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WESTON

*Instructions for using your **NEW** ruggedized*

WESTON MASTER IV EXPOSURE METER

WESTON Model 745

Ruggedized MASTER IV

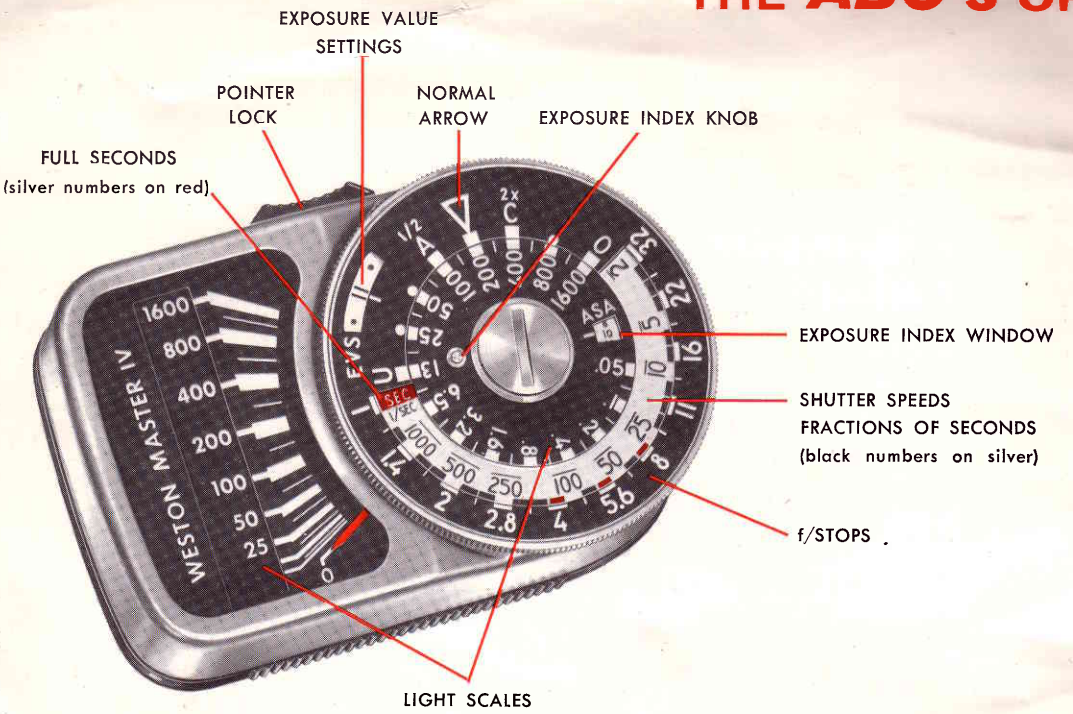
. . . the result of over 25 years' experience in the production of photo-electric type exposure meters by the world's leading manufacturer of precision electrical measuring instruments.

YOUR MASTER IV is the most accurate and versatile exposure meter available to any photographer — amateur or professional. Its superior sensitivity and truly universal design will quickly provide correct camera settings for all your pictures whether in color or black and white, indoors or outdoors, and with all still or movie cameras.

The Master IV is calibrated to ASA specifications, has exposure indexes up to 16,000, and will read reflected or incident light values on the same scales. When desired, the ON-OFF pointer lock can be used to conveniently hold any light reading. The spring-suspended, jeweled movement assures a lifetime of dependability.

CONTENTS Page

THE ABC'S OF



NOTE: Red blocks adjacent to 1/25, 1/50 and 1/100 second are, respectively, 1/30, 1/60 and 1/125 second.

YOUR MASTER IV

High and Low Light Scales

Your meter has two sliding light value scales to provide correct readings under extremely bright or very dim light conditions. Movement of the hinged baffle automatically changes scales.

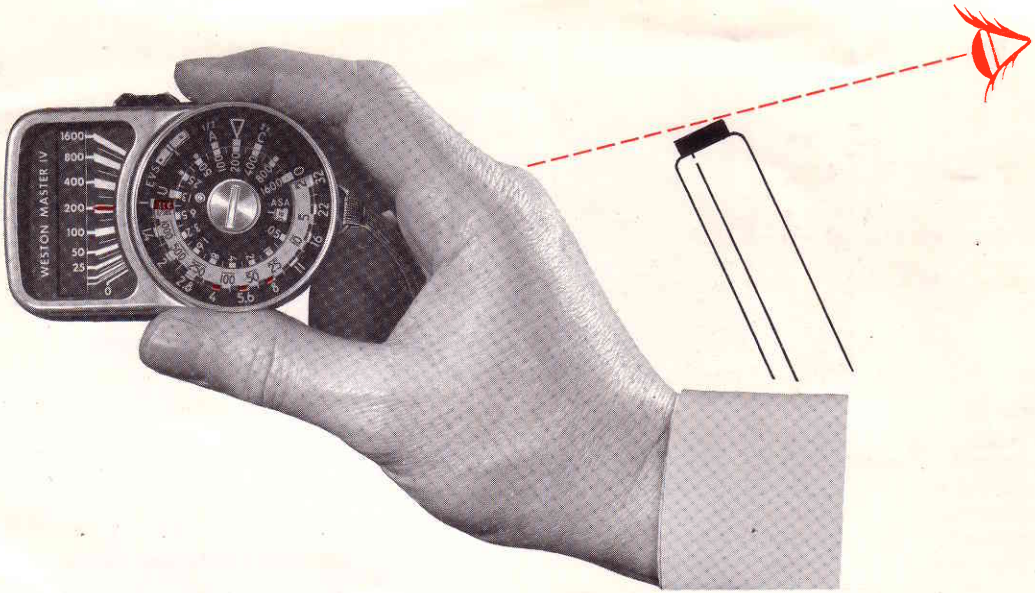
When the baffle is closed the high light scale (0-1600) moves into position. The baffle should be kept closed when the light reads 25 or higher. If the light reading is less than 25 the baffle should be opened for more accurate readings on the extended (0-25) low light scale.

REFLECTED OR INCIDENT LIGHT

Reflected light is light reflected from the subject to the camera. Incident light is the light which falls on the subject. Measurement of either reflected or incident light can be used to determine correct exposure.

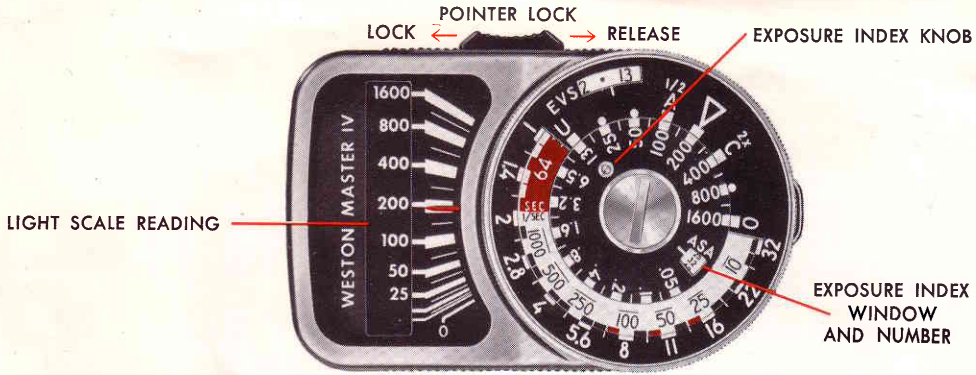
The Master IV is basically a reflected light meter but with the addition of the Weston Invercone it can be used to measure incident light. (See Page 17). For certain types of photography such as portraits or copy work incident light will be found quite convenient but for the majority of pictures reflected light is more suitable. The one you use will depend upon prevailing conditions and your own personal preference.

HOLDING AND AIMING THE METER



The best way to hold the meter is shown in the illustration. Be careful not to obstruct the photocell with your fingers or have the neckcord dangling across the cell opening. In outdoor general scenes, when the reading is taken from the camera position, tilt the meter at an angle slightly downward so that your line of sight passes over the front edge of the pointer lock, as shown in the insert. This will exclude sky areas which would tend to inflate the reading and cause underexposure.

THE *QUICK-EASY* WAY TO



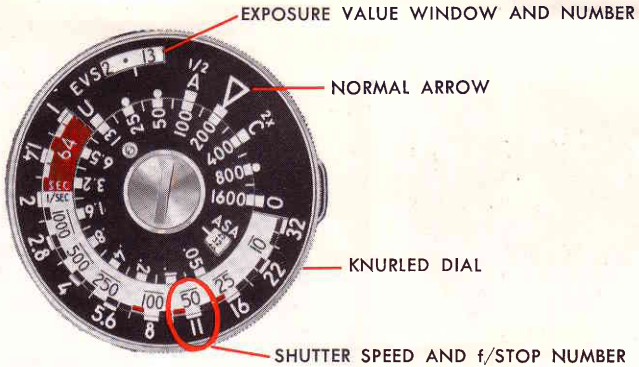
SET THE FILM EXPOSURE INDEX by moving the Exposure Index Knob until the Exposure Index number of your film appears in the Exposure Index Window. The Exposure Index number (commonly called "ASA Index") is given on the film manufacturer's data sheet enclosed with the film. The more popular films are also listed with their Exposure Index numbers on page 29. For example let's assume an Exposure Index number of 32 (See illustration).

AIM THE METER at the subject or scene and note the reading on the light scale (assume 200).

ON-OFF POINTER LOCK

By sliding the pointer lock to the left, the pointer will be locked at the reading. To release the pointer, slide the pointer lock to the right.

TAKE REFLECTED LIGHT READINGS



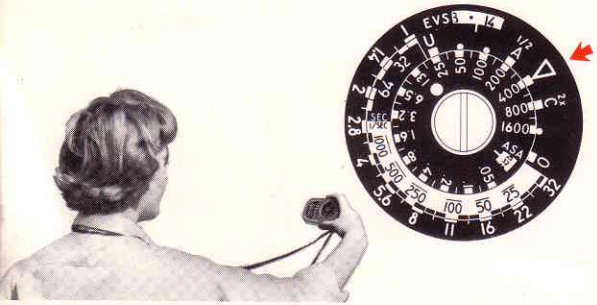
POINT THE NORMAL ARROW at this reading (200) on the LIGHT SCALE of the exposure control dial by turning the large knurled outer dial.

SET YOUR CAMERA with any combination of SHUTTER SPEED and F/STOP indicated, for example 1/50 second at f/11. Any combination of shutter speeds and f/stops opposite each other on the exposure control dial will give the same correct exposure: 1/100 second, f/8; 1/25 second, f/16; etc. The combination you select depends on whether you want a fast shutter speed (with its corresponding lower f/stop number) to stop action occurring in the scene; or depth of field with a higher f/stop number and its slower shutter speed.

EXPOSURE VALUE NUMBERS — Polaroid Land cameras of recent manufacture, and certain other cameras are calibrated in Exposure Values. If you use this system, set your camera with the Exposure Value number appearing in the Exposure Value Window. In this instance, number 13.

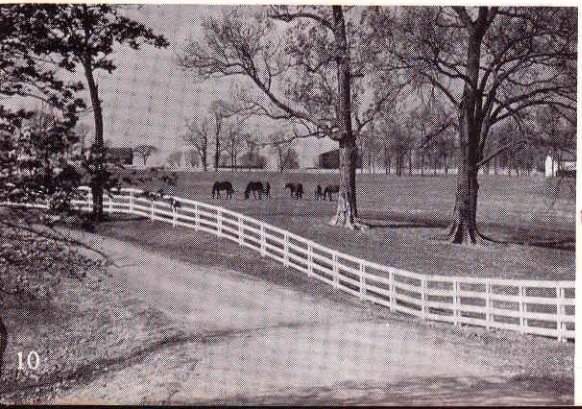
3 Basic Methods for

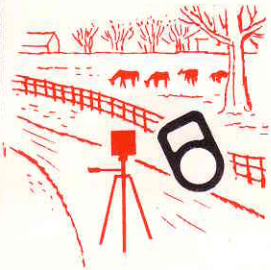
1 The Camera Position Method



This is a simple and quick method of using your meter and is usually used for most outdoor general scenes.

Hold the meter as shown on page 7 aiming toward the scene from the camera position. Point the meter down slightly to avoid reading sky areas which will give inflated values and cause under-exposure. Set the arrow on the exposure control dial to the light reading obtained, for example 400. Select any combination of f/stop and shutter speed opposite each other.





EXAMPLE:

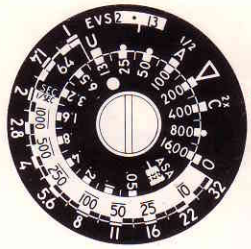
Meter Reading 400
Exposure Index 32
Use Normal Arrow
Exposure 1/100 Sec—f/11

Correct Exposure

2 The Close-Up Method

This method should be used for portraits or any scene where there is but one object of interest and the background is of no importance.

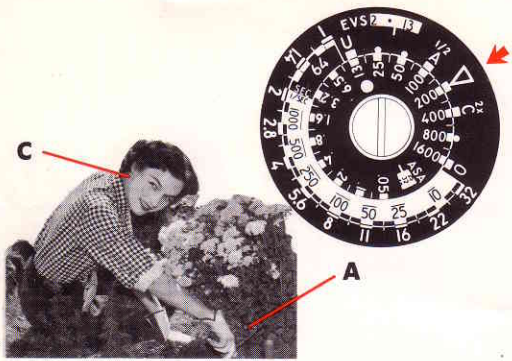
In general, the meter reading should be taken about six inches from the subject, but in no case should the meter be held farther away than the subject's smallest dimension. Set the *normal arrow* on the exposure control dial to this reading and select any combination of f/stop and shutter speed opposite each other. When the meter reading is taken from a person's face set the "C" position on the dial to the reading instead of the normal arrow (assume 400, see illustration). Select the camera settings in the usual manner. If the shadow of the meter or your hand is cast on the subject be sure not to include it in the reading. (Turn page for Method Number 3.)



EXAMPLE:

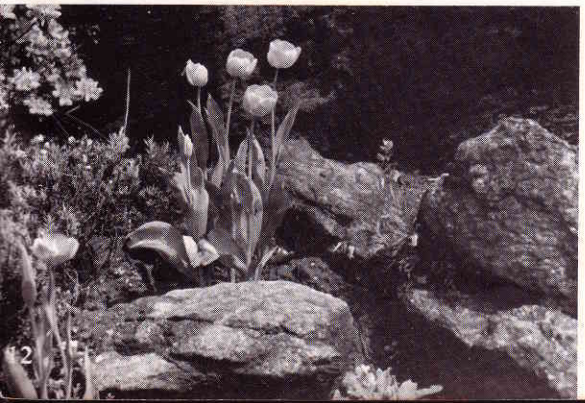
Meter Reading 400
Exposure Index 32
Use "C" Position
Exposure 1/50 Sec.—f/11

3 *The Brightness Range Method*



This is the most accurate method for determining the correct exposure of scenes consisting of a wide range of bright and dark light values.

Take two close-up readings, one for the darkest object and one for the brightest. In color photography, black and white are not considered colors and should not be measured. Set the normal arrow midway between the two values measured. This will give an average exposure. For example, assume the darkest object reads 100 (A) and the brightest 400 (C). The normal arrow is set midway between at 200, as illustrated.



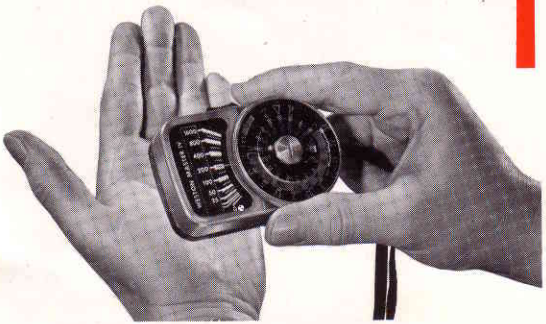
EXAMPLE:

Meter Reading
Dark Area 25
Bright Area 400
Use Normal Arrow
Midway at 100
Exposure Index 64
Exposure
1/50 Sec.—f/11

Substitute Readings

If your subject is inaccessible for a close-up reading, substitute readings of nearby similar objects in the same light. Nearby trees for trees in the scene, rocks for rocks, etc. The palm of your hand is a good substitute for a person's face.

Set the arrow on the exposure control dial to the light reading; use the "C" position when reading flesh tones.

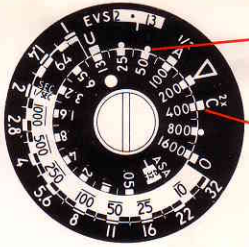


EXAMPLE:

Meter Reading 800
Exposure Index 32
Use "C" Position
Exposure 1/50 Sec.—f/16

The U and O Positions

On the Exposure Control Dial



Black and white photographic film has a range within which it reproduces the brightness of objects in a scene in tones of gray from white to black. Knowing these limits enables you to expose so that the negative has the overall density most desired. The U and O positions on the exposure control dial are the limits of correct exposure for black and white film.

When a meter reading is taken from the camera position the reading is the average brightness of the entire scene. Assume in the illustration this reading is 200. From close-up readings of the hair, the darkest object, and of the blouse which is the brightest object, readings were obtained of 50 and 400 respectively. Setting the normal arrow at 200 you will note that the 50 and 400 values are well within the U and O positions on the dial and therefore both the high and low brightness values will be included on the film.

If the brightness ratio were greater (1.6 to 400) and the normal arrow placed at the midway point (25), it will quickly be seen that objects having a brightness value of 400 or more will be overexposed since they fall outside the O position.

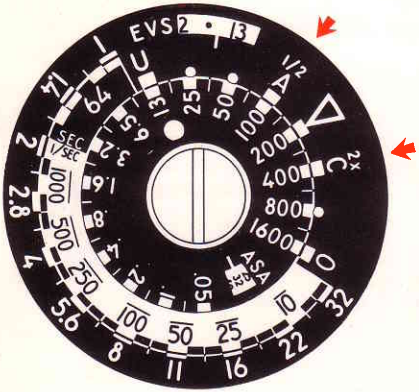
Extreme Low Light Readings

The O position will also prove very useful when black and white pictures are to be taken in extremely low light. By taking a close-up reading of the brightest object in the scene and setting the O position at the corresponding value on the light scale of the exposure control dial correct exposure will be given to all areas in the scene which have brightness values corresponding to the range covered by the U and O positions.

Occasionally a backlighted or very contrasty scene exceeds even the wide acceptance range of black and white film. In this event the exposure can be keyed to that portion of the scene, either the shadows or the highlights whichever are of most importance, by placing the U or O opposite the darkest or brightest reading respectively.

The A and C Positions

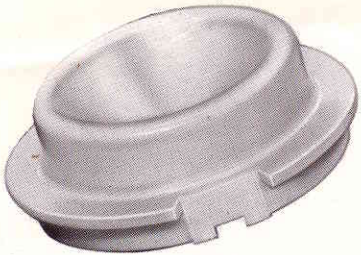
On the Exposure Control Dial



The A and C positions which represent a brightness ratio of 4 to 1 can be of great value in exposing for color shots. Attempt to have the primary colors of interest fall between the A-C positions for most faithful rendering of those colors. While most color films now have a range, or latitude, that exceeds this ratio, if the primary colors fall within the A and C position you can then be assured that the balance of the scene will be properly exposed within the limits of the film you are using.

With black and white film the "A" is used to indicate "Absence of Contrast" and "C", "Contrast". The A provides a convenient way of halving normal exposure for "flat" scenes such as landscapes where there is no extreme contrast between highlights and shadows. The C provides double normal exposure as indicated by the 2X and is used for scenes of very high contrast such as backlighted subjects.

TAKING INCIDENT LIGHT READINGS



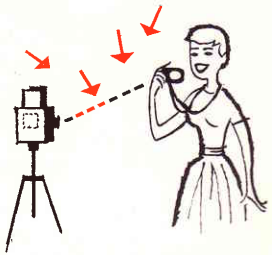
Your Master IV can be converted to read incident light simply by attaching the Weston Invercone.

Attaching the Invercone

For most indoor and outdoor pictures where illumination is relatively low, open the exposure meter baffle and slip the Invercone into place, as shown. Where the level of illumination is high, close the baffle and slip the Invercone into place over the baffle.

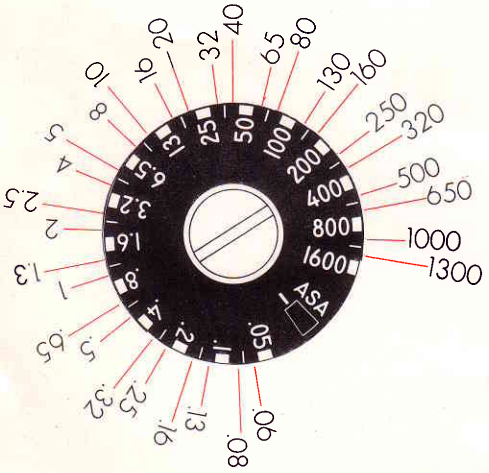
Using the Invercone

With the Invercone attached, stand at the subject you are going to photograph and point the meter at the spot from which you are going to take the picture. The exposure meter settings are then selected the same as when taking reflected light readings. If the subject is inaccessible a substitute reading can be taken at the camera position providing the illumination is the same as on the subject.

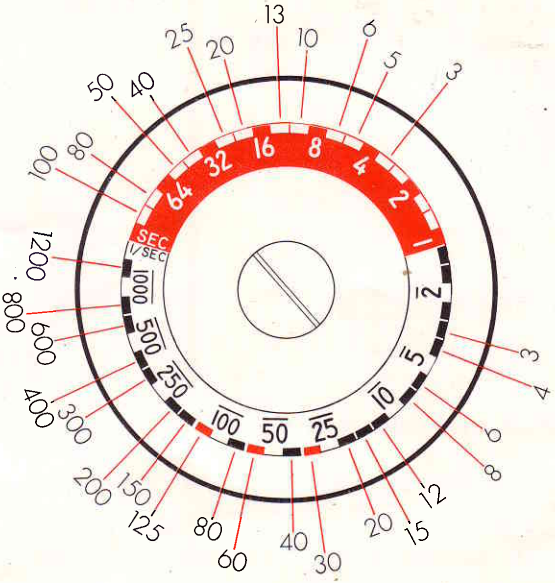


Values of Unnumbered Blocks on the Meter Exposure Control Dial

The unnumbered blocks on the Light Scale, Lens Opening (f/stop) Scale, and the Shutter Speed (Time) Scale have definite values but to show them all on the scales would make them appear very congested. The values of these unnumbered blocks are shown in the following illustrations.



LIGHT SCALE



SHUTTER SPEED (TIME) SCALE

LENS OPENING (f/stop) SCALE (Upper Section)

Provides quick means to decrease exposure by two f/stops.

A and C positions provide a convenient means of averaging readings within a 4 to 1 range; plus a method to give ½ or double normal exposure. C position also used for skin tone meter readings.

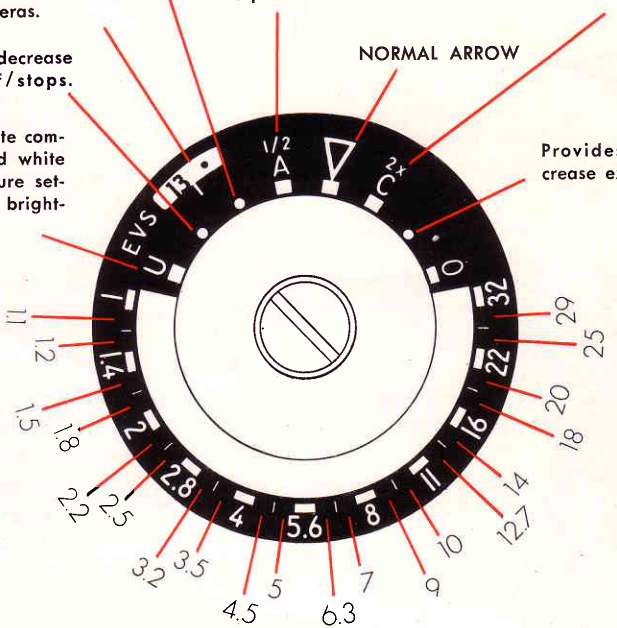
Exposure value scale direct reading for light value shutter cameras.

NORMAL ARROW

Provides quick means to decrease exposure by three f/stops.

U and O positions indicate complete limits of black and white film. Permits easy exposure settings by measurement of brightest and darkest objects.

Provides quick means to increase exposure by two f/stops.

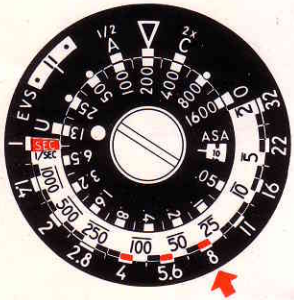


LENS OPENING (f/stop) SCALE (Lower Section)

MOVIES and your MASTER IV

Any of the methods of determining exposure described for still cameras can be used for movie cameras. For correct exposure first determine the exposure index of the film from the film manufacturer's data sheet, and the constant shutter speed of your camera at the normal framing speed from your camera instruction book.

Set the exposure index in the Exposure Index window. Aim the meter at the scene and note the reading. Now set the meter arrow at this reading on the light scale of the exposure control dial the same as you would for still cameras. Just below your camera shutter speed on the dial will be found the correct f/stop.



EXAMPLE

Assume that your camera operates at 1/30 second at 16 frames per second. The 1/30 second on the shutter speed dial of the meter is indicated by the red block adjacent to the numbered 1/25 second.

Assume an Exposure Index of 10, a shutter speed of 1/30 second at 16 frames per second and a light reading of 200. With the meter arrow set at 200, the correct f/stop (f/8) will be found directly below the 1/30 second red block on the shutter speed dial. Therefore, the scene will be filmed at 16 frames per second at f/8.

Note: If your camera operates at 1/40 second, use the black block adjacent to the 1/50 second.

CAMERA WITH ADDITIONAL FILMING SPEEDS

If your camera can be operated at filming speeds other than 16 frames per second and you wish to shoot at a speed other than 16 FPS, the corresponding shutter speed required may be determined from the table.

FPS	SHUTTER SPEEDS IN SECONDS		
	(1)	(2)	(3)
8	1/15	1/20	1/25
12	1/20	1/30	1/40
16	1/30	1/40	1/50
24	1/40	1/60	1/80
32	1/60	1/80	1/100
48	1/100	1/130	1/150
64	1/130	1/150	1/200

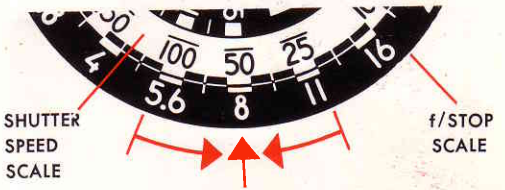
FOR EXAMPLE: Find the shutter speed at 16 FPS for your camera from your camera instruction book. Then locate this number (underlined) in one of the columns (1), (2), or (3). The required shutter speed for different FPS speeds will be found in the same column.

HOW TO INCREASE OR DECREASE EXPOSURE

It may be necessary to either increase or decrease the indicated exposure for special effects or under unusual light conditions. Since the f/stop scale markings are one full f/stop apart, the exposure can be *increased* one full f/stop by turning the outer control dial to the next *lower* number. To *decrease* the exposure, turn the dial to the next *higher* number.

FOR EXAMPLE:

Shutter speed 1/50 second, f/8
Increase one f/stop, 1/50 second, f/5.6
Decrease one f/stop, 1/50 second, f/11



HOW TO ALLOW FOR FILTERS

A simple way to compensate for the increased exposure required when using filters is to divide the exposure index by the filter factor.

FOR INSTANCE:

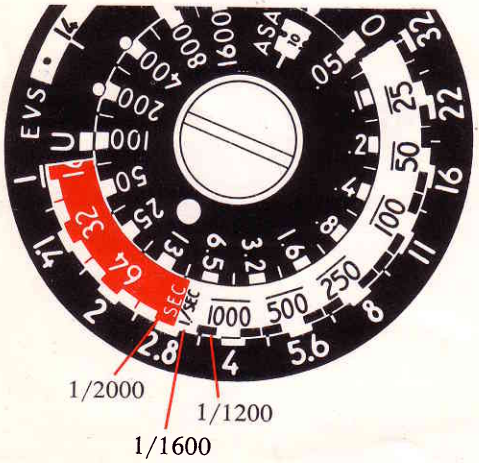
$$\frac{\text{Exposure Index } 100}{\text{Filter Factor } 2} = 50 \text{ Exposure Index to set on your camera}$$

Extending Ranges Beyond 1/1000 Second and f/32

If it is desired to shoot at shutter speeds faster than the 1/1000 second indicated on the meter dial, or at an aperture above f/32, these ranges can be extended in the following manner.

SHUTTER SPEED (TIME) SCALE

Three additional shutter speeds higher than 1/1000 second are available. The black block above 1/1000 second indicates a shutter speed of 1/1200 second; the white (1/sec) block, 1/1600 second; and the red (SEC) block, 1/2000 second.



FOR EXAMPLE—

Assume your meter reading indicated a shutter speed of f/4 at 1/1000 second, as illustrated. Then, the black block would indicate a shutter speed of 1/1200 second at f/3.5; the white (1/sec) block would be 1/1600 second at f/3.2; and the red (SEC) block 1/2000 second at f/2.8.

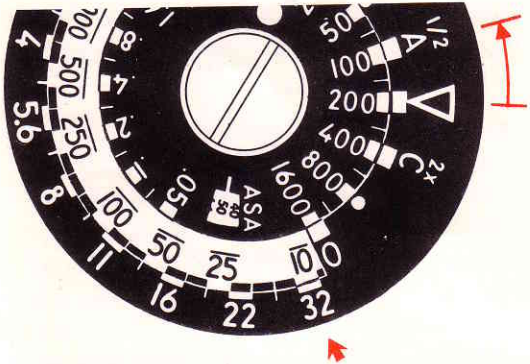
Note: Refer to Values of Unnumbered Blocks on page 18.

APERTURE (F/STOP) SCALE

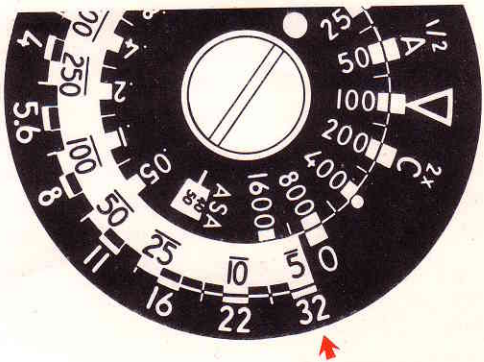
This scale can be extended beyond f/32 in full f/stops (f/45, f/64, f/90) to f/128.

FOR EXAMPLE—

Assume your meter reading indicated a shutter speed of 1/10 second at f/32, as illustrated in Fig. 1. If you desire to shoot at f/45, move the normal arrow (which is now opposite the 200 on the light scale) three blocks counter clockwise to 100, see Fig. 2. This will place the f/32 below the 1/5 second on the shutter speed scale. Now, assuming f/32 to be f/45, the corrected exposure will be f/45 at 1/5 second. Each additional movement of the normal arrow three blocks counter clockwise will provide the next smaller f/stop number with its corrected shutter speed.



1



2

High Altitudes — There is considerable ultra-violet radiation present at high altitudes to which films are sensitive. To eliminate this effect it is always good practice to use a haze filter. No exposure correction is necessary so use the meter in the regular manner.

Snow, Beach and Water Scenes — Take readings of the brightest and darkest objects and use the f/stop midway between, or take a reading from the palm of your hand and use the "C" position on the control dial. Best snow texture results when the snow is back —or cross lighted.

Copy Work—When copying pages of a book or photographs in black and white or color take a reading from a white card placed over the subject. Divide the exposure index by five and set this value in the Exposure Index window. Point the arrow at the light reading obtained and select the camera settings in the usual manner.

Television — Adjust the television screen for contrasty black and whites. Place the camera on a tripod, set the shutter at 1/25 second and focus on the lines across the screen. Dim the room lights. Take a close-up average reading holding the meter about six inches from the screen. Set the meter arrow at this reading and select the camera settings in the usual manner.

Sunsets and Silhouettes — Aim the meter directly at the subject and set the meter arrow at the reading.

Measuring Room Illumination — To determine the foot-candles of light falling on any surface such as a writing desk or work bench, take a reading from a piece of white paper lying on the surface you want to measure. Multiply this reading by four to convert from candles per square foot to foot-candles. **EXAMPLE:** If the meter reads 13 this means that the surface has a brightness of 13 candles

per square foot. Multiplying this by four gives you 52 foot-candles.

Aerial Pictures — To prevent the sky from inflating the reading, aim the meter down toward the ground. In general, below 1,000 feet use the meter reading indicated; from 1,000 to 2,000 feet stop down 1/3 f/stop; from 2,000 to 4,000 feet close down 1/2 f/stop; above 4,000 feet close the camera aperture one full stop from the reading. Use a Skylight Filter with daylight color film, no exposure correction is required.

Overcast Scenes frequently lack contrast due to diffused light and absence of shadows. In such situations black and white pictures can be improved by using the "A" position on the meter rather than the normal arrow when scene brightness is measured from the camera position.

Key and Fill Lights — For normal results in studio photography, the lighting contrast range should be limited to 8:1 for color, and 64:1 for black and white. This means that the key light for color should produce no more than 8 times the light falling on the subject than the fill lights, and for black and white the key light should produce no more than 64 times the fill light.

To determine the ratio of key light to fill light, insert the Invercone in the exposure meter, stand at the subject's position, and measure the light produced by the key light by aiming the Invercone at this light, with all other lights turned off. Now turn off the key light and measure the light produced by the fill light. If the ratio is greater than the suggested limits, move the lamps near to or farther away from the subject, as required.

Contrasty Scenes — Occasionally scenes metered from the camera position will be excessively contrasty. Exposure for black and white pictures can be improved by doubling the exposure indicated by placing the "C" posi-

tion opposite the brightness reading. Remember, "C" stands for contrast, so use the "C" position for contrasty pictures.

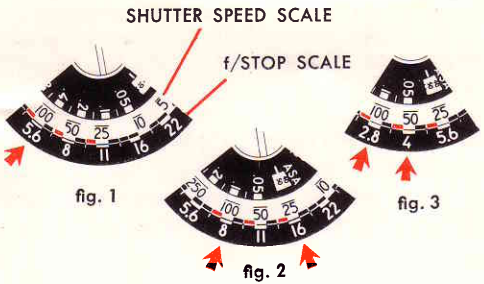
Absence of Contrast — For scenes with little or no contrast, being metered for black and white film from the camera position, set the "A" on the meter opposite the reading obtained. This will halve the exposure and result in a better print. Remember, "A" stands for absence of contrast.

Flash Outdoors can be used to illuminate shadows, especially of backlighted subjects. For natural looking results the flash fill-in should be only a secondary source. Use blue bulbs with daylight color film. Check the flash lamp carton and find the guide number. Aim the meter at the scene and determine the f/stop. Now divide the flash guide number by the f/stop number to get the proper flash distance from the subject. This will provide a 2 to 1 ratio, with the sunlight being twice as strong as the flash.

EXAMPLE: Assume a flash guide number of 90, an f/stop of 10, then $90 \div 10 = 9$ feet. If the distance from lamp to subject is too great for convenience, place a handkerchief over the flash reflector and move the flash 1/3 of the way toward the subject.

Extended Bellows — Where the subject to lens distance is less than 8 times the focal length of the lens a corrective shutter speed must be computed. In this computation, if the focal length of the lens is given in millimeters convert it to inches by dividing the focal length by 25 (1 inch = 25 mm).

EXAMPLE: Assume your lens has a focal length of 8″, and you are shooting at a shutter speed of 1/100 second at f/5.6 (See fig. 1). Using the f/stop numbers as focal length numbers, (take f/8 to be a focal length of 8″) place the 8 on the f/stop scale below the 1/100 second shutter speed (See fig. 2).



Measure the distance of the bellows extension (lens to film distance). Assume this distance to be 16". Now look on the f/stop scale and find the number 16 and directly above on the shutter speed scale will be found 1/25 second. This new shutter speed (1/25) should be used with the f/stop selected previously (f/5.6). Align these two values on the meter dial and any of the exposure combinations aligned may be used, i.e., 1/50 sec., f/4; 1/100 sec., f/2.8, etc. (See fig. 3).

Reflections — Correct exposures for reflections in store windows, mirrors, etc. can be readily determined with your Master IV. Take a substitute reading from the palm of your hand held as near the reflecting surface as possible and set the "C" position on the meter to this reading. Remember that the proper focusing distance for the reflection is the distance from the camera to the reflecting surface *plus* the distance from this surface to the object being reflected.

Available Light — Occasionally scene brightness will be too low to obtain a reading from the camera position. In situations such as this take a close-up reading from the brightest object in the scene. If no object in the scene is bright enough to produce a reading, substitute a piece of white paper or a handkerchief adjacent to the brightest object and take a close-up reading from the paper or handkerchief. Set the "O" position to the light reading obtained and select camera settings in the usual fashion.

A WORKING TEAM

It is possible that slight errors in camera shutter speeds, lens calibrations, as well as exposure meters may be additive and result in consistently over- or under-exposure.

Your camera and exposure meter should be tested together as a working team by making trial exposures of the same scene at different exposure indexes to determine if any compensation is necessary.

If your pictures indicate equipment errors change the listed exposure indexes, lowering them if consistently underexposed and raising them if overexposed.

ZERO CORRECTOR

A wise precaution is to check the position of the meter pointer once in a while to be sure it returns to zero when all light is excluded from the photo-electric cell.

To set the pointer, cover the cell with your hand or a card and turn the zero corrector until the pointer is directly over zero on the light scale.

CARE OF YOUR METER

Although ruggedly constructed, your meter is a precision instrument and should receive the same careful handling as you would give any good camera.

Normal temperatures and humidity will not harm the meter but temperatures in excess of 130°F, which you might find in the glove compartment of a car, may affect the meter's accuracy.

Leather Carrying Case

Your leather carrying case will help prevent scratches from marring your Master IV and will also give some protection against shock.

REPAIR SERVICES

Your meter is ruggedized to give you many years of accurate and dependable service. However, should it be damaged and fail to operate, return it to your dealer or, if not convenient, send it directly to:

EAST COAST AREA

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION
SERVICE DIVISION
2530 Polk Street
Union, New Jersey

Attach an identification tag clearly showing your name and address. Careful packing is important to prevent further damage during shipment. To avoid delays in handling please do not send instruction books, carrying cases and other accessories with the meter.

WEST COAST AREA

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION
SERVICE DIVISION
736 Monterey Pass Road
Monterey Park, California

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION
SERVICE DIVISION
1125 Marshall Street
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