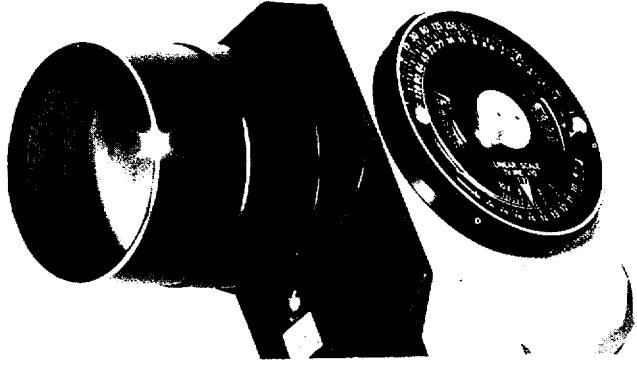
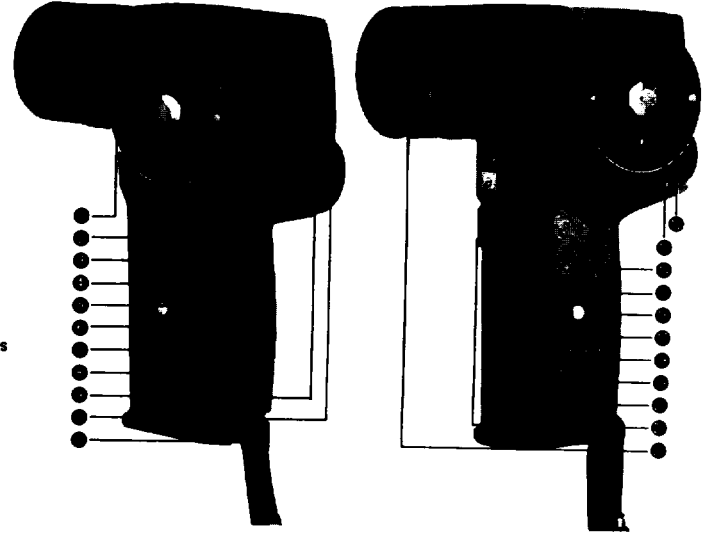
ASAHI
PENTAX

SPOTMETER V



- Nipple for turning ASA/DIN index
- DIN scale
- IRE scale
- Index for EV scale
- EV scale
- Diaphragm scale
- Shutter speed scale
- ASA scale
- Eyepiece
- Eyepiece adjustment ring
- Wrist strap
- Index for ASA scale
- Window for ASA scale
- Window for DIN scale
- Index for DIN scale
- Grip
- Scale illuminating button
- (Inside grip) Mercury batteries
- Zero adjusting screw
- Battery checker button
- Light metering (ON) button
- Objective lens



SPECIFICATIONS

Measuring range: EV 1 ~ 19
ASA/DIN film speed range: ASA 6 ~ 6400/DIN 9 ~ 39
Diaphragm range: f/1 ~ 128 (with markings at 1/3rd f/stops)
Shutter speed range: 1/4000 sec. ~ 4 minutes
Angle of light measurement: Circle of 1° of arc in center of finder
Measuring distance: 1.5m ~ ∞, angle of field fixed (by turning the eyepiece adjustment ring minimum distance can be reduced to 1m.)
Type of measurement: Spot metering of reflected light (with light metering button depressed). Direct-reading light scale (IRE scale included).
Photo cell: SPD (Silicon photo diode)
Batteries: Three G-13 type 1.5V mercury batteries.
Battery checker: Battery testing mark on light meter scale (uses light meter pointer).
Viewfinder: Pentaprism used as in single lens reflex camera, providing unreversed, right side up projected image. Fresnel lens. Field of vision identical with 35mm camera, 17° lateral, 12° horizontal viewing angle. Magnification 1.5x. Eyepiece correction 0~−1 Dptr. Provided with scale illuminator.
Weight, dimensions: Width – 62mm. Height – 163mm. Length – 127mm. Width of Grip – 34mm. Weight – 450 gr. (With batteries).
Accessories: Mercury batteries, wrist strap, case

FEATURES

It goes without saying that one of the keys to successful still or motion picture photography is the accurate setting of exposure. For this reason there are a great number of exposure meters on the market.

At the same time, film manufacturers have been bringing out film with increasingly wide exposure latitudes which has tended to simplify exposure setting.

The high standards of accuracy required for modern color photography, and commercial and television film making led, however, to a recognition among professional photographers in television studio and movie lot alike of the need for spot metering.

The Asahi Optical Company responded to this need with the Pentax Spotmeter, combining the principle of the single lens reflex camera with which Asahi has had long experience, with a more sophisticated version of their standard light metering system. Years of testing and development in use have resulted in the Spotmeter as we now know it.

The Pentax Spotmeter V makes use of a superior SPD (Silicon photo diode) light sensitive element. SPD sensitivity is extremely good under low lighting conditions and stable metering can be performed over a very wide range of light values, extending from EV 1 to 19 (ASA100). No other light meter in use before this would have been able to come even close to this performance.

1. POINT-METERING WITHOUT COMING CLOSE TO SUBJECT

The ideal way of measuring exposure is to do it from where the camera is located. The majority of

light meters fall into one of two types, the incident-light meter and the reflected-light meter. The incident-light meter requires, however, that metering take place from the subject's position. There are many situations in which this is impractical or impossible, as when photographing scenes on a stage, or subjects high from the ground or at great distance from the camera. Many kinds of reflected-light meter are available, the two most common examples being the clip-on and Through-The-Lens types. The latter system insures that the angle of coverage of the light meter will be the same as that of the lens used, an important feature in cameras with interchangeable lenses. This built-in metering is used in Asahi Pentax K series cameras, ME and MX, and ES and SP model cameras. It is the best metering system of its kind.

The K series and SP model cameras are equipped with light metering systems providing an integrated reading of the entire viewing area.
This type of metering is the easiest to use, but under high-contrast conditions it is often not possible to set exposure selectively, to emphasize one area over another in measuring lighting conditions.
The Spotmeter permits measuring the light at a single point on the subject with a high degree of precision. Because point-metering is possible from the camera location, with the Spotmeter one can now set exposure for that scene on a stage, or for objects high from the ground or at great distances. It is also possible to objectively judge lighting balance, and to measure contrast in the subject against film exposure latitude.

2. METERING ANGLE OF ONLY 1 DEGREE

The metering angle of the Pentax Spotmeter V is a mere 1° of arc. With this narrow angle and extremely high light sensitivity, as its name suggests, the Spotmeter can measure light reflected from any chosen point in the field of vision. With the Spotmeter even neon signs and similarly difficult objects can be photographed with confidence. The standard 50 mm f/1.4 Pentax lens has a field of vision of 46° of arc; you can imagine how small an area you are dealing with at 1°

3. EXCEPTIONALLY BRIGHT EYELEVEL FINDER WITH 1.5x MAGNIFICATION, UNREVERSED, RIGHT SIDE UP IMAGE

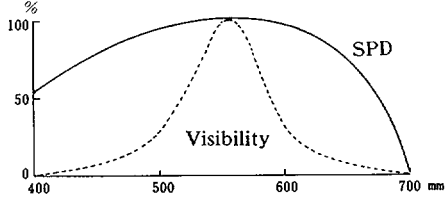
Because the Pentax Spotmeter V uses a single-lens reflex pentaprism, eyelevel light metering is provided as in an SLR camera. This is, in fact, the same high precision pentaprism known to Asahi Pentax enthusiasts all over the world through the cameras in which it is used. The telescopic finder's extremely bright, unreversed, right side up image allows the user to view any subject with ease. The eyepiece is fitted with a focusing adjustment which permits correction for slight near-sightedness.

4. FOR USE WITH FILTERS ALSO

The SPD photo sensitive element of the Pentax Spotmeter V can also be used to measure the different reflectivities of various colors. By mounting filters in front of the objective lens of the Spotmeter and measuring exposure through the filter one can avoid the necessity of using filter factors to calculate exposure. The correct

exposure will be indicated directly on the Spotmeter's light-level scale.

Spotmeter V SPD spectroscopic sensitivity



5. USE AS A BRIGHTNESS METER

The Pentax Spotmeter V has many uses outside of photography. In television broadcasting, for example, the maximum reproducible contrast ratio between brightest and darkest areas is 1:30. Using the Spotmeter one can adjust lighting and color to maintain a contrast ratio between highlights and shadows of 1:30 or lower. Also, scenes which show excellent contrast in color can appear flat in black and white. Use of the Spotmeter will insure adequate contrast in black and white as well as color. In making posters and similar items, the Spotmeter will be an aid in maintaining a balance in color and color reflectivity which is pleasing to the eye.

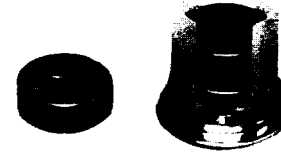
BATTERIES

INSTALLATION

As shown in the photograph, unscrew the slotted cap at the base of the grip with a coin. The inner side of the cap will have a (–) marked on it. Insert three batteries in the opening so that the (+) sides of the batteries all face inward, and the ends marked with (–) all face the side of the cap marked (–). Retighten the cap.

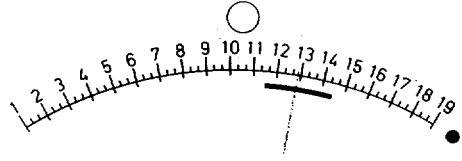
BATTERY LIFE

Mercury batteries are long-lived. Approximately 70,000 spot-metering cycles can be carried out at light level EV 16 with one set of batteries. Depending on use, the batteries should last about one year. Mercury batteries deliver virtually full power for as long as there is any charge left in them. When they reach the end of their life, however, they lose power suddenly and without warning. For this reason it is wise to test battery condition with the battery checker before each use.

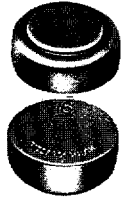


BATTERY CHECKER

The button marked "B" located underneath the objective lens on the grip is the battery checker. If battery condition is good, pressing this button will make the light level meter needle, seen through the eyepiece, point to a black mark which extends from the 11 to the 15 mark on the light level scale. If the needle does not move to this zone the batteries have lost their power and should be replaced.



The Spotmeter V uses three type G-13 mercury batteries.



If the mercury batteries are accidentally dropped in a fire or suddenly heated by some other means there is a possibility of their exploding. The exhausted batteries should be left with the dealer or the nearest service center. If the batteries are to be out of use for an extended period of time, they must be removed from the meter. If this is not done, battery leakage could do damage to the contacts.

OPERATION

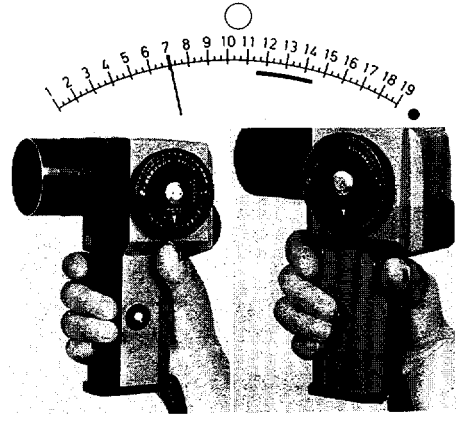
1) As shown in the illustration to the left, press in the two nipples on the ASA/DIN disk and turn the disk to set film speed on either the ASA or DIN scale by means of the corresponding index.

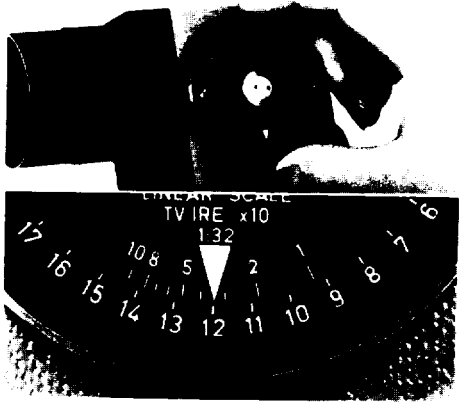
2) Looking through the eyepiece, turn the eyepiece adjustment ring until the light level scale is in clear focus.

3) Aim the Spotmeter so that a small circle in the center of focusing screen (see illustration on top) is placed on a section of the subject to be measured. Depress the metering button and read the number on the light meter scale indicated by the needle.

The light level scale seen in the finder has no high or low sub-scales, and is therefore extremely simple to read. The sample reading shown in the illustration to the right is EV 7.3.

If light from the subject is too low to enable the scale to be read, press the scale illuminator button on the side of the grip of the Spotmeter V as you look in the eyepiece. The use of the scale illuminator will make it easy to read light levels EV 1 ~ 8 on the left end of the scale.





4) Turn the outer ring of the meter calculator located on the side of the meter so that the number read from the light level scale is aligned with the large triangular index at the bottom of the calculator face.
If, for example, the number indicated on the light level scale is EV 12, turn the outer ring so that the number 12 is aligned with the large triangle (standard index).

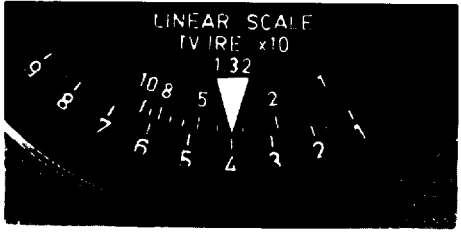
5) When the EV reading has been set, the proper exposure combination will be indicated on the two scales at the top of the calculator. The "T" scale indicates shutter speed, the "F" scale lens aperture (f-stop).

For example: If, using ASA 100 film, the light level is EV 4, the combinations of f/64 at shutter speed 4 minutes, of f/16 at 15 sec. (orange number), or of f/1.4 at 1/8 sec. will all provide proper exposure. Any other pair of corresponding numbers on these scales will provide equally correct exposure settings.
While a great number of combinations will be indicated on the calculator, only a portion of them will be actually usable because of limits on diaphragm and shutter settings of the camera. A suitable pair of numbers should be chosen from among the possible combinations and transferred to the camera.

Sometimes, it will be advisable to take several readings of different parts of the subject area.
For instructions on dealing with this situation and for a description of the method of averaging readings, see pages 15 ~ 22, "Various Methods of Exposure Readings."

IRE (INSTITUTE OF RADIO ENGINEERS) SCALI

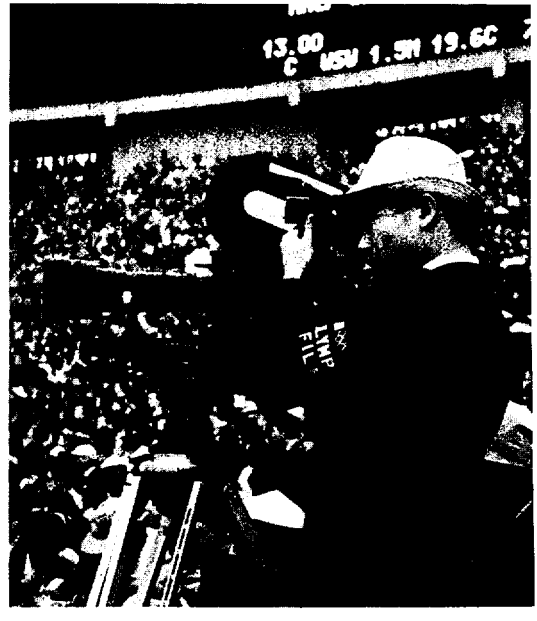
The Pentax Spotmeter V is provided with an IRE scale which is very useful for television filming and movie making, as well as general photography. 120 Pentax Spotmeter II's equipped with IRE scales were used to provide exposure settings for the making of the official film of the 1964 Tokyo Olympics. Since that time, this scale has come to be used whenever comparable precision in exposure setting is called for.



IRE units provide a means for the percentagewise comparison of energy. The maximum energy value is taken to be 100% and energy levels taking this maximum as a standard are expressed as percentages of maximum level. This method is used in radio communications to compare signal voltages, but is also applicable to the comparison of light energy obtained in exposure measurements. The light level of the brightest highlight in the subject is taken as 100% and the energy of other parts of the subject is expressed in IRE units as a fraction of that level.

Index 10 (100% IRE) indicates the level of the brightest highlight in the picture, the upper brightness limit, and is called the "white level."

Index 1 (10% IRE) shows the maximum darkness of shadow detail reproducible on the film. This is called the "Black level."
The intermediate numbers 9 ~ 2 (90 ~ 20% IRE) indicate comparative brightness based on the 100% "White level." These indices represent divisions of the linear gray scale.
The large triangular index between 3 and 4 is the **standard index,** in use on most light meters, which shows the average of optimum film exposure levels (light level obtained using standard reflecting surface, reflectivity ratio of 18%).
The figure "1:32" above the standard index indicates the contrast ratio between IRE scale 1 and 10. The IRE scales from 1 to 10 cover 5 light level numbers. Since an increase of one EV number represents a doubling of light level, the contrast ratio is 1:32 ($2^5 = 32$).



VARIOUS METHODS OF EXPOSURE READINGS

Methods of exposure reading include the half-tone reading method, the averaging method, the highlight reading method, and the shadow reading method.

HALF-TONE READING METHOD

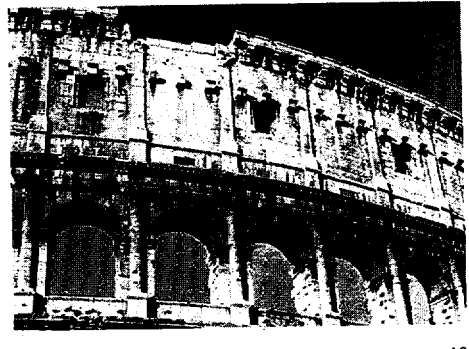
Center the metering circle on a half-tone area in the picture section of primary interest and take the reading for that spot from the light level scale. If, for example, the subject is a person, aim the metering circle at his or her face. If the subject is an object or a landscape, select an area of average tonal quality and place the metering circle in that area.

After reading the light level, set this number by the standard index on the IRE scale. Select an appropriate set of values for shutter speed and aperture opening from the two scales at the top of the exposure calculator.

The spotmeter will prove itself especially valuable for measuring exposure of persons standing under stage spotlights and in similarly difficult situations.

AVERAGING METHOD

Measure the highlight (brightest) and shadow (darkest) areas and take the average of the readings obtained. The best results will be obtained if the difference between the highlights and shadows is no greater than the reproducible contrast ratio of the film. For ordinary black and white film this difference is approximately 7 EV numbers; for color reversal film it is approximately 5 EV numbers. If the contrast between highlights and shadows exceeds these ranges, measure the light of at least three locations in the picture area and divide the sum of readings by the number of locations measured to obtain an average value. Set this average value by the standard index. In this case the highlight areas beyond the film's reproducibility range will be overexposed, or the shadow areas will be underexposed. By this method, however, one will have obtained correct exposure for the greatest area of the picture as a whole.



FOR THE SPECIALIST

HIGHLIGHT READING METHOD

This is a method for which the Pentax Spotmeter is uniquely adapted. In this case, the light level of the subject highlights are made the base value for exposure setting. This method was developed for television filming, but is just as useful for still and moving picture photography. As previously mentioned, the maximum reproducible contrast ratio differs according to film type, but generally speaking this ratio is the same for color film as for television broadcasting, about 1:30. The ratio for black and white film is approximately 1:100.
To use this method, the light level of the highlights is first determined, and this EV value taken as the upper exposure limit. By doing this the optimum exposure will be based on the light areas.

The light level read at the highlights is set on the exposure calculator by **index 10 of the IRE scale.** With color film, only those shadows with a light level reading falling to the left of index 1 of the IRE scale (black level) will be reproduced. Areas with a light value falling below index 1 will appear as unrelieved shadow.

Therefore, when the light level of the highlights has been set on index 10, if important shadow detail has insufficient light to bring it above index 1, it will have to be given additional illumination until its light level reading does exceed this mark.

EXPOSURE FOR SPECIAL EFFECTS

Highlight metering is also a convenient means of achieving an underexposed, low-key effect which is desirable when creating a nocturnal atmosphere in a daytime shot.

To achieve this effect, read the light level of the highlights, and set this number on the exposure calculator by one of the IRE scales chosen in accordance with the degree of density desired in the resulting photograph.

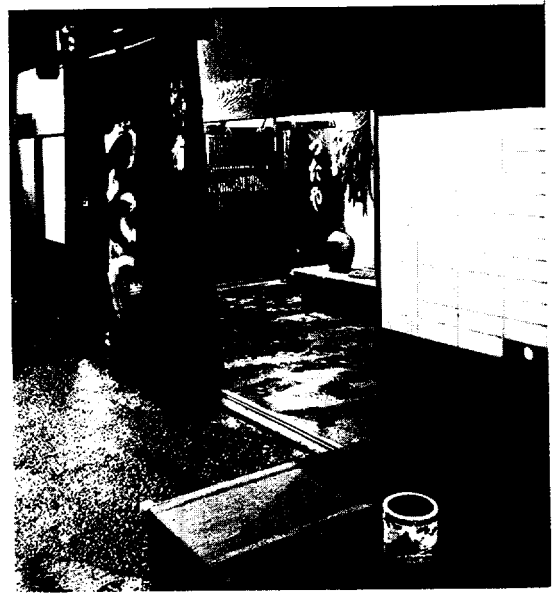
For example, if the light level of the highlights is EV 16, and this value is set on the exposure calculator by the standard index, the highlights will be reproduced in a gray tone as if they were a standard 18% reflective surface.

SHADOW READING METHOD

The reverse of the highlight reading method, this method gives an optimum exposure based on the shadow areas. Shadow reading is employed for bringing out detail of persons photographed with backlighting, and for fully reproducing shadow detail in pictures taken at night.

When ordinary light meters are used to set exposure for evening or nighttime scenes which are not brightly illuminated by neon or other lighting, the resulting photograph has the same appearance as a daytime scene. By using the spotmeter and the shadow reading method, exposures can be set to give evening scenes an "Evening-look" and nighttime scenes a "Nighttime-look."

Read the light values of the shadow areas it is desired to reproduce, and set this light level on the exposure calculator by IRE index 1.
In this case, areas of light value falling between indices 1 and 10 on the IRE scale will be reproducible on color film. Areas of light value falling above index 10 will be washed out. Consequently, if important highlight detail has a light level falling above index 10 when shadow light level has been set according to index 1, it will be necessary to reduce illumination of the highlighted area, or to reduce the reflectivity of the highlighted object, until its light level falls on or below index 10.



LUMINANCE CONVERSION TABLE

Spotmeter V can also be used as a brightness or illuminance meter. Exposure values may be converted into candles per square meter (cd/m^2), candles per square foot (cd/ft^2) and foot lamberts (ft/L) as shown in the chart. Conversions into foot lamberts are useful in making lighting adjustments to match and integrate TV live studio and film material. They are also useful for establishing TV live studio lighting for new shows, and for aiding in the achievement of proper gradation of live-color TV for compatible black and white, because the meter will objectively see color brightness and hue in terms of a gray scale.

EV – LUMINANCE CONVERSION TABLE

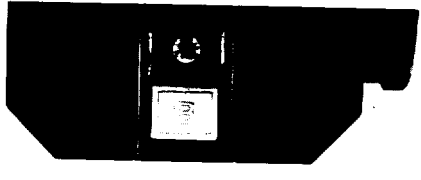
EV	cd/m²	cd/ft²	ft-L
1	0.28	0.026	0.082
2	0.56	0.052	0.164
3	1.1	0.1	0.3
4	2.2	0.2	0.7
5	4.5	0.4	1.3
6	9.0	0.8	2.6
7	17.9	1.7	5.2
8	35.8	3.3	10.4
9	71.6	6.7	20.9
10	143	13.3	41.7
11	286	26.6	83.5
12	573	53.2	167
13	1,150	107	336
14	2,290	213	668
15	4,580	425	1,340
16	9,170	852	2,680
17	18,300	1,700	5,340
18	36,700	3,410	10,700
19	73,400	6,820	21,400

When the Spotmeter is used to take a reading of ordinary objects, the exposure value obtained is not convertible into luminance. Conversion is accurate only against a standard 18% reflecting surface.

OTHER INFORMATION

ZERO ADJUSTMENT

When no light level reading is being taken, the indicator needle seen through the finder should rest on the small black circle to the right of the light level scale. If the needle is off this black circle, turn the small screw located just above the battery checker button B with a screwdriver either right or left until the needle again points to the black circle.



CLOSE-UP READINGS

Because of the extremely narrow measuring angle of 1° of arc, light metering of a point should be possible with the Pentax Spotmeter V without being close to the subject. Consequently, there is no need to bring things into sharp focus as with a camera. Nevertheless, if it should be necessary to come extremely close to the subject in order to measure a very small point, the fact that the objective lens is of fixed focus might make viewing difficult. In such a case, unscrewing the adjustable eyepiece to the limit of its travel will make viewing a little easier. It will be noticed, however, that the light level scale is now out of focus, and readjustment may be necessary to read the value indicated.

SELECTING FILTERS

When photographing colored objects with black and white film, it is necessary to take into account the reflectivity of each of the colors. While contrast between adjacent colors may appear good to the eye, if their reflectivities are nearly the same, the contrast in the resulting black and white photograph will be disappointing. As is well known, the use of color filters can improve contrast in cases such as the above, but it is difficult to judge which filter to use.

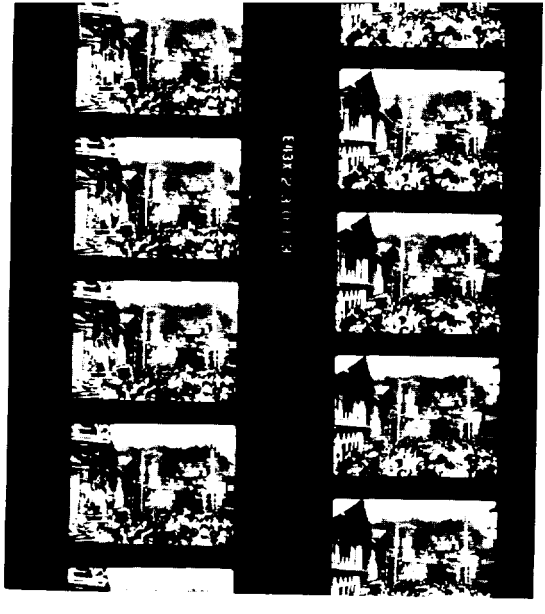
By mounting different filters in front of the objective lens of the Pentax Spotmeter and comparing the readings taken of the various colored areas with each filter, it will be easy to determine which one provides the best contrast for black and white film.

USE IN SELECTING COLORS

The age of color has arrived in television broadcasting, but while almost all movies now televised are in color, they are viewed on black and white television sets as well as color. For this reason it will not do to make movies for television broadcasting which are attractive in color, but drab in black and white.

Thus, it is necessary to consider color distribution and composition, as well as simple light values, when filming for color televising.

If light values are determined with a Pentax Spotmeter V, not only will the brightness contrast be known, but the proper choice of colors can be decided as well. This principle is being utilized now in the creation of displays and designs of all types.



SPOTMETER V AND MOVIE CAMERA

The movie camera is being put to a variety of uses, 35mm for feature films and commerical use; 16mm for television, educational films and documentary films, and 8mm for amateur and home movies.

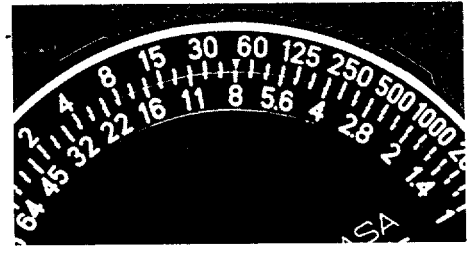
In recent years, color film has become dominant in motion picture making and filming techniques have been displaying constantly increasing virtuousity. Correct color reproduction and exposure are now taken for granted, when sophisticated techniques are being employed for even the minutest details. The Pentax Spotmeter V has proven itself indispensable for setting exposure in filming situations demanding quick response, and for filming in cramped quarters or at long distances.

USING SCALE FOR MOVIE CAMERAS

The operation of the Spotmeter V for movie making differs somewhat from that of still photography. The shutter speed of movie cameras is determined by camera type, the shutter open-angle, and whether the camera is being used for high or low speed photography.

The standard shutter speed of the ordinary 35 and 16mm movie camera is approximately 1/50 of a second (24 frames per second). This speed is marked with an orange triangle on the shutter speed scale of the Spotmeter V between the 1/30 and 1/60 sec. divisions. Therefore, when using the meter with these cameras, the aperture opening is found on the F-scale below this mark.

With the 8mm movie camera, the Super- and Single-types take 18 frames per second, and the Double-type takes 16 frames per second. In both cases, the proper aperture opening will be found on the F-scale below the 1/30 second mark..



WRIST STRAP ADJUSTMENT

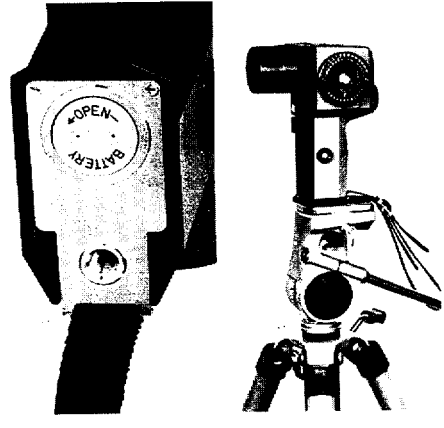
1) As shown in the accompanying photograph, the wrist strap can be adjusted by pushing the strap into the clip from one direction and then pulling on it in the opposite direction until the desired length is obtained.

2) As the wrist strap protrudes through a hole in the lower part of the case, the Spotmeter can be placed in its case without removing the wrist strap. To insert the Spotmeter in the case, open the zipper and spread apart the sides.

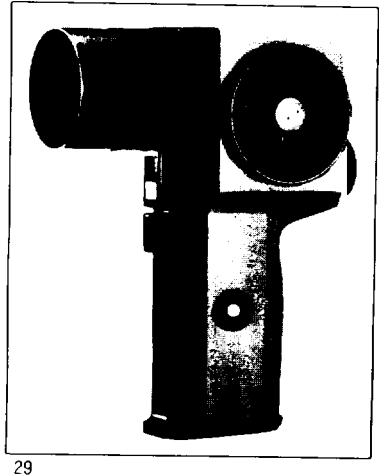
TRIPOD MOUNTING

1) If the Spotmeter V cannot be held steadily enough in the hand, it can be mounted on a tripod and used from there.

2) As shown in the photograph to the right, the Spotmeter V is equipped with a threaded connection for mounting on any standard tripod. The spotmeter can be mounted on the tripod with the wrist strap in place.

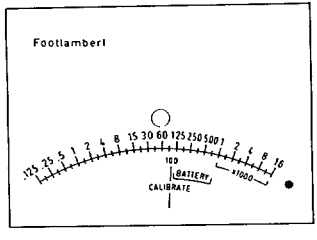


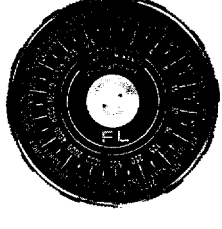
SPOTMETER V-FL



Designed exclusively for T.V. and film making, Spotmeter V-FL gives viewfinder readings directly in foot lamberts (ft/L). Other than the fact that both the viewfinder and calculator scale are in foot lamberts, this model is identically the same in optical and mechanical construction as model V. The inner scale of the calculator dial features a foot lambert scale with a range of 0.125 to 16000 ft/L., while the outer scale indicates luminance ratios ranging from 1:1 to 128,000:1. If, for instance, as shown in Illust. 2, the brightest spot in a given area reads 250 ft/L and the darkest spot reads 1 ft/L, set the 1 ft/L calibration of the inner scale to correspond with the 1:1 luminance ratio of the outer scale. A glance at the luminance ratio number matching the 250 ft/L reading obtained for the brightest spot will inform you immediately that the illuminance ratio is 250:1. If the darkest spot had read 3 ft/L (the index line between 2 and 4 on the inner scale) and the 1:1 luminance ratio number were adjusted accordingly, the luminance ratio given at the 250 ft/L setting would be 90:1.

Other aspects of Spotmeter V-FL are the same as for Spotmeter V. Please read the pertinent sections of this manual carefully before operation.


Footlambert
.125 .25 .5 1 2 4 8 15 30 60 125 250 500 1 2 4 8 16
100
BATTERY
CALIBRATE
x1000


FL