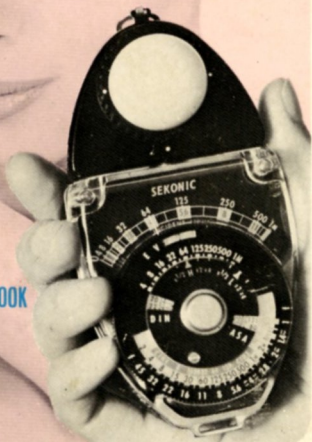


SEKONIC
STUDIO
DELUXE

MODEL L-28C INSTRUCTION BOOK





SEKONIC STUDIO DELUXE

MODEL L-28C

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1. Introducing the Sekonic Studio Deluxe L-28

Dual Purpose Exposure Meter

1-1. Foreword

For years Sekonic has marketed the Sekonic Studio S, which has been widely accepted throughout the world by commercial and amateur photographers, artists, and movie cameramen. The Sekonic Studio Deluxe is a new improved model of the Sekonic Studio "S". It is easy to use and designed to give the most accurate exposure readings based on incident light. A variety of accessories make the Sekonic Studio Deluxe a professional and versatile instrument that will meet all your photographic requirements.

1-2. Specifications

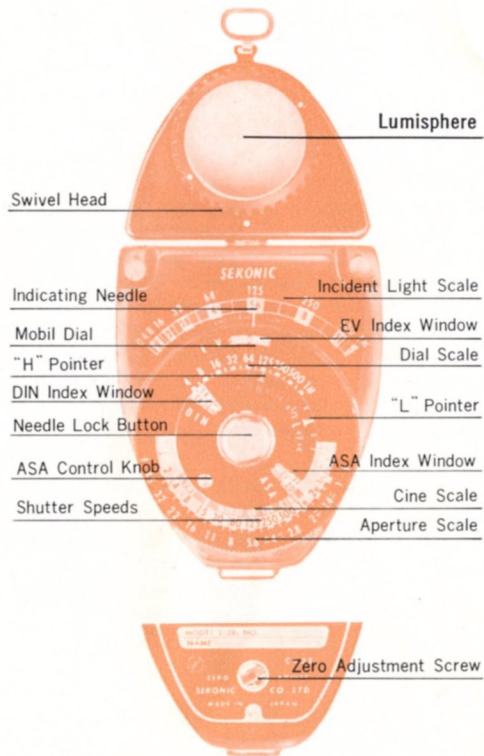
MEASUREMENT

Method	Incident & reflected light
Range	EV 4-17 at ASA 100
Accuracy	± 0.03 EV Max. (less than 1/3 aperture scale)

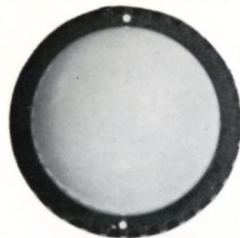
SCALE

ASA	6—12,000
DIN	9—42
Time (Shutter speed)	60—1/2,000 sec.
Aperture	1—45
Cine	8—128 frames per second
EV scale	light values 1—20
Correction factor	$C \pm 25$ $K \pm 1.15$
Dimension	4.2 × 2.3 × 1.2 inch
Approx. weight	8.8 oz.

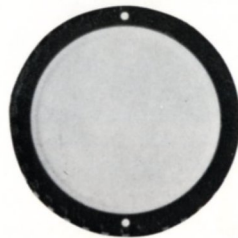
1-3. Name of Parts



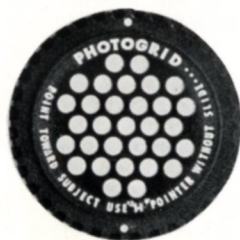
Accessories



Lumisphere



Lumidisk



Lumigridd

HIGH Slide

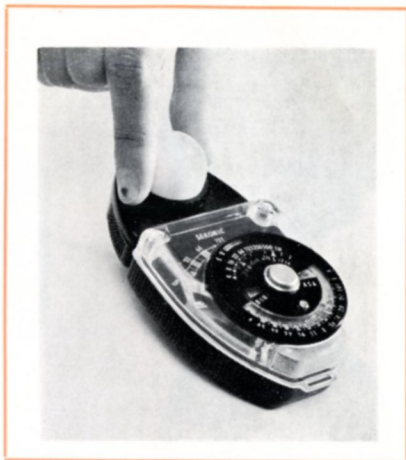


Set of 9 Direct Reading Slides

These are available with the following ASA indexes: 25, 40, 50, 64, 80, 100, 160, 200 and 400.

Note: Direct Reading Slides and other accessories for the Sekonic Studio Deluxe can be purchased from our local dealers.

1-4. Introducing the Accessories



Lumisphere

Used only to determine exposure by incident light (i.e., the light that falls on a subject).

To install: match the white dots on the Photosphere and socket, insert the Photosphere, and turn it clockwise until it stops. Reverse procedure to remove.

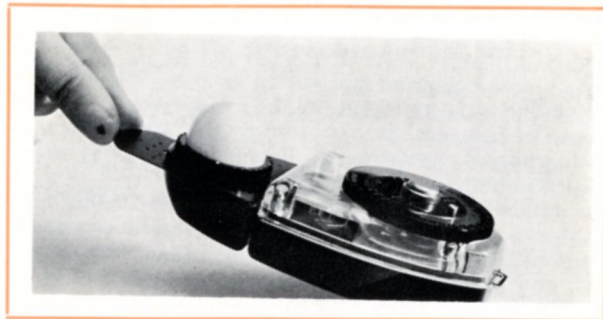
Lumidisk

Used to obtain brightness in foot-candles (or in "lux" if so converted) and to measure and control contrast. Install as with Lumisphere.

Lumigrid

Used to measure the reflected light and relative brightness of a subject. Can also be used to determine exposure when an incident light measurement cannot be taken. Install as with Lumisphere.

"HIGH" Slide



Used with Lumisphere or Lumidisk outdoors or in bright places when the indicating needle moves above 1 M (or 6 on) the Incident Light Scale. Insert the HIGH Slide in the slot behind the Lumisphere or Lumidisk to convert the Sekonic Studio Deluxe to high illumination measurement. The Slide settles in place with a click.

Direct Reading Slides

Used when it is more important to obtain one quick, direct reading rather than a variety of lens opening and shutter speed combinations. Nine types are available with various ASA and DIN indexes. To use: (1) Select the appropriate slide for the particular film you are using; (2) Set your camera to the shutter speed indicated on your slide; (3) Insert the slide into your Sekonic Deluxe meter just as you would the HIGH Slide; (4) Point the meter in the proper direction; (5) Read the number on the incident Light Scale. This is your proper f/stop reading; (6) Set your camera to the f/stop, and you're ready for a perfect picture.

Note: Direct Reading Slides are for use with the Lumisphere and Lumidisk. They **can not** be used with the **Lumigrid**.

2. Special Features of the Sekonic Studio Deluxe

2-1. Incident Light Measure

In the past, conventional exposure meters measured illumination by reflected light. The Sekonic Studio Deluxe, developed and perfected by the world's leading photographers, determines illumination by a more accurate method:—incident light.

The difficulty with the reflected light method is the time it takes a photographer to obtain a successful exposure. Every subject combines areas of high and low reflection, and to obtain a proper exposure by reflected light, one has to take many different readings and to average them successfully.

This difficulty is overcome with the Sekonic Studio Deluxe. It is designed to measure subjects by a standard reflection of 18% and to determine illumination by incident light. This standard reflection assures perfect tones in black and white photography and establishes a point of reference from which deviations can be made for special effects.

2-2. Lumisphere

The Lumisphere of the Sekonic Studio Deluxe determines exposure in a revolutionary way.

Because a subject is usually three-dimensional, it presents a contrast of lights and shadows which traditional meters are unable to measure without error or difficulty. The Lumisphere, however, receives all incident light just as the subject receives it. It automatically assigns to each light source its photographic value depending on its strength and direction, and averages them into one correct camera setting.

2-3. Measuring Illumination

- (1) The Lumidisk is used to measure illumination. It can be pointed directly at a light source to measure its intensity.

- (2) The top numbers on the Incident Scale indicate foot candles, (i.e., the intensity of light on a certain spot.). For example; if the indicating needle points to 64, the light intensity or illumination on the spot is 64 foot-candles. In order to convert foot candles into Lux units of illumination, multiply the number of foot candles by 10.76. For example, if the Incident Scale reads 64 (which is 64 foot candles) the corresponding Lux measurement will be 688.64.

$$64 \times 10.76 = 688.64$$

When the HIGH Slide is used, the Incident Light Scale number must be multiplied by 32 to obtain the Foot-Candle Number. For example, if the Incident Scale reads 64, then

$$64 \times 32 = 2,048 \text{ (foot-candles)}$$

The Studio Deluxe plays an important role when lighting in a studio must be recorded for future duplication and when contrast must be controlled.

2-4. Direct-Reading Method

With the Direct-Reading Slides there is no need to fuss with the computer dial. The proper f/stop can be found directly from the indicating needle. This is a great advantage when speed is more important than obtaining a complete selection of f/stop and shutter speed combinations.

2-5. Intermediate Values

- (1) The top numbers on the Indicating Scale are foot candle numbers from 4 to 1 M (1000). The red numbers directly beneath them are for f/stops. The values of the unnumbered divisions on both scales are found in the diagram.
- (2) The numbers on the Time Scale indicate shutter speeds. The numbers on the Aperture Scale indicate f/stops.

Notice the mark beneath each number on the Time Scale and above each number on the Aperture

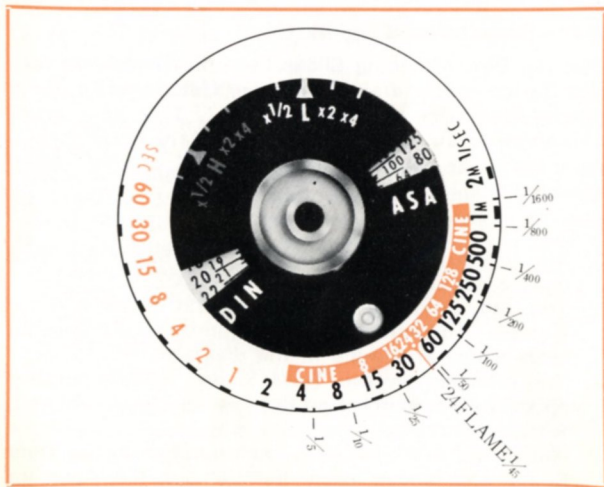
Scale. Every shutter speed and f/stop indicated on the dial is at the exact center of this mark.

The intermediate values, (i.e., the value of the unnumbered divisions) on these scales are shown below.



Intermediate Values for Foot-Candles and red Incident Scale f/stops :

Intermediate Values for Shutter Speeds and Aperture Scale f/stops :



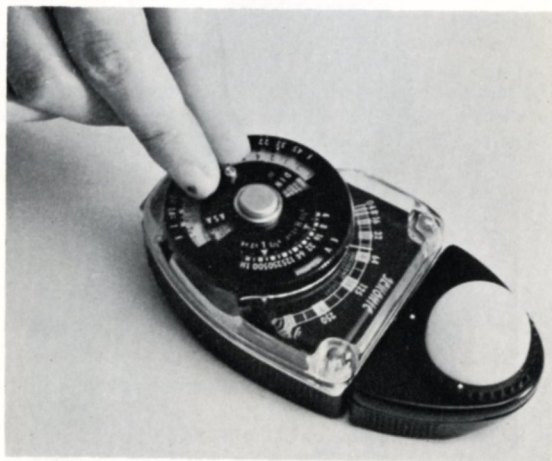
3. How to Operate The Meter

3-1. Foreword

Read carefully Sections 3 and 4 to learn how to operate your Sekonic Studio Deluxe. Complete familiarity will allow you to take advantage of its versatility and professional accuracy.

3-2. Preparation

- (1) Insert Lumisphere into socket, as explained in Section 1-4.
- (2) Turn ASA (or DIN) exposure index dial until the index of the film you are using appears in the window. Every roll of film has its own instruction leaflet indicating its ASA or DIN exposure index.



3-3. Taking the Picture

- (1) Point the Lumisphere **from** the subject **towards** your camera, on a line with the light axis of your camera's lens. (See figure of next page.)



- (2) If the same light falls on your camera as on the subject, the Sekonic Studio Deluxe can be held at the camera position, directed away from the subject. (See figure below.)

Remember that when light on the camera position differs from that on the subject, (e.g., the camera or subject is shaded by trees or buildings) your Studio Deluxe should be held only at the subject.



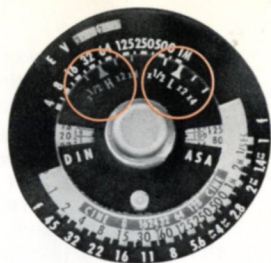
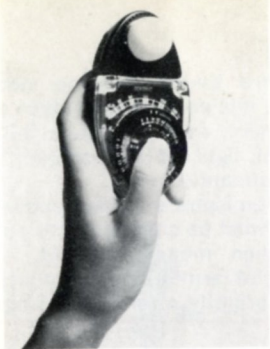
Note 1: When you are taking pictures indoors under artificial lighting, it is necessary to place your meter close to the subject, as indicated in 3-3-(1), because the quantity of light at the subject and camera will differ significantly.

Note 2: Since the Lumisphere is an extremely sensitive to light, you must be careful not to shade it with your hand when measuring light. You should hold the meter at arm's length, especially when wearing light or brightly colored clothing.



3-4. Reading the Meter

- (1) While the Lumisphere is held facing the camera, push the Needle Lock Button which is at the center of the dial. The Indicating Needle will swing and rest at the certain point on the Incident Light (Foot Candle) Scale. Remove your finger from the button to lock the needle. Now you are free to read the foot candle number which the needle has indicated.



- (2) If under bright lights the indicating needle moves past the end of the Incident Light Scale, use the HIGH Slide. This switches the range of the Sekonic Studio Deluxe from low to high illumination. When the HIGH Slide is used, turn the dial until the red "H" mark corresponds exactly to the number (4 to 1 M) indicated by the needle. When the HIGH Slide is **not** used, turn the dial until the white "L" mark corresponds exactly to the number (4 to 1 M) indicated by the needle.
- Note:** In outdoor photography it is advisable to insert the HIGH Slide before taking measurements.

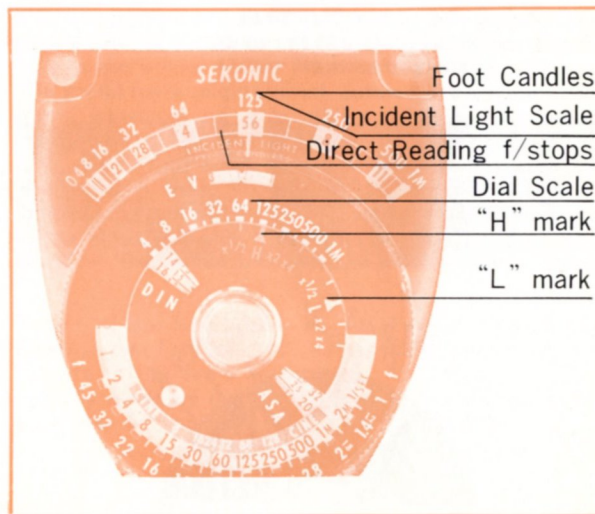


- (3) On the lower half of the dial, and adjacent to each other, you will find all the combinations of shutter speeds and f/stops possible for each exposure. You may set your camera to any f/stop and shutter

speed which are directly opposite each other on the meter. For example, assume you are using the HIGH Slide and a film with ASA index 100. The needle points to 64 on the Incident Light Scale. Set the red "H" mark to 64 on the Dial Scale. Look now at the Aperture and Time Scales below. Correct exposure readings are 1/125 at f8, 1/30 at f16, and so on.



Incident Light Scale & Dial Scale



3-5. Exposure Magnification and Reduction Indexes

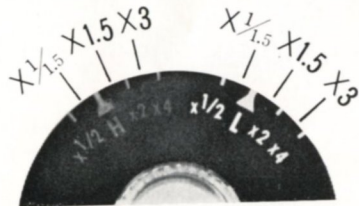
Notice the symbols $\times 1/2$, $\times 2$, and $\times 4$ on both sides of the "H" and "L" marks on the Dial Scale.



These are used for magnifying and reducing exposure. $\times 1/2$ is for reducing exposure time by one-half. $\times 2$ is for doubling the exposure. $\times 4$ is for increasing it four times. With the HIGH Slide in the meter, set the red $\times 1/2$, $\times 2$, or $\times 4$ to the Dial Scale, rather than "H". Without the HIGH Slide, set the white $\times 1/2$, $\times 2$, or $\times 4$ to the Dial Scale, rather than "L".

These indexes are helpful, for example, when filters are required. When using a filter with an exposure index of 2, set the red or white $\times 2$ to the Dial Scale. With an exposure index of 4, set $\times 4$ to the Dial Scale.

Note: The intermediate values of these indexes are given in the figure below. Though they are not marked on the scale itself, you can use them effectively when needed.



3-6. E. V. S. Numbers

E. V. S. means Exposure Value (light value.) It is a number system used occasionally to replace the traditional shutter speed and f/stop combinations.

For cameras equipped with an E. V. S. scale, use the E. V. S. numbers found in the window above and slightly to the left of the Dial Scale. When the dial is set as usual, the proper E. V. S. number will appear.



3-7. Motion Pictures

Measure the light and set the dial as instructed.

Cine speeds ranging from 8 to 128 stops (frames-per-second) are given in the red Cine Scale.

Find the cine speed used by your camera and read the corresponding f/stop on the Aperture Scale.

This is the proper f/stop for your camera.



Note: If the cine speed on your meter falls midway between two f/stops, set the Aperture Scale on your camera in the same way.

The red numbers on the Cine Scale are equivalent to the following shutter speeds on your camera:

8 (stops)	1/15 (second)
16	1/30
24	1/50

32	1/60
64	1/125
128	1/250

Most popular cine cameras use 16 frames-per-second with a shutter speed of 1/30. To find the proper f/stop, read the number on the Aperture Scale which corresponds to 16 on the red Cine Scale.

(You can of course use other exposures for special effects.)

Note 1: Some movie cameras have shorter exposure times.

For example a camera with 16 frames-per-second may have a shutter speed of 1/40.

In the instruction booklet or catalogue that accompanies your camera is a list of the camera's shutter speeds and corresponding f/stops. Study them carefully.

When you know only the aperture angle of a cine camera, compute the shutter speed with the following formula:

$$\begin{array}{l} \text{When: Shutter aperture angle} = \angle \alpha^\circ \\ \text{Frames-per-second} = N \\ \text{Shutter speed} = T \end{array}$$

$$\text{Then: } T = \frac{1}{N} \times \frac{\alpha}{360}$$

For example:

When the aperture angle is $\angle 128^\circ$ and there are 16 frames-per-second, then:

$$T = \frac{1}{16} \times \frac{128}{360} = \frac{1}{45}$$

Since your meter does not indicate a shutter speed of 1/45, you must judge the point which is midway between 1/30 and 1/60. Directly beneath this midpoint is the proper f/stop setting for your camera.

Note 2: The standard camera used by professionals has a shutter speed of 1/50 with 24 frames-per-second. This setting is indicated by a red line beneath the 24 on the Cine Scale.

4. Correct Exposures under Special Conditions

4-1. Portraits

Follow the instructions given in Section 3, with particular attention to 3-3 (Note 1).

Because of its Lumisphere which uses an incident light system, the Sekonic Studio Deluxe is ideal for taking portraits. Details are always clear, even when lights are behind the subject.



4-2. "Short-distance" Landscapes

When photographing scenes which are relatively near, (trees, buildings, etc.), hold Lumisphere as directed in 3-3.

When the subject and camera are struck with different quantities of light, move to where the subject's lighting condition is reproduced and point the Lumisphere towards and on a line with the lens axis of your camera. When only the subject is in shadow, either move the Lumisphere within the shadow or shade the Lumisphere with your hand.



4-3. Distant Landscapes

Photographs of distant landscapes are often hazy and over-exposed due to the influences of the sun. For good, clear photographs take one reading in the normal way with the Lumisphere held at the camera position, away from the scene and a second reading with the Lumisphere pointed directly at the sun. Set the "H" or "L" mark halfway between these two readings.

Note 1: The quickest and easiest way to figure the halfway mark is to find the mid-value of two foot candle which the needle has indicated. Be careful to note the correct mid-values of foot candles. For example, between 250 and 64 foot-candles the mid-value is 125. Between 125 and 64 foot-candles the mid-value is indicated by an unnumbered white line on the Dial Scale. Another method for finding the halfway mark is to set the dial to the two Dial Scale numbers and to note the two shutter speeds. The shutter speeds can then be averaged and an f/stop obtained.

Note 2: People in a landscape must be treated as part of the scenery. They should not be 'read' individually as with portraits.



4-4. Snow Scenes

- (1) Snow pictures taken according to reflected light measurement often fail because the snow magnifies and distorts the reading. This problem does not arise, however, with Sekonic's incident light meter. The reflection factor for fresh snow is 70%. It is 60% for 'city' or old snow. With your Sekonic you compensate for this reflection mathematically and thereby avoid mistakes. You find the shutter speed by regular incident light measurement and increase it by $1/\sqrt{2}$ or $1/2$.

For example:

When the measured shutter speed is $1/125$ at $f 16$,

Then:

$$1/125 \times 1/\sqrt{2} = 1/177 \text{ (1/200) or}$$

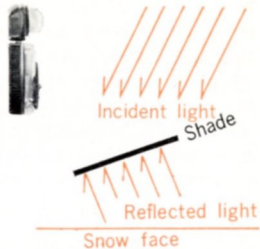
$$1/125 \times 1/2 = 1/250$$



Note 1: Over-exposed pictures lack clarity. It is therefore advisable, when a choice is possible, to use the faster shutter speed.

Note 2: The correction index of $1/\sqrt{2}$ — $1/2$ is based on a standard reflection factor for snow. The index will vary slightly depending on the nature of the snow (clean, dirty, etc.), and you should consider such variations when determining a correct shutter speed.

Note 3: When registering incident light, the sensitive Lumisphere cannot help but pick up some of the extra light reflected from the surface of the snow. It is therefore advisable to shield the Lumisphere from this reflected light.



- (2) When taking pictures under a clouded sky, snow reflected light measurement will give satisfactory results. Place Lumigrid in the socket of the Sekonic Studio Deluxe and direct it slightly downward from the camera position to the subject. The HIGH Slide cannot be used, but be sure to set the "H" mark to the Dial Scale.

4-5. Side and Back-lighted Scenes



In pictures of side or back-lighted scenes, the front of the subject may appear too dark while other parts of the photograph are over-exposed. This, of course, may be your desired effect; but, if not, take two readings, one in the regular way with the Lumisphere directed away from the subject, and another with the Lumisphere directed towards the light source. Use a setting midway between these two readings, as explained in Sec. 4-3. (Note 1).

4-6. Silhouetted Scenes

To silhouette objects (persons, trees, etc.) against a bright sky or sunset, remove the Slide and turn the Lumisphere directly towards the sun, (as if you were using a reflected light meter).

Set the "H" mark to the needle reading, though the Slide is out. Deliberate under-exposure is necessary to record the source of light. Objects in the foreground will be silhouetted.

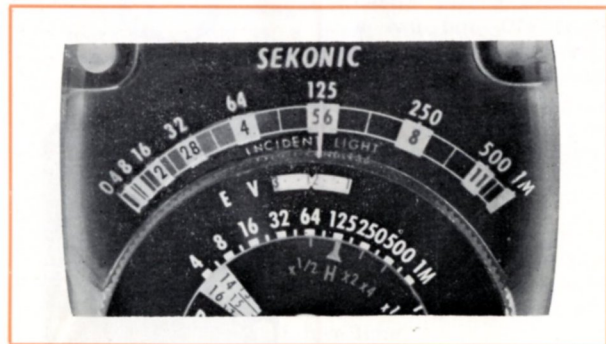


4-7. Direct Reading Method

There are nine different Direct Reading Slides available for the Sekonic Studio Deluxe. They may be used with the Lumisphere or Lumidisk, but not with the Lumigrad. As previously explained, the HIGH Slide can be used not only for high illumination measurement but also for direct readings. The nine Slides, however, are only for direct readings.

HIGH Slide	Shutter Speed
ASA 10 (DIN 11)	T 1/50 (1/60)
Direct Reading Slides	
ASA 25 (DIN 15)	1/30 (1/25)
" 40 (" 17)	1/60 (1/50)
" 50 (" 18)	" (")
" 64 (" 19)	" (")
" 80 (" 20)	" (")
" 100 (" 21)	" (")
" 160 (" 23)	1/125 (1/100)
" 200 (" 24)	1/250 (1/200)
" 400 (" 27)	" (")

Note: Shutter speeds within parentheses are for cameras with only a general shutter speed scale. See the "Direct Reading Scale" section of 2-4 for directions on proper installation and use.



Although there are ten Direct Reading Slides (including the HIGH Slide), each may be used with different film indexes to obtain a variety of shutter speeds. For example, film with ASA 100 used with HIGH Slide (ASA 10) requires a shutter speed of 1/500.

The shutter speed—with which you must set your camera for direct readings—can be calculated from the following formula :

When :

ASA index of a slide = A

Shutter speed of same slide = T

ASA index of film used = A'

Shutter speed of same film = T'

Then :

$$T' = A/A' \times T$$

In the example above, using ASA 100 film with an ASA 10 HIGH Slide, you calculate :

$$10/100 \times 1/50 = 1/500$$

What now would be the shutter speed for a film with ASA 200 when a slide of T 1/60 with ASA 50 is used.

Answer :

$$T' = 50/200 \times 1/60 = 1/240$$

In other words, with an ASA 200 film you may set the shutter speed to 1/240 and use a Direct Reading Slide of ASA 50-1/60.



5. Special Lighting Conditions

5-1. Foreword

For general photography, correct exposure readings can be obtained by following the instructions and examples in Sections 3 and 4. The Sekonic Studio Deluxe, however, is a precision instrument which can be used to obtain special effects under controlled conditions. Section 5 should be studied carefully so that your meter can be used to its full advantage.

(1) Incident Light Measurement.

Incident light measurement is the most accurate, up-to-date method to determine exposure. The Sekonic Studio Deluxe, which has adopted this method, is widely used by professional photographers and motion picture specialists. Unlike reflected meters, it is acclaimed by amateurs and professionals alike as the one meter giving correct exposure readings for both black-and-white and color photography. Flesh tones in portraits are particularly natural with the Sekonic meter, because it receives all incident light just as the subject receives it, and averages the light into one correct exposure. This is a great advantage, as flesh tones in color photography are the first which the untrained eye readily recognizes as either good or bad. Standard reflection of 18% assures perfect tones, and establishes a point of reference from which deviations can be made for special effects.

(2) The Lumidisk

The Lumidisk is indispensable in close-ups, to measure the contrast ratio between main and fill-in lights. The Lumidisk also makes it possible for the photographer to record his lighting ratio and duplicate it at any future time.

5-2. Lighting Contrast Control (Indoors)

Lighting contrast control is necessary in order to measure the main and fill-in lights directed at a subject. When the intensity of these lights is known, the photographer can change and control the ratio between them for whatever effects he wishes to achieve. He can also duplicate this lighting contrast at some future time.

To measure contrast:

- (1) Replace Lumisphere with Lumidisk
- (2) Switch on only the main (key) light
- (3) From the subject position point the Lumidisk directly at the main light, and read out the foot-candles registered on the meter.
- (4) Turn on the fill-in lights, and point the Lumidisk directly at them from the subject position. When measuring the fill-in lights, be sure to shade the Lumidisk from the main light.
- (5) Divide the intensity of the main light by that of the fill-in lights to find the contrast ratio (light balance).

Example:

The main light reads 500

Fill-in lights read 250

Lighting contrast ratio = $\frac{500}{250} = \frac{2}{1}$ or 2 to 1

- (6) If the lighting contrast ratio is not as desired, the fill-in lights must be readjusted.
- (7) When the proper ratio is found, the Lumidisk can be replaced by the Lumisphere. Now the exposure can be determined in the usual way.

Note: In a fully-equipped studio it is suggested that for the best results you keep the lighting contrast ratio between 2 to 1 and 4 to 1.



5-3. Outdoor Contrast Control

Lighting can be measured and controlled outdoors with the same precision as in a studio. The procedure is almost exactly the same.

White or silver-faced reflectors are used to brighten those sides of a subject which are in shadow. Place the Lumidisk in the meter and take a reading when it is directed towards the sun. Now take another reading with the Lumidisk turned towards the reflectors, making certain to shield the Lumidisk with your hand from the direct rays of the sun. You now know the intensity of both lights and can control their ratio by rearranging the reflectors. For best results in color photography, the fill-in light should be from 1/2 to 1/4 that of the main light.

Dramatic black and white effects can be achieved by using a higher ratio, such as having the reflected lights as little as 1/16 the sunlight intensity.

Note: When the needle moves outside the scale (because of bright light) use the HIGH Slide. To obtain foot-candles (light intensity) with the HIGH Slide, the number indicated by the needle must be multiplied by 32, (as explained in 2-3). The lighting contrast ratio can be obtained readily by computing the relative intensity of the main light and the fill-in lights, (as explained in 5-2).

When the proper ratio has been obtained, replace the Lumidisk with the Lumisphere and determine the exposure as usual. Be sure that all the light from the sun and reflectors falls upon the Lumisphere.



Exposure
determination

Keeping the main
light constant, vary-
ing the fill-in light
changes the contrast
ratio of the lighting



1 : 1

2 : 1

4 : 1

8 : 1

16 : 1



5-4. Reflected Light Readings



The Sekonic Studio Deluxe allows one to read exposures not only by its special incident light system but also by the reflected light system offered by standard meters. The Lumigrad is used to take these reflected light readings.

1. When using the Lumigrad it is necessary to remember:

- (1) The Lumigrad should be pointed towards the subject from 4 to 6 inches away.
- (2) No slides can be used.
- (3) The numbers indicated on the Incident Light Scale do not represent foot-candles. (They represent foot-candles only with the Lumisphere or Lumidisk.) The Incident Light Scale in this case is only an index used for finding the proper shutter speed or f/stop.
- (4) All indications must be set to and read at the "H" mark.
You will notice that reflected light measurement with the Lumigrad is possible only when the intensity of the incident light exceeds 125 foot-candles.

2. Mid-point of brightness range
Reflected light measurement is taken to determine the brightness of the subject. The brightness depends on the intensity of the incident light and on the reflection of the subject. Incident light measure-

ment is a method of determining exposure by measuring incident light, assuming that the subject reflects 18% of its incident light.

The effective foot-candles measured by the Lumisphere to determine the correct exposure, determines the mid-point of brightness.

Example: Assume that by regular measurement with the Lumisphere without the Slide, the needle indicates 500 foot-candles. With a film index of ASA 10, the correct exposure is midway between F11 and F16, with a shutter speed of one second. When the "L" mark is set to 500, the "H" mark points to 16. This 16 is the mid-point of brightness range. This means that if a standard 18% reflector is measured with the Lumigrad under the same conditions, the needle will point to 16.

In determining exposure with the Lumisphere or Lumigrad, the "H" mark always indicates the center of the brightness range, regardless of whether the "H" or "L" mark was used in determining the correct exposure.

If the "H" mark is off scale when the "L" mark is set to the needle, the light level is so low that no usable reading can be obtained with the Lumigrad. In other words, reflected light measurement with the Lumigrad is possible only when the intensity of incident light exceeds 125 foot-candles.

3. There are three reasons for choosing the use of reflected light measurement:
 - a. To determine the brightness range of a subject.



- b. To photograph illuminated subjects such as neon signs.
- c. To photograph subjects when you are unable to measure the incident light (Figures in show windows, etc.).

4. To determine the brightness range, install the Lumigrad and direct it about 6 inches from various areas of the subject. Be careful that neither you nor the meter cast a shadow on the area being read, (a 6" diameter circle). Note the various indications on the foot-candle scale, which is a convenient scale for determining range.

Now divide the highest foot candle reading by the lowest to obtain the brightness range of the subject. For example if the brightest area reads 64, and the lowest 4, then:

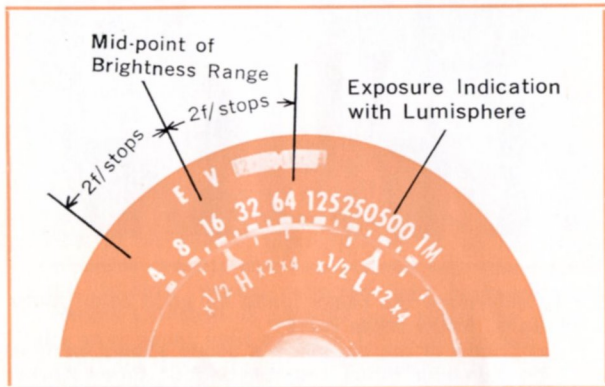
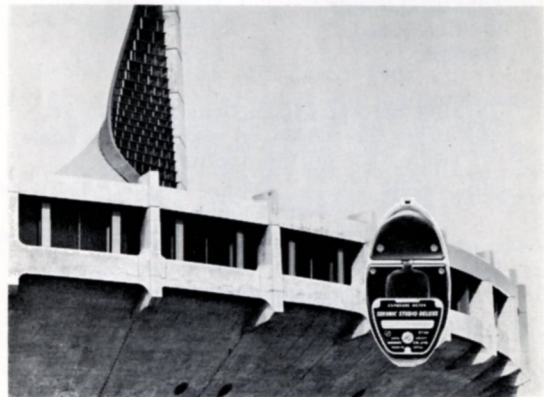
$$\text{Range} = \frac{64}{4} = 16 \text{ to } 1$$



5. To determine the range limits for good color photographs, follow these rules:
 - (a) None of the objects in a scene should be more than four times brighter or four times darker than the mid-point of the brightness range. In other words the foot candle range should not

exceed 16 to 1. If, for example, the mid-point is 16 and the lowest area reads 4, the highest should not exceed 64. ($4 \times 16 = 64$)

- (b) If any area of the subject is too bright to fit within this 16 to 1 range, its color will appear washed-out. Therefore this area should be shaded to reduce the intensity of light upon it.
- (c) If any area of the subject is too dark to fit within this range, more light must be concentrated on it to assure proper coloring.
- (d) On the Sekonic Studio Deluxe two f/stops on either side of the mid-point limit the normal brightness range for color.



6. Special Uses for Lumigrad

When taking photographs of illuminated subjects or of subjects for which an incident light reading cannot be made, the Lumigrad should be used in place of the Lumisphere. (See 5-4-1 for general instructions, and study the pictures above.)

5-5. Modern Lighting Control

The Sekonic Studio Deluxe allows full-lighting control and is therefore the most efficient and accurate meter for indoor movies. Here are the steps recommended to arrange a studio for a motion picture scene. The same general procedure may be followed for still photography.

Required lighting :

Film Index	ASA 16 (DIN 13)
Lens Diaphragm	f/2.8
Shutter Speed	1/50 second
Frames	24-per-second

Step 1 - Finding general light intensity

- Set Sekonic Studio Deluxe to ASA 16
- Bring the red 24 on meter's Cine Scale in line with f/2.8 on the Aperture Scale
- Locate the "L" mark. The corresponding foot-candle reading should be slightly over 500. (650 foot-candles are required for these specified conditions).



Step 2 - Setting the key (or main) light

- Switch on main light and direct it as desired towards the subject.
- Hold the meter at the subject position and point the Lumisphere at the lens of the camera. Do **not** use a slide. Press the needle lock button until Step 3.
- Increase or decrease the intensity of the main light until the indicating needle points to 500. (The fill-in lights, when added, will increase the foot-candle number to the required 650.)

Step 3 - Adjusting lighting contrast

- Replace Lumisphere with Lumidisk.
- Measure intensity of key light. It should measure 500 foot-candles.
- Switch on fill-in lights.
- Adjust the fill-in lights for proper lighting contrast as explained in 5-2. Back lights will have a negligible effect on this ratio.

Note: For a 2 to 1 ratio, fill-in lights should register an intensity of 250.

Step 4 - Adjusting brightness range

- Replace Lumidisk with Lumisphere
- Take a foot-candle reading with the Lumisphere at subject position pointed towards the camera. The reading should be 650 now with all the lights on. If not, vary the key light intensity until it does. This should require a minimum of adjustment.
- Turn "L" mark to 650 foot-candles and read out the foot-candle number corresponding to the "H" mark. (See 5-4-2 for explanation). It will read 20, which is the mid-point brightness of the subject. Since a brightness range of 16 to 1 gives the best results, no object should be brighter than 80 foot-candles ($4 \times$ the mid-point 20) or darker than 5 ($1/4$ of 20).
- Replace Lumisphere with Lumigrad. Measure light and dark areas of the subject to be sure none of them is brighter than 80 or darker than 5.

Step 5 - Finding correct exposure

- The reading obtained with the Lumisphere in Step 4 (b) should now be completely accurate. It should tell you to set your camera at f/2.8 at 1/50 second.

5-6. Closeups

- (1) Whenever the subject is closer to the camera than ten times the focal length of the camera lens, the exposure indicated on the Sekonic Studio Deluxe must be increased. For example, a camera using a 50 mm lens must increase its exposure time for any object closer than 500 mm. This is because a subject is increasingly magnified as it approaches the lens of the camera. When light from the subject is focused into an image on the film through the lens, the following relation exists between illumination on the film's face, brightness of the subject, and magnification of the subject.

Where :

E = illumination of film face

L = brightness of subject

M = magnification of subject

F = F number

π = circular constant

a = constant

$$E = \frac{a \cdot \pi L}{4 \cdot F^2} \cdot \frac{1}{(M+1)^2}$$

From this formula it will be seen that when there is a change in magnification, the brightness (illumination) of the film face changes in inverse proportion to $(M+1)^2$.

In other words, when M is small, or when the distance from the camera to subject is great, the effect on the exposure is minimal.

However, as the distance from subject to object decreases, M increases. $(M+1)^2$ is called the correction index for closeups. See (3) for determining the value of M.

(2) Measuring the Incident Light

- (a) Hold the Sekonic meter as close to the subject as possible and point the Lumisphere towards the camera lens.

- (b) If the main or fill-in lights are very near the subject, the subject should be removed and the Lumisphere held in the exact spot the subject will occupy. The light striking the subject will then be the same as that striking the Lumisphere.

(3) Exposure corrections for closeups

- (a) First determine exposure, as explained in 5-6-2.
(b) Measure the size of the object, and of its image in the lens.
(c) Divide the larger dimension into the smaller. You will thus obtain the magnification (if the image is larger than the subject) or reduction (if image is smaller than the subject).
(d) Find the proper correction factor from the chart on the following page.
(e) Multiply this correction factor by the exposure time indicated on your meter.

TABLE 1 : Exposure Correction for Closeups

(Correction Factor is $(M+1)^2$ where M is the magnification.)

Reduction		Magnification	
Ratio of Object to Image	Correction Factor	Ratio of Object to Image	Correction Factor
20 : 1	1.10	1 : 1	4
19 : 1	1.11	1 : 1.25	5
18 : 1	1.12	1 : 1.50	6
17 : 1	1.12	1 : 1.75	7.5
16 : 1	1.13	1 : 2	9
15 : 1	1.14	1 : 2.25	10.5
14 : 1	1.15	1 : 2.5	12
13 : 1	1.16	1 : 2.75	14
12 : 1	1.17	1 : 3	16
11 : 1	1.19	1 : 3.5	20
10 : 1	1.21	1 : 4	25
9 : 1	1.24	1 : 4.5	30
8 : 1	1.27	1 : 5	36
7 : 1	1.31	1 : 6	49
6 : 1	1.36	1 : 7	64
5 : 1	1.44	1 : 8	81
4.5 : 1	1.50	1 : 9	100
4 : 1	1.56	1 : 10	121
3.5 : 1	1.65	1 : 11	144
3 : 1	1.78	1 : 12	139
2.75 : 1	1.86	1 : 13	146
2.5 : 1	1.96	1 : 14	225
2.25 : 1	2.09	1 : 15	256
2 : 1	2.25	1 : 16	289
1.75 : 1	2.47	1 : 17	324
1.5 : 1	2.78	1 : 18	361
1.25 : 1	3.24	1 : 19	400
1 : 1	4.00	1 : 20	441

5-7. Sunlight-Flash Photography

The simplest and quickest method of accurately balancing sunlight with flash is offered by Sekonic Studio Deluxe. For the first time the same basic method of light balance used by professional studio photographers is applied to flash photography. This method, the most efficient yet devised, accurately controls contrasts between brilliant light and dark shadows.

1. Determine the intensity of the sunlight by directing Lumisphere **from** the subject position **towards** the sun. For example, should reading directed towards the sun with the HIGH Slide indicate 200 foot-candles, the effective foot-candle number is 6400 (200×32).
2. Select a main to fill-in light ratio. A popular one is 4 to 1, (i.e., the fill-in light to have 1/4 light intensity of the main light).
With 6400 effective foot-candles, used in the example above, the fill-ins should register 1600 ($6400 \div 4$) foot-candles.
3. Look down the left column of the flashbulb chart on page 42—45. Locate 1600. Read across to learn the distance the flash must be held from the subject for specified flashbulbs and shutter speeds. For a Press 25 used at a shutter speed of 1/100, the flash lamp must be held 22 1/2 foot from the subject for the proper 4 to 1 sun-to-flash ratio.
4. Camera settings may be obtained by using the light value found in (1).

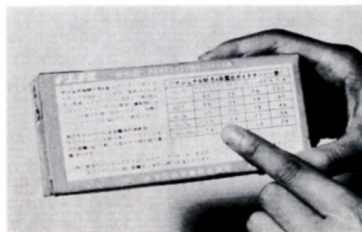


TABLE 2: Distance of flash lamps from subject for correct fill-in ratios (Unit: Foot)

Note: The intensity of light of one lamp at any distance given in the table can be duplicated by using (a) 2 lamps at 1.4 times the distance, (b) 3 lamps at 1 3/4 times the distance, or (c) 4 lamps at twice the distance.

	2			3.50		
	1/25sec.	1/50sec.	1/100sec. & over	1/25sec.	1/50sec.	1/100sec. & over
16,000	8	10	11 1/4	9	12 1/2	17 1/2
13,000	9	11 1/4	12 1/2	10	14	19 2/3
10,000	10	12 1/2	14	11 1/4	16	22
8,000	11 1/4	14	16	12 1/2	18	25
6,500	12 1/2	16	18	14	20	28
5,000	14	18	20	16	22 1/2	31 1/4
4,000	16	20	22 1/2	18	25	35
3,200	18	22 1/2	25	20	28	39
2,500	20	25	28	22 1/2	32	44
2,000	22 1/2	28	32	25	36	50
1,600	25	32	36	28	40	56
1,300	28	36	40	32	45	62 1/2
1,000	32	40	45	36	50	70
800	36	45	50	40	56	79
650	40	50	56	45	64	88
500	45	56	64	50	72	99

TABLE 3:

	0			Press 25 & Press 40		6B-B25
	1/25 sec.	1/50 sec.	1/100sec. & over	1/25 sec.	1/50 sec. & over	150sec. & over
16,000	4	5	5 2/3	5	6 1/3	7
13,000	4 1/2	5 2/3	6 1/3	5 2/3	7	8
10,000	5	6 1/3	7	6 1/3	8	9
8,000	5 2/3	7	8	7	9	10
6,500	6 1/3	8	9	8	10	11 1/4
5,000	7	9	10	9	11 1/4	12 1/2
4,000	8	10	11 1/4	10	12 1/2	14
3,200	9	11 1/4	12 1/2	11 1/4	14	16
2,500	10	12 1/2	14	12 1/2	16	18
2,000	11 1/4	14	16	14	18	20
1,600	12 1/2	16	18	16	20	22 1/2
1,300	14	18	20	18	22 1/2	25
1,000	16	20	22 1/2	20	25	28
800	18	22 1/2	25	22 1/2	28	32
650	20	25	28	25	32	36
500	22 1/2	28	32	28	36	40

TABLE 4:

	6.26		SF		SM		M2B	
	1/25sec. & over	1/50sec. & over	1/25sec.	1/50sec.	1/25sec.	1/50sec.	1/25sec.	1/200sec. & over
16,000	4 1/4	8 1/2	2 1/4	3	3	4 1/2	4 3/4	
13,000	4 2/3	9 1/2	2 1/2	3 1/2	3 1/2	5	5 1/2	
10,000	5 1/3	10 1/2	2 3/4	4	4	5 1/2	6 1/4	
8,000	6	12	3	4 1/3	4 1/3	6 1/4	7	
6,500	6 2/3	13 1/2	3 1/2	5	5	7	7 3/4	
5,000	7 1/2	15	4	5 1/2	5 1/2	7 3/4	8 3/4	
4,000	8 1/3	17	4 1/2	6 1/4	6 1/4	8 3/4	9 3/4	
3,200	9 1/3	19	5	7	7	9 3/4	11	
2,500	10 2/3	21	5 1/2	7 3/4	7 3/4	11	12 1/2	
2,000	12	24	6 1/4	8 3/4	8 3/4	12 1/2	14	
1,600	13 1/3	27	7	9 3/4	9 3/4	14	15 1/2	
1,300	15	30	7 3/4	11	11	15 1/2	17 1/2	
1,000	17	34	8 3/4	12 1/3	12 1/3	17 1/2	18 3/8	
800	19	38	9 3/4	13 3/4	13 3/4	19 3/8	22	
650	21	42	11	15 1/2	15 1/2	22	24	
500	23 1/4	47	12 1/2	17 1/2	17 1/2	25	27 1/2	

TABLE 5:

	11				22				31, 2A						
	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over		
16,000	4%	6%	7 1/4	9	6 3/4	9 3/4	11 3/4	13 1/2	4 3/4	6 1/4	9 3/4	11 3/4	13 1/2	4 3/4	6 1/4
13,000	5 1/4	7 1/2	8%	10 1/2	7 3/4	11	13 1/2	15	5 1/2	7 1/2	11	13 1/2	15	5 1/2	7
10,000	6	8 1/2	9 1/4	11 1/2	8%	12 1/4	14 3/4	16 3/4	6	8 3/4	12 1/4	14 3/4	16 3/4	6	7 3/4
8,000	6%	9 1/2	11	13	9 3/4	13 3/4	16 3/4	19 1/2	6 3/4	8 3/4	13 3/4	16 3/4	19 1/2	6 3/4	8 3/4
6,500	7 1/2	10 1/2	12 1/2	14 1/2	11	15 1/2	18 3/4	21	7 3/4	9 3/4	15 1/2	18 3/4	21	7 3/4	9 3/4
5,000	8 1/2	11 3/4	13 3/4	16 1/2	12 1/4	17 1/2	21	23 3/4	8%	10 3/4	17 1/2	21	23 3/4	8%	11
4,000	9 1/2	13 1/2	15 1/2	18 1/2	13 3/4	19 1/2	23 1/2	26 3/4	9 3/4	12 1/2	19 1/2	23 1/2	26 3/4	9 3/4	12 1/2
3,200	10 1/2	15	17 1/2	20%	15 1/2	21 3/4	26	30	11	14	26	30	34	11	14
2,500	11 3/4	16 3/4	19 1/2	23	17 1/2	24 1/2	29 1/2	33 1/2	12 1/4	15 1/2	24 1/2	29 1/2	33 1/2	12 1/4	15 1/2
2,000	13 1/4	18 3/4	22	26	19 1/2	27 1/2	33 1/2	38 3/4	13 3/4	17 1/2	27 1/2	33 1/2	38 3/4	13 3/4	17 1/2
1,600	14 3/4	21	24 1/2	29	21 3/4	31	37 3/4	42 1/2	15 1/2	19 3/4	31	37 3/4	42 1/2	15 1/2	19 3/4
1,300	16 3/4	23 3/4	27 1/2	32 3/4	24 1/2	34 3/4	42	47 1/2	17 1/2	22	34 3/4	42	47 1/2	17 1/2	22
1,000	18 3/4	26 3/4	31	36 3/4	27 1/2	39	47	53 3/4	19 1/2	24 3/4	39	47	53 3/4	19 1/2	24 3/4
800	21	30	34 3/4	41 1/4	31	43 3/4	53	60	21 3/4	28	43 3/4	53	60	21 3/4	28
650	23 1/2	33 1/2	39	46 1/2	34 3/4	49	58 3/4	67	24 1/2	31	49	58 3/4	67	24 1/2	31
500	26 1/2	37 1/2	44	52	39	55	67 1/2	77 1/2	27 1/2	35	55	67 1/2	77 1/2	27 1/2	35

TABLE 6:

	5B • 25B • M2 • B8				22B • 2B			
	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over	1/25sec. 1/50sec. 1/100sec. & over	1/200sec. & over
16,000	2%	3 3/4	4 1/2	5 1/2	4 1/2	6	7 1/2	8 3/4
13,000	3	4 1/4	5	6	4 3/4	6 3/4	8 1/2	9 3/4
10,000	3 1/2	4 3/4	5 3/4	6 3/4	5 1/2	7 3/4	9 1/2	11
8,000	3 3/4	5 1/2	6 1/4	7 1/2	6	8 3/4	10 1/2	12
6,500	4 1/4	6	7	8 1/2	6 3/4	9 3/4	11 3/4	13 1/2
5,000	4 3/4	6 3/4	8	9 1/2	7 3/4	11	13 1/2	15
4,000	5 1/2	7 1/2	9	10 1/2	8 3/4	12 1/4	14 3/4	16 3/4
3,200	6	8 1/2	10	12	9 3/4	13 3/4	16 3/4	19 1/2
2,500	6%	9 1/2	11 1/4	13 1/2	11	15 1/2	18 3/4	21
2,000	7 1/2	10 3/4	12 1/2	15	12 1/4	17 1/2	21	23 3/4
1,600	8 1/2	12	14	17	13 3/4	19 1/2	23 1/2	26 3/4
1,300	9 1/2	13 1/2	15 3/4	19	15 1/2	21 3/4	26 1/2	30
1,000	10 3/4	15	17 1/2	21	17 1/2	24 1/2	29 1/2	33 1/2
800	12	17	20	24	19 1/2	27 1/2	33 1/2	38 3/4
650	13 1/2	19	22 1/2	27	21 3/4	31	37 3/4	42 1/2
500	15	21	25	30	24 1/2	34 3/4	42	47 1/2

6. Taking Care of Your Sekonic Studio Deluxe

6-1. Zero Setting

Hold the meter upright and cover the Lumisphere with the palm of your hand so as to shut out all the light. The indicating needle should point to zero. If the needle is slightly off, reset the needle to zero by slowly turning - with a coin or perforated slide - the screw on the meter's nameplate, on the back of the meter.



6-2. Slide Slot

Under very bright lighting conditions when the Sekonic meter is used without a slide, a little light may enter through the slide slot. This seldom effects exposure, but for the sake of higher fidelity it is best to shade this slot with your hand.

6-3. Other Precautions

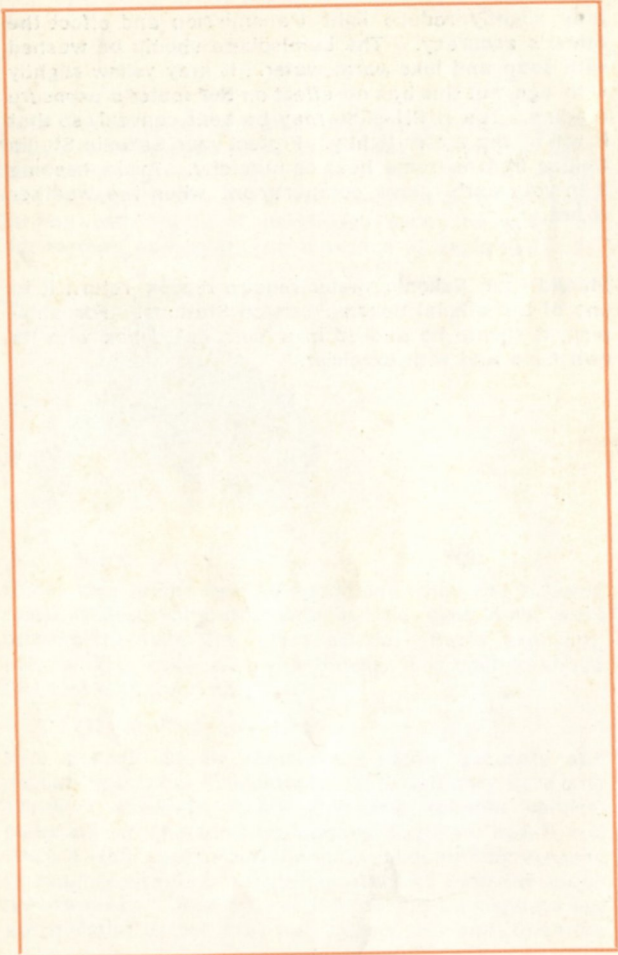
Your Sekonic Studio Deluxe is a highly accurate and delicate electrical instrument. With ordinary care and handling, however, it will give long reliable service. Naturally, it shouldn't be opened or taken apart, and since it isn't shockproof, the meter shouldn't be dropped or roughly handled. It is important to keep the Lumisphere clean. Slight scratches on the Lumisphere are not harmful except that they collect dirt and therefore

may slightly reduce light transmission and effect the meter's accuracy. The Lumisphere should be washed with soap and luke-warm water. It may yellow slightly with age, but this has no effect on the meter's exposure reading. The HIGH Slide may be bent convexly so that it will fit the meter tightly. Protect your Sekonic Studio Deluxe from extreme heat or humidity. Avoid keeping it in your car's glove compartment when the weather is hot.

6-4. Service

Should your Sekonic meter require repair, return it to one of the official Sekonic Service Stations. For shipping, it should be packed in a corrugated box with its own case and with excelsior.

MEMO



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