

Tips for Avoiding “Overexposure” of an Image’s Highlights

Preface

The human eye can capture bright colors of an image, such as a bouquet in a bright environment. This is because the human eye has a very wide dynamic range (the range of light levels that it can handle). However, when the same bouquet is shot with a video camera, the bright areas of the image can be overexposed and “washed out” on the screen. For example, as shown in the “Before Setting” image, the white

petals and down are overexposed. This is because the luminance signal of the petals and down exceeds the camera’s dynamic range.

In such situations, the picture can be reproduced without overexposure by compressing the signals of the image’s highlight areas so they fall within the camera’s dynamic range.



Before Setting



After Setting

Features of Sony Cameras

Sony cameras have a KNEE function, which allows you to adjust the threshold (KNEE POINT) from which the video signal should be compressed, and the compression ratio (KNEE SLOPE) which determines how much the signal should be compressed. By adjusting the KNEE function properly, the white petals and down are clearly reproduced without overexposure, as demonstrated in the “After Setting” image. KNEE adjustment is also essential when shooting an object with multiple cameras, such as in a studio. This is because each

camera captures light bounced off from the object from a different angle or distance, making individual KNEE settings required for each camera. By optimizing each camera’s KNEE settings, a natural and consistent look is obtained when switching from camera to camera at the video switcher’s final output.

Major Sony cameras with the KNEE adjustment function

HDW-900 series, HDW-750/730 series
DVW-970 series, PDW-530/510 series
DSR-450/400 series, MSW-970 series

Camera Settings

To adjust KNEE, use the KNEE page of the PAINT menu.

1 Open KNEE of the PAINT menu.

00●CONTENTS	TOP
01.SW STATUS	
02.WHITE	
03.BLACK/FLARE	
04.GAMMA	
05.BLACK GAMMA	
→06.KNEE	
07.DETAIL 1	
08.DETAIL 2	
09.DETAIL 3	
10.SKIN DETAIL	

2 Set KNEE to ON, and adjust KNEE POINT in the range of 50.0 to 109.0.

P06OKNEE	
KNEE POINT	ON
→KNEE SLOPE	80.0
KNEE SATURATION	ON
KNEE SAT LEVEL	0
WHITE CLIP	0
WHITE CLIP LEVEL	109.0

3 Adjust KNEE SLOPE in the range of -99 to +99.

P06OKNEE	
KNEE POINT	ON
KNEE SLOPE	80.0
→KNEE SATURATION	-40
KNEE SAT LEVEL	ON
WHITE CLIP	0
WHITE CLIP LEVEL	109.0

By lowering KNEE POINT and increasing KNEE SLOPE, brighter objects can be reproduced without overexposure.

In the case shown in the “After Setting” image, the KNEE POINT was set to 80.0 and KNEE SLOPE was set to “-40.”

The example shown is with the DSR-450WSL. The results of this adjustment may differ from the sample image, depending on the camera model and the lighting conditions.

For additional information, refer to the Operating Instructions of your camera.

Technical Information

What is Dynamic Range?

In general, dynamic range indicates the difference or the ratio of the smallest and largest signal that can be handled by a device. The dynamic range of the video signal is 100–110 percent. In contrast, video cameras with 2/3-inch CCDs, for example, can handle a wide dynamic range of approximately 600 percent. (Dynamic range may decrease depending on the camera setting.)

What is KNEE?

KNEE is a function which compresses the signals in the highlight areas so they fall within the video signal’s dynamic range (approximately 109 percent: white clip point). In most cases, KNEE POINT is set between 85.0 to 100.0, which is approximately the luminance level of human skin.

In Sony video cameras, increasing the KNEE SLOPE to a positive value (making the angle of the KNEE SLOPE gradual) increases the compression ratio so a greater range of the

camera’s dynamic range is used.

However, it is important to note that the image color of such compressed highlight areas can look pale and “washed out” with a larger KNEE SLOPE value. This is because the color difference (R-Y, B-Y) signals are compressed together with the luminance signal. To avoid this, the combined use of the KNEE function and the KNEE SATURATION function is recommended (refer to Issue 02).

Some Sony cameras have a DCC (Dynamic Contrast Control) function, also called Automatic Knee Control, which adjusts the knee point and knee slope automatically.

