farther to the right. When lever 1 is pressed, shutter blades will open in about 8-12 seconds. For ground glass focusing, set shutter at B and use locking type cable release to hold shutter open.

Special Instructions for 135mm Schneider Xenar

Cock: Move lever 6 to the right for all speeds including B.

Trip: Press lever 1 down.

Shutter Speeds: Revolve knurled ring 5 until desired shutter speed number is over the index line.

B: Shutter will stay open as long as lever 1 is held down.

PRESS FOCUS:

To Open: Press back on lever 7 and press lever 1 down. Recock.

To Close: Pull lever 7 forward.

Diaphragm Setting: Set lever 8 opposite f-number desired. ❷

Cable Release: Attach at 2. Use tapered tip type or Kodak All-Metal. ❶

Flash Connection:

DIN or PC Connector at 4. Use Cat. No. 2821 or 2721 Cord.

SYNCHRONIZATION*:

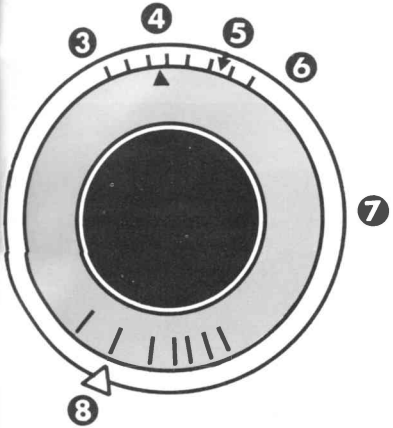
Electronic Flash—Set lever 3 at X. Cock and release.

SM and SF Bulbs—Set lever 3 at X. Use shutter speed 1/100 or slower. Cock and release.

Type M Bulbs—Set lever 3 at M. Cock and release.

***Solenoid Synchronization:** The MX-CRO Synchro-Compur Shutter **may not** be solenoid synchronized unless the shutter is first converted to "X" synchronization only. It is necessary to remove the "M" synchronization gear train from the shutter since the gear train would otherwise introduce a double delay preventing proper synchronization with solenoid. (Continued Next Page.)

F/4.7 lens in MX-CRO Synchro-Compur Shutter

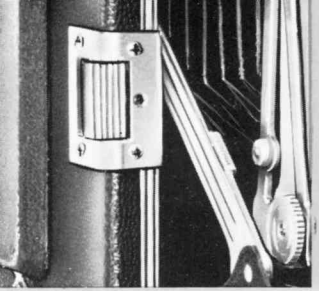


However, solenoid may be used for tripping only if desired without shutter modification. A stud must be mounted on the release arm to attach a solenoid. The convenience of remote tripping with solenoid may be enjoyed with Graflite by setting the selector switch at #1. Connect a shutter cord (Cat. No. 2821 or 2721) to the shutter flash connections (4) and the shutter outlet of the Graflite Battery Case. Connect a solenoid cord (Cat. No. 2809 or 2704) to the solenoid outlet of the Graflite Battery Case and the solenoid. When the red button at the back of the Graflite is pressed, the shutter will be tripped by the solenoid and flash synchronization will be determined by the shutter.

Graflex Service Centers are equipped to modify shutters as described above:

Cat. No. 9462 Fit stud to shutter release arm

Cat. No. 9463 Remove internal "M" synchronization delay train to permit solenoid synchronization. Convert to "X" sync



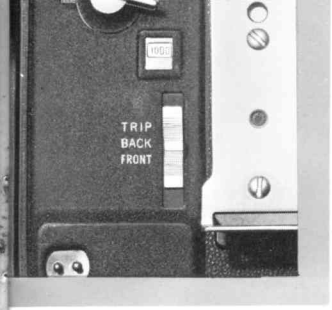
BODY RELEASE

The Pacemaker Graphic is equipped with a conveniently located body release. On Speed Graphic Cameras a selector slide is also provided. When the selector slide is in the "FRONT" position the arm on the front standard will engage the shutter release lever and trip the shutter. With the selector slide in the "BACK" position the focal plane shutter will be tripped.

To set the selector slide push *in* and *up* or *down* to the desired setting.

The selector slide may be used to release the focal plane shutter without firing a flash lamp and is useful when it becomes necessary to change shutter speeds. To release shutter push in and up as far as it will go. (Trip)

> **NOTE:** When using the front shutter the focal plane shutter must be open and when using the focal plane shutter the front shutter must be open.



FOCAL PLANE SHUTTER

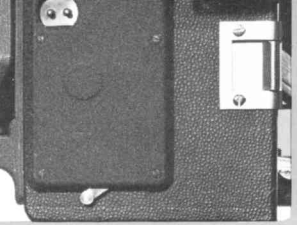
Pacemaker *Speed* Graphic Cameras are equipped with a focal plane shutter at the back of the camera. This shutter has a wide selection of accurate speeds in a generally higher range than between the lens shutters. It provides for the use of telephoto or other lenses which may not be mounted in shutters. Generally speaking, the focal plane shutter has more motion stopping ability than between the lens shutters. Where there is duplication of shutter speeds, either focal plane or front shutter may be used at preference of the user. If shutter speeds slower than 1/30 of a second are required, use the front shutter.

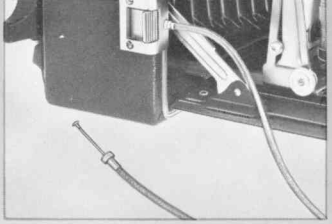
To use the focal plane shutter:

1. Open the front shutter. (Set at "T" and open it or use Press Focus feature.)
2. Set the selector slide at "back."
3. Turn the shutter winding key until the desired shutter speed appears in the shutter speed window. With the speed control lever moved toward the back of the camera the mask in the shutter speed window will be raised to expose the following shutter speeds: 50, 250, 1000. With the lever moved forward a speed control governor is engaged and the following figures will be seen in the shutter speed window: 30, 125, 500. These numbers indicate the exposure time in terms of fractional parts of a second.

CAUTION: Do Not Wind The Focal Plane Shutter with the dark slide removed from the holder as the film will be exposed.

To maintain peak efficiency of the focal plane shutter, it is advisable to allow the curtain to run down to the open (O) or fully closed position before putting the camera away.





TIME EXPOSURES:

Time exposure may be made with the focal plane shutter.

1. Move the speed control lever toward the back of the camera to disengage the governor.
2. Wind or release the focal plane shutter until letter "T" appears in the shutter speed window.
3. Press the body release to allow the focal plane shutter to run down to the full open position.
4. Press the body release again to close the shutter at the end of the exposure time.

NOTE: It is preferable to release the shutter by means of a heavy duty metal cable release threaded into the cable release socket of the body release.

FOCAL PLANE SHUTTER FLASH SYNCHRONIZATION

Since the length of curtain travel is different for each size of Pacemaker Speed Graphic Camera, the effective flash peak requirements vary. Hence, instructions for flash synchronization with the Speed Graphic 23 Camera vary slightly from those for the larger Speed Graphic 34 and 45 Cameras.

1. Attach the Graflite Battery Case to the camera.
2. Plug the Graflite cord into the synchronizer outlet on the camera and the shutter outlet in the battery case
   Make the exposure by pressing the body release. (Do not press the switch button on the battery case.)

SPEED GRAPHIC 23 CAMERAS

Use #31 and #2A flash lamps at 1/1000, 1/500, and 1/250. No. 6 and FP 26 flash lamps may be used at 1/1000 shutter speed only.

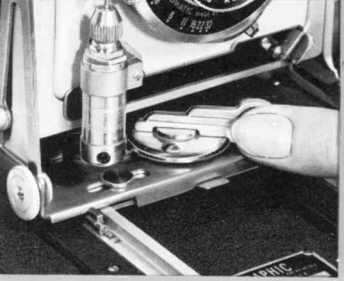
FOR SPEED GRAPHIC 34 and 45 CAMERAS

Use only the No. 31 and No. 2A flash lamps at shutter speeds of 1/1000 and 1/250 of a second. Synchronization can not be obtained at other instantaneous speeds. Speeds marked in red serve as a reminder that they are not to be used for flash synchronization.

All types of flash lamps as well as high speed electronic flash units may be used with the Time exposure setting by means of the built-in contacts. The curtain should be set for the making of a Time exposure, previously outlined. (See Page 20.) The lamp will be fired as the curtain reaches the full open position.

The Graflex focal plane shutter will not fire a flash lamp when the shutter curtain is wound or when the shutter is released with the shutter selector slide since a secondary switch connected to the body release makes it necessary to release the focal plane shutter by the body release in order to fire the flash lamp.

NOTE: If the focal plane shutter has not been used recently, the contacts may have become oxidized. To insure good contact wind and release the curtain occasionally, or at least a few times before using for flash.



RANGEFINDER FOCUSING

TO USE:

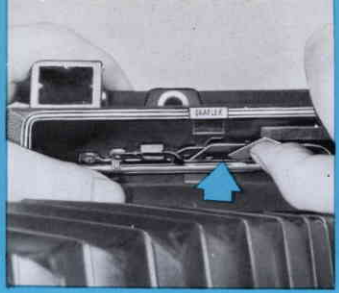
1. Open camera as described on page 6.
2. Move the front standard against the infinity stops. Look into the rangefinder eyepiece and rack the track forward until the image of your subject as seen in the central, moving field exactly coincides with the larger stationary image. The field moves horizontally in the Graphic Rangefinder and vertically in the Kalart.
3. Lock the track. (Track lock not required on 23 Cameras.)

GRAPHIC RANGEFINDER AND EXTRA LENSES

The Graphic Rangefinder is an integral part of the Pacemaker Graphic Camera body and functions with interchangeable cams each made to match a specific lens. *Cams for the Graphic Rangefinder may not be interchanged with those for the Super Graphic Rangefinder.* With the proper cam in position the rangefinder and parallax correcting viewfinder will indicate true focus and field coverage of the lens [unless the front standard adjustments (See Pages 29, 30, 31, 32, 33) are used].

KALART RANGEFINDER AND EXTRA LENSES

Additional lenses fitted to cameras equipped with Kalart Rangefinders must be focused by ground glass or focusing scale. The Kalart Rangefinder may be focused on the subject and the distance read from the focusing scale matching the lens for which the Kalart Rangefinder is adjusted and this reading transferred to the focusing scale for the lens being used.



TO CHANGE THE GRAPHIC RANGEFINDER CAM:

1. Open the camera and pull the front standard forward.
2. Rack the track forward about 2″ (until the actuator bracket clears the plunger).
3. Hold down the rangefinder access door located under the top of the camera.
4. To remove the cam, pull the free end forward and out.
5. To fit cam into rangefinder, hold it with the long smooth edge facing the front of the camera. Slide the narrow end of the cam into the slot of the tube and under the rangefinder follower arm. Compression of the spring in the tube will hold the cam in place against the plunger. If the slot appears to be filled, slide the point of the cam between the caps on the spring and plunger. Push the plunger over, or tip the camera upright and tap lightly. This will open a space for insertion of the cam.
6. Let the metal cover close; rack the track back as far as it will go; position the front standard against the infinity stops matching this rangefinder cam, and lens combination. The Graphic Rangefinder and automatic parallax correcting optical viewfinder will operate in synchronization with the focusing of the lens.
7. The Graphic Rangefinder will synchronize with all properly fitted lenses from wide angle to long focus telephoto, providing the matching cam and properly fitted infinity stops are used in each instance.

LIGHT BEAM FOCUSING FOR NIGHT PHOTOGRAPHY

When it is too dark to see the image clearly by looking through the rangefinder, this rangefinder may still be used to obtain proper focus by the projection of light from the two front windows of the rangefinder out to the subject. Focusing will cause one beam of light to move with respect to the other and when they coincide on the subject the lens is automatically in focus on that subject.

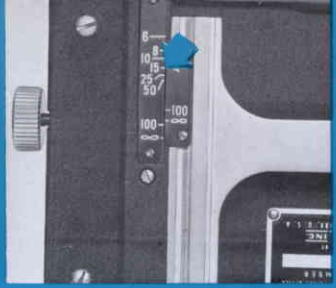
In the Graphic Rangefinder the Rangelite is built in as an integral part; the light can be turned on by pressing the red switch on the left side of the rangefinder housing. Two photoflash penlite batteries power the built-in Rangelite and must be installed at the time of purchase of the camera.

1. To install new batteries press in and to the left on the left end of the battery compartment cover at the back of the rangefinder housing.
2. Remove old batteries.
3. Insert two fresh photoflash penlite batteries side by side in the battery compartment. Position batteries so that they are lined in series, positive to negative as shown.

NOTE: Old batteries sometimes leak causing corrosion. Do not store the camera with old or well used batteries in place.

The Kalart Focuspot may be attached to the top of the Kalart Rangefinder to provide beam focusing. A connecting cord from it to a Graflite battery case with standard size D batteries will provide the electrical energy. Full instructions accompany each Focuspot.

focused at 6 ft.



focused at 15 ft.

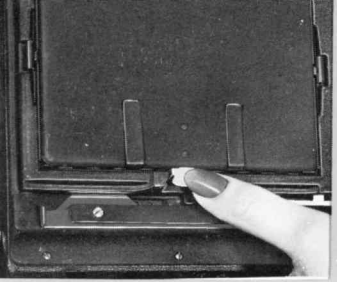
focused at infinity

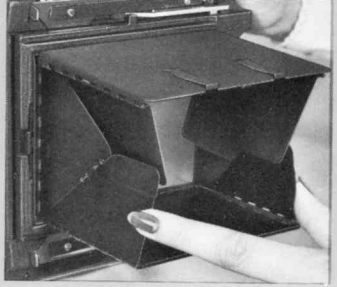
SCALE FOCUSING

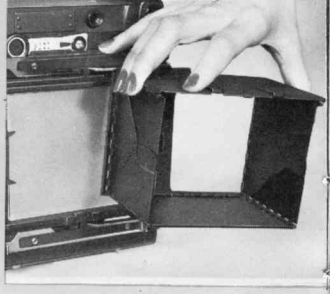
A focusing scale, and index scale for each lens to be used on the Pacemaker Graphic should be installed on the bed and track along with a properly identified pair of infinity stops for each lens to be used on the camera. Be sure to use the proper set of infinity stops.

The focusing scales on Pacemaker Graphic Cameras are of the modified vernier type with one part carried on the camera bed and the other on the sliding track. The distances indicated are from film position to the subject. Each focusing scale has been calibrated especially for the lens supplied with it. If this scale is used with any other lens, even of the same make, speed and focal length, out of focus pictures may result since lenses do vary somewhat from their indicated focal length. Each lens must have its own focusing scale, calibrated especially for it.

Focus on greater distances by matching the figures for the measured subject distance indicated on each scale. For shorter distances use the pointer at the front of the short index scale set opposite the figure representing the subject distance.





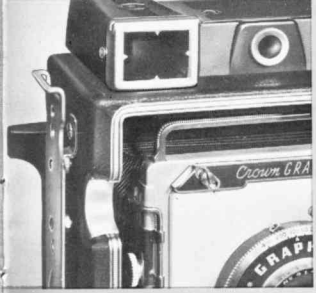


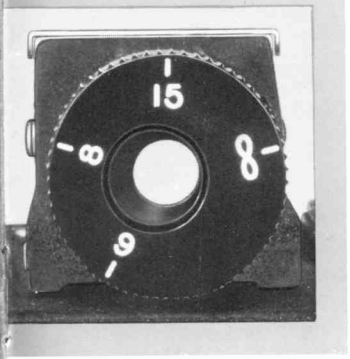
GROUND GLASS FOCUSING

Ground glass focusing through the lens is recommended for all critical photography, since it allows checking sharpness of focus, depth of field, composition and shape of the image as it is to be recorded on the film. The ground glass must be used whenever the front is tilted, shifted, or otherwise moved from the normal position. The focusing panel of the Pacemaker Graphic 34 and 45 Cameras have an Ektalite Field lens under the ground glass for a brighter image.

1. Press down the latch to open the focusing hood.
2. To close the hood, first press in on the side wings and up on the bottom panel; then pull the top downward until it latches.
3. To remove the focusing hood (allowing the use of a magnifying glass over the entire ground glass area), lift up on the release latch while pressing sideward on either of the two catches holding the focusing hood onto the focusing panel. Lift the focusing hood off.
4. To reattach the hood, position over the ground glass and press until it snaps into place.
5. A dark slide clip is provided at the lower edge of the focusing hood of the 4 x 5 size.

NOTE: Focusing panels of Pacemaker Graphic 23 Cameras may be converted to include Ektalite at a Graflex Service Center.





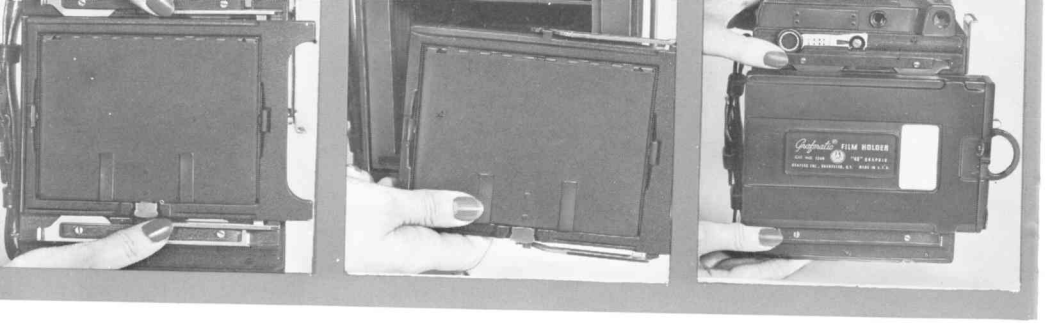
THE OPTICAL VIEWFINDER

This is built into the Graphic Rangefinder and has automatic parallax compensation. The optical finder is a separate item on other Graphics, all sizes.

The optical viewfinder is often preferred to the open frame finder in order to more clearly define the limits of the field since it may be fitted with masks of different sizes to correspond with the field coverage of various focal length lenses and different film sizes used with the camera. Both finders are used to best advantage when the eye is held as closely as possible to the rear element.

For *parallax adjustment*, set the eyepiece dial by placing the number which most closely corresponds to the distance from the subject opposite the line along the top center of the finder.

(*See page 46 for Table of Masks for Optical View finder*)

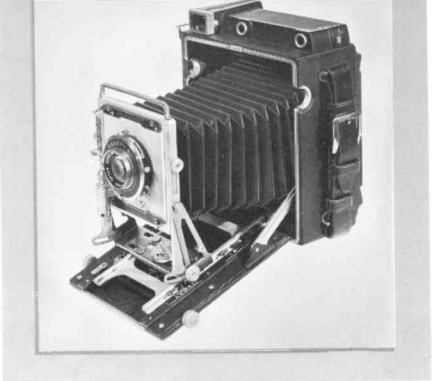


FOCUSING PANEL

1. To remove the focusing panel*, press down on the knurled edges of both focusing panel release arms. Slide across camera about ¼" and lift off. Accessories such as the Graphic Roll Holders, Graphic Polaroid Back, Graflarger, etc., can now be attached and held into place by the slide locks.
2. Release the slide locks by sliding to the left. By sliding firmly to the right, any attachment can be held firmly in position.
3. To reattach the focusing panel release the slide locks. Place the focusing panel approximately in the normal position and slide it ¼" to engage the release arms; it will snap into place.

*See Page 50 for Graflex Backs.

FRONT STANDARD ADJUSTMENT



The Pacemaker Graphic has three important adjustments to shift, rise and tilt the lens and shutter. Each movement may be used independently, or with the others. Watch the ground glass image for the improvement or correction that each movement contributes to the appearance of the image. All focusing and composing must be done on the ground glass. Remember that some lenses, notably short focal length lenses, may not adequately cover the entire negative with a clear, sharp image when moved or tilted from the normal position.

It is generally desirable to keep the back of the camera parallel to the subject, unless special effects are desired. The area which will be included in sharp focus (depth of field) will be generally parallel to the lensboard. Turning a lens toward a plane at an angle to the camera will bring more of that subject into sharp focus on the film. Note the subject matter not included on this plane or area may not come into sharp focus, even though closing the diaphragm will help somewhat.

RISING FRONT

The rising front of a Pacemaker Graphic permits raising the lens above its normal position and is useful for vertically centering the image. Bringing the top of a building into the picture area without tilting the camera will "straighten up" a tall building and remove unwanted foreground.

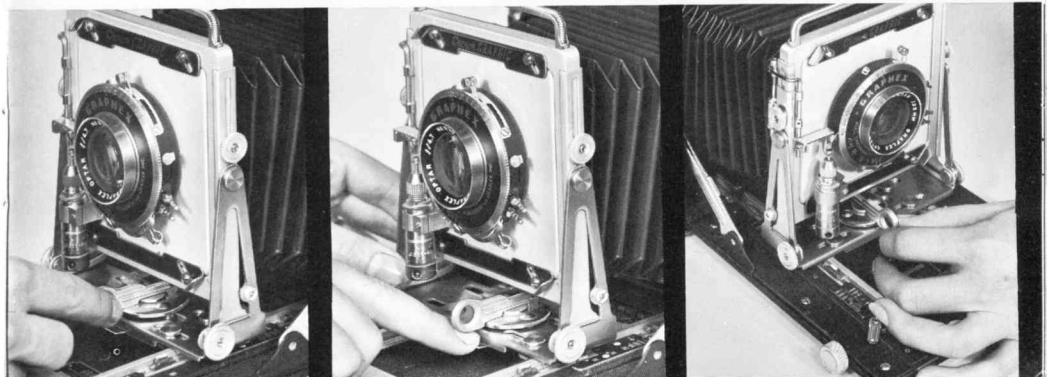
1. Loosen both rising front lock nuts. Compose and focus your picture on the ground glass—lift the lensboard frame as needed.
2. Tighten the rising front lock nuts before taking the picture.

NOTE: Short focal length lenses may not cover the entire negative, inclusive of the corners when they are raised, tilted or otherwise shifted from the normal position.

SIDE SHIFTING FRONT

The side shift permits laterally centering the image without swinging the camera, which changes perspective and may cause undesirable distortion.

1. Release the front standard lock.
2. Press down on the lateral shift release and slide the front standard left or right as desired, while observing the effect on the ground glass image.
3. When the adjustments are about as you want them by ground glass inspection, tighten the front standard lock slightly, recheck the adjustments and then lock each securely.



TILTING FRONT

The tilting front changes the location of the plane of sharp focus and is thus often considered to provide control over depth of field. When tilted back, it is useful for photographing areas above the camera.

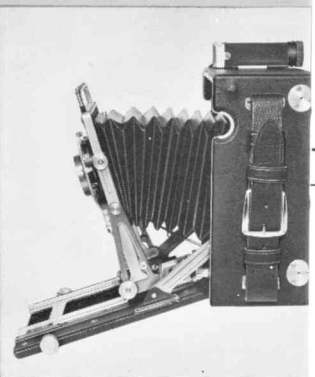
To Tilt:

1. Loosen the tilting front lock nuts.
2. Tilt the lensboard backwards (outward at the bottom) as desired while checking the appearance of the image on the ground glass.
3. Tighten the lock nuts securely before taking the picture.

DROP BED

The drop bed of the Pacemaker Graphic Camera is used for three important functions:

1. To provide downward or forward tilt of the lens (see next page).
2. To lower the lensboard—the opposite effect of "rising front" (Page 30).
3. To eliminate cut-off when wide angle lenses are used.



USING THE DROP BED:

1. Rack the track *all* the way back.
2. Press downward with your thumbs on both bed braces and snap the bed into the lowered position.
3. To raise the bed, first rack the track back.
4. Press on the bed braces to unlock, and allow the bed to raise.

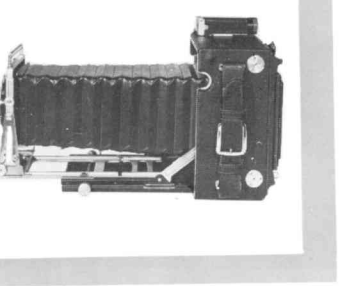
Sometimes the subject matter lies below the level of the camera and it is desirable to shift the lens downward:

1. Drop the bed as directed above. Be sure track is racked back, first.
2. Loosen the tilting front lock nuts slightly and tilt the lensboard backward at the top as far as possible.
3. Loosen the front rising lock nuts. Raise the lensboard as necessary to bring the image into proper alignment and perspective.
4. Check sharpness of image and tighten all lock nuts.

SUGGESTED BED POSITION WHEN WIDE ANGLE LENS IS USED

Lens	Crown "23"	Speed "23"	Crown "34"	Speed "34"	Crown "45"	Speed "45"
47mm	Drop	—	—	—	—	—
65mm	Normal	—	Drop	—	Drop*	—
80mm	Normal	Normal	Normal	Drop	—	—
90mm	—	—	Normal	Normal	Normal	Drop
100mm	—	—	Normal	Normal	Normal	Normal

*Super Angulan f/8



BELLOWS EXTENSION

Double bellows extension of the Pacemaker Graphic permits the use of telephoto lenses and long focal lenses—also permits the making of 1:1 copies with normal lenses.

1. To extend bellows, tip the infinity stops down, release the front standard lock, pull forward and relock. Rack the track forward as needed.
2. Unless using front adjustments, use care to make sure that the front standard is square with the track. (Lensboard parallel to film plane.)

When the lens is focused upon subjects closer than 3½', it is necessary to recalculate the "f" number in order to determine correct exposure.

1. Divide the marked focal length of the lens into the bellows extension you are using to determine the "bellows extension factor."
2. Opposite the "bellows extension factor" on the chart below you can locate the ratio of the image size between the image and the object you are photographing.
3. Use the exposure factor to determine the correct exposure just as you would use a filter factor. If the factor is 4, increase your exposure two full stops beyond normal.

Bellows Extension Factor	Ratio of Image to Object Size	Exposure Factor
1.125	1:8	1:25
1.25	1:4	1:5
1.5	1:2	2:25
1.75	1:1.5	3:0
2.0	1:1	4:0

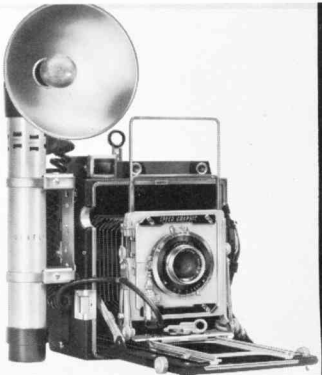
Example: Normal focal length lens (4x5 Camera) equals 152mm (6"). "Bellows Extension Factor" for close-up equals 304mm (12"); 12 ÷ 6 equals "Bellows Extension Factor" of two which in turn requires "Exposure Factor" of 4; assuming a normal aperture of f/22 for the photo, you would use f/11 and get a correctly exposed negative image the same size (1:1) as the original object.

FLASH PHOTOGRAPHY – GRAFLITE

To mount the Graflite Battery Case, fit the bottom battery case clamp to the bottom lug of the mounting plate and press the top clamp against the top of the mounting plate until it snaps into place.

When using the built-in sync of the *focal plane shutter* or the *front shutter* (without solenoid) connect the battery case and camera as directed in the flash manual. *Do not use* the button on the battery case to make a flash picture. Trip the shutter. It will fire the bulb. If using a solenoid for synchronization purposes on a shutter with built-in sync be sure the shutter is set at OFF (X on Compur. See also Page

See the complete Graflite manual for full details concerning use and operation.



GRAFMATIC FILM HOLDER

To fit the Grafmatic film holder, slide it under the focusing panel and lock in place with top and bottom slide locks. If more convenient, remove the focusing panel first (see page 28 , and then lock the Grafmatic in place with the slide locks.

The Graphic Grafmatic film holder is one of the most useful accessories for the Pacemaker Graphic. It is a magazine-type holder about as thick as a film pack adapter holding 6 sheets of film. Film can be changed in seconds with simple, pull-push motion, making this accessory most convenient for normal and rapid sequence use. An identification panel is conveniently located on the back. Each film is automatically numbered during each exposure (4 x 5 only).

Loading instructions accompany each Graphic Grafmatic film holder.

Cat. No. 1268 for 4x5 Cameras
Cat. No. 1266 for 2 ¼x3 ¼ Cameras

See page 50 for Graflex Grafmatic listings

2 ¼ x 3 ¼—Cat. No. 1212
3 ¼ x 4 ¼—Cat. No. 1213
4 x 5 Riteway Cat. No. 1284

SHEET FILM HOLDERS

Sheet film holders hold two sheets of film, one on each side. To fit to the camera, slide it under the focusing panel as far as possible. The dark slide, when withdrawn, can be held in the dark slide clip (45 Cameras).

Sheet film, which is available in the greatest variety of emulsions, comes packed in a box with each piece of film interleaved with a sheet of black paper. It must be loaded and unloaded in total darkness, but has the advantage of allowing the processing of one or more exposed negatives as desired.

While the following instructions may help you, we urge you to practice in the light with a piece of exposed film.

To load the holder, withdraw the slide and open the end flap. Handle the film by the edges only, keeping the film code notch in the upper right corner as shown. Slide the film all the way into the channels formed by the metal flanges or lips on all three sides of the film septum in the holder. If the bottom flap does not seat smoothly, the film has not been pushed under the upper end of the septum. Insert the dark slide with the raised dots on the bright side of the handle facing outward, indicating that the film is ready to be exposed. Turn the catch or hook to prevent unintentional withdrawal. After exposing film, reinsert the slide with the black side of the handle facing outward—to indicate exposed film.

NOTE: Riteway film holders with hard rubber slides required for use with certain types of color film can be ordered.

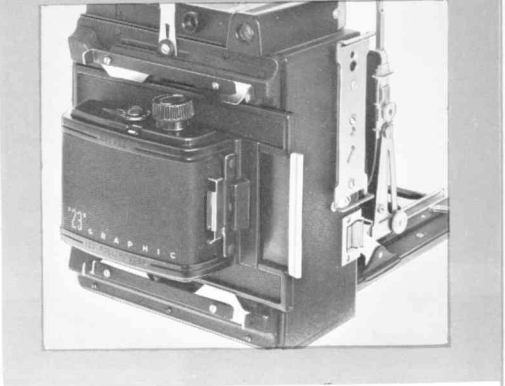
FILM PACK ADAPTER

To fit the Graphic film pack adapter, slide it under the focusing panel. If desired, the focusing panel may be removed (see page 28) and the adapter can be locked in position with the slide locks.

The Graphic film pack adapter holds a 12-exposure film pack which can be loaded in daylight. Film packs are readily obtained and processed, are light and easy to carry. *Instructions covering the loading of the film pack into the adapter will be found on the instruction sheet, packed with the film pack itself.*

2¼ x 3¼—Cat. No. 1232
3¼ x 4¼—Cat. No. 1233
4 x 5 —Cat. No. 1234

GRAPHIC ROLL HOLDERS



To fit the Graphic Roll Holders, remove the focusing panel (see page 28) and lock the holder in position with the slide locks.

Graphic roll holders have automatic exposure counter, use economical 120 roll films and are equipped with dark slides, so that the holder can be removed at any time, even if unexposed film remains. The holders are available in two models (2¼x2¼ and 2¼x3¼) and three sizes to fit 23, 34, 45. Use either black and white or color films with these holders.

FOR	23 (8—2 ¼x3 ¼ exposures per roll)	22 (12—2 ¼x2 ¼ exposures per roll)
2 ¼x3 ¼ Cameras	Cat. No. 1242	Cat. No. 1249
3 ¼x4 ¼ Cameras		Cat. No. 1250
4 x5 Cameras	Cat. No. 1244	Cat. No. 1251

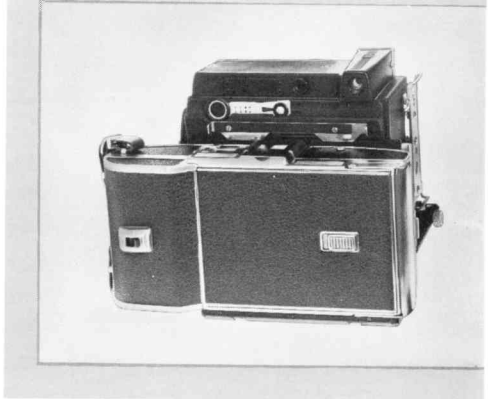
For roll holders for Graflex Backs, see page 50.

Optical viewfinder mask (see page 46) is supplied to define the smaller area included on roll film. For sports viewfinder frame on 4 x 5 camera only, order 9102 Mask.

POLAROID BACK

For Pacemaker Graphic 45 only.
To fit the Graphic Polaroid Back, remove the focusing panel (see page 28) and lock the accessory in position with the slide locks. The design of this accessory requires relocating the front standard about 1½" behind the normal position. By using the track spacer provided for this purpose, the front standard can be located correctly so that the range-finder and focusing scale can be used normally.

The Graphic Polaroid Back, Cat. No. 9108, lets you combine the advantages of 60-second photography with the versatile shifts, tilts, interchangeable lenses and other features of the Pacemaker Graphic 45 Camera. It is useful for checking lighting arrangements, models' poses, real estate photography, recording of important laboratory and engineering data as well as many other purposes.



POLAROID FOCUSING PANEL

For full size ground glass focusing, composition and more critical use of the Polaroid Back, the Polaroid Focusing Panel, Cat. No. 9288, is available. Required for all closeup photography. This panel attaches exactly as the Polaroid Back. The ground glass is at exactly the same plane of focus as the film in back.

Four-Sided Metal Viewing Hood, Cat. No. 9146, may be used with the focusing panel if desired.

GRAFLOK DIVIDING BACK

For Pacemaker Graphic 45 only.

The Graflok Dividing Back, Cat. No. 9109, is useful for making two exposures on a single 4 x 5 film for law enforcement photography, conservation of film, for test purposes or low cost portrait photography. The back moves from side to side, eliminating the need of twisting the camera, thereby disturbing linear perspective.

Remove the focusing panel (see page 28). Attach the Graflok Dividing Back by the slide locks. To focus the image on the new film plane, which will be occupied by the holder and the Dividing Back, attach focusing panel to dividing back.

All holders used on the Pacemaker Graphic 4 x 5 Camera can then be attached to the Graflok Dividing Back just as they are attached to the back of the Pacemaker Graphic Camera itself. Note that this will require relocating the front standard in order to bring subject matter into focus. If desired, an additional set of infinity stops can be added, so that the rangefinder can be used in a normal manner.

Cat. No. 9014 Graflex Dividing Back fits 4 x 5 Graflex Backs.

CARRYING CASE

Vulcanoid Handicase for Pacemaker Graphic Cameras is made of special fibre. Has reinforced corners, lock, double snaps and shoulder strap. Width 9½″, length 19½″, depth 11½″. Has room for camera, flash, two reflectors, at least six extra film holders, Riteway or Grafmatic, lamps, light meter, etc.

GRAFLARGER

The Graflarger converts your camera for use as an enlarger. Attach to the camera after the focusing panel is removed. With the front movements of the Pacemaker Graphic, you can correct, or otherwise alter undesirable linear perspective in the negative.

The Aristo Cold Gridlite built into the Graflarger is balanced for variable contrast papers and their proper filters. No change in exposure is required when changing filters. Excellent for all black and white enlarging papers. The Graflarger is complete with heavy duty transformer, and self-contained glassless negative carrier. U.L. approved.

2¼ x 3¼—Cat. No. 6017

4 x 5—Cat. No. 6019

GRAFLARGER STAND. This is useful for holding the camera vertically or horizontally while enlarging or copying. Large cast triangular base with 8″ sides assures solid support, may be bolted or clamped down. 30″ high with adjustable horizontal arm extending outward from 6½″ to 10⅛″ from upright column. Cat. No. 6040.

GRAFLITE EXTENSION FLASH, CAT. NO. 2778

Has adjustable rubber-covered spring clamp, 15′ cord and separate circuits for B-C as well as D cell use. Plugs into "Extension" outlet of Graflite Battery Case, accepts Graflite reflectors, 5″—Cat. No. 2745, for bayonet base lamps, and 7″, Cat. No. 2747, for medium screwbase lamps.

TELEFLASH, CAT. NO. 2024

For Bayonet Base Flash Lamps—a complete, self-contained flash unit with built-in B-C power supply, triggered by light sensitive phototube for "Slave" operation. Sold with four 30-volt miniature batteries, Quick Change C clamp, adjustable swivel and phototube.

STROBOFLASH

Stroboflash represents the finest in electronic flash equipment and is the result of years of experience in the design and construction and the supplying of fine electronic flash equipment for news, commercial and other exacting photographic requirements. Thyratron triggering insures against damage to shutter contacts and permits easy slave operation with an inexpensive photo-tube accessory. The complete Stroboflash line includes three different power packs with lampheads, extension cords, Battery Booster, as well as other useful accessories. Each outfit is sold complete with Power Pack, lamphead and rubber battery case adapter. Stroboflash synchronizes with any "X" contact in the shutter.

STROBOFLASH I

A light-weight, compact unit for most convenient operation.

Energy Storage.....50 watt-sec.
E.C.P.S. Rating.....1200
Flash Duration.....1/1400 sec.
Recycling Time (with Fresh Batteries).....3 sec.
Power Pack Weight.....3 lbs. 2 oz.
Power Pack Size.....5 ½"x8 ¾"x1 ⅝"

STROBOFLASH II

General purpose unit, represents optimum balance of light output and performance with portability and battery life. Twice the light output of the Stroboflash I.

Energy Storage . . . . . 100 watt-sec.
E.C.P.S. Rating 2300
Flash Duration . . . . . 1/1000 sec.
Recycling Time (with Fresh Batteries) . . . . . 3 sec.
Power Pack Weight . . . . . 7 lbs. 8 oz.
Power Pack Size . . . . . 6½" x 7" x 4½"

STROBOFLASH IV

Heavy duty, all purpose unit, 4-way power switch. Four times the light output of the Stroboflash I.

Selector Setting	¼	½	¾	full
Nominal watt seconds	50	100	150	200
Flash Duration (approx.) . . .	1/1200	1/800	1/600	1/400
E. C. P. S. Rating	1100	2200	3300	4400
Recycling Time (approx.) . . . (with Fresh Batteries)	2 sec.	3 sec.	5 sec.	6 sec.
Guide Numbers:				
Color—ASA 32	45	66	81	94
B&W—ASA 200	115	165	200	235

Power Pack Weight . . . . . 9 lbs. 8 oz.
Power Pack Size . . . . . 6½" x 8⅞" x 4½"

OPTICAL VIEWFINDER MASKS

Interchangeable masks for the optical viewfinder are available to indicate the subject matter included by camera lenses of different focal lengths on different film sizes. The wide angle viewfinder attachment, Cat. No. 3060, when fitted to the front of the finder in place of a mask determines the field of view included by a 90mm lens on a 4 x 5 film area.

Table Showing Standard Masks and Lenses For Various Film Sizes (not camera size)

2¼x3¼	3¼x4¼	4x5	Mask Number	2¼x2¼ Lens	Mask
—	4½″— 4¾″	5″— 5⅞″	4	3 15/16″— 4½″	12
3¼″— 3⅞″	4 13/16″— 5¼″	5 15/16″— 6⅜″	3	4 9/16″— 5″	14
3 15/16″— 4½″	5 5/16″— 6″	6 7/16″— 6⅝″	2	5 1/16″— 6″	15
4 9/16″— 5″	6 1/16″— 8½″	6 11/16″— 8½″	9	6 1/16″— 8″	17
5 1/16″— 6″	7 1/16″— 8″	8 9/16″— 9½″	10	9 9/16″—11⅞″	13
6 1/16″— 7½″	8 1/16″— 8½″	9 9/16″—10½″	11		
7 9/16″— 7¾″	8 9/16″—12″	10 9/16″—13½″	8		
7 13/16″— 9½″	12 1/16″—13⅞″	13 9/16″—15″	7		
9 9/16″—11⅞″	13 15/16″—16″	15 1/16″—16⅞″	6		
11 15/16″—13″	16 1/16″—20″	16 15/16″—20″	5		

Masks for Wide Angle Viewfinders Negative Size

W.A. Lens	2¼x3¼	3¼x4¼	4x5
65mm	4	*	**
90mm	**	4	none required
88mm	**	4	none required
80mm	3	4	**
100mm	**	3	4

*We do not have a mask recommended for the 65mm lens when used with the Crown Graphic "34" Camera, since this lens includes considerably more angle of view than can be seen through the viewfinder with no mask at all.

**Lens indicated not recommended for use with this camera.

ACCESSORY LENSES

Basically, there are 3 groups of lenses: Normal, Wide Angle and Telephoto.

All lenses, regardless of the focal length or design, have standard diaphragm openings and require no change in exposure calculations.

The angular field of view and the size of the image are important essentials in selecting a lens, although maximum aperture or speed is a consideration.

A normal lens usually has a focal length equal to either the long side or diagonal of the film area. Its maximum aperture or speed may vary greatly, but f/4.5 is usual. These lenses have a medium angular field for general purpose work.

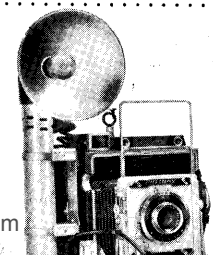
A wide angle lens is especially designed to include a greater angular field of view and has a short focal length. It has great depth of field, but even so is generally used at the smaller diaphragm openings. These lenses permit only limited use of the front standard movements. These lenses will usually come to focus with the front standard on the rear sliding track.

Telephoto lenses are also especially designed and constructed. They have a very narrow angular field of view, maximum diaphragm openings of around f/5.6 and produce a much larger image than a normal or wide angle lens at the same camera subject distance. They are particularly suited to portrait, scenic and sports photography. They require less bellows extension than normal lenses of the same focal length. Consequently, the 25cm (10″), 270mm (10½″) and the 38cm (15″) telephoto lenses can be used on the Pacemaker Graphic 34 and 45 Camera, providing magnifications of 2× and 3× respectively over the size of the image produced by standard 127mm (5″) lens.

When using telephoto lenses, insert Mask Cat. No. 9101 into the open framefinder (45 cameras only), or proper mask in optical viewfinder (see Page 46). Insert the bottom end first and then slip the coiled wire top of the finder into the groove at the top of the mask.

PHOTOGRAPHIC BOOKS

	AUTHOR
Advanced Flash Photography	Arnold
Basic Photo Series	Adams
Bigger & Better, The Book of Enlarging	Nibbelink
Color—How to See and Use It	Bond
Commercial Photography	Keppler
Feininger on Photography	Feininger
Focal Encyclopedia	
Graphic Graflex Photography	Morgan and Morgan
Kodachrome and Ektachrome From All Angles	Bond
Lenses in Photography	Kingslake
Mortenson on the Negative	Mortenson
The New Guide to Better Photography	Abbott
Photo Lab Index	Lester and Carroll
Photography, Its Materials and Processes	Neblette
Photography, Theory and Practice	Clerc
Speed Graphic Guide	Tydings
Strobe, the Lively Light	Luray
Theory of the Photographic Process	Mees



CARE OF YOUR CAMERA

You have purchased a fine camera, carefully designed, produced and tested. It should give you long and most satisfactory service. Protect it from dust and dirt and avoid rough handling; and if possible, keep the camera closed and in the carrying case when it is not in use.

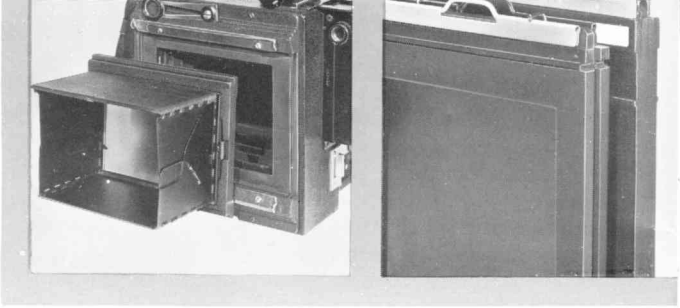
Do not attempt to make any repairs to the shutter and never oil a camera shutter. If it needs attention, turn it over to a competent camera mechanic. Remember that, on general principles, it is a good idea to have the complete camera checked over every few years to keep it in tip top shape.

The surface of the lens has received a special hard coating, which will reduce internal reflections and help you make better negatives. Clean the lens carefully, with smooth, easy motions using a camel's hair brush or lens tissue. Moisten the tissue with a drop or two of lens cleaner, but do not apply the cleaner to the surface of the lens.

Your Graflex Dealer is ready to be of service in discussing your camera and its use, and over-the-counter discussions of your pictures will be very helpful to you. The Graflex Consumer Correspondence Department is also at your service to assist you in getting the most out of your Graphic Camera. Do not hesitate to write about any photographic problems which you may have. Should such questions relate to the making of pictures, be sure to send in your negatives and such exposure data as you may have available.

THE GRAFLEX BACK AND GRAFLEX HOLDERS

For older Cameras equipped with optional Graflex Back



FOCUSING PANEL

To remove the Graflex Focusing Panel open the slide locks at the top and bottom of the camera by sliding them to the side. These same slide locks are used to attach and hold to the camera the various Graflex Film Holders listed below.

Graflex Holders may be identified by the grooved light traping at the head end of the holder while Graphic holders have a ridge. (See Illustration.)

GRAFLEX FILM HOLDING ACCESSORIES

Camera Size	Sheet Film Holder Cat. No.	Film Pack Adapter Cat. No.	Grafmatic Holder Cat. No.	22 Roll Holder Cat. No.
2¼ x 3¼	1112	—	1166	—
3¼ x 4¼	1113	1133	—	—
4 x 5	1114	1134	1168	1151