

INON D-180

Underwater Auto-Strobe

User Manual

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INON D-180

Underwater Auto-Strobe User Manual

Thank you for purchasing the Inon D-180 Strobe. The D-180 is a dual use underwater and land external strobe with 18 Guide Number (ISO 100, Air x 1meter) and the following main features.

- Allows “External Auto Flash Exposure Adjustment” (hereafter, “External Auto”) when used with various digital camera systems.
- Shutter linked, auto-off Focus and Target Light, supports both Auto Focus and Manual Focus.
- “Advanced Cancel Circuit” (Patent Pending) allow use of both real time and “pre-flash” type digital cameras. For pre-flash type cameras, the circuit allows superior images by reproducing the camera’s pre-flash, but at higher intensity for optimum underwater performance.
- Compatible with Inon “Clear Photo System” (Patent Pending) to reduce or eliminate incidence of “marine snow” (backscatter) caused by digital camera internal strobes illuminating suspended particles in front of camera lens.

The D-180 is a complex, multi-function device with different features available for different camera / housing systems. Before learning more about how to use the D-180 we recommend you read or review your camera / housing manual(s) so that you thoroughly understand these components of your system first. Then, we strongly advise you thoroughly read this Manual to become familiar with the D-180, especially with regard to your particular camera system and applications.

The D-180 is designed to withstand and perform in extreme environments. And, before leaving the factory each strobe is pressure tested and all functions are tested to confirm quality. *However, before using in the water, each user should test the strobe with their camera/housing system to re-confirm proper functioning.*

Also, to maintain optimum operation and performance of your D-180, and for safety’s sake, please pay close attention to this Manual’s Warning and Caution statements, and preventative maintenance recommendations. Failure to do so may cause flooding or damage to your strobe or camera system, or personal injury to you or others.

INON America Limited Warranty Terms & Conditions

INON America, Inc. warrants INON products for one year from date of purchase by original consumer purchaser, except for strobe focusing lights, which are warranted for six months. INON America will repair or replace the product, free of charge, during the warranty period, for

manufacturing defects or repair matters where the product has been subject to normal use; and, when operation, handling and maintenance have been conducted in accordance with this User Manual.

Repair or replacement will not be free of charge in the following cases:

- 1) When product is stolen or lost.
- 2) When product is damaged due to fire or natural disaster.
- 3) When product is damaged due to owner negligence and abuse, such as damage due to repeated continuous firing and discharge of strobe without recommended cooling interval.
- 4) When product has been modified or repaired or disassembled by anyone or at a facility not approved by INON America.
- 5) When product defects or malfunction are attributed to or resulting from normal wear and tear.
- 6) When product was not purchased from INON America or an INON America Authorized Dealer.
- 7) For consumable items such as O-rings, or lost items such as screws, caps etc.

No other warranty, expressed or implied, applies to the product.

Furthermore, INON America assumes no responsibility, if as a result of using the product there are any damages or losses, including but not limited to fees, costs or other expenses incurred or related to taking photographic images, or any lost or unattained profit from not being able to take photographic images.

Instructions to activate and receive warranty service

- 1) Complete and mail the Warranty Activation Card, enclosed with your product, within 10 days of purchase. INON America must receive to validate Warranty. Keep the other half of the card, the Warranty Terms and Conditions part, for your records.
- 2) If you think your product requires warranty service, first contact INON America or your dealer to determine if the product needs to be returned.
- 3) If the product needs to be returned, pack *the complete product* in a sturdy box with adequate padding and *send together with your half of the product warranty card*. We may ask you to enclose a dated proof of purchase or sales receipt to confirm warranty period is still in effect. Inside the box, please include your name, address, phone number and email address; and, a description of the malfunction of the unit and what kind of service you require.
- 4) Ship the product, prepaid and insured to:
INON America, Inc.
6445 Ithaca Lane North
Maple Grove, MN 55311
TEL: 763-559-1212

FAX: 763-559-5236

INON will return the product, shipping prepaid to you in the United States.

5) Upon receipt, carefully inspect the product.

Note: For non-warranty service, INON will evaluate product and advise cost of any necessary repair or service.

Note: We highly recommend you *obtain insurance* to cover any non-warranty issue, and to protect against risk of loss or damage to your other equipment.

Note: The company names, product names and trademarks used in this Manual are the property of their respective owners.

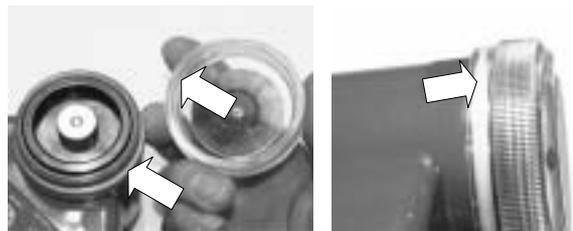
Measures to prevent accidental flooding

Before explaining how to use the many features of the D-180 we recommend first understanding some essential practices that will greatly reduce the main causes of accidentally flooding the D-180. The D-180 is waterproof due to a rubber O-ring that seals the internal circuitry from the elements. There is only one user serviceable O-ring: the **Battery Box O-ring**. This O-ring requires frequent inspection and care to ensure its watertight integrity. Since most flooding occurs due an O-ring related problem we strongly recommend you to inspect the O-ring (and clean, grease or replace as necessary) each time before using the strobe. Equally important are O-ring contact surfaces. Check the contact surfaces for contaminants or scratches. We cannot stress enough the importance of making O-ring related inspection and maintenance a habit and essential part of your pre-dive equipment preparation routine.

O-Ring inspection locations

Inspect and maintain these three points:

- Battery Box O-ring
- Battery Box O-ring groove
- Battery Box outer cap O-ring contact surface



O-ring inspection methods

These are the essential factors to ensure proper O-ring function:

- The O-ring itself
- O-ring contact surfaces
- O-ring grooves
- If O-ring is properly seated in groove
- Grease

First, inspect the O-ring as it is seated in the groove. If any of the following are evident, there is a high chance that the strobe will flood if placed in water. Be very careful about checking these points:

If hair, sand, lint or other debris is attached to the O-ring

Remove O-ring and wipe-off the debris.



If the O-ring is cut or cracked

The O-ring must be removed and replaced with a new O-ring.



If the O-ring is twisted

The O-ring must be removed and reinstalled uniformly with no twists or other irregularities.



If there is hair, sand, lint or other debris on the O-ring *contact surfaces*

Wipe of any debris.

If there is a scratch, blemish or other imperfection on the O-ring *contact surfaces*

The strobe must be inspected by an authorized technician, and repaired if possible. Contact Inon or you local Inon distributor for advice.

O-ring Maintenance Method

- **Grease:** Inon O-rings are compounded with a special type of oil that is not compatible with all grease types. Periodically re-grease the O-rings only using the supplied Inon Grease. **Do not** use any other grease, which may cause the O-rings to swell or deform, causing poor seal and water leakage. Use of non-Inon grease will void warranty.
- **Field Maintenance:** For periodic maintenance in the field it is not necessary to always remove the O-ring and inspect the O-ring groove for each dive. If there is not any sand or other debris visible it is ok to lightly grease the O-ring while it is seated in the O-ring groove. For other maintenance follow the instructions below.



- **Removing O-ring**

If you need to remove the O-ring for replacement, inspection, or to check the O-ring groove etc., lightly squeeze the O-ring from the sides (see figure) so it bulges out from one side. Grasp the extended part and gently pull to remove. *Never use sharp or metal objects to remove O-rings as they may damage the O-ring itself or the O-ring groove contact surface.* If squeezing the O-ring from both sides does not work, try gently using the edge of a credit card or similar object, to pry the O-ring up a little so you can grasp it. Then clean any residual grease or debris from the O-ring groove and contact surface, and check the condition



of both surfaces. Wipe off the O-ring and determine if it is still useable or not.

- **Installing O-ring**

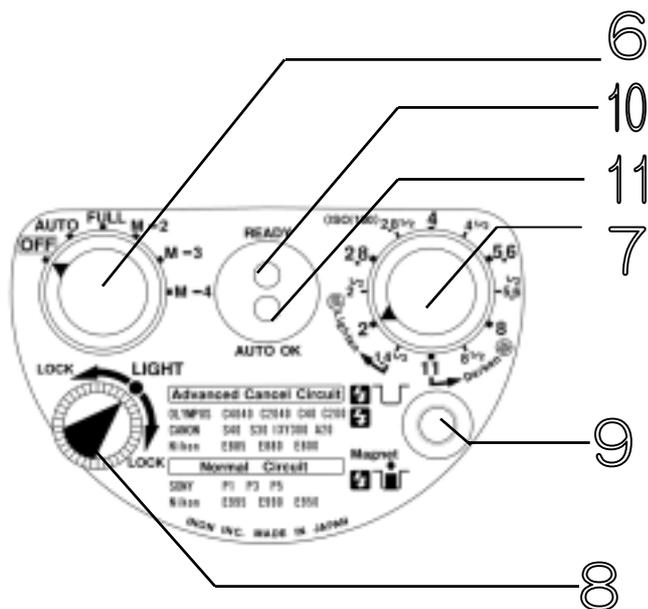
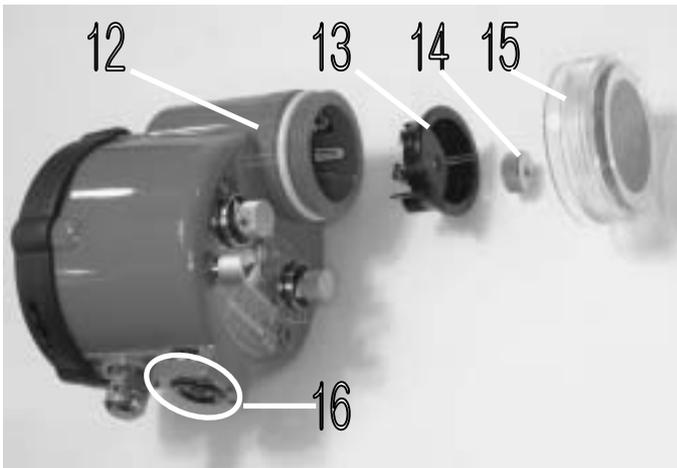
After checking and confirming that the O-ring groove is clean and not damaged, using your fingertips, apply a thin uniform film of Inon grease on the O-ring. Install the O-ring in the groove, making sure that it is seated uniformly and not twisted. Then add a little extra grease to the O-ring, and liberally grease O-ring contact surface on the battery box. *A little extra*

grease is necessary due to friction when screwing down the battery box cap. Slowly screw down the battery box cap, making sure you don't feel any excessive resistance, which could mean the O-ring is binding or bearing too much friction.

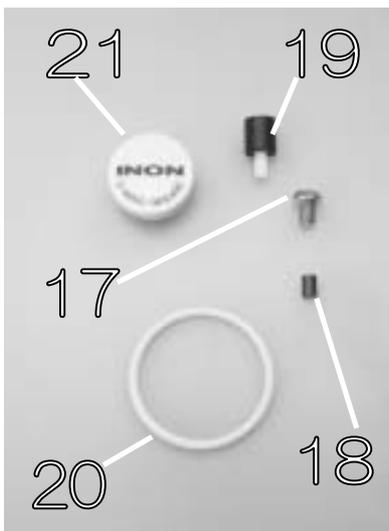


When the battery box cap is fully screwed down and seated on the O-ring surface, look at the O-ring through the transparent edge of the cap. You should see a continuous, uniform contact line (the “witness line”) between the cap and O-ring. If the contact line is not uniform, or twisted, contaminated with hair, lint or sand etc. there is a good chance the strobe will flood. Remove cap, re-seat O-ring and/or remove contaminants as necessary.

Names of D-180 Parts



1. Flash Tubes	12. Battery Box
2. Focus Light	13. Battery Box Inner Cap
3. Light Adjustment Sensor	14. Battery Box Inner Cap Screw
4. +1/4 EV Compensation Switch	15. Battery Box Outer Cap
5. Slave Sensor	16. 6mm threaded socket for Z-Adapter / YS Adapter
6. Main Mode Switch	17. Magnet Switch Screw
7. Aperture Value Set Switch	18. Magnet Switch
8. Focus Light Switch	19. Magnet Screw Tightener
9. Advanced Cancel Circuit Switch	20. Battery Box Spare O-ring
10. Strobe Ready Red Lamp	21. Inon Grease
11. "TTL" OK Green Lamp	



Chapter 1 D-180 Features

D-180 Main Functions

The D-180 is a high performance, multi-function underwater auto-strobe, designed to be particularly useful with digital camera systems and including features such as advanced cancel circuitry and an integral underwater light. Depending on what camera system and master strobe the D-180 is used with, the useable D-180 functions will be different. Some functions are only useable in conjunction with certain camera and strobe systems.

The main functions are:

1) **Flash Function (External Auto Strobe / External Auto Function)**

When camera shutter is released the D-180 flashes in time with the camera and automatically adjusts flash output for correct exposure.

Using the D-180's "External Auto Flash Exposure Adjustment" (hereafter, "External Auto") control mode the D-180 itself automatically adjusts for correct flash output amount and "proper" exposure. It is not necessary to rely on the camera's automatic flash adjustment control. Or use the Manual Mode 4 step flash output adjustment for manual strobe control.

2) **Slave Strobe (External Auto Slave Strobe Function)**

When connected to another (master) strobe, including internal strobes of digital cameras, the D-180 flashes at the same time as the master strobe.

Using the D-180's "External Auto" control mode the D-180 itself automatically adjusts for correct flash output amount and "proper" exposure. It is not necessary to rely on the camera's automatic flash adjustment control. Or use the Manual Mode 4 step flash output adjustment for manual strobe control.

3) **Advanced Cancel Circuitry**

For digital cameras which emit a "pre-flash", compared to conventional strobes with simple pre-flash cancel circuits which cause the camera's internal strobe to emit a full discharge on the second main flash, the D-180 Advanced Cancel Circuit effectively reduces the main flash output with the following benefits:

- Conserves the internal strobe's condenser energy so the internal strobe's recycle time is shortened, allowing quicker follow-up shots.
- Reduces energy consumption so more images can be taken per set of batteries.

4) **"Clear Photo System" Compatible**

"Clear Photo System" allows the external strobe (D-180) to be more effectively used

as a Slave Strobe, by reducing the amount of backscatter caused by light coming from the camera's internal strobe illuminating suspended particles in front of the lens, enabling clearer, higher quality images.

The system (Patent Pending) was devised from the D-180's design conception. First, a "Clear Photo Filter" is placed over the camera's flash. This filter blocks visible light, only allowing non-visible wavelengths to pass through. Accordingly, there is no visible light to illuminate the particles in front of the lens. The non-visible light is picked up by a fiber optic cable and relayed to the strobe, triggering a flash output. Clear Photo Film is included with Inon "Optical D Cable/Cap Sets" available for various camera/housing systems.

5) Shutter Linked Auto-Off Focus and Target Light

The Focus and Target Light has many functions. First it shines light on the subject, increasing contrast so both Manual and Auto Focusing are easier. Also, it helps aim the strobe's beam axis directly on the subject. Upon activating the Focus Light Switch, the Focus Light will turn on, and upon sensing the camera's internal strobe flash, will automatically turn off so no light from the Focus Light is recorded in the image. Also the Focus Light can be set to turn off automatically in about eight seconds if the Focus Light Switch is not pressed again.

Reference No. 1 Automatic Flash Adjustment of External Strobes

When using external strobes, in order to automatically adjust the amount of flash output and properly expose the subject, it is necessary to calculate and control the strobe's flash duration (light output amount / "intensity") using the following information.

- ISO sensitivity
- Aperture Value
- Reflectivity of the subject

Of this information, depending on the method of measurement and part of the subject being measured for reflectivity, the methods of automatic flash output adjustment can be classified as follows:

1) During exposure, the camera meters (measures) in real time

- Subject reflectivity measured TTL (Through The camera's Lens) in real time; strobe quenches (turns off) at time of "proper" exposure. **(Real Time TTL Auto Exposure Adjustment)**
- Using a light sensor on the camera, subject reflectivity is measured in real time; strobe quenches at time of "proper" exposure. **(Real Time Auto Exposure Adjustment)**

2) Before exposure, camera meters (measures) a "pre-flash"

- Camera's internal strobe fires a small "pre-flash" to illuminate the subject. During pre-flash,

subject reflectivity measured TTL; based on this information, second (main) flash duration is calculated, and then strobe fires main flash quickly afterwards, only for the specified duration.

(Pre-flash TTL Auto Exposure Adjustment)

3) During exposure, strobe itself measures in real time

- Using a light sensor in the strobe, subject reflectivity measured in real time, with strobe quenching at time of “proper” exposure. **(External Auto Flash Exposure Adjustment)**

For each of these automatic flash adjustment methods to work, besides a signal instructing the external strobe to fire, the various combinations of cameras (and master strobes) and external strobes must be compatible with each other’s signal transmission methods.

- | | | |
|------------------------|--------------------------------|--|
| - In case of 1) above: | From Camera to External Strobe | Instruction to stop flash |
| - In case of 2) above: | From Camera to External Strobe | Instruction to stop flash; or,
Instruction for flash duration |
| | External Strobe to Camera | External strobe information |
| - In case of 3) above: | From Camera to External Strobe | ISO Sensitivity information, and
Aperture Value information |

As of December 2002, a majority of consumer digital cameras use Pre-Flash TTL Auto Exposure Adjustment. Unlike conventional 35mm film camera systems with the widely adopted Real Time TTL Auto Flash Adjustment, most current digicams cannot use such automatic exposure adjustment with external strobes. Likewise, except for some dedicated land strobes for certain camera brands, there are no external strobes yet available fully compatible of functioning with the various Pre-Flash TTL Auto Exposure Adjustment type cameras available. The main reasons are:

- Because pre-flash specifications and protocol have not been standardized between the camera manufacturers.
- The external strobe to camera signal transmission specifications have not been standardized between camera manufacturers, and the communication method used by most existing external strobes has not been adopted in most digital cameras.

Due to the lack of real time information from camera to strobe, digital cameras cannot automatically adjust exposure with external strobes. Therefore it is necessary for the external strobe itself, to a certain extent, independently execute automatic flash adjustment.

The D-180, as an External Auto Flash Exposure Adjustment type of strobe, and using an Advanced Cancel Circuit, is compatible with the vast majority of digital cameras using Pre-Flash TTL Auto Exposure Adjustment, and of course Real Time Auto Exposure Adjustment type cameras. Regardless of the camera type, automatic light adjustment is possible with the D-180 external

strobe itself.

To determine your camera's automatic light adjustment type please refer to your camera manual, and Page 18, "Items to confirm before using D-180".

Flash Adjustment Type Naming Conventions used in this Manual:

Real Time TTL Auto Exposure Adjustment	R-TTL
Real Time Auto Exposure Adjustment	R-S
Pre-flash TTL Auto Exposure Adjustment	P-TTL
External Auto Flash Exposure Adjustment (with pre-flash)	P-S
External Auto Flash Exposure Adjustment (without pre-flash)	R-S
Manual Flash Exposure Adjustment (with pre-flash)	P-M
Manual Flash Exposure Adjustment (without pre-flash)	R-M

Reference No. 2 "TTL" – What is it?

TTL stands for **T**hrough **T**he **L**ens; that is, light which passes through the camera lens.

In order to obtain proper exposure, of various methods to measure exposure amount, light passing through the lens and directly striking the light sensitive medium/device (silver halide film, image sensor(CCD) etc.) is metered directly; or, metered indirectly if it is reflected off the light sensitive medium/device.

An external strobe using these TTL metering methods of automatic light control is called a "TTL Strobe" and an external slave strobe set to synchronize with the master strobe's flash duration is called a "TTL Slave Strobe".

For the purposes of this Manual, we distinguish between two types of TTL light adjustment, both of which are common in current digital cameras.

- Real Time TTL Auto Exposure Adjustment
- Pre-flash TTL Auto Exposure Adjustment

Real Time TTL Auto Exposure is when the image is being taken (when the shutter is open), and when TTL metering is occurring and the exposure value is being adjusted in real time.

Pre-flash TTL Auto Exposure Adjustment is when the camera's internal strobe fires a flash before the shutter opens, and this light reflecting from the subject is metered TTL, and the data resulting from this is used set the main strobe's actual flash amount, so when the shutter opens and the strobe flashes, the flash output is of a predetermined amount.

Reference No. 3 "Pre-Flash" – What is it?

Camera's internal strobe fires one or more small flashes before the main flash. Reflected light from the pre-flash(s) is measured by the camera and used to calculate the main flash duration, for correct exposure.

In general, for “Pre-flash TTL Auto Exposure Adjustment” type camera systems, before the shutter opens to actually record the image, the subject reflectivity must be metered in order to calculate the main flash duration (intensity).

In order to meter the subject reflectivity, the camera first fires one or more small flashes (pre-flashes) and measures the light reflected back from the subject. Then the camera calculates what it “thinks” the best main flash duration would be to achieve correct exposure. Finally, the shutter opens and the camera’s internal strobe fires its main flash for the pre-calculated duration.

Reference No. 4 “External Auto” (External Automatic Flash Exposure Adjustment)

A function where a strobe has a light adjustment sensor mounted in the strobe itself, whereby the light adjustment sensor adjusts flash output based on subject reflectivity, for “correct” exposure.

For strobes with this function, by setting the strobe’s Aperture Value to match that of the camera system, at the same time as the camera’s internal strobe fires its main flash, the external strobe’s light adjustment sensor measures subject reflectivity in real time, and automatically adjusts for correct strobe output.

Reference No. 5 “Master Strobe” and “Slave Strobe”

“Master” and “Slave” are terms corresponding to “which strobe is the controlling device” and “which strobe is being controlled”.

When using two strobes (including the case of the camera’s internal strobe and the D-180), where both the camera’s strobe and D-180 are directly connected to the camera/housing, and are controlled by the same signal, since there is no difference in function, there is no distinction between Master and Slave.

However, it is possible to connect only one of the strobes directly to the camera/housing, with the other strobe connected to the first strobe. The strobe connected to the camera/housing (Master) receives control signals directly from the camera and flashes. At that time, the other (Slave) strobe sees the master strobe’s flash, and at that signal, reproduces the same flash duration as the master strobe. “Master” and “Slave” terms are used when the two strobes have such definite master/slave relationship.

For the purpose of compatibility with the D-180, as of December 2002, most digital camera’s internal strobe is the master strobe, with the external strobe being a slave connection.

Reference No. 6 “Advanced Cancel Circuit”

By proactively utilizing the fundamental light control theory of digital cameras using “Pre-flash TTL Auto Flash Adjustment”, compared to conventional strobes with simple pre-flash cancel circuits which cause the camera’s internal strobe to emit a full discharge on the second main flash,

the D-180 Advanced Cancel Circuit (patent pending) effectively reduces the internal strobe's main flash output with the following benefits:

- Conserves the internal strobe's condenser energy so the internal strobe's recycle time is shortened, allowing quicker follow-up shots.
- Reduces energy consumption so more images can be taken per set of batteries.

The Advanced Cancel Circuit reduces the internal strobe's second main flash by first telling the D-180 to reproduce (in real time) the camera's pre-flash, but at a multiple of the actual camera pre-flash output. (e.g., In the case of the C-3030/3040 pre-flash, the D-180 emits its own pre-flash but at 22 times higher intensity.) The actual D-180 pre-flash strength corresponds to the particular camera model's internal strobe pre-flash intensity.

The purpose and design of the camera's pre-flash is to illuminate the subject *in air*, in order to calculate the main flash duration. The camera's pre-flash intensity and main flash exposure calculation method were not designed to be used in water, where much of the pre-flash's light is absorbed in the water between the camera and subject. The camera, receiving little reflected light back from the subject, thinks "Oh my, it is really dark out there." and tells the internal strobe to emit a full discharge, hoping to sufficiently illuminate the subject. So the internal strobe fires a full "dump" of light and releases all the built-up energy stored in its capacitor. It then takes a few seconds for the energy to build up again before another image can be taken.

In contrast, in addition to the internal strobe's pre-flash intensity, the D-180 calculates its pre-flash based on the fact that *the pre-flash must pass through water* (not air) on its way to the subject and back again to the camera. When the camera receives more light from the D-180 pre-flash, it does not "think" it is so dark and fires its main flash at reduced output, conserving stored energy in the internal strobe's capacitor, enabling the strobe to recycle faster, shortening the interval between shots and allowing more shots per set of batteries.

Reference No. 7 "Clear Photo System"

The Inon "Clear Photo System" helps produce clearer better images, shortens the camera's internal strobe re-cycle time for quicker follow-up shots, and prolongs the camera's battery life.

No Backscatter: The most important function is to minimize incidence of "marine snow" (backscatter). Backscatter is when particles suspended in the water in front of the lens are illuminated by the camera's internal flash, resulting in a "blizzard" effect of white specs in the image. Or, if the particles are very small, the resulting image may look hazy or out of focus. Clear Photo System works by first placing a visible light cut filter ("Clear Photo Filter") over the camera's internal strobe. This filter only lets the non-visible wavelengths pass through. Accordingly, there is no visible light coming from the camera to illuminate the particles and cause backscatter. The D-180 does not need a visible light signal from the master strobe to function.

The non-visible light which passes through the Clear Photo Filter is picked up by an Inon “Optical D Cable” fiber optic and guided to the D-180’s slave sensor. When the D-180 receives this light signal it fires. Since the D-180 can be mounted externally, at an angle away from the camera, the strobe’s light beam can reach the subject without illuminating the water and particles between the camera and subject. Another benefit of Clear Photo System is no stray light from the internal flash causing ghosts or flare inside the housing, port tube barrel or attachment lenses. Clear Photo Film is included with Inon “Optical D Cable/Cap Sets” which are available for many popular camera/housing models. Refer to the User Manual with your Optical D Cable/Cap Set.

Connecting D-180 to Camera System

The D-180 can receive strobe control signals several ways. Depending on how you intend to use the D-180 will determine the control signal reception method, and the way of connecting the D-180 to your camera/housing/master strobe system. Before attempting to use your strobe, it is important to understand the connection method relevant for your situation.

The D-180 can be connected to your camera/housing/master strobe system as follows:

- 1) Using D-180 as an external Slave Strobe to digital camera’s internal strobe (Master Strobe) ^(*1)

Optical D Cable Connection

Select an Inon “Optical D Cable/Cap Set” specified for your camera/housing, and connect one end to the Master Strobe/Housing, and the other end to the D-180 Slave Strobe. The Master Strobe transmits light through the fiber optic cable to the D-180’s Slave Sensor. As the Slave Strobe, the D-180 fires and quenches when it senses “correct” exposure.

- 2) Using external D-180 as a Slave Strobe to another external strobe (Master Strobe) ^(*2)

Optical Slave Cable

Connect an Inon “Optical Slave Cable” ^(*3) between the D-180 and the other external strobe. The other external strobe (Master Strobe) transmits light through the fiber optic cable to the D-180’s Slave Sensor. As the Slave Strobe, the D-180 fires and quenches when it senses “correct” exposure.

- 4) Using D-180 as a Master Strobe to another external strobe (Slave Strobe)

Optical D Slave Cable Connection

Connect an Inon “Optical D Slave Cable” ^(*4) between a D-180 or Z-220 strobe (Master Strobe) and an Inon Z-220 or Z-220 strobe (Slave Strobe). Light from the D-180/Z-220 Focus Light will link to and allow functioning of the slave strobe’s Focus Light and Target Laser.

(*1) Wireless slave connection not possible. Optical D Cable necessary.

(*2) Wireless slave connection not possible. Optical Slave Cable necessary.

(*3) Depending on the diameter of the Master Strobe, choose an Optical Slave Cable with either an S (short) or L (long) harness size. (see page 24 for details)

(*4) Not possible to use Z-220 -0.5 or -3.0 diffusers. Possible to use D-180 -0.5 Diffuser. When using Z-22, "TTL Sensor Z" is necessary.

Items to confirm before using D-180

Now that we have covered the D-180 features and connection methods, before using let's confirm your camera system / master strobe configuration, and also confirm each D-180 usable function.

Confirming how you want to use the D-180

First, confirm what configuration the D-180 will be used with, either a digital camera alone, or together with another external (master) strobe. Fill-in or ✓ the check boxes below.

✓ Check Point: Use with: _____	Use with: Digital Camera alone, or Use with: other external (master) strobe
---	--

Confirming your camera system / master strobe / housing

Next, confirm the camera system / master strobe / housing that you will be using. Then, confirm which automatic flash adjustment method your camera system / master strobe is compatible with in the various charts on the next pages.

✓ Check Points:																					
Camera's Strobe Light Adjustment type is: (✓ check one)	<table style="border-collapse: collapse;"> <tr><td style="border: 1px solid black; padding: 2px;">R-TTL</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">P-TTL</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">R-S</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">P-S</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">R-M</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> <tr><td style="border: 1px solid black; padding: 2px;">P-M</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> </table>	R-TTL	<input type="checkbox"/>	P-TTL	<input type="checkbox"/>	R-S	<input type="checkbox"/>	P-S	<input type="checkbox"/>	R-M	<input type="checkbox"/>	P-M	<input type="checkbox"/>	With: (✓ check)	<table style="border-collapse: collapse;"> <tr><td style="padding: 2px;">Settable ISO</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> <tr><td style="padding: 2px;">Aperture displayed in LCD</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> <tr><td style="padding: 2px;">Settable Aperture</td><td style="padding: 2px;"><input type="checkbox"/></td></tr> </table>	Settable ISO	<input type="checkbox"/>	Aperture displayed in LCD	<input type="checkbox"/>	Settable Aperture	<input type="checkbox"/>
R-TTL	<input type="checkbox"/>																				
P-TTL	<input type="checkbox"/>																				
R-S	<input type="checkbox"/>																				
P-S	<input type="checkbox"/>																				
R-M	<input type="checkbox"/>																				
P-M	<input type="checkbox"/>																				
Settable ISO	<input type="checkbox"/>																				
Aperture displayed in LCD	<input type="checkbox"/>																				
Settable Aperture	<input type="checkbox"/>																				
Camera / Master Strobe is: _____		Housing is: _____																			

Ref.	R-TTL:	Real Time TTL Auto Exposure Adjustment
	P-TTL:	Pre-flash TTL Auto Exposure Adjustment
	R-S:	Real Time Auto Exposure Adjustment / External Auto Flash Adjustment (w/o pre-flash)
	P-S:	External Auto Flash Exposure Adjustment (with pre-flash)
	R-M:	Manual Flash Exposure Adjustment (without pre-flash)
	P-M:	Manual Flash Exposure Adjustment (with pre-flash)

Master Strobe (Digital Camera Integral Strobe) Group Chart

✓	Mfr.	Camera Model (USA)	Camera Model (Japan)	Camera Model (Europe)	Housing Model	Light Adjustment Type	Settable ISO	Aperture Displayed in LCD	Settable Aperture
	Olympus	D-400Z	C-900Zoom	C-900Z	PT-003	P-TTL	NO	NO	NO
		D-450Z	C-920Zoom	C-920Z	PT-003		YES	NO	NO
		C-3030/3000/2020Z	C-3030/3000/2020Z	C-3030/3000/2020Z	PT-005/007/010		YES	YES	YES
		D460/D490Zoom	C-960Zoom, C-990Zoom C-990ZS	C-960Zoom, C-990Zoom	PT-006		YES	NO	NO
		C-3040Zoom, C-2040Zoom	C-3040Zoom, C-2040Zoom	C-3040Zoom, C-2040Zoom	PT-007, PT-010		YES	YES	YES
		Brio 100	C-1	C-1	PT-008		NO	NO	NO
		D-510Z, D-550Z	C-200Zoom, C-300Zoom	C-200Zoom, C-300Zoom	PT-009		YES	NO	NO
		C-4040Zoom	C-4040Zoom	C-4040Zoom	PT-010		YES	YES	YES
		C-4000Zoom (slave mode)	C-4100Zoom (slave mode)	C-4000Zoom (slave mode)			R-M	YES	YES
		C-4000Zoom (other than above)	C-4100Zoom (other than above)	C-4000Zoom (other than above)		P-TTL	YES	YES	YES
		Brio 230	C-2	C-2	PT-011	NO	NO	NO	
		D-40Z	C-40Zoom	C-40Zoom	PT-012	YES	YES	YES	
		Brio Zoom 150	C-1 Zoom, C-2 Zoom	C-1 Zoom, C-2 Zoom	PT-013	NO	NO	NO	
		C-50 Zoom	X-1, X-2	C-50 Zoom	PT-014	YES	YES	YES	
		C-5050 Zoom (slave mode)	C-5050 Zoom (slave mode)	C-5050 Zoom (slave mode)	PT-015	R-M	YES	YES	YES
	C-5050 Zoom (other than above)	C-5050 Zoom (other than above)	C-5050 Zoom (other than above)	P-TTL		YES	YES	YES	

		Stylus 300, Stylus 400	u-10 Digital, u-20 Digital	Digital u-300, Digital u-400	PT-016		NO	NO	NO
		D-560 Zoom	X-200	C-350Z, C-450Z	PT-017	P-TTL	NO	NO	NO
		C-750/740 Ultra Zoom	C-750/740 Ultra Zoom	C-750/740 Ultra Zoom	PT-018		YES	YES	YES
Canon		S300 Digital ELPH	IXY D300	IXUS 300	WP-DC100		NO	NO	NO
		S330 Digital ELPH Digital IXUS330	IXY D300a	IXUS 330	WP-DC500		YES	NO	NO
		A20, A10	A20, A10	A20, A10	WP-DC200		NO	NO	NO
		A40, A30 (Manual Mode)	A40, A30 (Manual Mode)	A40, A30 (Manual Mode)	WP-DC200s	R-M	YES	YES	YES
		A40, A30 (other than above)	A40, A30 (other than above)	A40, A30 (other than above)		P-TTL	YES	NO	NO
		S50, S45, S40, S30 (Manual Mode)	S50, S45, S40, S30 (Manual Mode)	S50, S45, S40, S30 (Manual Mode)	WP-DC300	R-M	YES	YES	YES
		S50, S45, S40, S30 (other than above)	S50, S45, S40, S30 (other than above)	S50, S45, S40, S30 (other than above)		P-TTL	YES	YES	YES
		A200, A100	A200, A100	A200, A100	WP-DC400	P-TTL	YES	NO	NO
		S230 Digital ELPH Digital IXUS v3 S200 DIGITAL ELPH Digital IXUS v2	IXY D320, IXY D200a	IXUS v2, IXUS v3	WP-DC600	P-TTL	YES	NO	NO
		A70, A60 (Manual Mode)	A70, A60 (Manual Mode)	A70, A60 (Manual Mode)	WP-DC700	R-M	YES	YES	YES
		A70, A60 (other than above)	A70, A60 (other than above)	A70, A60 (other than above)		P-TTL	YES	NO	NO
		SD100 Digital ELPH Digital IXUS2	IXY D30	IXUS II	WP-DC10	P-TTL	YES	NO	NO

		S400 Digital ELPH Digital IXUS400	IXY D400	IXUS 400	WP-DC800	P-TTL	YES	NO	NO
		G2 (Manual Mode)	G2 (Manual Mode)	G2 (Manual Mode)	Aquamir G2	R-M	YES	YES	YES
		G2 (other than above)	G2 (other than above)	G2 (other than above)		P-TTL	YES	YES	YES
		G3, G5 (Manual Mode)	G3, G5 (Manual Mode)	G3, G5 (Manual Mode)	UMIE DCH-701	R-M	YES	YES	YES
		G3, G5 (other than above)	G3, G5 (other than above)	G3, G5 (other than above)	Aquamir G3	P-TTL	YES	YES	YES
Nikon		CP800	E800	CP800	DN-800	P-TTL	YES	YES	NO
		CP880	E880	CP880	DN-880		YES	YES	YES
		CP995, CP990, CP950	E995, E990, E950	CP995, CP990, CP950	-	R-S	YES	YES	YES
		CP885	CP885	CP885	CP4	P-TTL	YES	YES	YES
		CP4300	CP4300	CP4300	CP4	P-TTL	YES	YES	YES
		CP4500	CP4500	CP4500	-	R-S	YES	YES	YES
		CP5000	CP5000	CP5000	Aquamir CP5		YES	YES	YES
		CP5400	CP5400	CP5400	-		YES	YES	YES
		CP5700	CP5700	CP5700	-		YES	YES	YES
Sony		DSC-P1	DSC-P1	DSC-P1	MPK-P1	R-S	NO	NO	NO
		DSC-P3, DSC-P5	DSC-P3, DSC-P5	DSC-P3, DSC-P5	MPK-P5	R-S	YES	YES	NO
		DSC-P7, DSC-P9	DSC-P7, DSC-P9	DSC-P7, DSC-P9	MPK-P9	P-TTL	YES	YES	NO
		DSC-P8, DSC-P10	DSC-P8, DSC-P10	DSC-P8, DSC-P10,	MPK-PHA	P-TTL	YES	YES	NO
		DSC-F707 / 717	DSC-F707 / 717	DSC-F707 / 717	Aquamir F717	P-TTL	YES	YES	YES
Fujifilm		FP401	FP401	FP401	DCP 401	R-S			
		FP410	FP410	FP410	DCP 410	R-S			

● Note: Some of above information based on camera maker catalog specifications, and not tested/confirmed by Inon.

Master Strobe Group Chart (External Strobe)

✓	Mfr.	Master Strobe Model	Flash Adjustment Type	Settable ISO	Aperture Displayed in LCD	Settable Aperture
	INON	D-180 w/ pre-flash type digital camera	P-S/M			(Depending on the Camera System or Master Strobe you are using.)
		D-180 (in all other cases)	R-S/M			
		Z-220 w/ pre-flash type digital camera	P-M			
		Z-220 (in all other cases)	R-TTL/M			
		Z-22				
	Nikon	SB-104, SB-105	R-TTL/M			
	Sea & Sea	YS-25DX, YS-30, YS-60, YS-90, YS-90DX, YS-120, YS-300, YS-350				
		YS-90AUTO YS-25AUTO (cancel off)				
	Ikelite	SS-50, SS-100, SS-200, SS-400				
		DS-50, DS-125				

Confirming useable functions

Here, confirm the D-180 functions possible with your camera system / master strobe configuration.

For detailed explanation of each function, see page 11, “D-180 Main Functions”.

For camera systems not listed in this chart, try shooting some test images to confirm functionality.

Useable functions when using with digital camera

✓	Flash Adjust. Type	Settable ISO	Aperture Displayed in LCD	Settable Aperture	Slave Strobe Function		Advanced Cancel Circuit	“Clear Photo System” Compatible (*3)	Focus Light Function
					“Ext. Auto”	Manual			
	P-TTL	YES	YES	YES	YES	YES	YES (*1)	YES	YES
	(*1)	YES	YES	NO	YES	YES	YES (*1)	YES	YES
		YES	NO	NO	YES (*2)	YES	YES (*1)	YES	YES
		NO	NO	NO	YES (*2)	YES	YES (*1)	YES	YES
	R-S,	YES	YES	YES	YES	YES	Un-necessary	YES	(*4)
	R-M	YES	YES	NO	YES	YES	Un-necessary	YES	(*4)
		YES	NO	NO	YES (*2)	YES	Un-necessary	YES	(*4)
		NO	NO	NO	YES (*2)	YES	Un-necessary	YES	(*4)

Useable functions when using with another external strobe

✓	Flash Adjustment Type	Settable ISO	Aperture Displayed in LCD	Settable Aperture	Slave Strobe Function		Advanced Cancel Circuit	"Clear Photo System" Compatible	Focus Light Function
					"Ext. Auto"	Manual			
	P-S , P-M (*1)	(According to camera system being used.)			YES (*2)	YES	YES (*1)	Un-necessary	YES
	R-S , R-M , R-TTL	(According to camera system being used.)			YES (*2)	YES	Un-necessary	Un-necessary	(*4)

(*1) For digital cameras using two or more pre-flashes (e.g. Olympus C2 etc.), the Advanced Cancel Circuit will only respond to the first pre-flash. The second and any subsequent pre-flashes will be treated as standard slave. Compared to one pre-flash type cameras, this means the light adjustment range will be narrower for the main flash. For more details see page 29, "Camera System Preparation".

(*2) For External Auto with digital cameras that do not have Aperture Value displayed on the LCD panel, or the ability to set ISO value, refer to your camera manual and determine the "Effective Aperture Value Range" and "Effective ISO Sensitivity Range". For more details see page 29, "Camera System Preparation".

(*3) "Clear Photo System" possible when using optional Inon "Optical D Cable/Cap Set" available for various specific camera/housing configurations.

(*4) It is possible that light from the Focus Light may expose the image. We recommend first turning the Focus Light OFF before releasing the shutter.

Confirming Connection Method

Next, because camera/housing to strobe connections, and strobe to strobe connections differ for each configuration type, confirm which optional parts are necessary. For details on optional connection parts see page 51, "Optional Accessories", or the instruction manual included with each product.

Optical D Cable Connection / Optional Parts Chart

✓	Mfr.	Housing Model	Necessary Optional Connection Parts	
			Optical D Cable	Mount Base
	Olympus	PT-005/007/010	Optical D Cable/Cap W2 Set	Not Necessary, Direct
		PT-009	Optical D Cable/Cap W4 Set	AD Mount Base PT-009
		PT-012	Optical D Cable/Cap W4 Set	AD Mount Base PT-012, or M67 Mount Base PT-012
		PT-014	Optical D Cable/Cap W6 Set	AD Mount Base PT-014, or M67 Mount Base PT-014
		PT-015	Optical D Cable/Cap W5 Set	Not Necessary, Direct

		PT-016	Optical D Cable/Cap W8 Set	AD Mount Base PT-016
		PT-018	Optical D Cable/Cap W7 Set	Not Necessary, Direct
		Other Olympus	(*5)	(*5)
	Canon	WP-DC100/500	Optical D Cable/Cap W3 Set	AD Mount Base DC100/500, or M67 Mount Base DC100/500
		WP-DC200/200s	Optical D Cable/Cap W3 Set	AD Mount Base DC200/200s, or M67 Mount Base DC200/200s
		WP-DC300	Optical D Cable/Cap W3 Set	AD Mount Base DC300, or M67 Mount Base DC300
		WP-DC700	Optical D Cable/Cap W3 Set	AD Mount Base DC700
		WP-DC800	Optical D Cable/Cap W3 Set	AD Mount Base DC800
		Other Canon	(*5)	(*5)
	Other housing brands		(*5)	(*5)

(*5) All optional connection parts as of October 4, 2003.

Optical D Slave Cable Compatible Strobe Chart

✓	Compatible Master Strobes*	Compatible Slave Strobes*
	D-180, D-180S Z-20, Z-220S	Z-220, Z-220S, Z22 D-180, D-180S

*There are limitations on what strobes and functions are possible. See Compatible Master / Slave Strobe section of Optical D Slave Cable Manual.

Optical Slave Cable Connection / Compatible Strobe / Parts Chart

✓	Mfr.	Master Strobe Model	Necessary Optional Connection Parts
	Inon	D-180/180S, Z-220/220S	Optical Slave Cable S
		Z-22	Optical Slave Cable L
	Nikon	SB-105	Optical Slave Cable S
		SB-104	Optical Slave Cable L
	Sea & Sea	YS-25, YS-30, YS-60, YS-90, YS-120	Optical Slave Cable S
		YS-300, YS-350	Optical Slave Cable L
	Ikelite	DS-50, DS-125, SS-50	Optical Slave Cable S
		SS-100, SS-200, SS-400	Optical Slave Cable L

Optical Slave Cable S (small) will fit strobes with diameters of approx. 6 – 10cm.

Optical Slave Cable L (large) will fit strobes with diameters of approx. 10 – 15cm.

Confirming Attachment Method

Lastly, a list of some optional parts for attaching the D-180 to your camera/housing system. For more details see page 51, “Optional Accessories” and the instruction manual included with each product.

The D-180 Strobe attaches to strobe arms by a 6mm threaded socket in the strobe base. There are two main ways to attach the strobe to strobe arm adapters:

- A) Z Adapter (Ball adapter compatible with Inon and Ultralite arm systems.)
- B) YS Adapter (Standard 12mm YS Adapter, available from Inon and various arm system manufacturers. An Inon “YS Adapter Fixing Bolt” is necessary to use a YS Adapter.)



For other Inon Base/Arm attachment options, see “Optional Accessories” page 51.

Description of Parts & Controls

1. Flash Tubes

The flash tubes are arranged in a “T” configuration to provide a round 100 degree angle of illumination. Guide Number 18 (Air, ISO 100 x m).

2. Focus Light

Activate Focus Light by pushing Focus Light switch. The Focus Light will turn on and then turn off automatically as the internal strobe fires; or, if shutter not released, after about 8 seconds. Or, by pushing Focus Light switch continuously, or by turning it to either right or left “Lock” positions *while pressing*, the Focus Light will turn on and shine continuously until the shutter is released. Then, the Focus Light will turn on again automatically 0.5 seconds after the image is taken.

4. +1/4 EV Compensation Switch

Using the +1/4 EV Compensation Switch will enable +1/4 Exposure Value to the aperture value set on the D-180’s Aperture Value Set Switch. Placing the switch so it covers the Light Adjustment Sensor sets +1/4 EV to ON position. For detailed setting information see Page 38, “+1/4 EV Compensation Switch Use Method”.

6. Main Mode Switch

Sets strobe power to ON/OFF. Sets light adjustment method, and in Manual mode sets strobe output amount. For details see Page 36, “Main Mode Switch Setting Method”.

7. Aperture Value Set Switch

When using External Auto mode, set to same aperture value as that of camera. For details see Page 37, “Aperture Value Set Switch Use Method”.

8. Focus Light Switch

Press this button to activate Focus Light. One push gives 8 seconds of light before automatically turning off. Pushing in while rotating will set and lock to continuous illumination mode. For details see Page 36, “Focus Light Switch Setting Method”.

9. Advanced Cancel Circuit Switch

Turns Advanced Cancel Circuit ON/OFF. When using **R-TTL**, **R-S**, **R-M** Group Cameras with internal strobes, or other external strobes as the Master strobe, it is necessary to set the switch to either OFF by installing the Magnet Switch and Magnet Switch Screw. For other group cameras, set switch to ON by not installing the Magnet Switch and Magnet Switch Screw. For details see Page 34, “Setting the Advanced Cancel Circuit.”

17. Magnet Switch Screw

18. Magnet Switch

19. Magnet Screw Tightener

Use this tool when changing the Advanced Cancel Circuit Switch. For details see Page 34, “Setting the Advanced Cancel Circuit.”

3. Light Adjustment Sensor

When using External Auto, this sensor measures the light reflected back from the subject. For details on use of +1/4 EV Compensation Switch, see Page 38, “+1/4 EV Compensation Switch Use Method”.

5. Slave Sensor

This sensor receives light from the master strobe, either via an “Optical D Cable”, an “Optical Slave Cable” or and “Optical D Slave Cable.” For details on connecting to camera/housing systems see Page 23, “Confirming Connection Method”.

10. Strobe Ready Red Lamp

Lamp turns red when strobe charge complete.

The Red Strobe Ready Lamp will activate when the strobe re-charge is 80% complete. For situations where more precise output is necessary, such as manual flash, or for External Auto when the subject is distant and at the far end of the strobe’s auto exposure effective working range, necessitating a full strobe discharge, we recommend you wait an additional one second after the Strobe Ready Lamp comes on.

11. "TTL" OK Green Lamp

When the strobe light adjustment mode is set to External Auto, and the image is taken and exposed properly within the "External Auto Exposure Adjustment Range" the lamp will shine green. But if the subject is not within the range, for example, too far away for the strobe light to adequately reach, causing the strobe to emit a full discharge, then the lamp will not shine.

12. Battery Box

Caution: Be very careful that no water enters the Battery Box or contacts the terminals on the Battery Box Inner Cap. If even one small drop of water enters for even a short period of time it may result in an electrical short, corrosion damage, cause buildup of flammable gas, lead to explosion or other accident. In particular, when removing the Battery Box Outer Cap, follow these precautions:

1. First rinse with fresh water and dry area around the Battery Box. (Assuming strobe is wet with salt water)
2. To prevent any water from entering the Battery Box, hold the Battery Box so the Battery Box Outer Cap is *facing down*.
3. Also, unscrew the cap slowly.

13. Battery Box Inner Cap

14. Battery Box Inner Cap Screw

15. Battery Box Outer Cap

The D-180 can use the following batteries:

AA Alkaline Batteries x 4

AA NiCad batteries (nickel cadmium) x 4

AA NiMH batteries (nickel metal hydride) x 4

Caution: To avoid strobe damage, or accidents including personal injury, do not use Lithium, Manganese or other non-specified batteries.

16. 6mm threaded socket for Z-Adapter or YS Adapter/YS Adapter Fixing Bolt

20. Battery Box Spare O-Ring

21. Inon Grease

Chapter 2 Preparation and Set-up

Camera System Preparation

When using with digital cameras make the following three settings:

- Set the camera's internal strobe to "force-flash", "fill-in-flash", "anytime flash" or similar mode where flash will always fire.
- When using the D-180's External Auto Flash Exposure Adjustment feature, it is also *necessary to pre-set* the camera's ISO sensitivity, Shooting Mode and Aperture Value to suit the conditions particular to your situation.
- Also, to obtain "correct" exposure or the exposure you visualize as optimum, depending on the subject reflectivity and shooting conditions it may be necessary to use exposure compensation on the camera and flash output compensation on the D-180.

For details on how to set the ISO Sensitivity, Shooting Mode and Aperture Value for your particular camera, refer to your camera manual.

When D-180 is configured with digital cameras it is necessary to set the D-180's Aperture Value to match the camera's aperture value setting, when the camera's ISO sensitivity is set to a base-line ISO 100. We recommend setting the camera as follows, as an initial standard setting.

- 1) Set the camera's ISO sensitivity to "ISO 100" on camera's that allow such setting.
- 2) Set the camera's "Shooting Mode" to a mode that allows setting the Aperture Value, if your camera allows such setting.
- 3) Set your camera's Aperture Value to a value that reflects your creative intent and the requirements of your particular imaging situation.
- 4) Set the camera's "Flash Mode" to "force-flash", "fill-in-flash" or "anytime flash".
- 5) As necessary, set camera exposure to -1EV to -2EV, especially for macro imaging.

After setting the strobe and shooting some images it is possible to adjust further as follows.

- 6) After taking the image and reviewing it on the LCD monitor, in accordance with your intended results and the shooting conditions, adjust the camera's aperture value, the camera's exposure compensation (on camera's that allow this), and/or the D-180's flash output compensation.

For camera's that do not allow setting the ISO sensitivity or do not have a Shooting Mode that allows setting the aperture value, refer to the camera's LCD monitor display, the camera manual and the lens specifications as printed on the lens itself. We recommend checking this information

Digital Camera Setting Example No. 1B (Olympus C-5050 Zoom)

- 1) Set Mode Dial to either A (Aperture Priority) or M (Manual), push the “OK/MENU” Button, and push the camera’s Arrow Pad control to RIGHT to enter “MODE MENU”.
- 2) In the CAMERA Tab, set ISO to “100”.
- 3) If using the internal strobe in “Slave Mode”, in the CAMERA Tab choose FLASH and then “Slave”, and push the camera’s Arrow Pad control to RIGHT. Then push the Arrow Pad UP or DOWN from (1) to (10) to select a flash intensity value. (When there is not much ambient light, or for general underwater conditions it is possible to trigger the D-180 using the smallest (1) flash intensity.)

Note: When the internal strobe is set to Slave Mode, the Master Strobe’s (i.e., the camera’s internal strobe) light adjustment method becomes **R-M**, and it is therefore necessary to set the D-180 Advanced Cancel Circuit to OFF. See Page 34 for instructions on how to set the Advanced Cancel Circuit.

- 4) Push OK/MENU Button to complete this setting.
- 5) Push Flash Mode Button one or more times to set Fill-in-Flash.
- 6) Turn the Jog Dial to select your desired Aperture Value. When the Shooting Mode is A (Aperture Priority) or M (Manual), push the Exposure Compensation Button while turning the Jog Dial to make these settings.
- 7) As necessary, while pushing the Exposure Compensation Button, turn the Jog Dial to set Exposure Compensation in Aperture Priority Mode to adjust Aperture; and turn the Jog Dial in Manual Mode to adjust Shutter Speed for Exposure Compensation.
- 8) Confirm these settings in the LCD display.

Below are some other cameras requiring similar settings. For details of making such settings, refer to your camera manual.

Olympus: C-3040Z, C-3000Z, C-2020Z, C-3040Z, C-2040Z C-4000, C-4100, D-40Z, C-50AZ, C-750/740

Canon: S50, S45, S40, S30, A70, A60, A40, A30, G2, G3, G5

Nikon: CP880, CP885, CP900, CP990, CP995, CP4300, CP4500, CP5000, CP5400, CP5700

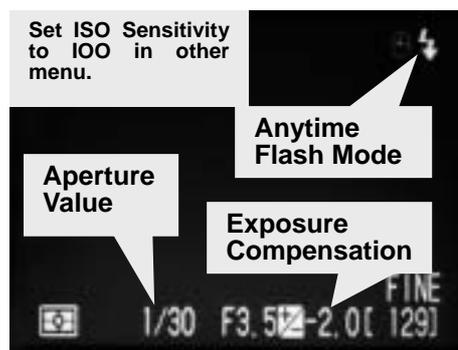
Sony: DSC-F707/717

Digital Camera Setting Example No. 2 (Nikon E800/CP800)

(And for cameras having settable ISO Sensitivity, but *not* settable Aperture Value, and with Aperture Value visible in LCD display)

- 1) Turn Mode Dial to **M**REC and push MENU Button to bring up Shooting Menu.

- 2) Push Zoom Button, align Cursor to Sensitivity and push Shutter Button to enter Sensitivity Sub-Menu.
- 3) Push Zoom Button, align Cursor to “100”, press Shutter Button and set ISO Sensitivity to 100.
- 4) Push Flash Mode Button one or more times to set camera’s internal strobe to Anytime Flash.
- 5) As necessary, push Exposure Compensation button, the Zoom Button to set Exposure Compensation.
- 6) Confirm above settings in LCD Monitor.
- 7) Adjust LCD Monitor brightness and confirm settable aperture ranges.



E800 LCD Monitor Display

Wide Setting: f/3.5 – 5.5 – 7.7 (in three steps)

Tele Setting: f/4.8 – 7.4 – 10.4 (in three steps)

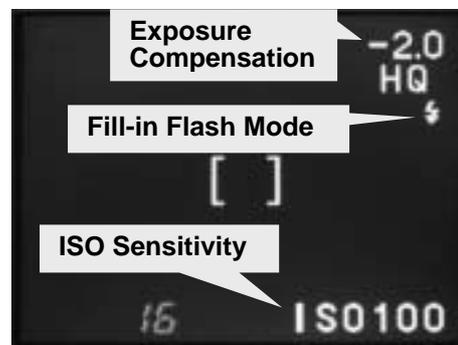
Below are some cameras requiring similar settings. For details of making such settings, refer to your camera manual.

Sony: DSC-P3, DSC-P5, DSC-P7, DSC-P8, DSC-P9, DSC-P10

Digital Camera Setting Example No. 3 (Olympus C-200 Zoom)

(And for cameras having settable ISO Sensitivity, but *not* settable Aperture Value, and with Aperture Value *not* visible in LCD display)

- 1) Push Menu Button to display Shooting Menu.
- 2) Set ISO Sensitivity to 100.
- 3) As necessary, set Exposure Compensation.
- 4) Push OK/MENU Button to fix settings.
- 5) Press Flash Mode Button (right button on Arrow Pad) to set Fill-in Flash.
- 6) Confirm above settings in LCD Monitor.
- 7) From the camera Manual Specifications check the settable aperture range.



C-200 / D-510Z LCD Monitor Display

Wide Setting: f/2.8 to 5.6 (in two steps)

Tele Setting: f/4.4 to 8.6 (in two steps)

Below are some other cameras requiring similar settings. For details of making such settings, refer to your camera manual.

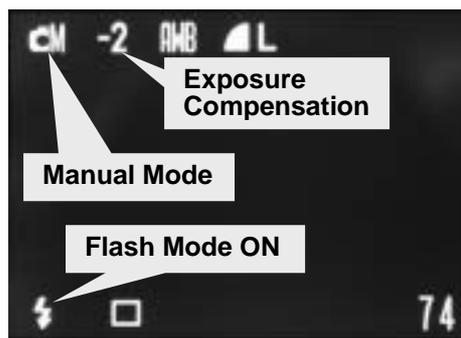
Olympus: D-450Z, D-460Z, D-490Z, D-510Z, D-550Z, C-300Z, C920Z, C960Z, C990Z, C990ZS

Canon: IXY300a, S330, IXUS 330, A200, A100, IXY320, IXY200a, S230, S200, IXUSv2, IXUSv3, IXY D30, SD100, IXUS II, IXY400, S400, IXUS400

Digital Camera Setting Example No. 4 (Canon A20)

(And for cameras *not* having settable ISO Sensitivity or Aperture Value, and with Aperture Value *not* visible in LCD display)

- 1) Set Mode Dial to Manual Mode.
- 2) Push Flash Set Button to set Flash Mode to ON.
- 5) As necessary, push Exposure / White Balance Button once, then Macro / Infinity Button, Continuous / Self-Timer Button, set Exposure Compensation and then push Exposure / White Balance Button twice to fix setting.



Widest Aperture (W-T)



A20 Lens Front

A20 LCD Monitor Display

- 6) Confirm above settings in LCD Monitor.
- 7) From the camera Manual Specifications page check the image sensor's sensitivity range.

ISO 100 – ISO 150

- 8) From the lens front or the camera Manual Specifications page, check the widest aperture value, or the settable aperture range.

Widest Aperture at Wide Setting: f/2.8

Widest Aperture at Tele Setting: f/4.8

Below are some other cameras requiring similar settings. For details of making such settings, refer to your camera manual.

Olympus: C900Z, D-400Z, C-2, Brio 230, C-1 Zoom, C-2 Zoom, Brio Zoom 150, Stylus 300, Stylus 400, u-10 Digital, u-20 Digital, u-300 Digital, u-400 Digital, X-200, C-350Z, D-560Z

Canon: A10, IXY300, S300, IXUS300

Sony: DSC-P1

Using another external strobe as a slave strobe

When configuring another external strobe to use as a slave strobe in addition to the D-180, please refer to the instruction manual for the other strobe and set it to Slave Mode. It may also be necessary to adjust the camera's ISO sensitivity, shooting mode and exposure compensation and the D-180's flash output compensation.

Note: With the addition of another strobe, depending on conditions, there is a good chance of overexposing the image as the total minimum output of all the strobes may be too much at close distances. Here are some countermeasures:

- Attach optional D-180 –0.5 diffuser to strobe to reduce flash output
- Stop down camera aperture
- Move strobe farther away from subject
- Use Clear Photo System on internal strobe

D-180 Preparation

Setting the Advanced Cancel Circuit

Caution: Before setting Advanced Cancel Circuit always turn Main Mode Switch to **OFF**.

For **R-TTL** , **R-S** , **R-M** Group Cameras

Turn the Advanced Cancel Circuit to **OFF** by installing the magnet into the Advanced Cancel Circuit Switch.

Installation Method

- 1) Insert the magnet into the Advanced Cancel Circuit Switch hole
- 2) Thread in and screw down the Magnet Switch Screw

Caution: Screwing down the Magnet Screw too tightly will damage the strobe. Use the “Magnet Screw Tightner” as shown in picture to screw down Magnet Screw so it is not quite snug, *almost loose*, but definitely not tight.



For all Group Cameras *other than* **R-TTL** , **R-S** , **R-M** leave the Advanced Cancel Circuit **ON**, by *not* installing the magnet.



Installing Batteries

Caution: Whenever installing batteries always turn Main Mode Switch to **OFF**.

Note: Whenever opening or closing Battery Box outer cap always check condition of Battery Box O-ring, O-ring groove contact surface and O-ring contact surface on inside of cap. Check for debris or damage, and clean/re-grease/replace O-ring as necessary.

The D-180 can use the following batteries:

- AA Alkaline Batteries x 4
- AA NiCad batteries (nickel cadmium) x 4
- AA NiMH batteries (nickel metal hydride) x 4

Caution: To avoid strobe damage, or accidents including personal injury, do not use Lithium, Manganese or other non-specified batteries.

- 1) Slowly unscrew the Battery Box outer cap counterclockwise.
- 2) Unscrew the Battery Box inner cap screw counterclockwise and remove the Battery Box inner cap.



- 3) Install the batteries in proper position, paying attention to the +/- indications on the inside of the battery box.



- 4) Align the V-shaped index depression on the Battery Box inner cap with the index ridges on the inside of the Battery Box, and screw down the battery box inner cap screw.
- 5) After once again checking the battery box O-ring and contact surface, *slowly* screw down the battery box outer cap clockwise.

Connecting to Camera System

Connecting with “Optical D Cable”, “Optical Slave Cable” or Optical D Slave Cable:

- 1) Select the appropriate Optical Cable for your camera/housing/master strobe system. Then, following the instructions provided with the cable, connect to your system accordingly.
- 2) Place Sensor Plug end of Optical Cable directly over the Optical Sensor, lightly push on, and screw down until lightly snug, but not too tight.



Attaching to Camera/Housing System

Caution: Whenever attaching to or removing from arm or system base always turn Main Mode Switch to **OFF**.

Follow the instructions provided with your arm system / system base. Note that improper use of screws or washers may result in damage to the D-180.

Recommend attachment methods:

- 1) Inon “Z Adapter” for attaching Inon or Ultralite arm systems.
- 2) Inon “YS Adapter Fixing Bolt” for attaching with standard 12mm “YS Adapter”.



There is a 6mm threaded socket in the base of the strobe. Whichever attachment system you use always be sure the bolt length is not too long. If the bolt is too long and is screwed down so that it contacts the housing body, the strobe may be damaged. When screwing in, always make sure there is a gap between the end of the bolt and the strobe body.

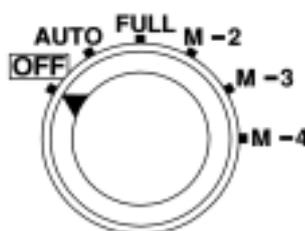
Chapter 3 How to use the D-180 Strobe

Main Mode Switch Setting Method

Main Mode Switch setting positions:

OFF

Turns D-180 power off.



AUTO

Set to AUTO when using “External Auto Flash Exposure Adjustment”. To actually enable “External Auto” it is necessary to set the Aperture Value Set Switch to a value closely matching that of the camera system.

FULL, M-2, M-3, M-4

For manual exposure, set the dial to one of the four positions.

The light output level for each position is as follows:

Switch Position	Output Level (**)	Guide Number (*), (**)
FULL	1	18
M-2	1/4	9
M-3	1/8	6.3
M-4	1/16	4.5

(*) Guide Number (Air / ISO 100 x m)

(**) The Red Strobe Ready Lamp will activate when the strobe re-charge is 80% complete. For situations where more precise output is necessary, such as manual flash, or for TTL when the subject is distant and at the far end of the TTL effective range, necessitating a full strobe discharge, we recommend you wait an additional one second after the Strobe Ready Lamp comes on.

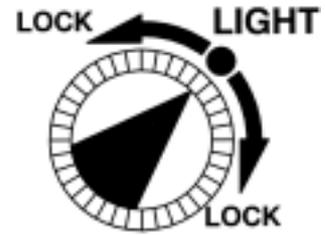
Also, when the batteries are near exhaustion the voltage level tends to decrease, and the actual strobe output may be slightly less than indicated. Alkaline batteries especially have this tendency for voltage to decrease, so also consider this factor when precise and/or full strobe output is necessary.

Focus Light Switch Setting Method

Focus Light mode functions, control and switch position are as follows:

OFF MODE (position set at “LIGHT” as in figure to right)

Set in this position to turn Focus Light off.



Single MODE (*)

Push Focus Light switch once and release. The Focus Light will turn on and then turn off automatically as the internal strobe fires; or, if shutter not released, after about 8 seconds.

Continuous MODE (*), (**)

By pushing Focus Light switch continuously, or by turning it to either right or left “Lock” positions *while pressing*, the Focus Light will turn on and shine continuously until the shutter is released. Then, the Focus Light will turn on again automatically 0.5 seconds after the image is taken.

(*) The Focus Light automatic off function is triggered by the Master Strobe’s flash. Therefore, the Focus Light automatic off function is not recommended for use with **R-TTL**, **R-S** and **R-M** Group digital cameras having internal strobes, or with other external strobes (that do not use pre-flash type of exposure calculation). The shutter-linked automatic off function will not work and light from the Focus Light will be recorded in the image. Turn the Focus Light OFF before releasing the shutter.

(**) In Continuous MODE, after the shutter is released, the Focus Light will turn off for approximately 0.5 seconds, before turning on again. Therefore, for slow shutter speeds longer than 0.5 seconds, do not use the Focus Light in Continuous MODE, since the light will turn back on while the shutter is still open, exposing the image with light from the Focus Light. Instead use OFF MODE or Single MODE.

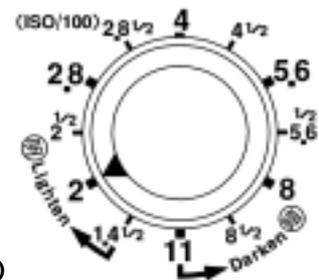
Aperture Value Set Switch Use Method

The Aperture Value Set Switch positions are as follows:

$1.4^{1/2}$, 2, through to $8^{1/2}$, 11

“External Auto” is possible when Main Mode Switch is in AUTO

position and the Aperture Value Set Switch position corresponds to the camera system’s Aperture Value settings, when the ISO Sensitivity value is 100.



Set switch to the value closest to the Aperture Value set on your camera. It is not necessary to exactly match the values.

When camera's ISO is set to value other than 100, refer to chart below to find the most appropriate switch position.

+1/4 EV Compensation Switch Use Method

The +1/4 EV (Exposure Value) Compensation Switch settings are as follows:



OFF Position:
No compensation of flash output



ON Position:
+1/4EV compensation of flash output

Camera System Aperture Value / ISO Sensitivity / Compensation Switch Chart

+1/4 EV Switch Position and Aperture Value Set Switch Position at each camera ISO value and aperture. Use this chart together with the troubleshooting points on next page.

ISO 50	ISO 100	ISO 200	ISO 400	Switch Position	Compensation Switch
1.0 ^{+1/2EV}	1.4 ^{+1/2EV}	2 ^{+1/2EV}	2.8 ^{+1/2EV}	1.4 ^{1/2}	OFF
1.0 ^{+3/4EV}	1.4 ^{+3/4EV}	2 ^{+3/4EV}	2.8 ^{+3/4EV}	1.4 ^{1/2}	ON
1.4	2	2.8	4	2	OFF
1.4 ^{+1/4EV}	2 ^{+1/4EV}	2.8 ^{+1/4EV}	4 ^{+1/4EV}	2	ON
1.4 ^{+1/2EV}	2 ^{+1/2EV}	2.8 ^{+1/2EV}	4 ^{+1/2EV}	2 ^{1/2}	OFF
1.4 ^{+3/4EV}	2 ^{+3/4EV}	2.8 ^{+3/4EV}	4 ^{+3/4EV}	2 ^{1/2}	ON
2	2.8	4	5.6	2.8	OFF
2 ^{+1/4EV}	2.8 ^{+1/4EV}	4 ^{+1/4EV}	5.6 ^{+1/4EV}	2.8	ON
2 ^{+1/2EV}	2.8 ^{+1/2EV}	4 ^{+1/2EV}	5.6 ^{+1/2EV}	2.8 ^{1/2}	OFF
2 ^{+3/4EV}	2.8 ^{+3/4EV}	4 ^{+3/4EV}	5.6 ^{+3/4EV}	2.8 ^{1/2}	ON
2.8	4	5.6	8	4	OFF
2.8 ^{+1/4EV}	4 ^{+1/4EV}	5.6 ^{+1/4EV}	8 ^{+1/4EV}	4	ON
2.8 ^{+1/2EV}	4 ^{+1/2EV}	5.6 ^{+1/2EV}	8 ^{+1/2EV}	4 ^{1/2}	OFF
2.8 ^{+3/4EV}	4 ^{+3/4EV}	5.6 ^{+3/4EV}	8 ^{+3/4EV}	4 ^{1/2}	ON

4	5.6	8	11	5.6	OFF
4 ^{+1/4EV}	5.6 ^{+1/4EV}	8 ^{+1/4EV}	11 ^{+1/4EV}	5.6	ON
4 ^{+1/2EV}	5.6 ^{+1/2EV}	8 ^{+1/2EV}	11 ^{+1/2EV}	5.6 ^{1/2}	OFF
4 ^{+3/4EV}	5.6 ^{+3/4EV}	8 ^{+3/4EV}	11 ^{+3/4EV}	5.6 ^{1/2}	ON
5.6	8	11	16	8	OFF
5.6 ^{+1/4EV}	8 ^{+1/4EV}	11 ^{+1/4EV}	16 ^{+1/4EV}	8	ON
5.6 ^{+1/2EV}	8 ^{+1/2EV}	11 ^{+1/2EV}	16 ^{+1/2EV}	8 ^{1/2}	OFF
5.6 ^{+3/4EV}	8 ^{+3/4EV}	11 ^{+3/4EV}	16 ^{+3/4EV}	8 ^{1/2}	ON
8	11	16	22	11	OFF
8 ^{+1/4EV}	11 ^{+1/4EV}	16 ^{+1/4EV}	22 ^{+1/4EV}	11	ON

Troubleshooting External Auto Flash

When using strobes, depending on the particular shooting conditions, subject characteristics and desired image characteristics, it is *very important to consider the total light of, and balance between both the natural ambient light and the strobe light.* Also, it is necessary to keep in mind the general characteristics of digital cameras and how the D-180 handles external auto flash. Here are some common situations, with causes and possible solutions.

1) Macro Imaging

Problem Blooming, image highlights washed out, overexposed, too bright.

Cause 1 Because the amount of strobe light exposing the subject is small, *the proportion of natural light reflecting off the subject is greater.* After the strobe stops firing, when it thinks proper exposure has been reached, natural light continues to expose the subject until the camera shutter closes, and the digital camera's exposure latitude is overcome.

Solution 1-2: Adjust camera to minus compensation, for example, from 0 EV (no compensation) to -2 EV, etc.

Solution 1-2: If using Aperture Priority or Manual Mode, stop down aperture on camera, for example from f/4.0 to f/8.0 or f/11 etc.

Solution 1-3: If using Manual Mode, increase shutter speed, for example from 1/60 to 1/125 or 1/180 etc.

Solution 1-4: Attach optional D-180 diffuser panel to strobe to decrease flash output.

Cause 2 *When subject has depth there is a difference light amount reaching the front and back, causing overexposure on the front or foreground, overcoming the digital camera's exposure latitude.*

Solution 2-1: Adjust strobe to minus compensation, for example if the camera aperture is f/8.0, set the strobe to f/5.6 or f/4-1/2 etc.

Solution 2-2: Using strobe arms, move strobes farther away from subject to reduce amount of light reaching the subject.

Solution 2-3: Attach optional D-180 diffuser panel to strobe to decrease flash output.

2) Mid-range Subject Imaging

Problem Blooming, image highlights washed out, overexposed, too bright.

Cause 1 If *the subject only covers a small portion of the frame*, such as a small fish with an open water background, only a small amount of light will be reflected off the subject and back to the D-180's light sensor. The strobe, sensing very little reflected light (under exposure) will try to emit more light than necessary, and overexpose/wash-out the subject. This is a difficult situation for any camera/strobe system.

Solution 1-1: Adjust strobe to minus compensation.

Solution 1-2: As needed, set camera's exposure compensation.

3) Using Multiple Strobes (including camera's internal strobe)

Problem Blooming, image highlights washed out, overexposed, too bright.

Cause 1 The *total possible minimum light output* from the *combined strobe system* (external strobe(s) + internal strobe) is too great at close distances, causing the close end (nearest the camera) of the effective flash exposure range to lengthen out, away from the camera. Subjects close to the camera/flash will receive too much light and be overexposed. This is particularly the case for camera's having internal strobes with relatively large minimum possible flash output. For such cameras we recommend placing Clear Photo System film over the internal strobe when using external strobe(s).

Solution 1-1: Use Inon "Clear Photo System"

Solution 1-2: Stop down camera's aperture value.

Solution 1-3: Adjust strobe to minus compensation.

Solution 1-4: Using strobe arms, move strobes farther away from subject to reduce amount of light reaching the subject.

Solution 1-5: Attach diffuser panel to strobe(s) to decrease flash output.

Cause 2 When using strobes other than Z-220 as TTL Slave strobes when the D-180 is the Master strobe, the effective exposure range is insufficient and/or the recycle time is too long (for use with pre-flash systems etc.) making proper exposure difficult or not possible.

Solution 2: Use Z-220.

4) Distant Subject Imaging

Problem Subject is underexposed, too dark.

Cause Subject is too far away, beyond strobe's effective range so adequate light is not reaching subject.

Solution 1: Move closer to subject, to within the strobe's effective range.

5) Advanced Techniques (slow synch imaging / using **auxiliary** strobes)

Problem Blooming, image highlights washed out, overexposed, too bright.

Cause The proportion of exposure due to natural light is comparatively greater, so that even after the strobe stops firing at what it thinks is "proper" exposure, the shutter is still open adding natural light exposure, causing total exposure to exceed the camera's exposure latitude.

Solution 1-1: Adjust strobe to minus compensation.

Solution 1-2: Adjust other shooting parameters on the camera.

6) Advanced Techniques (back-lit subjects)

Problem Difficulty to achieve intended image.

Cause The balance of natural light to strobe light is improper for the camera shooting parameters.

Solution 1: Set strobe flash output compensation and camera exposure compensation according to the subject reflectivity, background brightness and to what degree the subject fills the frame. In general, set camera exposure to plus (+) compensation and strobe flash output to minus (-) compensation.

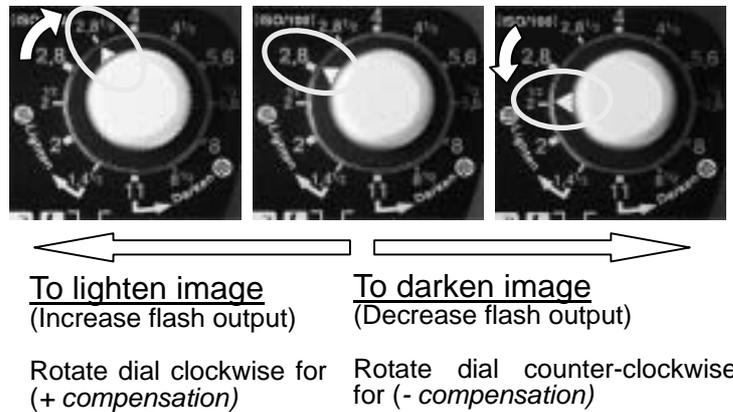
Adjusting D-180 Flash Output

It is *not necessary to always exactly match* the Aperture Value Set Switch to the camera's aperture value. However, in addition to the various situations described above, depending on the subject condition and the D-180 strobe position relative to the subject and camera, there may be a difference between the subject reflectivity measured by the D-180, and the subject reflectivity metered through the camera lens. Exposure difference may vary based on camera manufacturer and camera model, as well as other factors.

To obtain optimum exposure in such cases, after double checking that the Aperture Value setting on the strobe matches the camera aperture in the camera monitor, if proper exposure still not obtained, adjust the Aperture Value Set Switch for flash output compensation as described below.

Note: In general, the images on consumer digicam monitors often appear a little overexposed, so to

help in judging if images are exposed correctly or not, first calibrate the brightness of the monitor by comparing an actual image with the same image on the monitor, and adjust the monitor until it matches the brightness of the actual image.



Reference No. 8 Exposure when using strobes

When using strobes to take images, the kind of light exposing the film/image sensor increases from just one type; natural Ambient Light, to two types; Ambient Light and Strobe Light. Therefore, when Strobe Light becomes a factor, in order to expose the image according to your intention, you must first image in your mind:

- 1) The combined total exposure amount of Ambient and Strobe Light
- 2) The balance between the Ambient and Strobe light in the total exposure amount, and how to match the camera parameters for each subject and shooting condition to appropriately control the outcome.

Considering the light exposure from the Film or Image Sensor's perspective, the characteristics of Ambient and Strobe light can be compared as follows.

Ambient Light

- Comparatively weaker than strobe light, but exposing for the whole time the shutter is open.
- Exposes subject, foreground and background equally based on the ambient conditions.

Strobe Light

- Comparatively stronger than natural light, but only exposes for a brief instant while the shutter is open.
- Because much of the strobe light will be absorbed by water, amount of strobe light reaching the subject, foreground and background is different. Objects closer to the strobe will receive and reflect more strobe light. Distant objects or background may not receive any strobe light at all.

Methods for controlling the Ambient and Strobe Light are different.

When using the D-180 on “External Auto” mode, with the camera’s ISO to 100, the ambient and strobe light are controlled as follows:

Ambient Light *The strobe’s setting does not make any difference.*

- **Camera’s Aperture Value:** As the aperture becomes smaller (the “f/ stop” number becomes larger, for example f/8.0 instead of f/5.6), less light passes through the lens and so the amount of exposure decreases (in Manual and Aperture Priority Modes). When using Exposure Compensation with Shutter Priority Mode, the camera’s aperture value will change as well.
- **Camera’s Shutter Speed:** As the speed becomes faster (the fraction becomes smaller, for example 1/125 of a second instead of 1/60), less light passes through the lens and amount of exposure decreases (in Manual and Shutter Speed Priority Modes). When using Exposure Compensation with Aperture Priority Mode, the camera’s shutter speed will change as well.

Strobe Light *Directly related to the camera’s aperture setting.*

- **D-180 Aperture Value Set Switch Value:** In contrast to setting the camera’s aperture value; 1) Dialing the Aperture Value Set Switch to a larger aperture value (smaller number) will reduce the flash amount (weaker). 2) Dialing to a smaller aperture value (larger number) will increase flash amount (stronger).
- **D-180 +1/4 EV Compensation Switch:** Moving switch to ON position (so that it covers the Light Sensor) will increase exposure by +1/4 EV. Flash light becomes stronger.

Reference No. 9 Differences between using external strobes with digital cameras and film cameras

Image Sensor Latitude

Compared to silver halide film, consumer grade compact digicams have narrower image sensor latitude and less dynamic range. This means there may be less possible contrast gradations, loss of shadow details, increase of blooming – washout of highlights etc. Accordingly, more precise control of natural light and strobe light is increasingly important.

Image Sensor Size and Lens Focal Length

Because the image sensor size of consumer digicams is small (compared to 35mm film systems), extremely short focal length lenses can be used. And because of this, it is possible to obtain much deeper depth of field (compared to 35mm film at the same view angle and optical aperture). With conventional 35mm film systems, achieving great depth of field, especially for macro imaging, required some skill and know-how, such as aperture setting and strobe placement. But for current digital cameras, obtaining good depth of field is comparatively easier due to the short focal length lenses commonly used. Also, due to current digicams having different

two stops to allow more light to reach the film/image sensor, compensating for the light absorbed by the water. Note: In water, the visual distance to the subject is about 0.75 times the actual measured distance.

Because proper Aperture Value / Guide Number may vary due to water conditions, strobe angle and distance relative to subject, subject reflectivity, amount of magnification of lens and various other factors, learn by taking test images, build up experience and adjust manual settings according to the situation.

Also note that as the distance from camera lens to subject becomes shorter, the camera lens tends to become “darker” and less light will reach the film/image sensor. Adjust settings accordingly. Also, be aware that natural light may increasingly contribute to the exposure based on you settings, so taking test images and analyzing the exposures is useful.

The chart below should be used as an initial reference guide for setting manual exposure, and supported with actual testing and experience to obtain optimum images.

ISO 100 / Underwater Manual Exposure					
Distance		Manual Setting Position			
ft	m	Full	-2	-3	-4
1	0.3	18	9	6.3	4.5
2	0.6	13	6.3	4.5	3.2
3	0.9	9	4.5	3.2	2.2
4	1.2	6.3	3.2	2.2	G.N.=18
6	1.8	4.5	2.2		ISO 100 x m
8	2.5	3.2			in air

How to interpret the exposure calculations

For example, when the film/image sensor ISO value is 100, and the distance to subject is 0.9 meters / 3 feet (underwater visual distance), at FULL flash, -2 flash and -4 flash settings, the aperture settings would be either f/9, f/4.5 or f/2.2 respectively.

Chapter 4 D-180 Care and Maintenance

To obtain best performance from your D-180, please follow these preventative care and maintenance guidelines.

- 1) Protect the D-180 from excessive impact shock and vibration. Do not drop. Do not leave on a vibrating boat deck without some cushioning, for example. Especially, protect the Optical Sensor. Use some towels or padding under the arm connector (see figure at right) to prop up the strobe so there is no pressure exerted on the Optical Sensor/Connector.
- 2) Do not leave strobe exposed to direct sunlight or other areas of high temperature.
- 3) **Do NOT disassemble or attempt to self-repair.** The strobe contains very high voltage circuitry. Disassembling could lead to severe electric shock and injury. If you think the strobe is in need of repair, always contact Inon or your Inon dealer.
- 4) Do not leave the strobe closed when traveling to or from high altitudes, including travel on aircraft. *Always remove the Battery Box Cap.*



- 5) When changing batteries use extreme care to prevent any water from entering the strobe or battery connection terminals. Where possible, avoid battery changes when the strobe is wet.
- 6) Limitation on number of continuous repeated strobe flashes

In order to prevent overheating and damage of D-180 flash tubes and internal circuitry, *do not repeatedly discharge the strobe more than recommended limit.*

Limit the number of continuous repeated strobe discharges according to the chart below. After reaching the limit, stop and let the strobe cool off for two minutes minimum. In general, it is preferable to let the strobe cool off anytime after a continuous burst of flashes, even if less than the maximum below.

D-180 Light Output (Main Mode Switch Position)	Maximum Number of Repetitive Flashes
AUTO Position*, FULL Position	20 Flashes
M-2, M-3 or M-4 Positions	60 Flashes

*When subject is at far (distant) side of light adjustment range, or shooting conditions cause the strobe to discharge in the FULL to -0.5 range.

7) Important points regarding battery handling and care

The D-180 uses four AA Alkaline, Nickel Cadmium (NiCad) or Nickel Metal Hydride (NiMH) batteries.

In general, as batteries are used, the battery voltage gradually decreases and it takes longer for the strobe to recycle after firing. As the batteries discharge, when using manual flash exposure, the flash output amount (Guide Number) may become slightly less than actually indicated. As

batteries discharge further, towards complete exhaustion, there will be a sharp reduction in voltage possibly causing the strobe to function inconsistently.

If you observe any of the following symptoms, it may be that the strobe is not receiving sufficient voltage necessary for correct function.

- When Focus Light brightness becomes dimmer.
- When it takes the Strobe Ready Red Lamp over 30 seconds to shine when using alkaline batteries;
- Or, when the Strobe Ready Lamp recycle time takes over 8 seconds for NiCad batteries.

In general, battery performance will decrease as temperature lowers, and batteries will slowly discharge over time when not used. And, number of possible flashes can greatly vary based on variables such as water temperature and how the batteries are used. If possible, start with a fresh or sufficiently charged set of batteries so that you do not end up with exhausted batteries in the middle of a dive, and lose important imaging opportunity.

Follow these precautions to avoid damage to batteries and strobe, and depending on the type of batteries, possible buildup and explosion of flammable (hydrogen) gas.

Warning: Equipment damage or personal injury may result if these precautions are not followed.

- A. Make sure battery +/- positions are properly placed in Battery Box.
- B. Do not use non-specified batteries, such as Lithium or Manganese batteries.
- C. Do not mix batteries from different manufacturers, or batteries having different remaining charges.
- D. Do not mix different battery types together, such as Alkali and NiCad.
- E. Do not attempt to charge non-chargeable batteries.
- F. Do not intentionally short the batteries or circuits.
- G. Do not store batteries in D-180 when not in use.
- H. Do not use battery charging devices that are not compliant with the battery manufacturer's recommendations.
- I. Do not repeatedly fire the D-180 to discharge/refresh rechargeable batteries, or any other time.

Caution: Never repeatedly fire the strobe continuously, for example, to discharge or refresh the batteries. Repeatedly firing the strobe will cause overheating and damage internal components.

Caution: If any water ever enters the Battery Box, or if you ever feel suspicion that the D-180 is not operating correctly:

1. Immediately stop using D-180.
2. Promptly remove batteries.

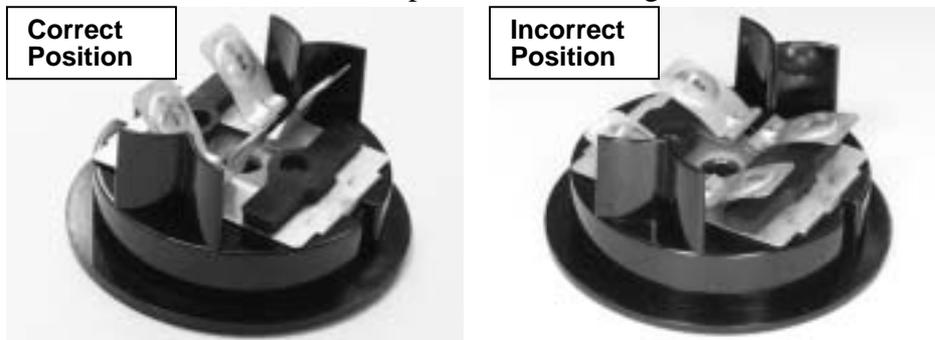
3. Contact Inon or your Inon dealer for advice. Service may be necessary.
4. Do not attempt to use the strobe, disassemble or self-repair.

8) Maintenance of rechargeable battery terminals and D-180 Battery Box terminals

Rechargeable batteries offer high capacity, high performance and long life but to ensure consistent and stable function it is necessary to monitor the both the battery terminals and the D-180 Battery Box terminals, and perform maintenance according the procedures below. Also, anytime you suspect inconsistent charging, unstable performance or poor battery connection, check the terminals as an initial troubleshooting measure.

1. Adjust position of Battery Box Inner Cap terminals

High performance rechargeable batteries can be heavy, and may tend to flatten the Battery Box Inner Cap terminals. This can cause poor connection, so gently bend the terminals back to the correct position, as in image below.



2. Clean battery terminals, Battery Box Inner Cap terminals and Battery Box terminals

High performance rechargeable batteries have a tendency to form an oxidized layer or build up residue on the battery terminals and Battery Box terminals. This can cause poor connection, so clean the terminal locations as in images below.



Cleaning Method

- a) Wipe each terminal surface with a cotton swab (or similar) soaked in alcohol to remove any oil or similar residue.

- b) 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.

Note: When cleaning, be careful not to let any alcohol or silver polish contact any plastic or vinyl parts.

Caution: When handling batteries always follow the handling precautions listed on page 47.

Caution: Whenever installing batteries always turn Main Mode Switch to **OFF**.

Post-dive care

- 1) After using strobe underwater, first rinse and then soak in fresh water, for several hours if possible, to dissolve any salt build-up. The water temperature should be no higher than 30C (86F) degrees. Do not immerse the strobe into hot water.
- 2) When soaking in fresh water, slowly manipulate the controls to work out any salt or sand trapped in the gaps.
- 3) Take care to rinse especially well the Optical Sensor. If salt is allowed to buildup, it may cause the clear resin portion to become hazy and prevent light from reaching the sensor. However, do not scrub the sensor with anything abrasive that could scratch the sensor surface.
- 4) After soaking, do not leave in direct sunlight. First, thoroughly towel dry and remove the batteries. Then place in shaded, well ventilated area. In areas of high relative humidity it may take several days for moisture in the small gaps and recesses of the strobe to completely dry. *Never apply flame or direct heat to the strobe.*
- 5) After completely dry, inspect the O-ring, O-ring groove and O-ring contact surfaces, and maintain / grease-up as necessary.



Caution: If the strobe exterior needs cleaning, do not use alcohol, benzene or solvent based cleaning solutions. Also, *never use alkali cleaning agents* or other chemicals as these will degrade the plastic body. Use a mild well diluted (neutral) detergent if exterior cleaning absolutely necessary.

Overhaul

The D-180 is designed and manufactured for use in severe conditions. Before shipping, all strobes are pressure tested in water and fully checked for proper function. To ensure your D-180 maintains optimum performance, in addition to the pre and post dive handling recommendations, maintenance procedures, and recommended storage conditions, it is also necessary that the strobe receive periodic overhaul at Inon, or an Inon authorized service facility.

There are two main types of overhaul:

1) Normal Overhaul

- Replace any exposed O-rings
- Replace any O-rings supporting moving parts
- Test all controls, moving parts
- Pressure test

2) Full Overhaul

- Replace all O-rings
- Test all controls, moving parts
- Pressure test

O-ring and other degradable part life can vary considerably due to type of use, frequency of use, maintenance method, storage conditions etc. Inon will conduct incoming product inspection of each overhaul request and determine at its discretion whether Normal or Full Overhaul is necessary.

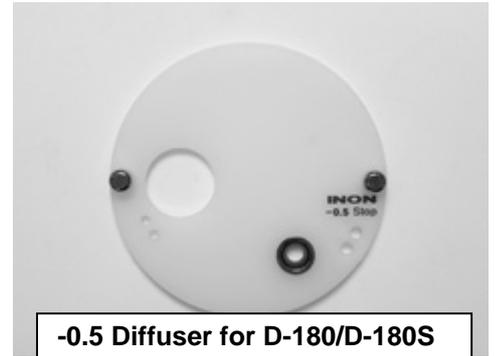
Of course, Inon can conduct overhaul any time based on specific instructions from the user, but in general Inon recommends normal overhaul once per year, and full overhaul every three years.

Chapter 5 Reference

Optional Accessories

- -0.5 Diffuser for D-180/D-180S

Dedicated for use with D-180 and D-180S strobes only. By attaching this diffuser panel, the strobe's beam angle widens (from a circular 100 to 110 degrees) and the quality of light and shadows becomes softer. The diffuser can be used in both "External Auto" and "Manual" Modes.



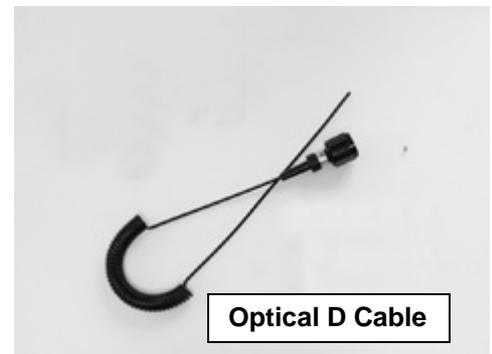
Connector parts for transmitting light from digital camera internal strobe to D-180

- Optical D Cable

Cap to fit on D-180 Slave Sensor on one end, bare fiber optic on other end.

- Optical D Cable/Cap W2 Set (with Clear Photo System Film)

Optical D Cable and fixtures for direct mounting on PT-005/007/010 housings. Possible to install a second Optical D Cable for dual strobe use.



- Optical D Cable/Cap W5 Set (with Clear Photo System Film)

Optical D Cable and fixtures for direct mounting on PT-015 housing. Possible to install a second Optical D Cable for dual strobe use.

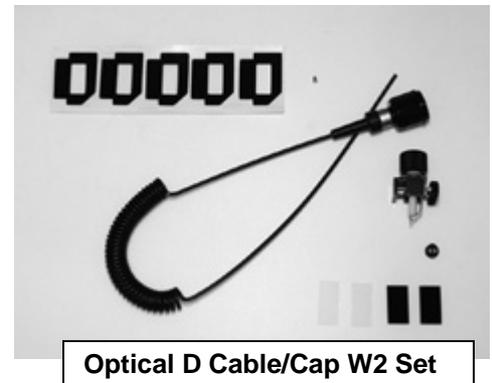
- Optical D Cable/Cap W3 Set (with Clear Photo System Film)

Optical D Cable and fixtures for mounting on:

AD Mount Base: DC100/500, DC200/200s, DC300

M67 Mount Base: DC100/500, DC200/200s, DC300

Possible to install a second Optical D Cable for dual strobe use.



- Optical D Cable/Cap W4 Set (with Clear Photo System Film)

Optical D Cable and fixtures for mounting on:

AD Mount Base: PT-012, PT-009

M67 Mount Base: PT-012, PT-009

Possible to install a second Optical D Cable for dual strobe use.

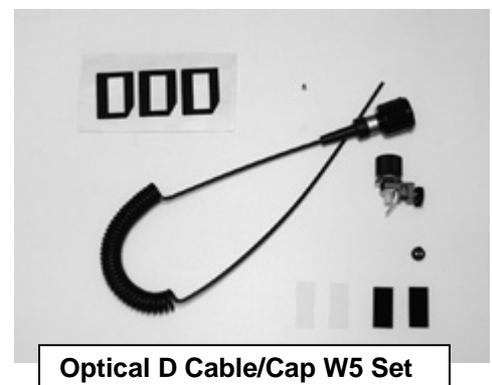
- Optical D Cable/Cap W6 Set (with Clear Photo System Film)

Optical D Cable and fixtures for mounting on:

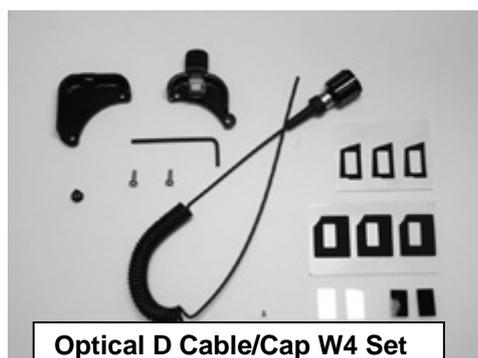
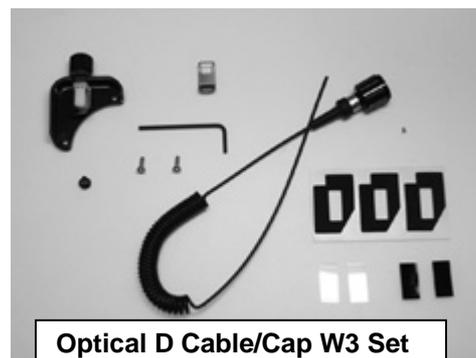
AD Mount Base: PT-014

M67 Mount Base: PT-014

Possible to install a second Optical D Cable for dual strobe use.



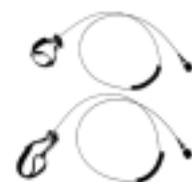
- Optical D Cable/Cap W7 Set (with Clear Photo System Film)
Optical D Cable and fixtures for mounting on PT-018. Possible to install a second Optical D Cable for dual strobe use.



Connector parts for transmitting light between external strobes

- Optical Slave Cable (S and L sizes)

Attach harness end to other external master strobe. Attach connector end to D-180 Optical Sensor. Light from master strobe transmitted directly to D-180 slave.



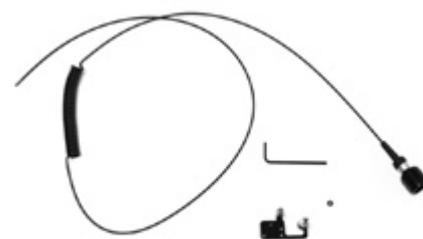
Optical Slave Cable

“S” (small, for strobes with diameters of approx. 6 – 10cm) for master strobes: Inon Z-220/220S, D-180/D180S, Nikon SB-105, Sea & Sea YS25, YS30, YS60, YS90, YS120, Ikelite DS-50, DS-125, SS-50.

“L” (large, for strobes with diameters of approx. 10 – 15cm) for master strobes: Inon Z-22, Nikon SB-104, Sea & Sea YS350, YS300, Ikelite SS-100, SS-200, SS-400.

- Optical D Slave Cable

Connect “Optical D Slave Cable” between a D-180 or Z-220 strobe (Master Strobe) and an Inon Z-220 or Z-22 strobe (Slave Strobe). Light from the D-180/Z-220 Focus Light will link to and allow functioning of the slave strobe’s Focus Light and Target Laser.



Optical D Slave Cable

Arm System

Strobe Connector Parts



Inon YS Adapter &
YS Adapter Fixing Bolt



YS Adapter Fixing Bolt



Z Adapter

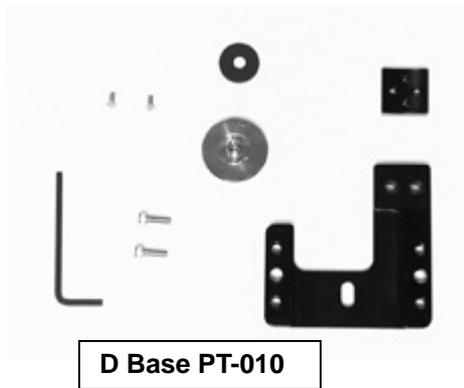
Arm / Base Parts (partial listing)

D Base Base Plate with screw mount for housing's 1/4 inch threaded socket. Attach one or two Grip Base III.

D Base PT-018

D Base PT-015

D Base PT-010



D Base PT-010

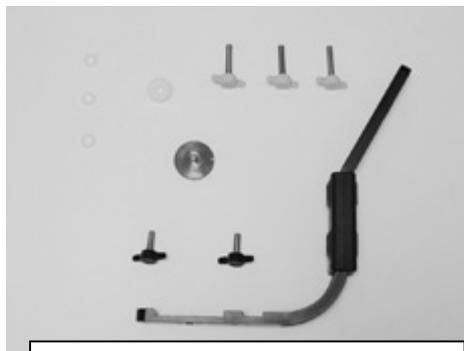


D Base PT-015

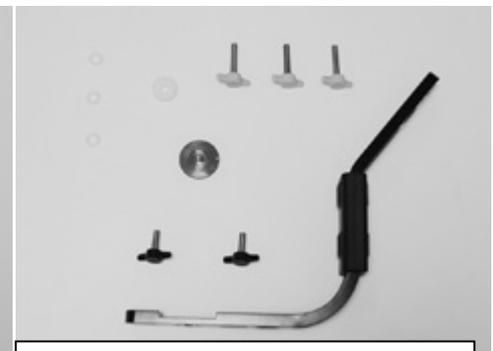
Grip Base Attach to D Base or AD/M67 Mount Adapters, use as grip and attachment point for strobe arms.

- Grip Base DII (for AD or M67 Mount Base)

- Grip Base DIII (for PT-018/015/010/007/005)



Grip Base DII with Rubber Grip

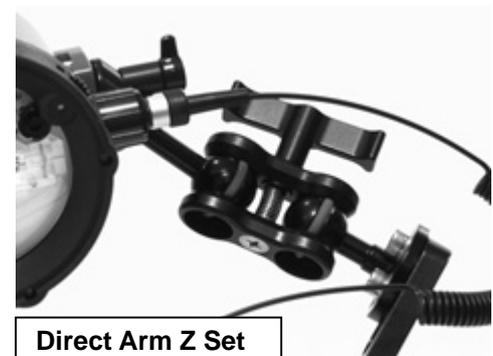


Grip Base DIII with Rubber Grip

Direct Arm Sets Permit greater flexibility of strobe placement.

Direct Arm Z Set (with Z Adapter mount)

Direct Arm YS Set (with YS Adapter mount)



Direct Arm Z Set

Port Arm D
Port Arm D Spacer
(for PT-007/010)



Port Arm D on PT-010



AD Mount Base System

A multi-function attachment for some specific camera housing models. An AD Mount base will accommodate Optical D Cable/Cap Sets, Strobe Arm Systems, and Inon Attachment lenses having an *INON AD Bayonet mount*. Refer to catalog to determine if an AD Mount Base is available for your housing model.



M67 Mount Base System

A multi-function attachment for some specific camera housing models. A M67 Mount base will accommodate Optical D Cable/Cap Sets, Strobe Arm Systems, and Inon Attachment lenses having a *standard 67mm threaded mount*. Refer to catalog to determine if a M67 Mount Base is available for your housing model.



- Spare O-ring (for D-180 Battery Box)

Inon yellow O-rings contain lubricant in the o-ring rubber. Yellow color for best contrast, so contaminants etc. are easier to see, and so it is harder to forget to install the O-ring.

- Inon Grease

Special grease formulated to match Inon yellow O-rings. Can also be used with conventional black O-rings.



Specifications:

Product Name: **Inon D-180**

Product: **D-180 Strobe body, Magnet, Magnet Screw, Magnet Screw Tightner, Hex Wrench, Spare O-Ring, O-Ring Grease**

Strobe Control: **“External Auto” and Manual (4 step Manual setting)**

Guide Number: **18 (full), 9 (-2), 6.3 (-3), 4.5 (-4).** (Air, ISO = 100 x 1 meter)

Settable Aperture Values:

$f/1.4^{+1/2EV}$ – $f/11(1/2EV$ increments)

$f/1.4^{+1/2EV}$ – $f/11^{+1/4EV}$ (1/4EV increments)

(At equivalent ISO 100 film sensitivity)

Beam Angle: **100° x 100° (air) circular beam**

Color Temp: **5500K**

Batteries: **AA Alkaline, Nicad, or Nickel Metal Hydride x 4**

Recycle Time*:

AA alkaline batteries: 1.7 seconds minimum

AA Nicad batteries: 1.7 seconds minimum (1,000mAh)

AA NiMH batteries: 1.5 seconds minimum (1,600mAh)

Flash Capacity*: **AA alkaline batteries: approximately 600 flashes**

AA Nicad batteries: approximately 240 flashes (1,000mAh)

AA NiMH batteries: approximately 500 flashes (1,600mAh)

* **Full strobe output at 30 second intervals with both Focus Light and Advanced Cancel Circuit OFF, at 25C (77F) degrees.**

For reference purposes. Based on Inon test data. Actual values may vary based on battery manufacturer, battery type and age.

Depth Rating: **100m (330 feet)**

Size: Diameter: **Approx. 100mm**

Length: **Approx. 100mm**

Height: **Approx. 137mm (including protruding parts)**

Weight: Air: **540gr without batteries**

U/W: **Approx. 30gr (with 4 AA Nicad batteries)**

Focus Light: **Linked to camera shutter (Manual ON, Auto OFF when shutter is opened, or after approx. 8 seconds)**

* Specifications subject to change without notice.

Technical Support & Service

- For overhaul, maintenance and repair please contact your Inon dealer.
- Warranty service is provided free of charge as specified under warranty conditions (pages 1-2 of this Manual). In principle, service is not free of charge after warranty period has expired, and customer is required to bear shipping costs to and from Inon, or Inon's designated repair facility.

Please consult with Inon *before* returning any products for service.

Inon Dealer Contact Information:

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Maple Grove, MN 55311 USA
Tel: (763) 763-559-1212
Fax: (763) 763-559-5236
Email: support@inonamerica.com
URL www.inonamerica.com