Nikon

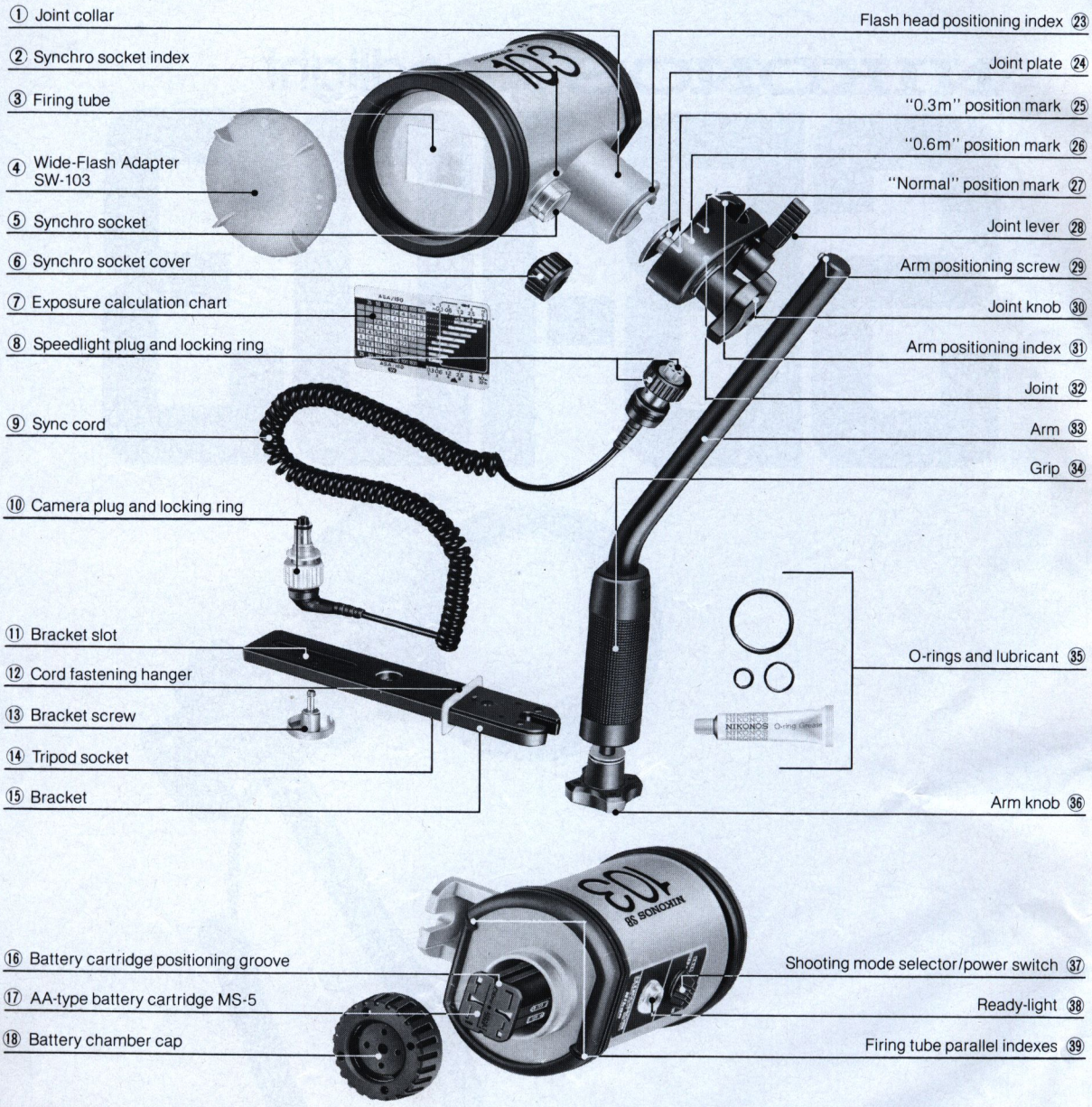
NIKONOS Speedlight

SB-103

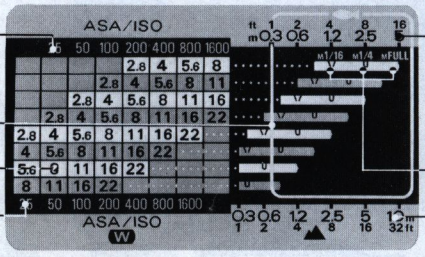
INSTRUCTION MANUAL

E

NOMENCLATURE



Exposure calculation chart



CONTENTS

FOREWORD

The Nikonos Speedlight SB-103, an amphibious high-performance electronic flash unit with a silicon-controlled rectifier and series circuitry, is designed for use with the Nikonos-V, Nikonos IV-A, and Nikonos III. The SB-103 can be submerged to a depth of 50 meters (160 feet) and withstand pressure of up to 6kg/cm² (85 lb/in²), enabling it to be used in environments where regular speedlights could not be taken.

In combination with the Nikonos-V, the SB-103 features automatic through-the-lens (TTL) flash exposure control. This means the silicon photodiode (SPD) in the Nikonos-V's shutter box reads the light passing through the lens and then automatically signals the speedlight to turn itself off when the exposure is correct. Because TTL flash offers a wide range of useable apertures and shooting distances, depth of field is easy to control and shooting as close as 0.3m (1 ft) is possible. Daylight fill-in flash photography becomes easier when using the Nikonos-V.

To enable it to be used with the Nikonos IV-A and Nikonos III, the SB-103 features manual control with three power settings: "MFULL," "M1/4," and "M1/16."

This speedlight has the same area of coverage as a 28mm lens. When the Wide-Flash Adapter SW-103 (provided) is used, the area of coverage increases to that of a 15mm lens.

For multiple flash photography, a double flash bracket and a double sync cord are available as options. In addition, a variety of other optional accessories is available to increase the versatility of the SB-103.

Even though this speedlight is extremely easy to operate, you should still familiarize yourself with the preparatory steps and basic operations explained in the first two sections of this manual. For more detailed information, refer to "CONTROLS IN DETAIL" and "TIPS ON SPEEDLIGHT PHOTOGRAPHY." A few minutes wisely invested now will pay off later in years of rewarding photographic experiences.

PREPARATION

STOP! READ THIS NOTICE BEFORE USING YOUR SB-103. THE O-RING SEALS MUST BE EXAMINED AND LUBRICATED BEFORE USE TO AVOID DAMAGING THE SPEEDLIGHT.

This Nikonos Speedlight SB-103 uses O-rings to seal and waterproof the junctions between parts. Your Nikonos Speedlight SB-103 should not be considered waterproof until you have examined the O-rings (one each for the battery chamber cap ⑱, the sync cord's ⑨ camera and speedlight plugs, and the synchro socket cover ⑥). They must be in perfect, undamaged condition and properly lubricated prior to each use. Read the following instructions thoroughly to familiarize yourself with the maintenance of the O-rings.

Because the outer surface of your Nikonos Speedlight SB-103 has been specially treated to make it waterproof, it must be protected from impact. If it becomes damaged, send it to a qualified technician for service before the next use.

Your Nikonos Speedlight SB-103 is watertight only when in perfectly serviced condition, when all O-ring seals are in perfect condition, and when all components are properly assembled and closed.

Pay special attention to the instructions for installing the O-rings because they are what make the Nikonos Speedlight SB-103 watertight. For the O-rings to perform properly, they must be in perfect condition (with no cuts, tears, or other imperfections) and properly lubricated. If they are not, they will not perform properly and may allow water to enter your flash unit. To prevent the accidental use of a defective O-ring, always discard old O-rings.

The channels into which the O-rings fit must be free of any foreign matter and in their original, smoothly finished condition. If they are not, the O-rings will not seat properly and may allow water to enter your flash unit. If any channel in your Nikonos Speedlight SB-103 becomes damaged, send the unit to a qualified technician for service before the next use.

All of the O-rings in your Nikonos Speedlight SB-103 must be examined at the end of each dive day and, if possible, after each dive.

PREPARATION—continued

Examining and lubricating the O-rings:

1. To remove the O-rings, except the one in the synchro socket cover, grasp the ring between your thumb and forefinger. Pinch your fingers together as you slide them in the direction of the arrow to create slack in the O-ring. Then grasp the slack portion with your other hand and pull the ring off (see Fig. 1).
   To remove the O-ring in the synchro socket cover, use the edge of a credit card or dive card or some thin, **blunt**, instrument. **Never use a knife or other sharp-edged object**. Push up on the center of the cover with a fingertip (or pointed object), insert the card under the ring, and pull it up to lift the O-ring out (see Fig. 2). Do not scratch the O-ring in the process.
2. Visually examine each O-ring for imperfections. If any O-ring is damaged (by tears, cuts, or other imperfections), discard it immediately. If any O-ring has dirt, sand, hair, or foreign matter on it, rinse the O-ring in fresh water to remove it.
3. When lubricating the various parts of your flash unit, **use only the special non-water-soluble silicone lubricant supplied with the speedlight**. Never use other lubricants (such as Vaseline) which are water-soluble.
4. To lubricate the O-rings, smear a small amount of the special silicone lubricant on your fingertips and then gently run each O-ring between your fingertips. Never use a brush or similar object to apply the lubricant; small hairs may fall into the channel and allow water to enter the flash unit. While lubricating each O-ring, examine it with your fingertips for imperfections. If an O-ring is properly lubricated it will glisten and will not have "gobs" of lubricant on it. To ensure the longest possible flash unit life, apply lubricant whenever necessary. Lubrication protects the O-rings from excessive wear; it also makes it easier to attach or remove other parts.
5. Visually examine the channels into which the O-rings fit to determine that each is clean and smooth. If any channel is dirty, clean it with a non-lint-bearing material. Coat each channel with a thin film of lubricant while being careful not to apply too much.
6. Reseat all of the O-rings with your fingertips by inserting one side of the ring into the channel and holding it in position while rolling the other side of the ring into place (see Fig. 3). To insert the O-ring into the channel of the synchro socket cover, push up on the center of the cover with a fingertip (or pointed object), place the ring over the channel, then press it down into place. Check that the O-ring is not twisted and that each of its edges is properly seated (see Fig. 4).
7. Check the surfaces which are opposite the O-rings to determine that each is clean, smooth, and free of foreign matter. Clean and lubricate the surfaces in the same manner as the channels.
8. When reattaching the parts with O-rings, be sure that each O-ring seats properly and securely. All of the O-rings must be properly aligned and not "pinched."

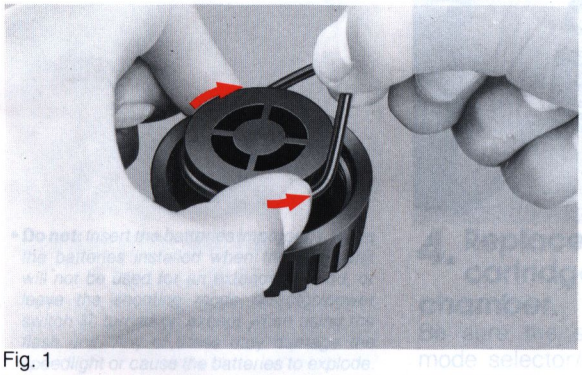


Fig. 1

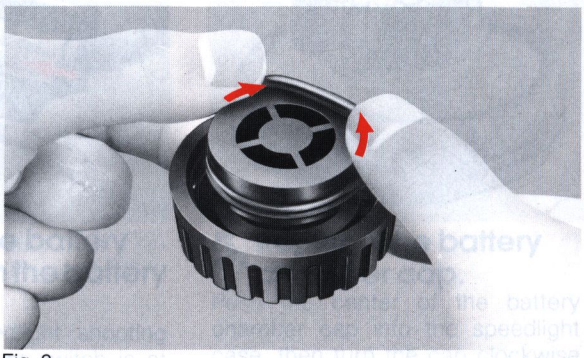


Fig. 3

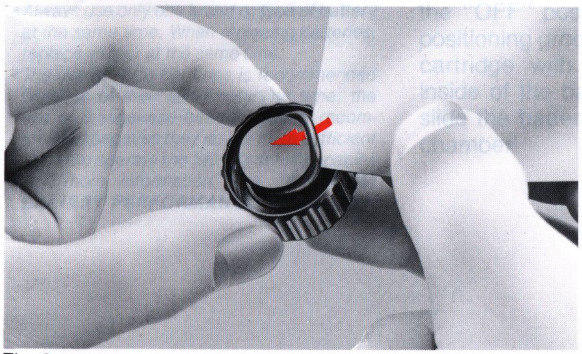


Fig. 2

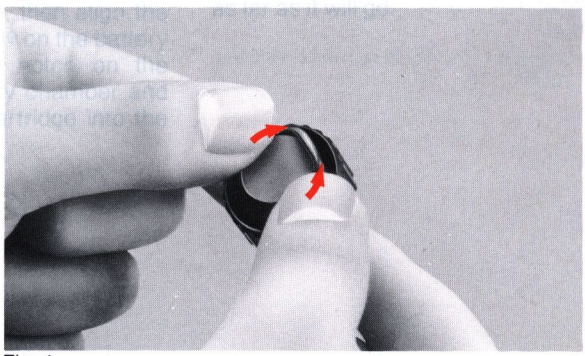


Fig. 4

PREPARATION—continued

The preceding instructions must be performed on each O-ring prior to each dive day and, if possible, prior to each dive. By following these procedures and all other procedures in this instruction manual, you will be able to enjoy using your Nikonos Speedlight SB-103 for many years.

Reminder: An extra set of O-rings and a tube of lubricant are supplied with the flash unit. Additional O-rings and lubricant are available from authorized Nikon dealers and service centers.

The O-rings and their sealing method

The method used by the O-rings to seal and waterproof the flash unit is shown in the following illustrations.

When a low level of pressure exists (for instance, just under the water's surface), each O-ring seals its channel by its own elastic force (see Chart A). When the pressure increases (at greater depths), the O-ring's shape is altered and its sealing ability is increased to withstand the greater pressure. The pressure changes the ring from its original "O" shape (when looking at a cross-sectional view) to a "D" shape (see Chart B).

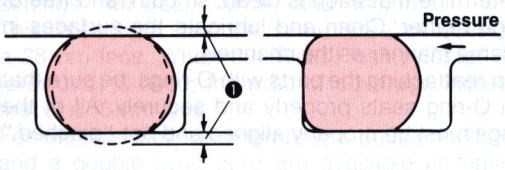


Chart A **Chart B**

❶ **Slight compression**

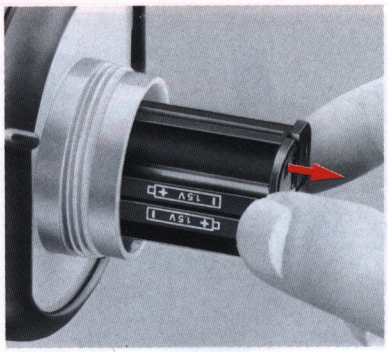
O-ring lubricant

BASIC OPERATIONS

1. Remove the battery chamber cap ⑱.

Turn the battery chamber cap counterclockwise and pull it off the speedlight case.

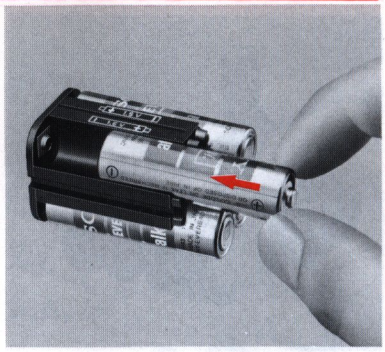
Note: *The small numbers in circles identify parts of the speedlight as listed in the* ***NOMENCLATURE*** *section.*



2. Remove the AA-type battery cartridge ⑰ from the battery chamber.

Turn the speedlight upside down so the battery cartridge slides out of the battery chamber.

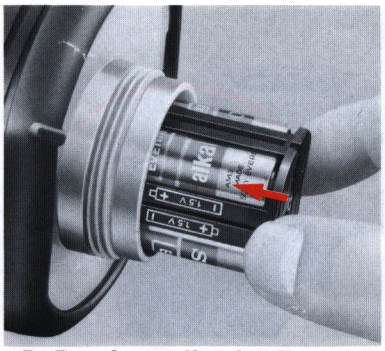
- *If the battery cartridge does not slide out when the speedlight is upside down, shake the speedlight until it does.*



3. Install the batteries.

Install four 1.5V AA-type alkaline-maganese or four 1.2V rechargeable NiCd batteries, making sure the positive and negative (+ and −) terminals are installed as shown in the diagrams on the cartridge.

- ***Do not:*** *Insert the batteries improperly, leave the batteries installed when the flash unit will not be used for an extended period, or leave the shooting mode selector/power switch ㊲ turned on except when using the flash unit. Any of these may damage the speedlight or cause the batteries to explode.*
- *Always use only one brand or type of battery at the same time. When replacing batteries, replace all four at the same time.*
- *The use of NiCd batteries is recommended because of their short recycling time; the use of manganese batteries is not recommended because they do not have sufficient power to operate the SB-103 at full capacity.*
- *For more information, see "* ***OPTIMUM BATTERY PERFORMANCE****" on page 24.*

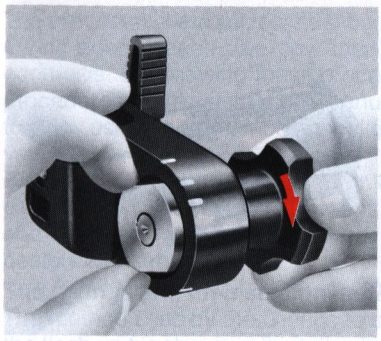


4. Replace the battery cartridge in the battery chamber.

Be sure the speedlight shooting mode selector/power switch is at the "OFF" position, then align the positioning groove ⑯ on the battery cartridge with the notch on the inside of the battery chamber and slide the battery cartridge into the chamber.

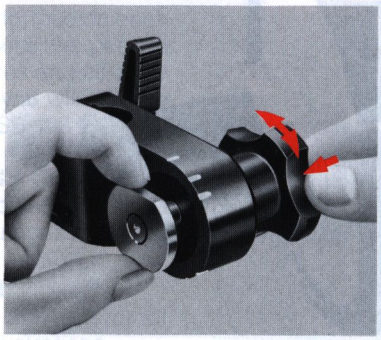
5. Replace the battery chamber cap.

Push the center of the battery chamber cap into the speedlight case, then turn the cap clockwise as far as it will go.



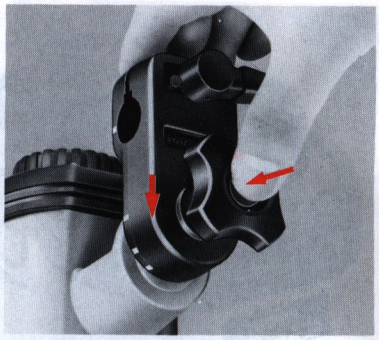
6. Loosen the joint knob ㉚.

To loosen the joint knob, turn it counterclockwise while holding the joint plate ㉔.



7. Properly position the joint plate.

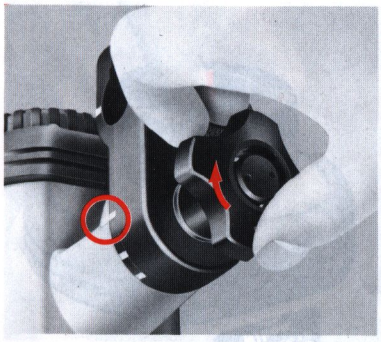
Turn the joint knob so the flat sides of the joint plate are parallel with the flat edges of the joint.



8. Insert the joint plate into the joint collar ①.

While holding the base of the joint knob against the joint, slide the joint plate into the joint collar until it is fully seated.

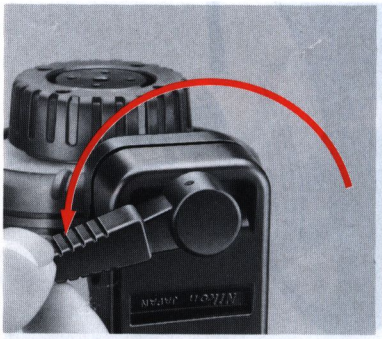
- *When inserting the joint plate into the joint collar, be sure the flat edges of the joint plate remain parallel to the flat edges of the joint.*



9. Lock the joint.

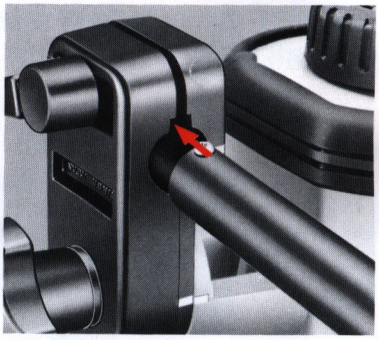
Align the flash head positioning index ㉓ with the "normal" position mark on the flash head positioning scale, then turn the joint knob clockwise until the joint is locked in position.

- *See page 15 for information about removing the joint.*



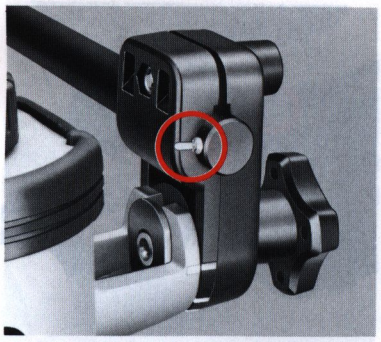
10. Loosen the joint lever ㉘.

Turn the joint lever counterclockwise as far as it will go to loosen it.



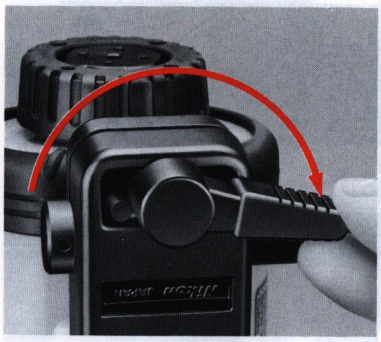
11. Insert the arm ㉝ into the joint.

Insert the arm positioning screw ㉙ into the slot in the joint. The arm can be inserted from either side of the joint. The normal position is shown in the photo.



12. Position the arm.

Align the arm positioning screw with the arm positioning index ㉛ on the joint by turning the arm 90°.

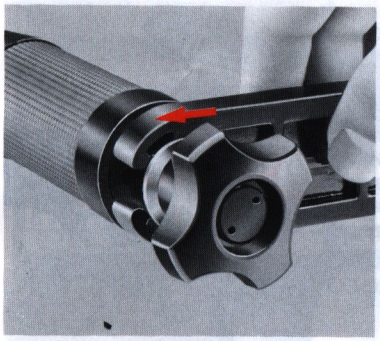


13. Lock the arm.

After aligning the arm positioning screw with the arm positioning index, turn the joint lever clockwise as far as it will go to lock the arm into position.

14. Loosen the arm knob ㊱.

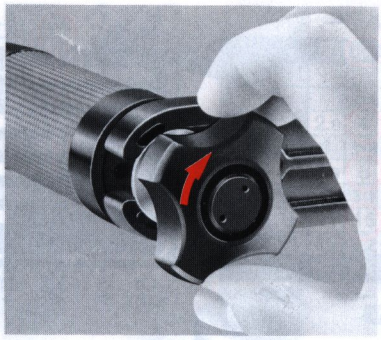
Turn the arm knob counterclockwise as far as it will go to loosen it (the two bracket positioning pins on the bottom of the grip ㉞ will be visible).

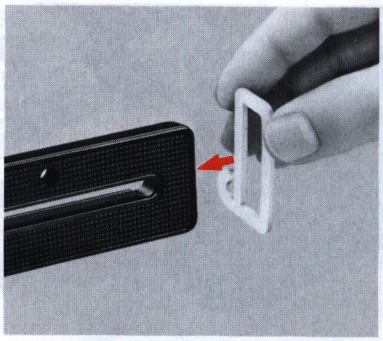


15. Attach the bracket ⑮ to the arm.

Slide the open end of the bracket between the arm knob and the grip, seat the two bracket positioning pins in the two indentations on the bracket, and turn the arm knob clockwise as far as it will go to lock the bracket into position.

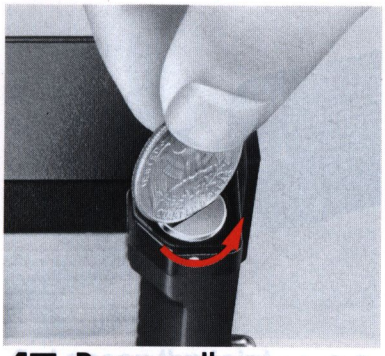
- *The correct arm/bracket position is with the three washers on the underside of the bracket and the rubber side of the bracket facing up.*





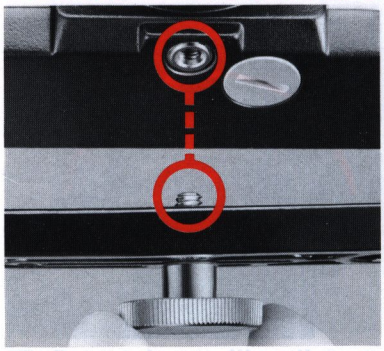
16. Attach the cord fastening hanger ⑫ to the bracket.

As shown in the photo, slide the cord fastening hanger onto the bracket.



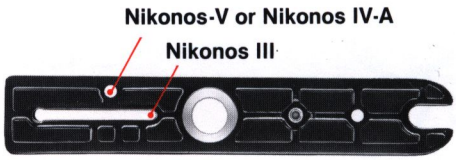
17. Remove the camera's flash sync socket cover.

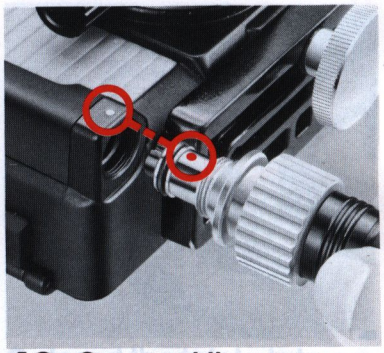
Turn the camera's sync socket cover counterclockwise with a coin to remove it.



18. Attach the camera body to the bracket.

With the camera against the rubber side of the bracket and the camera's tripod socket over the bracket screw, screw the bracket screw into the camera's tripod socket until the camera and bracket are securely attached.

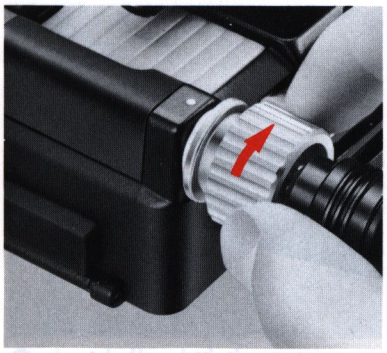


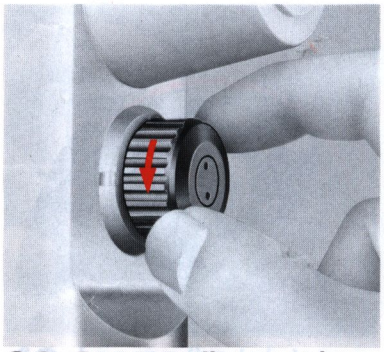


19. Connect the sync cord ⑨ to the camera.

Remove the dust-proof plastic cap from the sync cord's camera plug (silver locking ring). Insert the camera plug in the camera's flash socket after aligning the white index on the flash synchro socket with the red dot on the camera plug. When the camera plug is inserted, turn its locking ring clockwise as far as it will go to secure the plug.

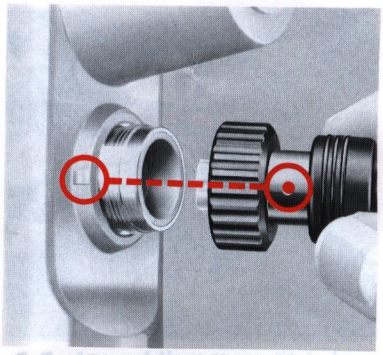
- *Do not apply excessive force to the sync cord's camera plug and, as much as possible, avoid twisting the cord.*





20. Remove the synchro socket cover ⑥.

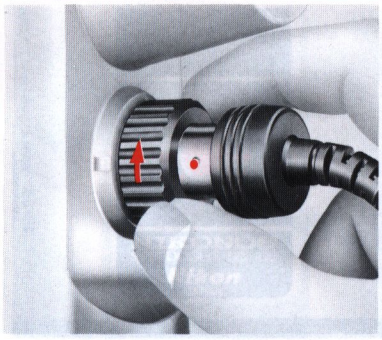
Turn the synchro socket cover counterclockwise, then pull it up.

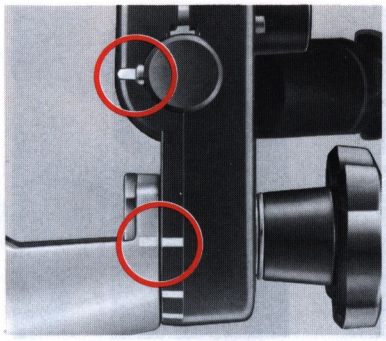


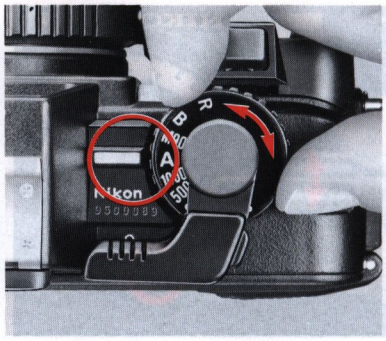
21. Connect the sync cord to the SB-103.

Remove the dust-proof plastic cap from the sync cord's speedlight plug (black locking ring). Insert the speedlight plug into the synchro socket after aligning the synchro socket index ② with the red index on the speedlight plug. When the speedlight plug is inserted, turn its locking ring clockwise as far as it will go to secure the plug.

- *To keep the sync cord out of the way while shooting, attach it to the hook of the cord fastening hanger.*







22. Confirm the position of the flash head.

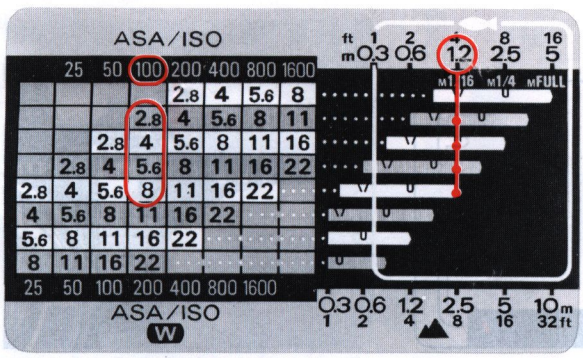
Confirm that the arm positioning screw is aligned with the arm positioning index, the flash head positioning index is aligned with the "normal" position mark on the flash head positioning scale, and the flash head is facing in the same direction as the camera's lens. If the arm positioning screw is not properly aligned, loosen the joint lever to reposition it. If the flash head positioning index is not properly aligned, loosen the joint knob to reposition it.

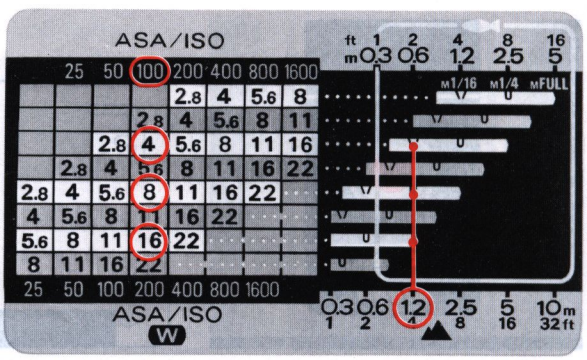
• *See page 15 for information about positioning the flash head for close-up shooting within approximately 1 m (3.3 ft).*

23. Set the shutter speed on the camera.

When using the Nikonos-V, set the shutter speed/mode selector dial to "A" or any shutter speed setting from 1/1000 to 1/125 sec.; when using the Nikonos IV-A, set the shutter speed dial to "A"; when using the Nikonos III, set the shutter speed dial to 1/60 sec.

When using either the Nikonos-V or Nikonos IV-A, the proper synchronization speed (1/90 sec.) will be automatically set when the SB-103's shooting mode selector/power switch is turned on.





24. Select an f/stop from the exposure calculation chart ⑦.

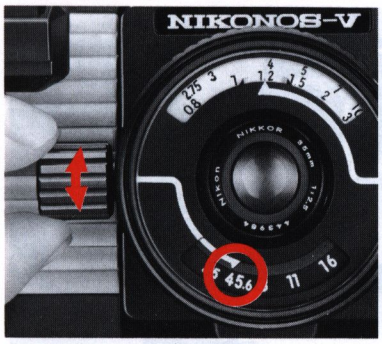
Select an aperture from the range of apertures that can be used at the existing flash-to-subject distance.

TTL flash operation with the Nikonos-V: For example, when shooting a subject underwater at 1.2 m (4.3 ft) without the wide-flash adapter while using ASA/ISO 100 film, the useable aperture range is from f/2.8 to f/8.

Manual flash operation with the Nikonos-V, IV-A, or III: For example, when shooting a subject on land at 1.2 m (4.3 ft) without the wide-flash adapter while using ASA/ISO 100 film, the appropriate f/stop at "MFULL" is f/16, at "M1/4" is f/8, and at "M1/16" is f/4.

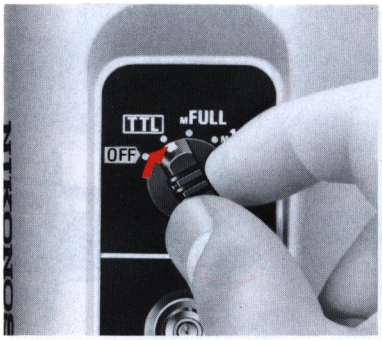
• *The exposure calculation chart is adhesive-backed, enabling it to be attached to the speedlight case.*

BASIC OPERATIONS—continued



25. Set the f/stop on the lens.

For TTL flash operation, select the best aperture from the exposure calculation chart by considering the desired amount of depth of field and recycling time. For manual flash operation, select the best aperture from among those corresponding to the "MFULL," "M1/4," and "M1/16" settings by considering the desired amount of depth of field. In the photograph, f/4 is set.



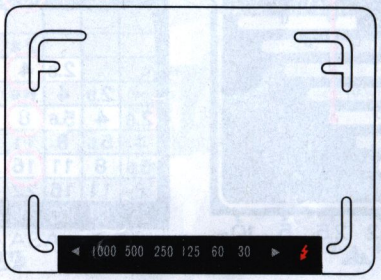
26. Set the shooting mode selector/power switch ㊲.

For TTL flash operation, set the shooting mode selector/power switch to "TTL." For manual flash operation, set it to "MFULL," "M1/4," or "M1/16." Because this switch doubles as a power switch, the SB-103 is turned on whenever the switch is set to other than "OFF."

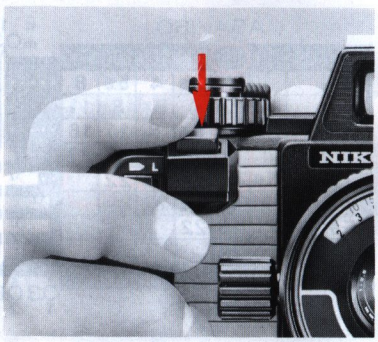
- *TTL automatic flash operation is possible only with the Nikonos-V.*
- *As soon as you turn on the SB-103 when using the Nikonos-V, the shutter speed LED indicator inside the viewfinder will blink if the shutter speed/mode selector dial is set at "A" or at any shutter speed from 1/1000 to 1/30sec. If the selector dial is set at "M90" or "B," no shutter speed indicator will blink or light. As soon as you turn on the SB-103 when using the Nikonos IV-A, the red viewfinder LED turns off.*
- *For information about the various shooting modes, see pages 16 to 17.*

27. Wait for the ready-light ㊳ to light.

As soon as the flash ready-light lights, the SB-103 is ready to fire. Except for Nikonos III, if the camera you are using has a viewfinder ready-light, it will light when the SB-103 is completely recycled. Note that with the Nikonos-V and Nikonos IV-A, the exposure meter must be turned on to activate the viewfinder ready-light.

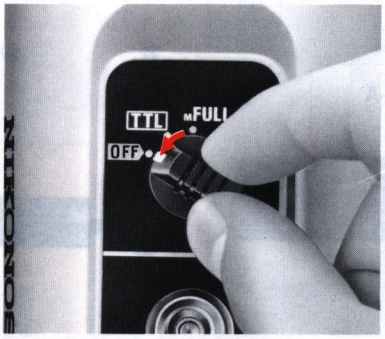


- *With a set of fully recharged NiCd batteries, the ready-light will light in approximately 6 seconds; with a fresh set of alkaline-manganese batteries, it will light in approximately 9 seconds.*
- *If either the SB-103's or the camera's ready-light does not light or blink, check that: the batteries are properly installed, the camera and flash unit are securely connected; and the shutter speed/shooting mode and ASA/ISO film speed setting on the camera are correctly set.*
- *See page 21 for information about ready-light exposure warning information.*



28. Take the picture.

When the shutter is released, the speedlight fires. After a few seconds, the ready-lights inside the camera's viewfinder and on the speedlight will light again to indicate the flash unit is fully recycled and ready for the next shot.

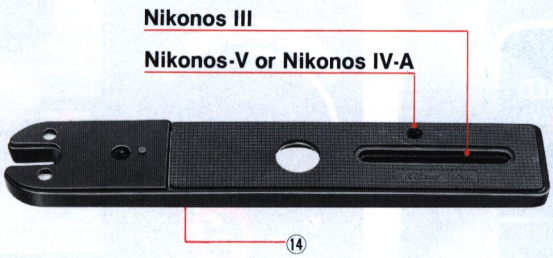


• *If the flash unit fires at its maximum output during TTL flash operation, its ready-light will blink for approximately 2 seconds after the shutter is released to warn that the shot may have been underexposed. In this case, recheck the shooting distance/aperture combination selected or move closer to the subject, if necessary. This warning is also indicated by the viewfinder ready-light of the Nikonos-V.*

29. Turn off the flash unit. To conserve battery power between shooting sessions, turn the shooting mode selector/power switch on the speedlight to "OFF."

• *Turning the shooting mode selector/power switch off between sessions will also help prevent battery leakage.*

CONTROLS IN DETAIL



Bracket ⑮

As indicated in the diagram, there are two positions for the bracket screw ⑬: one for the Nikonos-V and Nikonos IV-A and another for the Nikonos III. To reposition the bracket screw, unscrew it, then screw it back into the hole or the threaded end of the bracket slot ⑪. Once screwed into the bracket slot, the bracket screw can be moved to any position.

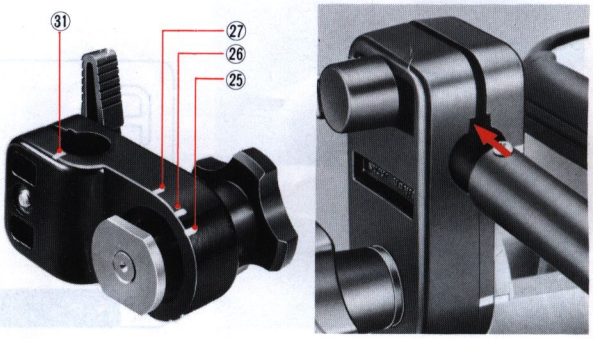
The larger hole in the center allows the sync cord to be connected through the bracket to the Nikonos III.

The small hole on the underside of the bracket is the tripod socket ⑭. The small hole that goes completely through the bracket is not used with the Nikonos SB-103.

Arm ㉝

To attach the arm to the joint ㉜, insert the arm positioning screw ㉙ into the slot in the joint from either side. Align the arm positioning screw with the arm positioning index ㉛ on the joint by turning the arm 90°. After aligning the arm positioning screw with the arm positioning index, turn the joint lever ㉘ clockwise as far as it will go to lock the arm into position. When the arm is attached in this manner, the speedlight's axis will always intersect with the lens's optical axis, even if the flash head is moved up or down on the arm. (Normally, the joint is locked at the top of the arm.) Before diving, be sure the joint knob ㉚ and joint lever are locked tightly.

To attach the arm to the bracket, turn the arm knob ㊱ counterclockwise as far as it will go to loosen it (the two bracket positioning pins on the bottom of the grip ㉞ will be visible). Slide the open end of the bracket between the arm knob and the grip, seat the two bracket positioning pins in the two indentations on the bracket, and turn the arm knob clockwise as far as it will go to lock the bracket into position. The correct arm/bracket position is with the three washers on the underside of the bracket and the rubber side of the bracket facing up.

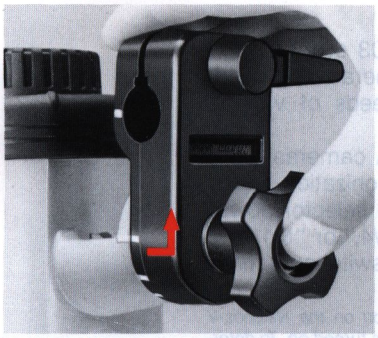


Joint ㉜

The joint connects the arm to the speedlight and allows the flash head to be positioned as required for various shooting situations.

The arm can be inserted from either side of the joint, but to use it in the normal position, insert it as shown in the photo. When using two SB-103 Speedlights (or an SB-103 and an SB-102) and the optional Double Flash Bracket, insert the arm that is next to the camera's film advance lever into the joint from the direction opposite that shown in the photo. (Flash head positioning scales are provided on both sides of the joint.)

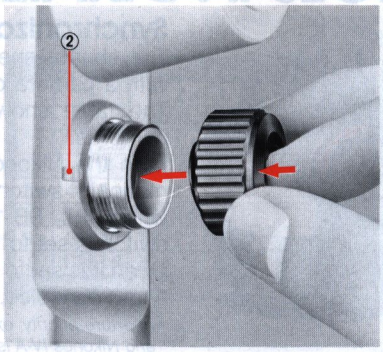
The joint lever allows the flash head to be turned on the arm's axis and moved up or down the arm as required. The joint knob is used to adjust the angle of the flash head (the angle of intersection between the speedlight's axis and the lens's optical axis). The normal angle of the flash head is with the flash head positioning index ㉓ at



To detach

the "normal" positioning mark ㉗ on the flash head positioning scale. The "normal" position is used for shooting between 1 m (3.3 ft) and infinity. For close-up shooting within approximately 1 m (3.3 ft), loosen the joint knob, point the flash head toward the subject, then tighten the joint knob. In addition to the "normal" position mark on the flash head positioning scale, "0.6 m (2 ft)" ㉖ and "0.3 m (1 ft)" ㉕ position marks are provided for use when shooting subjects at these distances. However, when the flash head is not in the "normal" position, the joint must be attached to the top of the arm or the flash head will not be pointed at the subject.

To detach the joint from the speedlight, turn the joint knob counterclockwise and slide the joint plate out of the joint collar while pulling the joint knob.



Synchro Socket ⑤

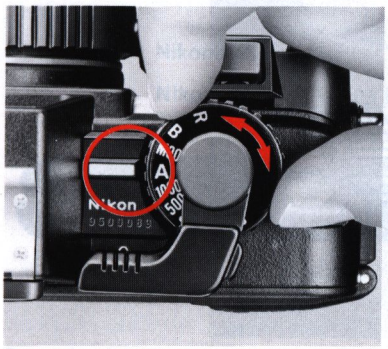
To connect the sync cord ⑨ to the speedlight, remove the synchro socket cover ⑥ by turning it counterclockwise and pulling it up. Remove the dust-proof plastic cap from the sync cord's speedlight plug ⑧ (black locking ring). Insert the speedlight plug into the synchro socket after aligning the synchro socket index ② with the red index on the speedlight plug. When the speedlight plug is inserted, turn its locking ring clockwise as far as it will go to secure the plug.

Never submerge the speedlight in water with the synchro socket cover removed or get the sync cord plugs wet. Always make sure the sync cord plugs are securely attached before entering the water.

After shooting underwater, wipe off any water droplets with a soft cloth **before** removing the plug to prevent water from entering the socket. When not using the sync cord or when washing the speedlight with the speedlight plug removed from the synchro socket, attach the synchro socket cover to protect the socket. To attach the socket cover, press it against the socket to seat the O-ring, then turn its locking ring clockwise as far as it will go.

- *To simplify identification, both the tip of the sync cord's speedlight plug and the inside of the synchro socket are color-coded yellow.*

CONTROLS IN DETAIL—continued



Synchronization Speed

The shutter speed at which the SB-103 synchronizes with a camera depends upon the camera being used. The table shows the flash sync speeds of various cameras.

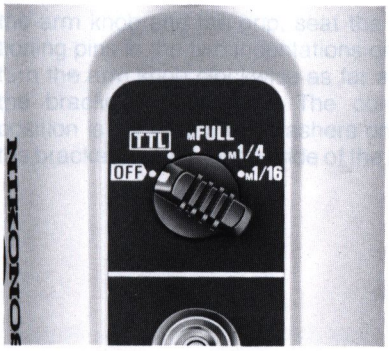
Both the Nikonos-V and Nikonos IV-A cameras automatically switch to the proper synchronization speed when the SB-103's shooting mode selector/power switch is set to "TTL," "MFULL," "M1/4," or "M1/16"; when it is set to "OFF," the automatic switchover function is canceled.

- *Aperture-priority exposure mode ("A") operation on the Nikonos-V and Nikonos IV-A is canceled when the SB-103 is turned on. To determine the correct aperture, use the SB-103's exposure calculation chart (see page 17).*

Camera	Sync Speed	Camera Setting	Operable Shutter Speed	Viewfinder Information	Remarks
Nikonos-V*	1/90 sec. or slower	A	1/90 sec.	Correct shutter speed blinks**	TTL operable
		1/1000 to 1/125 sec.	1/90 sec.		
		1/60 to 1/30 sec.	as set		
		M90 or B	as set	—	TTL inoperable
Nikonos IV-A*	1/90 sec. or slower	A	1/90 sec.	LED does not light	
		M (1/90 sec.) or B	as set	—	
Nikonos III	1/60 sec. or slower	—	as set	—	

** When batteries in the Nikonos-V or Nikonos IV-A are exhausted, reset the Nikonos-V's shutter speed/mode selector dial to M90 (1/90 sec.) or B (Bulb), or the Nikonos IV-A's shutter speed dial to M (1/90 sec.) or B (Bulb). TTL automatic flash control is not possible when the Nikonos-V is in the M90 or B modes.*

*** This indicates the correct shutter speed as determined by the subject's brightness and the aperture setting. Although this is not a speedlight function, it is helpful when using daylight fill-in flash shooting.*



Shooting Mode Selector/Power Switch ㊲

The shooting mode selector/power switch has five click-stop settings. The shooting modes that can be used with specific cameras are listed above.

"OFF" position

The speedlight is turned off when the switch is set at this position.

"TTL" position—TTL (through-the-lens) Automatic Flash Mode

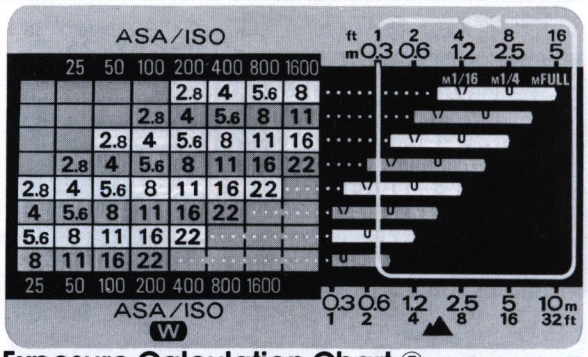
This mode, which can be used only in conjunction with the Nikonos-V camera, automatically controls the flash exposure **Through-The-Lens** (TTL). In this mode, the Nikonos-V's SPD (silicon photodiode) reads the light passing through the lens and automatically signals the SB-103 to turn itself off when the exposure is correct.

The range of useable apertures is larger (from f/2.8 to f/22 when using ASA/ISO 100 film) with TTL flash, and you can easily control the depth of field. In addition, the TTL mode makes daylight fill-in flash and close-up photography easier than ever.

- *The useable film speed range for TTL operation is from ASA/ISO 25 to 400. For information about the apertures that can be used at various film speeds, see page 18.*
- *TTL operation is not possible with the Nikonos IV-A or III or when the Nikonos-V's shutter speed/mode selector dial is set at M90 (1/90sec.) or B (Bulb).*
- *Even if the Nikonos-V's shutter speed/mode selector dial is set at "A" or from 1/30 to 1/1000sec., TTL operation is not possible when: the sync cord is not securely connected, the ASA/ISO film is set beyond ASA/ISO 400, or the batteries are completely exhausted.*
- *In TTL automatic flash operation, the SB-103 emits amounts of light sufficient for subjects having average reflectivity. Therefore, correct exposure may not be obtainable if the subject's reflectivity is extremely low or high.*

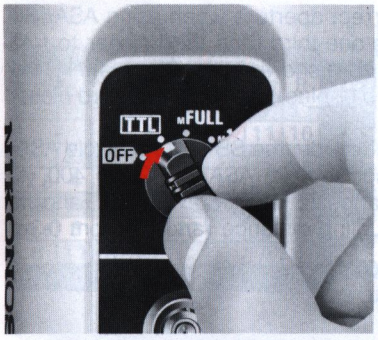
"MFULL," "M1/4," and "M1/16"—Manual Flash Modes

These modes can be used with the Nikonos-V, Nikonos IV-A, and Nikonos III. Manual control is very convenient when the correct exposure cannot be obtained through TTL automatic operation. The SB-103 has three manual control modes for selection according to the flash-to-subject distance and the shooting situation. The guide numbers are GN 20 (10) at the "MFULL" position, GN 10 (5) at "M1/4," and GN 5 (2.5) at "M1/16" when using ASA/ISO 100 film. (The guide numbers in parentheses are for underwater photography). To determine the correct aperture, use the exposure calculation chart or perform the calculations by yourself (see page 19).



Exposure Calculation Chart ⑦

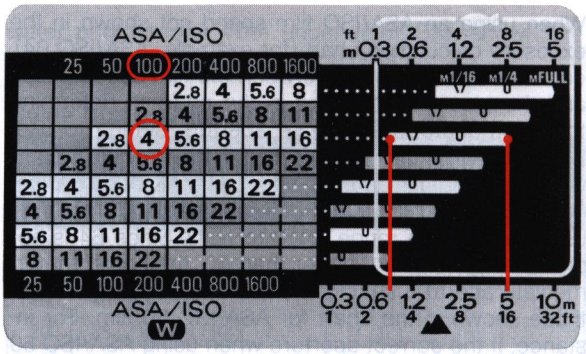
In flash photography, which apertures can be used is closely related to the flash-to-subject distance. To determine the useable apertures, use the exposure calculation chart.



TTL Automatic Flash Control

In TTL automatic flash photography, the useable apertures are from f/2.8 to f/22 (when using ASA/ISO 100 film), although the actual range for a specific shooting situation depends upon the flash-to-subject distance, the ASA/ISO film speed, the type of photography (on-land or underwater), and whether or not the wide-flash adapter is being used.

The actual ranges for specific situations can be easily determined with the exposure calculation chart.



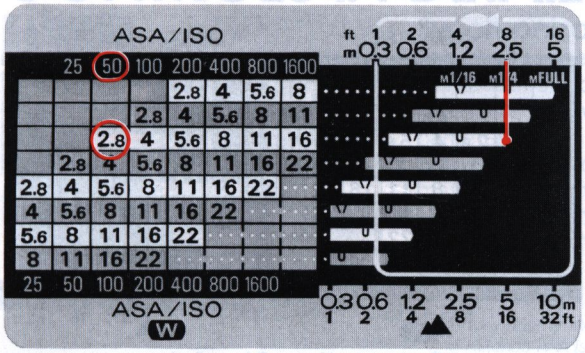
Example 1:

When shooting on land at f/4 without the wide-flash adapter while using ASA/ISO 100 film, you can take pictures of subjects located between 0.9m (3ft) and 5m (16.4ft).

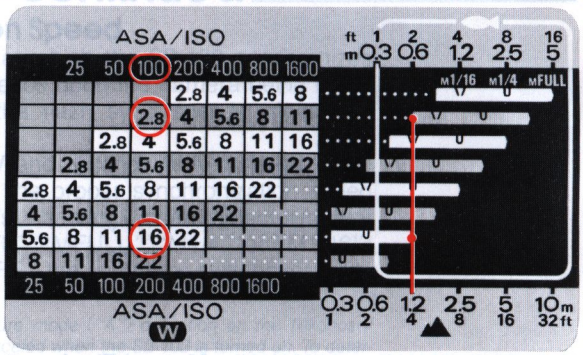
In the same manner, when shooting underwater at f/11 with the wide-flash adapter while using ASA/ISO 400 film, you can shoot subjects located between 0.3m (1ft) and 1.2m (4.3ft).

Before you select an aperture, always take the flash-to-subject distance into consideration. To increase the flash-to-subject coupling distance as much as possible, select a larger f/stop (a numerically smaller f-number). In the opposite case, close-up shooting, select a smaller f/stop (a numerically larger f-number).

CONTROLS IN DETAIL—continued



Example 2:
When shooting underwater at 2.5m (8.2ft) without the wide-flash adapter while using ASA/ISO 50 film, you must use f/2.8.
When several f/stops are useable at a specific flash-to-subject distance, make your selection by taking the desired depth of field and speedlight recycling time into consideration.



Example 3:
When shooting on land at 1.2m (4.3ft) without the wide-flash adapter while using ASA/ISO 100 film and you want the largest depth of field possible, select f/16. If you want to minimize recycling time as much as possible, select f/2.8.
Even though the exposure calculation chart may appear to indicate otherwise, the minimum flash-to-subject coupling distance for underwater photography is 0.3m (1ft).

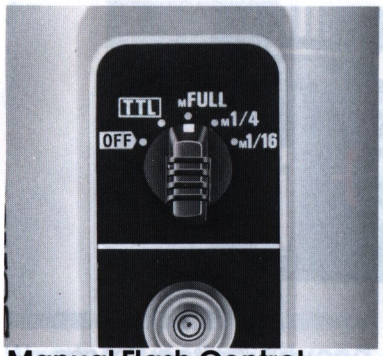
When using an ASA/ISO film speed not shown in the exposure calculation chart (for example, ASA/ISO 64), calculate the difference between the film speed in use and the closest film speed in the chart to determine the appropriate intermediate aperture setting to use. For example, when shooting underwater at 0.3m (1ft) with the wide-flash adapter while using ASA/ISO 64 film, determine the closest film speed (ASA/ISO 50) and its useable aperture range (f/2.8 to f/11). Since 64 is approximately one-third larger than 50, the correct intermediate aperture settings will be one-third larger than those shown in the chart for ASA/ISO 50 film. For instance, if the correct aperture when using ASA/ISO 50 film is f/2.8, the correct aperture when using ASA/ISO 64 film is f/2.8 plus one-third (one third closer to f/4). Likewise, if the aperture shown in the chart is f/11, the correct aperture is f/11 plus one-third (one third closer to f/16).
In the TTL automatic mode, the SB-103's useable ASA/ISO film speed range is from ASA/ISO 25 to 400, its useable aperture range is from f/2.8 to f/22, and its flash-to-subject coupling distance range is from 0.3m (1ft) to 14m (46ft).

TTL Auto Shooting Range

Unit: m (ft)

	ASA/ISO Film Speed					On land Without adapter	On land With adapter	Underwater* Without adapter	Underwater* With adapter
	400	200	100	50	25				
f/stop	2.8	—	—	—	—	2.5 to 14 (8.2 to 46)	1.8 to 10 (5.9 to 33)	1.3 to 7 (4.3 to 23)	0.9 to 5 (3 to 16.4)
	4	2.8	—	—	—	1.8 to 10 (5.9 to 33)	1.3 to 7 (4.3 to 23)	0.9 to 5 (3 to 16.4)	0.6 to 3.5 (2 to 11.5)
	5.6	4	2.8	—	—	1.3 to 7 (4.3 to 23)	0.9 to 5 (3 to 16.4)	0.6 to 3.5 (2 to 11.5)	0.35 to 2.5 (1.1 to 8.2)
	8	5.6	4	2.8	—	0.9 to 5 (3 to 11.4)	0.6 to 3.5 (2 to 11.5)	0.35 to 2.5 (1.1 to 8.2)	0.3 to 1.7 (1 to 5.6)
	11	8	5.6	4	2.8	0.6 to 3.5 (2 to 11.5)	0.35 to 2.5 (1.1 to 8.2)	0.3 to 1.7 (1 to 5.6)	0.3 to 1.2 (1 to 3.9)
	16	11	8	5.6	4	0.35 to 2.5 (1.1 to 8.2)	0.3 to 1.7 (1 to 5.6)	0.3 to 1.2 (1 to 3.9)	0.3 to 0.8 (1 to 2.6)
	22	16	11	8	5.6	0.3 to 1.7 (1 to 5.6)	0.3 to 1.2 (1 to 3.9)	0.3 to 0.8 (1 to 2.6)	0.3 to 0.6 (1 to 2)
	—	22	16	11	8	0.3 to 1.2 (1 to 3.9)	0.3 to 0.8 (1 to 2.6)	0.3 to 0.6 (1 to 2)	0.3 to 0.35 (1 to 1.1)
	—	—	22	16	11	0.3 to 0.8 (1 to 2.6)	0.3 to 0.6 (1 to 2)	0.3 to 0.35 (1 to 1.1)	—

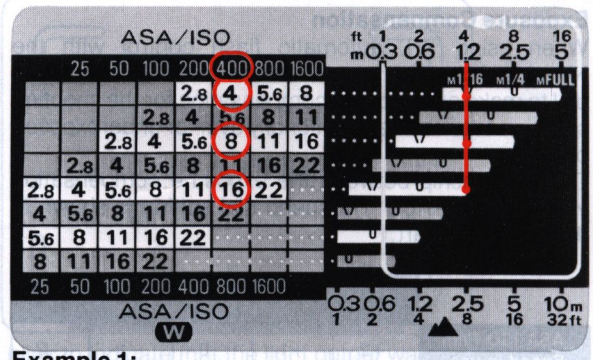
**These figures should only be used as a guide because flash-to-subject coupling distance ranges are affected by the existing conditions (water quality, surroundings, subjects, and so on).*



Manual Flash Control

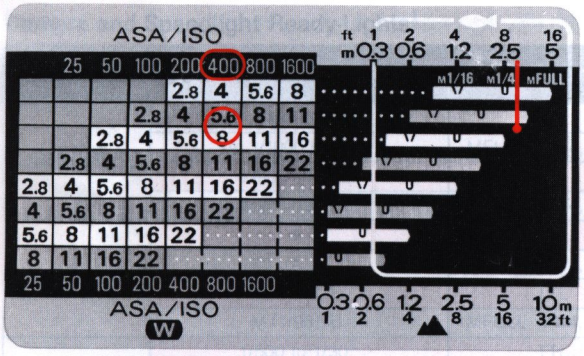
Manual flash operation allows you to control the light output of the SB-103 by setting the shooting mode selector/power switch to one of three positions: "MFULL," "M1/4," or "M1/16."

To determine which setting to use, select an aperture from the exposure calculation chart and set it on the lens. At each intersection of a distance line ⑳ and an aperture line on the aperture scale ㉑, one of four conditions will be present: 1) the distance line will intersect the extreme right-hand edge of the aperture line (the "MFULL" mark), 2) the distance line will intersect a semicircle (the "M1/4" mark), 3) the distance line will intersect a triangle (the "M1/16" mark), or 4) the distance line will intersect an unmarked portion of the f/stop line. The first three conditions indicate the manual flash mode that can be used at those particular f/stops.



Example 1:

When shooting underwater at 1.2m (4.3ft) without using the wide-flash adapter while using ASA/ISO 400 film, you can select one of three aperture/mode settings: f/16 at "MFULL," f/8 at "M1/4," or f/4 at "M1/16."



Example 2:

If the shooting distance changed to 3m (9.8ft) but you still wanted to use "MFULL," you would have to use an intermediate aperture setting between f/5.6 and f/8.

To determine the correct f/stop without using the exposure calculation chart, divide the GN from the chart by the flash-to-subject distance (in meters).

Example 3:

When shooting on land at 5m (16.4ft) without using the wide-flash adapter while using ASA/ISO 100 film and "MFULL": The GN for "MFULL" at ASA/ISO 100 on land is 20 from the chart. Divide the GN of 20 by the flash-to-subject distance of 5m to get the correct aperture, f/4. Because water absorbs a great deal of light, however, you cannot use the same GN underwater as on-land or your shot will be underexposed.

Instead, multiply the on-land GN by 1/2 to 1/3 for underwater photography. (The underwater GNs shown are 1/2 of the corresponding on-land GNs.)

Guide Numbers in the Manual Mode

Film speed (ASA/ ISO)	On-land shooting			Underwater shooting		
	"MFULL"	"M1/4"	"M1/16"	"MFULL"	"M1/4"	"M1/16"
1600	80 (56)	40 (28)	20 (14)	40 (28)	20 (14)	10 (7)
800	56 (40)	28 (20)	14 (10)	28 (20)	14 (10)	7 (5)
400	40 (28)	20 (14)	10 (7)	20 (14)	10 (7)	5 (3.5)
200	28 (20)	14 (10)	7 (5)	14 (10)	7 (5)	3.5 (2.5)
100	20 (14)	10 (7)	5 (3.5)	10 (7)	5 (3.5)	2.5 (1.7)
50	14 (10)	7 (5)	3.5 (2.5)	7 (5)	3.5 (2.5)	1.7 (1.2)
25	10 (7)	5 (3.5)	2.5 (1.7)	5 (3.5)	2.5 (1.7)	1.2 (0.9)

- *The values in parentheses are when the Wide-Flash Adapter SW-103 is being used.*
- *The full amount of light is emitted when the shooting mode selector is at "MFULL."*

CONTROLS IN DETAIL—continued

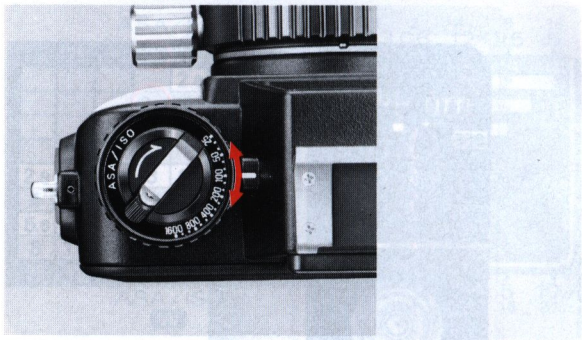
Exposure Compensation

When using TTL automatic flash control with the Nikonos-V camera, you can use its ASA/ISO film speed dial to make an exposure compensation for the shooting situation or to create intentionally over- or underexposed photos.

The relationship between the exposure compensation value and ASA/ISO film speed dial setting is shown in the following chart:

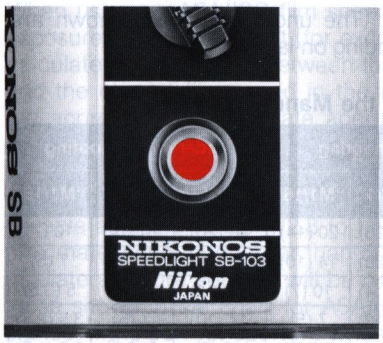
ASA/ISO Film Speed in use	Exposure Compensation Value (New ASA/ISO Setting)				
	+2	+1	0	−1	−2
25	—	—	25	50	100
50	—	25	50	100	200
100	25	50	100	200	400
200	50	100	200	400	—
400	100	200	400	—	—

The useable aperture range and flash-to-subject coupling distance range for TTL automatic flash photography changes according to the exposure compensation value being used. When making an exposure compensation, use the aperture/shooting distance combinations in the reset ASA/ISO film speed column in the exposure calculation chart. For example, when making



a +2 exposure compensation while using ASA/ISO 100 film, use the aperture/shooting distance combinations in the ASA/ISO 25 column in the exposure calculation chart.

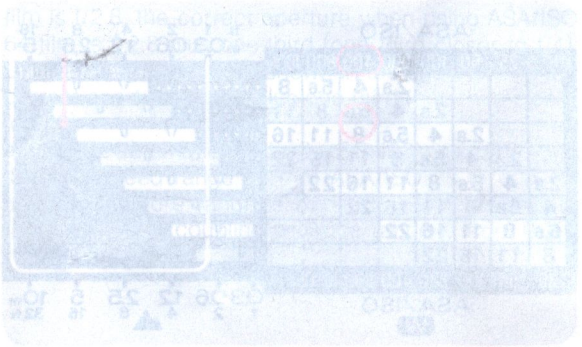
- *Positive (+) exposure compensation cannot be made when using ASA/ISO 25 film, and negative (−) exposure compensation cannot be made when using ASA/ISO 400 film. In these cases, make the necessary compensation by using one of the manual flash modes. Note that the Nikonos-V's viewfinder ready-light blinks if you attempt to make a −2 or greater exposure compensation while using ASA/ISO 200 film, or a −1 or greater exposure compensation while using ASA/ISO 400 film in the TTL mode.*
- *When you finish making the exposure compensation, be sure to reset the ASA/ISO film speed dial on the Nikonos-V to its original setting.*
- *If you photograph a subject with very high reflectivity—such as a mirror or metallic surface—in the TTL mode, underexposure is almost certain to occur. To prevent this, use manual control.*



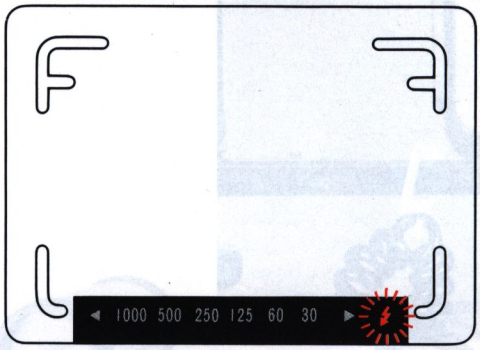
Ready-Light ㊳

After its power switch is turned on, the ready-light on the SB-103 will light to indicate that the speedlight has recycled and is ready to fire. If you are using either a Nikonos-V or Nikonos IV-A camera, its viewfinder ready-light will also light at the same time to let you know the speedlight is ready for the next shot.

In addition, the viewfinder ready-lights of the Nikonos-V and Nikonos IV-A blink to warn of improper settings. If this happens, check that: the camera and flash unit are securely connected, and the shutter speed/shooting mode and ASA/ISO film speed on the camera are correctly set.



- *The ready-light goes out when the flash unit is turned off.*
- *When the exposure meter of the Nikonos-V or Nikonos IV-A is not activated, the camera's viewfinder ready-light will not light even if the speedlight is turned on (except when the shutter speed/mode selector dial or shutter speed dial is set at M90 or M). Always confirm that the viewfinder ready-light is lighted before shooting.*
- *When the shutter speed/mode selector dial or shutter speed dial of the Nikonos-V or Nikonos IV-A is set at M90 or M, the viewfinder ready-light lights when the flash unit ready-light lights.*
- *As the voltage of the batteries decreases with use, the GN of the flash unit decreases slightly.*
- *The voltage of NiCd batteries decreases rapidly when their power is almost exhausted, increasing the recycling time. When this occurs, stop using them immediately and recharge them or they may be damaged.*
- *When using alkaline-manganese batteries, if recycling takes 30 seconds or longer, replace the batteries with a fresh set.*
- *A special red LED is built into one end of the firing tube to ensure stable light output. If you release the camera's shutter before the SB-103 is fully recycled, the LED might light up—this is not a malfunction.*



Warning Function: Beyond Auto Shooting Range

In the TTL automatic mode, the ready-lights on the flash unit and in the camera's viewfinder blink for approximately 2 seconds if the flash unit has fired at its maximum output to indicate that the light output may not have been sufficient for correct exposure. If this happens, recheck the flash-to-subject distance. If it is beyond the coupling distance range, use a larger aperture (a numerically smaller f-number), if possible, or move closer to the subject.

Because the voltage of batteries (especially alkaline-manganese batteries) decreases rapidly with use, the GN of the flash unit will decrease slightly. The flash output of the SB-103 also varies according to the amount of ambient light and the subject's reflectivity.

Because of these three factors, the ready-light may blink to indicate that the light output was insufficient for correct exposure even if the subject was within the coupling distance range.

Other Warning Functions:

When the speedlight's shooting mode selector/power switch is set at "TTL," the camera's ready-light will blink in the following situations:

1. When the shutter speed/mode selector dial of the Nikonos-V is set to M90 (1/90 sec.) or B (Bulb).
2. When the Nikonos IV-A is being used.
3. When the sync cord is not securely connected to the Nikonos-V.
4. When the ASA/ISO film speed setting dial of the Nikonos-V is set to beyond ASA/ISO 400.

Camera and Speedlight Ready-Lights[1]

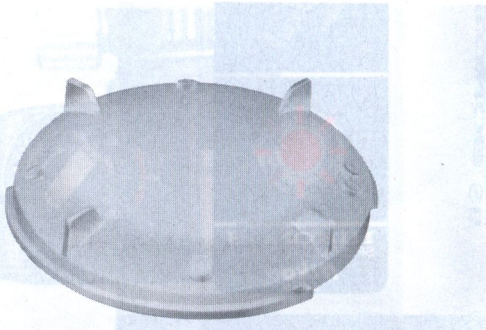
Camera	Shutter Speed Setting (sec.)	Shooting mode	SB-103 ready-light	Camera ready-light	
				Meter ON	Meter OFF
Nikonos-V	A, 1/1000 to 1/30	TTL	Lights	Lights or blinks[2]	Does not light
	A, 1/1000 to 1/30	MFULL, M1/4, M1/16	Lights	Lights	Does not light
	M90 (1/90), B	TTL	Lights	—	Blinks
	M90 (1/90), B	MFULL, M1/4, M1/16	Lights	—	Lights
Nikonos IV-A	A	TTL	Lights	Blinks	Does not light
	A	MFULL, M1/4, M1/16	Lights	Lights	Does not light
	M (1/90), B	TTL	Lights	—	Blinks
	M (1/90), B	MFULL, M1/4, M1/16	Lights	—	Lights
Nikonos III	1/500 to 1/30[3]	TTL	Lights	—	—
	1/500 to 1/30[3]	MFULL, M1/4, M1/16	Lights	—	—

1. When the speedlight has recycled.
2. When the ASA/ISO film speed dial is set to beyond ASA/ISO 400.
3. Speeds of 1/500 second, 1/250 second, and 1/125 second cannot be used because the sync shutter speed is 1/90 second or slower.
= Proper flash synchronization is not possible because the shutter speed/shooting mode is improperly set.
• When the camera is set at M90 or M, the camera's exposure meter will not operate even if the shutter release button is depressed.

Cord Fastening Hanger ⑫

This hanger secures the sync cord to the bracket to keep it out of the way while shooting.

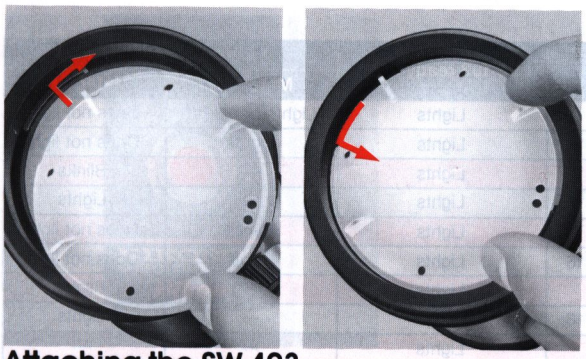
To use the cord fastening hanger, attach it to the speedlight bracket as shown in the photo, then attach the sync cord to the hook.



Wide-Flash Adapter SW-103 ④

Designed specifically for use with this flash unit, the Wide-Flash Adapter SW-103 increases the SB-103's angle of coverage from that of a 28mm lens (on land and underwater) to that of a 15mm lens (underwater). When the adapter is attached, the SB-103's GN is reduced to 14 on land and 7 underwater (when using ASA/ISO 100 film at "MFULL").

- *To prevent overexposure during close-up shooting within approximately 0.6m (2ft), attach the adapter even if using a lens other than the UW-Nikkor 15mm f/2.8N.*



Attaching the SW-103

To attach the adapter, align the adapter's mounting notches with the adapter mounting catches on the flash head, push the adapter onto the flash head as shown in the photo, then turn the adapter clockwise as far as it will go.

To remove: Turn the adapter counterclockwise and pull it off.

- *To prevent the loss of the SW-103 and to enable it to be attached quickly, tie one end of a piece of string to its hole and tie the other end to the speedlight.*

Multiple Flash Photography

The optional Double Flash Bracket and Double Sync Cord enable two SB-103 Speedlights (or an SB-103 and an SB-102) to be used at the same time. When shooting with a Nikonos-V, either the TTL mode or one of the manual modes can be selected; when shooting with a Nikonos IV-A or III, only manual operation is possible.

- *The flash head mounted on the arm that is next to the camera's film advance lever can be mounted either as shown in Photo 1 or as in Photo 2.*
- *If you decide to use only one speedlight in the TTL automatic flash mode, turn off the speedlight which is attached to the gray sync cord. Should you turn off the speedlight which is attached to the black cord, TTL automatic flash control is automatically canceled and the unit will fire at its maximum output regardless of the setting.*

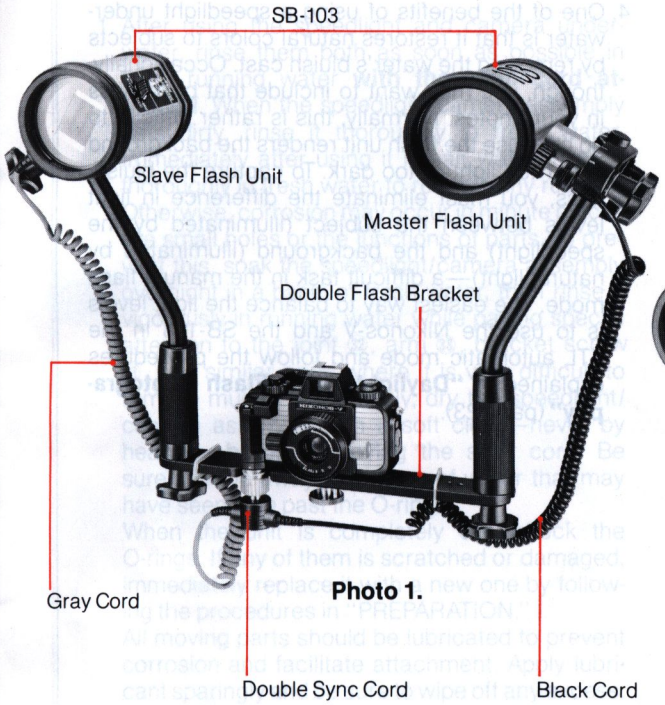


Photo 1.

Photo 2.

When two flash units are the same distance from the subject and face approximately the same direction, the combined GN of the two units can be determined with the following equation:

$$\text{Combined GN} = \sqrt{GN1^2+GN2^2}$$

(GN 1 and 2 are the guide numbers of the flash units.)

- *When using two flash units facing the same direction in either the TTL mode or one of the manual modes, compensate as follows according to the equipment in use:*
  1) *With two SB-103 Speedlights: select an aperture one step smaller (a numerically larger f-number) than that shown in the exposure calculation chart.*
     For example, when the f/stop shown in the exposure calculation chart is f/4, reset the aperture to f/5.6.
  2) *With one SB-103 and one SB-102 Speedlight: select an aperture two steps smaller (a numerically larger f-number) than that shown in the exposure calculation chart.*
     For example, when the f/stop shown in the exposure calculation chart is f/4, reset the aperture to f/8.
- *When using manual flash operation, set each speedlight's shooting mode selector/power switch to the same position, for example, "M1/4." To use them at different positions, first calculate the combined GN from the equation formula above, then determine the correct aperture from the combined GN.*

Daylight Fill-In Photography

When shooting in daylight, a backlit subject may come out almost as a silhouette if the background is correctly exposed. If, on the other hand, exposure compensation is made to correctly expose the subject, the background may be washed out. To fill in the shadows and balance the illumination levels of the subject and the background in daylight shooting, use daylight fill-in flash photography. When using the Nikonos-V, its viewfinder LED indicator will blink to indicate the correct shutter speed under natural lighting. To obtain the correct exposure with daylight fill-in flash shooting, turn on the flash unit and select progressively smaller f/stops (numerically larger f/numbers) until the camera's 1/125 second and 1/60 second LEDs begin blinking or until either the 1/60 second or the 1/30 second LED indicator blinks. Make sure the subject is within the coupling distance range and, if the viewfinder ready-light is lighted, release the shutter.

Operable shutter speed (1/90 sec.)

Adjust the aperture until one or two of these LED indicators begins blinking.

TIPS ON SPEEDLIGHT PHOTOGRAPHY

1. The flash-to-subject coupling distances and useable apertures indicated by the exposure calculation chart are for clear-water shooting. Therefore, the correct exposure will be different if the water is muddy or has floating particles, and some exposure compensation must be made.

2. In shallower depths with natural lighting, overexposure may occur when shooting in the automatic mode. To prevent this, use the smallest aperture possible (the numerically largest f-number) or turn off the speedlight and use only natural lighting. When shooting with the Nikonos-V, the correct shutter speed for the lighting conditions is displayed in the viewfinder. (For more information, refer to the camera's instruction manual.)

3. The Nikonos-V's TTL flash control makes it easier than ever to shoot close-ups with the optional Close-Up Outfit. When using the optional Close-Up Outfit, set the shooting mode selector/power switch to "TTL" (Nikonos-V) or to "M1/4" (Nikonos IV-A or Nikonos III), then turn on the SB-103 and set the appropriate aperture on the lens. For best results, use smaller apertures (numerically larger f-numbers) and, to prevent possible overexposure, attach the Wide-Flash Adapter SW-103.

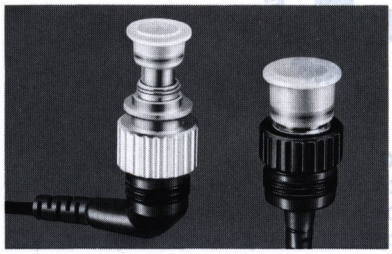
4. One of the benefits of using a speedlight underwater is that it restores natural colors to subjects by removing the water's bluish cast. Occasionally, though, you may want to include that bluishness in your photos. Normally, this is rather difficult to do because the flash unit renders the background either too light or too dark. To capture the bluishness, you must eliminate the difference in light levels between the subject (illuminated by the speedlight) and the background (illuminated by natural light)—a difficult task in the manual flash mode. The easiest way to balance the light levels is to use the Nikonos-V and the SB-103 in the TTL automatic mode and follow the procedures explained in **"Daylight Fill-In Flash Photography"** (page 23).

OPTIMUM BATTERY PERFORMANCE

1. **New batteries**
   Between manufacture and first use, all batteries exhibit some drain. Therefore, care should be taken to purchase the newest (and freshest) ones possible. To help you do this, some manufacturers stamp the date of manufacture on the bottom of each battery. Ask your camera dealer for assistance in interpreting the codes.
2. **Temperature**
   Battery life ratings are based on operation at around 25°C (77°F). At other temperatures, battery life is shortened. Spare batteries should therefore be kept available if operation in low temperatures is anticipated.
3. **Continuous use**
   Batteries are drained much more quickly by continuous use than by intermittent use.
4. **Storage**
   When not in use, the batteries should be removed to prevent damage from leakage. To minimize drain during the period of disuse, store the batteries in a cool, dry place below 20°C (68°F).
5. **Battery brands**
   Do not mix brands of batteries or use batteries with different model numbers. Also, avoid mixing new and old batteries since proper performance will not be obtained and battery leakage may occur.
6. **Disposal**
   Do not dispose of batteries by burning. Also, for safety's sake, never disassemble batteries.
7. **Polarity**
   When installing batteries, observe the voltage polarities carefully. Reversal of the positive (+) and negative (−) terminals will result in leakage. If leakage should occur, take the SB-103 to an authorized Nikon dealer or service center.
   The SB-103 requires an excessive current, so the life span of the batteries may be shorter than with other speedlights.
8. **NiCd batteries**
   In comparison with regular batteries, NiCd batteries provide faster recycling and higher efficiency at low temperatures. However, the recycling time and the number of flashes per battery set depend upon the age of the batteries, their charges, and their capacities.
   - *Do not continue to use NiCd batteries after they are exhausted. Continued use may reduce their life span or cause leakage.*
   - *Before charging, thoroughly read the battery and battery charger instructions.*
   - *Charging should only be done for the designated number of hours on a battery charger recommended by the battery manufacturer. Excessive charging may cause battery deterioration.*
   - *Charging should only be done in temperatures between 5°C (41°F) and 35°C (95°F). Never charge batteries while they are still hot from use.*
   - *Never attempt to charge NiCd batteries that are incorrectly installed in the battery charger.*
   - *The charging capacity of NiCd batteries may be shortened after a long period of storage. If this occurs, discharge and recharge them several times.*
   - *If working time is markedly reduced even after they have been correctly charged, replace them with a fresh set.*
   - *Do not mix new and old NiCd batteries.*
   - *Do not use NiCd batteries which have been charged for different lengths of time.*

TIPS ON SPEEDLIGHT CARE

1. After using the speedlight and camera underwater, rinse them both as soon as possible in fresh running water **with the sync cord attached**. When the speedlight/camera assembly gets dirty, rinse it thoroughly in fresh water. Immediately after using it in salt water, rinse it thoroughly in fresh water to remove any residue. Otherwise, corrosion may occur in minute places like small holes or the junctions of parts. To prevent this, soak the speedlight/camera assembly overnight in a basin of fresh water, then rinse it vigorously in running water while paying special attention to the joint ㉜, arm ㉝, bracket screw ⑬, and similar parts where it is very difficult to remove mud or salt. Finally, dry the speedlight/camera assembly with a soft cloth—never by heating—**before** removing the sync cord. Be sure to wipe away any drops of water that may have seeped in past the O-ring.
   When the unit is completely dry, check the O-rings. If any of them is scratched or damaged, immediately replace it with a new one by following the procedures in "PREPARATION."
   All moving parts should be lubricated to prevent corrosion and facilitate attachment. Apply lubricant sparingly and be sure to wipe off any excess.
   When the speedlight will not be used for some time, store it in a cool, dry, clean place with the batteries and battery chamber cap removed.
2. **Never submerge the speedlight in water with the sync cord cover removed, or get the sync cord plugs wet**. Always make sure the sync cord plugs are securely attached before entering the water.
3. Never pick up or suspend the speedlight by the sync cord.
4. If an O-ring with dust, scratches, or damage is used, water may enter the flash unit and damage the electrical circuitry. Before and after diving, check the O-rings by following the procedures in "PREPARATION."
5. Do not allow the speedlight to be exposed to direct sunlight for long periods. And never place the speedlight in an area where the temperature is or may rise to 60°C (140°F) such as in a closed car or car trunk during warm weather.
6. If water enters the flash unit, the possibility of electrical shock exists because of the unit's high-voltage electrical circuitry. Should water get inside the flash unit, take it—with the batteries and battery chamber cap removed—to an authorized Nikon dealer or service center immediately.
   If you experience difficulty of an electrical nature with the unit, never attempt to disassemble or service it yourself. Instead, take the unit to an authorized Nikon dealer or service center.
7. As much as possible, avoid removing the battery chamber cap near salty wind or splashing water because either may damage the unit's electrical circuitry. If the battery chamber cap must be removed in one of these situations, for instance, to exchange batteries, use a vinyl bag to prevent water or salt from entering the unit.
8. When the speedlight will not be used for more than two weeks, remove the batteries to avoid possible damage to the unit's electrical circuitry caused by battery leakage. The battery chamber of this speedlight is air-tight, so gas may be trapped inside. If the inside of the battery chamber becomes corroded by leakage, take the unit to an authorized Nikon dealer or service center.
9. If your SB-103 has not been used for a long time, its recycling time may be longer. To maintain the built-in condenser in peak condition, thereby enabling you to use the SB-103 for many years, fire the speedlight a few times every month. After firing, wait until the ready-light lights, then turn off the power switch, remove the batteries, and store the SB-103 in a suitable location. This will prevent the condenser from deteriorating.
10. To remove dirt or fingerprints, wipe with a soft, dry, or silicone-treated cloth. Never use thinner, benzine, or alcohol because they may damage plastic parts. To clean the Wide-Flash Adapter SW-103, wash it with soap and water. Never use a brush.
11. If this speedlight is frequently used underwater (especially in salt water or dirty water), take it to an authorized Nikon dealer or service center for inspection on a regular basis.
12. If the speedlight is dropped or bumped against a hard surface, take it to an authorized Nikon dealer or service center for inspection even if there is no surface damage.
13. After using the speedlight, attach the dust-proof plastic caps to the sync cord plugs to protect them from damage.



ACCESSORIES

Various accessories are available to increase the SB-103's versatility.

Extension Arm

This accessory increases the length of the arm when a special lighting effect is desired or needed.

Double Sync Cord

This cord enables two SB-103 Speedlights (or an SB-103 and an SB-102) to be controlled by one camera. TTL automatic flash operation is possible only with the Nikonos-V; manual flash operation is possible with the Nikonos-V, IV-A, and III.

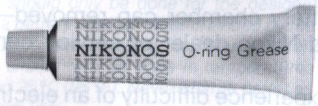
• *For information, see "Multiple Flash Photography" on page 22.*

Double Flash Bracket

This accessory allows two flash units to be mounted on the camera at one time, thereby doubling the amount of flash illumination available. This bracket is especially useful during close-up shooting because it enables the subject to be evenly illuminated from the left- and right-hand sides.

O-rings and lubricant

Additional O-rings and lubricant are available to allow you to maintain the flash unit in perfect condition.



SPECIFICATIONS

Electronic Construction:	High-performance silicon-controlled rectifier and series circuitry
Useable Exposure Modes:	TTL auto exposure (with Nikonos-V); Manual (with Nikonos-V, Nikonos IV-A, and Nikonos III): "MFULL," "M1/4," and "M1/16" settings
Guide Numbers:	With ASA/ISO 100 film on land (underwater), full output: 20 (10): 1/4 output: 10 (5); 1/16 output: 5 (2.5)
Angle of Coverage:	70° × 53° on land; covers picture angle of 28mm lens on land and underwater; with Wide-Flash Adapter SW-103, picture angle increases to that of a 15mm lens
Batteries:	Four AA-type NiCd batteries or four AA-type alkaline-manganese batteries (high-performance manganese batteries not recommended)
Number of Flashes/ Recycling Time:	NiCd: 50 flashes/minimum approx. 6sec. (depending upon battery brand and amount of recharging) Alkaline-manganese: 130 flashes/ minimum approx. 9sec.
Useable Ranges:	TTL: ASA/ISO film speed coupling range: ASA/ISO 25 to 400; useable aperture range: f/2.8 to f/22 (at ASA/ISO 100); coupling distance range: 0.3m (1ft) to 7m (23ft) (at ASA/ISO 100 on land); 0.3m (1ft) to 3.5m (11.5ft) (at ASA/ISO 100 underwater)
Resistant Pressure:	6kg/cm² (851 lb/in²) maximum; useable to depths of 50m (160ft)
Multiple Flash Capability:	Requires optional Double Flash Bracket and Double Sync Cord in addition to two SB-103 Speedlights (or an SB-103 and an SB-102)
Dimensions:	Flash head: Approx. 175mm(W) × 130mm(H) × 99mm(D)
Weight (without batteries):	Flash head only: Approx. 780g Flash head with arm, bracket, joint and sync cord: Approx. 1650g

Note: *All performance data are for normal-temperature operation [25°C (77°F)].*

Subject to change without notice.

Supplied with: *Main flash head (including battery cartridge MS-5), arm, bracket, joint, cord fastening hanger, sync cord, Wide-Flash Adapter SW-103, O-ring set, exposure calculation chart, and Speedlight Case SS-101*

Nikon

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