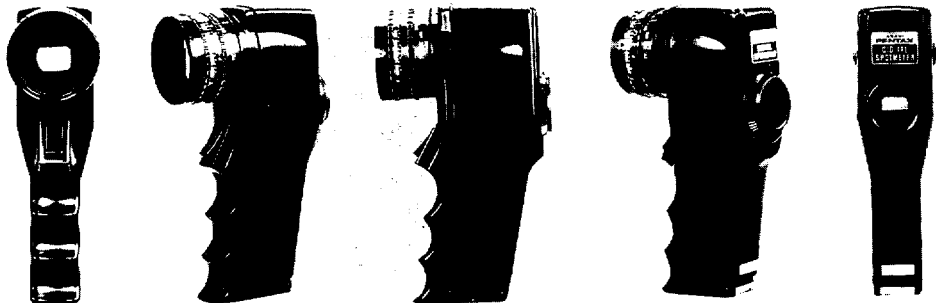


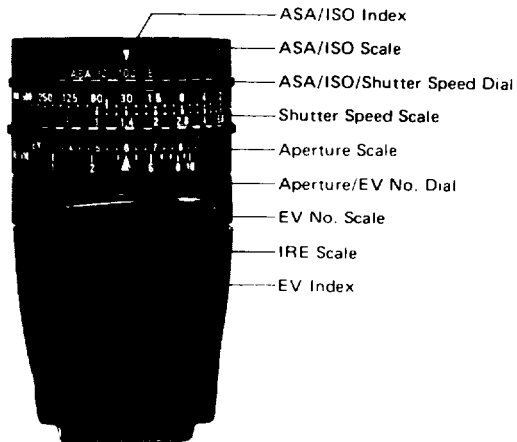
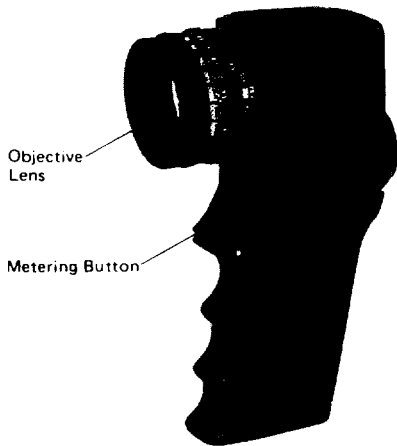
PENTAX®

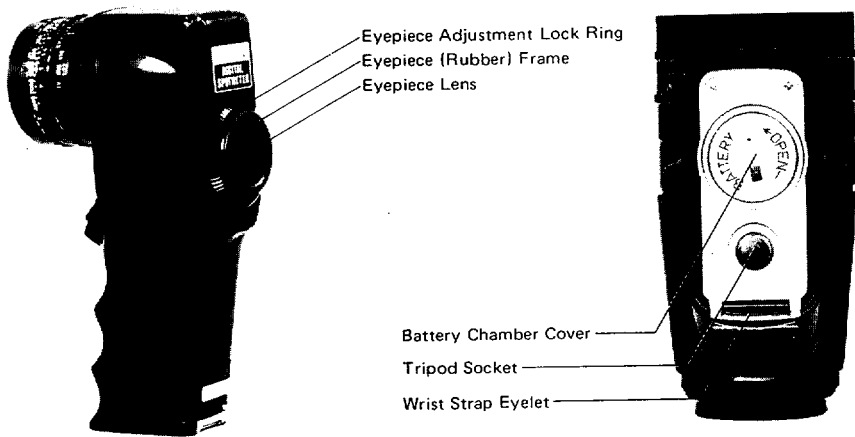
DIGITAL SPOTMETER

OPERATING MANUAL



NOMENCLATURE





SPECIAL FEATURES

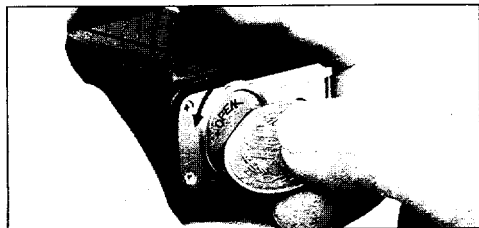
- 1. Light and small enough to carry.**
- 2. The minute 1° angle of view makes it possible to take accurate exposure measurements of a distant subject.**
- 3. LED digital display visible under any lighting condition in the range of EV 1~20 (ASA/ISO 100).**
- 4. Can work in dim surroundings at EV1 level because of the instantaneous response of the Silicon Photo Diode.**
- 5. Viewfinder angle of 26 degrees with 1.15x magnification makes it easy to observe surroundings and details of the subject for easy search of proper measuring spots.**
- 6. Stabilizer Circuit eliminates flickers for comfortable read-out.**
- 7. Objective and eyepiece lenses Super-Multi Coated and pentaprism specially coated for bright viewing.**

BATTERIES

Inserting the Battery

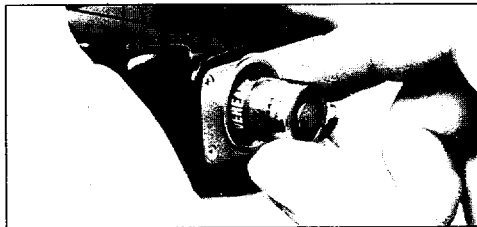
1. Rotate counterclockwise with a coin and remove the Battery Chamber Cover found on the base plate of the Grip.

1



2. Insert a 6V battery (4SR44, 4LR44 or equivalent) with plus-side down into the Battery Chamber, and put back the cover (minus side of battery faces cover).

2

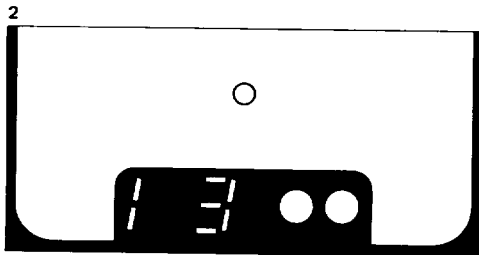


Checking Battery Life

1. Look through the viewfinder and depress the metering button, as in the picture.



2. A Battery Check Circuit is connected to the LED digital display so that illumination of the LED digital display indicates battery condition is good.
If the digital display appears faint or fails to illuminate, the battery should immediately be replaced with a new one.



Precautions

- Make sure that polarity of the battery is properly aligned. Incorrect polarity alignment may cause unexpected damage to your equipment.
 - Remove the battery when not using your equipment for a long time. The battery may tend to leak if left too long in your equipment and may cause serious damage.
- Batteries are very sensitive to cold and performance tends to deteriorate at temperatures near freezing point. Performance is restored as soon as batteries are brought back to room temperature. Keep a set of batteries in a warm pocket when shooting in cold weather to substitute if the others no longer perform well.



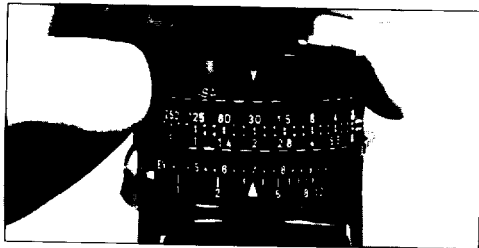
4SR44 type battery

**Never try to break up or recharge the batteries, or throw into fire to prevent explosion. It may cause unexpected damage or injury to you.
Keep the batteries out of reach of children.**

OUTLINE OF OPERATING PROCEDURE

1. Align the film speed in use with the green ASA/ISO index by rotating the front ring.
2. While looking through the viewfinder at a distant object, rotate the Eyepiece Adjustment Lock Ring until the small circle in the center of the viewfinder (1° spot) appears sharp.

1



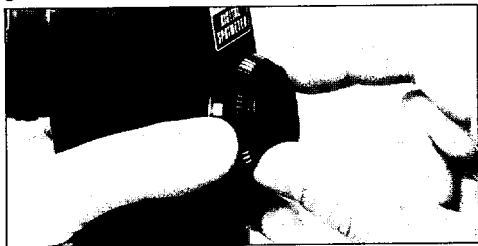
6

2



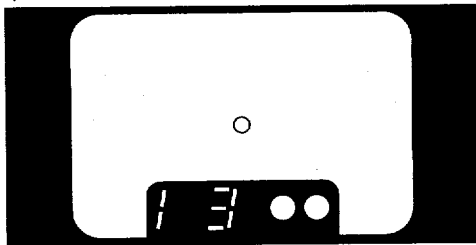
3. After adjusting the eyepiece for maximum sharpness, hold the rubber Eyepiece Frame securely so that it does not move, and lock it by rotating the Eyepiece Adjustment Lock Ring clockwise until it stops.

3



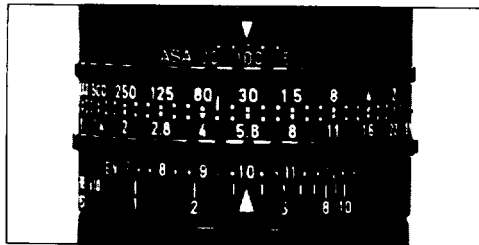
4. While holding the spotmeter up to your eye, align the 1° spot in the center of the viewfinder with the part of the subject you wish to measure. Squeeze the Metering Button and an LED digital display will appear. In the following drawing the digital display indicates 13-2/3 EV; A single dot indicates 1/3 EV.

4



- Align the EV No. indicated by the digital display with the red EV Index by rotating the Aperture/EV No. Dial.

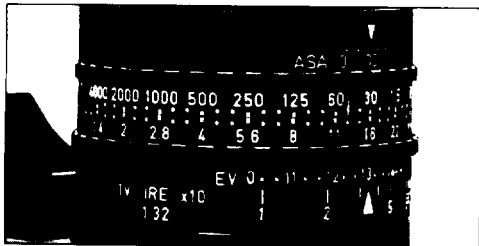
5



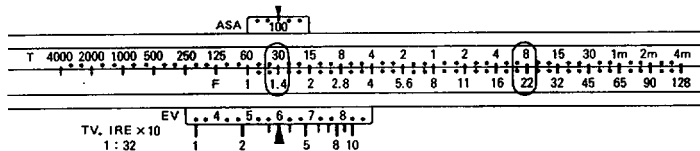
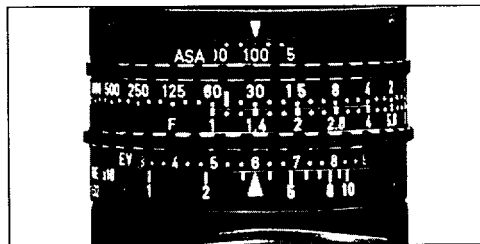
8

- After aligning the EV No. with the EV Index, merely select any aperture-shutter speed combination indicated on the respective scales. (T=time in white, F=f/stop in blue)

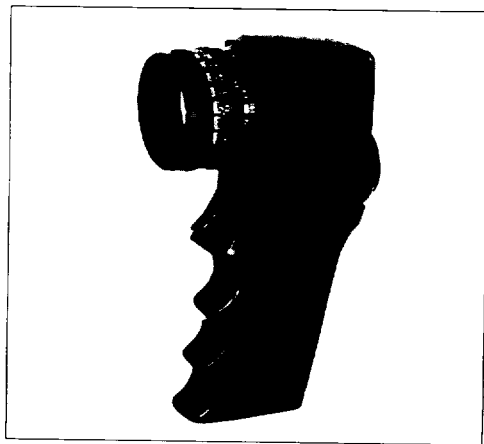
6



For example, when the ASA/ISO setting is 100 and EV No. 6 is aligned with the red EV Index, any of the following combinations result to meet your shooting situation. f/1.4 1/30 sec., f/2 1/15 sec f/22 8 sec.



VARIOUS METHODS OF EXPOSURE READINGS



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

Half-Tone Reading Method

Center the 1° spot on a half-ton area of primary interest and take the reading of that point. If, for example, the subject is a person, aim the 1° spot at his or her face. If the subject is a still-life object or a landscape, select an area of average tonal quality and place the 1° spot in that area.

After reading the light level, align this number with the red EV Index. Select an appropriate set of values for shutter speed and aperture opening.

The spotmeter will prove itself especially valuable for measuring exposure of persons standing under stage spotlights and in similarly difficult situations. Measure the gray 18 per cent standard reflection card (Neutral Test Card sold by Kodak) directly or something else with a reflectivity ratio very close to it (a Japanese male's face) to get the best results.



Averaging Method

Measure the high light (brightest) and shadow (darkest) areas and take the average of the readings obtained. The best results will be obtained if the difference between the high light and shadow is no greater than the reproducible contrast ratio of the film.

For color reversal film and black and white prints it is within 5 EV numbers. With color prints, the narrower difference will render a soft tone.

If the contrast between high lights 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 to the red Index. If the difference is more than 5 EV's, the high light areas beyond the film's reproducibility range will be overexposed, or the shadow areas will be underexposed. By this method, however, one will obtain correct exposure for the greatest area of the picture as a whole.

For example, the exposure values in the high light and shadow in the picture on the right are 12 EV's and 9 EV's respectively, making only a 3-EV difference because of a low contrast cloudy weather condition. The average value is 10.5 EV's which is namely the correct exposure value and happens to correspond to that of the bamboo leaves.

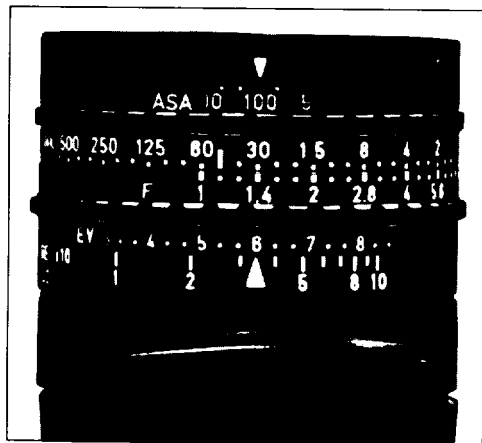


IRE (Institute of Radio Engineers) SCALE

The Pentax Digital Spotmeter is provided with an IRE Scale which is very useful for television filming and movie making, as well as general photography to confirm the light levels of the upper and lower brightness limits (High light and shadow reading methods).

The latitude of reversal films and movie films used for TV broadcasting is said to be within 5 EV's (1:32 in contrast ratio). The IRE scale ranges from 1 to 10 (divided into ten fractions, but not equidistantly) in accordance with the contrast ratio of 5 EV's.

There is a scale showing 1~10 with the EV index in between.



Index 10 (100% IRE) indicates the limit of the high light details reproducible in the picture, the upper brightness limit, and is called the "White level."

Index 1 (10% IRE) shows the minimum darkness of shadow detail reproducible on the film. This is called the "Black level." The intermediate numbers 9~2 (90~20% IRE) indicate intermediate contrast ratios based on the 100% "White level" corresponding Index 10. These indices represent divisions of the linear gray scale.

*** IRE UNIT**

IRE units provide a means for the percentage-wise 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 large red triangular index between 3 and 4 is the **EV Index**, which shows the average of optimum film exposure levels (light level obtained using standard reflecting surface with reflectivity ratio of 18%). The figure "1:32" at the extreme left of the scale indicates the contrast ratio between IRE scale 1 and 10, corresponding to a 5-EV range. The IRE scales from 1 to 10 cover the 5 EV latitude range of reversal photo films and movie films used for TV broadcasting. See the following table for your reference;

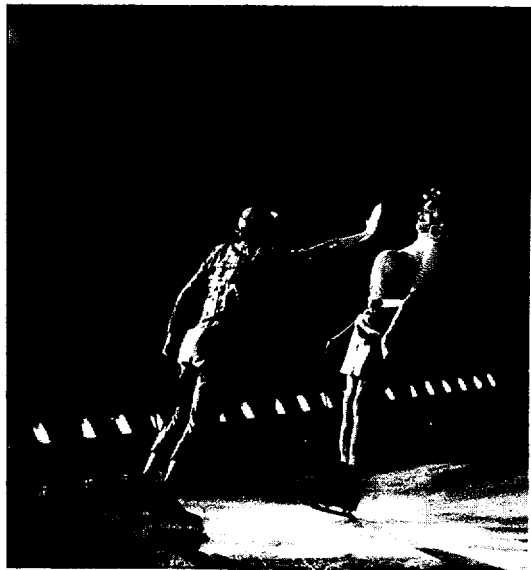
Index 10	→	+2.3EV	—
8	→	+1.7EV	↑
5	→	+0.7EV	EV 5
2	→	-1.3EV	(1:32) Reproducible range
1	→	-2.7EV	↓



High Light Reading Method

This is a method for which the Pentax Digital Spotmeter is uniquely adapted. In this case, the light level of the subject's high light is made the base value for exposure setting. This method was developed for television filming, but is just as useful for still and motion 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, namely about 1:32. The ratio for black and white film is approximately 1:100. To use this method, the light level of the high light is first determined, and this EV value is taken as the upper exposure limit. By doing this the optimum exposure will be based on the high light areas.

The light level read at the high light portion of a subject such as white wall, white paper, etc. is aligned with the index 10 of the IRE scale, so that proper exposure is obtained for the best rendition of white color. With color film, only those shadow details with a light level reading falling to the right 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 black. Therefore, when the light level of the high light 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 index 1.





Shadow Reading Method

The reverse of the high light 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 do not include bright subjects such as neon or other lighting, the resulting photograph has the same appearance as a daytime scene. By using the spot-meter 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 up to index 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 high light 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 high light area, or to reduce the reflectivity of the high light point, until its light level falls below index 10.



LIGHT REFLECTIVITY OF 7 COLORS

Color	Reflectivity(%)	Index No.
Red (bright red)	15 ~ 21	5
Orange	35 ~ 45	6 ~ 7
Yellow (dark yellow)	65 ~ 75	8
Green (dark leaf-green)	18 ~ 26	EV Index (Standard index)
Blue	15 ~ 21	5
Indigo	6 ~ 12	2 ~ 3
Purple	6 ~ 12	2 ~ 3

Don't Be Misguided by Colors

You should be careful about colors when using the Digital Spotmeter. If exposure is set strictly on the basis of a light level reading taken from a color area, there is a good possibility that the exposure will be incorrect. This is because reflectivity is different for different colors.

The reflectivity of yellow is lower than that of white, but yellow has the highest reflectivity of all the colors. Indigo and purple have the lowest reflectivity. Consequently, if a light level value taken from a reading of a yellow area is set to EV Index (Standard Index), the resulting photograph is somewhat underexposed. In such cases, you can try the referential data in the table on the left according to your actual experiences.

USING AS A LUMINANCE METER

EV – Luminance Conversion Table

EV	cd / m ²	cd / ft ²	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

EV=Bv+Sv (Exposure value = Subject's ' luminance + APEX index of film speed). Even if Bv remains the same, Ev varies when Sv varies, making this spotmeter a handy luminance meter. Since this meter's K value is 1.4 (in cd/ft²) or 14 (in cd/m²), exposure values (with an ASA/ISO 100 film) may be converted into candles per square meter (cd/m²), candles per square foot (cd/ft²) and foot lamberts (ft/L) as shown in the chart. When the Spotmeter is used to take a reading of ordinary objects, the exposure value obtained is not convertible into illumination. Conversion is accurate only against a standard 18% reflecting surface.



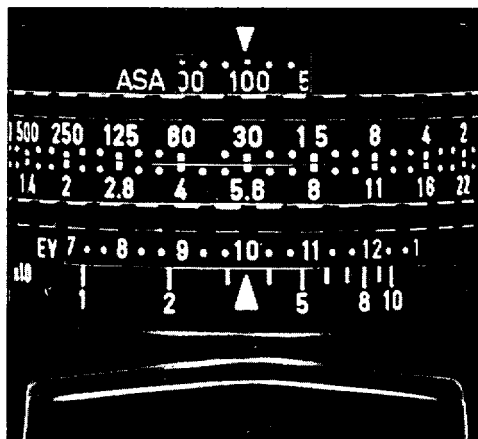
CINE CAMERAS AND SPOTMETER

Pentax Digital Spotmeter can be effectively used to obtain ideal brightness or luminance balance for intended color rendition or correct exposure results, especially under difficult situations, when shooting with a cine camera or video camera.

Cine Index

The operation of the spotmeter for movie camera differs somewhat from that of still photography. The shutter speed of movie cameras is determined by camera type, the shutter opening angle, and whether the cameras 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 in red on the Shutter Speed Scale between the 1/30 and 1/60 sec. divisions. Therefore, when using the meter with these cameras, the aperture opening is found on the Aperture Scale below this mark.



PRECAUTIONS BY SHOOTING SUBJECTS

Movie Screen

24 frames per second are projected on the movie screen and during the time of switching a frame to another, there is no image projection. On such subjects the spotmeter shows somewhat lower exposure values because its display function does not catch up with such changes.

TV Screen

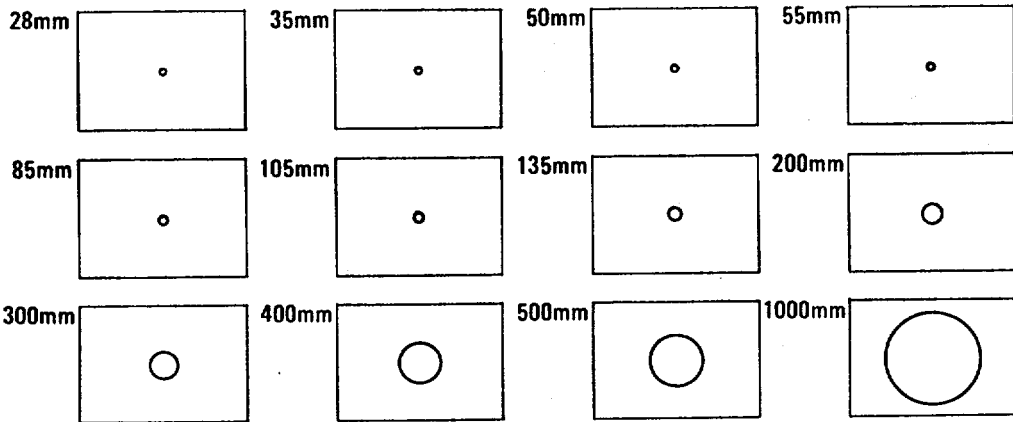
It also shows lower exposure values as in the above case due to the TV scanning lines.

In either way, it is difficult to correctly measure such a light that is quickly switching on and off alternately (also in case of mercury lamps and some fluorescent lamps).

Exposure Factor

Light on the film plane becomes weaker in short distance photoshooting, because the helicoid of the taking lens is fully extended to result in a longer lens/film plane distance than the focal length. This means that in actual shooting sessions you must increase the exposure value by 1.1 ~ 1.5 times (which is, however, taken account of in the case of a SLR camera at the time of its design to avoid such a complicated compensation).

Size of the 1° metering angle of the Digital Spotmeter relative to the field of vision obtained with various lenses used with 35mm cameras.



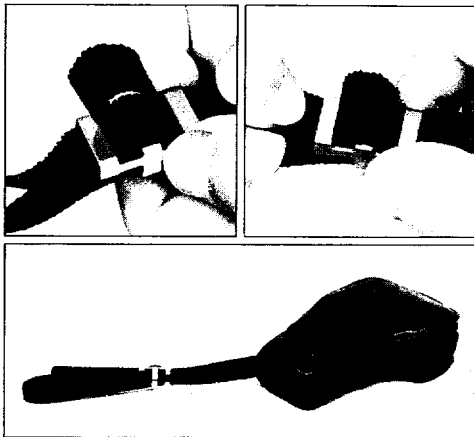
OTHER PRECAUTION



1. We recommend you to have your Spotmeter examined periodically at a near-by Pentax Service Station to keep its accuracy.
2. When first removing the lens cap and taking a reading from a dimly-lit subject (e.g. EV 3 or below) a few seconds may be necessary before obtaining the correct exposure measurement. Once it has measured a bright subject, its display reaction becomes faster.
3. The temperature range for its proper function is 50°C to 20°C below zero.

WRIST STRAP ADJUSTMENT

1. As shown in the accompanying photographs, 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 an opening in the lower part of the case, the Spotmeter can be placed in its case without removing the wrist strap.
3. When desiring to support the Spotmeter from your neck or shoulder, use the neck strap available as an optional accessory.



SPECIFICATIONS

Measuring System: Spot measuring of reflected light. (Meter switches on when button depressed).

Exposure Read-Out: LED digital display of EV Numbers with two dots (each of which equals + 1/3 EV).

Photosensitive Cell: Silicon Photo Diode. K value = 1.4 (in cd/ft^2) or 14 (cd/m^2)

Measuring Angle: 1° (small circle in the viewfinder)

Measuring Range: (ASA/ISO 100) EV 1 ~ 20 (EV 20 displayed as "0").

Scales: ASA/ISO 6 ~ 6400; Aperture $f/1 \sim 128$; Shutter speed, $1/4000 \text{ sec.} \sim 1 \text{ sec.} \sim 4 \text{ min.}$; Cine Index [24 frames/s]; IRE, 1 ~ 10.

Measuring Distance: From about 1.5m to infinity, fixed focal length (focusing down to about 1m possible by screwing the eyepiece out as far as it will go).

Viewfinder: Pentaprism type with unreversed, upright image. Viewfinder coverage similar in shape to that of a 35mm SLR, and with a diagonal field of view of 26° , horizontal field of 17° , and vertical field of 14° , viewfinder magnification of 1.15x, adjustable eyepiece of -2 to +1 diopter.

Power Source: One 6V silver oxide battery or equivalent alkaline battery.

Battery Check: Failure of LED digital display to illuminate indicates battery needs replacing.

Others: Equipped with Tripod Socket and 40.5mm filter thread.

Dimensions & Weight: 45.5mm(W) x 144mm(H) x 83mm(D). 250g (without battery).

Accessories: Case, wrist strap, battery and lens Cap.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT ANY OBLIGATION ON THE PART OF THE MANUFACTURER.





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