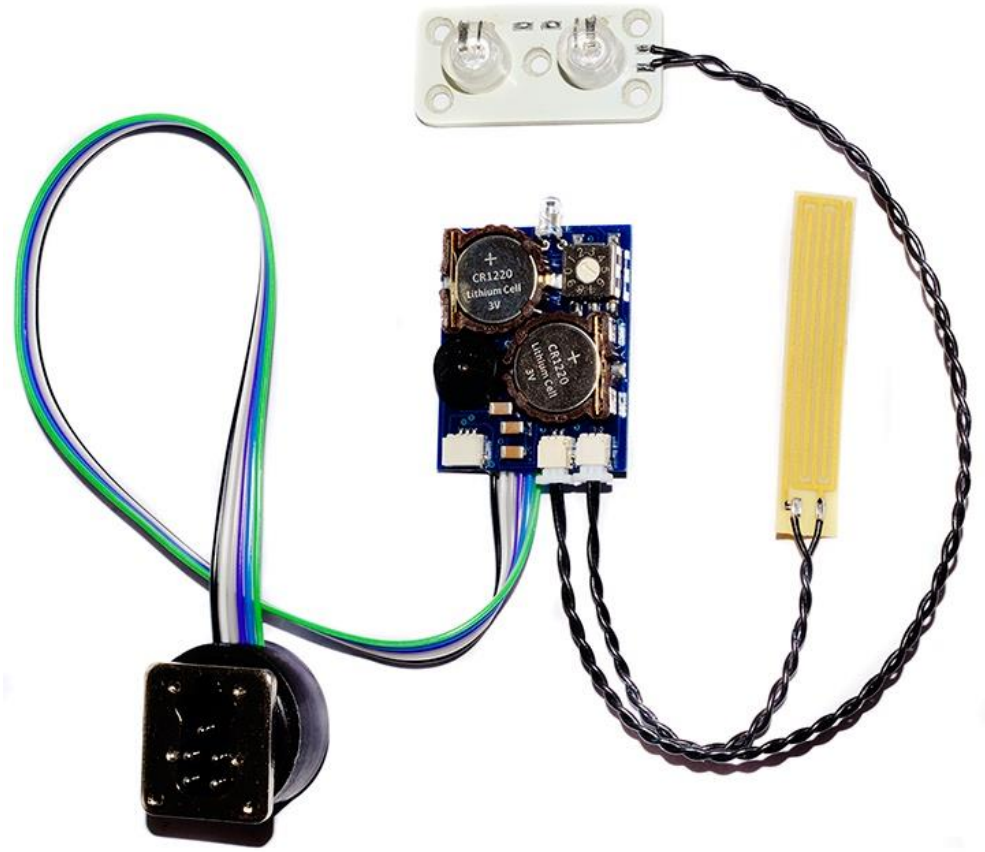
16017-HSS Optoelectronic TTL Converter for SEAFROGS underwater photo housings for NIKON cameras

(Firmware: June-2024)

USER'S MANUAL



Specifications

- Compatible photo cameras: Nikon
- Compatible underwater housings: Seafrogs
- Compatible TTL strobes: Inon Z240, Z330, S220, D200
  Sea&Sea YS-D3 Mark II, YS-D3-DUO, YS-D1, YS-250
  Ikelite DS-232, DS-230, DS-162, DS-161, DS-160, DS-125
  Retra Pro MAX (including HSS functionality)
  Subtronic Pro 270, Pro 160
  Marelux APOLLO-III V2.0, APOLLO-S (including HSS functionality)
- TTL outputs onboard: 2 optical (LED module) + 1 electrical output
- HSS (High Speed Synchronization) support: manual type HSS with Retra and Marelux strobes, - up to 1/8000 s
- Continuous shooting mode (CL / CH) support: yes
- "Rear/Front Curtain" modes support: yes
- Switching "TTL / M" underwater: yes
- (+/-) "Flash Exposure compensation" control underwater: yes
- Switching power "ON/OFF": automatic by camera command
- Battery type: CR1220 (2pcs.)
- Current consumption (in standby mode) 0.01 mkA
- Battery capacity (+20°C): 25 000 flashes, 1 year in standby mode
- Optical cable type: 613 core fiber type (Nauticam 26216 / 26217, HowShot 613L, Sea&Sea 50133 / 50128 / 50135)
- Electric Bulkhead type (optional UWTechnics Electric Bulkhead): Nikonos, Ikelite
- Dual Electric Sync Cord support: yes

Safety Warning for Batteries usage

- Use only batteries of the type specified in the Specification.
- Batteries must be new and undamaged. Carefully check batteries before usage.
- To avoid leakage or explosion, always check appropriate battery terminals position (“plus” terminal up) before installing to the TTL Converter.
- Never expose batteries to overheating, short-circuiting, disassembling, high pressure, mechanical deformation. Save batteries from high humidity and water. All these circumstances may cause a chemical leakage, electric shock, explosion or fire, which can be dangerous for health.
- Remove batteries from TTL Converter before longtime storage.
- Utilize used batteries according appropriate rules.
- Keep out batteries of children. Save batteries in inaccessible for children place

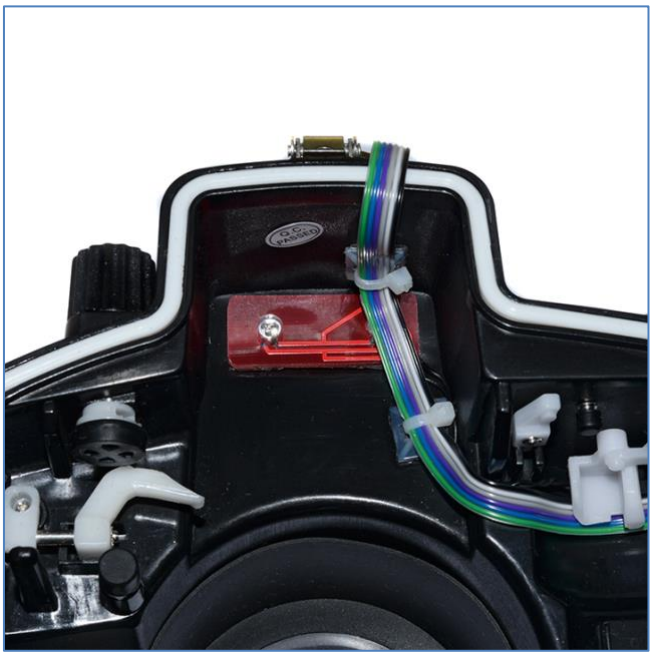
External cable connections for underwater strobes

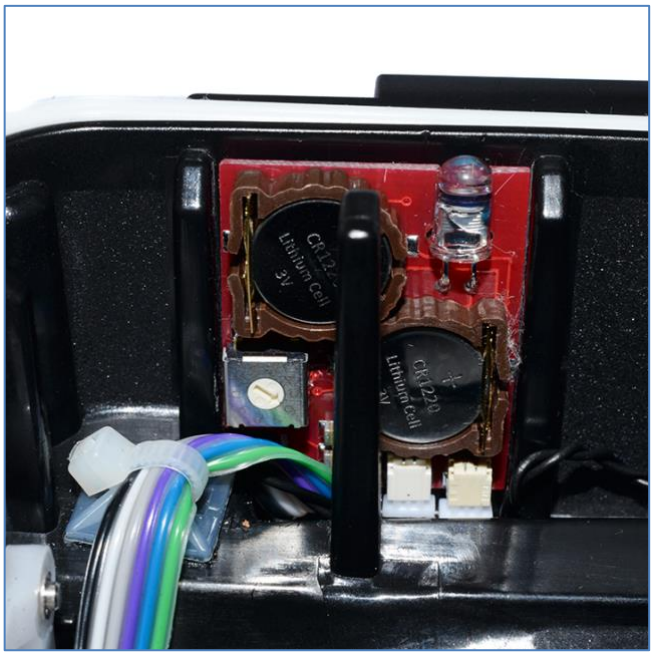
- TTL-Converter maintains synchronization for underwater strobes by Fiber Optical cable connection and by electric cable connection as well.
- Fiber optical cables can be connected via 2 optical sockets on the housing. It is possible to connect underwater strobes using a single or dual fiber optical cables listed in Specification above.

- The **613-core** fiber optical cable type is strongly recommended for usage with TTL Converter, to achieve an accurate automatic TTL flash control. TTL Converter is tuned for 613 fiber cable usage only. Other fiber cables have a lower “transmission index” and give a worse exposure in TTL flash control, and even can be totally incompatible.

- Electric sync cord can be used via electric (Nikonos or Ikelite style) UWTechnics bulkhead.
- Dual electric sync cord (“Sea&Sea”, “Ikelite”) can be connected to electric bulkhead as well.

Installation





- Remove Seafrogs original Leak Detector board and Sensor strip from the housing.

- Install UWTechnics Sensor strip to the bottom, instead of original. The sensor strip has an adhesive tape on the back side.

- Install Optical LED module on the surface of the housing front part, using the adhesive tape existing on the back surface. Connect the LED module cable to the TTL-Converter 2-pin socket.

- ***(Optional):*** In case of using Electric Synchronization, install UWTechnics optional electric bulkhead (Nikonos, or Ikelite style) on the top of the housing (instead of original Seafrogs electric bulkhead), and connect the cable to 3-pin socket on the TTL-Converter board.
- Connect Sensor strip cable to TTL-Converter board 2-pin socket (the last right socket on the board).

- Insert batteries into TTL-Converter. Before installation check that “plus” terminal of each battery is in Up position. Be careful to avoid damaging of 2 plastic taps of the battery holder, - first insert the battery edge below those plastic taps, then push battery down until the click).

- Make few test shots with TTL flash.

- Test Leak Detector alarm by touching the sensor with wet finger.

- Fix TTL-Converter board on the housing wall by double-side adhesive tape on the back side, or by a drop of glue.

➢ **IMPORTANT! Changing the batteries (every 6 months), first please remove the TTL Converter from the housing. Remove battery from the holder slightly moving the metal contact to a side by the finger. Be careful, to avoid the metal contact bending and opposite plastic protrusions damaging. Insert the new battery one edge under the plastic protrusions first, then push the other edge of battery down until it clicks with metal side contact.**

Setting the strobe type

- Set TTL-Converter rotary switch according to your strobe type:
  - **0** – **Manual Mode** (TTL protocol is disabled)
  - **1** – **Inon Z240, D200, Sea&Sea YS-D1**
  - **2** – **Marelux APOLLO-III V2.0**, **APOLLO-S, Sea&Sea YS-D3-DUO** (YS-D3-DUO details are listed below)
  - **3** – **Sea&Sea YS-D3 Mark II**
  - **4** – **Ikelite DS-232, DS-230, Sea&Sea YS-250, Subtronic Pro 270** (by electric sync cord)
  - **5** – **Ikelite DS-162, DS-161, DS-160, DS-125** (by electric sync cord)
  - **6 – Inon Z330**
  - **7 – Retra Pro MAX**
  - **8 – Subtronic Pro 160** (by electric sync cord)
  - **9 – Inon S220**

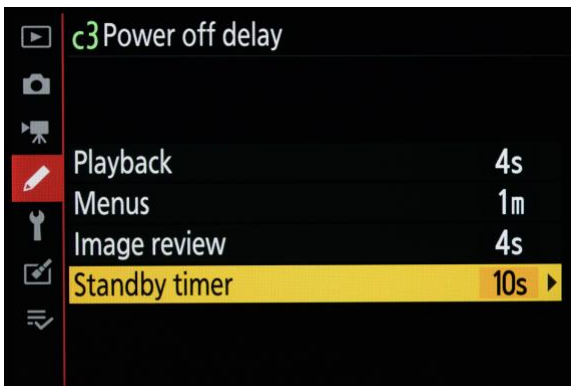
- **YS-D3-DUO strobe programming details and notes:**

  - **YS-D3-DUO must be programmed before the usage**, using its User Manual, to the following settings:
  - *Pre-flash cancel* setting must be programmed: “5.6” (mode C),
  - *Optical input* setting must be programmed: “1” (mode 10, - factory default).
  - *Manual mode* of the strobe must be set to “Manual Mode-2” for single flash synchronization without Pre-Flashes.

  - **Note:** Available TTL range is restricted by the input signal processing algorithm inside the YS-D3 DUO strobe.

Battery energy saving

- **IMPORTANT!** Set an acceptable small **“Standby Timer”** (or “**Power Off Delay”**) and other small times of camera activity (time for image viewing, menu displaying time etc.) in camera menu. This is important for TTL Converter battery saving. When camera is in Standby mode or switched OFF, the TTL-Converter is switched OFF automatically.
- **Strongly recommended time – 4…10 seconds.** This is a normal time to look an image underwater and save energy the same time. Don’t set any significant time, it causes quick battery exhausting.

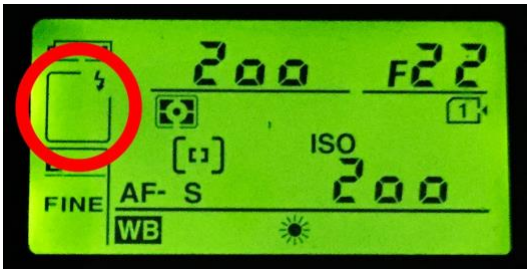


Initial settings

- Set the TTL Converter rotary switch to position 1-9 according to your strobe type.
- insert the Hot Shoe plug into the camera socket until it stops.
- Switch ON the camera.

- **TTL Converter ON/OFF.** The product activates automatically (**power is ON**) when user pushes camera Shutter Release Button or other controls for focusing or shooting. Device goes to standby mode (**power is OFF**) also automatically few seconds later after camera going to its standby mode, camera deactivation, camera mechanically switching OFF, or after disconnection from camera Hot Shoe.

- If TTL Converter works properly, **camera recognizes a compatible TTL device** on the Hot Shoe socket and confirms it by the **“Flash” symbol** on the service screen.

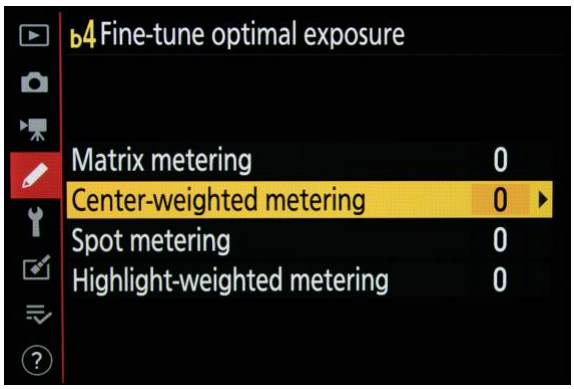


- If **“Flash”** symbol does not appear on the screen, it means that intellectual communication protocol between camera and TTL Converterdoes does not work.

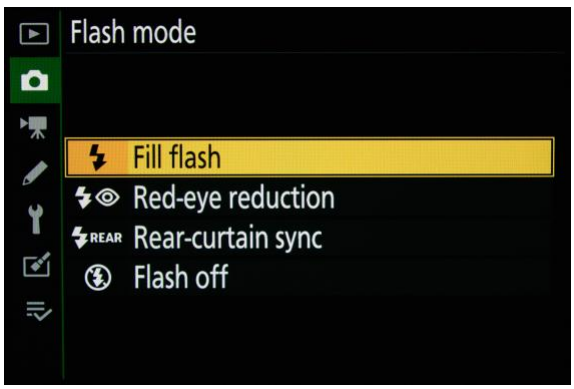
Shooting in TTL flash mode

- Adjust your camera settings before the underwater shooting:

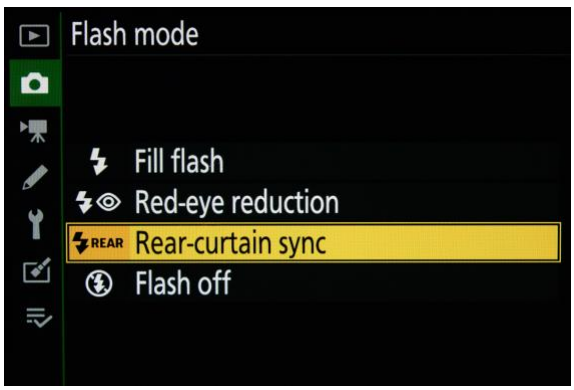
  - Set appropriate “**Exposure Metering Type”** for the flash TTL (**“Matrix”, “Central-weighted, “Point”** etc.) according to your shooting tasks and conditions. Right type of TTL exposure metering is the key setting for accurate TTL flash work. In case of wrong setting, the shot may be over-lighted, or under-lighted. If you have an experience, also tune the **“Fune-tune optimal exposure”** correction (+/-) for each type of metering (if this option exists in your camera model**)**, this option is often required in underwater shooting.
    If you don’t have an experience, for beginning please set **“Central-weighted metering**”, as most popular:



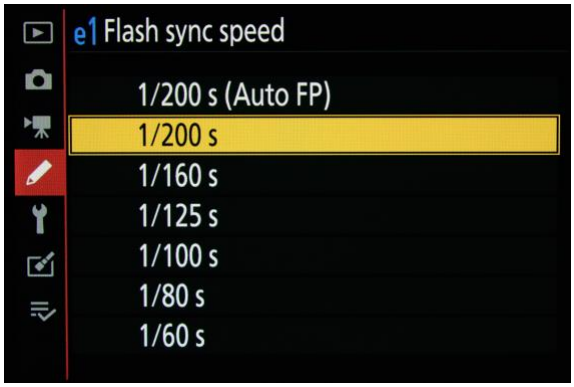
  - Set necessary synchronization for the flash, using menu **“Flash mode” (“Flash Synchronization Mode”)**. The most popular sync mode is **“Fill Flash”,** it means **“Front curtain”** synchronization (**1-st curtain sync**). So, for beginning, please set **“Fill Flash”** (**1st curtain sync**).



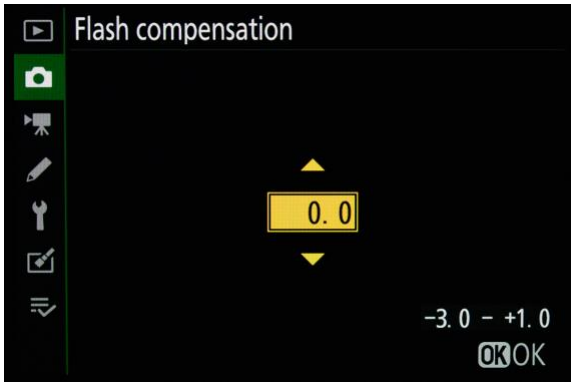
  - Later, as an option for special creative shooting, you also can set **“Rear-curtain sync” (“2-nd Curtain sync”) mode.** This option is supported by TTL-Converter as well:



  - For shooting in TTL flash mode user should set a desired maximum “**Flash sync speed”** by camera menu, for example - **1/200 s**. **Shooting in TTL mode, don’t set any sync speeds marked by “Auto FP**”. The command “Auto FP” is assigned by the TTL Converter firmware for switching the system to M (manual) mode, this feature is explained later in the partition “Shooting in Manual Mode” of this User Manual.
    For the beginning, set **“Flash sync speed”** to **1/200 s** for example:



- Set **"Flash Compensation"** and **"Exposure Compensation"** to "0 Ev", as initial value. Later you will have to adjust it as desired (+/-) correction to TTL flash intensity:



- Set Manual controls mode by camera dial and set manually the **Aperture** and **Shutter Speed**, according to the real underwater conditions and shooting task. It is recommended to set manually (fixed value) Aperture and Shutter speed (in M-mode of camera controls). The automatic modes and semi-automatic modes (A, T, P etc.) also can be used by experienced users. But in common case, the fully automatic or half-automatic modes of setting Aperture/Shutter/ISO are not recommended for underwater shooting, because of unpredictable results in underwater conditions.

- Set recommended **Aperture** in range **F8-F16** for **Wide-angle photo**, or **F16-F22** for **Macro photo**, as initial settings.

- Set manually the appropriate fixed **ISO**. TTL Converter can work effectively in ISO range 50….25600, but depending on the shooting conditions certainly. For most of cases of wide-angle underwater shooting it is recommended to use medium level **ISO 400….800** for best resolution and TTL accuracy with most of strobes. For Macro shooting it is recommended to use **ISO 200…400**.
  Be careful choosing extremely high ISO values or "Auto-ISO" mode, it may cause over-lighting by underwater strobes.

- Use other settings recommended by your camera User's Manual.

- Set underwater strobe dial switch to desired **TTL mode.** Please refer to your strobe User Manual to choose an appropriate mode. Usually it marked "S-TTL" ("DS-TTL II", or "TTL" etc.) on the strobe body.

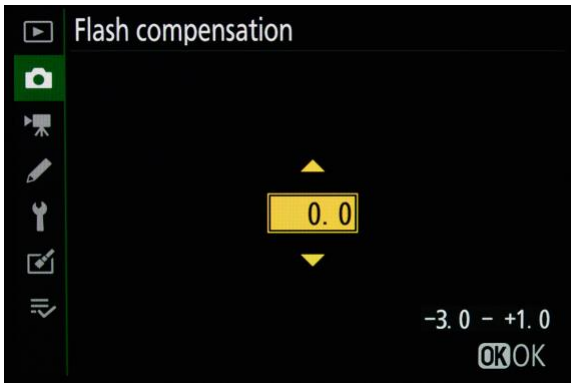
- Set TTL-correction (+/-Ev) dial switch on the strobe body to "0 Ev" position, as initial setting for Optical TTL usage. It may be adjusted later if necessary.

- On the **INON Z240, Z330, S220, D200** strobes body set the following modes by the dial knobs:

  - Set "**STTL**" mode by the left dial switch.
  - In case of Electric Sync Cord usage, set (+/-Ev) set right dial switch to position "**TTL**" (another words "9 o'clock" position).
  - In case of Fiber Optical Cable usage, set (+/-Ev) set right dial switch to position "**0 Ev**" (another words "12 o'clock" position).
  - Magnet must be locked in "Push" (**down**) position for both cases mentioned above.

- Make a few **TTL test shots** with a flash (on the land, before diving), checking image quality via camera display. If image is too dark, or too light, you should **adjust (+/-) Flash Exposure Compensation**" by camera menu:

- Later, during the diving, depending on concrete underwater subject type, strobes type and condition, fiber cables, ambient light underwater etc., photographer can use +/- TTL flash correction ("**Flash Exposure Compensation**") in the whole available range, **to reach balanced TTL lighting**:



- Don't forget that you can adjust the +/-TTL correction mentioned above, by **2 ways**:
  1) **Using camera menu "Flash exposure compensation"** (for INON strobes it is effective for both Fiber-optical TTL and Electric TTL connections). Available range of "Flash exposure compensation" for Nikon cameras: **-3ev…0...+1ev.** User can adjust it by steps 0.3ev or 0.5ev (step should be set in camera menu), viewing +/-Ev value on the camera screen.
  2) **Using (+/-Ev) dial switch on the underwater strobe body** (for INON strobes it is effective for Fiber-optical connection only).

- **Continuous shooting** (**CL/CH modes)** are available at all modes of TTL Converter, but underwater strobes usually recycle a significant time (2-3 seconds), so the TTL shots in fast long series usually have a different lighting. For accurate TTL work it is strongly recommended to make 2-3 seconds interval between shots.
  To reach an acceptable lighting for shots in fast series, user should use **Manual mode** and set a **small flash intensity**.

- **IMPORTANT**! For normal TTL accuracy don't set your strobe closer than 0.35m to object underwater (for land tests - not closer than 0.7m) **to keep the system inside of working TTL range**.

- In some shooting conditions TTL may be not effective or **out of working range.** This case please use **Manual modes,** described below.

- TTL-Converter maintains **nominal accuracy of TTL flash lighting only for underwater conditions**.
  Shooting on the land may give another result.

Shooting in MANUAL flash mode

TTL-Converter supports 2 different variants of manual flash mode (described below in detail):

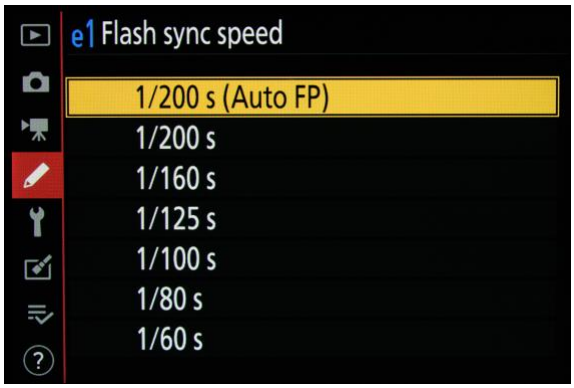
- ***Manual Flash Mode set via camera menu*** ("Auto FP" command usage, flash intensity also can be adjusted via camera menu),
- ***Manual Flash Mode at rotary switch "0" position*** (When TTL Converter rotary switch is in "0" position, the communication protocol with camera is disabled).

Manual Flash Mode set via camera menu (using "Auto FP" command):

- Switching the flash system to such kind of M mode during the dive (underwater) is a most useful feature.

- Nikon classic menu did not have an original command for switching to M flash mode, that is why the **"Auto FP"** command was assigned for switching to **M mode** in the TTL Converter firmware.

- Switch TTL Converter to this mode, using the camera menu "Flash sync speed": ***Bracketing/flash >> Flash sync speed >> 1/200 Auto FP (or 1/250 Auto FP):***



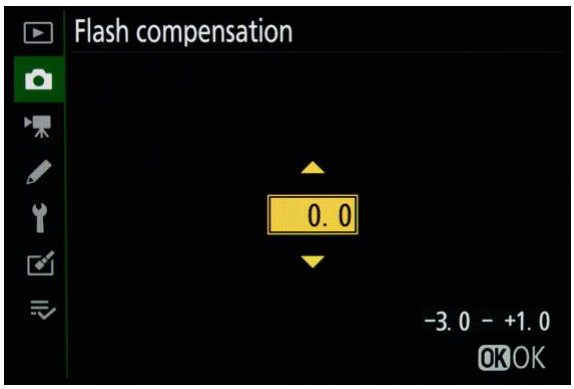
- Usually Nikon camera has 1 or 2 such sync speeds marked **"Auto FP".** Choosing a speed marked **"Auto FP",** you point TTL-Converter to **"Manual Flash Mode"** without Pre-Flashes. TTL Converter produces only a **single main flash** in this mode.

- **IMPORTANT!** Pay attention, that “Auto FP” functionality also allows ultra-fast FP shutter speeds in the camera. To avoid mistakes for lighting using underwater strobes, **set shutter speeds not faster than** “***speed of X-synchronization”*** of your camera. Most modern Nikon cameras with mechanical shutter have maximum X-sync speed **1/200 or 1/250**.

Flash Intensity Adjustment in this mode:

1) For the **flash intensity adjustment by the camera controls** in this mode**,** -
the strobe must be set in **“TTL”** mode by the dial switch on the strobe body. The other dial switch (+/- Ev) can be at “0” position as initial setting.
User adjusts the flash intensity by the camera menu **“Flash Compensation”, rotating the camera control dial.** He also can look at the **camera scale “Flash Compensation” (-3ev…+1ev)** existing on most of Nikon cameras service screen.
Flash intensity adjustment range: from Minimum flash intensity (displays as “-3ev” on camera screen) to Maximum flash intensity (displays as “+1ev” on camera screen). Possible to setup step 0.3ev or 0.5ev by camera menu.

   In this mode photographer can keep hands on the housing handles and adjust flash intensity manually by camera controls only, this is very comfortable, he does not need to rotate the adjustment switches on the pair of strobe bodies.



2) For the **flash intensity adjustment by the strobe dial switch** in this mode**, -**
the strobe must be set in **“M”** mode without Pre-Flashes**”** by the dial switch on the strobe body.
User can **adjust the flash intensity by the other dial switch on the strobe body**.

Manual Flash Mode at rotary switch “0” position:

- Switch system to Manual mode by setting TTL-Converter onboard rotary switch to “0” position.
- This operation can be done only before submerging, when underwater housing is open.
- **TTL protocol communication is totally disabled** in this case. The symbol “Flash” disappears from camera service screen.
- In this mode all Pre-Flashes are disabled. TTL-Converter produces **a single control pulse of maximum available power** at each shutter release.
- For the **flash intensity adjustment by the strobe dial switch** in this mode**, -**
the strobe must be set in **“M”** mode without Pre-Flashes**”** by the dial switch on the strobe body.
User can **adjust the flash intensity by the other dial switch on the strobe body**

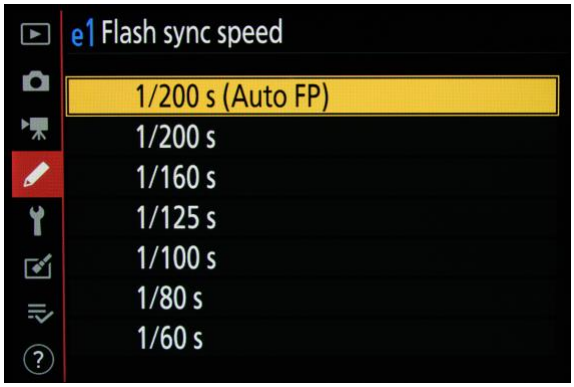
HSS (High Speed Synchronization) with Retra and Apollo strobes

3) High Speed Synchronization (Nikon “FP”, Canon “HSS”) are available up to 1/8000s in the most of modern photo cameras.

4) Pay attention, that Apollo and Retra strobes HSS system performs only Manual type flash, but not TTL. The flash intensity can be adjusted only manually by the knob on the strobe body.

5) For shooting with a flash at FP (HSS) speeds, set the following settings:

- Set the strobe dial knob to “**HSS**” position.
- Set Manual (M) HSS flash mode in the Converter system via camera menu (**using “Auto FP” command**).



- Test camera with a flash at any HSS speeds (up to 1/8000s). Adjust the desired flash intensity by the strobe dial knob.

- Pay attention that 1/200 and 1/250 shutter speeds on most of cameras usually don't require FP (HSS) type flash. Independently of menu "Auto FP" setting, camera uses just a normal sync flash for them. If set strobe at "HSS" knob position, but camera at 1/200 or 1/250 Auto FP position, then a small black strip (1-st curtain) may be visible at the image. So, for 1/200 or 1/250 please use normal sync speed modes of the strobe, to get properly lighted images.

Ultra-fast Shutter Speeds for shooting with ambient light (without flash)

- Camera automatically limits sync speed 1/250 (or 1/200) for classic flash system, if Hot Shoe plug is connected. But our new TTL-Converter **firmware allows to use ultra-fast shutter speeds** for shooting underwater (or half-water, or above the water surface) with ambient sunlight as well (but without flashing) **even if Hot Shoe plug is connected**. User does not need to reopen the housing to disconnect the Hot Shoe plug for such aim.

- These ultra-fast shutter speeds for shooting with natural sunlight are available in Manual mode of the system (use "Auto FP" command to set M mode) up to 1/8000 (depending on camera model). All models of classic underwater strobes in this case will not produce a flash, the flash is automatically switched OFF via TTL-converter control.

Continuous (Serial) Shooting using underwater strobes

- TTL Converter supports Continuous shooting in all modes, including TTL and M modes. But the main role in this case performs the underwater strobe itself (read below).

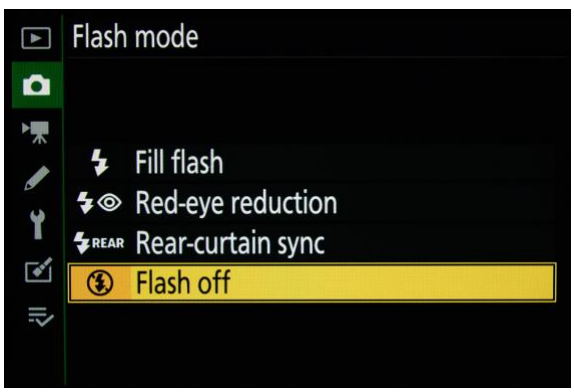
- Compact size underwater strobes (like Z-240, Z-330, YS-D1, YS-D3 Mark II etc.) have small size capacitor inside, and usually are not able to fully recharge it quick enough between series of TTL doubled flashes (pre-flash + main flash). Each next shot the energy is less, not enough to keep accurate pre-flash and main flash. That is why, compact size underwater strobes are not recommended for Continuous (Serial) Shooting in TTL mode. The 1st shot will have normal exposure, but the next shots will have different lighting or none at all. The effect strength depends on specific strobe's capabilities.

- Large size underwater strobes (like YS-250, DS-162 etc.) have bigger size main capacitor inside, which contents much more energy. Those strobes work some better in Continuous (Serial) Shooting TTL mode. The user usually can make few shots with acceptable lighting. However, the best lighting accuracy anyway will be for the first 1-2 shots in series, the next shots will have less flash exposure. The effect strength depends on specific strobe's capabilities.

- In common case, all underwater strobes support accurate TTL lighting only in Single Shot mode (not Continuous Shooting Mode), because underwater strobe must be fully charged before each flash. Usually full charging time for modern underwater strobes is 3-8 seconds. For Continuous (Serial) Shooting with underwater strobes, it is recommended to use **Manual mode** and set **small flash intensities**. This way it is possible to get serial shots with acceptable lighting accuracy, due to a small energy of each flash.

Shooting with flash off

Photographer can set **"Flash OFF"** mode by camera menu, or assign **"Fn"** button (by menu) to option "flash off" on some cameras. Use this option when it is necessary to temporary switch the flash OFF.



Storage

- After shooting please switch OFF the camera. This way you save TTL Converter battery energy.
- Disconnect TTL Converter Hot Shoe plug from camera after the diving. This way you defend the TTL-Converter from any accidents. Also, you save TTL Converter battery, because current consumption is minimum in this case.
- For a longtime storage remove batteries from TTL-Converter.

Warranty

- This warranty only applies to products purchased from Underwater Technics authorized distributor / dealer and does not extend beyond the initial retail purchaser.
- Product warranted against any manufacturing defects for two years from the date of purchase for consumer use.
- Manufacturer accepts no responsibility for any damage and defects in product caused by improper use and/or poor maintenance.
- The product is intended for underwater use. Damages or defects caused by use on land will be rated as improper use and are not covered by the warranty.
- Manufacturer does not hold responsibility for damage of any equipment used with the product.
- Manufacturer accepts no responsibility for any loss of captured images or the inability to capture images even if it is due to the malfunctioning of the product.
- In case of warranty claim the corresponding proof-of-purchase (sales receipt / invoice) or warranty certificate issued by an official regional Underwater Technics distributor / dealer must be presented.
- Underwater Technics company and its distributors / dealers don’t cover the warranty if the corresponding proof-of-purchase (sales receipt / invoice) or warranty certificate issued by an official regional Underwater Technics distributor / dealer is not produced when presenting a warranty claim.
- Unauthorized modifications and/or repairs of the product will automatically invalidate this warranty.
- To return products for service, please contact authorized dealer in your region.