



# CREATIVE FLASH PHOTOGRAPHY

Explore the creative possibilities of flash photography in the studio and on location.

- BASICS
- PRACTICE
- EQUIPMENT





# YOUR CANON ACADEMY

Canon Academy offers inspiration and expertise for photographers. Whether in a workshop with our trainers or in our online programme (available live or 24/7):

We share our experience with enthusiasm and passion.



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## BASICS



## PRACTICAL EXPERIENCE



## EQUIPMENT



### Basics

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# FLASH FOR FANTASY

## Intro

Canon Academy's Creative Flash guide introduces you to the many ways flash can be used in photography. The basics section explains the characteristics of this type of lighting and the technical requirements. The practical section explains how flash can be used in both indoor and outdoor photography, and what options are available for shaping and directing the flash. The Equipment section focuses on Canon Speedlite flash units and accessories. The glossary explains technical terms related to flash.



# BASICS

## How flash light differs from natural light and artificial permanent light

The flash symbol is generally associated with speed and energy. These characteristics also apply to photographic flash light: a flash emits a large amount of light in a short time: "flash-like". Natural sunlight and artificial ambient light, on the other hand, illuminate a subject continuously. Flash light can replace or supplement ambient light: In photography, the properties of flash light can be used to replace missing light, to supplement existing light or to give the subject a special look with flash light effects.



## Flashback: The early days of artificial flash

Even the pioneering photographers used artificial flash. However, there were less creative reasons for doing so: Exposure times for portrait photography were so long that movement of the subject during the exposure caused the image to blur. Photographers therefore used an explosive flash powder mixture of magnesium and other chemicals, which was ignited when the picture was taken. The resulting flash was short enough (approx. 1/30 of a second) to minimise motion blur. However, handling this flash powder was risky: burns, explosions and fires were not uncommon.

## Modern flash systems

The electronic flash literally made flash photography socially acceptable. Clip-on and bounce flashes are part of most amateur and professional equipment. With electronic flash control, in-camera TTL flash metering and the ability to control multiple flashes together, the flash was finally "tamed". The higher ISO sensitivity of today's digital cameras means that the use of flash as a "last resort" in low-light situations is becoming less and less necessary. All the more reason for modern compact flash units to play to their strengths in creative lighting design in conjunction with sophisticated E-TTL metering.

## Exposure with flash

Unlike ambient light, flash light has special characteristics that need to be taken into account.

With ambient light (daylight, artificial light), the amount of light falling on the sensor is controlled by both the lens aperture and the camera's exposure time. Depending on the scene, the aperture setting can be used to increase or decrease the depth of field, or a short exposure time can be used to freeze motion, or a long exposure time can be used to create long exposure effects.

With flash, shutter speed is not a suitable means of exposure control. This is because the flash duration is usually shorter than the camera's exposure time. When using a flash, the exposure time only affects the available ambient light.

If you are shooting exclusively with a flash, as in a photo studio, it makes no difference to the exposure whether the camera's shutter speed is 1/125th of a second or 1/30th of a second: the short flash fires the same amount of light onto the sensor in both cases.





**To control exposure with the flash, there are other "dials":**

### 1. the flash power setting

Most flash units offer a manual flash power setting, which can be adjusted in half, full or third increments.

### 2. setting the lens aperture

When adjusting the aperture, the same exposure rules apply as for daylight or artificial light: changing the aperture by one f-stop doubles or halves the amount of light falling on the sensor. Example: At aperture 11, only half as much light reaches the sensor as at aperture 8.

### 3. lighting distance

Exposure can also be affected by the distance between the light source and the subject, both with flash and ambient light. Illuminance decreases "quadratically" with distance: For example, if the distance between the flash and the subject is doubled from 1 to 2 metres, the amount of light will be reduced by a factor of four, which corresponds to a decrease of two f-stops.



**Tip:** When theory is too grey for you: In practice, EOS cameras and Speedlite flash units measure and control automatically, so you can concentrate on your subject without worrying about the flash.

## Flash colour temperature

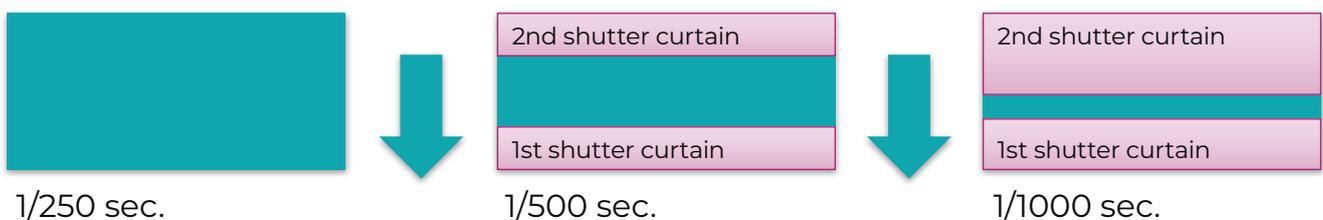
One advantage of flash light is its constant colour temperature. The light colour is similar to that of daylight and is around 5,600 Kelvin. In the camera settings for the white balance (WB) you will find a flash symbol. This setting is useful when the flash is used as the main light, for example in a studio. If you forget to change the setting, the automatic white balance (AWB) automatically detects whether a flash is connected and switched on, and sets the correct white balance internally.



## Synchronisation and shutter speed

The shutter of the camera and the triggering of the flash must work synchronously.

Synchronisation means that the flash is triggered only when the shutter is fully open, so that the entire sensor area is evenly exposed. On EOS cameras with a mechanical focal plane shutter, the shortest flash sync speed is 1/180 to 1/250 second (varies with model).



**Tip:** Interesting effects can be achieved by deliberately setting the white balance incorrectly: For example, if you set the white balance on the camera to the incandescent lamp symbol and then use the flash, the subject will appear cold and bluish. On the other hand, if you set the white balance to flash, areas of the scene lit by halogen or LED lights, for example, will appear warmer. Playing around with white balance is particularly useful when using flash and daylight or artificial light at the same time. In addition, colour filters can be placed in front of the flash reflector, e.g. to match the flash subject to the background or to separate it more from the background.

## Flash metering

Experienced photographers can estimate the exposure in daylight. When using a flash, it is much more difficult to judge the brightness due to the short and bright light pulse. For this reason, studio flash units use separate flash meters to determine the amount of flash light.

With Speedlite flash units, however, there is no need for a separate flash meter, as Canon EOS cameras and Speedlite flash units work together perfectly for flash metering. Flash metering takes place in the camera after the light has passed through the lens. This TTL (Through The Lens) metering measures both the flash light falling on the exposure sensor and the available daylight, allowing you to easily combine flash and daylight for creative and professional lighting setups.

## How Canon E-TTL II works

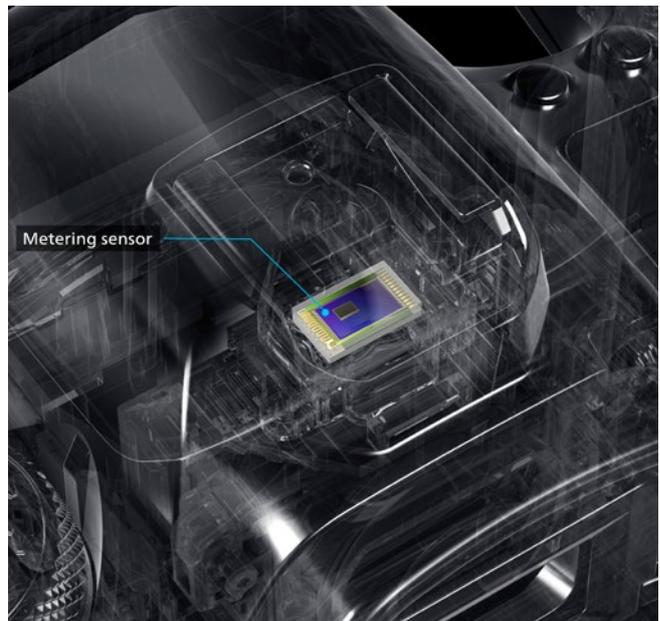
All Canon EOS cameras since the EOS-1D Mark II and 20D and all EX Series Speedlite flash units for the EOS system use the advanced Canon E-TTL II technology. E-TTL II takes into account not only the flash and ambient light, but also the distance to the subject.

The light reflected from the subject is measured and evaluated with a metering flash before the picture is taken. E-TTL II uses multi-segment metering to determine the exposure of several areas of the scene. By comparing the sub-areas, the camera determines a contrast scheme, which in turn allows conclusions to be drawn about the brightness distribution and the subject. This also explains the meaning of the 'E' in the E-TTL II designation, namely 'evaluative'.

### E-TTL II

**E** = evaluative

**TTL** = Through The Lens



E-TTL exposure metering on EOS DSLR cameras is carried out using a dedicated sensor.

## HOW CANON E-TTL II WORKS

### 1 Camera shutter release pressed halfway →

Ambient light level is measured and stored

### 2 Press shutter fully → Pre-flash is triggered

→ Combined pre-flash and ambient light value is measured and stored

**3 The ambient value** is subtracted from the combined value to obtain the flash-only value

**4 The areas with the greatest difference** between the ambient and flash value are defined as objects

**5 Areas with a very large difference** between ambient light and flash light are recognised as reflective surfaces and are not taken into account

**6 An average value is calculated** from the values of all accepted ranges

**7 If the lens used** transmits the distance information measured by the AF system, this is taken into account in the exposure

**8 Flash power of the Speedlite** is regulated



# LET THERE BE ... ... FLASH LIGHTING

## Practical Application

Flash lighting offers many possibilities for creative and controlled image composition. Depending on the subject and lighting conditions, the flash can be used either as the main light source or to supplement available daylight or artificial light.



# FLASH INDOORS AND OUTDOORS

## Flash in the photo studio

Flash systems are mainly used in studio photography. Compared to daylight, flash lighting provides constant lighting conditions, which is important for product photography, for example.

Flash also allows you to reproduce a lighting situation for portrait photography, regardless of the time of day or cloud cover. This is useful for passport and job application photos. Many portrait photographers have customised setups with multiple flashes and different reflectors or soft-boxes that they use over and over again to develop their style. For experimental portraits, the flash can be used as a backlight or hard accent light to create special effects.

In the studio, flash has the advantage of producing less heat than "hot" artificial light (halogen or HMI lamps). This is important for food photography, for example, but also pleasant for portraiture.

LED lights are also 'cold', but offer fewer options for shaping the light than a flash. Extremely bright light is also uncomfortable for portrait photography - the short flash pulse is more pleasant in the long run.

## Indoor flash light



Photographing dark or diffusely lit interiors with artificial light is also a common application for Speedlites. On-camera Speedlites also provide even and colour-neutral lighting for reportage,



In this shot, a Speedlite positioned to the side is used to cast the long shadows.

events or red carpet receptions. The flash is often fired indirectly against a ceiling or wall to minimize the harsh shadows caused by direct flash.

When this indirect flash option is not available, many photographers use reflectors or soft-boxes attached to the Speedlite flash to 'soften' the light.

When used with many of the newer Canon DSLR or DSLM cameras the Speedlite 470EX-AI can calculate and automatically adjust the ideal angle to the ceiling for perfect, soft exposures.

**Tip:** An unleashed flash can be used as an "artificial sun" to create lighting accents in diffuse daylight. An orange colour filter in front of the flash reflector enhances the effect.

### **Flash in daylight**

When shooting in daylight, the flash is usually used to brighten up the main subject. Particularly in situations where there are shadows or back-lighting, the flash acts as a compensating fill-light, making the main subject in the foreground appear sharper and more accentuated.

### **Flash for night photography**

When shooting at night, the flash combines with existing artificial light, for example in the city, to provide colour-neutral illumination of the foreground.

Combining flash with long time exposure creates exciting motifs: movement in the background dissolves into motion blur due to the long exposure. Movement in the flashed foreground is sharply rendered. If possible, the subject should not be illuminated by ambient light.



# EXPOSURE PRACTICE: CONTROLLING AND MONITORING SPEEDLITE FLASHES

## Automatic flash control

Canon E-TTL II automatic flash metering determines the amount of flash required for correct exposure and automatically sets the flash and camera accordingly. The flash sync time is also automatically set.

## Manual setting M

In certain lighting situations, it may be necessary to manually adjust the output of the Speedlite flash units, for example when a flash unit is out of radio or IR range during master-slave operation. Manual mode "M" is then selected on the unit. Depending on the model, the flash output can be varied by up to seven f-stops (1/1 to 1/128 of full output).

## Shooting modes and flash

When using Speedlite flashes with an EOS, different exposure priorities apply depending on the shooting mode selected on the camera.

## Program P

The camera determines the shutter speed, aperture and, on some models, ISO sensitivity if the automatic ISO function is active. P mode is ideal for starting out with flash photography or in situations where speed is of the essence.

In **bright ambient light**, the flash in P mode acts as a foreground fill-flash at a sync speed of 1/60 to 1/250s (HSS also available). For more information on HSS, see page 22.

When **ambient light is low**, the flash acts more as a main light source, the sync speed is 1/60s, and the background can often appear very dark or black.

### Shutter-priority Tv (time value)

The exposure time is preset and the camera automatically selects the aperture setting according to the available light. The Tv mode is useful for checking and controlling the sharpness or blurriness of movement in the scene. The foreground subject is brightened and the flash freezes a sharp "core" image. Here you can directly influence the entire exposure time range, whether 10 seconds or 1/8,000 second (with HSS).

If depth of field is less important, Tv is a good choice for many situations.

### Aperture Priority Av (Aperture Value)

The aperture is preset in this mode. The camera automatically determines the exposure time according to the available light.

The Av mode is useful for controlling and monitoring the depth of field of the subject by pre-selecting the aperture. The foreground subject is brightened.

This makes it ideal for portraits in normal or bright lighting conditions. When shooting portraits, make sure to activate the high-speed sync function, as exposure times often exceed 1/250s.

**Note:** Long exposure times are possible in low light and with a low ISO setting. This will result in motion blur and overlapping flash and ambient light effects.



**Tip:** With the combination of long exposure time and flash, the direction of movement of an object in the scene can be emphasised by flashing on the first or second curtain.



**Manual M:** Complicated at first glance, but ideal for total control. Both the desired shutter speed, to allow or prevent movement, and aperture are preset to achieve the desired depth of field. The exposure scale in the viewfinder or on the camera's display shows the result of the shot or the amount of added flash light in advance, so the background brightness can be preset with the ISO value. It is recommended to underexpose by about 1/3 to 1 f-stop to allow the flash to illuminate the subject without mixing the flash light with the ambient light.

Current EOS cameras have an automatic ISO function in M mode and also an exposure compensation function for precise adjustment.

### **Flash control via the EOS camera menu**

All EOS or PowerShot cameras since 2012 allow you to control your Speedlites via the camera menu. For example, you can set the operating

mode, remote control and flash exposure compensation. Menu control via the camera is particularly useful for complex transmitter/receiver configurations.

### **Unleashed flash with cable**

The easiest way to use a Speedlite that is detached from the camera's hot-shoe is to connect the OC-E3 external flash cable. This allows the Speedlite to be mounted on a flash bar, for example, on the side of the camera.

Connecting EOS or PowerShot cameras and Speedlites with the Canon OC-E3 flash cable supports fully automatic E-TTL II flash control.

## Wireless transmitter/receiver flash

Wireless control offers significantly more options for off-camera flash photography. The Speedlite flash unit is controlled by infrared or radio signal from a Speedlite transmitter or another Speedlite flash unit.

This method is used for demanding, complex lighting ideas. One or more Speedlite units can be placed within range of the transmitter to create customised lighting, such as side lighting, backlighting or a background light.

The use of multiple Speedlite units in one shot is controlled according to the transmitter/receiver principle. A Speedlite transmitter or a Speedlite flash unit with wireless capability ("transmitter") controls one or more other flash units ("receivers").

Wireless control is either optical via infrared (IR) or via radio signal (RT= Radio Transmission). The two standards are incompatible and have different characteristics. However, the RT-capable Canon Speedlites are also equipped with IR, so Speedlites without RT can be integrated into a transmitter/receiver scenario.



**Speedlite EL-1:** Can be used with radio (RT) and IR as both transmitter and receiver flash.



**Speedlite EL-5:** Usable with RT as transmitter or receiver.

## Radio channels

All Speedlite units that are to work together in transmitter/receiver mode must be set to the same channel. There are 15 channels in RT mode and four channels to choose from in IR mode.

## Flash groups

The Speedlites operating in transmitter/receiver mode can be assigned to flash groups. For transmitter/receiver units with RT control, these are groups A, B, C, D, E; for RT control, the groups are available (for current cameras) .

The Speedlite transmitter always belongs to group A, regardless of whether it is IR or RT.

The power distribution between groups A and B can be set in relation to each other. At a ratio of 1:1, both groups emit the same amount of light; at an A to B ratio of 8:1, the output of the Speedlites in Group B is one eighth of the output of the Speedlites in Group A.

2:1 → A is one f-stop brighter than B | 2:1 → B is one f-stop brighter than A

4:1 → A is two f-stops brighter than B | 4:1 → B is two f-stops brighter than A

8:1 → A is three f-stops brighter than B | 8:1 → B is three f-stops brighter than A

**Example:** An ST-E3 transmitter on the camera controls all the groups. A Speedlite EL-1, also in Group A, is used as the main light. A Speedlite EL-5, which belongs to group B, is positioned to the side as a second main light. The A:B ratio is 2:1. A Speedlite EL-10, assigned to Group C, is used to light the background. This is set at +2, which means it produces an overexposure of two f-stops compared to the main light.

## Linked Shooting

A Speedlite function made possible by RT wireless operation with compatible Speedlites is Linked Shooting. This allows up to ten cameras to be triggered by the ST-E3 transmitter, EL-1 or EL-5 Speedlites. The transmitter or Speedlite acts as a remote trigger for the camera. The "transmitter" is the triggering Speedlite flash or transmitter, and the receivers are the remotely triggered cameras. The activation of the flash trigger can also be set with Linked Shooting.

It should be noted that this flash release does not apply to the transmitter camera, as the radio signal takes too long in relation.





# CREATIVE FLASH IDEAS

## **Practical Application**

Flash light can supplement or replace the existing light. Canon Speedlite flash units give you precise command of light distribution with their exposure control.



## Unleashed flash for portraits

Uncoupled from the camera, the flash unfolds its full potential. With an untethered flash, the flash is no longer attached to the camera's hot shoe, but is mounted on a tripod or held by hand. E-TTL control of the flash is provided by a wireless remote control (transmitter) or a second flash on the camera. The characteristics of the flash can be influenced with additional reflectors and fill-lights.

If you leave the flash on the camera, you can attach one or more flash units to a camera or lamp tripod, for example. The stand supplied with the Speedlite has a thread on the underside for this purpose.

You can then position the flash unit at an angle behind the subject to use the backlight to illuminate their hair, for example.

To reduce harsh shadows on the subject, aim the flash mounted on the camera at the ceiling or at a well-reflecting white surface (Styrofoam board).

This will give you a softer, indirect light. But be careful: indirect flash requires more power than direct flash. If necessary, increase the ISO sensitivity, e.g. to ISO 800. The E-TTL II control will automatically provide the right amount of light.



The photo results from a flash at an exposure time of 1/10 second. The flash is synchronized with the 2nd shutter curtain, creating a nice contrast between the artist and the red cloth.

## Long Exposure plus flash

The combination of a long exposure (from about 1 second) and flash creates special effects of light and movement and works particularly well in the dark or in a studio. The 'trick': Your main subject in the foreground, such as a person or object, is illuminated by the flash and is in focus, while the rest of the scene is 'dynamically blurred' by the long exposure.

The camera can be used on a tripod or handheld, both of which affect the movement in the image. Shooting from a tripod, the flashed foreground and any non-moving background elements will be sharp, while headlights from moving cars, for example, will paint light trails into the subject.

**Tip:** When changing the field of view after focusing and exposure metering (half-pressing the shutter-release button), the final field of view should be communicated to the camera beforehand by pressing the FEL button. You can then freely change the frame, focus and release the shutter. The FEL function is assigned to the asterisk button on most EOS models, on some EOS cameras it is the Mfn button.



Photos: Petra Selbertinger

### Low-Key: Dark pictures with flash

Flash doesn't have to be bright and glaring: low-key photography with flash offers an exciting combination. Low-key photography excludes ambient light. In other words, the camera is set to produce a black image, as in the example

images above (with unleashed flash) 1/200 s, F8.0, ISO 100. The FEL button is used for pin-point flash metering. The flash is metered at the centre of the frame (exception: EOS-1D series).

## HSS (High-Speed Synchronisation)

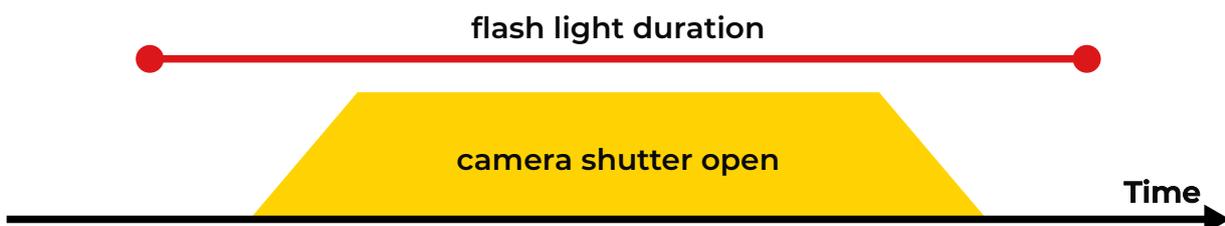
Sometimes it is desirable to be able to use shorter flash sync times when using a flash. For example, in bright daylight or against a backlight, you may want to use the flash at an open aperture to brighten up a portrait to create a beautiful bokeh effect. Or when you want to selectively underexpose the background of a daylight subject to illuminate the main subject in the foreground with the flash (e.g. wedding portraits against a dramatic cloudy sky).

This is where the HSS mode of the flash comes into play. During the short exposure time of  $1/1,000$ s, for example, an even, very fast sequence of individual flashes is fired instead of a single flash.

In this way, the subject is evenly exposed despite the short exposure time and the fact that the shutter is not fully open. The disadvantage: The flash unit distributes the power of the single flash over the entire flash sequence, so the range is correspondingly shorter.

HSS mode can be activated as an additional setting on Canon Speedlite flash units.

If the calculated or selected exposure time is longer than the shortest sync time ( $1/180$ - $1/250$ s depending on the model), this mode is automatically deactivated, even if the symbol is visible on the flash unit. This gives you great flexibility when the situation changes quickly.



The high-speed sync or HSS flash mode can be used in bright daylight with very short exposure times. The flash duration is controlled so that it extends evenly over the entire exposure time. Due to this special feature, the range of the HSS flash is shorter.



# A FLASH FOR ALL OCCASIONS

## Equipment

Whether it's a macro shot of a flower in nature, a sports car in the studio or a classic portrait in daylight: any scene can be shaped and enhanced with flash.



# TYPES OF FLASHES

## Built-in flash

Most EOS cameras have a built-in flash that can be used as a frontal main or fill light in low light conditions. Compared to external Speedlite flash units, the flash output is lower, so the range is limited. Like the external Speedlites, the built-in flashes on EOS cameras are precisely controlled by E-TTL II and can be used in conjunction with the large Speedlites for remote flash photography.

## Studio flash systems

There are a number of different flash systems used in photographic studios, the most important of which are flash generators with separate flash heads and mono flashes, where the flash tube and generator are integrated in one housing. The flash is triggered by cable or wirelessly via a radio transmitter.

Flash generators are available in a range of power levels; studio flash is usually specified in watt-seconds (Ws). The trend is towards

compact battery-powered units, which can also be used on location. Flash heads with an integrated flash generator are referred to as mono or compact studio flash units.

Most studio flash units do not offer TTL control; the power is set manually. The power of each connected lamp head can be individually adjusted until optimum illumination is achieved. In the past, high light output was often necessary because, for example, in product photography with large and medium format cameras, the flash had to be stopped down considerably to achieve sufficient depth of field. In addition, film and later digital backs offered relatively low ISO sensitivities of ISO 100. Today, there is a wide range of different flash heads with lower and higher power levels, so that the right flash unit can be found for every type of application.



# THE CANON SPEEDLITE SYSTEM

Canon Speedlite external flash units for EOS and compatible PowerShot cameras are more powerful and versatile than a built-in flash. A Speedlite unit mounted on the camera can flash frontally or indirectly against a ceiling or wall.

The Canon Speedlite system offers units for different applications and areas of use. Depending on the model, a Speedlite can control other flash units (transmitter) or be controlled by a suitable flash unit or remote flash control (receiver). The MR-14EX II ring flash and the MT-26EX-RT Macro Twin Lite are specially designed for macro photography.



### Speedlite EL-100

Compact flash with swivel zoom reflector for versatile lighting



### Speedlite EL-1

Advanced Speedlite flash unit with enhanced high-speed performance



### Speedlite EL-5

Powerful flash with fast recharge and full creative control



### Speedlite 430EX III-RT

Powerful and portable flash for creative lighting



### Speedlite 600EX II-RT

Powerful and fast flash unit for the most demanding situations



### Macro Twin Lite MT-26EX-RT

Versatile E-TTL II flash for close-up photography with radio and IR control, can be used as transmitter flash



### Macro Ring Lite MR-14EX II

Ideal for close-ups and creative portraits, with built-in LED light, can be used as transmitter flash

	<b>Speedlite EL-100</b>	<b>Speedlite 430EX III-RT</b>	<b>Speedlite EL-1</b>	<b>Speedlite EL-5</b>	<b>Speedlite 600EX II-RT</b>	<b>Macro Ring Lite MR-14EX II</b>	<b>Macro Twin Lite MT-26EX-RT</b>
<b>Guide number</b>	26 (m at ISO 100)	47 (m at ISO 100 with 105 mm)	60 (m at ISO 100 with 200 mm)	60 (m at ISO 100 with 200 mm)	60 (m at ISO 100 with 200 mm)	14 (m at ISO 100)	26 (m at ISO 100)
<b>Zoom</b>	manual 24 and 50 mm	24-105 mm (14-105 mm with integrated wide panel diffusor)	24-200 mm (14-200 mm with integrated wide panel diffusor)	24-200mm automatic	20-200 mm (14-200 mm with integrated wide panel diffusor)		
<b>Swivel</b>	head: 45, 60, 75 and 90°	yes	head: 45, 60, 75, 90, 120°, unten: 7°	head: 45, 60, 75, 90, 120°, bottom: 7°	yes	no	yes, on the bracket
<b>Tilt</b>	60, 75, 90, 120 and 150° n.r. 180°)	yes	left/right: 60, 75, 90, 120, 150 and 180°	left/right: 60, 75, 90, 120, 150 and 180°	yes	no	yes, on the bracket
<b>Flash recycle time</b>	approx. 5,8 s	approx. 3,5 s	approx. 0,1-0,9 s	approx. 0,1-1,2 s	approx. 3,3 s	approx. 5,5 s	approx. 5,5 s
<b>High speed sync FP</b>	yes	yes	yes	yes	yes	yes	yes
<b>Second-curtain flash sync</b>	yes	yes	yes	yes	yes	yes	yes
<b>Transmitter</b>	IR	radio	radio/IR	radio	radio/IR	IR	radio/IR
<b>Sender</b>	Infrared	radio	radio/IR		radio/IR	IR	radio/IR
<b>Receiver</b>	Infrared	radio/IR	radio/IR		radio/IR	no	no
<b>Remote camera control</b>		yes	yes	yes	yes		
<b>Modelling light</b>	flash light	Infrared/stroboscopic flash (with central AF-point 0,7 to 4 m)	Infrared light	two white LEDs	Infrared light	yes, LED	yes, LED
<b>Custom/personal functions</b>	3 (6 options)	10 (8 personal functions)	14 (9 personal functions)	11 (8 personal functions)	15 (6 personal functions)	12 (27 options) + 3 personal functions	8 (19 options) + 5 personal functions
<b>Power source</b>	2 AA batteries	4 AA batteries	1 x rechargeable Lithium-ion battery	1 x rechargeable Lithium-ion battery	4 AA batteries	4 AA batteries	4 AA batteries
<b>Externe power supply</b>	no	no	CP-E4N	no	CP-E4/CP-E4N	CP-E4/CP-E4N	CP-E4/CP-E4N
<b>Dust and water resistance</b>	no	no	yes	yes	yes	no	no
<b>Multi-function foot</b>	no	no	yes	yes	no	no	no
<b>Weight</b>	190 g (without batteries)	295 g (without batteries)	approx. 572 g (body only)	approx. 491 g (body only)	435 g (without batteries)	455 g (without batteries)	approx. 570 g

## Optional accessories

<b>Speedlite Transmitter</b>	–	ST-E3-RT, ST-E2	ST-E3-RT, ST-E2	ST-E10, ST-E3-RT	ST-E3-RT, ST-E2	–	–
<b>Off-Camera Shoe Cord OC-E3</b>	·	·	·		·	–	–
<b>Bounce adapter</b>	–	SBA-E2	SBA-EL (imLieferumfang)		SBA-E3	–	–
<b>Colour filter/holder for bounce-adapter</b>	–	·	–		–	–	–
<b>Colour filter</b>	–	SCF-E2	SCF-ELOR1, SCF-ELOR2 (included)		SCF-E3OR1, SCF-E3OR2		
<b>Macro Lite adapter</b>	–	–	–		–	72c, 67	72c, 67
<b>Battery pack CP-E4/CP-E4N</b>	–	–	·		·	·	·



# SPEEDLITE ACCESSORIES

Wireless transmitters are a convenient and versatile way to control Canon Speedlite flash units. Depending on the model, up to 15 flash units can be controlled. The Canon E-TTL II process is fully supported by Speedlite transmitters.



## Speedlite Transmitter ST-E10

- Radio control (2,4 Ghz)
- E-TTL II support
- Controls up to 15 flash units
- Range up to 30 metres
- Dust and water resistance
- Powered directly by the camera
- Compatible Speedlites: EL-1, 600EX II-RT, 600EX-RT, 430EX III-RT



## Speedlite Transmitter ST-E3-RT

- Radio control (2,4 Ghz)
- E-TTL II support
- Controls up to 15 flash units
- Range up to 30 metres
- Dust and water resistance
- Remote camera triggering
- Compatible Speedlites: EL-1, 600EX II-RT, 600EX-RT, 430EX III-RT

# GLOSSARY

**Colour temperature:** The term colour temperature is based on a physical structure for determining the spectral composition of light. Colour temperature is measured in Kelvin. Low Kelvin values indicate warm light (candlelight, incandescent light), while high Kelvin values indicate cold, bluish light (shadows, cloudy skies). The average colour temperature of daylight is between 5,000 and 6,000 Kelvin. This colour temperature also applies to flash units, so that daylight and flash light can be mixed without problems.

**Guide number:** The guide number is a measure of the flash's performance and describes the aperture setting that will correctly expose the subject at a given distance. The guide number is based on a sensitivity of ISO 100.

**The formula is:**

Guide number = aperture x shooting distance

**Example:** A flash unit that correctly exposes a subject at a distance of 10 metres at an aperture of 5.6 has a guide number of 56.

If the guide number is known, it is also easy to calculate which aperture setting is permissible at a given distance.  $\text{aperture} = \frac{\text{guide number}}{\text{shooting distance}}$

**Example:** For a flash unit with a guide number of 56, an aperture of 2.8 should be used at a distance of 20 metres, while an aperture of approximately 11 should be used at a distance of 5 metres.

The maximum possible distance to the subject can be calculated using the following formula:  $\text{Shooting distance} = \frac{\text{F number}}{\text{aperture}}$

When shooting with an open aperture of 1.4 and a fast lens, a flash unit with a guide number of 56 will illuminate a distance of 40 metres.

**Flash synchronisation time:** Synchronisation means that the flash only fires when the camera's sensor is ready to take the picture. On SLR cameras with a mechanical focal plane shutter, the shutter must be fully open before the flash fires. The fastest shutter speed for this is 1/125 or 1/250 second for most cameras. When using an automatic programme, the EOS camera automatically sets the appropriate flash sync speed.

When using studio flashes, a shadow may appear in the lower part of the image. In this case, the camera's exposure time should be increased, e.g. to 1/125 second, as the flash fires slower than the available open window of the shutter.

**Exposure value (EV):** The exposure value covers different shutter speed/focal length combinations with the same brightness.

**Example:**

EV 1 = f-stop 1.4 | 1s corresponds to f-stop 2 |

2s corresponds to f-stop 2.8 | 4s

EV 2 = f-stop 1.4 | 0.5s corresponds to f-stop 2 | 1s

corresponds to f-stop 2.8 | 2s

**FEL: Flash Exposure Lock**

For situations where a specific point is metered separately and the camera is then panned to focus on another point and measure the exposure. Depending on the camera model, metering is performed with the star button or Mfn button. On earlier EOS models, this button was labeled "FEL".



## SUMMARY

Designing with flash expands your creative possibilities. Flash light is a sophisticated ingredient not only for portrait or product shoots in the studio, but also on location and as a "kicker" in available light situations. Innovative technologies such as Canon E-TTL II and the convenient control of multiple Speedlite flash devices ensure optimum exposure results.



# ILLUMINATING WORKSHOPS

What's your next flash idea? In the Canon Academy workshops, our trainers will teach you step by step how to get as close to the perfect shot as possible.

**Check our website for all the latest workshops and dates on flash - and other photography and video topics. Let us inspire you!**

