

# Camera Basics

Drive Modes and Focus Settings

# Introduction

This is another in our series of Camera Basic talks, which have been designed to take you from setting up your camera, to using the most common camera settings.

In today's presentation we will discuss

**Drive Modes and Focus Settings**



# Modern technology is wonderful !

We take our camera technology for granted.

We just press the shutter button half-way. We hear the autofocus “beep” and we can take our photo, secure in the knowledge it will turn out well - most of the time ! But it wasn’t always like this !

The first cameras only had the lens-cap – no shutter.

The photographer took off the front cap, counted out the exposure in seconds and then replaced the cap.

Early lenses were also fixed focal-lengths. You had to fit a new lens, or move the entire camera, to accommodate subjects at different distances.



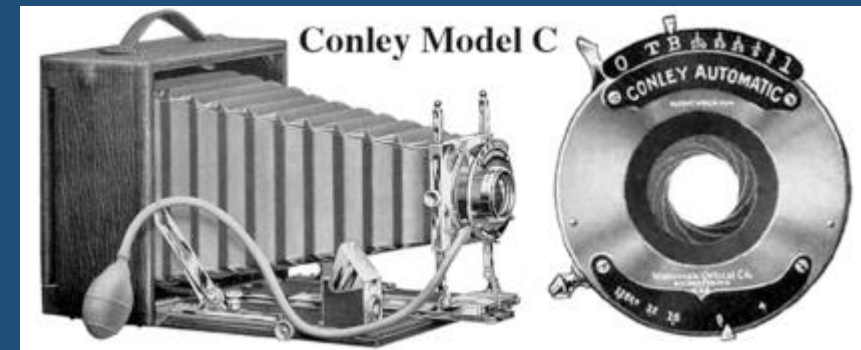
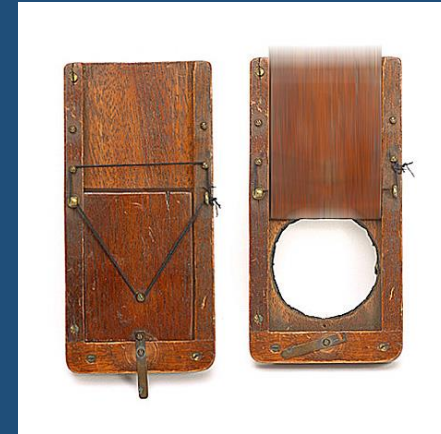
# Camera shutter development

You may be surprised to learn that shutters have been present in cameras since the late 19<sup>th</sup> Century.

The earliest manufactured shutter was the drop shutter of the 1870s. This was an accessory guillotine-like device. A wooden panel with a slit cutout mounted on rails in front of the camera lens that gravity dropped at a controlled rate. As the slit passed the lens, it "wiped" the exposure onto the photographic plate. With rubber bands to increase the drop speed, a 1/500 or 1/1000s shutter speed could be reached.

Some later shutters were activated by pneumatic pressure, by the photographer pressing a "bulb". We still have a bulb setting on shutter speed controls today !

By the 1920s, mechanical shutters were now present in-camera.



# Autofocus development

However, autofocus only became widely available from the 1970s onwards !

Before then, photographers had to manually calculate the focus. Lenses came with markings to help with this. Some lenses still have these markings today.

Between 1960 and 1973, Leitz (Leica) patented an array of autofocus and corresponding sensor technologies. The first mass-produced autofocus camera was the Konica C35 AF, a simple point and shoot model released in 1977.

The Pentax ME-F, which used focus sensors in the camera body coupled with a motorized lens, became the first autofocus 35 mm SLR in 1981.

The Minolta 7000, released in 1985, was the first SLR with an integrated autofocus system, meaning both the AF sensors and the drive motor were housed in the camera body, as well as an integrated film advance winder — which was to become the standard configuration from then on.



# What are Drive modes ?

Drive modes control

- how many images are taken when you press the shutter button
- if the image is taken immediately, or after a delay.

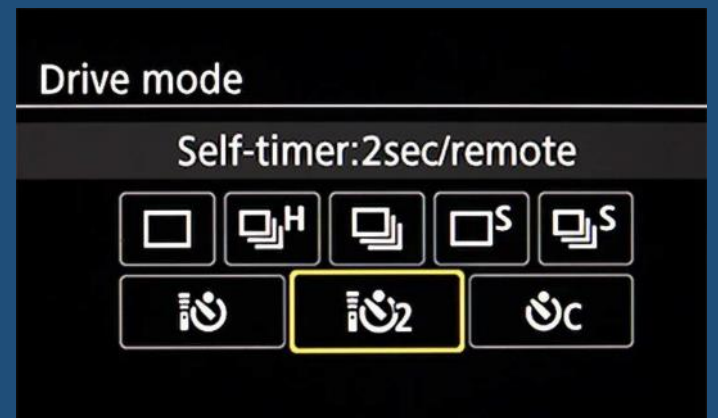
The range of drive modes available varies from camera to camera, but the most common are :

Single shooting

Continuous shooting

Self-timer mode and

Bracketing



# How can I access them ?

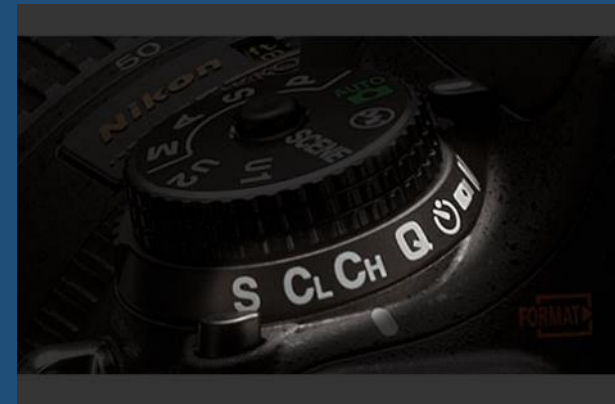
On some cameras, the drive modes are accessed using a dedicated dial on the camera.

Please note this dial is not the Command / Mode dial we discussed previously ! Look for a dial matching the photos on the right.

Other cameras have a dedicated button, like the one on the bottom photo.

Or, you may have to enter a menu to access them.

Check your manual to see what your camera can do !



# Single Shooting

**Single shooting** is the default setting on almost every camera.

Single shooting is usually represented by a single square on the drive mode menu, or dial.

**In this mode, every time you press the shutter button the camera records a single photo.**

In this mode, the camera will still take just one picture even if you keep your finger held down on the shutter button.

To take another image, you must lift your finger and re-press the shutter button, which takes a few milliseconds.



# Single Shooting

Single shooting is usually used when shooting subjects like still life, landscape photography and portrait photography - where you have a bit more time with your subjects and scenes.

You should try to avoid this option when shooting action scenes because the act of lifting your finger and repressing the shutter could mean you miss a crucial moment.



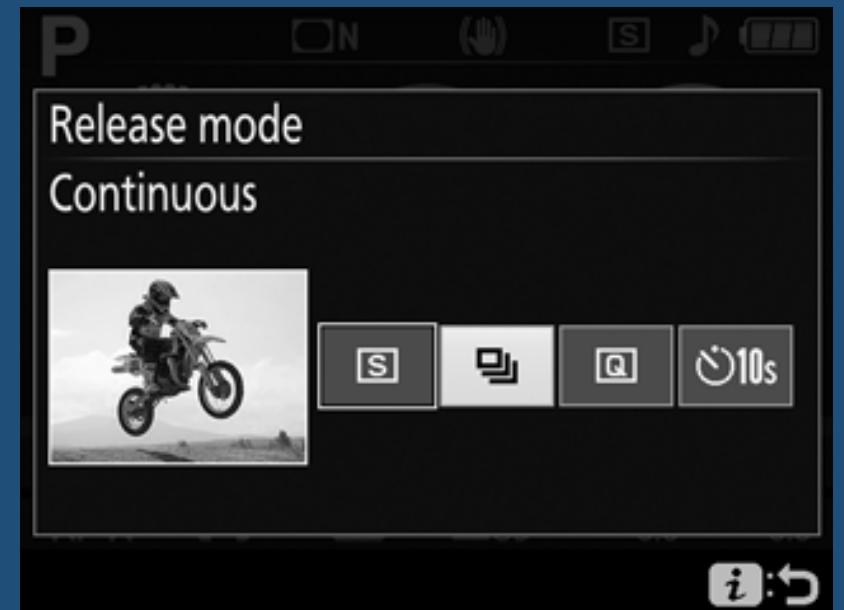
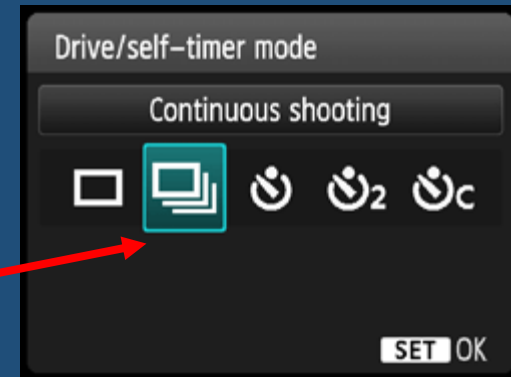
# Continuous Shooting

**In this drive mode, your camera will take photos for as long as you keep your finger pressed down on the shutter** or until the camera's buffer, or memory card is full (more later).

Continuous shooting is usually represented by a group of squares on the drive mode menu or dial.

**Continuous shooting is also called "burst" mode**, as you take bursts of images each time you press the shutter.

This mode is usually used for action or wildlife shots, where the subject is moving quickly. However, you can use it for every situation - as long as you don't mind reviewing lots of images !

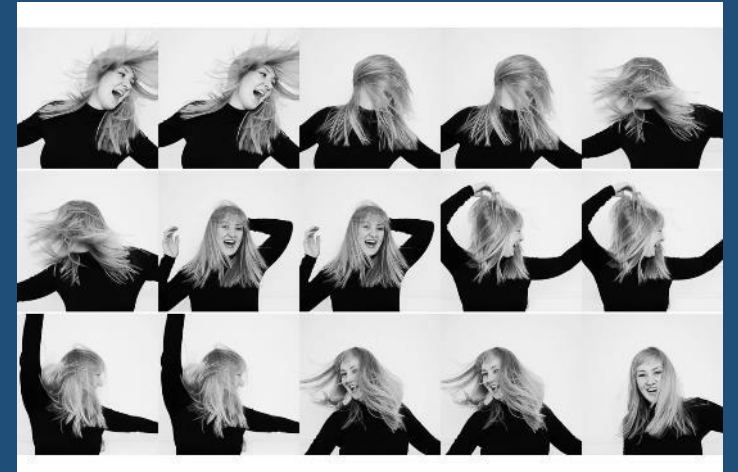


# Continuous Shooting

There are downsides to using continuous shooting all the time:

- 1) You end up with many images, to review/keep/delete
- 2) Many images take up lots of storage space, so you need a large memory card to hold them
- 3) Depending on your camera and settings, on fast continuous shooting, your camera may take images faster than it can write to the memory card.

Inside the camera is a small memory “buffer” which stores images before writing them to the card. Once the buffer is full, your camera will only be able to take images at the rate it is able to empty the buffer, perhaps 1 or 2 images per second !



# Continuous Shooting – fast or slow burst

On some cameras, you can adjust the rate the camera takes images under continuous shooting.

Some cameras offer a “High” (fast) burst or a “Low” (slow) burst speed, sometimes labelled CH (Cont. High) or CL (Cont. Low).



Sports photographers and those who shoot moving targets like wildlife or planes, might opt for the high continuous shooting mode which employs your camera's fastest possible frame rate to capture a sequence.

However, be warned that some cameras can struggle to focus continuously when shooting at these high frame rates.

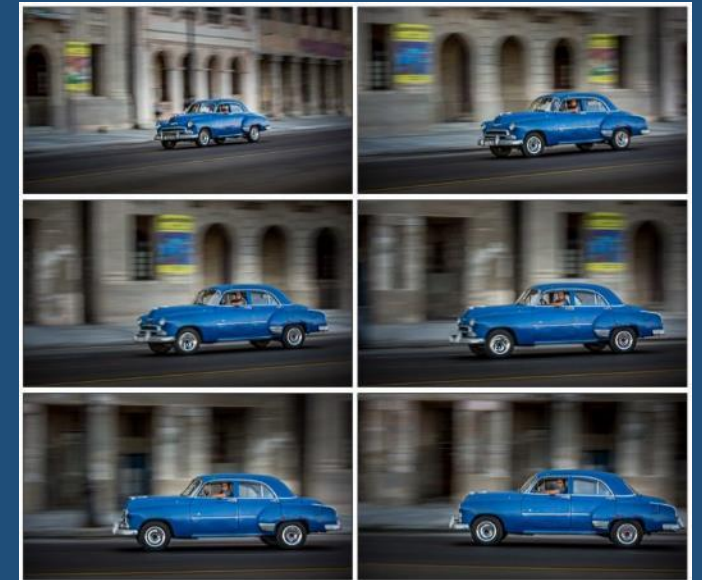


# Continuous Shooting and Auto focus

When using continuous shooting mode, you also need to consider which Autofocus (AF) mode to use.

If you are using your **continuous AF mode**, your camera will attempt to re-focus your shot in between frames.

Depending on how you set up the camera, it will either **slow down the rate at which it is shooting** (to re-acquire the focus), or it may just take lots of images, **some of which are not correctly focussed !**



# Continuous Shooting and Auto focus

If you set your camera to its single autofocus mode (AFS) it will normally only set the focus at the start of your sequence of shots.

Again, this may mean some of them are not correctly focussed.

Tip : if your fast-moving subject is moving towards, or away from the camera, use the low continuous shooting mode so that your camera can focus the lens in-between images in the sequence.

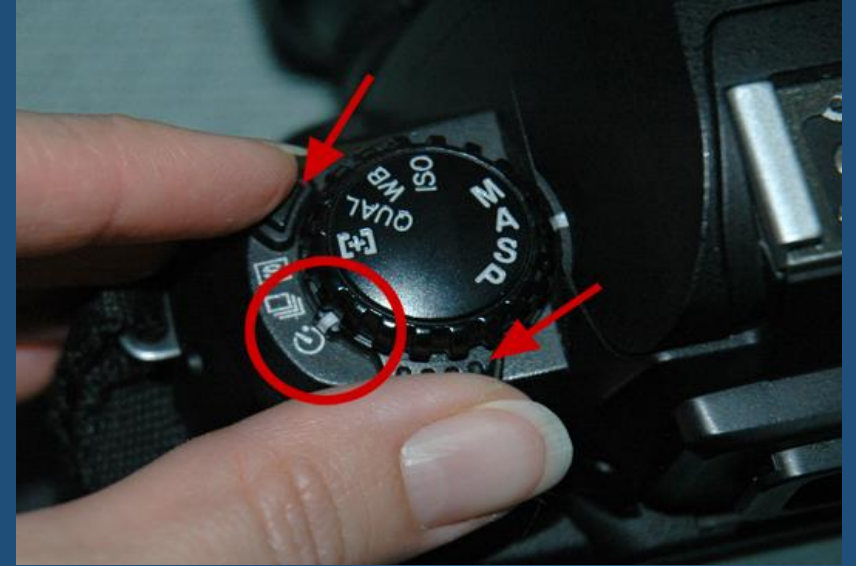


# Self Timer

In this mode, a short delay occurs between pressing the shutter and the image being taken. This mode is usually represented by a stopwatch image on the drive mode dial or menu.

Depending on your camera, it may be possible to choose a short (2s) or longer delay (5, 10s or even 30s).

It's commonly used so the photographer can also appear in the picture.



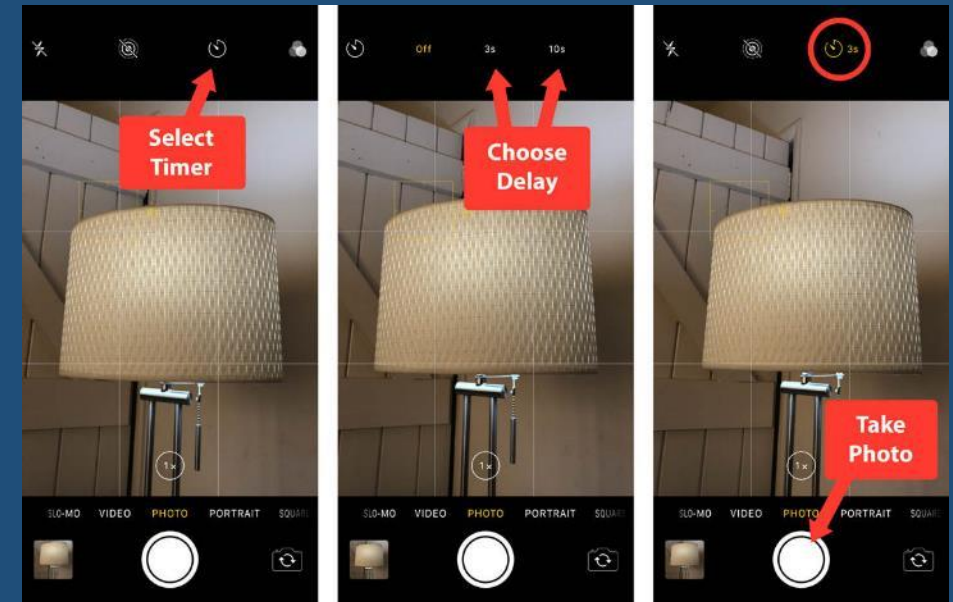
# Self Timer

However, the self-timer can also be used to stop camera shake.

When you press the shutter button you always shake the camera to some degree and this isn't good when you're taking photographs in low light, as you'll often end up with a blurred image.

By using the self-timer, you can press the shutter button, step back and take an image without any shake.

This works especially well when using a tripod.



# Bracketing

Bracketing is part of the “multi-exposure” drive mode family.

In this mode, the camera will **automatically** take several images (usually at least 3, but 5, 7 or more are possible – check your manual !)

The photographer just needs to hold the camera steady whilst the camera is shooting.

Bracketing is normally used so that images at different exposures or focus distances can be taken.

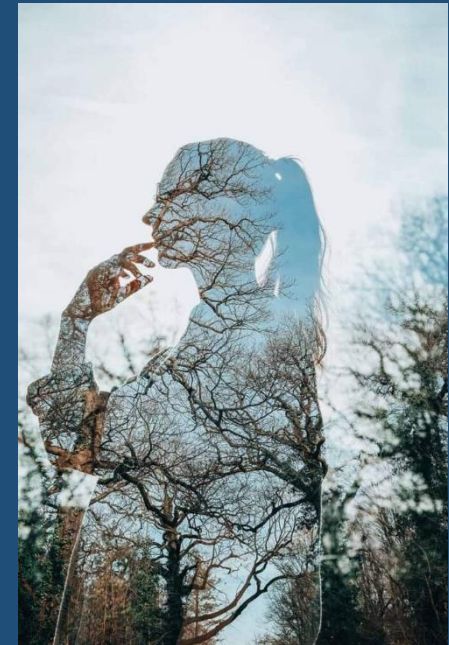


# Bracketing : multi-exposure

However, bracketing can also be used to create some unusual images. For example, if you wanted to duplicate the subject (see right) .

You take the first image and instead of it moving onto your memory card it stays in the buffer.

You press the shutter again to take a second image, which is placed by the camera on top of the first image. Then the two images are combined in camera.



Drive mode video (1 min)

2a Camera Drive Modes Explained.mp4

<https://www.youtube.com/shorts/Pj5ELyXxYU0>

# Focussing

Autofocus on today's cameras is so good, that you can normally let it do all the work to get the super-sharp images.

But as useful as Autofocus is, sometimes the camera gets it wrong and focuses on the wrong subject.

This is when Manual Focus is still needed.

Today, we will briefly cover the main focus modes :

Single

Continuous

Macro

Manual



# But first, how does Autofocus work ?

For autofocus systems to function properly, they usually need an **area of high contrast**. If you use your camera to focus on a white wall with no texture, or a blue sky without any clouds, your autofocus system will try to focus a few times and eventually give up.

There are two types of AF (Autofocus) systems – **Active** and **Passive**.

The “**Active AF**” system works by shooting an infra-red beam onto your subject, then bouncing that light back to your camera to figure out the distance between the camera and the subject.

Once the camera knows what that distance is, it instructs the lens to adjust focus based on this information.



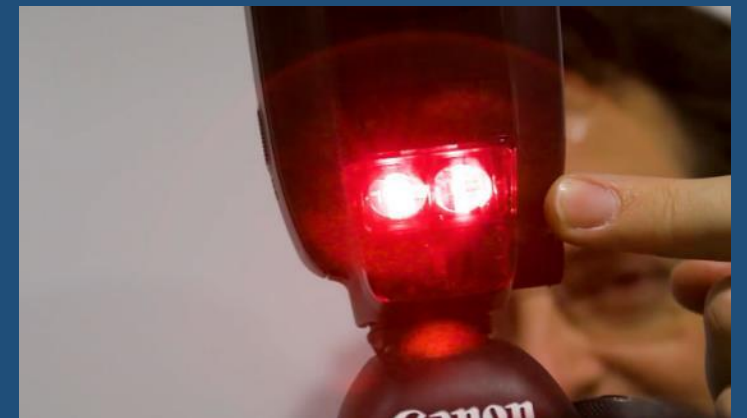
# Active Autofocus

Active AF has good and bad points....

Good : Active AF can be used in poorly-lit environments, where normal (Passive) AF does not function.

Bad : You can only use it for stationary, non-moving subjects and it normally only works for close subjects.

If you use a Nikon or a Canon **Flash** that has an “AF Assist” function, your camera can use this as an Active AF system.



# Passive Autofocus

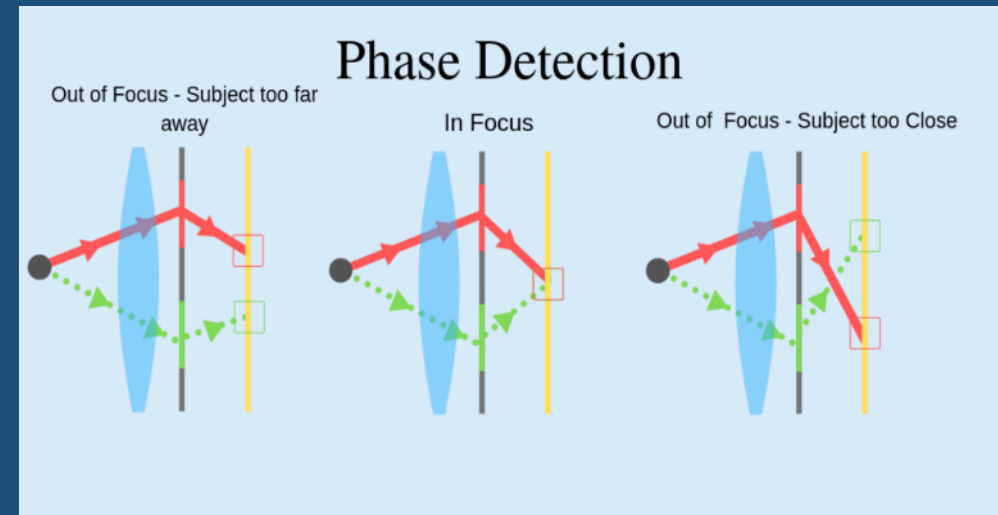
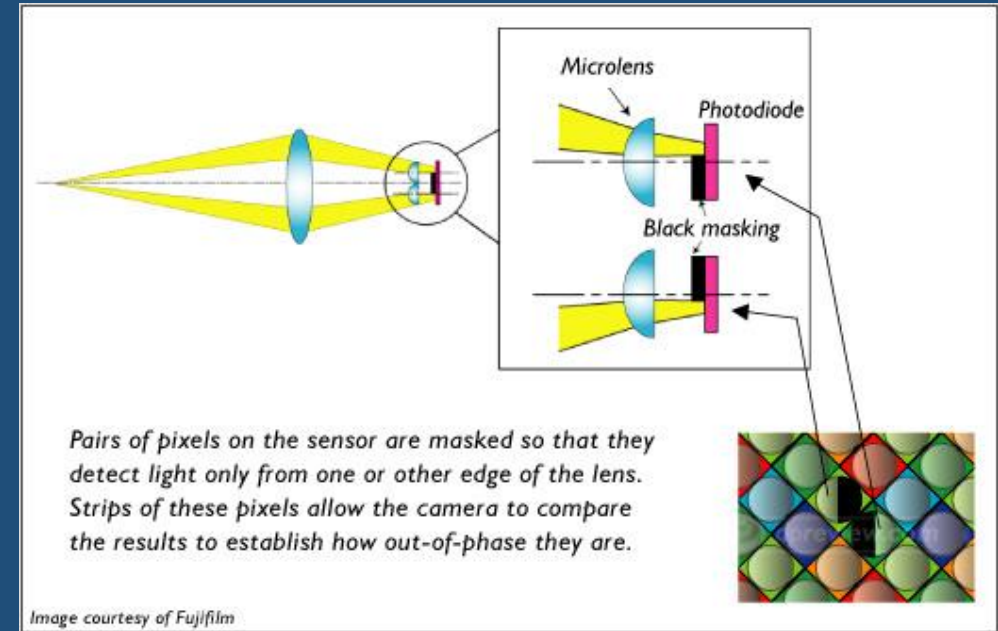
The “Passive AF” system works very differently. Instead of relying on the red beam to find out the distance between the camera and the subject, it either uses “Phase Detection” or “Contrast Detection” (or a combination of both) for detecting focus.

**Phase Detection** uses an array of microlenses for focusing.

As light passes through these microlenses, it splits the scene into a pair of images.

The distance between these images is then measured to see how far front or back-focused the subject is. The camera can then use this information to send exact instructions to the lens on which way to turn its focus and by how much.

As a result, **Phase Detection is very fast**, which makes it ideal for tracking fast-moving subjects.

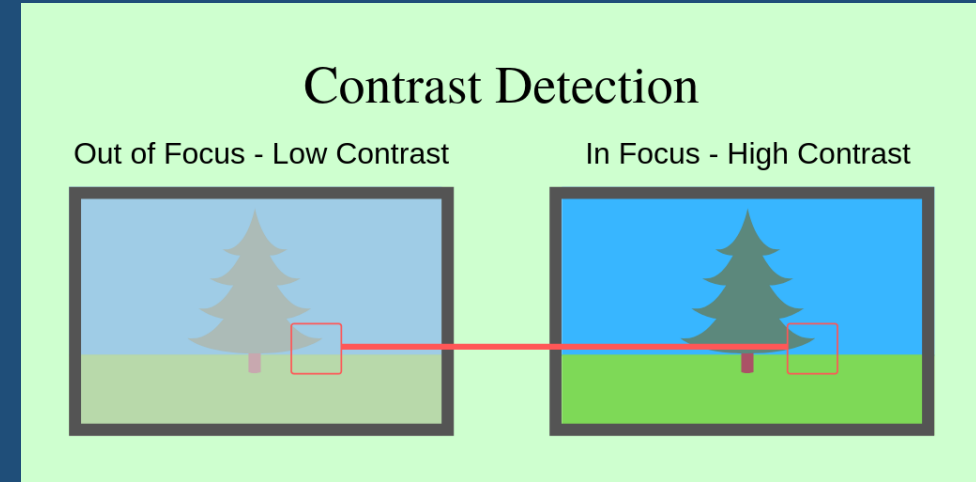


# Contrast Detection

Whereas Phase Detection AF uses hardware, **Contrast Detection** relies on software algorithms that “probe” through areas of an image looking for edge detail.

Basically, the part of the scene that needs to be in focus is scanned by the camera – it uses the lens to rapidly change focus from foreground to background until the subject is perfectly sharp / in focus. **However, this back-and-forth probing means that Contrast Detection is slower than Phase Detection on most cameras.**

At the same time, Contrast Detection AF can be much more reliable and accurate compared to Phase Detection AF when shooting in low-light conditions, which is why some cameras incorporate both. **Such cameras can easily switch between Phase and Contrast Detection AF – this is known as Hybrid AF.**



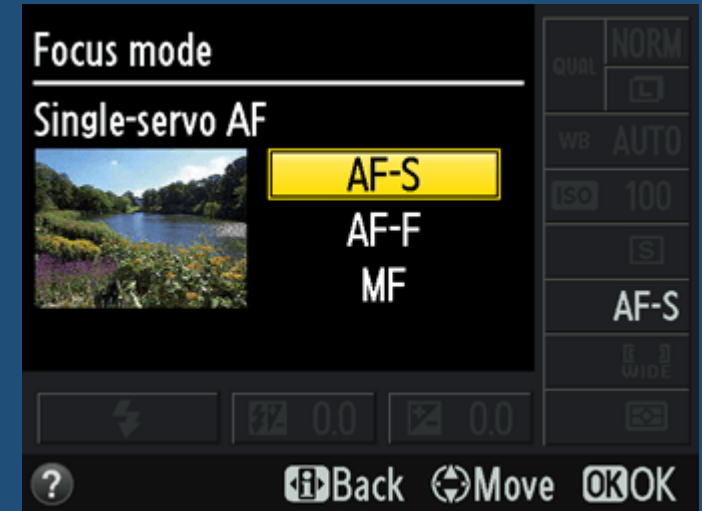
# Autofocus Single

In this mode, when you depress the shutter release halfway, the camera focuses on the subject **just once** – there’s no continuous adjustment.

The key point is the camera will focus just the once. If your subject moves, it won’t reacquire focus, even if you continue to press the shutter. Hence, the focus remains “**locked**”.

This can be useful. If you keep the shutter half-pressed down, the focus remains locked and you can move the camera to re-compose the scene, for example using the rule of thirds.

The same result can also be achieved using the AF lock button / back button focussing. Press the AF lock button freezes the focus, so you can move the camera around without having to keep your finger on the shutter button.



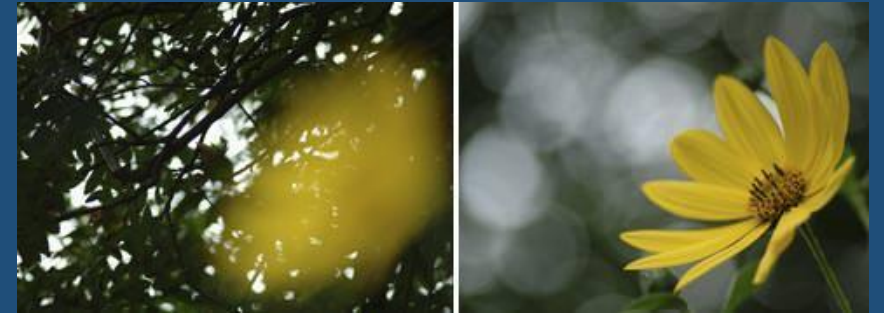
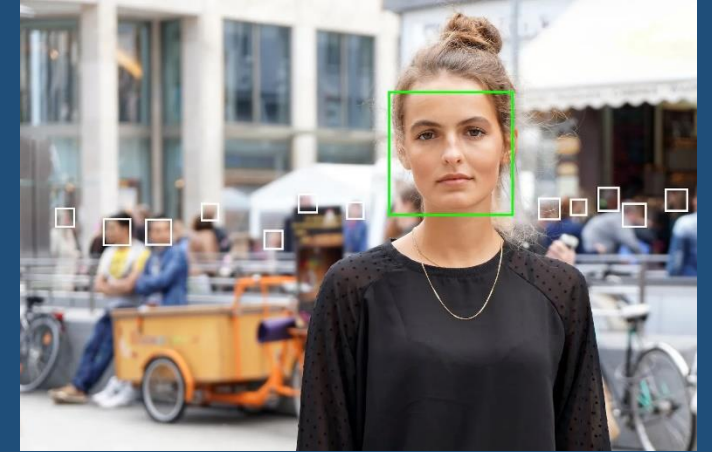
# Autofocus Single

This mode saves battery power and is ideal for subjects that aren't moving. However, this mode falls short when you're trying to capture something that's moving about.

Depending on your camera settings, this mode often requires the camera to lock into focus before allowing you to take a picture.

**Under extreme conditions, if the camera is unable to focus, pressing the shutter will do nothing.**

On some cameras, a variant of this mode (Autofocus Flexible AFF), is available, which allows the camera to refocus.



# Autofocus Continuous

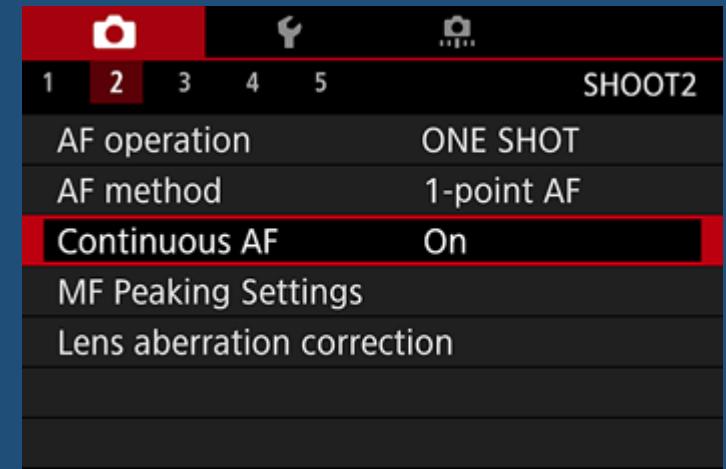
This mode is most useful for keeping moving objects sharp within the viewfinder as you track the object.

As soon as you begin to depress the shutter release, the camera goes into action and begins to focus. **In Continuous focusing mode, the camera detects the subject's movements and refocuses accordingly to keep the object sharp.**

Use this mode for moving subjects, such as sports or wildlife.

This mode uses a lot of battery power because it is continuously focusing and refocusing.

In addition, the autofocus technology might not accurately predict the direction in which a chaotic, fast-moving subject is going to move - so you might still get a blur.



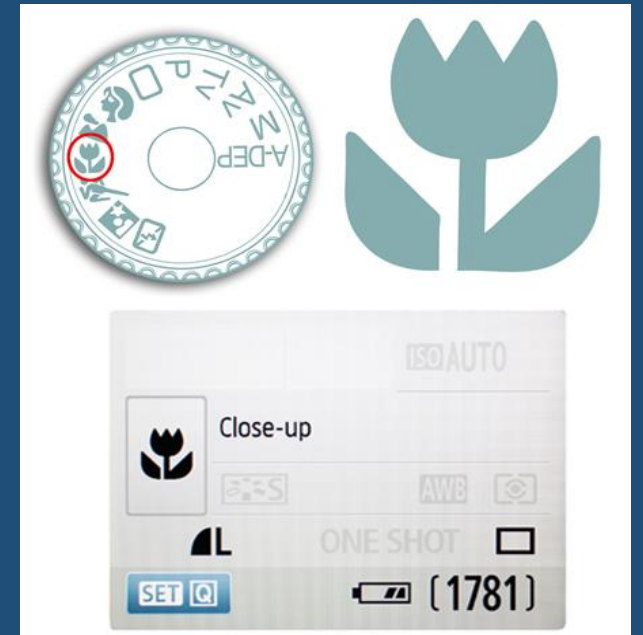
# Macro focus

This mode is used when you want to get really close to the subject, or when you are shooting something small and want a larger close-up.

In Macro focus mode the camera adjusts the lens elements so that its minimum focus distance is reduced. Note you can also buy specialist **macro lenses** which allow you to focus even closer to the subject.

The Macro focus option is normally shown as a flower icon.

After shooting, don't forget to switch back to a normal Autofocus, or you may find your camera doesn't focus properly on distant objects !



# Manual focus

This mode could be described as the 'No' autofocus mode. For most photographers, setting the focus manually takes much longer and is more prone to error than autofocus. For these reasons, manual focus is a mode they seldom use.

However, it can be useful if you are photographing a subject where you want to take multiple photos, but neither the camera or subject will move. In this case there is no use for the camera to autofocus for every photo, and manual focus can be used to set the focus where it is wanted, then left locked in place for subsequent shots.

Manual focus can also be useful for still life and product photography, landscape and architectural photography. These styles of photography typically involve setting the camera up on a tripod and where you have lots of time to adjust the focus.



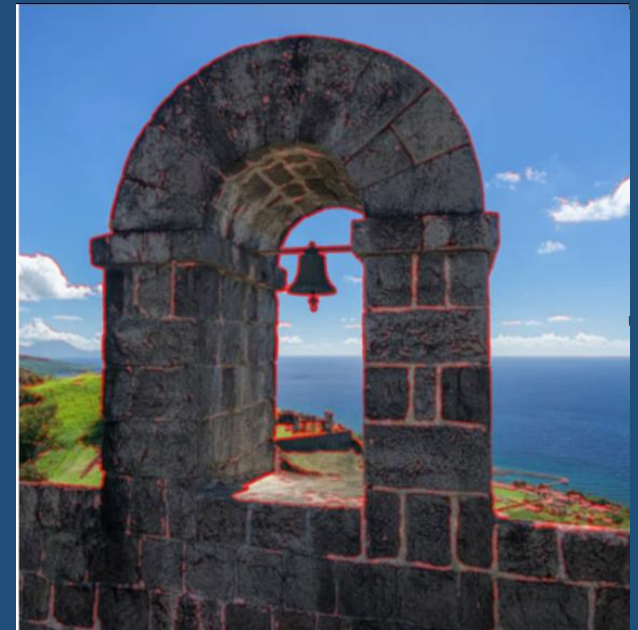
# Manual focus assist

Manufacturers have realised it is not always easy to judge the focus manually.

You could measure the distance to the subject and adjust the lens, as they did in the old days. So, some lenses have the focus distances recorded on them. Turn the lens until the distance on the lens is lined up with the notch/arrow.

A more modern option is for the camera to highlight the edges of the subject as it comes into focus. Usually, the highlight colour can also be changed.

Check your manual to find out what settings are available to you.



# Manual focus

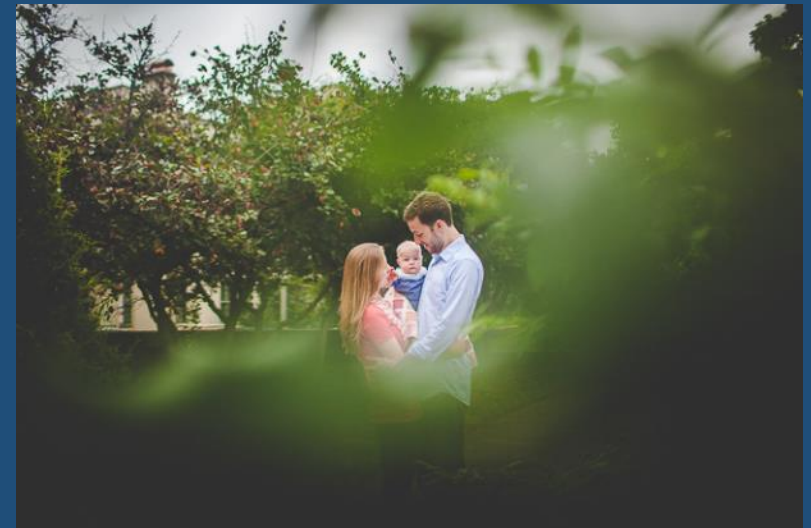
Photographers also turn to manual focus when Autofocus fails.

As mentioned previously, Autofocus needs areas of contrast to work. You may need to switch to manual focus for shooting low contrast scenes.

What if the scene is complicated ? You could adjust the focal points to a single point and place this precisely where you want. Or you could switch to manual focus.

Another option is to focus on something at the distance you want, half-press the shutter to lock the focus and then move the camera to point at your subject. Then press the shutter fully.

If you have an “AF lock” button, this works in the same way.



# Focal Points

Focus points are the little empty squares or dots that you see when you look through your viewfinder.

These are the areas the camera will look at to find the correct focus.

Your camera's default setting is to focus across the whole image, but you can change this setting and ask the camera to focus on a smaller area, or even a single point.


There's no single "best" camera autofocus point system, as the ideal choice depends on your photography style and subject matter.

Single-point AF is good for static subjects, while multi-point or zone AF can be better for tracking moving subjects.

To find out how to do this, please consult your manual !

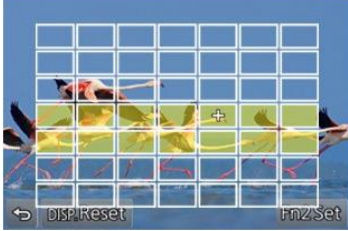
## Examples for Panasonic cameras

**Versatile AF Mode**




**49-area AF**

The focus detection area is increased from the conventional 23 points to 49 for more flexible composition.




**Custom Multi AF**

Custom Multi mode lets you freely select blocks to focus on from 49 focusing areas.




**Face / Eye Detection AF**

In addition to the conventional Face Detection AF, the Face/Eye Detection AF automatically focuses on your subject's face or eye.



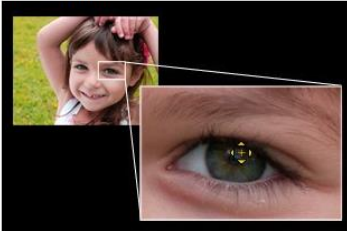
**Seamless 1-area AF**

Now the 1-area AF area can be seamlessly magnified not only in manual focus but also in auto focus mode.



**Advanced Tracking AF**

The camera locks on and automatically "tracks" the subject continuously. New Tracking AF is advanced in the point of tracking accuracy.



**Pinpoint AF**

More precise auto focusing by further enlarging the focusing area. Display time is selectable.

# Focal Point methods compared

## Single-Point AF (or Centre AF Point):

### Best for:

Static subjects, portraits, or situations where you want precise control over the focus point.

### How it works:

You select a single autofocus point, usually the centre point, and the camera focuses on that specific area.

### Pros:

Precise control, good for situations where you want to focus on a specific part of the scene.

### Cons:

Requires more manual adjustment if the subject moves or is off-centre.

## Multi-Point AF (or Zone AF):

### Best for:

Moving subjects, action shots, or situations where you need to track a subject that might move out of the centre of the frame.

### How it works:

The camera uses multiple autofocus points to track the subject and maintain focus.

### Pros:

Better for tracking moving subjects, can adapt to changing conditions.

### Cons:

Can sometimes focus on the wrong part of the scene, if the subject is obscured, or if the background is too busy.

# Other Options (may not be on your camera)

## AI Focus AF:

Some cameras offer AI Focus AF, which automatically switches between single-point and continuous AF based on subject movement.

## Face/Eye Detection:

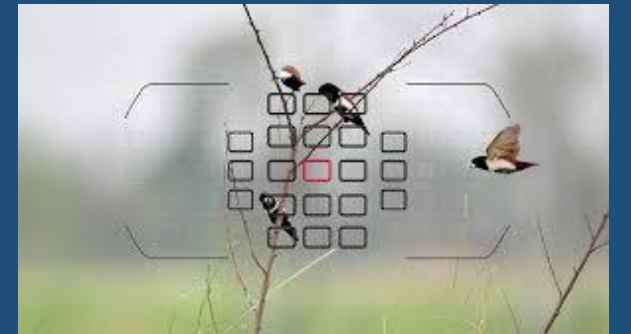
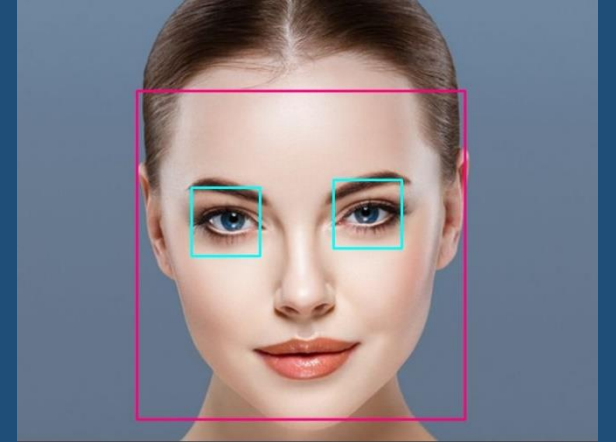
Many cameras have face or eye detection autofocus, which prioritizes focusing on the subject's face or eyes.

## Dynamic Area AF:

This mode uses a cluster of autofocus points to track a subject, offering a balance between single-point and zone AF.

## Group Area AF:

This mode uses a cluster of autofocus points to focus on a group of people or subjects.



# Linking drive mode and focus

You may have noticed that we use common terms for drive modes and focus. In most cases, there is a link between the two :

- If you have the drive set to **single shot**, you usually want **single autofocus**
- Similarly, if you are using **continuous shooting**, you will usually want **continuous autofocus**

Of course, you don't have to strictly follow these rules, but they are a useful reminder.



# Autofocus explained – video (9 mins)

2b Autofocus Modes Explained.mp4

<https://www.youtube.com/watch?v=fEDDS9xPkps&list=WL&index=8>

# Summary

In today's talk we have covered

Drive modes

Focus settings



We'll try out some of these concepts in a practical session next time...