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Sunpak Auto Zoom 4000

Congratulations on purchasing a Sunpak! Your Auto Zoom 4000 electronic flash, made by one of the world’s largest manufacturers of precision electronic flash equipment, has been carefully engineered and constructed to give you years of good service. Since this flash is more versatile than other electronic flash units, please take a few minutes to read this Instruction Manual carefully with your Sunpak Auto Zoom 4000 in front of you.
Features of the Auto Zoom 4000

1. Automatic Flash Computer

With the conventional manual electronic flash units, the intensity of the flash cannot be changed and the aperture of the camera has to be adjusted each time the distance to the subject is changed.

With the Auto Zoom 4000, however, a computerized flash unit automatically adjusts the intensity of the flash after you set the camera's aperture. You only need to release the shutter.

An electronic eye catches the light reflected from the subject. When the intensity of this reflected light is adequate for a proper exposure, the computer signals the flash to stop.

- Computer Zoom Aperture

Select your aperture from as many as four different f/stops for computerized photography. Intermediate apertures between f/stops, such as 1/2 or 1/3, can also be used.
2. Variable Guide Number

For manual photography, the world's first guide number selector system allows you to vary the intensity of the flash from a minimum of GN1.8 (ASA 100/m) to a maximum of GN40 (ASA 100/m).

Since the intensity of the flash can easily be changed, aperture operation in macrophotography and daylight photography with synchronized flash is simplified. Diffusing the flash, reducing its intensity by placing handkerchief in front of the flash bulb, cannot produce the same perfect exposure.

3. Patented Series Control Circuitry

Earlier electronic flash computer units discharged unused electricity into a bypass tube. This method consumed much power. In addition, the recycle time and number of flashes showed no improvement over ordinary manual electronic flash units.

The Auto Zoom 4000, however, employs patented series control circuitry which completely cuts off unneeded electricity. Any remaining electricity is stored in a capacitor and used for the next flash. The system shortens charging time and also saves your batteries. When the unit is switched to manual operation, the guide number selector system functions in the same way. Power consumption is improved and recycle time is shortened, too. Its fantastic recycle time also allows the Auto Zoom 4000 to be
synchronized with a motor drive camera. The Auto Zoom 4000 displays its advantages in continuous photography.

4. Ultra High Speed Flash

The guide number selector system makes possible an ultra high speed flash of 1/50,000 of a second at GN1.8, even during manual operation. Now you can capture a balloon as it bursts, or a droplet of water as it falls.

<table>
<thead>
<tr>
<th>ASA 100/m</th>
<th>GN</th>
<th>1/50,000 second</th>
</tr>
</thead>
<tbody>
<tr>
<td>GN 8</td>
<td>1/10,000</td>
<td></td>
</tr>
<tr>
<td>GN 14</td>
<td>1/4000</td>
<td></td>
</tr>
<tr>
<td>GN 32</td>
<td>1/700</td>
<td></td>
</tr>
<tr>
<td>GN 40</td>
<td>1/400</td>
<td></td>
</tr>
</tbody>
</table>

Donated to www.orphancameras.com
5. The Remote Sensor gives you a wide range for bounce light photography.

You can move in as close as 10cm (4 inches) or back up as far as 10 meters (33 feet) and still get perfectly exposed pictures. The Remote Sensor calculates the exact amount of light you need.

**Bounce Lighting**

Since the clamp and bracket of the Autozoom 4000 can be tilted $360^\circ$ both forward and backward, it is very easy to bounce the light off a wall or a ceiling.

i) Push the bracket-attaching-button. Release the bracket from the clamp. Then tilt the Autozoom 4000 to the desired angle.

ii) When photographing with bounce lighting and automatic exposure control (AUTO), be sure to aim the sensor exactly towards the subject. Light intensity changes depending on the surface it bounces off. Consequently, the distance at which AUTO operation can be effective will decrease depending on the way the light bounces.

iii) Only experience with the flash will give you consistently excellent bounce light photography. Since ambient conditions and your subjects are different on each occasion, you should practice under a variety of lighting conditions.
CAUTION

It is recommended that you tilt the unit enough for bounce lighting. If the tilt is insufficient, the upper half of your picture will be overexposed and the lower half will be dark and underexposed.

6. Angle of Illumination

Covers 28mm wide-angle lens. The flash of the Auto Zoom 4000 can illuminate widely without a loss of intensity. A Wide Adaptor is not necessary even when using a 28mm wide-angle lens.

7. Full Intensity at All Times

An automatic pressure regulator lights the green lamp to let you know that power is charged 100%. This new mechanism operates correctly on any power source and completely eliminates changes of light intensity caused by varying house current voltage.

You should release the shutter when the green lamp is on, or when you hear an intermittent sound.

Because of its power source adaptability, the Auto Zoom 4000 can be used safely anywhere in the world.
Flash Preparation

Using "C" Type Alkaline Batteries
(It is better to avoid using ordinary "C" type dry batteries. They are not powerful enough.)

1. Open battery compartment by turning the knob on the cover counterclockwise.
2. Remove battery cartridge and load four "C" type alkaline batteries as shown in the diagram.
3. Close the cover and firmly turn the knob clockwise.
4. Set power switch to BATT. You will hear a faint oscillation. The red lamp will light at 80% of charge. The oscillation will become louder and the green lamp will light. This indicates that full intensity flash has been reached.
5. When the green lamp lights at 100% intensity, the unit is ready to flash. To test, press the flash test button.
6. When you have finished using the unit, switch to AC turning the unit off.
7. When the batteries are worn out, it will take more time to light the neon lamp. If green lamp does not light at all, change the four batteries.
ATTENTION!

To keep the unit in good condition:

i) Always remove batteries after use. If left in the compartment, they will leak and damage the unit.
ii) Store the unit with the neon lamp on.
iii) When the Auto Zoom 4000 is not to be used for a long time, charge it once a month from AC house current.
iv) When the unit has not been used for a long time, charge it first from AC house current until the neon lamp lights. Since the condenser has discharged all power, if you start to operate the unit with batteries, they will wear out quickly.
v) Be careful not to leave the body or the auto-sensor in humid places. Do not let rain or sea water wet them. Also, do not leave them out in direct sunlight.

Do not leave the Sunpak Auto Zoom 4000 inside a car exposed to direct sunlight, nor in your car trunk, particularly in the summer.
Using AC House Current

1. Set the voltage selector (100-120V, 200-240V) on the AC adapter to the voltage of the current you are using.
   To change the voltage selector setting, first remove the screw. After setting the selector, tighten the screw securely.

2. Set the power switch (BATT ↔ AC) to AC. Insert the plug of AC Adapter into the AC receptacle on the body. Then plug the other end of the Adapter into a wall socket.
   When electricity reaches the AC Adapter, its green lamp will light.

3. When charging reaches 80% of flash intensity, the red lamp on the back of the body will light. The green lamp will light when the intensity reaches 100%. Then the unit is ready to flash. To test, press the flash test button.

4. After you have finished using the unit, remove the AC socket from the wall.
Nickel Cadmium Battery Operation

(Optional Equipment)

The Sunpak Autozoom 4000 is designed for use with Nickel-Cadmium batteries. These batteries have the distinct advantage of extremely short recycle time. They can provide up to 100 flashes on a single charge. And Nickel-Cadmium batteries can be recharged repeatedly after use.

1. Place the Ni-Cd batteries into the battery compartment.

2. Move the AC/BATT switch to AC.

3. Insert the Ni-Cd charger plug into the charger receptacle on the unit. (Remember to check the voltage of your AC current.)

4. While charging the batteries, the green indicator lamp on the charger unit will glow. A full charge takes approximately 14 to 16 hours.

WARNING

Do not attempt to charge Zinc-Carbon or regular alkaline batteries. Only rechargeable Ni-Cd batteries may be recharged.
Installing Auto Zoom 4000 on your Camera

1. Snap the bracket connecting stud into the clamp of the flash body with a click.

- Lock the bracket by turning the ring knob of the release button clockwise.
- To detach bracket, turn the ring knob counter-clockwise and pull the bracket out while pressing the release button.

2. To adjust the height of the clamp, loosen the clamp’s screw. After adjusting, tighten the screw.

- The clamp is adjusted so that the optical axis of the electronic flash aims straight at the subject when the flash is attached to the camera. Be especially careful about this when you are shifting the position of the clamp.

3. Place your camera on the bracket and secure it with the camera set screw.
Attaching the Remote Sensor to your Camera

1. Insert the foot of the remote sensor into your camera’s flash mounting shoe.

2. Set the synchro cord.
   The remote sensor has two cords. The synchro cord is the thinner one. Insert the tip of the synchro cord firmly into the synchro terminal of your camera. (Refer to page 43 for Shutter Speed).

3. Set the auto-plug.
   Insert the thick cord of the remote sensor to the auto receptacle of electronic flash. This cord has four pins at its tip.
   • If you wish to use this unit as an ordinary electronic flash, remove the remote sensor and connect the synchro cord to the receptacle on the body. The unit will operate as an ordinary electronic flash with guide number 93 (ASA 50/f).
   • Use the tripod socket to screw the Auto Zoom 4000 to a tripod. You will then be able to light from various positions.

The synchro cord (optional) is available in three different lengths (1m, 3m, 5m).
For Automatic Photography

1. Turn the switch on the Remote Sensor to "Auto" position (red is visible). Your Remote Sensor has two calculator dials. The larger (two color) dial is used for determining lens opening for automatic operation.
2. Set ASA (DIN) speed to match your film by rotating the inner dial until speed is indicated by red triangle.
3. Rotate calculator wheel clockwise until it stops. The triangle outside the wheel indicates the smallest lens opening which may be used (Example: with ASA 50 film, the smallest lens opening is f/8). Now, rotate the calculator wheel counterclockwise until it stops. The triangle outside the wheel now indicates the largest lens opening which may be used (Example: with ASA 50 film, f/2.8).
4. You may shoot at any lens opening (or fractional opening between these minimum and maximum apertures) by setting your lens to the desired aperture and making sure that same aperture number is shown opposite the triangle on your calculator wheel.

The maximum distance at which you can shoot is shown by "effective dist." on the inner calculator disc, opposite the triangle which indicates lens opening. (Example: with ASA 50 film and a lens opening at f/5.6, the maximum for "effective dist." is 5m/17f).

All pictures taken from 0.5m (1.6f) to this maximum distance (5m or 17f in
The exposure range changes according to film speed.

<table>
<thead>
<tr>
<th>ASA</th>
<th>DIN</th>
<th>Kodachrome II</th>
<th>Agfa Pan IFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>23</td>
<td>Ansochrome Panatomic-X</td>
<td>Agfa Pan IF</td>
</tr>
<tr>
<td>100</td>
<td>21</td>
<td>Agfacolor CT18</td>
<td>Ilford Pan F</td>
</tr>
<tr>
<td>64</td>
<td>19</td>
<td>Ektachrome-X</td>
<td>Ektachrome CP</td>
</tr>
<tr>
<td>50</td>
<td>18</td>
<td>Sakura color N</td>
<td>Agfacolor CNS</td>
</tr>
<tr>
<td>40</td>
<td>17</td>
<td>Agfa Pan IF</td>
<td>Kodachrome-X</td>
</tr>
<tr>
<td>32</td>
<td>16</td>
<td>Agfacolor CT18</td>
<td>Ilford Pan F</td>
</tr>
<tr>
<td>25</td>
<td>15</td>
<td>Ektachrome 100</td>
<td>Ansochrome D100</td>
</tr>
<tr>
<td>200</td>
<td>24</td>
<td>Fujicolor N100</td>
<td>Agfa Pan IFF</td>
</tr>
<tr>
<td>200</td>
<td>24</td>
<td>Neopan SSS</td>
<td>Super Pancho Press</td>
</tr>
<tr>
<td>250</td>
<td>25</td>
<td>High Speed Ektachrome EX</td>
<td>TRI-X Pan Pro</td>
</tr>
<tr>
<td>320</td>
<td>26</td>
<td>Kodak Ektachrome</td>
<td>TRI-X Royal Pan</td>
</tr>
<tr>
<td>400</td>
<td>27</td>
<td>Kodak Ektachrome</td>
<td>Kodak Ektachrome</td>
</tr>
</tbody>
</table>

The exposure range changes according to film speed.

- The example will be perfectly exposed by your Sunpak's computer mechanism.
- Now, focus and shoot!
- Your SUNPAK Auto Zoom 4000 will automatically compute the correct volume of light for a perfectly exposed picture.
- For greatest distance range, select the widest available lens opening by turning the calculator wheel counterclockwise until it stops.
- (Example: with a setting of f/2.8 for ASA 50 you can shoot up to 10m (33 ft.).)

The degree of creative control is genuinely remarkable. You can shoot at an in-between (fractional) lens opening such as f/3.5, f/6.3, the precise opening that is needed. With this unique Sunpak system, you will enjoy a total depth-of-field control not found in any other electronic flash system.
For Manual Photography


1. Switch the GN/Auto selector (on Remote Sensor) to GN (so blue is visible).
2. For maximum light output (to shoot at greatest distance), set GN selector to ‘Full’ as shown.
3. Now, referring to the Magic Dial on the back of your flash, set the correct film speed to ‘Full’. (Example: ASA 50).
4. Focus your lens normally; read off the distance shown on the distance scale of your lens. (Example: 5m/17f).
   The lens opening appearing **below** this distance on the GN Magic Dial is the correct lens opening for a picture taken at this distance.
   (Example: correct lens opening with ASA 50 film and subject at 5m/17f is f/5.6).
5. Set your lens to the indicated aperture, and shoot. All photographs taken at this distance will be properly exposed.
II. Manual Operation: Selecting Light Output For Different Lens Openings

Your Sunpak 4000 electronic flash has the unique capability of varying light output duration even when used in its manual mode. This allows you to shoot at wider lens openings, to control depth-of-field, and simultaneously shorten recycling time. This remarkable feature is extremely easy to use:

1. Switch to Auto/GN Selector of the Remote Sensor to GN (so blue is visible).
2. Focus as you normally do, and read off the distance indicated by the distance scale on your lens. (Example: 3m/10f).
3. Set your camera to the desired lens opening. (Example: f/4).
4. Rotate the Magic Dial (on the back of the flash) until the correct distance (3m/10f) appears above the desired lens opening (f/4).
5. The correct GN selector setting is found alongside the ASA speed for the film you are using.
(Example: with ASA 50 film, the GN for f/4 aperture at 3m/10f is 16.) Set this number (16) on the GN Selector dial as shown.

6. Shoot . . . Your Sunpak 4000 will automatically compute the correct volume of light for a perfectly-exposed picture at this distance and lens opening.
In the example, using straight manual exposure (at full power) would have required a lens opening of f/8. Yet your Sunpak would have allowed you to shoot at f/4.

You can shoot at f/2.8, f/2.0 or f/1.4 simply by positioning the number of the desired lens opening under the distance. Then find the GN Selector setting below your film speed and re-set. You may also use any intermediate lens opening (f/3.5, f/4.5, etc.) as well. You have total depth-of-field control with the Sunpak Auto Zoom 4000!

Another feature of this unique light-varying control is the ability to control recycling time even in manual operation. For example, when using the widest lens opening for your film type, recycling time is reduced to an astonishing 0.25 seconds . . . approximately thirty times faster than is possible in maximum-power manual operation.
This is made possible because, unlike conventional thyristor systems, Sunpak's energy-saving system continues to function when the variable power control is employed. This advanced feature -- controlled recycling -- makes the Sunpak 4000 particularly valuable for use with motor-driven cameras.
III. Manual Operation: Synchro/Sun Photography (Fill-In Flash)

Use your Sunpak 4000 electronic flash in outdoor photography. When even careful metering would produce an unbalanced image, the Sunpak 4000 can fill-in your shot, balancing everything perfectly.

Here’s how:
1. Select the highest shutter speed at which your camera is synchronized for electronic flash (‘X’ synch). (Example: 1/60th second).
2. With your camera’s built-in meter (or a separate light meter), determine the correct lens opening at this shutter speed for the brightest part of the scene (usually the background). Set your lens to this opening. (Example: f/11).
3. Now, focus. Turn the Sunpak’s Magic Dial (on the back of the flash) setting the distance (indicated by your lens’ distance scale) to the correct lens opening (the one for which your camera is already set). (Example: 1m/3ft).
4. On the Magic Dial, find the correct GN Selector number below the ASA speed of your film. (At 1m/3ft and f/11, correct number for ASA 50 film is 16). Set this number (16) on the GN selector.
5. Switch the GN/Auto Selector to ‘GN’ (so blue is visible).
6. Shoot . . . your Sunpak 4000 will automatically compute the correct volume of light to fill-in your subject perfectly. And since your lens opening and shutter speed were originally determined for the background light, it will also be perfectly exposed. The possibilities are almost endless: subjects partially in sunlight, partially in shadow; subjects under trees or foliage, a subject indoors gazing through a window and partially unlit. In these and many other situations, your Sunpak 4000 will help you to create strikingly beautiful daylight/synchro photographs.
Shutter Speed

with a lens shutter camera:

If your camera employs a lens shutter marked for “X” synchronization, the Autozoom 4000 can be synchronized at any shutter speed. However, it is recommended that you use speeds of 1/60 of a second or higher. When using shutter speeds lower than 1/60th of a second, light sources other than the flash may affect the exposure of your picture.

with a focal plane shutter camera:

If your 35mm camera employs a horizontal focal plane shutter, the Autozoom 4000 will usually synchronize best with speeds between 1/50-1/60th of a second. In most focal plane shutter cameras, an “X” or “f” mark is inscribed on the shutter dial to indicate the proper shutter speed for synchronization with flash. If you attempt to photograph at speeds higher than the limit marked by “X”, the camera may not properly synchronize the flash and the exposure. Your picture may be unsuccessful (see example).

Some cameras have a lever or switch to adjust to the synchro setting.

However, if your camera employs a vertical focal plane shutter, the Autozoom 4000 will synchronize at a speed of 1/125 of a second.

In all cases, refer to the instruction manual provided with your camera.
Remote Control Auxiliary Lighting
Sunpak Slave Unit

(Optional Equipment)

The Sunpak Slave Unit is a revolutionary wireless multi-flash synchronizer with solar battery power. The solar battery detects the light of the master electronic flash unit, converts the light energy into electrical energy, then perfectly synchronizes the light of an auxiliary electronic flash.

The Slave Unit is astoundingly sensitive — but very tiny. It offers perfect operation even under bright ambient light, up to 1000 lux (typical department store lighting is approximately 600 lux). It has a master flash detecting angle of $120^\circ$ and an effective range of 30 meters. The Slave Unit is provided with a suction cup for easy mounting.

Multiple Lighting with the Sunpak Slave Unit

Multiple lighting can improve your flash photography. Use the Autozoom 4000 as your master light and connect each auxiliary light to a Sunpak Slave Unit. With this system you can synchronize flash perfectly even at 30 meters (100 feet).
Correct Exposure for Multiple Lighting

When using an auxiliary slave light, set your exposure according to the guide number of the master light. If you use two flashes directly aimed at your subject, reduce the aperture by one f/stop from the setting for a single flash.
Specifications

Guide Numbers: 1.8 - 40 (ASA 100/m)
Angle of illumination: 55° (Vertical)
75° (Horizontal) (Permits use of 35mm cameras with 28mm wide angle lenses.)
Flash Duration: 1/50,000 to 1/400 second.

<table>
<thead>
<tr>
<th>GN</th>
<th>1.8</th>
<th>1/50,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1/25,000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1/16,000</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1/10,000</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1/6,000</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1/4,500</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1/3,850</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>1/1,750</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>1/700</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>1/400</td>
<td></td>
</tr>
</tbody>
</table>

F-stop settings:
Exposure index (ASA) f-stops
25  2 - 5.6
50  2.8 - 8
100 4 - 11
200 5.6 - 16
400 8 - 22

Variable between upper and lower f-stops.

Power Sources:
a) Four "C" batteries
b) 510 volts accumulated layer cells battery
   (Eveready's No. 497 or equivalent)
c) AC house current
   100V - 120V  50/60Hz
   200V - 240V  50/60Hz

Recycling Time:

<table>
<thead>
<tr>
<th></th>
<th>Green light (100%)</th>
<th>Red light (80%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni-Cd</td>
<td>5 to 6 sec.</td>
<td>3 to 5 sec.</td>
</tr>
<tr>
<td>Alkaline-Manganese</td>
<td>13 to 15</td>
<td>8 to 10</td>
</tr>
<tr>
<td>510V</td>
<td>1.5 to 2.5</td>
<td>1 to 10</td>
</tr>
<tr>
<td>AC 120V</td>
<td>2 to 4</td>
<td>2 to 5</td>
</tr>
<tr>
<td>AC 240V</td>
<td>7 to 15</td>
<td>5 to 8</td>
</tr>
</tbody>
</table>

(The above recycling times are applicable when unit is fully charged.)

Number of flashes:
Ni-Cd 90 - 1300
Alkaline-Manganese 100 - 2000
510V 110 - 5000

(The smaller number refers to flashes when unit is set to maximum output.
The larger number refers to flashes when unit is set to minimum output.)

Color temperature of flash: Suitable for daylight color film.

Synchronization contact: Standard plug. DIN/ISO standards for flash unit and also for built-in sensor unit.

Mounting: Handle-type 360° rotating double lock mounting clamp for use with 24 x 36mm format camera bracket. (Brownie-type bracket optional.)

Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>Sensor</th>
<th>Flash body</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60x45x20mm</td>
<td>260x98x120mm</td>
</tr>
</tbody>
</table>

Weight:

<table>
<thead>
<tr>
<th></th>
<th>Sensor</th>
<th>Flash body</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>57 grams</td>
<td>930 grams</td>
</tr>
</tbody>
</table>