OPERATING MANUAL
FOR
SUNPAK
RING LIGHT
MODEL 7R

IN MEDICINE ·········

IN SCIENCE ·········

EXTREME CLOSE-UPS IN
OTHER FIELDS ·········
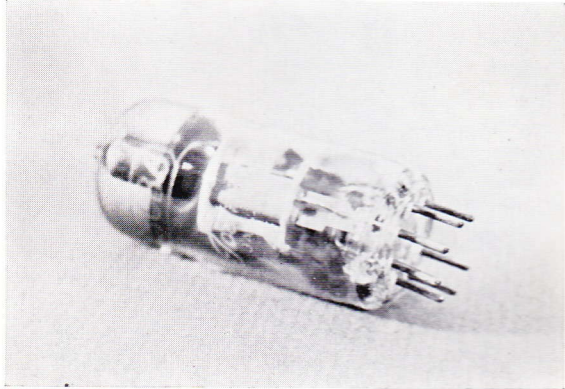
3 DEGREES OF FLASH INTENSITY ★ AUTOMATIC CUT-OUT ★ SAFE AC-DC OPERATION ★ FIRST ON THE MARKET WITH ALL THESE FEATURES ★ IN A MODERN, COMPACT DESIGN ·············
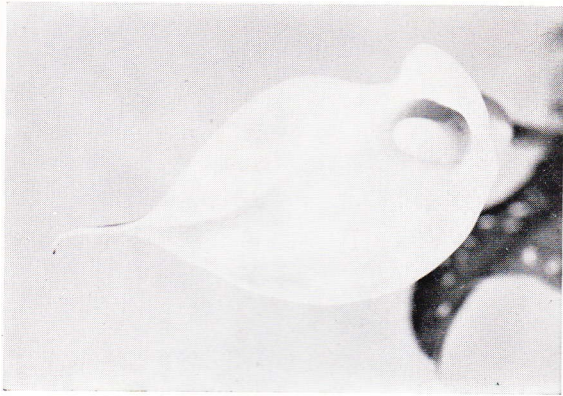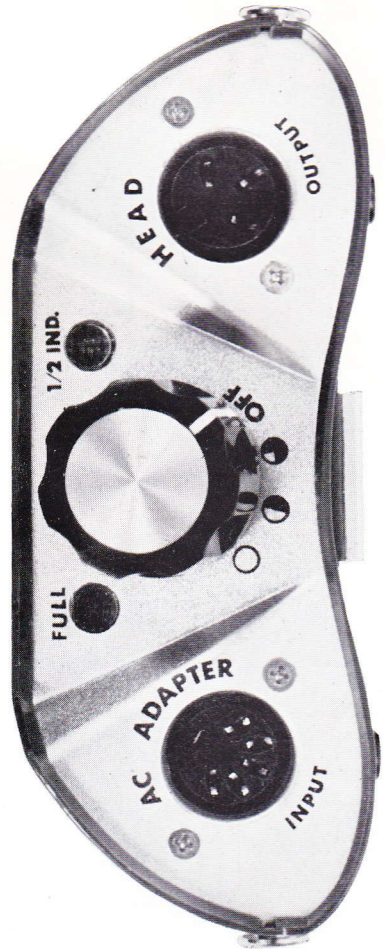
Operating Manual For SUNPAK
Ring Light Model 7R

Ring Flash Head

1. Threaded collar for attaching adapter ring.
   (series ≳7 screw = 54mm diameter, 0.75 pitch)
2. Neon Charge Indicator Lamp
3. Synchro Test Terminal
4. Power Input Plug
5. Synchro Cord
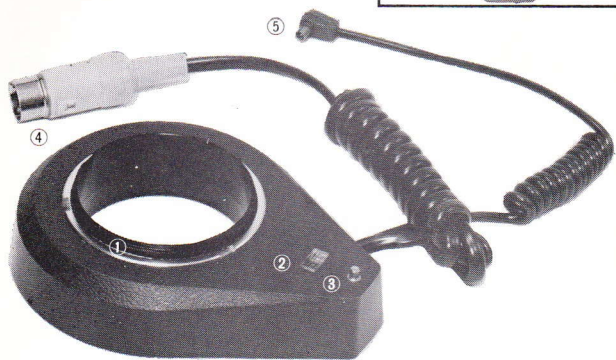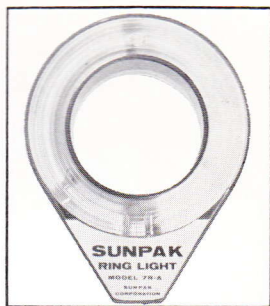
Universal Adapter Ring

1. Adapter Mounting
   Lock
2. Adjustable Mounting
   Cams

AC Adapter

1. AC Input Plug
2. AC Output Plug
3. Pilot Lamp

Power Pack

1. Ring Flash Head Plug
   Output Receptacle
2. AC Adapter Receptacle
3. Flash Intensity Selector
4. Battery Housing

○ Full flash intensity   ◐ ½ flash intensity   ● ¼ flash intensity'

The ring-flash is essential for all extreme close-up photography. The ring-shaped flash tube attached around the camera lens makes it possible to take photographs which are free of detail-hiding shadows.
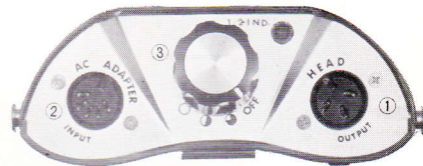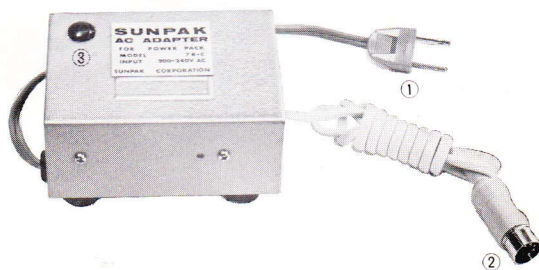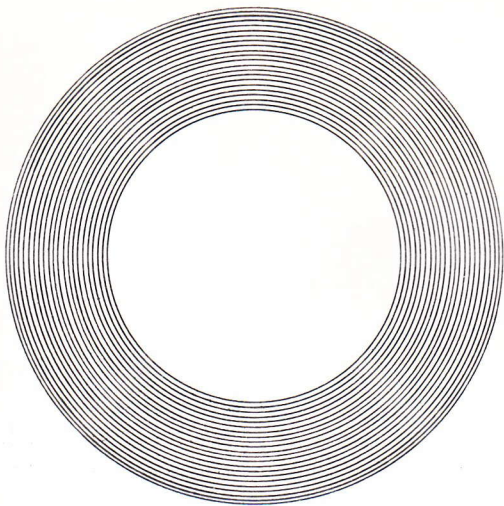
As the light will reach even deep recesses, using cold light of extremely brief duration, the ring-flash is a valuable adjunct in medical photography. Clear, detailed, shadow-free photographs can be taken of the eye, ear, throat or other such normally difficult-to-photograph areas.

Similarly, it has a broad application in science and industry, whereever extreme close-up photography is necessary. ∴

1. Light and compact, its 3 step flash intensity feature (1/4, 1/2 and full intensity) makes the use of an intensity reducing filter unnecessary for extreme close-ups. Used at full intensity, its high Guide Number rating greatly increases the camera-to-subject distance range.

3. Operating on either AC or DC, it is the first of its type to be designed for complete safety of operation. Since its color temperature of 5800°K approximates that of natural daylight, no filters are necessary if used with daylight type color film.

∴ Since the SUNPAK Ring Light can be regulated to three different levels of flash intensity, its scope of application has been widened beyond mere close-up work to include the field of biology as well as general photography.

It is also extremely useful as an auxiliary light in portrait work. The SUNPAK Ring Light is, therefore, far more versatile than any previous ring-flash strobe light.

2. Similarly, being the first ring light strobe with an automatic cut-out feature, the condenser maintains a constant, predetermined charge, eliminating the possibility of under-exposures through insufficient light intensity, while assuring maximum economy in power consumption.

4. Its advanced, compact design, lightweight construction and extreme versatility, makes the SUNPAK Ring Light the finest ring-flash strobo available on the market today.

Adjusting Ring Flash Head

1
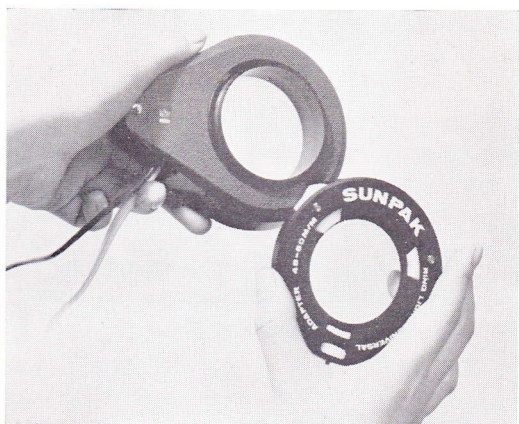
2

3
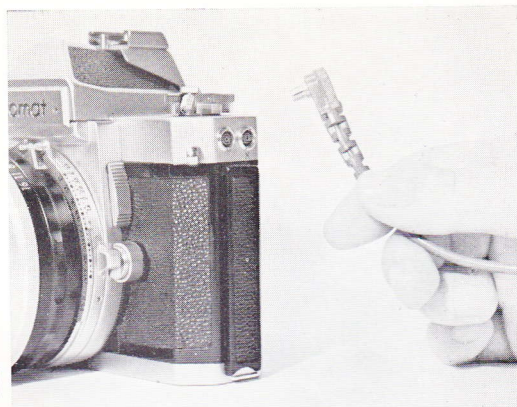
4

1. The Adapter Ring may be adjusted to the diameter of the front rim of the camera lens by rotating the 2 plastic adjusting cams. These cams are adjustable to 5 click-stop settings; 48, 51, 54, 57 and 60. These numbers appear in the apertures on the adapter ring and correspond to the outside diameter, in millimeters, of the front ring of the camera lens.

Mounting the SUNPAK Ring Light on Your Camera

2. After adjusting the Adapter Ring cams to fit the front rim of the camera lens, screw the flash head onto the Adapter Ring.

3. Mount the assembled unit onto the front rim of the camera lens, locking firmly in place by rotating the knurled mounting lock.

4. Connect the synchro cord of the flash head to the X setting of the camera.

If the front rim of the camera has a series 7 screw (54mm diameter, 0.75 pitch) on the inside of the rim, the flash unit may be screwed directly on to the camera, without using the adapter.
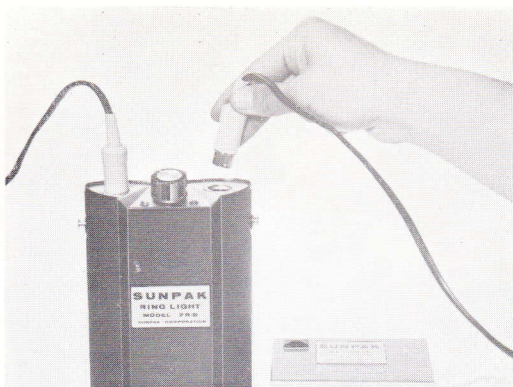
1
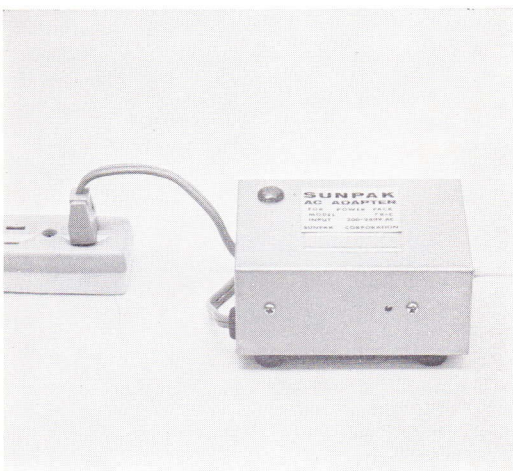
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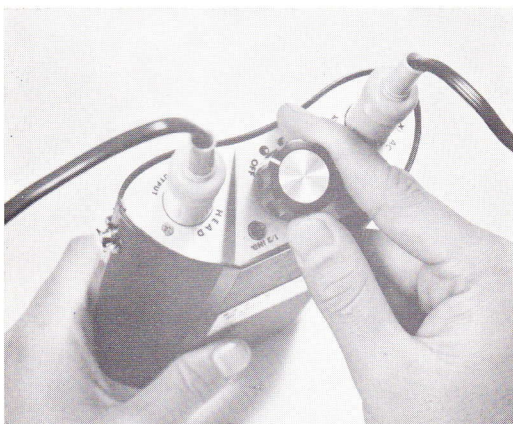
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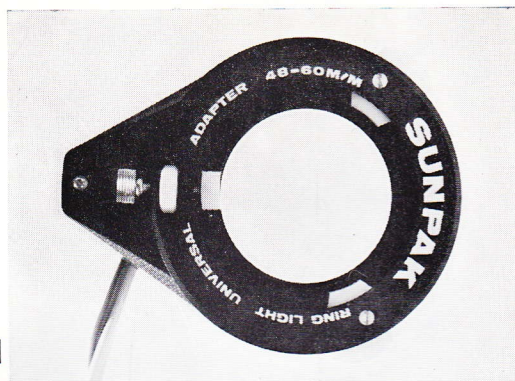
4

1 Connect the flash unit power input plug to the head output receptacle on the power pack. Connect the AC adapter output plug to the AC adapter input receptacle of the power pack.

2 Connect the AC Input plug of the adapter to the AC power source. (The red pilot lamp will light immediately).

3 Select the desired flash intensity by turning the selector to any of three positions:

◑ = ¼ flash intensity (Guide No. 6*)
◐ = ½ flash intensity (Guide No. 8.5*)
○ = Full flash intensity (Guide No. 12*)
  * Using exposure index ASA 25
  (In feet)

4 When the selector is turned to any of the above settings, a tiny, high-pitched sound signal will be heard, indicating a charge is building up in the condenser and the neon charge indicator lamp will light up a few seconds later. After a short interval, the continuous sound signal will become intermittent. The unit is now ready for use.

For the correct shutter speed, aperture setting and flash intensity, refer to "Determining Correct Exposure" on page 15.

DC (Battery) Operation
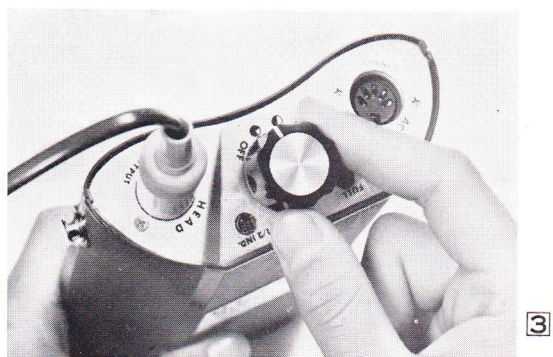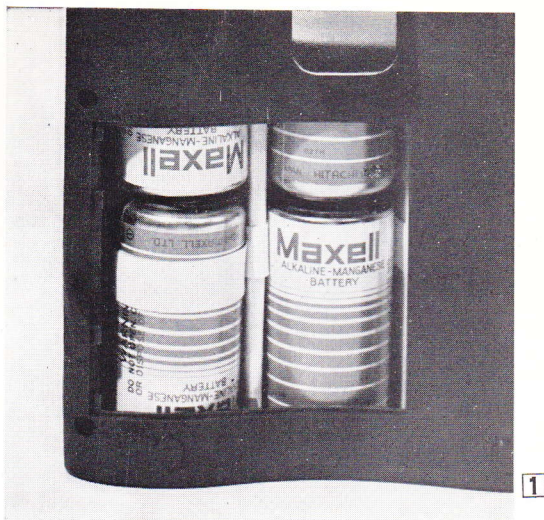
1. For battery operation, the AC input plug must be removed from the input receptacle on the power pack. Open the cover of the battery housing on the back of the power pack and insert 4 C-type dry cells, being careful to orient the plus and minus terminals of the cells correctly by following the diagram inside the housing.

2. Insert the flash unit input plug into the output head receptacle of the power pack.

3. Following the same procedure as in AC operation, turn the flash intensity selector to the desired setting.

4. As in AC operation, a high-pitched sound signal will be emitted by the power pack, followed by the glowing of the neon charge indicator lamp. As soon as the sound signal becomes intermittent, the flash unit is fully charged to the level selected and is ready to be fired at any time.

Always turn the flash intensity selector to the "off" position after use. If left on, the batteries will be exhausted in a day the power pack may be damaged by leaking batteries.

When, after the flash intensity selector is turned on, the sound signal cannot be heard or if the neon charge indicate lamp fails to light within 30 seconds, it is an indication that the batteries are exhausted and should be replaced with fresh cells.

AC⇆DC The SUNPAK Ring Light is designed for use with both AC and DC current. When changing from DC to AC operation, the unit may be used without removing the batteries from the power pack. Switching from AC to DC, or vice versa, may be accomplished simply by connecting or disconnecting the AC adapter.

Flash Ignition Test

Flash ignition should be tested before use. This is done by simply touching the end of the synchro cord to the synchro test termnal after the selector switch is turned on and the neon lamp begins to glow.
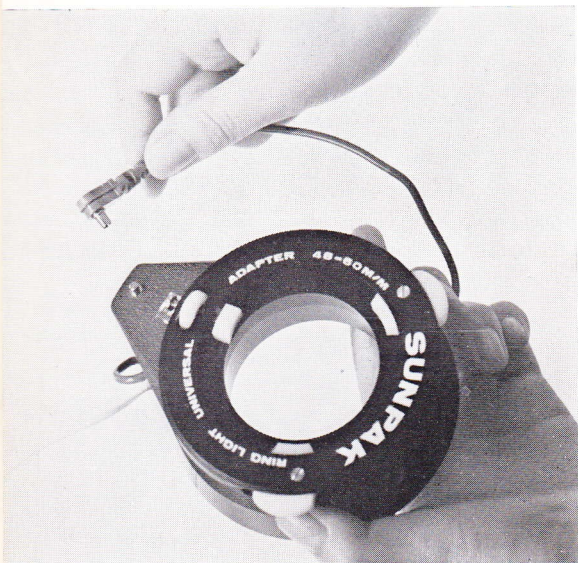
Care of Unit when not in use

After the Ring Light is flashed and the selector switch is turned to the "off" position, the neon charge indicator lamp will continue to glow, indicating the condenser is charged. If the unit is to be stored away, do not discharge the flash. It should be left with the lamp glowing.

If the unit is to be stored for an extended period, it should be taken out and flashed at least once a month.

The unit should be stored in a dry area.

The above precautions are to prevent deterioration of the condenser.

Automatic Cut-Out

Wheh the charge in the power pack condenser reaches the level to which the flash intensity selector is set ($\frac{1}{4}$, $\frac{1}{2}$ or full intensity), the Automatic Cut-Out cuts off the flow of electricity from the batteries to the condenser.

When the charge tn the condenser drops below the selected intensity level because of either normal self-discharge or operation of the flash head, the Automatic Cut-Out immediately permits current from the batteries to feed the condenser so as to bring the charge back up to the selected level.

The sound signal can be heard during charging, stopping when the selected level is reached, resuming whenever the charge drops below the level.

It is obvious, therefore, that the condenser is charged to the maximum of the selected level at the instant the sound signal ceases and the light output will be the most accurate if the unit is flashed at this moment. However, since the variation in light output between the time of the starting and stopping of the sound signal is so negligible, in practice, the photograph may be taken at any time after the round signal ceases.

Neon Charge Indicator Lamp

The Neon Charge Indicator Lamp on the flash head glows when the condenser is $\frac{1}{4}$ charged, so if a $\frac{1}{4}$ flash intensity is desired, the flash may be discharged when the lamp on the flash head glows. If a $\frac{1}{2}$ or full intensity is desired, fire the flash at the moment the neon lamp on the power pack begins to glow.

Carrying the Power Pack

The power pack is designed so that it will fit closely to the body, whether worn hooked over the belt (1) or carried by a shoulder strap (2).
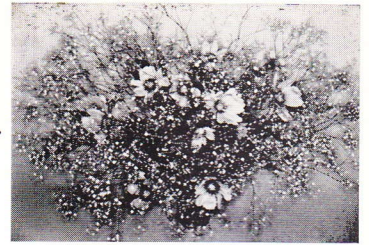
The power pack is provided with a belt clip

①

The shoulder strap provided may be fastened to the power pack by means of the 2 metal studs.

②

1/60 sec.

1/125 sec.
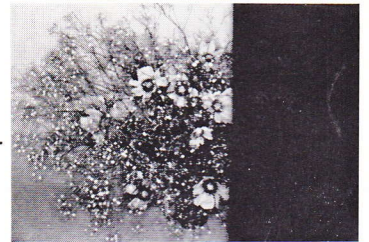
1/250 sec.
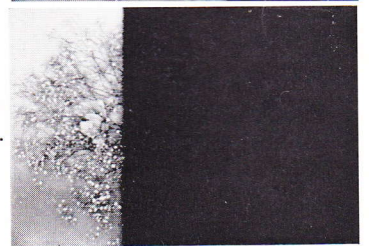
Determining Correct Exposure

SHUTTER SPEED

The strobe flash will synchronize at any shutter speed when used with a lens shutter camera because when the synchro cord is connected to the camera with the X setting, the strobe will flash when the shutter opens to its maximum point and since the flash duration is only 1/1000th of a second.

When used with a focal plane shutter, however, the shutter speed must be set to a speed no faster than 1/60th of a second in order for the strobe to flash at the point of maximum shutter opening.

If synchronized with a faster shutter speed, the shutter will cut off part of the light, resulting in faulty pictures similar to those illustrated above.

Unless the camera manual specifies otherwise, the shutter speed dial shoud be set at the X setting (1/50th – 1/60th second).

However, since, in the case of a square shutter, the strobe will synchronize with the camera up to speeds of 1/125th of a second, it can be seen that the shutter speed settings may vary with the type of camera so the correct setting should be determined after consulting the instruction manual provided with your camera.

Calculating the correct aperture

Since the flash duration of the electronic flash is constant, film exposure can be controlled by varying the size of the aperture. The proper value setting to be used is usually determined by following the Guide Number chart.

If the distance between the strobe light and the subject is over **3 feet**, the (f) setting to be used is found by dividing the Guide Number by the distance, the resulting figure being the (f) number. However, if the distance is very short, **3 feet**, or less, the Guide Number chart for close-up photography is used and if a close-up ring or an extension bellows is used, the difference in the distance from the lens to the film surface must be included in the calculation in order to obtain the correct (f) reading.

The correct (f) value may also be calculated from the image magnification of the subject.

When the distance between the electronic flash and the sudject is over **3 feet**.

The correct Guide Number to use may be found at the juncture formed on the Guide Number chart by the ASA index number of the film used and the intensity to be used.

The Guide Number found is divided be the distance between the electranic flash and the subject, the resultant figure being the correct (f) value to use.

$$[f] = \frac{[GN]}{[feet]}$$

Example :

Guide No. (GN)	=	12
Distance	=	6 ft.
12 ÷ 6	=	2
Therefore : f	=	2

Guide Number Chart

for SUNPAK Ring Lighr Model 7R
giving proper GN for various ASA film speeds (over 3 ft.)

flash intensity \ ASA	25	32	50	64	80	160	400
○ Full flash intensity	12	15	17	21	22	30	48
◐ ½ flash intensity	8.5	11	12	15	17	24	34
● ¼ flash intensity	6	8	8.5	11	12	16	24

(1) By calculating :
   [Close-up ring, (Extension bellows)] + [the distance the lens is extended]

When the distance between the electronic flash and the subject is 3 feet or less, the correct f-value to use is found at the juncture formed on the Guide Number chart [II] by the distance and the flash intensity.

In extreme close-up photography, however, use of a close-up ring or extension bellows or extending the lens outwards will decrease the amount of light striking the film surface so if the (f) value found by usting the Guide Number chart is used as it is, the film will be underexposed. For this reason, [the length of the close-up ring, (extension bellows)] + [the extension distance of the lens] must be caluculated in order to correctly compensate for the (f) value.

(i) Using the Guide Number chart [II] (P-18), the correct (f) value to use is found at the juncture formed by the distance from the electronic flash to the subject and the flash intensity to be used.

(ii) The (f) values in the Guide Number chart [II] are based on an ASA index of 25. If the ASA index of the film to be used is other than 25, the (f) value must be calculated from the ASA index of the film:

   Let GN' be the (f) value

   (In regard to the method of calculation, please refer to "Calculating (f) aperture according to film speed", immediately below the Guide Numder chart [II]).

(iii) Let F be the focal length of the lens

(iv) Let be the length of the close-up ring (or extension bellows) plus the distance the lens is extended.

(v) The correct (f) aperture GN is calculated as follows·

$$GN = GN' \times \left(\frac{F}{F+L}\right)$$

Guide Number Chart 〔II〕

SUNPAK Ring Light Model 7R Guide Number chart for distances of **3 feet** or less, when using ASA **25** film.

	○ Full flash intensity	◐ ½ flash intensity	◕ ¼ flash intensity
3ft	f = 4	f = 2.8	f = 2
2.5ft	5.1	3.6	2.6
2ft	5.6	4	2.8
20in.	7	4.5	3.5
16in.	8	5.6	4
12in.	11	8	5.6
8in.	16	11	8
4in.	29	19	14

Calculating (f) aperture according to film speed

Since the (f) values in the Guide Number Chart 〔II〕 are based on a film ASA index of 25, use of a film with an ASA index other than 25 will necessitate (f) value calculations based on the index used, as follows :

$$(f) \text{value of ASA } x = (f) \text{ value of ASA25} \times \sqrt{\tfrac{x}{25}}$$

Example :

If ASA 100 index film is used at 2 ft., at full intensity, then, according to the Guide Number chart 〔II〕 :
the (f) value at 2 ft., using full flash intensity is 5.6

Then : $5.6 \times \sqrt{\dfrac{100}{25}} = 5.6 \times 2 = 11$

Therefore : f = 11

Let the (f) value be GN' and calculate according to method (1) on Page 16 or method (2) on page 17. However, if the close-up ring (or extension bellows) is not used, the value obtained from the Guide Number chart 〔II〕 may be used without further calculation.

(2) Method of calculating from the magnification :

The ratio of the image size of the subject is the magnification. Calculation of magnification is usually based on the focal length of the lens and the length of the close-up ring (or the extension bellows) the distance the lens is extended.

Since photos are often taken wherein the image size is equal to, ½ or ⅓ the size of the subject, the correct aperture reading may be calculated from the magnification.

(i) Let M be magnification of the image.

(ii) The exposure factor $(1+M)^2$ is calculated from M.

(iii) The correct (f) value to de used is determined by the distance from the electronic flash to the subject and the flash intensity, as shown in the Guide Number chart 〔II〕.

(iv) The (f) values in the Guide Number chart 〔II〕 are based on the ASA index of 25, so if the film used is other than ASA 25, the correct (f) value must be calculated from the ASA index of the film used.

This value will be GN'

(In regard to the method of calculation, please refer to "Calculating (f) aperture according to film speed", immediately below the Guide Number chart 〔II〕).

(v) The correct (f) aperture GN is calculated from GN' the exposure factor $(1+M)^2$

Please refer below to the calculation for the exposure factor in order to obtain the correct (f) value to use.

The (f) values on a camera are indicated by figures such as 4, 5.6, 8, 11, etc. with each smaller figure admitting twice the amount of light as the larger figure adjoining it. Exposure factor = 2, indicates that twice the amount of light is required to obtain the correct exposure.
Therefore, the aperture must be opened a stop larger.
If the exposure factor is ½, the aperture must be set to the next smaller stop.

Example :

If M = 1

Exposure factor = $(1+M)^2$ = 4
If GN' (f) = 11
The (f) value that is 4 times brighter than 11 (11 → 8 → 5.6) is 5.6
Therefore : f = 5.6

Technical Date:

1. Guide Numder - Full Flash Intensity: 12 (ASA 25)
   - ½ Flash Intensity: 8.5 (ASA 25)
   - ¼ Flash Intensity: 6 (ASA 25)

2. Flash Duration: 1/1000 sec.

3. Power Source: (a) Batteries: 4 "C" type dry cells
   - (b) AC supply: 100 - 120 V
   - or   220 — 240 V. fixed

4. Number of flashes: Full Flash Intensity:
   (4 C type dry cells)   40 per fully charged batteries
   - ½ Flash Intensity:
     100 per fully charged batteries
   - ¼ Flash Intensity:
     200 per fully charged batteries

5. Recycling time: (With Manganese "C" cells)

	(With AC)
Full Flash Intensity: 10 - 11 sec.	10 - 12 sec.
½ Flash Intensity: 6 - 7 sec.	7 - 8 sec.
¼ Flash Infensity: 4 - 5 sec	4 - 5 sec.

6. Angle of Illumination: Approximately 100° Vertical and Horizontal

7. Color Temperature: 5,800°K

8. Dimensions: (a) Power Pack: 160 × 105 × 40mm
   - (b) Flash Head: 115 × 90 × 20mm

9. Weight: (a) Power Pack: 350 gr. (without batteries)
   - (b) Flash Head: 100 gr.

10. Adapter Ring: Universal type, fitting range from 48 to 60mm.