

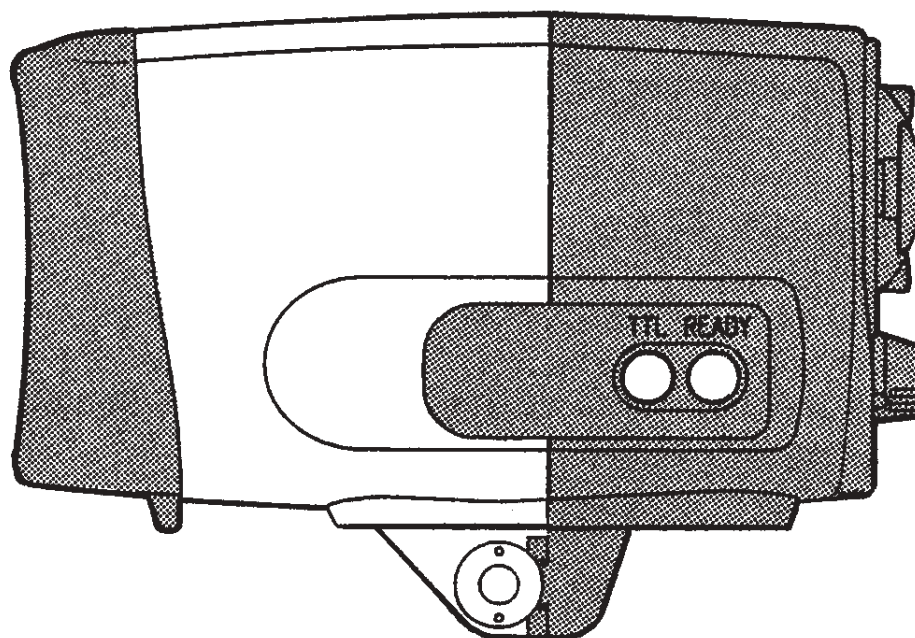
SEA&SEA



UNDERWATER TTL STROBE

YS-120Duo

INSTRUCTION



— Yellow Sub —

YS-120

TTL STROBE Duo

Thank you very much for purchasing our strobe.

Please read this manual thoroughly before using it.

Be sure to keep this manual handy so that you can refer to it whenever necessary.

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Safety Precautions

- For safe handling of this product, please read the following precautions before use.

Please read the following precautions carefully as they contain highly important information related to personal and product safety. Precautions designated "WARNING!" refer to those situations which could result in serious injury or death. Precautions marked "CAUTION!" refer to those situations or conditions which could result in personal injury or property damage. Please observe all precautions.

General Precautions for the Care and Operation of the Strobe

WARNING!

- Use only manganese, alkaline, nickel-cadmium or lithium batteries rated 700mA or less in this unit. Do not use any other type of battery. Doing so may generate a toxic gas.
- Do not fire this strobe with the reflector placed on a table or the floor as that may cause overheating of the internal circuitry and/or fire.
- Do not trigger the flash near combustible materials. It may cause fire.

CAUTION!

- Always make sure that the strobe and accessories are securely mounted to the camera or housing to prevent them from falling off, getting lost, causing personal injury or equipment malfunction.
- Do not attempt to disassemble the strobe. Contact with internal high voltage circuitry can cause personal injury.
- Do not alter or modify the strobe. User modifications can result in flooding or malfunction. User modifications will void the product warranty. If you detect smoke or an acrid odor, discontinue use immediately. Remove the batteries from the strobe. Bring or send to an authorized Sea & Sea dealer for evaluation and repair.
- In the event of flooding, turn off both the strobe and camera or housing and discontinue use. Remove batteries from strobe and camera.
 - *Beware of increased pressure inside the strobe. Handle with extreme care when opening.
- Do not shortcircuit the connector pins. That may cause equipment malfunction.
- During transportation or when not in use for an extended period of time, remove the batteries to avoid unwanted battery consumption due to accidental activation of the power switch.

- This product incorporates plastic parts. Do not subject this strobe to extreme heat, such as on a car dashboard, or to direct sunlight. Plastic parts are prone to warping.
- SEA & SEA Products Ltd. will not be responsible for unobtained pictures or costs incurred related to the shooting of such pictures due to malfunction of the YS-90 TTL/Duo strobe, housing, camera, strobe, or accessories.
- SEA & SEA Products Ltd. will not be responsible for any damages, repairs, or replacement of the camera, lenses, or accessories used with this strobe due to flooding caused by user mishandling.

Precautions for Storage of the Strobe

⚠ CAUTION!

- When not in use for an extended period of time, remove the batteries; possible battery leakage will cause equipment malfunction.
- Do not store in a damp or humid environment. It can cause mildew or malfunction.
- Do not store in a chemically-laden environment. Napthalene, camphor, or other strong chemicals can cause mildew, rust, corrosion, and other damage to the metal and rubber components in this product.
- When not in use for a long period of time, periodically attach to the camera and trigger the shutter release (with batteries and without film.) This will exercise the internal parts and keep the strobe in good working condition.

Handling and Maintenance of the O-ring

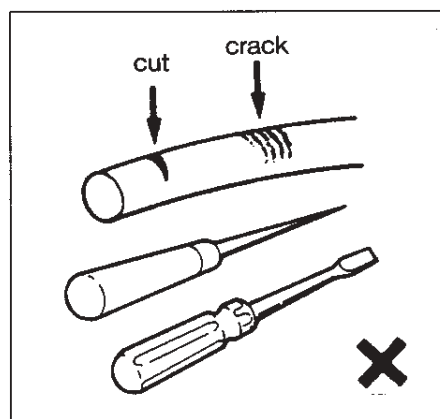
The O-ring on the front case of your YS-90 TTL/Duo strobe provides an airtight waterproof seal. Improper handling of the O-ring can cause flooding. Please observe the following instructions carefully.

● Remove the O-ring for inspection.

Before use, check the O-ring, the O-ring channel, and the O-ring contact surface. A thorough examination of the O-ring and the O-ring channel is not possible unless the O-ring has been removed. Never remove the O-ring with a sharp or pointed tool. To avoid damaging the O-ring, use the O-ring Remover, a Sea & Sea tool made specifically for O-ring removal.

● Always inspect the O-ring for scratches, cuts, and cracks.

If the O-ring is damaged, it must be replaced.



- **Inspect the O-ring for debris.**

Make sure that there are no foreign particles, such as dust, sand, or hair adhering to the O-ring, O-ring channel, or O-ring contact surface. Such contamination will breach the seal and cause flooding. If necessary, wash the O-ring thoroughly in fresh water and dry with a lint-free cloth. Use a moistened cotton swab to clean the O-ring channel and contact surface. Make sure there is no fiber residue.

- **Lubricate with silicone grease.**

Silicone grease protects the O-ring from drying and abrasion. Dab a small amount of grease onto your finger and draw the O-ring through your fingers until the O-ring is evenly coated. Use the silicone grease sparingly. Too much grease attracts debris.

- ⚠ **CAUTION!**

Use only the Sea & Sea brand silicone grease in the tube with a BLUE cap. Never use the Sea & Sea silicone grease in a tube with a WHITE cap. Never use any other brands of silicone grease to lubricate the O-ring on your YS-90 TTL/Duo, as they may adversely affect the O-ring sealing capability.

- **Do not crimp the O-ring.**

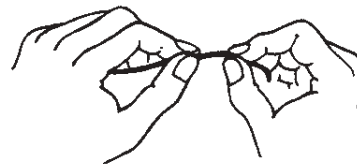
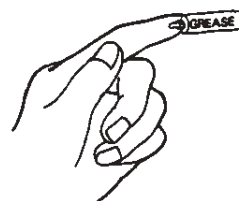
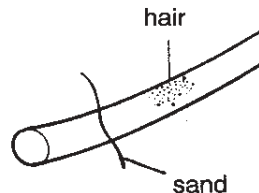
Do not bend or twist the O-ring when fitting it into the O-ring channel.

- **O-ring storage.**

Always store the O-ring in an airtight container and in a cool environment. Keep out of direct sunlight. Make certain it is stored flat is not bent or twisted. Do not place heavy objects on it, excessive weight will flatten it and impede its sealing capability.

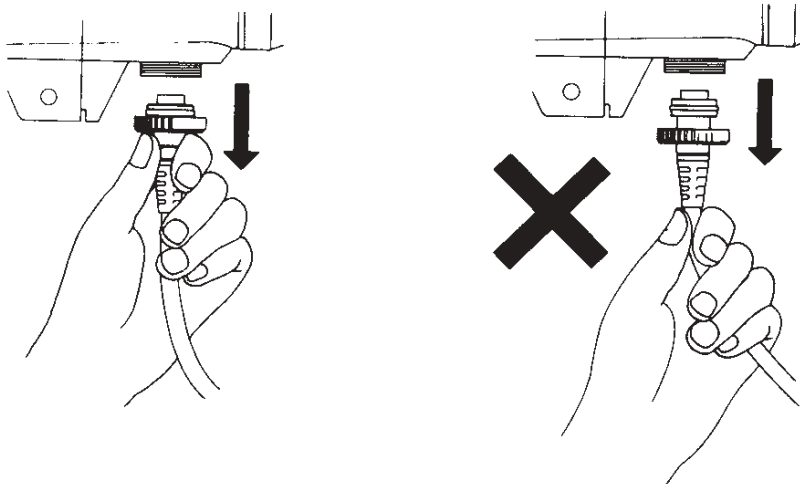
- **The O-ring's life is one year.**

The life of the O-ring depends on the diligence of your maintenance, frequency of use, and storage conditions, but on average, if you maintain your O-ring properly, it will retain its watertight integrity for one year.



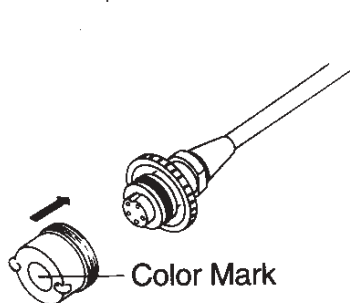
Handling of Synchro Cord

This equipment has detachable synchro cord. Be sure to remove the connector downward in detaching it from the main body so as not to allow water to get into it. After use, clean the contact parts, apply silicone grease thinly to the O-ring and store with the cap on it. It would be safer to have a spare synchro cord on hand.

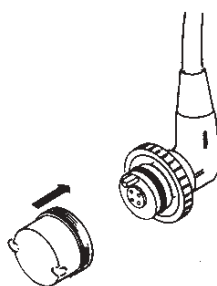


NOTE

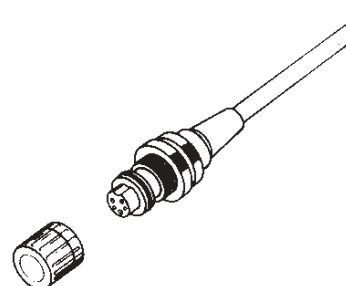
- * Do not touch the connector's contact parts with finger or attach silicone grease to them. If silicone grease is attached by any chance, clean it with alcohol.
- * When the synchro cord was removed from the strobe's main body or the camera, be sure to use the synchro cord cap to protect the connector. Pay attention as there are two kinds of synchro cord cap; one is usable exclusively for the strobe side (with color mark) and the other for camera side.
- * When washing the synchro cord which has been removed from the strobe's main body or the camera with water, be sure to wash it after attaching the cap on it.



[For Strobe]



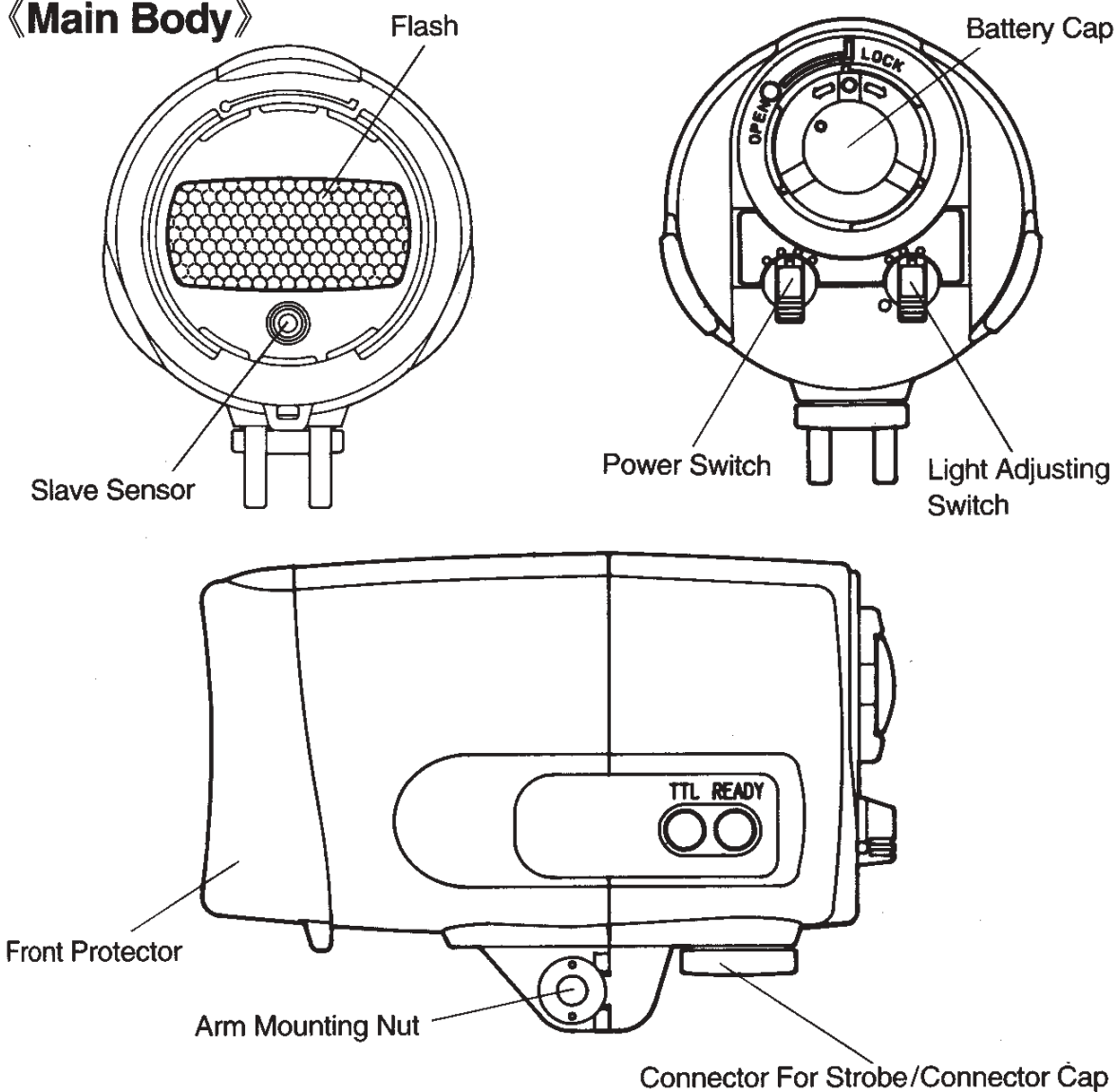
[For MOTOR MARINE II]



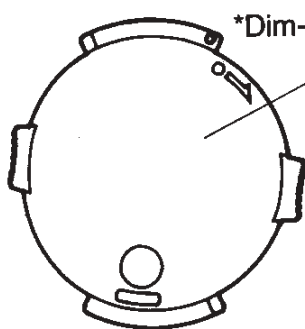
[For NIKONOS]

Parts Identification and Accessories

《Main Body》



《Accessories》



* SUM-3 (AA) alkaline batteries	8
* Arm Fixing Bolt	1
* O-ring	1
* Silicone Grease	1
* Synchro Cord	1
* Labels Set	1

(Exposure Calculation Table · TTL Automatic Light Adjusting Range)

Before Photographing

Battery Mounting

Battery types compatible with this unit are SUM-3 (AA) alkaline, Ni-Cd or lithium.

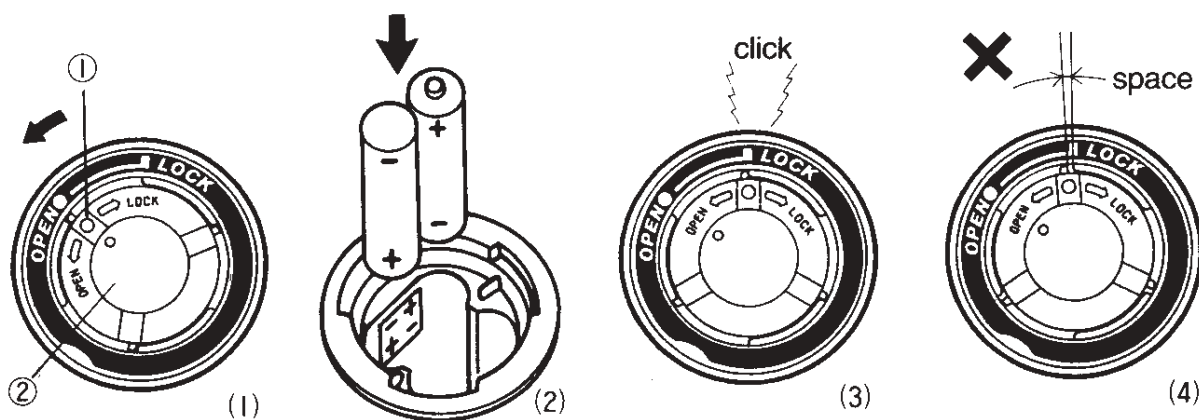
Mounting and Exchanging

1. Turn ① counterclockwise to the OPEN position, and pull ② straight out. (Fig. 1)
2. Make sure that the switch is turned OFF, then put four batteries into position while confirming their \oplus \ominus orientation as indicated. (Fig. 2)
3. Make sure that there is no dust or flaw on the battery cap's O-ring, and apply a bit of silicone grease over the O-ring. Align the positions of circles ① and ② with that of OPEN. After getting them together by inserting them straight, turn ① until it reaches the LOCK position and is fixed with a click. (Fig. 3)

NOTE

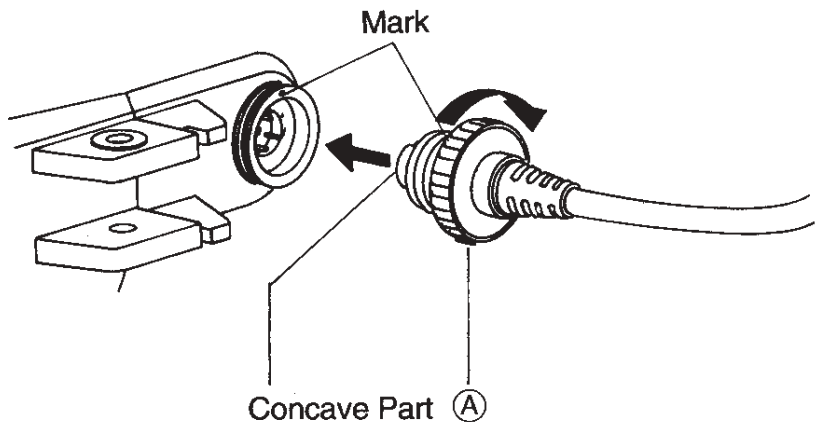
When you see a slight space between ① and LOCK, try it still harder until it clicks. (Fig. 4)

4. When exchanging batteries, dry your hands and create a moisture-free environment. In particular, wipe any water drops from your hair and your wetsuit sleeves.
5. Be sure to use the same kind of batteries. Always exchange all four batteries at the same time.



Setting Connector to Strobe

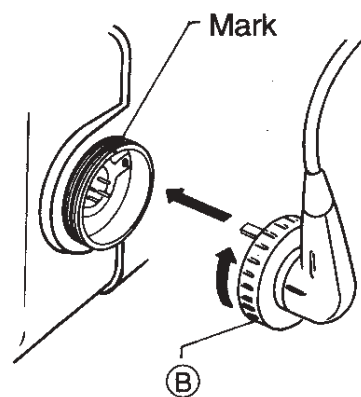
1. After making sure that there is no flaw and dust on the O-ring, apply silicone grease thinly.
2. Fitting the strobe's convex part into the connector's (5 holes) concave part, insert the connector directly into the strobe. Fit the part ① into the screw of the strobe and turn until it stops and then fix it firmly.
3. When removing the connector, slacken ① and pull out the connector directly by holding it firmly at its base. Never twist or pull the cord.



Connection with Camera

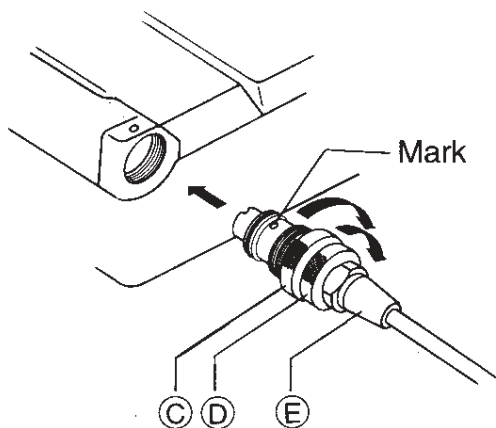
《MOTOR MARINE II—compatible cable》

1. Make sure that there is no cut or dust on the connector's O-ring, then apply a thin coat of silicone grease over it.
2. Align the making on the camera side with the part that protrudes on the connector (4-hole) side, and fit them together by inserting them straight. Turn ② so as to fit the screw on the camera side until it comes to a stop, then fix it firmly.
3. To remove the connector, unfasten ② and pull it out straight while firmly holding the base of the connector part. Never twist or pull the cord.



《NIKONOS—compatible cable》

1. Make sure that there is no cut or dust on the connector's O-ring, then apply a thin coat of silicone grease over it.
2. Align the O mark on the camera side with that of the connector side (with 5 holes), and join them by thrusting straight in.
3. Turn ④ so as to fit the screw on the camera side until it comes to a stop, then fix it firmly.
4. To mount it on Type III, fasten ③ firmly so as to sandwich the stay.
5. To remove the connector, loosen 4 to 1 in that order and pull ⑤ straight out. Never twist or pull the cord.

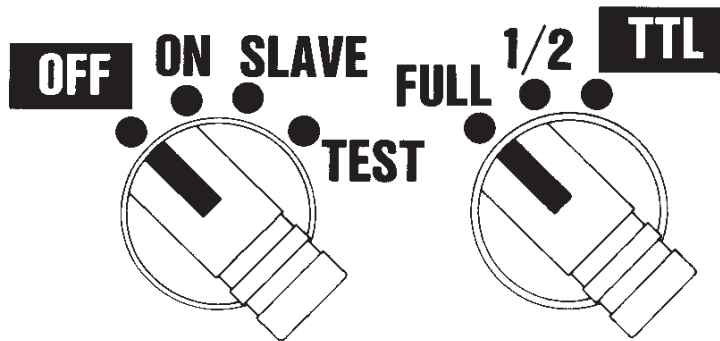


How to Photograph

This unit has two switches—a power switch and a light adjusting switch. According to the purpose of your photography, you can choose either fine adjustment of light amount in the manual flashing mode or fully-automatic photography in the TTL light adjusting mode.

Switch Manipulation

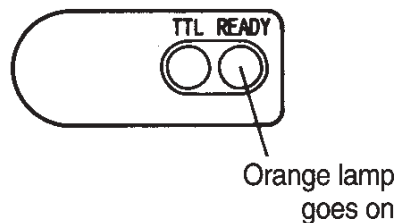
The power-switch mode has a manual flashing mode at the [ON] position, a slave flashing mode at the [SLAVE] position, and a test light mode at the [TEST] position for confirmation of flashing. Meanwhile, the light adjusting switch mode has a full-flashing mode at the [FULL] position, a 1/2 flashing mode at the [1/2] position, and a TTL flashing mode at the [TTL] position.



[Power Switch Mode]

[OFF] Use this position when the equipment is not used.

[ON] This is manual flash mode. The lamp flashes with a constant light quantity of FULL, 1/2, and 1/4 when its light adjusting switch mode is selected. When used in combination with a diffuser, this mode allows a delicate light quantity setting which has not been possible so far, providing a powerful effect in proximity photographing. When charge has been completed, the neon lamp lights up and the electronic alarm sounds at the same time so that it can be confirmed by both eyes and ears. Start photographing after obtaining a proper iris stop value depending on the photographing distance from exposure calculation table or through calculations.



$$\text{Iris Stop Value} = \frac{\text{GN}}{\text{Photographing Distance}}$$

*When film sensitivity (ISO) is 100

NOTE Since light absorption under water is noticeable, calculate with a 1/2 to 1/3 value of GN value on the ground.

Exposure Calculation Table (Reference Value)

Calculated with the guide number 11 (1/2 of FULL)

Photographing Distance (m)		I S O					Distance (ft)	
Full	1/2	25	50	100	200	400	Full	1/2
0.2		22					0.6	
0.3		16	22				1	
0.5	0.2	11	16	22			1.6	0.8
0.6	0.3	8	11	16	22		2	1
1	0.5	5.6	8	11	16	22	3.3	1.6
1.3	0.6	4	5.6	8	11	16	4.3	2
1.9	1	2.8	4	5.6	8	11	6.3	3.3
2.7	1.3		2.8	4	5.6	8	9	4.3
3.9	1.9			2.8	4	5.6	13	6.3
		Aperture (Iris Stop Value)					120PP01	

* Use the values on the table as reference since the value is affected by visibility, water quality and floating particles in the water.

[SLAVE] This is the slave flash mode. This function allows flashing of light by receiving other strobes flashing lights without using a cord. The light adjusting switch mode allows two kinds of light-quantity selection such as FULL and 1/2. When the equipment is used on the slave side, it becomes possible to perform a multiple lamps photographing with two, three or any other number of lamps in order to create a lighting effect which is suitable for images. The guide number (GN) for a multiple photographing is obtainable by the following calculations.

$$\text{Multiple GN} = \sqrt{\text{GN}_1^2 + \text{GN}_2^2 + \dots}$$

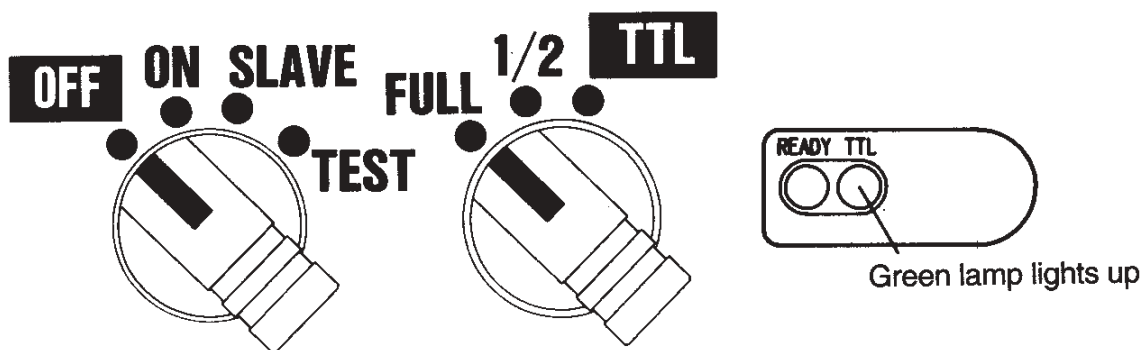
NOTE

- The slave flashing is activated by receiving directly or reflectively a light emitted from other strobe light sources. Consequently, there would be an occasion that it does not function when it is difficult to receive the light depending on underwater conditions or under a too strong external light condition. It would be also possible that it functions by receiving a light when strobe photographing is being carried out in surroundings.
- In TTL automatically light adjustable mode slave lighting can not be operated.

[Light Adjusting Switch Mode]

- [FULL] This is full light flashing mode. Full light quantity flashing (GN. 27 ground value).
- [1/2] This is 1/2 flashing mode. 1/2 output light quantity is obtained (GN. 13.5 ground value).
- [TTL] This is TTL automatic light adjusting mode. In this mode, the camera side measures brightness of the subject and the strobe controls flashing light quantity to give a proper exposure. The light quantity is automatically controlled depending on the change in photographing distance so that a proper exposure can be obtained easily. When photographing in the TTL automatic light adjusting mode, the light adjustment confirmation can be made by the TTL lamp. The TTL lamp (Green) lights up and the electronic alarm sounds for about 2.5 seconds if photographed within a light adjusted range. It is also possible to make light adjustment confirmation by a green lamp which lights up in the finder of camera (MM-II).

If exceeding the limit, the lamp does not light up, and the mode is switched to full flash. Therefore, if there is a possibility of under-exposure, confirm the relationship between the object's distance and shutter stop value, and reset to the proper stop value.



[Test Flashing]

Set the strobe on the camera (without loading a film) and conduct test flashing. Turn off the strobe power switch when loading a film.

The relationship among film sensitivity, iris stop value and distance in the TTL automatic light adjusting photographing are as shown in the following table.

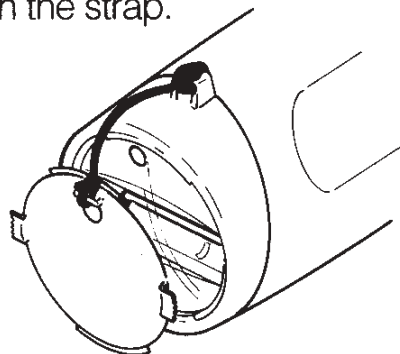
TTL Automatic Light Adjusting Range (Reference Value)

Aperture (Iris Stop Value)	I S O					Distance (Light Adjusting Range)	
	400	200	100	50	25	m	ft
	5.6	4	2.8			1.0~3.9	3.3~13
	8	5.6	4	2.8		0.8~2.7	2.6~9.0
	11	8	5.6	4	2.8	0.6~1.9	2.0~6.3
	16	11	8	5.6	4	0.4~1.3	1.3~4.3
	22	16	11	8	5.6	0.3~1.0	1.0~3.3
		22	16	11	8	0.3~0.6	1.0~2.0
			22	16	11	0.3~0.5	1.0~1.6
Under Water Exposure Table							120PP02

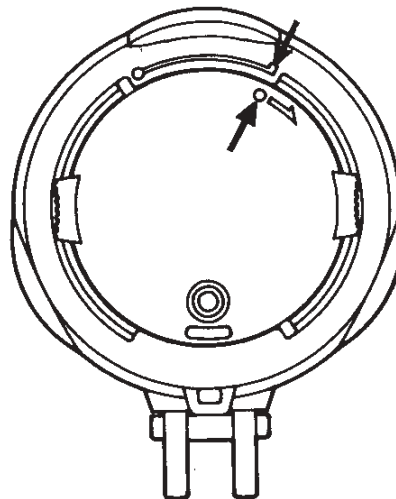
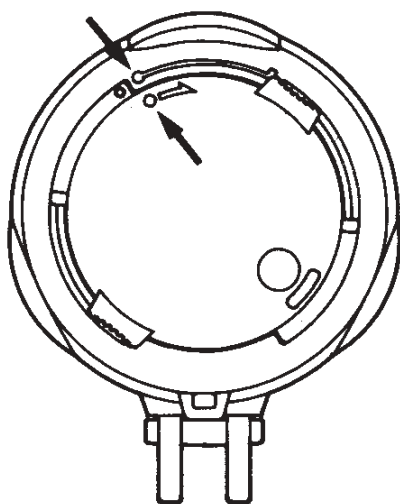
- * Use the light adjusting range as the reference value since it is affected by the water transparency, floating particles in the water, and quantity of light reflection, etc.
- * It becomes the full light flashing mode and the TTL lamp does not light up when the light adjusting range is exceeded. Reset at a proper iris stop value after conforming the relationship between photographing distance and iris stop value.

Attaching and Detaching Dim-cut filter

1. The Dim-cut filter and the front protector have a hole each to be passed a strap through. Depending on the situation of use, you can tie the Dim-cut filter and the front protector with the strap.



2. Attaching: Align the O mark on the Dim-cut filter with that of the front protector. Then, while pressing it lightly, turn it in the arrow's direction until it comes to a stop.



3. Detaching: Turn it in the direction opposite to the arrow's, then detach.

※ The Guide Number would be changed when a Dim-cut filter is used.
(on land)

FULL: GN 16

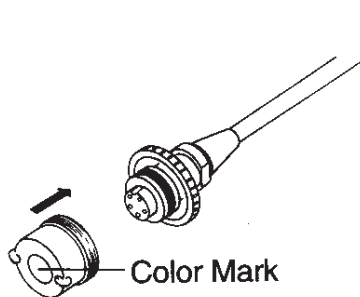
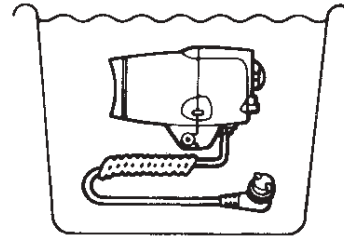
1/2: GN 8

Care and Storage After Photographing

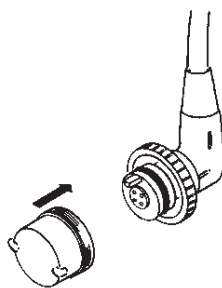
1. After using this unit under water (including seawater), be sure to wash it thoroughly with fresh water, while leaving all caps on waterproofing components closed.
2. After washing with fresh water, wipe it with a dry, soft cloth and dry in the shade.

NOTE Do not dry it forcibly with heating equipment or a hair drier.

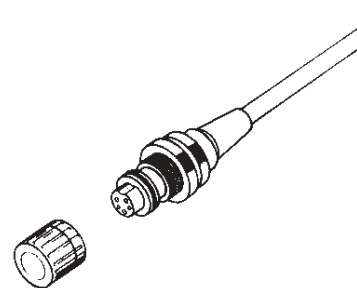
3. After using, remove batteries from the battery component.
When removing them, wipe water away completely so that water drops will not get into the component. If they do, wipe them away completely.
4. After using, apply a thin coat of grease over the connector's O-ring, then put a cap on it.
5. When not using for a prolonged period of time, store unit with care, away from high temperature, high humidity, direct sunlight, or severe cold.
6. Remove the synchro cord from the main body, apply silicone grease thinly on the O-ring and mount it again.
7. Clean the two connector parts of the synchro cord, apply silicone grease thinly on the O-ring, and attach the synchro cord cap exclusively used for the strobe (with color mark) and the cap exclusively used for the camera.



[For Strobe]



[For MOTOR MARINE II]



[For NIKONOS]

Major Specifications

YS-120 DUO			
Compatible Cameras	MOTOR MARINE II, EX, SX-1000		NIKONOS V, RS
Guide Number (Ground value)	FULL		22
ISO-100/33ft	1/2		11
Illuminating Angle (Ground value)	Length 105°, Width 105°		
	With Dim-cut filter: Length 110°, Width 110°		
Flashing Frequency	Alkaline battery	Ni-Cd battery	Lithium battery
	280 times	140 times	600 times
Recycling Time	Alkaline battery	Ni-Cd battery	Lithium battery
	4 sec.	3 sec.	4 sec.
Color Temperature	5,100°K ± 200°K without diffuser		
	4,800°K ± 200°K with diffuser		
Power Source Used	SUM-3 (AA) alkaline batteries (1.5V x 8 = 12V), 8 units		
	SUM-3 (AA) Ni-Cd batteries (1.2V x 8 = 9.6V), 8 units		
	SUM-3 (AA) lithium batteries (1.5V x 8 = 12V), 8 units		
Slave Function	Works when in slave mode.		
Test Flashing Function	Works when in test flashing mode.		
Synchro Cord (attachable/detachable)	Strobe synchro cord/S		Strobe synchro cord/N
Operation Indicators	TTL lamp	Lights up and gives an electronic beep sound for about 2 sec. when set in automatic light adjusting mode.	
	Ready lamp	LED lamp lights up simultaneously with an electronic beep sound, indicating completion of charging.	
	Check inside of viewfinder	LED lights up when using MMII	When using NIKONOS
			Specifications same as SB-103

Compatible Cameras	MOTOR MARINE II, EX, SX-1000	NIKONOS V, RS
(Light Adjustment Range)	<u>When using MMII</u>	<u>When using NIKONOS</u>
Film Speed Interlocking	ISO 50, 100, 400	ISO 25~400
Available Iris Range	F3.5~F22 (ISO 100)	F2.5~F22 (ISO 100)
Automatically Light-adjustable Range	2.6~10.3ft underwater (ISO 100, F3.5)	3.3ft~13ft underwater (ISO 100, F2.5)
Water Pressure Resistance	60m	
Dimensions	φ102mm x 185mm	
Weight (including cords and batteries)	1.3kg (on ground)	
	-150g (underwater)	
Body Colors	yellow · black · orange	
Remarks		NIKONOS III, IV type for manual use only.

Notes: All performance capability values in the above specifications are at ambient temperature (25°C). Data regarding Ni-Cd batteries are reference values available from a fully charged battery with a claimed capacity of 700mAh.

Specifications and product exterior are subject to change without prior notice.

Separately Marketed Accessories for Strobe

	Item No.
1) NB-700 (SUM-3 (AA) Ni-Cd batteries 700mAh type N-U x 8 units)	1815
2) NB-8 Box (Battery box for NB-700 batteries; with a DC jack and an LED)	1817
3) NB-8 Charger (For use in Japan; AC100V, 50/60Hz)	1812
4) NB-8 Charger (For use outside Japan; AC 120/240V, 50/60Hz)	1816
5) NB-700/Charger Set (NB-700, NB-8 Box, NB-8 Charger for use in Japan)	1813
6) NB-700/Charger Set (NB-700, NB-8 Box, NB-8 Charger for use outside Japan)	1814