11086-HSS Optoelectronic TTL Converter
for ISOTTA underwater photo housings for CANON cameras
(including 2 LEDs)

(Firmware: June-2024)

USER'S MANUAL

Specifications

- Compatible underwater housings: Isotta
- Compatible photo cameras Canon
- Compatible TTL strobes: Inon Z-330, Z-240, D-200, S-220
  Sea&Sea YS-250, YS-D1, YS-D3 Mark II, YSD3-DUO
  Ikelite DS-232, DS-230, DS-162, DS-161, DS-160, DS-125
  Retra Pro MAX (including HSS functionality)
  Marelux APOLLO-III V2.0, APOLLO-S (including HSS functionality)
  Subtronic Pro 270, Pro 160
- TTL outputs onboard: 2 optical + 1 electrical
- HSS (High Speed Synchronization) support manual type HSS with Retra and Apollo strobes, - up to 1/8000s
- Flash settings control by camera menu yes
- Flash settings storage in TTL Converter nonvolatile onboard memory, even after power is turned off yes
- Rear / Front Curtain synchronization support: yes
- Continuous shooting mode (CL / CH) support: yes
- Switching "TTL / M" underwater: yes
- (+/-) "Flash Exposure compensation" support: yes
- Switching power "ON/OFF": automatic by camera command
- Battery type: CR2032 (2pcs.)
- Current consumption (in standby mode) 0.01 mkA
- Battery capacity (+20°C): 65 000 flashes, 1 year in standby mode
- Fiber-optical cable type: 613 cores only (Nauticam 26216 / 26217, HowShot 613L, Sea&Sea 50133 / 50128 / 50135)
- Compatible Electric Bulkheads (optional accessories): UWTechnics electric M14 bulkheads (Nikonos, S-6, Ikelite)
- Electric Sync Cord support (Sea&Sea, Ikelite): yes
- Dual Electric Sync Cord support (Sea&Sea, Ikelite): 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

Installation in ISOTTA underwater housing

- Only separable new style bulkheads (with 5-mm transparent insert for LED replacement inside) are compatible. Ask the housing manufacturer about the optical bulkhead ability for disassembling and compatibility with standard 5mm-LEDs, before purchasing the TTL Converter.
- Unscrew the Isotta optical bulkhead upper part. Don't unscrew the optical bulkhead from the housing (!!).
- Put on the original Isotta O-ring on the each LED.
- Install both LEDs into the existing Isotta optical bulkheads.
- Screw the upper part of the optical bulkhead.
- Remove Isotta original electronic circuitry from the front part of the housing.
- Install 2 batteries CR2032 into the TTL board battery holder, plus terminal (+) in Up position.
- Connect both LEDs and electric Nikonos bulkhead (if exist) to the TTL board sockets.
- Install TTL board to the plastic podium, fix it by 4 screws.
- Perform the pressure test (in pressure chamber) for the housing to check the quality of sealings inside the optical bulkheads.

External cable connection 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 1 electric Isotta original bulkhead.
- Dual electric sync cord ("Sea&Sea", "Ikelite") can be connected to the electric bulkhead as well.

Setting your strobe type

- Set TTL-Converter onboard rotary switch according to your strobe type:

  - **0** – **Manual Mode** (TTL protocol is disabled)
  - **1** – **Inon Z-240, D-200, Marelux APOLLO-III V2.0, APOLLO-S (**including HSS functionality)
  - **2** – **Sea&Sea YS-D1, Inon S-220**
  - **3** – **Sea&Sea YS-D3 Mark II**
  - **4** – **Ikelite DS-232, DS-230, Sea&Sea YS-250, Subtronic Pro-270**
  - **5** – **Ikelite DS-162, DS-161, DS-160, DS-125**
  - **6 – Inon Z-330**
  - **7 – Retra Pro MAX (**including HSS functionality)
  - **8 – Subtronic Pro-160** (by electric sync cord)
  - **9 – Sea&Sea YS-D3 DUO** (YS-D3 DUO strobe programming and notes are listed below)

IMPORTANT! Please, read the notes given below for some strobes usage:

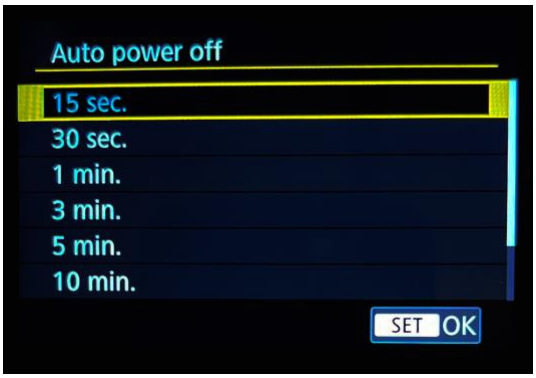
- **YS-D3-DUO strobe programming and notes:**

  - **YS-D3-DUO must be programmed before the usage**, according to 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).

  - **Note2:** TTL Converter's special feature "Flash intensity adjustment by camera controls in **"Controlled Manual mode"** (look the appropriate partition below) is not applicable with YS-D3 DUO, because of the optical signal processing algorithm inside the strobe. But electric input of YS-D3 DUO supports this feature.

TTL Converter battery energy saving

- In camera menu please set an acceptable Review Time and Time before going to Standby mode and other timings of camera activity, these are most important settings for TTL-Converter battery saving. When camera is active, TTL Converter is also active and consumes energy from battery. When camera is in Standby mode or switched OFF, the TTL-Converter is also switched OFF automatically.
  Recommended time of camera activity, – 15 seconds, or another minimal time allowed by the camera menu. Also, please set a minimum time for viewing image and other similar camera activities. Don't set "Hold" option in camera menu, it causes fast battery drain.

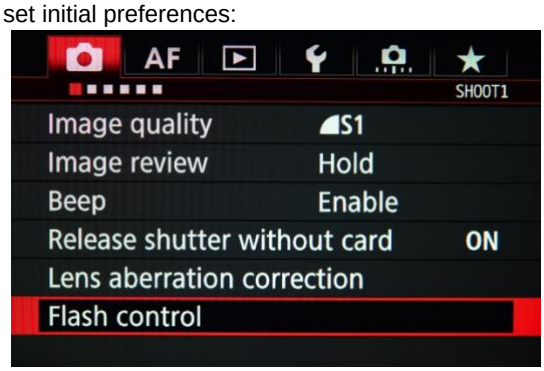


Initial settings for underwater shooting with flash

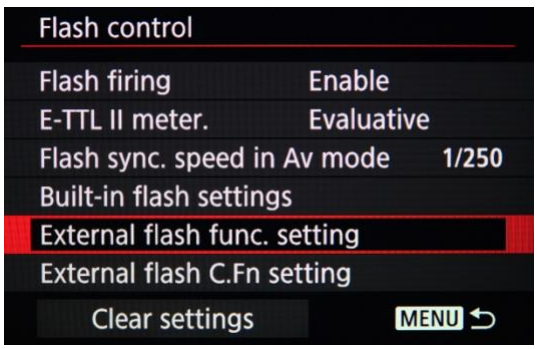
- Set and check the following camera settings before underwater shooting:

  - Set Camera mode ("M", "P", "A", "S" etc.), dependently of preferences. For underwater shooting it is recommended to use "M" mode, when user can manually set fixed aperture and fixed shutter speed.
  - Set appropriate Exposure Metering ("Evaluative", "Partial", "Spot", "Center-weighted) according your shooting conditions. Right type of Exposure Metering is the key setting for accurate TTL work. In case of wrong setting, the shot may be significantly over-lighted, or under-lighted.
  - Set **"Mechanical" shutter** type. All other options regarding shutter type in camera menu must be set for "mechanical" shutter usage too.
  - Set camera's "Flash Exposure Compensation" (and "Exposure Compensation") to "0 Ev", as initial setting.
  - Set appropriate ISO. For most of cases it is recommended to use ISO 200….400 for best resolution and TTL accuracy underwater. For TTL shooting with Retra strobes it is recommended to use ISO 400 and higher.
  - Set Aperture and Shutter Speed according real underwater conditions and shooting task.
  - Shooting in TTL mode with classic underwater strobes, the maximum mono-flash sync speed allowed by the cameras is about 1/250.
  - Shooting in manual mode with Retra and Apollo strobes, sync speeds are available also in HSS range, - up to 1/8000s.
  - Recommended apertures F8-F16 for wide angle underwater photo, and F16-F22 for Macro photo, as initial settings.
  - Use other settings recommended by your camera User Manual.

- Using camera menu photographer can totally control TTL Converter underwater.
- Flash settings are always stored in TTL-Converter nonvolatile onboard memory, even after power is turned off. This is very comfortable feature. After shooting on land, all last flash settings for underwater usage will be loaded into the camera automatically from TTL Converter.
- Enter **Flash control** menu to set initial preferences:

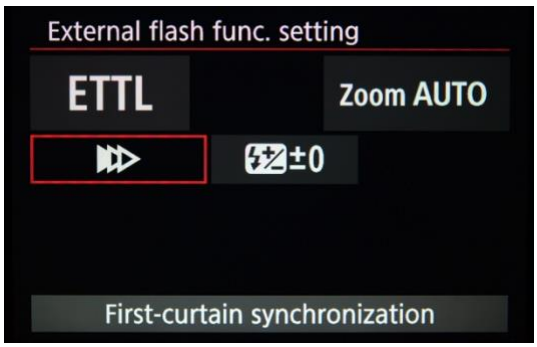


- Enter **External flash functions setting** submenu:



- **Flash firing** – “Enable” (switch ON the flash) or “Disable” (switch OFF the flash)
- **E-TTL II meter.** – Recommended to set **“Average”** metering type, as initial setting, **“Evaluative” type** also can be useful with some camera models.
- **Flash sync. speed in Av mode** – “1/250 fixed”, “1/60-1/250 auto” or “Auto’

- Enter submenu for **Synchronization** settings:



- Set **“1st curtain”** or **“2nd curtain”,** or **“HSS”** synchronization:

Shooting in TTL flash mode

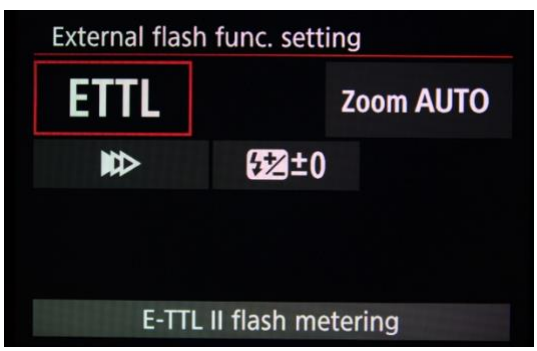
- Set main dial switch on the underwater strobe body to TTL mode. Please refer to concrete strobe User Manual to choose an appropriate mode (Z330, Z-240, Retra Pro MAX set to “S-TTL”, YS-D1 set to “DS-TTL”, YS-250/DS-161/DS160 set to “TTL”).

- Set another dial (+/- Ev correction) on the underwater strobe body to “0 ev” position, as initial setting. Using Z-240/Z330 strobes, pay attention: magnet must be in “Push” position, for fiber optical connection set second dial switch to “0 Ev” (position “12 o’clock”), for electric wire connection set to “ttl” mark as fixed position (“9 o’clock”). In case of optical TTL, adjustment (+/-) is available by the strobe dial “+/- Ev” and also by the camera wheel “flash exposure compensation”, the final value is the sum of these two corrections. In case of electric wire TTL, adjustment (+/-) is unavailable by the strobe dial, but available by the camera control wheel using “flash exposure compensation”.

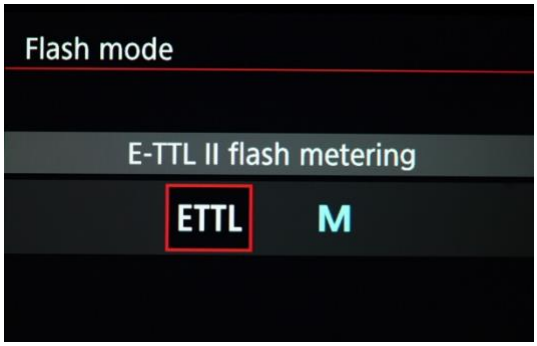
- Connect TTL-Converter Hot Shoe plug to the camera Hot Shoe socket. Switch ON the camera. TTL-Converter activates automatically (switch ON) when user pushes camera Shutter Release Button for shooting or focusing. Device goes to standby mode (switch OFF) also automatically few seconds later (according the camera command), or after disconnection from camera Hot Shoe socket.

- Camera recognizes E-TTL device on the Hot Shoe socket and confirms compatibility by the “Flash” symbol  on the service screen. Submenu “External Flash func. settings” becomes available in camera menu only in case of full compatibility of camera and TTL-Converter.

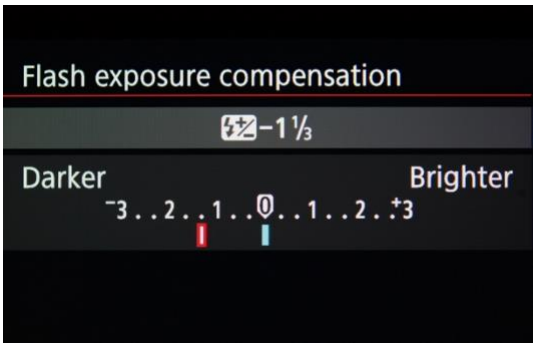
- Enter submenu **Flash mode**:



- Set **ETTL flash mode**:



- Set “1-st curtain” or “2-nd curtain” synchronization type.
- Don’t set “HSS” menu option when shooting in TTL mode, - this setting switches system to manual HSS mode even if TTL option is set.
- During the initial test, dependently of concrete camera model, strobes condition etc., photographer should initially adjust (+/-) correction to TTL Flash exposure control. (Flash Exposure Compensation). Pay attention on this.
  Later, photographer should use necessary correction in wide range, according shooting conditions, if images are to bright or too dark.



For the shooting, TTL Flash exposure compensation is available by 2 ways:
- Use “+/- Ev” dial on the underwater strobe body (adjustment works for fiber-optical type connection only).
- Use camera “Flash Exposure Compensation” function. Such adjustment is recommended, it is deeper, more accurate, works for both types of connection. Available “Flash Exposure Compensation” range for Canon cameras: -3 Ev…0...+3 Ev. User can adjust it by steps 0.3 Ev or 0.5 Ev (choose the step by camera menu), viewing the value on the camera menu scale.
  The same adjustment is available by camera wheel, looking to camera service screen scale.

- Shooting macro, for normal TTL accuracy the nearest distance from underwater strobe to a target must be more than 0.35m underwater (or more than 0.7m for the land tests), to keep the system inside of working TTL range. But camera can be positioned as close to the target as necessary.

- TTL Converter is tuned for the normal TTL accuracy underwater. Land tests may give another result.

- In some shooting conditions or camera settings, TTL system may be not effective or ***out of working range*****.** This case photographer should use Manual flash mode.

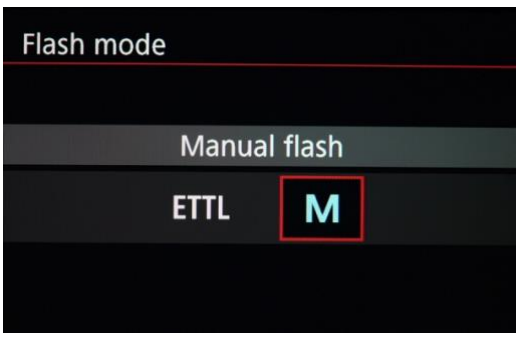
Shooting in Manual flash mode

- Underwater photographer can use 3 different ways to shoot in Manual mode:
  - Camera menu Manual mode
  - Underwater strobe Manual mode
  - TTL-Converter hardwire Manual mode

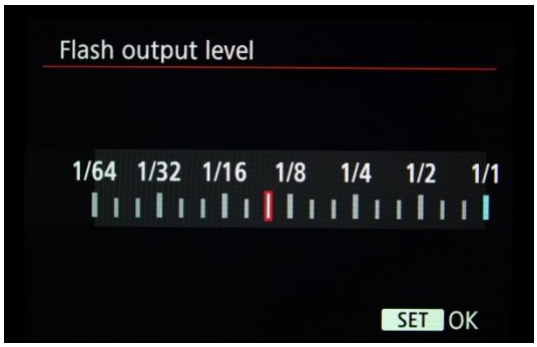
  - **Camera menu Manual Mode (controlled M mode)**

    Switch system to Manual mode by camera menu.
    Set underwater strobe to S-TTL (TTL) mode for availability of flash output adjustment via camera controls.

    This is preferable Manual mode for universal usage, easy switchable and controllable under water during the diving. This case TTL-Converter also switches to appropriate M mode automatically by camera command.



In such Manual mode also becomes available flash output level scale in submenu. User can adjust flash output level by camera wheel, looking to this menu scale (or looking to camera service screen):



Some manual underwater strobes (like MF-1) requires very strong optical signal for synchronization, this case necessary to set maximum power by this scale (1/1).

- **Special note for YS-D3 DUO strobe usage:** TTL Converter's Flash intensity adjustment by camera controls in this "Controlled Manual mode" is not applicable with YS-D3 DUO via optical input, because of the optical signal processing algorithm inside the strobe. However, the electric input of YS-D3 DUO supports this feature normally.

- **Underwater Strobe Manual Mode:**

  Set underwater strobe to M mode without pre-flashes. Adjust strobe light intensity by the dial switch on the strobe body.

  Recommended settings in camera menu: "M" mode, flash output level "1/1".
  For information: If camera is in "M" mode by menu, - all Pre-flashes in system are disabled.

  If user needs to get full dump from underwater strobe, - set "FULL" on the strobe body, set camera menu to "M" mode and flash output level "1/1" by camera menu.

- **TTL-Converter hardwire Manual Mode** (set by onboard switch to "0" position):

  Set TTL-Converter onboard rotary switch to "0" position.
  Set underwater strobe to M mode without pre-flashes. Adjust strobe light intensity by the dial switch on the strobe body.

  Setting TTL-Converter rotary switch to "0" position can be done only before submerging, when the housing is open. This is forced Manual mode. This case camera does not recognize any device on it's HotShoe socket, TTL protocol in system is totally disabled.
  In this mode TTL-Converter emits single pulse of fixed (maximum) duration at each shutter release.
  This mode is recommended for any creative shooting, for example using long length fiber optical cables (up to 40m length is supported), or for usage with TTL incompatible underwater strobes, or for any other difficult situations.
  For information: In this Manual mode all Pre-flashes are disabled.

HSS (High Speed Synchronization) with Retra and APOLLO strobes

- "HSS" shutter speeds on most of Canon cameras are available up to 1/8000 s.
- Pay attention, that Retra and APOLLO high speed sync mode performs a Manual type flash, but not TTL. In this HSS mode the flash intensity can be adjusted only manually by the strobe dial knob.
- For shooting with a flash at HSS speeds, please do the following settings:
  - Set strobe dial knob to "HSS" position.
  - Set HSS type synchronization and M flash mode in the Canon camera menu for External Flash Control.
  - Adjust necessary flash intensity by the strobe dial knob.

Shutter High Speeds availability for shooting with ambient light

- Classic underwater strobes produce a mono-flash, they cannot work in HSS range speeds (excluding Retra and Apollo strobes), camera automatically limits sync speed 1/250 for them, usually until Hot Shoe plug is connected. But our new TTL-Converter firmware allows shutter high speeds usage for shooting underwater with ambient sunlight as well (without flash) even if Hot Shoe plug is connected. User does not need to reopen the housing to disconnect the Hot Shoe plug.

- Shutter high speeds for shooting are available in Manual HSS mode of the system in range 1/320 ….1/8000 (and faster, dependently of camera model). All models of underwater strobes (excluding Retra and Apollo) in this case don't produce a flash and automatically OFF via TTL-converter control. Only Retra and Apollo strobes in this mode can produce a flash (HSS flash).

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 plays underwater strobes specific (read below).

- Compact size underwater strobes like Z-240, Z-330, YS-D1, YS-D3 Mk II etc. have rather weak charger inside, which cannot charge the strobe quick enough between series of TTL doubled flashes (pre-flash + main flash). Each next shot the energy is not enough to keep accurate pre-flash duration. That is why, compact size underwater strobes are not recommended for Continuous (Serial) Shooting in TTL mode. The 1st shot will have normal lighting, but next shots will have different lighting or none at all. The effect depends on specific strobe's capabilities.

- Large size underwater strobes, like YS-250, DS-161, DS-160 etc. have more powerful charger inside and large main capacitor. Those strobes work some better in Continuous (Serial) Shooting TTL mode. The user can make more shots with acceptable lighting. However, the best lighting accuracy will be on only the first 1-3 shots in series, the others may have different lighting. The effect depends on specific strobe's capabilities.

- For Continuous (Serial) Shooting with underwater strobes, it is strongly recommended to use **Manual mode** and set **small flash intensities** manually. This way it is possible to get serial shots with acceptable lighting accuracy due to reduced recycle times.

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.