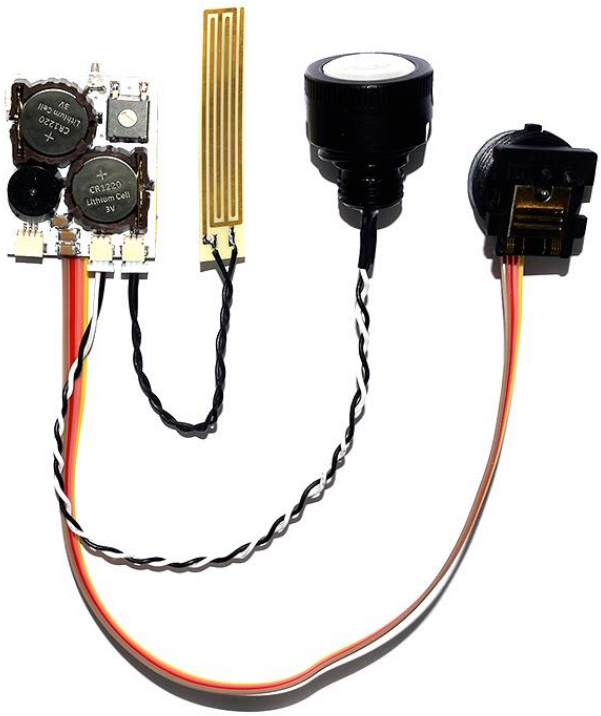
16034-HSS Optoelectronic TTL Converter
for SEAFROGS underwater photo housings
(housing version with an electric bulkhead on the top)
for SONY A7, A7II, A7III, A7IV cameras

(Firmware: June-2024)

USER'S MANUAL



Specifications

- Compatible photo cameras: Sony
- Compatible underwater housings: Seafrogs for Sony A7, A7II, A7III, A7IV
- Compatible strobes: Inon Z-330, Z-240, S-220, D-200,
  Sea&Sea YS-250, YS-D1, YS-D3 Mark II, YS-D3 DUO,
  Ikelite Ds-232, DS-230, DS-162, DS-161, DS-160, DS-125,
  Subtronic Pro-270, Pro-160 (by electric sync cord),
  Retra Pro MAX (including HSS functionality),
  Marelux APOLLO-III V2.0, APOLLO-S (including HSS functionality)
- TTL outputs onboard: 1 optical + 1 electrical
- Optical Bulkhead (Seafrogs style mount): 1 pc
- HSS (High Speed Synchronization) support manual type HSS with Retra and Apollo strobes, - up to 1/8000s
- Flash settings control by camera menu 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: CR1220 (2pcs.)
- Current consumption (in standby mode) 0.01 mkA
- Battery capacity (+20°C): 25 000 flashes, 6 months 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 bulkheads (Nikonos, 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

- Remove original Seafrogs Leak Detector and sensor strip from the housing.
- Install UWTechnics sensor strip to the bottom, instead of original sensor. The sensor strip has an adhesive tape on the back side.
- Unscrew the nut and remove the original Seafrogs electric bulkhead from the housing. Keep the original nut for further installation of Optical bulkhead.
- Before Optical bulkhead installation, please check both o-rings condition and grease them by silicone lubricant. Install Optical bulkhead to its place and screw the nut (use original Seafrogs nut from electric bulkhead). Connect Optical bulkhead cable to the TTL-Converter 2-pin socket.
- ***(Optional):*** In case of using Electric Sync Cord for synchronization, install UWTecnics electric bulkhead (Nikonos or Ikelite style bulkhead) the same way and connect the cable to 3-pin socket on the TTL-Converter board.
- Connect Leak Detector sensor cable to TTL-Converter boar 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.
- Make few shots, testing TTL flash control work with the camera and underwater strobe.
- Test Leak Detector alarm by touching the sensor with wet finger.
- Glue TTL-Converter board on the housing wall by double-side adhesive tape, or by a drop of glue.

Optional Accessories compatible with Seafrogs housing

- **UW Technics #91385 Nikonos style Bulkhead (Seafrogs mount)** with cable and Ci-11 connector.
- **UW Technics #91386 Ikelite style Bulkhead (Seafrogs mount)** with cable and Ci-11 connector.
- **UW Technics #91303 Optical Bulkhead (Seafrogs mount)** with cable and Ci-11 connector.
- Bulkheads are optional products and must be purchased separately

External cable connection to 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 1 Optical Bulkhead installed on the top of the housing (instead of Seafrogs original electric bulkhead). 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 (Nikonos or Ikelite style) UWTechnics bulkhead installed on the top of the housing (instead of Seafrogs original electric bulkhead).
- Dual electric sync cords ("Sea&Sea", "Ikelite") can be connected to the electric bulkhead as well.

Initial Settings

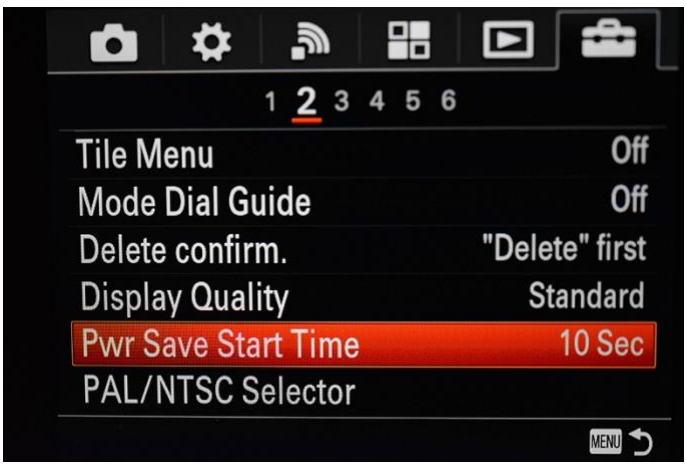
- Set and check camera settings before underwater shooting:
  - Set only **"Mechanical Shutter"** type in camera menu. You also can use **"e-Front Curtain Shutter".** But don't set fully Electronic Shutter by menu, it is not supported by this TTL system.
  - Set Camera mode ("M", "P", "A", "S" etc.), as is your preference. For underwater shooting it is recommended to use "M" mode, so the underwater photographer can control Aperture and Shutter Speed manually.
  - Set Aperture and Shutter Speed according to the actual underwater conditions and shooting task. Do not exceed 1/250 shutter speed (1/250 is maximum "sync speed") when using mono-flash underwater strobes.
  - Set appropriate Exposure Metering ("Multi", "Spot", "Center") according to the shooting conditions. The right type of Exposure Metering is the key setting for accurate TTL work. In the case of wrong setting, the shot may be over exposed, or under exposed.
  - Set camera's "Flash Exposure Compensation" (and "Exposure Compensation") to "0 ev", as initial setting.
  - Set appropriate ISO. Recommended to use ISO 200….400 for the best resolution and TTL accuracy underwater.
  - Use recommended apertures F8-F11 for Wide-angle underwater photo, and F11-F22 for Macro photo.
  - Use other settings recommended by your camera User's Manual.

TTL Converter Battery energy saving

- **TTL Converter battery can work about 1 year, but only if camera activity settings have been set properly by user.**

- When camera is active, TTL Converter is also active and consumes energy from battery. When camera is not active (Standby mode or switched OFF), the TTL-Converter is also switched OFF automatically.

- Please set acceptable minimum **Power Save Start Time**, **Image Review Time and other timings for camera activity**. These are most important camera menu settings for TTL Converter battery energy saving.
  Recommended camera activity time setting is about 10 seconds, or less if allowed by camera menu.
  Don't set "Hold" or similar option of activity in camera menu, it causes fast battery drain.



Setting the strobe type

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

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

- **Sea&Sea 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).

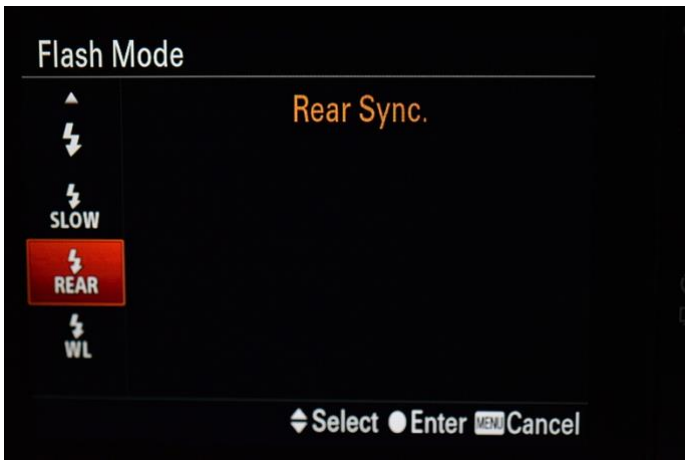
- **Note1:** Sony camera must be set by menu to the Electronic 1-st curtain shutter type (**front e-curtain**) for this TTL Converter usage with YS-D3 DUO, because of the processing algorithm inside the YS-D3 DUO strobe. Sony menu setting "mechanical shutter" is not applicable.
- **Note2:** TTL Converter's 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.

- **Marelux APOLLO-III, APOLLO-S strobes** (important note):

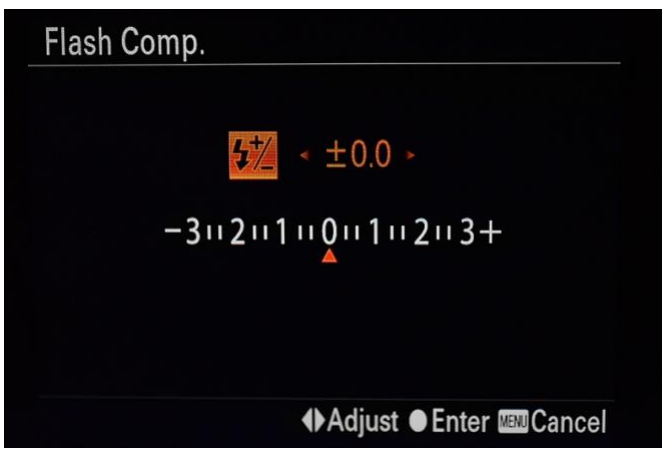
  - Shooting in TTL mode, please pay attention that Apollo-III is a high-power strobe**,** so position the strobe not closer than 0.35m from the subject underwater (and not closer than 0.7m from subject on air). For better TTL accuracy set camera ISO 100 - 500. The best TTL performance can be achieved at ISO 200.

Shooting in TTL mode

- Set main dial switch on the underwater strobe body to TTL mode. Please refer to strobe's User Manual to choose appropriate mode (Z330, Z240 set to "S-TTL", YS-D1/D3mkII set to "DS-TTL", YS-250/DS-162, DS-161/DS160 set to "TTL").
- Set the dial (+/-Ev correction) on the underwater strobe body to "0 ev" position, as initial setting.
- Using Z240 / Z330 strobe, pay attention:
  1) Pre-flash control magnet must be in "Push" (down) position and locked by rotation.
  2) Using optical synchronization, set right dial switch on the strobe body to "0ev" (position "12 o'clock"), but using electrical wire synchronization set right dial switch to "ttl" mark as fixed position ("9 o'clock").
  3) In case of optical synchronization, TTL correction (+/-) is available by the strobe dial switch "+/-Ev" and also by the camera controls via "Flash Exposure Compensation". The final correction value is the sum of these two corrections. Pay attention: In case of electric wire synchronization, the adjustment (+/-) by the strobe dial is unavailable on most of underwater strobes, but still available by camera controls 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) automatically a few seconds later (based on input from the camera), or after disconnection from camera Hot Shoe socket.
- Camera recognizes Sony compatible TTL device on the Hot Shoe socket and confirms the compatibility by the two "Flash" symbols  on the service screen.
- In Flash Mode menu set "Fill-flash", "Slow" sync, or "Rear curtain" sync, depending on the shooting tasks:



- Based on the concrete camera model and strobes quantity (a single strobe, a pair, or more) photographer should set any initial (+/-) Flash Exposure Compensation for balanced flash lighting. Please make a land test of TTL work before submerging.
- During the shooting underwater, photographer can use (+/-) Flash Exposure Compensation in wide range (-3ev ….+3ev), based on shooting conditions, subjects and tasks, if images are too bright or too dark.



In normal operation, TTL +/- Flash exposure compensation adjustment is available for underwater photographer through 2 methods:

- Using "+/-Ev" dial switch on the underwater strobe body (adjustment works for fiber-optical type connection only).
- Using camera "Flash Exposure Compensation" function. Such adjustment type is recommended as more accurate, and it works for both types of connection (optical / electric). Available "Flash Exposure Compensation" range for Sony cameras: -3ev…0...+3ev. User can adjust it in steps 0.3ev or 0.5ev (set the step by camera menu), viewing the value on the camera menu scale.

- Set only Mechanical Shutter type in camera menu. This is important for normal TTL work. Don't use fully electronic shutter (option available in some cameras menu). Only e-front curtan can be activated, if necessary.
- 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 the camera can be positioned as close to the target as user requires so long as the strobe minimum distance is adjusted
- TTL-Converter is tuned for normal TTL accuracy under water. Land tests may give different results.
- In some shooting conditions or camera settings, TTL system may be not effective or **out of working range.** This case photographer should use **Manual mode**.

Shooting in Manual mode

- Underwater photographer can use 3 different methods for shooting in Manual mode:
  - *Camera menu Manual mode*
  - *Underwater strobe Manual mode*
  - *TTL-Converter hardwire Manual mode*

○ Camera menu controlled Manual Mode (set by camera menu assigned command – "WL")

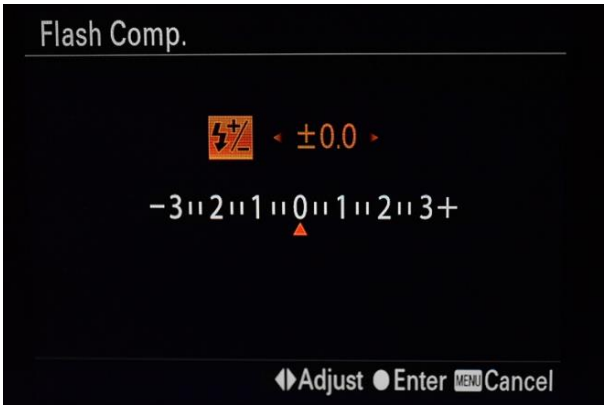
Switch TTL-converter to Manual mode by camera menu ("WL" setting in menu).
Set underwater strobe to "S-TTL" mode on the dial switch on the strobe body, - to control light intensity manually via camera scale.

Sony camera menu does not have any original command for switching to M mode. That is why the "**WL**" command (On/Off) is assigned for this aim via TTL-Converter firmware. "**WL**" command ON switches TTL-Converter to M mode without Pre-flashes. This is preferable Manual mode for universal usage, easy switchable and controllable during the diving.

Based on your camera firmware, if "**WL**" sign doesn't show on the Flash Mode Menu, it can also be found on page 11 of Camera Menu 1. When ON, it will override the flash mode setting menu and the TTL system will operate in Manual Mode only.

In this Manual Mode the **flash intensity manual adjustment by camera menu** also becomes available**.** Pay attention, underwater strobe must be in STTL mode for this function. Then, user can comfortably adjust flash intensity by camera wheel, looking at the camera scale. Full scale range (-3ev….+3ev) corresponds to flash intensities 1/64 …1/1.

Some manual underwater strobes (like MF-1) requires very strong optical signal for synchronization, this case necessary to set maximum power by this scale (+3 ev):



- **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. Although the electric input of YS-D3 DUO supports this feature normally.

- **Underwater Strobe Manual Mode** (set by underwater strobe dial switch):

  Set underwater strobe dial switch to M mode without pre-flashes. Adjust strobe light intensity by the dial switch on the strobe body.
  Shooting in this mode, it is strongly recommended to set TTL-Converter also to M mode (by camera menu "WL" command), to exclude Pre-flashes in system (for energy saving).

- **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 by dial switch on the strobe body. 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 closing the case, while the housing is open. This is a hardwired Manual mode. In this mode the 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, without Pre-flashes.
  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.

High Speed Synchronization (HSS) with Retra and Apollo strobes

- HSS shutter speeds are available for underwater flash usage up to 1/8000 for most of Sony A7-A9 cameras.

- Pay attention, that Retra and Marelux HSS is a Manual type HSS, but not TTL. Flash intensity can be adjusted only manually by the strobe knob.

- For shooting with HSS, use the following settings:
  - Set strobe knob to "HSS" position.
  - Set TTL-Converter rotary switch to the position – "7" for Retra Pro MAX
  - Set TTL-Converter rotary switch to the position – "2" position for Apollo-III V2.0
  - Set TTL-Converter rotary switch to the position – "3" position for Apollo-S
  - Set MANUAL flash mode for the system by the camera menu, **using "WL" ("Wireless"- ON) camera menu command**.
  - Test shooting at high shutter speeds with HSS flash.
  - Adjust necessary flash intensity manually by the strobe 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 at "X-sync speed" mentioned in camera Specifications (usually 1/250 s) for them, if Hot Shoe plug is connected. But new TTL-Converter firmware allows shutter high speeds usage for shooting underwater with ambient sunlight (without flash) even if Hot Shoe plug is connected. User does not need to reopen the housing to disconnect the Hot Shoe plug when he wants to shoot above the water surface (at ambient sunlight only, without a flash).

- Shutter high speeds for shooting are available in Manual mode of the system (use “WL” command) in range 1/320 ….1/8000 (and faster, dependently of camera model). All model underwater strobes (excluding Retra Pro MAX) in this case don’t produce a flash, automatically 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 plays underwater strobes specific (read below).

- Compact size underwater strobes like Z240, Z330, S2000, YS-D1, YS-D3MkII 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, 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.