

FUJIFILM IS PRO

IMPORTANT NOTICES AND DISCLAIMERS

PLEASE READ BEFORE USING THIS CAMERA

THIS CAMERA HAS BEEN DESIGNED FOR TECHNICAL USE IN ULTRAVIOLET (A), VISIBLE, AND NEAR INFRARED PHOTOGRAPHY. PLEASE READ THE NOTICES BELOW.

WARNING: Use of powerful light sources generating UVC, UVB, UVA, including IR projection and laser systems without proper training, protective clothing, gloves and eyewear can lead to serious health effects including blindness and skin cancer. Seek proper training before attempting to use any specialized light projection systems.

PLEASE READ THE CAMERA'S NON-TRANSFERABLE FIRMWARE USER LICENSE AGREEMENT. The camera's firmware contained is fully activated to engage the camera's UV, Visible, and IR abilities, and is ready for use. No other firmware modifications are necessary to activate the camera's IR wavelength sensitive CCD.

UV/IR LIGHT

The human eye only perceives the spectrum of electro magnetic radiation between 360nm (blue) and 830nm (red) (nm = nanometers). Above 780nm is exclusively the Infrared area of the spectrum and is invisible to the human eye. UltraViolet (UV) exists below 400nm while Infrared (IR) starts to enter the spectrum above 655nm in the Red portion of the spectrum. **IR light capture is greatly dependent on the amount of IR light available in the scene.** Low IR light availability will require longer exposures. *Remember: you cannot see IR light, so proper exposure is often a trial and error process. Images taken with IR filters covering the lens above 655nm will appear red or pinkish hue.* With other IR filters with ratings above 780nm, images will take on a more neutral and slightly purple hue. This is because no visible light exists for the camera to process into a color image.

SHOOTING UV /IR WITH THE IS Pro

The Camera CCD is not shielded from UV and IR light. The CCD is protect by a special formulated glass filter that facilitate basic maintenance and dust removal and aids in visible light auto focusing.

The Camera's CCD captures the light spectrum from the UVA(380nm) through the visible portion of the spectrum and into the near Infrared spectrum (IR below 1000nm). It will not capture IR heat energy in ranges above 1350nm.

This camera can not auto focus to objects in the UV or IR spectrum. To achieve proper focus, use the manual focus mode in combination with the cameras Live Image Preview mode fine tune your focus on a subject.

The IS Pro provides a 30 sec. Live Image preview directly from the CCD via the cameras LCD monitor. Given a sufficient level of IR light this feature enables you to focus the camera in manual mode even while the lens is obscured by opaque UV and IR filters.

- a. To aid in focusing the camera features an LCD focus zoom-in feature activated by pressing the up arrow on the Multi-Selector button during Live Image Preview.
- b. During Live Image Preview the LCD brightness can be increased or decreased to further aid in focusing by pressing the Left or Right arrows on the Multi-Selector button.
- c. Fast access to the Live Image Preview can be achieved by pressing and holding the Face Detection button down for a few seconds. This method offers a color or B&W preview option. Immediate access to the B&W Live Image Preview is achieved by pressing and holding the DISP (Display) button for a few seconds. This is very useful when the camera is mounted to a copy stand system.
- d. The Live Image preview can output to a monitor via the cameras NTSC/ PAL compatible video out port or activated and viewed from a PC / MAC using the optional HyperUtility HS-V3 software and the cameras USB 2.0 port.
- e. **Sufficient UV and IR light is necessary before an image is displayed on the LCD.** Be sure the camera's manual focusing mode is turned on. Increase or decrease the intensity of the LCD during Live Preview mode if nothing is visible.

SHOOTING GUIDELINES

Images taken with IR filters covering the lens above 655nm will appear red or pinkish hue. With other IR filters with ratings above 800nm, images will take on a more neutral and slightly purple hue. This is because no visible light exists for the camera to process into a color image.

Pink hue, soft focus, and abnormally bright shadow detail is common in images taken without lens filtration.

This is because UV and IR light are combining with available visible light captured by the camera's CCD.

1. Your lens is unable to sharply focus these three very different wavelengths resulting in a soft focus effect. Using filters to isolate or narrow the number bandwidth of light you're trying to capture will greatly increase sharpness.
2. Bright hot spots and lens or aperture flare appears in the center of the image. This is a very common IR problem encountered in outdoor daylight photography with both IR digital and IR film cameras. This can only be eliminated by manually holding a light deflector just off the side of the lens to help eliminate potential reflections. This often caused from bright objects that create IR light to reflect off internal lens elements or even the IR filter itself. Often the lens hood will not provide enough protection from such flares.

3. The net result of combined IR and Visible light gathering at the same time is an increase in apparent sensitivity similar to increasing your ISO.
4. To eliminate the UV and IR portion that is causing these effects and achieve a normal looking visible light image, add a UVIR cut filter to the camera's lens.
5. A "hot mirror" filter will only remove the IR portion of light leaving UV and visible to be recorded to the CCD.
6. A sharp focus in the UV spectrum may be impossible to achieve with a standard lens and may require a specialized Quartz glass lens. An 18a UV filter combined with a "hot mirror" filter will limit the camera's visibility to the UV spectrum only.
7. Utilizing an IR filter that passes some green light (E.g. B+W RG 610 – RG 655 Filters) may return some auto focusing capability back to the camera. However, this technique is not always consistent.
8. Modern lenses are intended for use within the visible light spectrum. A soft focus effect is common when taking pictures without lens filtration. This is due to the presence of IR light and its different focusing point than visible light. Experimentation with different lenses, including older Non-CPU based lenses is suggested. Older lenses also offer manual offset focusing marks that can scientifically aid in IR focusing. Most lenses are shielded or coated against IR and UV however even the best lenses pass a significant amount of UV and IR light. The IS Pro offers compatibility with these older style Non CPU lenses in the setup firmware menu.

Under situations where IR is the dominant source of light, the camera's Auto Exposure (AE) system may not operate properly due to the lack of visible spectrum light. It's recommended that Manual Exposure (M) be used in these situations. Program (P), Aperture Priority (A), and Shutter Priority (S) are likely to malfunction in the presence of high amounts of UV and IR light.

Under extreme IR lighting conditions, moiré patterns and other image problems can appear. Using an ISO above 200 can help reduce this effect, but may not eliminate it completely.

FILTER SUGGESTIONS

Although Fujifilm does not endorse any filter company, filters provided by Peca, Lee, Hoya, Kenko, Schneider / B+W, and Tiffen filters all provide good quality filtration methods. Many traditional IR filters are no longer in production and can be hard to find. Fine art photography benefits from almost any IR filter; here is a list of highly suggested filters for forensic / scientific photography.

IR Filters

70 equivalent -	Peca 902	
87 equivalent -	Peca 904	
87a equivalent -	Peca 906	
87b equivalent -	Peca 908	B+W 092
87c equivalent -	Peca 910	B+W 093
88a equivalent -	Peca 912	
89b equivalent	Peca 914	Hoya R72

FILTERS CONTINUED

*Hoya's RM90 fits between the 87b and 87c

UV + IR Filters

18a (UV) equivalent Peca 900 B+W 403

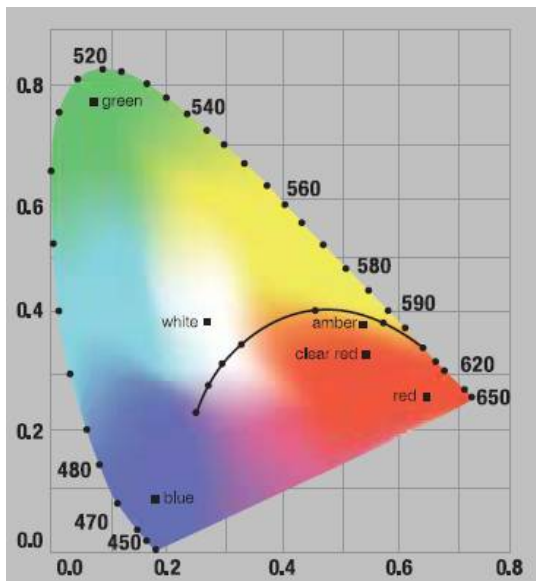
UV/IR Blocking (Cut) Filters (limits light capture to visible spectrum only)

B+W 486

Kenko DR655

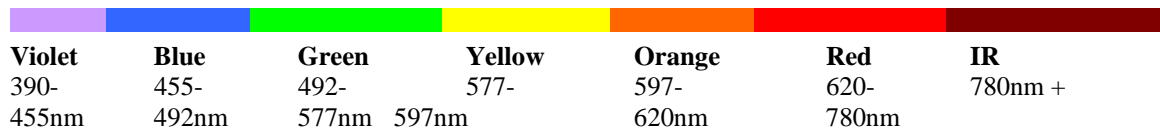
HELPFUL TOOLS

This visible color space chart shows the visible spectrum between 480nm blue to 655nm red.



WAVELENGTHS

Wavelengths get longer as you move from blue to Infrared.



Note: IR light can slightly overlap into the red spectrum. Thus IR light energy can be found in the red portion of the spectrum from 655nm and above.

LENS FILTRATION RESULTS

Below are several examples of what you might expect to see from various lens filtering options. Images can be converted to Black and White for additional effects.



No lens filtration (UV + Visible + IR Combined)



UVIR cut filter on lens (visible light only)



#70 IR filter



#87 IR filter



#87a IR filter



#87b IR filter



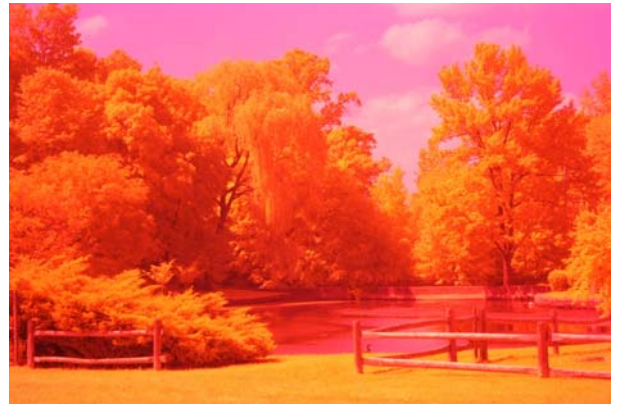
#88a IR Filter



#89b IR Filter



#18a UV IR filter



#18A UV IR filter with Hot Mirror filter



#25 red filter



#87 IR filter converted to B&W in camera