

Camera Settings and Functions

Although there are some camera functions and settings unique to some cameras/manufacturers there are also many that are common to almost all cameras. Below is listed just a few of the more common ones.

White Balance

Light sources have a “colour temperature” which is recorded in degrees Kelvin (k) with 5000k being approximately the colour temperature of natural daylight. The human eye copes extremely well for changes in colour temperature but film does not and this also applies to digital images. In the days of film it was possible to buy film to suit certain types of lighting e.g. daylight or tungsten lighting or it was possible to use filters to change the colour temperature so a daylight film would produce the correct colours under tungsten light and vice versa. Digital cameras do this via the White Balance setting. All digital cameras will have an automatic setting and, apart from the very basic models, it will also be possible to set the white balance manually.

	Auto White Balance
	Custom
	Kelvin
	Tungsten
	Fluorescent
	Daylight
	Flash
	Cloudy
	Shade

The table on the left shows some of the symbols used for WB settings and an explanation of the lighting conditions they represent. The Kelvin setting allows the photographer to enter the actual colour temperature or temperature range if it is known. The Custom setting is best used when the subject is lit by different light sources. This is done by taking a reading from a white or grey card or object under the lighting conditions then recording the reading.

ISO

A camera's ISO (ISO is short for International Standards Organisation) setting is what used to be referred to in the days of film as film speed and, listed on film packaging as ASA or DIN (DIN being the German equivalent). It controls the sensitivity of a camera's sensor to a given amount of light. Like film the lower the ISO the better quality the image will be. A high speed film resulted in an increase in the film's grain, digital images on the other hand are affected by “noise”. The image below shows a photograph taken at an ISO of 5000. It was taken with a Canon EOS 60D and Tamron 17-50 f2.8 zoom lens. The exposure was 1/125 sec at f2.8.



Exposure Metering

Many cameras will allow the user to set different exposure modes to suit the subject for example a backlit subject. These are generally evaluative (also known as zone and matrix metering), centre-weighted and spot. Each one is described in more detail below:

- **Evaluative Metering**

This is a camera's standard metering mode which will cope with most situations. It's well suited for most subjects including those that are backlit. It's basically just what the human eye does when looking at a scene. The camera will assess the subject's position in the viewfinder; record the brightness of the scene, lighting conditions and also the orientation of the camera (horizontal or vertical).

- **Centre-weighted Metering**

Although centre-weighted metering takes a reading from the whole scene it is strongly weighted towards the centre of the image. It's best thought of as being somewhere between evaluative and partial metering (see below) where around 60-80 percent of the scene towards the central point is metered for.

- **Spot Metering**

When using spot metering a reading is taken from a specific part of a scene or subject. The metering is heavily weighted to the centre (or pre-selected focussing point) covering just a small percentage of the viewfinder area, usually around 2 - 4%. This type of metering is ideal for backlit subjects or for light subjects against a dark background.

On some cameras there is a fourth metering mode which is partial metering. This is similar to spot metering but takes a reading from a larger percentage of the centre of the image, usually around 8 – 13%.

Exposure Modes

All DSLR's, and many of the other types of camera have a number of different exposure modes. Canon refers to these as basic and creative modes. The image below shows the mode dial on a Canon EOS 60D DSLR.



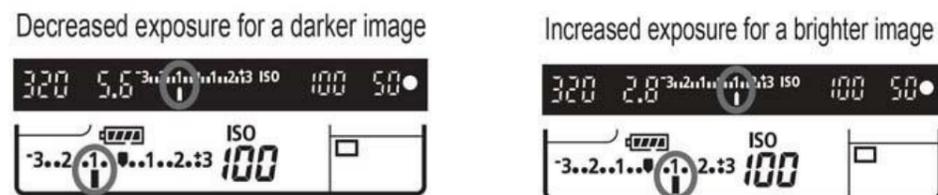
The small green box in the basic shooting zone represents the camera's fully automatic mode. When this is set all the camera functions are set to auto. The other settings in this zone allows the photographer to set the camera to choose the correct settings depending on the subject. On the 60D these include, close up, portrait, landscape, sport and night photography. Once set, none of the basic zone settings can be overridden by the photographer. The final setting on the dial shown is the CA (Creative Auto mode) setting. This allows the photographer to set some limited camera settings.

The options in the creative shooting zone on the other hand allow the photographer far more control over the camera functions. The P or program mode is the most simple to use. Like the basic fully automatic mode the camera chooses the optimum settings for aperture and shutter speed but the difference is that the photographer has some control over both of these together with a small number of other settings. The other creative zone options are described below

- **TV**
This is shutter priority mode. With this option the photographer sets the shutter speed and the camera automatically chooses the correct aperture.
- **AV**
This is aperture priority mode. This functions in a similar way to the shutter priority mode but here the photographer sets the aperture and the camera sets the shutter speed.
- **M**
This is the fully manual mode where the photographer has the most control over the picture being taken. With this setting the photographer chooses the best shutter speed and aperture needed for the image being taken.
- **B**
The B stands for bulb mode. When this option is set the shutter will remain open for as long as the photographer keeps the shutter release pressed in. This is best used for taking pictures of fireworks and for very long exposures.
- **C**
The final setting on the dial is the C or custom setting. This allows the user to set the most regularly used camera functions rather than having to reset these each time the shutter, aperture and other functions have been changed. This is useful if one regularly sets the camera up for a particular subject and lighting condition such as a studio portrait.

Exposure Compensation

Exposure compensation (also referred to as EV) allows an exposure set by the photographer in the creative settings zone to be overridden to compensate for the over or under exposure that can occur when taking predominantly light or dark subjects. This is generally represented in camera by a scale showing a + and – symbol. Compensation can usually be set to around three stops either way in half or third increments. The images below show the difference in exposure by setting a + and – exposure.



Exposure Bracketing

Exposure bracketing can be used for static subjects like landscapes where it might be difficult to assess the correct exposure. By setting exposure bracketing the camera will take usually three images, one at the correct exposure, one that is under exposed and one that is over exposed.

Another use for exposure bracketing is for producing images that will later be combined to produce a HDR image (High Dynamic Range – See section on HDR).

Focusing modes

Another common feature to be found on modern DSLRs is a choice of different focusing modes. Generally these are one shot and continuous. One shot is best for subjects with little movement and continuous is for moving subjects. Some cameras have a third option (Canon calls it AI

Focus) and this is a combination of both one shot and continuous modes. If the subject is stationary it will use one shot focusing but if the subject begins to move it will change to continuous focusing. In addition, DSLR lenses have a manual override. This is useful when the auto focus is having difficulty in finding focus or if the photographer does not want the focus to move once set e.g. during a long exposure.

Drive Modes

Some cameras have a number of drive modes. The most common being single shot and continuous. Some cameras allow the photographer to have some control over the speed of the continuous mode by being able to choose a low or a high speed.

Image Quality Settings

All digital cameras record images using the JPEG file type and even some of the more basic cameras will have the option of changing the image quality so as to produce smaller file sizes, usually for use on the internet or if enlargements are not required. However, from the point of view of quality, cameras that capture images using the RAW format will produce the best image quality albeit after a certain amount of post-production.

When using the JPEG file type all the post-production, e.g. sharpening, is done in camera. The biggest advantage of this format is that, on the whole, file sizes will be kept smaller and so more images can be captured per memory card than using RAW. Also, providing that the exposure has been set correctly, little or no post-production will be required. The main disadvantage of JPG's is that they are what is referred to as a "lossy" file. As a result, each time the file is edited and saved it loses a small amount of image quality. Although this is minimal it will have an aggregated affect and so the more the file is edited the worse the compression will get. Also, because a JPEG image is processed in camera, the photographer has limited control over the amount of work that can be done on it during post production.

RAW files on the other hand are not processed in camera and so have to be "processed" using software during post-production. Camera manufacturers produce their own software, like Canon's Digital Photo Professional and Nikon's Capture NX. Canon bundles its software along with its cameras. In addition there are many third party RAW processing applications available like Adobe Camera RAW and Lightroom. Adobe Camera RAW works alongside Photoshop while Lightroom is a standalone application. The obvious advantage of the RAW format is that all camera settings such as white balance, ISO and exposure can be changed. In addition, unlike JPEG's, RAW files are "lossless" so there is no depreciation in image quality. Once processed the RAW image should be saved using another format. The main disadvantage of capturing RAW files is that the images are much larger than JPEG's so take up more space on memory cards.

Other Camera Functions/Settings

The functions/settings listed above just give some of the main options available to digital photographers. However, there are many more functions available depending on the manufacturer and the sophistication of the camera. These include Wi-Fi, GPS, depth-of-field preview, flash exposure compensation, in build sensor cleaning and image stabilisation to name just a few.