FULL FRAME

Discover the benefits and versatility of full-frame EOS cameras

- BASICS
- CAMERAS
- LENSES AND ADAPTERS
- BUYING ADVICE

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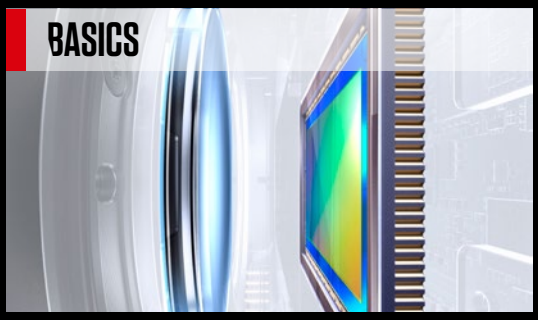
CONTENTS



FULL FRAME: THE CLASSIC

The term "full frame" for the size of an image sensor dates back to analogue photography and the 35mm film format commonly used at the time. When a sensor has this 24 x 36 mm format, it is called full frame. Smaller sensor sizes include the APS-C format at 22.5 x 15 mm.

Sensor size and crop factor

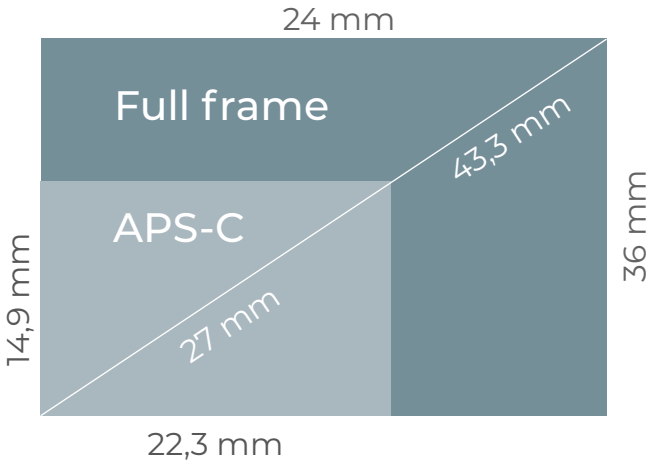
Of the image circle created by the lens, an APS-C sensor captures a smaller portion of the image circle than a full frame sensor. If you want to use this smaller section on the surface of a full frame sensor, a lens with a longer focal length is required. The ratio of the two is called the crop factor.

You can determine the crop factor using the sensor format. The full frame sensor is 36 mm x 24 mm. The diagonal from corner to corner is approximately 43.3 mm. The APS-C sensor measures 22.5 x 15 mm, the diagonal is approximately 27 mm. The crop factor is calculated by dividing 43.3 mm by 27 mm: The result is 1.6.

To calculate the focal length you need on an APS-C camera to get the same field of view as a full frame camera, divide the focal length value by 1.6.

The equivalent focal length of an 80mm lens on a full-frame EOS is 80mm : 1.6 = 50 mm on an EOS with an APS-C sensor.

The Canon RF-S lenses, whose image circle is designed for the smaller sensor of an APS-C camera, can be used with EOS R cameras. They will only use a cropped area of the sensor.



Size comparison: The surface area of the full-frame sensor is more than twice as large as that of the APS-C sensor.

The light area shows the image section provided by a full-frame lens on a camera with an APS-C sensor. With a full-frame sensor camera, the full angle of view can be made use of.

In available-light situations, Canon cameras with full frame sensor have significantly more reserves in terms of ISO sensitivity and dynamic range than an APS-C sensor - and even more so than a smartphone.

FULL-FRAME ADVANTAGES

The full-frame format offers a number of technical advantages over cameras with smaller sensors.

ISO sensitivity

Due to the larger format, the pixels are larger for the same resolution than with APS-C sensors. With the same sensor generation, this results in better noise behaviour and a wider usable ISO sensitivity range. The dynamic range - the ratio of minimum to maximum brightness - is also better.

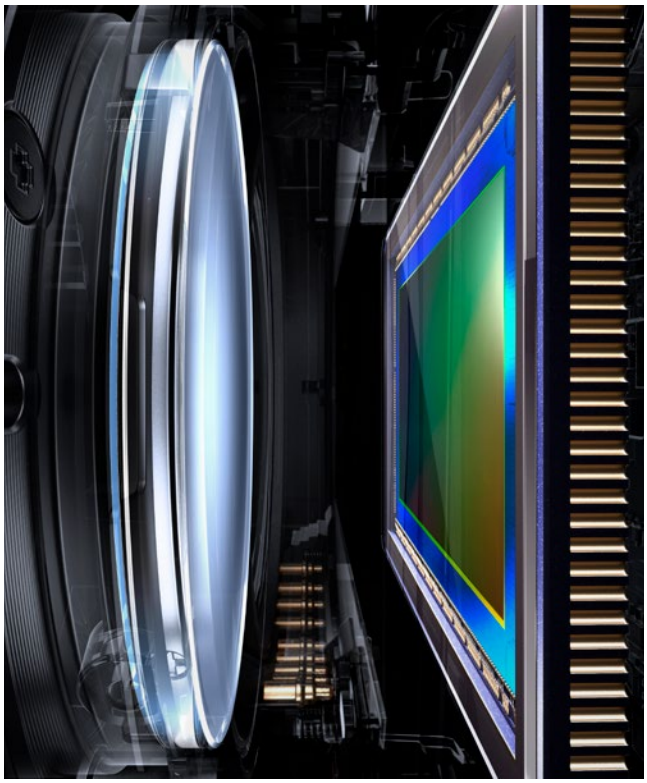
The large rear display provides a live view of the subject. On the EOS R, the electronic viewfinder also displays a live image.

THE CHALLENGES OF FULL FRAME

Lens contruction

The Canon EF and RF lenses for the EOS full-frame cameras have a larger image circle than the EF-S lenses (see the 'Lens Basics' section), in order to capture the subject on the larger sensor area.

At the same time, they offer a high resolution to take full advantage of the sensors resolution. For these reasons, full frame lenses are slightly larger than APS-C format lenses.



Data volume and speed

The response speed of EOS cameras is largely guaranteed by Canon‘s DIGIC image processor. The latest generation, DIGIC X, has the processing power to handle the most complex camera and lens functions.

Autofocus: fast and accurate

A cameras autofocus system should be fast and as accurate as possible. This is particularly important with full-frame cameras, as the depth of field is very shallow, especially with fast lenses and an open aperture. Inaccurate focusing results in visible blur.

Autofocus on DSLR cameras

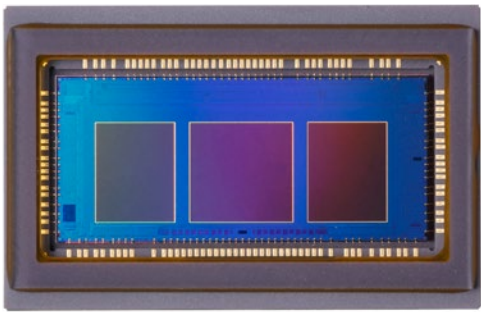
The autofocus system in full-frame DSLR cameras uses separate AF sensor chips to determine focus by detecting a phase difference. Two AF sensors look for comparable brightness levels in either a horizontal or vertical orientation. If the intensities match, the image is in focus. Cross-type sensors, which can detect horizontal and vertical structures in the image, are particularly accurate.

The DSLR‘s autofocus system is very fast. It can also track movements accurately. DSLR AF systems have an advantage when it comes to tracking movement in the subject.

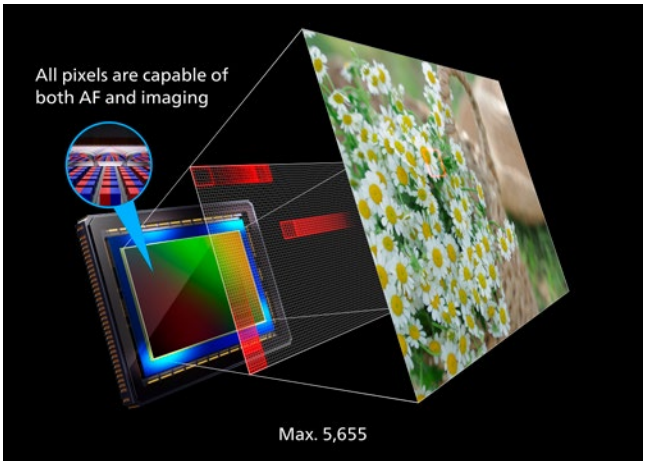
The AF system in DSLR cameras requires a high level of mechanical and optical precision: because the AF sensor and image sensor are not identical, the components must be precisely matched. The number of possible AF points is limited, as is the area of the screen that can be covered by the AF system.

Dual Pixel CMOS AF: measurement on the sensor

Canon‘s Dual Pixel CMOS AF technology is used in the mirrorless EOS R and RP and - in Live View mode and when shooting video - also in the EOS DSLR full-frame cameras. The advantage: with Dual Pixel CMOS autofocus, the focus is measured directly on the sensor. As the measuring and image planes are identical, there can be no mechanically or optically induced defocussing, and the Dual Pixel CMOS AF sensors use two photo-diodes for each pixel. These are read out separately for the phase AF determination. The focus calculation is computationally intensive; the new generation DIGIC processors provide this computing power.



In DSLR cameras, a separate AF sensor is responsible for capturing the focus information, here the AF CMOS sensor from the EOS-1D X Mark III.



With the dual-pixel CMOS sensor, almost every pixel can provide both image and AF information.

The advantage of mirrorless cameras is that almost the entire image area can be used for focusing, rather than just a few AF points. Dual Pixel CMOS AF is also extremely light sensitive. For example, it works at an exposure value of -6 EV. This is very dark: at ISO 100 and f-stop 1.2, you would need an exposure time of 180 seconds! Dual Pixel CMOS AF is used in all EOS R cameras, and in DSLRs from the EOS 200D onwards (in Live View mode only).

Touch AF can be used to select specific subject areas in Live View mode for photo and video recording.

Size and weight

By design, full-frame cameras are larger than cameras with an APS-C sensor. Full-frame lenses are also larger and heavier, resulting in a well-balanced system that feels smooth and quiet in the hand.

The comparison between the EOS 5D Mark IV (left, with the EF 24-70mm F2.8L II USM) and the EOS R5 Mark II (right, with the RF 24-70mm F2.8L IS USM) highlights the differences in dimensions and technology between the EOS DSLR and EOS R camera generations.

The EOS R5 Mark II is more compact, even with its IBIS (In-Body Image-Stabilisation). While the RF lens is only slightly larger, it offers 5 stops of internal stabilisation, which, when combined with IBIS, provides up to 8 stops of stabilisation.

BASICS OF FULL-FRAME LENSES

Full-frame lenses are more complex than equivalent focal lengths for smaller sensors. There are good reasons for this.

Larger image circle

Sensors are rectangular. However, a lens always produces a circular image that corresponds to the shape of its imaging components, the lenses. The diameter of this image in the sensor plane is called the image circle. It is usually larger than the image diagonal of the sensor, which is the minimum diameter required. With a full-frame format, the image circle must be significantly larger than with a lens designed for the smaller APS-C format. This also increases the effort required in the optical design to correct image errors.

The EOS R6 Mark II with full-frame sensor and RF lens mount.

Depth of field

Depth of field refers to the area of the image in front of and behind the focal point that is still perceived as sufficiently sharp. The measure of acceptable sharpness is given by the size of the circle of confusion. This is created when light rays pass through the lens. They are projected onto the image plane as cones. The sharper these cones are imaged, the smaller the cone base. If the circle of confusion is smaller than the human eye can resolve, it is perceived as sharp.

The amount of depth of field can be calculated from the size of the circle of confusion. Several parameters affect this: aperture, focal length, image distance, image angle and image diagonal, as well as image or sensor format. Depth of field increases with shorter focal lengths and therefore with a larger angle of view (at the same aperture). Depth of field also increases with smaller apertures (for the same focal length and angle of view), with increasing image distance and with decreasing image diagonal.

Conversely, it gets smaller. This means, for example, that a 24mm wide-angle shot at f/5.6 will appear almost perfectly sharp, whereas a 300mm telephoto at the same aperture and distance will have a shallow depth of field.

Comparison of aperture and resulting depth of field for full frame and APS-C formats

In terms of sensor formats, the depth of field of a full frame camera is about one f-stop less than that of an APS-C camera, all other things being equal.

For example, if you have set an aperture of 5.6 on a full frame camera with an 80mm lens, an APS-C camera with a 50mm lens = equivalent focal length, and an aperture of 5.6 will give you the same depth of field as with an aperture of 8 in full frame.

Aperture

An important parameter of a lens is the maximum aperture. It is specified as 'F2.8' or '1:2.8'.

Back focal length and flange focal length

Two design dimensions, the flange focal distance and the flange focal length, are important in lens design. The flange focal length is the distance from the front edge of the bayonet on the camera to the sensor. It determines the possible focal lengths of the lenses, i.e. the distance from the rear lens to the sensor. With the EOS DSLR cameras, the flange focal length is greater than with the EOS R series, which does not have a mirror, due to the depth expansion of the oscillating mirror.

This means that the possible focal lengths of the RF lenses are shorter, which has a favourable effect on the design.

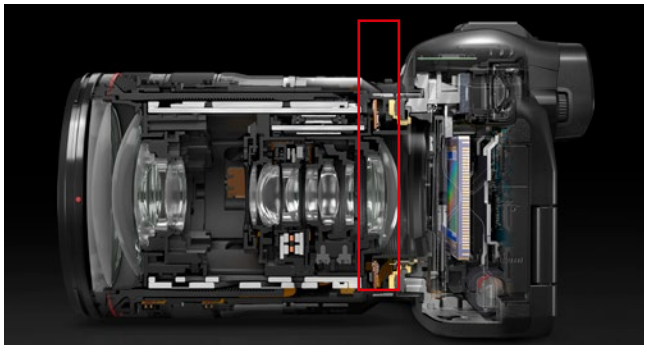
The larger the maximum aperture of a lens, the faster it is. With this lens, the maximum aperture is F2.8.

RF lenses for the EOS R sit closer to the sensor than EF lenses for EOS DSLR cameras. The adapter for the EF lenses reflects this difference in flange focal length.

IS (Image Stabiliser) = Bildstabilisator

Lens image stabilisation reduces camera shake. This system uses moving lens elements to compensate for the inevitable movement of hand-held shooting. Image stabilisation is particularly important with a full-frame camera. The higher resolution of full-frame cameras not only shows more detail in the scene, but also registers smaller movements than lower-resolution sensors.

The rule of thumb for a blur-free handheld shot is exposure time = 1/focal length. This gives an exposure time of 1/200 second for a 200mm lens. With the EOS 5DS, the exposure time is calculated to be two f-stops shorter due to the high resolution; in the example, this is around 1/1,000 second.

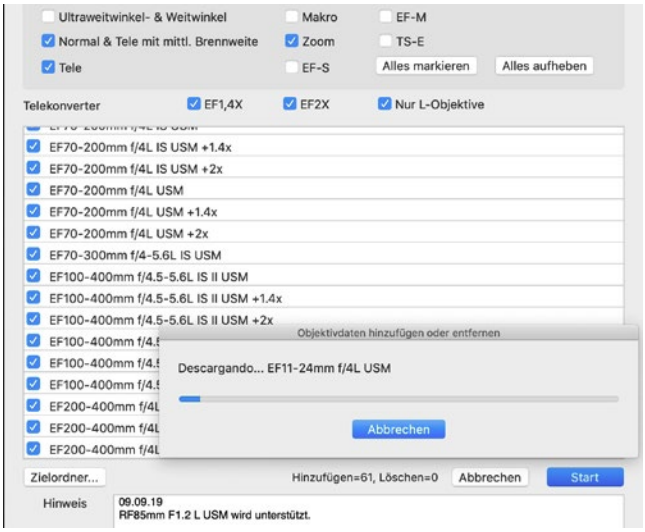


The coordinated image stabilisation of the EOS R system can extend exposure times by up to 8.5 stops, depending on the subject and camera.

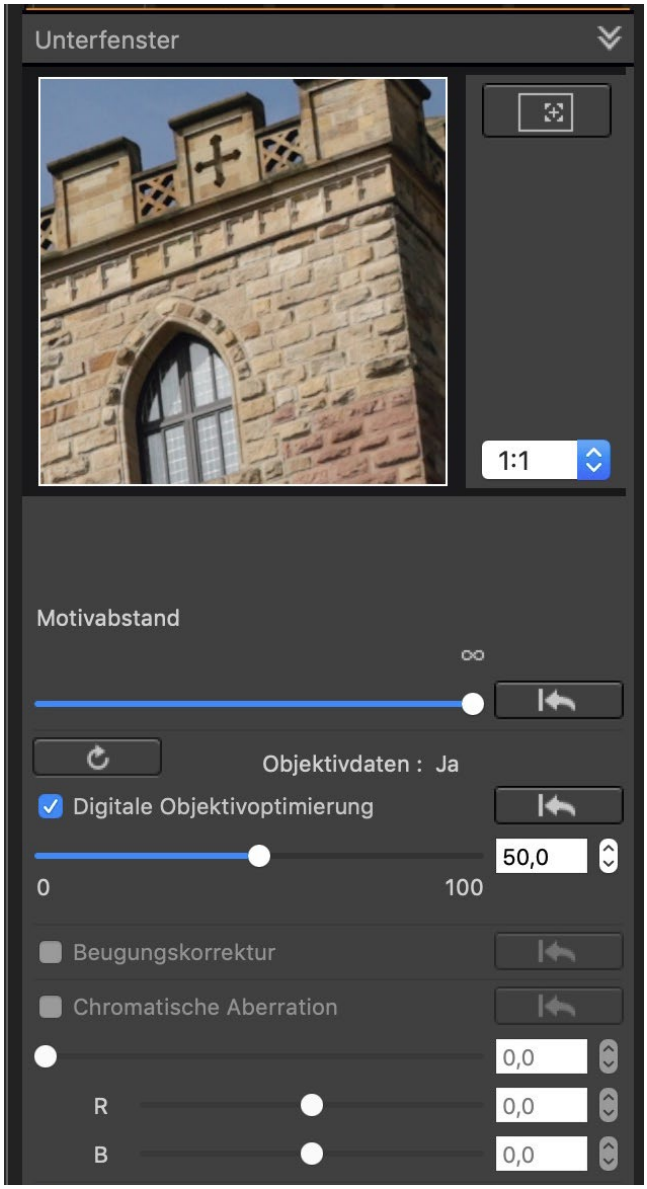
Digital lens correction

Despite all the technical refinements, every optical system has residual errors due to physical and optical factors. Since these are known at the design stage, they can be corrected during image processing and the necessary lens profiles are stored directly in the new RF lenses. When creating a JPEG, the EOS R takes into account the correction values stored in the profile without any time delay, using a process called DLO = Digital Lens Optimiser. On some full-frame EOS DSLR cameras, lens profiles can be loaded and made available for calculation; DLO profiles are also stored in Canon's Digital Photo Professional (DPP) RAW software. When shooting in RAW format, lens correction can be performed in Canon DPP.

In the EOS R1, the additonal DIGIC Accelerator image processor boosts the performance of the camera



Up-to-date Digital Lens Optimiser profiles for all supported lenses can be downloaded from Digital Photo Professional online.



Canon's RAW software, Digital Photo Professional, allows the DLO function to be applied at a subsequent time.

FULL FRAME MIRRORLESS

EOS R camera system

Canon invented the EOS R system in 2018. Since then EOS R full frame sensor cameras cover the demands of ambitious enthusiasts and high level professionals.

EOS R: CONSISTENTLY MIRRORLESS

EOS R1

The EOS R1 is the high-performance flagship camera within the EOS R system camera range. It is designed to meet the demands of sports, action, wildlife and news photography, all packed into a rugged body.

Its 24.2 megapixel stacked BSI CMOS sensor delivers up to 40 frames per second with full AF/AE tracking. A new Action Priority mode automatically determines the subject in football, volleyball and basketball.

The EOS R1 also features cross-type AF measuring. Its new Dual Pixel Intelligent AF is sensitive to horizontal and vertical lines for greater autofocus precision. The autofocus is incredibly sensitive and works in conditions as dark as -7.5 EV – equivalent to polar light illumination.

The EOS R1's powerful DIGIC accelerator processor and Canon's deep-learning technology allow images from the high sensitivity sensor to be enlarged accurately by up to four times, up to 96 megapixels in the camera, thus enhancing the options for cropping or large printing formats.

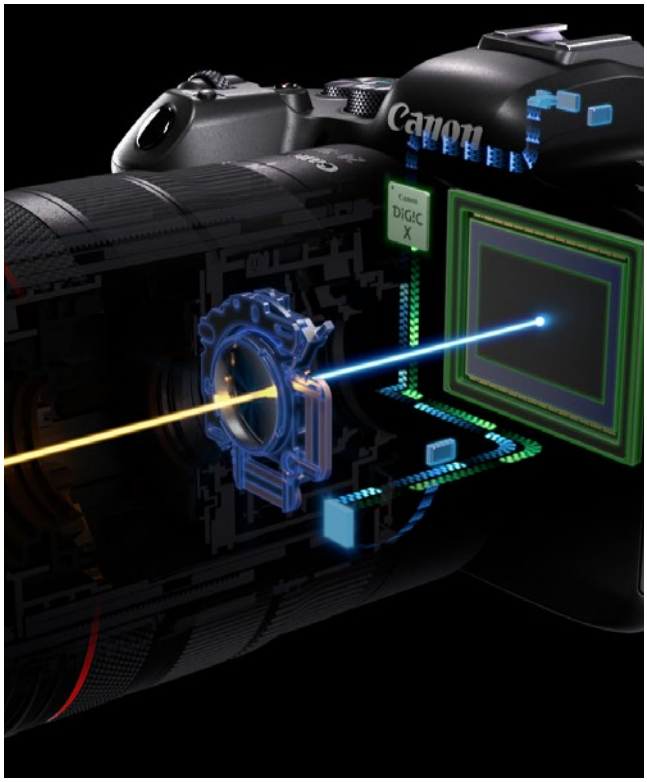
Using deep learning algorithms, the EOS R1 sports the new AF Action Priority mode that automatically determines the subject in football, volleyball and basketball.

An improved Eye Control function allows the starting point of the AF point to be controlled and calibrated to the photographer's eye by looking through the viewfinder. Focus is instantly locked on the subject and tracked when the shutter release button is pressed halfway.

In conjunction with the optical IS system of the RF lenses, the camera's internal 5-axis image stabiliser compensates for up to eight levels of exposure and minimises blur caused by camera shake.

The EOS R1 will also appeal to videographers with its powerful 6K RAW video up to 60p, 4K up to 120p and 2K up to 240p, all from the full width of the full-frame sensor.

The EOS R1 also features powerful networking capabilities including Wi-Fi 6E and 2.5G BASE-T ethernet. The OLED colour EVF sports 9.44 million dots for perfect image control.



IBIS image stabilisation on the EOS R image sensor (green), combined with the image stabilisation of Canon's RF lenses (blue), allows you to shoot up to 8 stops longer without blurring caused by camera shake.

EOS R3

EOS R3 is designed to capture the fastest moving action and meet the demands of professional shooters with ultra-responsiveness, high sensitivity, reliability and durability. Its 24.1 megapixel sensor offers an ideal balance of image quality, high ISO performance and file size. Sensitivity ranges from ISO 100 to ISO 102,400 (expandable to ISO 204,800).

The Eye Control AF tracking allows to select focus points or subjects to track simply by looking at them system. The EOS R3 is capable of up to 30fps continuous shooting and 6K RAW or over-sampled 4K video. The integrated grip and dust/drip-proof performance is designed to meet the demands of rigorous professional use and built in Wi-Fi and ethernet gives instant connectivity.

Using deep learning algorithms, the EOS R1 sports the new AF Action Priority mode that automatically determines the subject in football, volleyball and basketball.

EOS R5 Mark II

The EOS R5 Mark II opens up new possibilities for photographers and videographers. The high resolution of 45 Megapixels ensures that your photos are rich in detail. Up to 12 frames per second are possible with the mechanical shutter and up to 30 frames per second with the electronic shutter. The EOS R5 Mark II has a fast CF express card slot and an D/SDHC/SDXC (UHS-II) slot.

With up to 8K RAW video resolution, you can shoot movies of the highest quality. Even if you are shooting at 4K or Full HD, the 8K resolution of the EOS R5 Mark II gives you additional options in post-production, such as cropping and virtual panning. 35.4-megapixel stills can also be extracted from 8K video. As the EOS R5 Mark II records 8K video at 30fps, this method is ideal for dynamic subjects in the studio or on location.

Another highlight of the EOS R5 Mark II is its autofocus system, which offers Eye AF, Face AF and Animal Tracking AF. The AF system uses Canon's proprietary Deep Learning technology.

The EOS R5 Mark II truly is a versatile "swiss knife tool" for professional content creators in photo and video.

EOS R6 Mark II

The EOS R6 Mark II is an ideal hybrid camera for capturing professional-quality stills and video. Its 24.2 Megapixel sensor provides approximately 20% more resolution than the EOS R6 (20.1 Megapixels) and features a faster readout speed. In video mode, this results in a significant reduction of the rolling shutter effect.

The EOS R6 Mark II also surpasses the EOS R6 in burst shooting, offering up to 40 fps with the electronic shutter compared to the R6's 30 fps. Its autofocus system is enhanced with an advanced deep learning algorithm, capable of detecting people, animals, and vehicles.

With up to 40 frames per second and a powerful AF system, the EOS R6 Mark II is perfect for action and sports photography.

EOS R8

The EOS R8 is a compact and lightweight all round camera with many of the powerful features of the EOS R6 Mark II. The EOS R8 features the same 24.2 full frame Megapixel sensor with DIGIC X image processor, up to 40 frames per second shooting speed and the same high performance AF system as the EOS R6 Mark II.

The ISO range of up to 102,400 ISO and sensitivity of up to -6.5 EV provide powerful low-light performance. The EOS R8 can shoot 4K video at up to 60p. Like the EOS R6 Mark II, the EOS R8 features Canon's Log 3 for video, which offers a wide dynamic range and options for grading.

A pre-release function allows images to be buffered when the shutter-release button is pressed halfway and recorded when the shutter-release button is pressed fully.

The EOS R8 is the compact alternative to the EOS R6 Mark II without the in-camera image stabilisation system.

At 461g, the body is lightweight and compact, making it ideal for street, travel and action photography.

RF AND EF LENSES

Lenses & adapters

Canon offers a comprehensive range of lenses for its full-frame EOS cameras. The EF lenses are designed specifically for the EOS R system. All EF lenses for EOS full-frame DSLRs can be used on EOS R cameras with adapters.

Full frame lenses: Similarities and differences

All Canon RF and EF lenses are full-frame lenses. EF lenses are designed for EOS DSLR cameras. They can also be used on EOS R cameras using Canon's RF mount adapters.

RF-S lenses are designed for the smaller APS-C sensor. You will need to keep to the 1.6 crop factor. The viewfinder on full-frame EOS R cameras will automatically display the cropped image when RF-S lenses are used with an adapter.

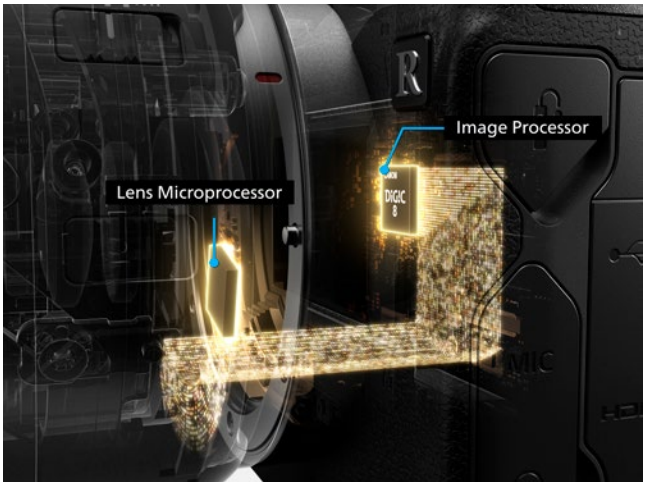
RF lenses

The RF lenses have been redesigned for the EOS R cameras with a new bayonet and a smaller flange focal distance. Due to the shorter flange focal distance compared to the EF bayonet, RF lenses cannot be used with the EOS DSLR cameras.

A special feature of RF lenses is the setting ring on which you can set various functions such as aperture, shutter speed, exposure compensation or ISO sensitivity.

The RF lens bayonet has twelve electronic contacts for exchanging information with the camera. That is four more than the EF lenses.

The additional contacts are used, for example, to quickly transfer DLO data from the lens to the camera. They also speed up communication between the lens and camera thanks to a higher bandwidth, and they offer possibilities for future lens technologies.



PRO CLASS: L SERIES LENSES

There are over 40 RF lenses available for EOS R cameras. The range covers focal lengths from 5.2mm to 1,200mm.

The L lenses stand out within this range. These professional lenses are designed for photographers who value performance and robustness.

They can be identified by the red ring at the front of the barrel. The fastest lenses within a "focal length family" are always the L variants.

They are elaborately constructed with special lens designs and materials to achieve very high image quality.

They are also more heavily sealed against external elements such as water and dust than lenses without the red ring.

Bokeh: What makes blur beautiful?

In photography, bokeh, a Japanese term meaning out of focus or blurred, refers to the subjective quality of blur in an image. As described in the section on depth of field and sensor size, a point of interest in a photograph appears blurred when the corresponding circle of diffusion created by the lens exceeds a certain size.

The appearance of such a blurred circle in the image also determines the effect of the overall blur. The outer shape, which is determined by the shape of the lens aperture, and the edge area, which is determined by aberrations, are decisive.

The ideal shape of a blurred circle would be perfectly round with no coloured edges. The ideal rounding is achieved with a large number of aperture blades. For example, the RF 85mm F1.2L USM has nine blades instead of six or seven.

The edges of the circle of confusion are heavily influenced by the aberrations of the lens. They tend to have an unattractive colouration due to chromatic aberration. This is minimised by increasing the optical quality of the lens. Portrait lenses in particular have a very attractive bokeh effect.

The Japanese term "bokeh" describes a harmonious blurring of the background, which is also an important design element in open aperture portraiture.

Object shots benefit from selective focus.

Fast lenses produce a harmonious background blur (bokeh) at open aperture, sample shot with RF 135mm F1.8 L IS USM.

Portrait lenses

Classic portrait focal lengths for full-frame format are between approximately 50mm and 135mm. Wide-angle lenses distort the face, making the nose bigger and the ears smaller. Lenses with longer focal lengths make faces look too flat.

A 50mm lens is suitable for beginners. It allows you to create harmonious portraits. With the fast RF 85mm F1.2 L IS USM lens, you can use selective focus beautifully with the aperture wide open. The lens is also high-contrast, crisp and sharp at this aperture, and has a particularly pleasant bokeh effect.

The RF 135m F1.8 L IS USM allows you to get further away from your subject. An excellent zoom lens for portraits is the RF 70-200mm F2.8 L IS USM. With the extra focal length range up and down, it covers exactly the area you need, and with a maximum aperture of f/2.8, it is also very fast. Together with the RF 24-70mm F2.8 L IS USM and the RF 15-35mm F2.8 L IS USM, this lens forms the fast 'trinity' of lenses for EOS R system cameras.

Fashion and People Photography

For fashion and people photography, you will choose a slightly wider frame than for portraits.

In fashion photography, selective focus is often used to separate the subject from the background. This works particularly well with a telephoto lens. From a focal length of 135 mm, you can achieve this effect with an aperture of f/4. This means that the subject is in focus and the background is blurred. This allows the viewer to focus on the essentials, the model and the fashion.

The RF 135mm F1.8 L IS USM is a professional lens for this application.

The RF 70-200mm F2.8 L IS USM is also the lens of choice for fashion photography. You can take pictures of the whole person without having to stand too far away, so you can also choose to shoot narrower details.

Photo: Sascha Hüttenhain, Canon Ambassador

Photo: Sascha Hüttenhain with EOS R5 and RF 50mm F1.2 L USM lens

Sports, nature and animal photography

When you can‘t get close enough to your subject, as is the case with many sports, wildlife and animal shots, you need a telephoto lens. Because your subject can move quickly, the lens should be fast enough to allow you to work with short exposure times to avoid motion blur. This also applies to your own movement when taking handheld shots. If possible, use a tripod for long focal lengths.

In the EF and RF lens series, the L lenses are the first choice for these subjects. The lens barrel is bright to minimise heating of the lens in sunlight, thus avoiding expansion and possible focusing inaccuracies.

The professional L-telephoto lenses are available with fixed focal lengths from 200mm to 1200mm and apertures of F2 at 200mm and F5.6 at 800mm. 1.4x and 2x extenders allow you to increase the focal length of the telephoto lenses by the corresponding factor.

Street Photography

Lenses for street photography need to be small and light enough to allow you to react quickly without attracting attention. They should cover a range of focal lengths from wide angle to slightly telephoto. A high light intensity is also useful for these subjects. The focal lengths can be achieved either with different fixed values or with zooms.

The classic for street photographers is the 35mm focal length. The RF 35mm F1.8 IS Macro STM is a particularly fast representative of this class. It allows you to work in low-light conditions or with selective focus, which enhances this short focal length.

The standard 50mm full frame focal length is also a classic. With the EF 40mm F2.8 STM, the EF series has a lens that meets the demands of street photography.

With an aperture of f/2.8, it is fast and extremely small, light and robust. The STM focus drive is particularly quiet and fast.

Photo: Robert Marc Lehmann, Canon Ambassador

With a zoom lens, you don‘t have to change lenses to change your angle of view. For example, if something unexpected happens up close and you want to capture the whole scene.

There are also classic focal length ranges, such as the RF 24-70mm F2.8 L IS USM or the RF 14-35mm F4 L IS USM. Both cover the focal lengths you typically need for street photography.

In combination, you have everything you need with two lenses - from extreme wide-angle to a lightweight telephoto lens.

Architectural photography

Wide angle lenses are often used for architectural photography. A special feature is the so-called converging lines. Parallel lines no longer appear parallel. If you tilt your camera upwards to get a full shot of a tall building, the edges of the building appear to converge at the top, the building 'tilts'.

There are two ways to deal with falling lines. You can either deliberately use them as a design element, or you can avoid them. You can avoid them by aligning the camera with the electronic level. But then you will always have a lot of foreground in the picture when you shoot from the ground.

Or you can use one of Canon‘s special tilt-and-shift lenses, known as TS-E lenses. Canon TS-E lenses are available in five fixed focal lengths from 17mm to 135mm.

They can be tilted and shifted in relation to the sensor plane. In the example of an architectural shot of a house, the TS-E lens can be tilted upwards to capture more of the building and less of the foreground.

The TS-E lenses can also use tilt to shift the focal plane, which is actually parallel to the sensor. This is how the 'miniature effect' is achieved.

Wide angle lenses are the preferred choice for architectural photography.

This ambience was captured with the Canon RF 24-240mm F4-6.3 IS USM.

Macro and product photography

Macro photography refers to a reproduction scale of 1:2 or larger.

At a scale of 1:1, the subject is reproduced at its original size on the sensor. The optical requirements for this scale are different from those for smaller scales.

For example, the depth of field decreases disproportionately with increasing scale. So as you move the camera closer and closer to an object, the depth of field decreases faster. The depth of field of a ring photographed in full frame is only in the millimetre range.

The beam paths of the incoming light are also different from those of other types of photography, and this is taken into account in the design of lenses specially developed for this area, the macro and enlarging lenses. They are also particularly suitable for product photography.

The RF 100mm F2.8 L Macro IS USM is perfect when you want to get a little closer to your subject. It can also be used for product photography in the studio.

The RF 85mm F2 Macro IS STM is also recommended for macro shots. If you want to include more of the surroundings of your macro shot, use the wide-angle RF 35mm F1.8 Macro IS STM.

A feature of close-up and macro lenses is that they have a wider aperture than comparable lenses for normal shooting.

You can take advantage of this by extending the aperture of one of your lenses with an extension ring. This allows you to get much closer to your subject with a 'normal' 100mm lens, for example, up to the macro range, depending on the width of the extension ring. Extension rings are an in-expensive alternative to macro lenses.

The RF 35mm F1.8 IS Macro STM for the EOS R system has an adjustment ring on the front of the lens, which can be used to manually control the aperture, for example.

Close-up with the EF 100mm F2.8L USM Macro and flash.

EF-EOS R bayonet adapter

All EF and EF-S lenses can be used on an EOS R camera with Canon adapters - without any loss. The adapters match the flange focal length of EOS DSLR cameras. They also match the EF bayonet's eight contacts to the RF bayonet's twelve. In principle, EOS R cameras speak both 'languages', EF and EF-S lenses can be used without restriction. Three different adapters are available.

EF-EOS R bayonet adapter

Standard adapter
The adapter is simply inserted between the RF bayonet and EF or EF-S lenses.

With lens control ring
As with the RF lenses, the lens control ring can be configured to suit your needs. For example, you can set the aperture, shutter speed, ISO or exposure compensation.

With interchangeable filters
For still and video capture and EF lenses with large front elements

- Vario-ND filter
- Polarisation filter
- Clear plug-in filter

FILMING WITH EOS CAMERAS

All current EOS R full-frame cameras are capable of high-quality 4K video recording. The EOS R5 and EOS R5 C achieve 8K resolution.

When recording 4K video with cropping, the entire sensor is not read out, but only a section that corresponds approximately to the Super 35 video standard.

Depending on the sensor resolution, the crop factor is around 1.8. Lenses vary by this crop factor: A 20mm wide-angle lens has the effect of a 36mm lens in 4K recording.

Autofocus

With RF lenses, the autofocus of full frame cameras can be used for video. All EOS R cameras use Dual Pixel AF on the sensor. Using the touchscreen, you can change the focus point with a simple tap of your finger to create a professional looking focusing motion.

Tip: The focusing ring on RF lenses has a grid setting. This clicking noise can be distracting when recording video. The click setting can be disabled and re-enabled via Canon Service.

Data rates and memory cards

Video recording generates very large amounts of data, especially when shooting at 8K or 4K. The memory card in the camera must be fast enough, as the EOS R5 C can achieve data transfer rates of up to 1,770 Mbps (megabits per second) at high resolutions.

The EOS R5 C has two card slots for CF express memory cards, which allow data transfer rates of up to 1,400 Mbps. SD memory cards should be UHS Speed Class II.

External recording

Full frame EOS R cameras can be connected to an external recorder via the HDMI output for extensive video projects. With up to 8K resolution and 12-bit RAW (8,192 x 4,320, 50fps), the EOS R5 C delivers the highest video quality of any EOS R camera.

Canon Log3

Canon Log3 is Canon's RAW format for video: The tone curve of a video shot in Canon Log3 is logarithmic and captures a wide dynamic range. This results in a wide exposure latitude - similar to the RAW format in photography - and a great deal of freedom for colour and contrast grading of the video material.

At first glance, a video shot with Canon's Log3 appears to be lacking in contrast and colour. This is intentional: the flat Canon Log gradation provides a particularly wide range of tonal gradations from light to dark areas of the image, which can be used in subsequent colour grading.

Particularly in dark areas and as colour saturation increases, Canon Log reduces image noise and reproduces colours and skin tones naturally and accurately.

Canon Log3 video from an EOS full frame camera is comparable to that from a professional Canon Cinema EOS camera. Canon Log can be used to seamlessly integrate film footage from Canon EOS R cameras into a Cinema EOS video workflow.

GLOSSARY

Full frame: Sensor format of 24 mm x 36 mm.

APS-C: Sensor size of 22.5 mm × 15 mm Image circle: Diameter of the circular image of a lens in the sensor plane.

Crop factor: Ratio of the diagonal of the APS-C sensor to the diagonal of the full frame sensor. Example: The diagonal of a 24 x 36 mm full frame sensor is approximately 43.3 mm. The diagonal of the APS-C format is approximately 27 mm. So the ratio is 43.3 : 27 = 1.6.

Using the crop factor, it is easy to calculate the focal length of a full-frame camera that corresponds to the focal length of the lens on an APS-C camera. For example: An 80mm lens on an APS-C camera is equivalent to a 50mm lens on a full frame camera (calculation: 50mm x 1.6).

Dynamic Range: The range of tonal values from white to black that can be displayed in an image.

Selective Focus: A means of separating a sharp subject area from a blurred background or foreground with an open aperture.

Lens speed: The ratio of the focal length (F) to the maximum aperture of a lens, expressed in the form F 'f-number'. Example: RF 70-200mm F2.8L IS USM. The smaller the f-number, the greater the intensity of the light and the more light that is transmitted to the sensor when the aperture is open.

Aperture Width: The distance from the rear lens of an optical system to the image or sensor plane.

Rear focal length: Distance from the lens mount to the image or sensor plane; on the EOS R camera, the back focal length is shorter due to the omission of the mirror box.

DSLR: Abbreviation for 'Digital Single Lens Reflex'.

DSLM: Digital Single Lens Mirrorless, also known as Digital Single Lens Reflex.

GPS: *Global Positioning System*, positioning via satellite

Subsampling: Reduces the sampling rate of the blue and red signals during video recording, reducing the data rate.

Low pass filter: An optical element directly in front of the image sensor that suppresses high-frequency image components, creating a slight blur in these areas. This reduces moiré patterns caused by the superimposition of uniform, fine structures in the image with the regular structure of the sensor pixels.

Exposure value: (EV) is a logarithmic measure in photography that refers to exposure. One exposure value represents all possible combinations of f-stops and shutter speed that allow the same amount of light to pass through. For example: with an ISO sensitivity of 100, EV 11 corresponds to an aperture of 5.6 at a shutter speed of 1/60th of a second, or an aperture of 8 at 1/30th of a second, an aperture of 11 at 1/15th of a second, and so on.

Vlogger: Short for video blogger. Wide-angle zoom lenses such as the RF 15-30mm F5-5.1 IS STM are often used for vlogging. The tilt and turn display allows for selfie clips and extreme perspectives.

Focus stack: A focus stack is a combination of shots of a subject with different, preferably overlapping, focus settings. This shooting technique is particularly useful for macro photography, where the depth of field is particularly shallow. This stack is combined in image editing software such as DPP, Photoshop, Affinity Photo and Helicon Focus to create a consistently sharp image.

Sweet spot: Refers to the aperture of a lens at which it has the best imaging characteristics. A good rule of thumb is to stop down the lens by two to three stops. For zoom lenses, the sweet spot can also refer to the focal length at which imaging performance is maximised.

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As your passion grows, you can collect membership points and qualify for further benefits such as fast repairs and exclusive events.

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