

INON

Safety Precautions

- Before using your flashlight, please ensure that you have read and understood the safety precautions described below and separate 「user manual」 / 「Measures to Prevent Accidental Flooding」. Please keep these documents handy for easy reference.
- The safety precautions are intended to instruct you in the safe and correct operation of the strobe to prevent injuries or damage to yourself, other persons and equipment.
- The symbols and their significance are described below.



DANGER

Failure to observe the precautions indicated by this symbol may lead to high possibility of serious injury or death.



WARNING

Failure to observe the precautions indicated by this symbol may lead to possibility of serious injury or death.



CAUTION

Failure to observe the precautions indicated by this symbol may have the possibility of resulting in possibility of injury or property damage.



WARNING

DO NOT turn on the flashlight in front of person's eye (particularly an infant).

The flashlight may cause irreparable injury to the eyes or cause temporary visual impairment.

Always use heat-safe gloves when using the light on land to avoid burns including

low temperature burns where you do not feel so hot.

DO NOT use the flashlight in a place where it may be exposed to flammable or explosive gas.

Otherwise fire ignition or explosion may result.

Turn OFF the flashlight when not in use. (Never leave the product being ON)

Remove batteries immediately after exhaustion.

Batteries could produce flammable gas causing the flashlight to explode. Storing the flashlight with batteries for extended periods of time could cause batteries to leak, overheat or explode which may result in fire, injury or damage to other property.

When turn OFF the light, lock the switch at OFF position.

Remove batteries when not in use.

Unexpected activation of the light by vibration etc. could cause fire or injury.

Storing the light with batteries for extended periods of time may cause batteries to leak, overheat or explode which may result in fire, injury or damage to other property.



WARNING

Never leave or carry battery loaded battery cartridge as it is.

Make sure to store in insulated container like a ziplock to avoid short-circuit which could generate flammable gas from batteries and possibly cause accidental explosion or battery to explode, or lead to fire/injury/property damage due to battery leakage or generated heat.

Never attempt to modify the flashlight or disassemble the light head to avoid malfunction, damage or flooding, which could lead to injury.

Prevent water from entering the flashlight to avoid malfunction, damage or flooding, which could lead to injury.

Always check O-rings, batteries and flashlight operation before using to avoid flooding, malfunction and unexpected deactivation of the product due to battery exhaustion, which could lead to an accident.

Stop operating and turn off the flashlight immediately if any water is observed inside flashlight or flashlight operates improperly.

Flammable gas may build up and cause explosion of the product, which may result in serious injury. Remove batteries being careful to avoid electrical shocks or burns. Contact your local dealer for repair.

DO NOT use flammable solvent containing alcohol, benzene or thinners, oil and fat containing/chemical material like organic solvent, rust inhibitor, lubricant, polish, or alkaline detergent to clean the flashlight.

The use of these substances may lead to fire, explosion or damage to the flashlight.

Keep the flashlight out of reach of children.

Their inability to read and understand warnings may lead to serious injury. They may swallow parts of the strobe or batteries. See a doctor immediately if a child swallow parts or batteries.



CAUTION

DO NOT apply strong vibration or shock to the flashlight by dropping or hitting it against something.

Damage to the flashlight could cause malfunction or flooding possibly leading to injury or fire. Strong vibration/shock could deform batteries or damage battery case causing battery to leak or to generate heat resulting in fire or injury.

DO NOT “jump” into the water with the flashlight or other photographic equipment to avoid injury which may be caused by malfunction, flooding or unexpected movement of equipment.

DO NOT leave/store the flashlight in a place subject to strong sunlight or high temperatures, such as a beach, the deck of a boat, dashboard or trunk/boot of a vehicle.

Otherwise damage to the flashlight may result in injury, fire or malfunction.

Partially unscrew the Light Head or remove it for flying or traveling to other areas with lower air pressure than sea level (traveling across mountains for example) to avoid damage to waterproof integrity which may result in flooding or injury.



DANGER

DO NOT use batteries other than batteries specified in user manual.

[Compatible batteries]

- Panasonic AA “eneloop” rechargeable battery (BK-3MCC) [recommended] ,
Panasonic AA “eneloop pro” rechargeable battery (BK-3HCC, BK-3HCD) [recommended] , and
 (“eneloop” type) “new generation” NiMH battery with same performance
- “Conventional” NiMH battery (1.2V) other than above [good quality]
- AA Alkaline (1.2V)

DO NOT use any battery which you observe irregularity including leakage, deformation, discoloration or damage on battery jacket etc.

DO NOT throw a battery in a fire or heat it. Never attempt to disassemble or short-circuit a battery.

DO NOT immerse battery in water or allow it to get wet.

DO NOT mix old and new batteries, recharged and discharged batteries or batteries of different capacities, types, brand or manufacturer.

DO NOT attempt to recharge non-rechargeable batteries.

Be sure to recharge rechargeable batteries with specified battery charger. Follow battery and battery charger instruction manual.

DO NOT load batteries with the +/- battery terminal reversed

Follow any other instructions indicated in the battery/battery charger user manual.

Dispose batteries in accordance with all applicable federal, state and local regulations.

If the battery should leak • • •

- Keep away from fire to avoid ignition/explosion.
- Should inner liquid contact skin or eyes, or get into mouth, immediately wash with a lot of fresh water and seek medical advice.

As of May, 2019

INON LF650h-N Light Head

Thank you for purchasing INON product.

This product is a service part for INON LF650h-N and optional light head.

This unit is not usable as standalone and has to be properly assembled with compatible LF series LED flashlight battery box in exchange with pre-installed light head. Be sure to read this manual and relevant document to ensure you proper operation of the product.

Package contents :	• LF650h-N Light Head	×1
	• This instruction manual	×1
	• LF650h-N 「User Manual」	×1
	• LF650h-N 「Safety Precautions」	×1

Standard packaged accessory of the 「LF650h-N」(「INON Grease」etc.) are not included and optionally available.

Compatible LF series LED Flashlight (compatible "battery box unit" to attach this unit) :

- INON LF1000-S (LF1000-S Battery Box Unit)
- INON LF1100-W (LF1100-W Battery Box Unit)
- INON LF800-N (LF800-N Battery Box Unit)
- INON LF1300-EWf (LF1300-EWf Battery Box Unit)
- INON LF650h-N (LF650h-N Battery Box Unit)
- INON LF1100h-EWf (LF1h00h-EWf Battery Box Unit)

This unit is for 3 x AA operated LF-1000S, LF1100-W, LF800-N, LF1300-EWf, LF650h-N and LF1100h-EWf but not usable for LE series LED flashlights or LF series flashlight (LF1400-S, LF2700-W, LF3100-EW, LF2400h-EW) which runs by 6 x AA batteries.

- Handling Precautions:**
- Before shipping, this product has been tested its water-proof property by manufacture with special jig tool. However you have to take full responsibility on assembling with a battery box unit to ensure water-proof property as whole LED flashlight since assembly with a battery box unit is done by a customer and INON INC. are unable to check how you assemble nor conduct pressure test of the assembled unit. Please be sure to read relative user manual/instruction manual carefully and follow them to ensure you with proper assembling. Before using assembled unit, we would recommend to conduct leak test as necessary. **INON INC. cannot take any responsibility for any problem resulting from assembly of this unit. Please contact purchasing dealer before assembling if you are not fully confident in installing this unit on your battery box unit.**
 - Before assembling, be sure to read though the LF650h-N 「Safety Precautions」 comes with this product and follow warnings/cautions described there.
 - Refer to the LF650h-N "User Manual" **comes with this product** and "**Measures to Prevent Accidental Flooding**" **comes with your LF series LED flashlight** to see how to assemble, use and conduct maintenance.
 - Do not disassemble this unit to prevent malfunction/flooding.

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As of May 2019

INON

INON LF650h-N

Thank you for purchasing INON product.



The INON LF650h-N is a watertight LED flashlight equipped with high-intensity power LED producing powerful 650 lumen intensity/ultra narrow 5° coverage, and two power setting in its compact body.

Before using, please read through this user manual and separate leaflets 「Safety precautions」/「Measures to Prevent Accidental Flooding」 to ensure proper operation of the product.

Minimum working range on land is approx. 22cm/8.7” on land or approx. 30cm/11.8” underwater. Underwater optional accessory can bring working range closer. Refer to “Working Range” section in this page for detail.

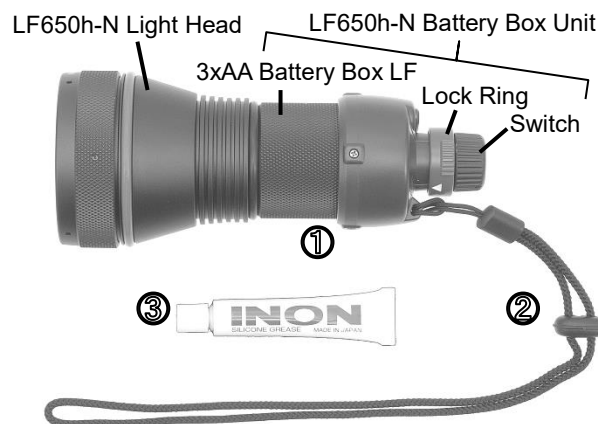
Features

- Usable in various field in addition to a diving light carrying 120m depth rating by its durable corrosion-resistant aluminum alloy and double O-ring construction for moving parts. In addition to general use on land, this product is best suited as a pointer or powerful constant lighting source for photography/videography thanks to its native 「5000K」 beam.
- Color temperature is approx. 6500K making it easier to reproduce natural color when mixing with ambient light or strobe light comparing to warmer color temperature torch
- Simple yet durable and user-friendly rotary switch assures you reliable ON/OFF and power setting operation. Operated by easily obtainable 3 x AA batteries. Compatible batteries including “eneloop” / “eneloop pro” etc. support approx. 90 minutes/1hr 30min (FULL) or approx.265 minutes/4hrs 25min (LOW) continuous operation (※) at minimal running cost.
※Average time to get half brightness comparing to initial performance when using “eneloop pro” batteries [Model code : BK-3HCD].
- Optionally available “Color Filter LF-N Set” consists of “Red Filter LF-N” which changes color not to stimulate marine lives and “Blue Filter LF-N” which calibrates to deliver further bluish light color. Other optional “Condenser Lens LF-N” functions to condense native narrow light further to expand application of this product as like “ultra- macro shooting with constant light”.
- Wide varieties of optional accessories are available including “Light Holder” products to attach this product on your camera/video system.
- Light Head is interchangeable with other compatible model to provide flexible usages.

	Waterproof LED flashlight	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
	MODEL : LF650h-N BATTERY : 1.5V  x 3 INON Inc. MADE IN JAPAN	

Package contents :

• LF650h-N ①	×1
• LF650h-N Light Head	×1
• LF650h-N Battery Box Unit	×1
(3xAA Battery Box LF)	
Switch	
Lock Ring	
• 3xAA Battery Cartridge LF	×1
(preinstalled in the battery box)	
• Hand Strap ② (preinstalled on ①)	×1
• INON Grease ③	×1
• This user manual	×1
• Safety Precautions	×1
• Measures to Prevent Accidental Flooding	×1
• Maintenance on battery terminals/contacts	×1



Working range : The LF650h-N carries unique optical system which successfully and effectively converts original 「125°(approx.)」 beam emitted from the LED module to ultra-narrow 「5°(approx.)」 beam. This unique optical construction delivers light within fixed range and will have center spot out of the working range as per below table.

Optional “Condenser Lens LF-N” supports various applications as it can change working range and minimum lit underwater.

LF650h-N Working Range

	Number of Condenser Lens LF-N	Working distance 【Min.】	Working distance 【Max.】 (*)	Diameter of lit area 【Min.】
air	Nil (Not usable on land)	approx.. 22cm/8.66”	∞	approx.. 6.5cm/2.56”
	Nil	approx.. 30cm/11.8”	∞	approx.. 7.0cm/2.76”
Underwater	1	approx.. 15cm/5.91”	∞ (**)	approx.. 3.5cm/1.38”
	2	approx.. 11cm/4.33”	approx.. 32cm/12.6”	approx.. 2.0cm/0.79”

* Theoretical working distance to illuminate a subject without significant center spot and not same as the maximum distance this product can deliver light.

** When illuminating a subject at approx.55cm/21.6” away or greater, using 「Condenser Lens LF-N」 will have bigger lit area.

Preparation

Prepare compatible batteries

Following 3 types are compatible with this product (*1). Prepare 『three』 batteries (same type/model) from same battery manufacture.

- 1) **Panasonic AA “eneloop” rechargeable battery (BK-3MCC) 【recommended】 ,
Panasonic AA “eneloop pro” rechargeable battery (BK-3HCC/BK-3HCD) 【recommended】 ,
Sanyo AA “eneloop” rechargeable battery (HR-3UTG/HR-3UTGA/HR-3UTGB) 【recommended】 ,
Sanyo AA “eneloop pro” rechargeable battery (HR-3UWX) 【recommended】 and
equivalent (“eneloop” type) “new generation” NiMH battery (*2)**
- 2) **AA “conventional” NiMH rechargeable battery other than above (1.2V) [good quality] (*3)**
- 3) **AA Alkaline battery (1.5V)**

*1 Other batteries are not usable such as AA Manganese battery, AA Oxyride battery or AA Lithium (1.5V) battery etc. Make sure to follow precautions of handling batteries described in separate 「Safety Precautions」.

*2 Including “new generation” NiMH batteries (“eneloop” type) carrying less self-discharging and heat generating characteristic comparing to “conventional” or “high-capacity” NiMH.

*3 Some “conventional” or “high-capacity” NiMH rechargeable batteries have significant self-discharge and heat-generating characteristic resulting difficulty to keep their performance during usage. We recommend using recommended batteries.

Turn OFF, lock, remove LF650h-N Light Head

Turn OFF the LF650h-N by rotating the “switch” counterclockwise until it has been stopped. Pull up the Lock Ring (①) and rotate it counterclockwise(②) to match its ∇ mark with “LOCK” position on “3xAA Battery Box LF” (③). Then screw in the switch (④) until it stopped to lock the switch position at OFF.



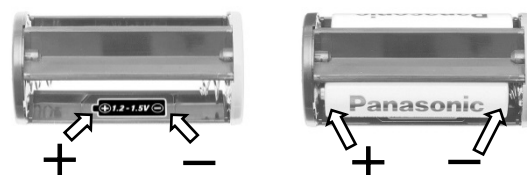
Next, with holding the “3xAA Battery Box LF” firmly, slowly turn the “LF650h-N Light Head” counterclockwise to separate the Light Head from the battery box unit.

To keep waterproof property, make sure slowly turn the switch/LF650h-N Light Head to prevent O-ring from being damaged/twisted.

Load Batteries in 3xAA Battery Cartridge LF

Take out “3xAA Battery Cartridge LF” from “3xAA Battery Box LF”. Conduct maintenance of “3xAA Battery Cartridge LF” in reference to 「Terminals/Contacts Maintenance」 section of this user manual.

Then install batteries in the “3xAA Battery Cartridge LF” with correct orientation as shown on stickers inside of the “3xAA Battery Cartridge LF” [Negative terminals must touch spring contacts]



Also make sure to follow any handling precautions on battery mentioned in separate 「Safety Precautions」.

Once batteries are loaded in “3xAA Battery Cartridge LF”, put it immediately in “3xAA Battery Box LF” with the LF650h-N being OFF or in an insulated container such as ziplock.

NEVER leave or carry battery loaded “3xAA Battery Cartridge LF” as its battery contacts being exposed.

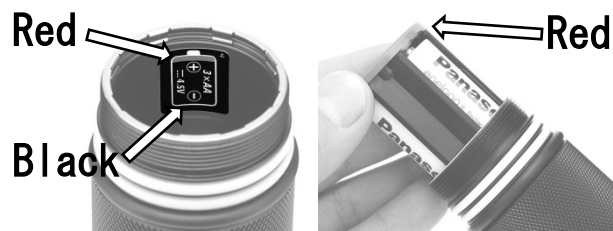
Doing so may have short circuit causing batteries to produce heat/explode/leak battery fluid resulting in fire/injury/property damage

Install 3xAA Battery Cartridge LF after Checking O-ring etc.

Check conditions of O-rings etc. and conduct leak test if necessary to ensure waterproof property in accordance with separate paper 「Measures to Prevent Accidental Flooding」.

Next, conduct maintenance in reference to 「Terminals/Contacts Maintenance」 section of this user manual , then install the 3xAA Battery Cartridge LF with correct orientation as shown in image right and indicated on a sticker inside of the “3xAA Battery Box LF”.

[positive[Red] terminal facing up]



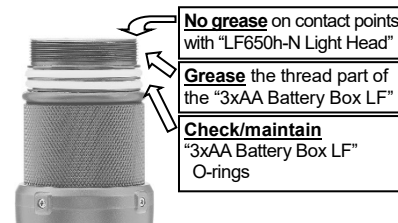
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Attach the LF650h-N Light Head

Apply thin film of INON grease on the thread part of the “3xAA Battery Box LF” to prevent 「salt build-up」 or 「electric corrosion」 causing anchoring between the “LF650h-N Light Head” and the “3xAA Battery Box LF”. Do not put grease on electrical contacts to avoid bad connection.

Make sure the LF650h-N is OFF once again at this stage, then slowly screw the LF650h-N Light Head onto the 3xAA Battery Box LF until it has been stopped with holding the 3xAA Battery Box LF firmly.

To keep waterproof property, make sure slowly turn the switch/LF650h-N Light Head to prevent O-ring from being damaged/twisted.

**Attach optional “Filter”/“Condenser Lens” as necessary**

Attach optional “Filter”/“Condenser Lens” if necessary. Refer to respective user manual for detail.

Operation

Unlock the switch Reverse procedure of previous “Turn OFF, lock, remove LF650h-N Light Head” section. Rotate the switch counterclockwise until lightly stopped, turn the Lock Ring clockwise to match ▽ mark with △ mark on the “3xAA Battery Box LF”, then hold it down to unlock the switch.

Always lock the switch at OFF position except for activating the light.

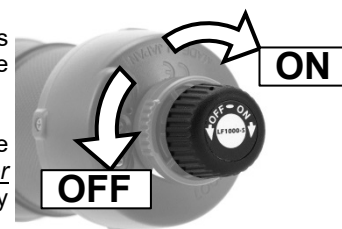
NEVER leave or carry the product with being the switch unlocked.

Doing so may cause unexpected operation of the product resulting in fire/injury/property damage.

ON/OFF , Selecting Power

To turn OFF the LF650h-N, slowly turn the switch counterclockwise until it has been lightly stopped. Slowly turn the switch clockwise for LOW mode and rotate further until it has been lightly stopped for FULL mode.

Make sure to turn all the way to the either end to turn ON(FULL)/OFF the LF650h-N. *When using LOW mode, make sure to turn 1/4 rotation further after activating the light.* Any position except OFF/LOW/FULL may possibly cause unstable operation like unexpected ON/OFF or flicking of the LF650h-N.



To keep waterproof property, make sure slowly turn the switch/LF650h-N Light Head to prevent O-ring from being damaged/twisted.

Change/Remove Batteries

The LF650h-N must be dry to change/remove batteries in accordance with previous 「Preparation」 section. If even a small amount of water contacts inside “LF650h-N Light Head” or contacts/terminals for short period of time, there will be corrosion of contact points or cause short circuit, and the LF650h-N may become inoperable. **Changing/removing batteries is not recommended if the LF650h-N is not completely dry. However if you have to change/remove battery before drying the LF650h-N, follow procedure below:**

- 1) Thoroughly wash the LF650h-N in fresh water and wipe off water drops with an air blower etc. in reference to “Maintenance” section.
- 2) Hold the LF650h-N with facing up so that no water droplets can enter inside the “LF650h-N Light Head” or drip on contacts/terminals.
- 3) Slowly unscrew the “LF650h-N Light Head” with facing it up to prevent water from getting in to take out batteries.

Maintenance

Rinse and Dry Completely

After dive soak the LF650h-N in fresh water for several hours (water temperature should be 0°C ~ +30°C/32°F ~ 86°F) **without any filter / Condenser Lens** to remove salt etc. Slowly turn the switch to remove trapped salt etc. but DO NOT turn the “LF650h-N Light Head” underwater. Then wipe off water droplets by an air blower etc. and dry the product completely in shaded and well ventilated area (it may take several days completely dry).

Remove Batteries and Check/Clean/Grease Thread Part/O-rings etc.

Make sure that the LF650h-N is completely dry, remove batteries in reverse procedure to loading batteries explained in 「Preparation」 section. Check/clean/grease O-rings, O-ring grooves, O-ring contact surfaces and thread parts of the “LF650h-N Light Head”/“3xAA Battery Box LF” in reference to separate leaflet 「**Measures to Prevent Accidental Flooding**」.

(continued)

Storage

Make sure to remove all batteries, then store in shaded and well-ventilated area within temperature range of [0°C ~ 30°C/32°F ~ 86°F].

Avoid storing near chemicals, high ozone, large temperature and humidity fluctuations (even in the temperature range described above) and magnetic fields (TV sets etc.) to prevent the product from possible malfunction and flooding.

- Handling precautions:**
- DO NOT disassemble the “LF650h-N Light Head” to avoid malfunction/flooding.
 - Protect from impact shock and vibration, such as vibrating boat deck to avoid accidental damage not only on this product but also on batteries.
 - Prevent sands or foreign substances from entering between the 3xAA Battery Box LF and the switch to avoid malfunction/flooding etc.
 - DO NOT leave the product to extreme heat, such as inside of a sun-heated car or in front of a heater, or in hot direct sunlight, such as a beach or boat deck to avoid malfunction/flooding etc.
 - This product is designed to withstand external pressure (water pressure), but not internal pressure (when ambient air pressure decreases). When traveling to or from high altitudes, including travel on an aircraft, always remove or loosen the “LF650h-N Light Head”.
 - Always hold the “3xAA Battery Box LF” instead holding the “LF650h-N Light Head” to prevent accidental loosening of the “LF650h-N Light Head” leading to flooding.
 - Make sure to use heat-safe gloves etc. for land use of this product. The “LF650h-N” surface and “3xAA Battery Box LF” surface could have heat more than 40°C/104°F causing personal injury like burn/low temperature burn.
 - Follow any other handling instructions/precautions explained in separate paper *[Safety precautions]*.
 - When turns OFF this product, **always lock the switch at OFF position. Unload all batteries** when not in use including during transportation to avoid accidental malfunction/fire/personal injury resulting from unexpected activation of this product by vibration etc.

- Battery**
- As batteries have been used, battery voltage gradually decreases making the LF650h-N intensity gets dark little by little. The rated continuous operable time is the duration to get half brightness comparing to initial performance.
 - In general, battery performance will decrease as temperature lowers, voltage will recover when not in use and batteries will slowly discharge over time when not used. And, usable time can greatly vary depending on water temperature and how the batteries are used etc. **We recommend replacing with sufficiently charged batteries even before they have been fully drained or carrying spare LF650h-N to avoid battery run out in the middle of a dive especially for night dive.**
 - Some NiMH batteries have high self-discharge rates and will begin to decrease their performance (intensity/continuous operable time etc.) immediately after charging. So we recommend using those NiMH batteries within one day after charging.
 - Also battery performance will decrease gradually with repeated charging and discharging, even within the possible number of charge-discharge cycles stated on the product package. When you observe less intensity/continuous operable time even with fully-charged (or refreshed) batteries, we recommend to change all batteries.
 - Together with these guidelines, be sure to read and understand **[Safety Precautions]** and any instructions that come with your batteries(rechargeable batteries/battery charger) and comply with any battery manufacturer requirements to ensure proper operation.

- Options**
- **Single Light Holder LF**
Optional product to attach single INON LF series LED flashlight including this product on “[YS Adapter] compatible arm”. Especially for handy and compact camera system set-up with INON [Shoe Base II] or [Grip Base D4].
 - **Strobe Light Holder LF**
Optional product to attach one or two INON LF series LED flashlight (excluding LF650h-N / LF800-N) on compatible lighting arm together with INON [S-2000], [D-200] or [Z-330]. The LF650h-N/LF800-N can be combined with [S-2000] strobe only via this holder but not with [Z-330] [D-200]. This product is attached on “[YS Adapter] compatible arm” including [Shoe Base II]/[Grip Base D4] etc. through [Z Joint]. Combination with the [Z Adapter II]/[Z Adapter] enables to attach on INON “Arm II System” or “Float Arm System” with [Clamp III].
 - **Single Light Holder LF for Tripod**
Optional product to attach one INON LF series LED flashlight on a tripod with 1/4-20UNC standard tripod screw hole. Usable for off camera lighting applications like backlighting or fish-lamp etc.
 - **Z Joint**
Optional product to attach [Strobe Light Holder LF] on “[YS Adapter] compatible arm”.
 - **Z Adapter II**
Optional product to attach [Strobe Light Holder LF] on INON “Arm II System” or “Float Arm System” with [Clamp III]. The ball-joint is made from metal to firmly fix strobe position by lightly clamp the [Clamp III].



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- **Spare O-ring Set (LF)**
Set of two yellow oil-bearing O-rings.
Refer to 「Measures to Prevent Accidental Flooding」 for detail.
- **INON Grease**
③ in the product image.
- **Color Filter LF-N Set (underwater use only)**
The set consists of “Red Filter LF-N” which changes color not to stimulate marine lives and “Blue Filter LF-N” which calibrates to deliver further bluish light.
- **Condenser Lens LF-N (underwater use only)**
Other optional “Condenser Lens LF-N” functions to condense native narrow light further to expand application of this product as like “ultra- macro shooting with constant light”. Packaged “Red Filter LF-N”/“Blue Filter LF-N” can be combined with the lens to change light color as well for different applications.
- **LF650h-N Light Head**
- **LF800-N Light Head**
Optional Light Head which produces narrow 5 degree beam as this product at 800lm/5000K. This Light Head is interchangeable with the original 「LF650h-N Light Head」 for other application.
- **LF1000-S Light Head**
Optional Light Head which produces 1000 lumen/5000K with 30 degree coverage. This Light Head is interchangeable with the original 「LF650h-N Light Head」 for other application.
- **LF1100h-EWf Light Head**
Optional Light Head which produces 1100 lumen/6500K with 100 degree coverage underwater supporting “shutter-linked Auto OFF” function. This Light Head is interchangeable with the original 「LF650h-N Light Head」 for other application.
- **LF1300-EWf Light Head**
Optional Light Head which produces 1300 lumen/5000K with 100 degree coverage underwater supporting “shutter-linked Auto OFF” function. This Light Head is interchangeable with the original 「LF650h-N Light Head」 for other application.
- **3xAA Battery Cartridge LF**



Terminals/Contacts: Maintenance

With the increased capacity, improved performance, and longer lifespan of different types of rechargeable batteries, it is possible for the performance of the LF650h-N to become unstable (the LF650h-N doesn't turn ON or flickers) due to bad contacts, caused by dirt or oxidation of the terminal surface of the rechargeable battery itself in addition to 【“LF650h-N Light Head” terminal/contact】/【“3xAA Battery Cartridge LF” terminal/contact】/【“3xAA Battery Box LF” terminal/contact】. For rechargeable battery terminals, it is difficult to distinguish through visual inspection of the terminal surface. As some rechargeable batteries can cause the above problems immediately after purchase because the terminal surface has already been oxidized, it is recommended to inspect and conduct maintenance periodically on the rechargeable battery terminals and LF650h-N terminals/contacts, by following the procedures described below.

● **Battery Terminals**

Conduct following maintenance within limitations/precautions described in battery instructions etc. if maintenance is necessary considering terminal conditions/performance of this product.

- 1) Wipe each terminal surface with a dry soft cloth/clean cotton swab (or similar) to remove any oil or similar residue.
- 2) If above step does not fully clean the terminal, dap a small amount of 『silver polish』 on a cotton swab (or similar) and wipe terminal surface until fully clean. Then clean off any 『silver polish』 residue with a clean swab.



● **“3xAA Battery Cartridge LF” Positive(+) Terminal**

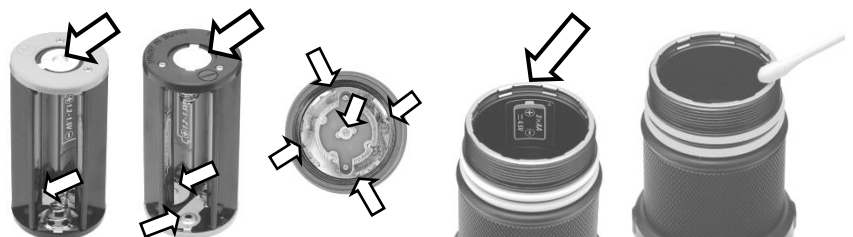
● **“3xAA Battery Cartridge LF” Contacts**

● **“LF650h-N Light Head” Terminal/Contacts**

● **“3xAA Battery Box LF” Contacts**

Clean up surface of contacts/terminals with clean cotton swab to wipe off any dirt/residual oil considering contacts/terminals condition/performance of this product.

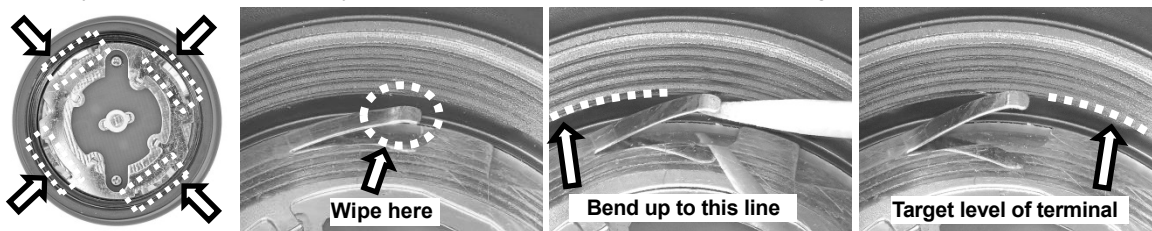
“3xAA Battery Box LF” contact has gold coating so maintenance should not be necessary under normal circumstances. If you observe foreign substances or water droplet etc. clean the contact with clean cotton swab as in the right image



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If above step fails to recover expected performance, conduct following maintenance on terminals (4 points) of the "LF650h-N Light Head".

- Dap a small amount of 『silver polish』 on a cotton swab (or similar) and wipe terminal surfaces until fully clean. Then clean off any 『silver polish』 residue with a clean swab.
- Slowly bend up all terminals by a bamboo stick etc. as shown in below images.



● **"Switch" Contact (Not mandatory)**

Maintenance of the switch contact may be necessary only for high frequent users when significant blinking is observed during switch operation. In this case contact your purchasing dealer for servicing.

INON Waterproof LED Light LF650h-N Specifications (*1)

LED	High-intensity Power LED (Cree XM-L2"4")
Max.Luminous flux (*2)(*3)	FULL mode: approx.650 lumen ["eneloop pro" battery]
	LOW mode: approx.250 lumen ["eneloop pro" battery]
Coverage	approx. 5°
Color Temp.(*3)	approx. 6500K
Operable Duration [air] (*4)(*6)	approx. 65 minutes ["eneloop" battery at FULL]
	approx. 215 minutes ["eneloop" battery at LOW]
	approx. 85 minutes ["eneloop pro" battery at FULL]
	approx. 265 minutes ["eneloop pro" battery at LOW]
	approx. 70 minutes [Alkaline battery at FULL]
	approx. 215 minutes [Alkaline battery at LOW]
Operable Duration [Underwater] (*5)(*6)	approx. 70 minutes ["eneloop" battery at FULL]
	approx. 215 minutes ["eneloop" battery at LOW]
	approx. 90 minutes ["eneloop pro" battery at FULL]
	approx. 265 minutes ["eneloop pro" battery at LOW]
	approx. 75 minutes [Alkaline battery at FULL]
	approx. 215 minutes [Alkaline battery at LOW]
EMC standards	EN 55015:2006 + A1:2007, EN 61547:1995 + A1:2000,
	CRF 47 FCC Part 15 [incidental radiator],
	AS/NZS CISPER 15:2006

Compatible Battery	AA "eneloop" / "eneloop pro" battery x 3 (*7)
	AA NiMH [good quality] x 3 (*8)
	AA Alkaline battery x 3
Depth rating	120m / 394'(*9)
Working range (*11)	approx. 22cm/8.66" ~ ∞ [air]
	approx. 30cm/11.8" ~ ∞ [Underwater, with/without a filter and without a condenser lens]
	approx. 15cm/5.91" ~ ∞ [Underwater, with one condenser lens]
	approx. 11cm/4.33" ~ 32cm/12.6" [Underwater, with two condenser lenses]
Size	Max. diameter 60.6mm/2.4" x 144.6mm/5.7"
Weight (*10)	Air: 270.2g/9.5oz, Underwater: approx.134g/4.7oz
Working/Storage Temperature	0°C~30°C / 32°F~86°F
LED life time	approx. 10,000 hours
Material/Finishing	Corrosion resistant aluminum alloy/rigid almite,
	PBT, PC, Optical grass etc.
Standard accessory	Hand Strap, INON Grease

*1) Subject to change without prior notice

*2) Nominal value calculated from LED manufacture specification sheet.

*3) Due to individual variability of LED, drive circuit or battery etc., luminous flux, color temperature or intensity may vary within rated specification.

*4) Average time to get half brightness when continuously turn ON the product with below listed batteries on land (approx. 20°C/68°F).

- "eneloop" battery : Panasonic "eneloop", BK-3MCC, 1.2V, Min.1,900mAh
- "eneloop pro" battery : Panasonic "eneloop pro", BK-3HCC, 1.2V, Min.2,500mAh
- Alkaline battery : Panasonic"EVOLTA NEO"LR6NJ, 1.5V

*5) Average time to get half brightness when continuously turn ON the product with below listed batteries underwater (approx. 25°C/77°F).

- "eneloop" battery : Panasonic "eneloop", BK-3MCC, 1.2V, Min.1,900mAh
- "eneloop pro" battery : Panasonic "eneloop pro", BK-3HCC, 1.2V, Min.2,500mAh
- Alkaline battery : Panasonic"EVOLTA NEO"LR6NJ, 1.5V

*6) Actual measured data by INON. The value may vary depending on product individual variability, battery manufacture/model, test condition.

*7) "New generation" NiMH batteries carrying less self-discharging and heat generating characteristic comparing to "conventional" or "high-capacity" NiMH including below listed batteries in right confirmed compatible by INON INC. as same as recommended 『Panasonic "eneloop"/"eneloop pro" battery (BK-3MCC, BK-3HCC / BK-3HCC)』.

- Panasonic Corporation Model name: eneloop [recommended] /Model code: BK-3MCC
- Panasonic Corporation Model name: eneloop pro [recommended] /Model code: BK-3HCC
- SANYO Electric Co.,Ltd Model name: eneloop [recommended] /Model code:HR-3JTG/HR-3JTG/HR-3JTCB
- SANYO Electric Co.,Ltd Model name: eneloop pro [recommended] /Model code: HR-3UWX
- Sony Corp. Model name: Cycle Energy Blue/Model cod : NH-AA-2BKA, NH-AA-4BKA
- Panasonic Corporation Model name: Rechargeable NiMH (AA)/Model code : HHR-3MPS
- Maha Energy Corporation Model name: IMEDION/Model code : MHRAA4
- GP Batteries International Ltd Model name: ReCyko+ /Model code : 210AAHCBE
- ANSMANNAG Model name: maxE/Model code : 5030991, 5030992, 5035052
- Electrochem Automation Inc. Model name: NEXcel energy/ON/Model code : n/a (AA,2000mAh)

*8) Some "conventional" or "high-capacity" NiMH rechargeable batteries have significant self-discharge and heat-generating characteristic resulting difficulty to keep their performance during usage. We recommend using recommended batteries.

*9) Without operating the "Switch". INON has confirmed depth rating 70m/230' including switch operation.

*10)Including 3 x AA "eneloop" batteries.

*11) Theoretical working distance to illuminate a subject without significant center spot and not same as the maximum distance this product can deliver light.

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