

Varifocal vs Fixed Lens Security Cameras

What's the difference and when would I need varifocal lenses?

Part 1 - What's the difference?

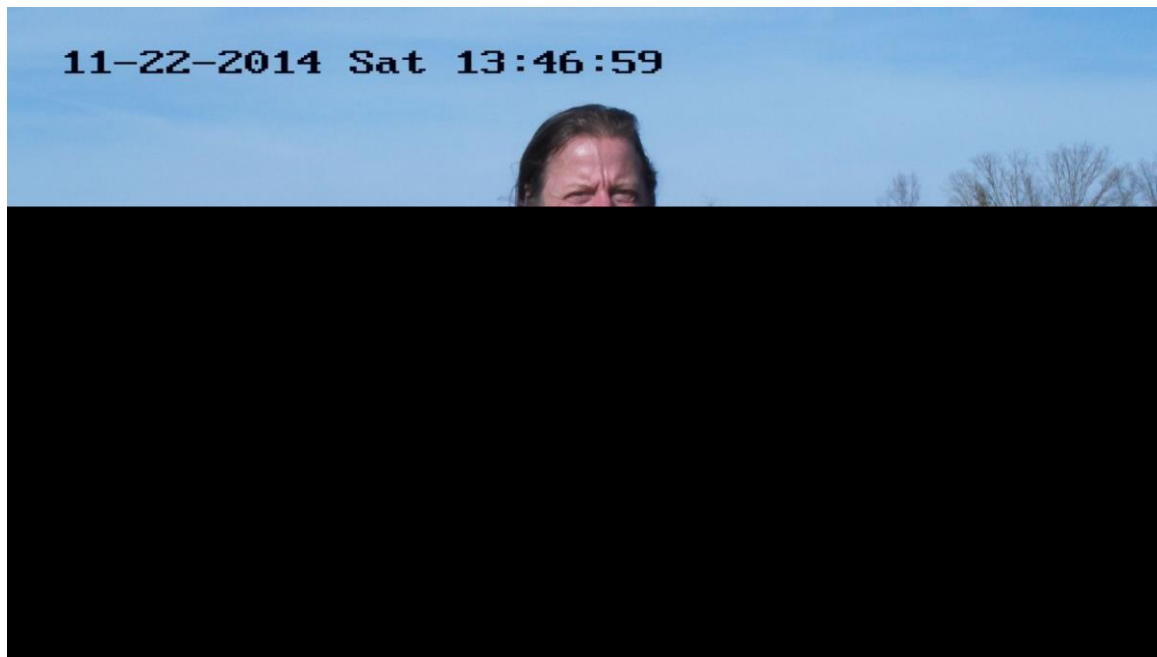
A fixed lens doesn't let you adjust the focal length, angle of view, and level of zoom. Almost all fixed lens cameras have a wide angle.

With a varifocal camera, you can adjust these things. Let's look at some examples of what this means:

This an image from a fixed lens 1080P camera (The Wasp Pro), which is fixed at 4mm with someone standing 10 feet away



This is an image from a similar 1080P bullet camera at 12mm (The Horner Pro, which is adjustable from 2.8 to 12 mm)



By increasing the focal length, you get a much better image of the man throwing the rock. At 10 feet, this doesn't matter very, much but at larger distances (which we will show in a second) this can mean the difference between identifying a suspect and not getting a clear enough picture of their face.

There is a drawback to increasing the focal length, however.

By increasing the focal length (the mm setting) and magnifying an area, you reduce your viewing angle, as superimposing the 12mm image on top of the 4mm one easily shows. You get a lot more detail for one area at the cost of losing a wide angle view.



Not just two settings

A varifocal camera allows you to adjust between its top and bottom limits on its view angle. This means that you have the ability to manually set both the view angle and level of zoom. Have a scenario where you need to zoom in on a gate or other access point? Use the 12mm setting (12 degrees and about 4x zoom). Need a wide angle view? Go with 2.8 mm (109 degrees). Need something in between? Try 6mm (~45 degrees) or 9mm (~30 degrees).

How to Adjust the Lens

Each camera will be a little different, but most adjustable lens cameras are adjusted manually at the camera. Continuing with using the Hornet as an example, you would take off the outer case to reveal two knobs. Like so:



Looking to change the viewing angle on the fly when responding to active security threats?

We also have [PTZ cameras](#) which allow you to pan, tilt, and zoom with a joystick and motorized varifocal cameras, like [the Bumblebee](#), that allow you to adjust the level of zoom remotely.

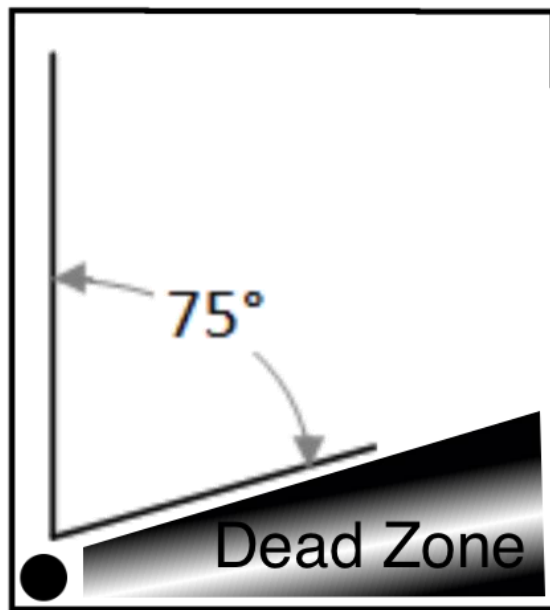
Cameras with mechanical optical zooms or PTZ functions can be adjusted via a joystick or the on-screen controls:



Part 2 - When Would I Need a Varifocal Lens?

One camera in a square room - When vari-focal cameras are nice

Because your normal fixed lens is 75 degrees, placing a fixed lens camera in the corner of a square room, will give you a coverage map like this:



This means that you really need two cameras to cover that area. With one 98 degree camera, you could cover the whole space and not have to buy two cameras (The walls are 90 degrees). So, a varifocal camera, set at 98 degrees would be able to see the whole room.

Distance - When vari-focal cameras become necessary

At about 50-100 foot a wide angle lens 1080P camera, will not doing a tremendously good job at identifying faces. (At about 20 foot, a standard definition camera will also not work identify faces, but if you are willing to pay for a vari-focal standard definition camera you should go HD wide angle - for about the same price as a standard definition vari-focal, you get a higher resolution picture that extends the distance that you can identify faces while not giving up any the wide angle view).

To demonstrate why varifocal cameras are necessary at distance, here's a picture of the same man throwing a rock with the same 1080P fixed lens camera (The Wasp), this time from 50 feet



And now from 100 feet



With greater distances, a wide angle view camera will lack the ability to identify faces. It becomes necessary to use a higher millimeter lens when you are trying to identify a security threat that is further away.

Here's the same two scenarios with the Hornet set at 12mm



Practical Applications: When you should absolutely use a Vari-focal Camera

1. When you only have the budget to have one camera in a room, only need one, and the room has 90 degree walls.
2. When you are have a gate, door, or other known entrance point but can't mount a camera very close.
3. When it is imperative that you get a close shot to identify a person or vehicle and have a good idea where they are going to be.
4. Anytime you want to identify someone more than 50 ft away.