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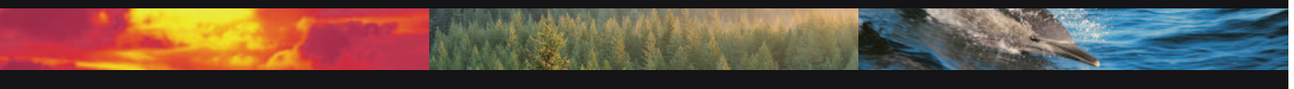
NEX-FS100 Handbook

The freedom to be professional



Contents

Chapter 1 Shooting-related functions and effects

ASSIGN : Can be allocated to one of the ASSIGN buttons.

Using Auto functions for quick-start shooting

When working on wedding videos and music videos, it is sometimes required to use the mobile, handheld style and start shooting at once. The NEX-FS100 offers auto functions in addition to manual functions to help you out in such situations. Please note the AUTO FOCUS, AUTO IRIS and optical image stabilization SteadyShot™ functions can all be used only when an E-mount lens is used.

NOTES: The E 16mm F2.8 (SEL16F28) lens does not support the optical image stabilization SteadyShot™ function.
The LA-EA2 lens mount adaptor makes the AUTO FOCUS and IRIS PUSH AUTO (Temporarily turns the Auto Iris function on even when the manual functions are selected) functions available even when an A-mount lens is used, once the NEX-FS100 has been updated with firmware. Please note the LA-EA1 lens mount adaptor does not offer this feature.

Comparison Chart for LA-EA1 and LA-EA2 (When used with NEX-FS100)

A-mount Lens Type	LA-EA1						LA-EA2					
	Focus			Iris			Focus			Iris		
	AUTO FOCUS	MANUAL FOCUS	PUSH AUTO	AUTO	MANUAL	IRIS PUSH AUTO	AUTO FOCUS	MANUAL FOCUS	PUSH AUTO	AUTO	MANUAL	IRIS PUSH AUTO
SSM	No	Yes	No	No	Yes	No	Yes*1	Yes	Yes*2	No	Yes	Yes
SAM	No	Yes	No	No	Yes	No	Yes*1	Yes	Yes*2	No	Yes	Yes
Coupler	No	Yes	No	No	Yes	No	Yes*1	Yes	Yes*2	No	Yes	Yes

*1 Iris position moves to either F3.5 or maximum iris in AUTO FOCUS mode.
*2 Iris position moves to either F3.5 or maximum iris in PUSH AUTO focus mode while exposure is adjusted by shutter speed.

Video Settings

AUTO EXPOSURE (AE) function lets you control image brightness automatically

Moving the AUTO/MANUAL switch to AUTO enables automatic adjustments of the iris, gain, shutter speed and white balance settings. You can start shooting right away without checking those settings.

AUTO EXPOSURE (AE) is a camcorder function that controls all or some of the iris, shutter speed and gain parameters automatically to achieve ideal brightness for videos.
With the NEX-FS100, the above parameters, as well as white balance, are controlled automatically when the AUTO/MANUAL switch is moved to AUTO. Please note that automatic control of iris is only possible when an E-mount lens is used. When another maker's lens is used, iris remains under manual control, while other parameters are adjusted automatically. When the AUTO/MANUAL switch is in the MANUAL position, pressing the specific button for a particular parameter, such as the GAIN button, lets you switch between the AUTO and MANUAL modes just for that parameter (gain in the case of the button). The [A] icon next to a parameter indicates it is being controlled automatically.

Even when the AE function is used, it cannot produce perfect results under all lighting conditions. But by also utilizing support functions, you can use the AE function effectively.

AUTO/MANUAL switch

GAIN button

AUTO/MANUAL control display

AE SHIFT for automatically shooting video a little brighter or darker ASSIGN

The AE SHIFT function enables you to shoot at an exposure level that is a little higher or lower than the AE function normally selects.

Usage examples

- When the subject is darker than the background, such as when shooting a person against light, a snowfield or another bright background using the AE function. If you want to capture the subject brightly even if the background becomes extremely bright, you can shift AE toward the + (plus) side.
- When the subject is too bright compared to the brightness of the background. If you want to tone down the subject's brightness even if the background becomes darker, you can shift AE toward the – (minus) side.

LEVEL = –2.0EV

LEVEL = 0EV

LEVEL = +2.0EV

How to set/operate

1. MENU → CAMERA SET → ON The currently selected level value is displayed.
2. MENU → CAMERA SET → LEVEL You can adjust the brightness level from –2.0 (Dark) through 0 (Normal) to +2.0 (Bright).
3. You can allocate [ON/OFF] for the AE SHIFT function to one of the ASSIGN buttons.

NOTE: This is an effective function when at least one of the iris, shutter speed or gain parameters are controlled automatically.

AUTO FOCUS function lets you control focus adjustment automatically

With focus, automatic adjustments kick in when the FOCUS switch is moved to AUTO.

FOCUS switch

Using Manual functions for purposeful shooting

Moving the AUTO/MANUAL switch to MANUAL enables manual adjustments of the iris, gain, shutter speed and white balance settings. Please note using this switch will change the settings for all these exposure settings. Regarding focus adjustment, moving the FOCUS switch to MANUAL enables manual adjustment.

AUTO/MANUAL switch for iris, gain, shutter speed and white balance

FOCUS switch

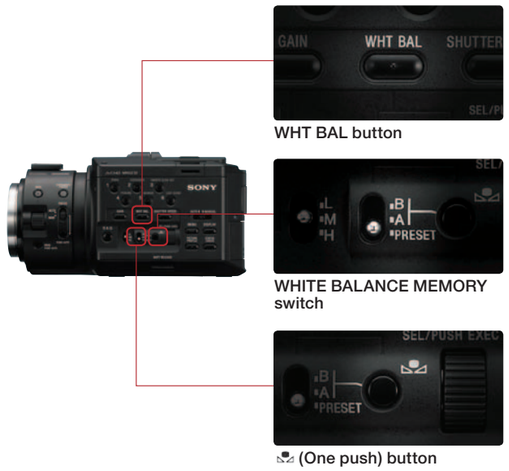
Shooting-related functions and effects

White Balance (WB)

To shoot images in correct colors, you need to adjust your camera so that it can capture a white object as white under lighting conditions with different color temperatures. At the same time, white balance is sometimes used to shoot something that is not white as white for dramatic effects.

One Push White Balance lets you capture white subjects as white

Selecting WHITE BALANCE MEMORY switch A (A) saves a white balance adjustment value in memory A. Choosing switch B (B) enables you to store another white balance adjustment value separately in memory B. Unless you readjust, the saved adjustment values will be held in memory even when the power is turned off. We recommend using this feature when you use ND filters.



WHT BAL button

WHITE BALANCE MEMORY switch

(One push) button

How to use/operate

1. Push the WHT BAL button on the camera body.
2. Select A (A) or B (B) with the WHITE BALANCE MEMORY switch located on the camera body.
3. Set the correct exposure under the same lighting conditions as the subject, capture the white subject as large as possible in the screen, and push the (one push) button.
4. The adjustment value is stored in A or B. The saved color temperature is displayed on the LCD screen for about three seconds.

WB TEMP SET (white balance temperature set) lets you directly set color temperature

This function enables you to specify the color temperature in numbers, such as 3,200K and 6,500K.

Usage examples

- When you want to match white balance with other broadcasting/professional camcorders whose color temperatures can be configured by entering numbers.
- When you want to keep the numerical values of color temperatures as shooting data when the shooting assignment extends over multiple days, for example.

TIPS

There are times when the correct white balance cannot be obtained by designating a color temperature alone, such as when you are shooting under fluorescent or LED lights. In such cases, we recommend you also use the WB SHIFT function under the Picture Profile menu.

For details on WB SHIFT function settings, please check [Chapter 4: PICTURE PROFILE].

How to use/operate

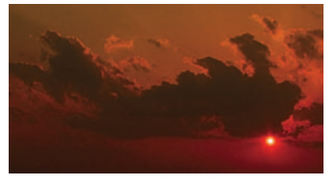
1. Move the WHITE BALANCE MEMORY switch to the PRESET position.
2. MENU → CAMERA SET → WB PRESET → MANU WB TEMP
3. WB TEMP SET → 2,300K ~ 15,000K in 100K increments.
   Or
   Push the (one push) button and highlight the color temperature in reversed display. Change the color temperature. Push the (one push) button again.

WB OUTDOOR LEVEL (white balance outdoor level) for controlling an image's color tone with white balance

This function lets you change the color temperature (default value at roughly 5,800K) for the OUTDOOR white-balance preset.

Usage examples

- When you do not have a white subject for setting white balance.
- When you want to match the white balance of multiple cameras as much as possible.
- When you want your image to have an orange tone like during sunsets or a bluish tone like at night and under shade.



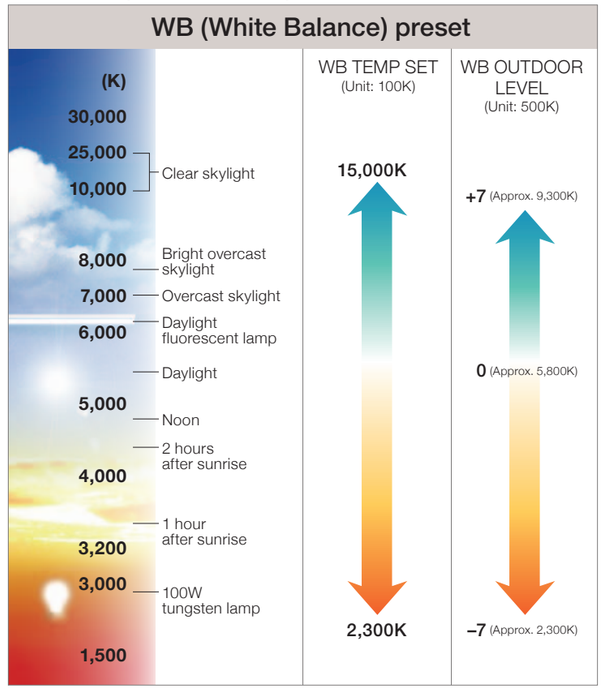
WB OUTDOOR LEVEL = +7

WB OUTDOOR LEVEL = –7

How to set/operate

1. Move the WHITE BALANCE MEMORY switch to PRESET.
2. MENU → CAMERA SET → WB PRESET → OUTDOOR
3. MENU → CAMERA SET → WB OUTDOOR LEVEL → –7 ~ +7 (Roughly 500K change per single step –7 (Bluish) ~ 0 (Normal) ~ +7 (Reddish))
   Or
   Push the (one push) button and display the WB OUTDOOR LEVEL next to the OUTDOOR icon . Change the level. Pushing the (one push) button again confirms the change.

Reference: WB preset and color temperature



NOTE: INDOOR color temperature is 3,200K and OUTDOOR color temperature is 5,800K in WB PRESET setting.

TIPS

Some camcorders in the HDV and NXCAM series are equipped with the same function. You can roughly match their color temperatures by setting their WB OUTDOOR LEVEL at the same level.

Shooting-related functions and effects

What is bokeh effect?

The bokeh effect creates beautifully defocused images with a shallow focus look. The major features of the NXCAM Super 35mm Sensor Camcorder NEX-FS100 are **1. bokeh effect**, **2. lens interchangeability** and **3. sensitivity**.

Most video camcorders that have been released so far do not support interchangeable lenses. Even the models that do let users change lenses cannot produce dramatic bokeh effects due to their small image sensor sizes. As a result, the bokeh effect has not been regarded as very important among video shooting techniques.
However, by utilizing the bokeh effect and highlighting the subject against a blurred background, it becomes possible to clearly communicate to viewers where in the image they should be focusing. It is also possible to produce a very good atmosphere by using the bokeh effect and creating some blurred sections in the image. In other words, having the bokeh effect in your arsenal expands the range of your expressions.
In this section, we will explain the bokeh effect, one of the NEX-FS100's unique offerings. By mastering the bokeh effect, you will be able to create new images that were not possible with conventional video camcorders.

How to control and use bokeh effect

The bokeh effect can be controlled by the following methods.

To increase bokeh effect

- Choose the brightest lens possible.
- Select a lens with a long focal length.
- Open the iris. (Reduce the F-value.)
- Shoot the image with the lens set more toward the telephoto side.

To reduce bokeh effect

- Select a lens with a short focal length.
- Close the iris.
- Shoot the image with the lens set more toward the wide-angle side.

Usage examples

High-level bokeh effect

- Highlighting the main subject against the background.
- Preventing a cluttered background from taking the focus away from the subject, such as when shooting in a small room.

Image with blurred background

Image with clear background

- Shifting viewers' attention

By shifting the camera's focus to different parts of the image, it is possible to make the viewer focus on the main subject of each scene. This technique is known as rack focus. It involves focusing on the main subject of the scene and shifting focus in the image to the next subject. This technique has been used with conventional video camcorders as well. But with a stronger bokeh effect, the NEX-FS100 lets you create more effective rack focus.

Focus is on the candle in front

Focus is on the candle in back

- Creating a softer atmosphere

It is possible to emphasize soft qualities of the subject, such as human or animal hairs, birds' feathers, flowers or grass, by blurring most of the image.

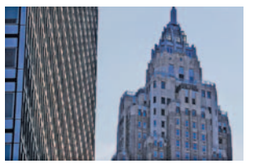
Soft image

Hard image with clear outlines

Low-level bokeh effect

- Capturing details throughout the screen

This technique, known as pan focus, puts the entire image, from near to far, in focus. It is an effective tool when capturing nature and landscapes from afar or creating hard images, with clear outlines, of sharply shaped objects such as architectural structures.



Shooting-related functions and effects

What is depth of field?

An image that highlights the in-focus main subject against a blurred background, or an image in which everything — from the subject in front to the background — appears to be in focus: The depth of field plays a major part in both of these examples.

Strictly speaking, only the area of the image that is parallel to the image-capturing elements can be said to be precisely in focus. But there is a zone near the in-focus area in terms of the distance from the camera that also appears to be in focus. This zone is called the depth of field. When the zone is large, it is described as having a deep or wide depth of field. If the zone is small, it can be said to have a shallow depth of field.

The iris plays an important role in controlling exposure along with the shutter. But it also has another key role of adjusting the depth of field, as a change in the iris results in a shift in the depth of field. With a lens whose f stops range from F1.4 to F22, F1.4 is its maximum iris and F22 is the minimum iris. Shifting the iris toward the minimum iris is described as closing the iris. Conversely, moving toward the maximum iris is called opening the iris.

The depth of field gets deeper as the iris becomes more closed. This expands the area that appears to be in focus, resulting in a larger area near the subject (in terms of the distance from the camera) looking sharp. On the other hand, the depth of field becomes shallower as the iris is being opened. This boosts blurring of the area around the subject, making the subject that remains in focus jump out. So, the iris has important roles, controlling not only exposure, but also the depth of field (amount of bokeh effect).

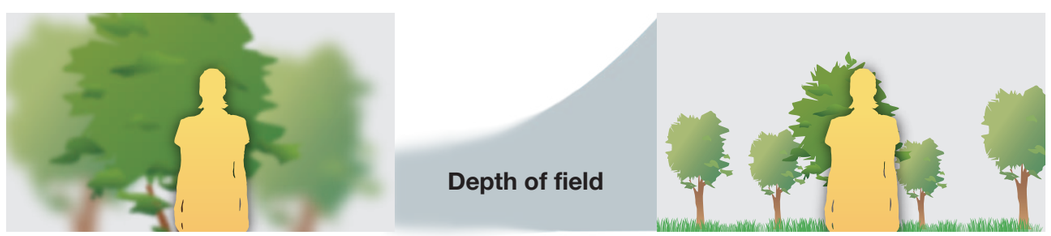
Even when the iris value is identical, the depth of field gets deeper as the shooting distance becomes longer. The opposite will occur as the shooting distance becomes shorter. The shorter the focal length of the lens, the deeper its depth of field becomes. A longer focal length will result in a shallower depth of field.

Understanding these characteristics of the depth of field will equip you with the knowledge that it is more effective to select a lens with a shorter focal length (wide-angle lens), close the iris and keep the shooting distance long in order to capture the entire image — from the foreground to background — sharply. It is also better to pick a lens with a long focal length (telephoto lens), open the iris and shoot the subject from nearby if the desired effect is to emphasize the subject by blurring the background or the rest of the image.

The depth of field is determined by three factors — iris value, focal length and shooting distance. But in actual shooting, you should also take into account the distance between the subject and background.

Depth of field vs. aperture / focal length / shooting distance

Aperture, focal length, and shooting distance can all affect depth of field significantly. By understanding the role these factors play, you can control the extent to which various elements in the frame are in or out of focus.



Relationship between depth of field and iris value

The depth of field becomes shallowest at the maximum iris and deepest at the minimum iris. In addition, the depth of field is deeper on the background side of the image than in the foreground of the in-focus area. The two images below were shot from the same location, using the same focal length, varying only the iris value. To attract viewers' attention to a guitar, you can highlight it by using as large an iris as possible to make the depth of field shallow and blur the background. Conversely, you can use as small an iris as possible to deepen the depth of field and also put the background in focus. As you can see, you can create different visual expressions even when using exactly identical framing by changing the iris value and shifting the depth of field.

Shot using maximum iris at F1.4 (35mm F1.4G (SAL35F14G))

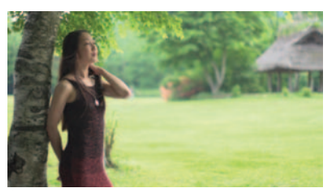
Shot using minimum iris at F22 (35mm F1.4G (SAL35F14G))

Relationship between depth of field and iris setting

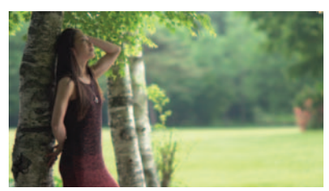
Even when an identical iris setting is used, the depth of field becomes shallower as the focal length gets longer, while a shorter focal length results in a deeper depth of field.

The three images below were shot using the same iris value and different focal lengths. Their shooting distances were also changed to make the subject appear in a similar size. Due to their different focal lengths, the size of the area that is captured in those images as a background also differs dramatically. Their depth of field and the resulting bokeh effect are also very different. These images show how the focal length changes the depth of field and other image expressions even when the subject is captured at an identical size. This variety of image expression is a reason why there are so many interchangeable lenses with differing focal lengths.

Shot with 35mm focal length and maximum iris F1.4 (35mm F1.4G (SAL35F14G))



Shot with 50mm focal length and maximum iris F1.4 (50mm F1.4 (SAL50F14))



Shot with 85mm focal length and maximum iris F1.4 (Planar T✻ 85mm F1.4 ZA (SAL85F14Z))

Shooting-related functions and effects

Relationship between depth of field and shooting distance

Even if the same iris value and focal length are used, the depth of field can vary depending on the shooting distance (the length between the camcorder and the point at which focus is targeted). The more distant the shooting distance is, the deeper the depth of field becomes. And the depth of field gets shallower as the shooting distance becomes smaller.

This tells you that more accurate focusing is required when you shoot the subject from a close distance, and the iris must be closed if you need a certain level of depth of field. It also tells you that you can shoot an image with a deeper depth of field using a telephoto-type lens if you keep the shooting distance long.

Controlling depth of field

We have already learned the depth of field changes depending on three factors — iris value, focal length and shooting distance. We will now look into changes in the depth of field more closely so that you can use the knowledge in actual shooting.

First, we will examine the control that the iris has over depth of field. The iris plays a significant role in determining the depth of field almost to the point that we can regard the iris as being equal to the depth of field. But in real situations, the focal length of the lens and the shooting distance dictate the depth of field to a certain degree. For example, even if you use a telephoto lens which has a shallow depth of field, shooting a subject at a distance will not produce much blurring because the resulting depth of field is deep. By the same token, even if you use a wide-angle lens, you will have an image with a shallow depth of field and significantly blurred background if you shoot the subject from close by. Also, because the depth of field centers around the in-focus point, the background will not be blurred much — even when you use a telephoto lens and open the iris — if the distance between the subject and the background is small. Since the depth of field is determined mostly by factors other than the iris, it can be said that the iris is mostly used to fine-tune the depth of field after the framing is fixed. On the other hand, it can be said that the iris is very important in controlling the depth of field since you only have the iris to change the depth of field once you lock in on the framing.

The depth of field has a close relationship with the bokeh effect. The deeper the depth of field, the smaller the bokeh effect becomes. Conversely, the larger the bokeh effect becomes, the shallower the depth of field gets. Let's look at the way you can use various lenses by taking into account this knowledge and what type of perspective you want to achieve in your image. When you use a wide-angle-type lens, position the camera close to the subject to create perspective. If you want to make the most of the deep depth of field that is available to you, you can close the iris. If you want the bokeh effect, you should open the iris.

With a telephoto-type lens, you will pay attention to the overlapping of the subject and the background to make the most of the blurring of the background. (The larger the distance between the subject and background, the bigger the bokeh effect you will get.) If you want significant blurring, you will get close to the subject to some degree and open the iris. If you want blurring to be modest, you keep a distance from the subject and close the iris.

When you use a macro lens, the depth of field can become extremely shallow depending on the shooting distance. Unless you want to take advantage of this, you should close the iris as much as possible.

Controlling brightness

We have looked at conditions for shooting videos with a shallow depth of field. We will now examine how we should control brightness (exposure) to actually record videos with a beautiful bokeh effect. Unless you have a special plan or intention, overexposed videos with whiteout are not considered desirable.

Thanks to its Super 35mm sensor developed specifically for handling moving images, the NEX-FS100 can shoot images at extremely high sensitivity without supplemental lighting even in a dark room or at nighttime. But when shooting outdoors under bright light, controlling brightness is a very important shooting technique for recording videos with a bokeh effect without causing whiteout. The iris, shutter speed and gain are the three major factors that determine brightness. To shoot videos with a bokeh effect in a bright location, it is also necessary to use an ND filter to control the light volume. Let's master this light volume adjustment technique as well.

Using the iris ring

Even when you are in the MANUAL IRIS mode, you can switch to the AUTO IRIS mode temporarily by holding down the IRIS PUSH AUTO button. So, please use this button when the situation calls for the AUTO IRIS mode. But please note, however, the IRIS PUSH AUTO function can only be used when the video camera is equipped with an E-mount lens or the combination of the LA-EA2 lens mount adaptor and an A-mount lens. Some still and cinema lenses come equipped with a manual focus ring and a manual iris ring. With these rings, you adjust brightness by using the iris ring. Some lens-mount adaptors are also equipped with a manual iris ring.

MANUAL IRIS ring

IRIS PUSH AUTO

NOTES: If an A-mount lens is used in combination with a Sony mount adaptor LA-EA1 or LA-EA2, the iris can be adjusted by using the MANUAL IRIS ring. Please note that shifting the iris using the MANUAL IRIS ring generates a noise. When the iris is moved toward the open side, in particular, the movement may not be smooth and noise can be heard. This is because the iris shifts to the fully open position first before moving to the selected value, and it does not mean there is any problem.

Controlling shutter speed

Shutter speed refers to the duration of time for which the shutter is opened and imaging elements are exposed to the light that passed through the lens. (It is sometimes abbreviated to SS, and is also called exposure time.) If this duration of time is short, the shutter speed is described as fast. And the shutter speed is said to be slow if the duration of time is long.

Because video camcorders deal with moving subjects, changing the shutter speed drastically from an appropriate level is not recommended unless you have a special plan or intention. If you increase the shutter speed too much, the subject's movement often appears pattering and unnatural. If you slow down the shutter speed too much, the movement becomes jumpy and camera shake blur increases, resulting in unsmooth images. With still images, you can control the amount of light that passes through the lens by changing not only the iris but also the shutter speed. With video camcorders, some techniques are required. For example, when you are shooting a video outdoors under bright light, you end up shooting overexposed images if you open the iris to produce the bokeh effect, unless you use a very fast shutter speed. Especially in the 24p mode, you often have no choice but to set a fast shutter speed, such as 1/1,000 second, when you open the iris to create the bokeh effect, despite the fact that around 1/48 second is the appropriate shutter speed. To open the iris and use a shallow depth of field under bright conditions, we recommend you reduce the light volume by using an ND filter. We will cover the use of ND filters later.

NOTE: If you use a slow shutter speed, automatic focusing becomes less reliable. We recommend you stabilize the camcorder by using a tripod or other equipment and focus manually.

Shooting-related functions and effects

Shooting near maximum iris by using ND filter

When you want to shoot a video near the maximum iris to record a video with a shallow depth of field, you can use an ND filter to reduce the light volume without changing the colors of the image. Because the NEX-FS100 is not equipped with any ND filters, you will have to obtain an ND filter separately.

Types of ND filters

There are several types of ND filters. You will need to select an appropriate type depending on the situation.

▪ **Round, glass screw-in type**

These filters are designed to be screwed in at the tip of the lens unit. Cheap and widely available, these filters can reduce the light volume to 1/4, 1/8, or 1/16 of the original level.

Because they need to match the lens unit's filter diameter requirement, you need to obtain filters that are in the right size or alter the filter diameter by using a tool such as a step-up ring.

If the light volume is still too high even with a 1/16 filter, you will need to combine multiple filters. In such instances, diffused reflections can easily cause flares and halation. To prevent them, you need to block the light from directly hitting the filters.

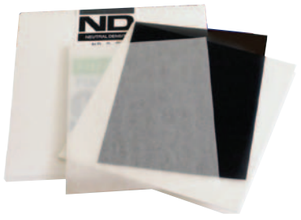
▪ **Square glass type**

These are high-priced filters that are used in combination with a matte box. They are not affected by the lens diameter, and the light volume can be adjusted by simply changing one filter with another.

▪ **Sheet type**

Because these filers were at first based on gelatin, they are still widely referred to as gelatin filters.

They are inserted into a paper filter-holder. Sometimes, they are cut up into smaller pieces and attached to the back of the lens or the lens mount. You need to be careful with dust and make sure that pieces of the sheet-type filter do not touch the sensor section. For these reasons, we do not recommend the second usage method.



▪ **Filters that enable ND level to be controlled via fader lever**

These recently introduced products are round, glass screw-in type filters with a lever on their outer circumference. By turning the lever, you can change the light volume.

These filters alter colors more than other types of ND filters. You need to take precautions, such as checking white balance manually for every cut.

How to select ND filters

If you normally use two or three lenses, we recommend getting 1/4, 1/8 and 1/16 round, glass screw-in type ND filters that match the diameter of your largest-diameter lens. Or it could be a fader-type ND filter that matches the diameter of your largest-diameter lens. When you use a smaller lens, you can attach your filter to a step-up ring.

If you use many lenses and they include a large-diameter lens, selecting the combination of a matte box and square glass ND filters will give you more flexibility. But this combination will be relatively more expensive than other options.

A cheaper alternative is to use the combination of a sheet-type ND filter and a paper filter-holder. But sheet-type ND filters need to be handled carefully because they are not durable and can be easily scratched.

Gain functions

Obtaining appropriate exposure using gain adjustment

Gain is a method of adjusting brightness. It electrically boosts the image signal level and makes the image appear bright. When the brightness of the subject and shooting environment changes beyond what can be compensated for by using the iris and ND filters, you can shift the gain value to respond to the change in brightness.

When you are shooting a dark stage with the NEX-FS100, for example, you can adjust gain to a value that cannot be used with normal video camcorders and still shoot a video with little noise because the NEX-FS100's noise level is low. It may depend on personal preference, but increasing gain up to 9dB would not normally cause any problems. We recommend you experiment with different gain values under various situations.

GAIN SET for adjusting gain value

You can assign a value between 0dB and 30dB to each of the H, M, and L positions of the Gain switch located at the side of the body.

How to set/operate

MENU → CAMERA SET → GAIN SET → H, M, L → 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30dB

AGC (automatic gain control) LIMIT lets you set maximum auto gain to the value of your choice

You can set the maximum gain value for the AUTO GAIN function. The more you increase the gain value, the more noise the video will contain. By using the AGC LIMIT function, you can prevent unintended gain increases.

How to set/operate

MENU → CAMERA SET → AGC LIMIT → OFF, 27, 24, 21, 18, 15, 12, 9, 6, 3, 0dB

Shooting-related functions and effects

ASSIGN: Can be allocated to one of the ASSIGN buttons.

Using support functions for obtaining the correct brightness (exposure) level

ZEBRA ASSIGN lets you check whether the brightness level for the subject is appropriate ASSIGN

This function overlaps a zebra-stripe pattern on image areas that match the preselected brightness level to provide a gauge for adjusting brightness. The zebra-stripe pattern will not be recorded in the memory card or the flash memory unit (HXR-FMU128). When you want to monitor overexposed areas on screen, set the ZEBRA value to 100+. Then carry out brightness adjustments to reduce the zebra-stripe pattern as much as possible.
If you want to capture a person's face at around 75% brightness level, set the brightness level at 75 and adjust brightness so that a zebra-stripe pattern is displayed over the person's skin.

How to set/operate

1. MENU → DISPLAY SET → ZEBRA → ON
2. LEVEL → 70, 75, 80, 85, 90, 95, 100, 100+
3. Zebra stripes and the brightness level are displayed on the LCD screen.
4. You can assign [ON/OFF] for the ZEBRA ASSIGN function to one of the ASSIGN buttons.
   (It is allocated to ASSIGN button No. 1 in the factory setting.)

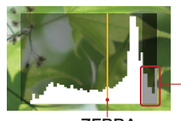
NOTE: Even when the [ALL OUTPUT] option is selected for the [DISPLAY OUTPUT] setting, Peaking, Zebra, and Maker displays will not be output through the HDMI and component video terminals.

HISTOGRAM lets you know your image's overall brightness balance ASSIGN

A histogram shows the brightness levels of the entire image in a bar-graph format. The horizontal axis indicates the brightness level, while the vertical axis represents the number of pixels at the given brightness level. By looking at a histogram, you can assess the image's brightness balance. For example, if you see more bars on the right-hand side, it indicates the image has many bright sections. A gray line is displayed at the 100% brightness level. The brightness levels exceeding 100% are shown in a different background color, making it easy for you to look out for whiteout.
Histograms also display a yellow line at the brightness level set in the ZEBRA assign function. By using the yellow line, you can visually grasp how much adjustment would be needed to bring the subject's brightness to the desired level.

How to set/operate

1. MENU → DISPLAY SET → HISTOGRAM → ON
   A histogram with a gray line at the 100% brightness level is displayed on the LCD screen.
2. When you select ON [ZEBRA POINT], a yellow line that depicts the brightness level selected under the ZEBRA assign function is also displayed on the LCD screen.
3. You can assign [ON/OFF] for the HISTOGRAM function to one of the ASSIGN buttons. (It is allocated to ASSIGN button No. 2 in the factory setting.)



Focus operations

PUSH AUTO enables temporary use of autofocus

While remaining in MANUAL FOCUS mode, you can adjust focus automatically by pressing down the PUSH AUTO button. You can return to the MANUAL FOCUS mode by simply removing your finger from the button. This function helps realize smoother transitions from one subject to another in manual-focus shooting.

Examples

- When shooting stage performances, certain color tones and brightness levels make it difficult to check focus in the LCD screen or the large LCD viewfinder. The PUSH AUTO function is useful for ensuring correct focus in such situations.
- Even when you're shooting music videos and wedding videos using manual focus, you can switch the operation mode without taking your eye away from the large LCD viewfinder by using the PUSH AUTO button when your subject is either approaching or moving away from the camera. This feature allows you to make focusing adjustments without losing concentration on framing and composition of your subject in the large LCD viewfinder.

How to set/operate

1. Shoot while holding down the PUSH AUTO button.
2. Return to the MANUAL FOCUS mode by removing your finger from the button.

PUSH AUTO button

EXPANDED FOCUS makes it easier to check focus in the LCD screen/ large LCD viewfinder

You can check focus more easily by zooming the center of the high-resolution large LCD viewfinder or LCD screen by about 200%. The EXPANDED FOCUS function can be accessed easily for frequent use since the dedicated button for this convenient function is located near the lens mount, right next to the focus mode switch button near the lens mount.

How to set/operate

1. Push the EXPANDED FOCUS button. [EXPANDED FOCUS] appears and the center of the screen is magnified by roughly 2.0 times.
2. The function can be canceled by pushing the button again.

EXPANDED FOCUS button

NOTES: The image appears larger only in the screen. It will not affect recording.
The EXPANDED FOCUS function cannot be used when the SMOOTH SLOW REC function is in use.

PEAKING also lets you check focus more easily in the LCD screen/ large LCD viewfinder ASSIGN

The PEAKING function offers a way to easily check focus in the high-resolution large LCD viewfinder or LCD screen by emphasizing the image outline. Turning up the PEAKING level to HIGH will result in easier focus checking. But, more signal noise also becomes visible in the LCD or large LCD viewfinder. Please decide whether to use the PEAKING function or not (and at what level) by monitoring the image in the screen. Using the EXPANDED FOCUS and PEAKING functions together will make it even easier to check focus.

How to set/operate

1. MENU → DISPLAY SET → PEAKING → ON Or designate the PEAKING function to one of the ASSIGN buttons.
   (Under the factory setting, the PEAKING function is allocated to ASSIGN 4.)
2. Select level from MENU → DISPLAY SET → PEAKING → LEVEL → HIGH/MIDDLE/LOW
3. Select color from MENU → DISPLAY SET → PEAKING → COLOR → WHITE/RED/YELLOW
   Checking focus may be difficult depending on the subject's color. By choosing red or yellow, you may be able to lessen the difficulty.

NOTES: The emphasized image outline in the PEAKING display will not be recorded.
Even when the [ALL OUTPUT] option is selected for the [DISPLAY OUTPUT] setting, Peaking, Zebra, and Maker displays will not be output through the HDMI and component video terminals.

Shooting-related functions and effects

Reference: Mount and lens

Lens types

E-mount lens

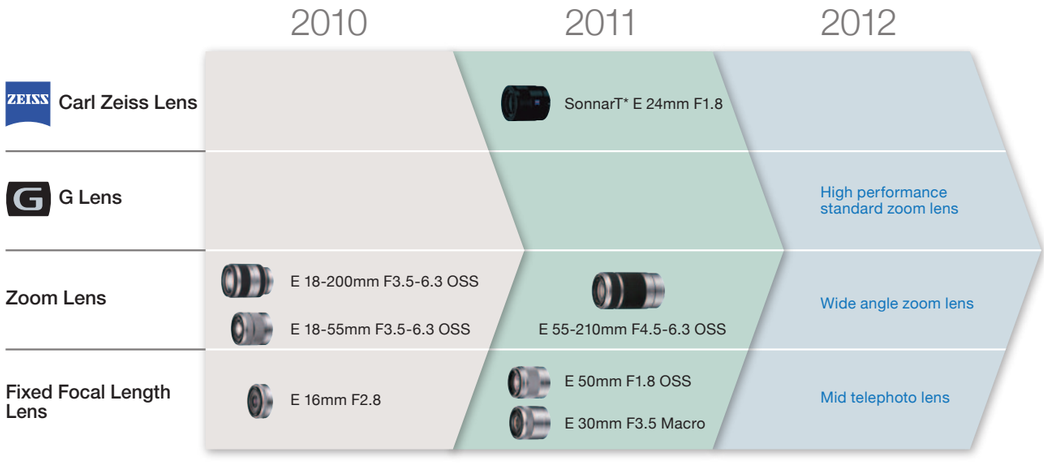
The NEX-FS100 features the E-mount Interchangeable lens system. You can directly attach an E-mount lens from Sony and other lens makers. When you use a Sony E-mount lens, you can grab the NEX-FS100 and start shooting easily because you will have access to electronically controlled AUTO FOCUS, AUTO IRIS and optical image stabilization SteadyShot™ functions.

NOTE: The E 16mm F2.8 (SEL16F28) lens does not support the optical image stabilization SteadyShot™ function.

Carl Zeiss Compact Prime E-mount lens

▪ **E-mount lens lineup**

Sony will broaden the E-mount lens lineup while also expanding the “NEX” series camera lineup.
The E 18-200mm F3.5-6.3 OSS (SEL18200) comes bundled with the NEX-FS100.



A-mount lens

By using a Sony lens mount adaptor, you can use A-mount lenses originally designed for α series DSLR cameras. The LA-EA2 lens mount adaptor lets you use functions such as AUTO FOCUS and IRIS PUSH AUTO (temporarily activates AUTO IRIS when shooting in the manual mode) even when an A-mount lens is attached.

LA-EA2

A-mount lenses

Third-party lenses

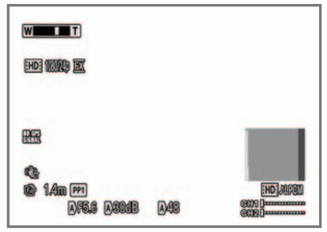
Various third-party lens mount adaptors have been released. By mounting them, you may be able to use most of the lenses you already own. Please note, however, that you can only control those third-party lenses manually because third-party lens mount adaptors do not have electrical contacts for electronic control like the ones on Sony’s LA-EA2 lens mount adaptor.

NOTE: Some third-party converters make auto focus and iris control possible with third-party lenses.

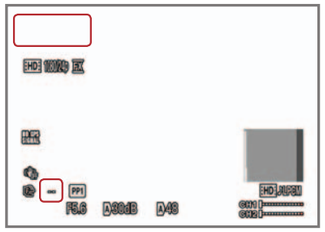
Shooting-related functions and effects

Parameter	E-mount lens	LA-EA1 or LA-EA2+ A-mount lens	Third-party lens
Focal distance information	Shown	"- - -" is displayed.	"- - -" is displayed.
Zoom position information (zoom bar or number)	Shown	Blank	Blank
Iris value	Shown	Shown	"- - -" is displayed.
Gain value	Shown	Shown	Shown
Shutter speed value	Shown	Shown	Shown
White balance value	Shown	Shown	Shown

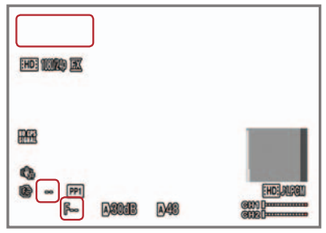
NOTE: Camera parameters that appear on the LCD screen will differ depending on the mounted lens.



With E-mount lens



With LA-EA1 or LA-EA2 & A-mount lens



With third-party lens

Flange back distance

The flange back is the length from the sensor surface to the mount surface. It differs from one mount type to another, but is strictly observed within the same mount type. For E-mount lenses, the flange back distance is set at a mere 18mm. Relatively long flange backs are designated for DSLR cameras.

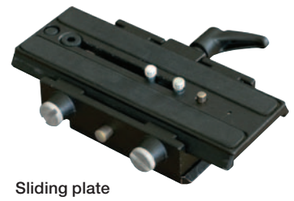
Lens mount adaptors are designed to bridge the gap in the flange back distance. For example, you should attach a 28.5mm distance adaptor with E-mount lenses that have a 18.5mm flange back distance in order to use Nikon F-mount lenses. In other words, they make it possible to mount a lot of lenses with a shorter flange back distance. As a result, the shorter the flange back distance of a lens mount is, the more variety of lenses you can use. As more than 100 types of E-mount lens adaptors are on sale, it can be said that NEX-FS100 allows the use of the largest range of lenses among video cameras in the world.

NOTES: There are some E-mount lens adaptors that cannot be attached to the NEX-FS100. Please make sure you try the adaptor or ask sellers about compatibility before making a purchase.

Manufacturer	Mount name	Flange back distance
Sony	E	18.0mm
Canon	EF	44.0mm
	FD	42.0mm
Nikon	F	46.5mm
	S	31.95mm
Leica	R	47.0mm
	M	27.8mm
CONTAX	CONTAX	31.75mm
Panasonic	Micro Four-Thirds	19.3mm
Cinema	PL	52.0mm

How to mount a lens and things to look out for

- Remove and attach lenses on a large table or other stable location.
- Turn the power off before changing the lens.
- Change lenses quickly to prevent dust from settling on the lens mount and sensor surface.
- Always carry a blower, lens cleaning cloth and cleaning liquid. Blow dust off lenses with the blower. If a lens is dirty, wipe it clean using the cleaning cloth and cleaning liquid. Never try to blow dust off lenses with your breath. Use the blower to clean the camera sensor surface. If the sensor surface is still dirty, take the camera to a service center. Never touch a sensor because it is an extremely sensitive part.
- A white marker is located on a lens mount. Make sure to securely mount the lens by turning it clockwise until you hear a click.
- When you carry or store a camcorder without a lens on it, attach a cap to protect the camcorder's sensor section. Do not forget to put a cap on the lens as well.



Sliding plate

Lens supporter

NOTES: When you attach a large lens, its weight may make the tripod less stable or damage the camcorder's lens mount section.
Please prepare an appropriate tripod and balance the camcorder by moving it forward/backward by using a sliding plate. Please also consider using a lens supporter.

Chapter 2

Special shooting/ playback functions

ASSIGN : Can be allocated to one of the ASSIGN buttons.

SMOOTH SLOW REC (smooth slow recording) lets you shoot smooth slow-motion video ASSIGN

This feature enables slow-motion recording by capturing images four times faster than the normal frame rate. In this mode, smooth moving slow-motion (25% Slow) images are captured for 3 seconds, stored in the built-in buffer memory, and then recorded to memory card or flash memory unit HXR-FMU128 as slow-motion pictures lasting 12 seconds.

SMOOTH SLOW REC button

START/STOP button

Usage examples

- When you are using slow-motion images as a dramatic effect.
- When you are shooting a fast-moving subject, such as a car or a motorbike in motion.
- When you want to capture skiing, or another high-speed sport, as slow-motion images for use in analysis and instruction.

How to set/operate

1. MENU → CAMERA SET → SMOOTH SLOW REC → REC TIMING Select from START TRIGGER or END TRIGGER

- START TRIGGER : Record for 3 seconds after the START/STOP button is pressed.
- END TRIGGER : Keep the last 3 seconds before the START/STOP button is pressed.

NOTES: The SMOOTH SLOW REC function can only be used in the 1080/60i or 1080/50i FH (Approx. 17Mbps) recording mode when you select the high-definition image quality (HD) recording format. Once the [SMOOTH SLOW REC] function is finished, normal recording will resume. No sound is recorded. Simultaneous recording on the memory card and flash memory unit HXR-FMU128 is not possible. The image will be recorded only on the recording medium that is selected under the [REC MEDIA SETTING] menu at that time. The picture angle will shift toward the telephoto side (25% teleshift).

S&Q MOTION (Slow & Quick motion) for shooting smooth slow/ quick motion video

By shooting at a frame rate that is different than the intended frame rate for playback, you can record slow-motion images at up to 1/2.5 the normal speed (40% Slow) or quick-motion images up to 60 times faster than the normal speed (6,000% Quick). Because you can record the image in Full HD (high-definition image quality), the image quality will not deteriorate as when using the SMOOTH SLOW REC function. For this reason, images shot using the S&Q MOTION function will not look out of place even if they are inserted into normally shot videos on the NLE software timeline and have their playback speeds changed via speed control.

NTSC model

Frame Rate (fps)	1080/ 24p	1080/ 307p	1080/ 60p
60	40% Slow	50% Slow	100% Standard
30	80% Slow	100% Standard	200% Quick
15	160% Quick	200% Quick	400% Quick
8	300% Quick	375% Quick	750% Quick
4	600% Quick	750% Quick	1,500% Quick
2	1,200% Quick	1,500% Quick	3,000% Quick
1	2,400% Quick	3,000% Quick	6,000% Quick

PAL model

Frame Rate (fps)	1080/ 25p	1080/ 50p
50	50% Slow	100% Standard
25	100% Standard	200% Quick
12	208% Quick	417% Quick
6	417% Quick	833% Quick
3	833% Quick	1,667% Quick
2	1,250% Quick	2,500% Quick
1	2,500% Quick	5,000% Quick

Usage examples

Slow motion

Effective when you want to express a person's movement in a sensual, smooth way.

Quick motion

When expressing the passing of time by showing the flow of people and cars at an intersection.

S&Q button

How to set/operate

1. MENU → CAMERA SET → S&Q MOTION → REC FORMAT

2. Choose the recording format from
1080/60p PS, 1080/30p FX, 1080/30p FH, 1080/24p FX, 1080/24p FH
or 1080/50p PS, 1080/25p FX, 1080/25p FH

3. FRAME RATE
Select the frame rate from 60fps, 30fps, 15fps, 8fps, 4fps, 2fps, 1fps
or 50fps, 25fps, 12fps, 6fps, 3fps, 2fps, 1fps

4. Start recording by first pushing the S&Q button on the left side of the camera body, then pressing the START/STOP button.

5. To change the frame rate, stop recording, push the S&Q button for about 1 second and change the value.

NOTES: Only effective in the high-definition image quality (HD) recording mode. Sound is recorded only when the shooting speed is at 100% (normal). Simultaneous recording on the memory card and flash memory unit HXR-FMU128 is not possible. The image will be recorded only on the recording medium that is selected under the [REC MEDIA SETTING] menu at that time. For a recording medium, please use Memory Stick PRO-HG Duo, Class 10 or higher SD Card, or flash memory unit HXR-FMU128.

Using with external devices

Chapter 3

NEX-FS100 as a system camera

The NEX-FS100 Super 35mm sensor camcorder is a system camera. In addition to allowing lens changes, its simple, box-shaped body is designed to facilitate the use of various peripherals and accessories via screw holes at many places and mechanisms for attaching and detaching a grip, handle and viewfinder.
It is also equipped with an HDMI signal output terminal that can send a superimposed Time Code (TC) signal, two sets of XLR terminals for external audio input, and a remote control terminal (REMOTE jack). The NEX-FS100 additionally provides features and functions that enable it to serve as a system camera from the electrical standpoint, as it can record signals simultaneously to a memory card, a detachable flash memory unit (HXR-FMU128), and even a third-party external recorder.
The system nature of the camera lets you use it to record images exactly the way you want in a range of shooting situations.

Using flash memory unit HXR-FMU128

Using the optional flash memory unit (HXR-FMU128) along with a memory card ensures data security since the signal will be recorded to both recording media simultaneously, effectively creating backup data. Recording to the two media also saves you copying time when you need to give data to the director, editor and other people right after the shoot.
The large 128GB capacity makes it possible to record 10 or more hours of video to the flash memory unit. Learning how to use the flash memory unit properly can dramatically improve the efficiency of your shooting and editing workflow.

Flash memory unit HXR-FMU128 is designed to be inserted into the camera.

Recording time

(minutes)

		HD w/LPCM					HD w/AC3					SD
		PS	FX	FH	HQ	LP	PS	FX	FH	HQ	LP	HQ
MS/SD	1GB	4	4	6	10	15	4	5	7	10	20	10
	2GB	8	10	10	20	35	9	10	10	25	45	25
	4GB	15	20	25	45	70	15	20	30	50	90	55
	8GB	35	40	55	90	145	35	40	60	105	190	110
	16GB	70	80	110	185	295	75	90	120	215	380	225
	32GB	145	170	225	375	590	150	180	245	440	770	460
FMU	128GB	600	700	940	1,560	2,460	640	750	1,030	1,830	3,200	1,910

Formatting the HXR-FMU128

You need to format flash memory unit HXR-FMU128 when using it for the first time or initializing it.

How to set/operate

MENU → OTHERS → MEDIA FORMAT → FMU

NOTES: If you mount a flash memory unit that has not been properly formatted, an appropriate warning appears on the LCD screen. If you see the warning, please format the flash memory unit again.
Please refrain from operating the POWER on/off button or removing the recording media or AC adaptor/charger while [Executing...] is displayed on the LCD screen.
(The access lamp will blink while the formatting is in progress.)

Recording on memory card and HXR-FMU128 simultaneously

It is possible to record data to a memory card and flash memory card unit HXR-FMU128 simultaneously.

How to set/operate

MENU → REC/OUT SET → REC SET → SIMULTANEOUS REC → ON

NOTES: Simultaneous recording is only possible in the HD format.
Even if recording cannot be continued with one of the recording media, recording to the other medium will continue. Please note that relay recording is not supported.
If either of the recording media becomes full, recording on that medium will simply stop. The simultaneous recording function is not available while the Slow & Quick motion recording function is being used.

Connecting a third-party recorder

The NEX-FS100 is equipped with an HDMI output terminal. Because the HDMI output terminal sends out an uncompressed digital HD (high-definition image quality) or SD (standard-definition image quality) signal at the time of shooting, you can record a high-quality video signal by connecting an external recorder to the output terminal via HDMI cable.
With the addition of a function to superimpose the Time Code (TC) to HDMI signals, it is now possible to handle HDMI video signals in almost the same way as HD-SDI signals. In addition, HDMI to HD-SDI signal converters are available from AJA, Blackmagic Design and Convergent Design. You can use those products when your system setup calls for conversion of HDMI signals to HD-SDI signals.
Below, we will introduce some third-party recorders that were available as of November 2011. Please contact their manufacturers for detailed specifications and information on their compatibility with Time Code and 2-3 pulldown.

AJA Ki Pro Mini

This miniature version of AJA's Ki Pro external recorder writes data to a CF card and an HDD using the Apple ProRes codec. This product offers a wealth of features and functions, including input and output terminals for HD-SDI and HDMI signals, as well as support for external Time Code (TC)* and RS-422 serial control, a standard feature for professional-use VTRs. One drawback is that the product does not include an image monitor.

* Support for Time Code recording will soon become available via firmware update.

Example of setup with NEX-FS100

Convergent Design nanoFlash

This device records data to a CF card in the MPEG2 i-Frame codec or the Long GOP format. Because the product allows a bit rate above 100Mbps, recording in high image quality is possible. It can also record native 24p footage. The device can be used as a converter as well because it is equipped with input and output terminals for both HD-SDI and HDMI signals and both signals are output simultaneously. It is also a compact, lightweight, power-efficient recorder. But, it does not feature an image monitor.

Using with external devices

ATOMOS Ninja / Samurai

This compact Ninja recorder with 4.3-inch monitor can record data to a 2.5-inch HDD or an SSD using the Apple ProRes codec. It only supports HDMI signal input, but an HD-SDI version of the product is available under the model name Samurai.

ATOMOS announced two new Connect converters at IBC2011 — an HD-SDI>HDMI converter and an HDMI>HD-SDI converter — that support Time Code (TC) and 2-3 pulldown. When you combine them with the Samurai, you can record images to Samurai with TC, even at a 24p frame rate. New external recorders are continuously being released. We recommend you select ones that match your shooting style.

NOTES: The HDMI output signal is YC 4:2:2 (8 bits).
The HDMI signal output does not support native recording of progressive signals. It sends out 59.94i or 50i interlaced signals. Because the signal is superimposed with 2-3 pulldown and 2-2 pulldown markers, it can be converted into 24p, 30p or 25p formats. Please note, however, external recorders must support those markers. We recommend you directly contact the recorder's manufacturer for details.
Signals can be output simultaneously from the HDMI and COMPONENT OUT terminals.

Using an external image monitor

The NEX-FS100 comes equipped with an easy-to-use, large LCD. But when you place the camera on a tripod for high-angle shots, or when you need to show the director, producer and other staff members the images you are shooting in real-time, you need an external image monitor. In addition, you might need an external monitor when you want to ensure precise focusing.

Screw holes

You can attach an external image monitor and other peripherals at appropriate positions by using 1/4-inch (1/4-20UNC) and 3/8-inch (3/8-16UNC) screw holes on the NEX-FS100's body and handle.

Bottom | Top | Side (with grip screw hole)

Body | **Handle**

Attaching an external portable monitor

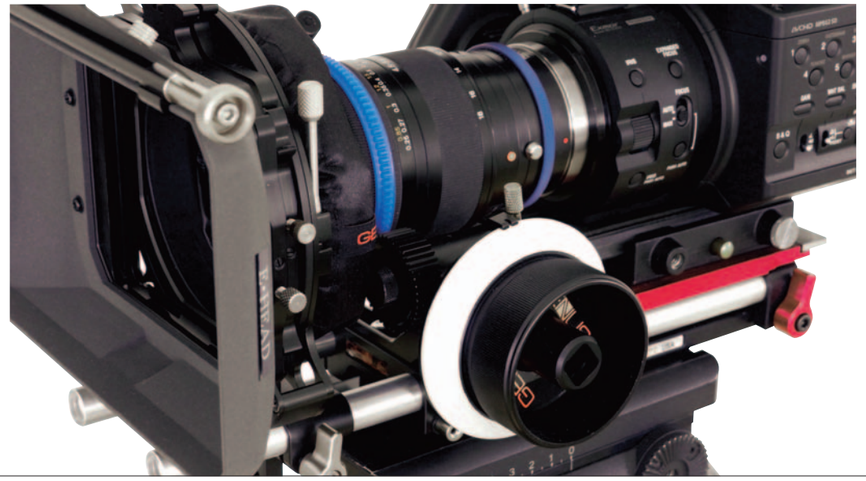
The photo on the right shows Sony's LPM-770BP 7-inch portable monitor attached to the NEX-FS100. As other makers continue to release various external image monitors in the 5-9 inch range, your choices are becoming broader.

NOTE: Signals can be output simultaneously from the HDMI and COMPONENT OUT terminals.

Using follow focus

Follow focus systems enable smooth focus shifting. They are used when shooting commercials and in other instances when someone is assigned to stand next to the lens and operate the focus. Using lenses designed for still cameras may sometimes be confusing since their focus rings may be at different locations than in video-camera lenses or may be designed to rotate in the opposite direction. Also, still-camera lenses may not have any "stickiness," making them feel strange to operate. By using a follow focus system, you can eliminate those unfamiliar characteristics of still-camera lenses. The functions in follow focus systems may differ somewhat depending on their prices. Some products can be attached left and right to suit your needs. Others may let you adjust their "stickiness" or gear pitch.

Follow focus systems are normally used together with a matte box and other peripherals. They are attached to a pair of 15mm-diameter aluminum or carbon rods that are placed 6cm apart. Because these measurements are standardized, their makers can be different than that of the follow focus system. So, we recommend you purchase peripherals that meet your taste and budget, as well as provide required functions.



Example of how a follow focus system from GENUS is installed.

Using with external devices

Using grip systems

Various grip systems — from simple stabilizers to shoulder pads — were designed to make long hours of handheld shooting possible. The NEX-FS100 is lightweight and comes equipped with a grip for handheld use. But it would be difficult to shoot for long hours without using any assistance. We recommend you try combinations of various grip systems as you work to establish your own shooting style.
The photo below shows a usage example of Sony's VCT-SP2BP camcorder support. It can be rested on the shoulder or installed on a tripod quickly.

Time Code (TC) synchronization for multi-camera systems

When you are setting up a system consisting of multiple cameras, it is a good idea to synchronize the cameras' Time Codes before shooting. Doing so will make synchronizing videos from different cameras easier and enhance editing efficiency.

How to set/operate

1. Power on all camcorders in which you want to synchronize the Time Code.
2. Insert a memory card, a flash memory card unit HXR-FMU128, or both to each camcorder.
3. Perform the following configuration process on all camcorders.
   MENU → TC/UB SET → TC FORMAT → Choose either "DF" or "NDF" for all camcorders.
   TC RUN → FREE RUN
   TC MAKE → PRESET MENU → OTHERS → REMOTE CONTROL → ON
4. Line up the camcorders and point the RMT-845 standard wireless remote control unit toward the remote signal receptor at the rear of the cameras. Press the TC RESET button on the remote control unit.
5. The time code of the camcorders that received the reset signal (infrared) is reset to "00:00:00:00" simultaneously. The time code starts running under the "FREE RUN" mode.
6. Confirm the cameras' LCD screens all show the same Time Code count.

RMT-845 remote control unit

NOTES: The NEX-FS100 does not support the "TC LINK" function found on the HXR-NX5. That function enables Time Code synchronization of camcorders linked via iLINK cables.
When recording in HD 1080/24p, the frame mode is fixed to NDF. Frame shifting will occur between camcorders set to DF and NDF. Please select a common TC FORMAT in advance.

Chapter 4

PICTURE PROFILE

What is PICTURE PROFILE?

PICTURE PROFILE is a menu for adjusting and changing parameters that determine image characteristics. There are many parameters that can be adjusted and changed, but they can be grouped into four types — parameters for selecting basic color tone, parameters for adjusting gradation (darkness-brightness tone), parameters for adjusting coloring, and parameters for correcting white balance.

Users can directly enter into the PICTURE PROFILE setting mode by pressing the PICTURE PROFILE button on the NEX-FS100.

Sporting a wide range of adjustable settings that rival ones found on upper-class camcorders, the NEX-FS100's PICTURE PROFILE menu allows users to change a variety of settings, such as Gamma Curve , Color and Detail. Up to six sets of setting combinations can be stored in the internal memory banks from PP1 through PP6.

PICTURE PROFILE button

Difference from image processing using nonlinear video editing software

PICTURE PROFILE adjusts colors and the vividness of the image upon recording. You can make similar adjustments by using nonlinear editing software after shooting. But there are the following differences.

To fit massive amounts of image data in a limited memory capacity, most camcorders compress image data when recording. No matter how advanced a compression format is, any data compression inevitably deteriorates image quality somewhat. Applying sharpness, gamma curve correction and other video effects to recorded images by using nonlinear editing software worsens the image condition further by processing already deteriorated images. For example, if video compression leaves the image with poor contrast or block noise in some areas, applying video effects often make the problems more noticeable.

Because PICTURE PROFILE processes video signals before compressing, it changes the gamma curve and corrects colors before image quality is damaged by compression. This makes it possible to carry out highly precise image adjustments while keeping the quality of the subject intact.

It should also be noted that recording images with proper contrast is crucial. If image contrast in dark and bright areas is not recorded right, underexposed dark and overexposed white areas will have no gradations. This means you cannot change image contrast properly later on with nonlinear editing software no matter how hard you try because there will be no gradations to work with.

Even if you intend to process your video with nonlinear editing software later, it is important that you record your image in the right way. Nonlinear editing software is a very powerful tool, but can't fix everything. If you adjust various settings to make sure your video is recorded in a way that is as close to your ideal as possible, you will be able to create a video that will be closer to what you have in mind with minimal processing via nonlinear editing software. It will also keep rendering time short and make video editing work more efficient.

What to do on the scene

If you are working on a project with ample time for editing or a short piece, you probably should record the image as flat as possible to allow for all kinds of post-production image processing and color adjustments.

If you are working on a project with a tight deadline or a long piece, on the other hand, you can dramatically reduce the amount of post-production image processing and enable highly efficient production by dialing in settings to record the video as close to the vision of the finished image as possible. Showing the image being recorded to the director and crew as close to the tone of the ideal finished image as possible on a display monitor will greatly boost morale on the scene. By shooting video in a manner that boosts the atmosphere on the scene, you will be able to make a major impact on the quality of the finished work.

In order to avoid the problems with nonlinear editing described in the previous section, and also to create pieces that make the most of the compact camcorder's mobility, please fully utilize PICTURE PROFILE and record the image at proper settings.

Information essential for making the most of PICTURE PROFILE

Gamma Curve and Knee Point

Gamma curve and knee point are two elements that exert great influence over image characteristics. By understanding these, you'll be able to utilize PICTURE PROFILE efficiently.

What is a gamma curve?

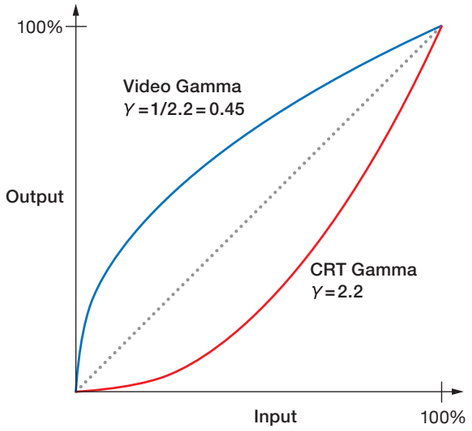
Gamma curves show the relationship between the input signal level and the output signal level. The camera converts the brightness signal from the subject into an electrical signal and sends the electrical signal to the display monitor, which converts that signal back to a brightness signal and reproduces the subject as an image.

The input signal level is the amount of the brightness signals from the subject and the original image overall, whereas the output signal level is the amount of the brightness signal output by the camera or display monitor.

In order to faithfully reproduce a subject in video images, the output signal level needs to be largely proportional to the input signal level, as shown in the straight line below. But the fluorescent material characteristics of a CRT (cathode-ray tube) cause the output signal level from CRT monitors to curve as shown below. This represents the gamma curve of CRT monitors (red curved line). Video cameras' gamma curve (blue curved line) plots the opposite curve. For this reason, the properties of the camera and CRT monitor can be offset to faithfully reproduce and display the original subject.

Nowadays, display monitors based on LCD, plasma and OLED are used widely. Because these monitors have different gamma curve characteristics from those of CRT display monitors, the ITU has set the gamma value for display monitors that are used in broadcasting and video production at 2.4 (ITU-R BT1886). This value was decided by taking into account that the gamma value of actual CRT master monitors used in broadcasting and video production was closer to 2.4, rather than their theoretical value of 2.2.

Sony's LCD and OLED display monitors enable users to choose a gamma curve that simulates that of conventional CRT monitors for smoother continuity from old systems.



How a gamma curve's shape influences images

Influence on dark areas and contrast

High-end camcorders have a function to slightly change the shape of the gamma curve for dark areas of the image. Known as black gamma, this function lets you dramatically alter the atmosphere of the image by changing the gamma curve shape and strengthening or weakening the shading, or image contrast, of the image.

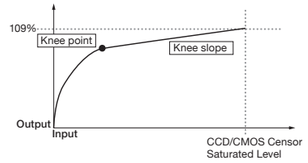
PICTURE PROFILE

What is knee correction?

Cameras are not good at clearly capturing a scene that contains extremely different luminance levels, such as one object under bright sunlight and another in the shade. If you adjust the iris to set the right exposure for the object in the shade, the object under the sun will be captured too brightly and appear as a plain white object without texture or gradation.

Knee correction is a function necessary to capture these images with a wide gap in luminance levels within the standard range of video signal levels. Just as black gamma influences contrast in dark image areas, knee correction deals with contrast in image areas with high luminance levels. CCD and CMOS sensors can handle an extremely bright input signal. To output it as a video signal, however, we need to keep the signal within the standard range for video. For this reason, the signal output level is kept lower than the signal input level in high-luminance areas that generate input signals beyond a certain level. In the chart below, the line bends like a knee at a point in the high-luminance range. This is called the knee point. And the line extending from the knee point is called the knee slope. By changing the position of the knee point and the inclination of the knee slope, contrast in the high-luminance range can be altered.

The breadth of input signal levels that a system can process is called the dynamic range. The input signal should stay within the approximately 109% (white clip point) dynamic range.



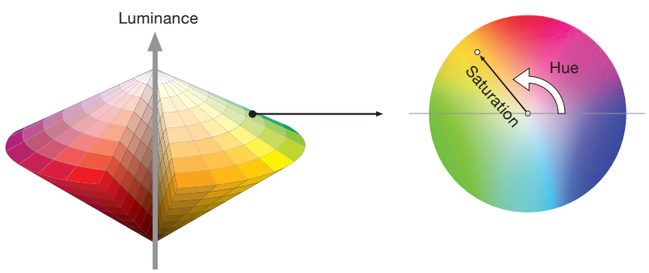
Without Knee function

With Knee function

Color Space

The NEX-FS100's PICTURE PROFILE uses the concept of a color space based on three elements — Hue, Saturation and Luminance. This color space can be represented as a shape that resembles two cones joined at their bases. When you slice the color space at a certain luminance level, a circular cross section appears. In this cross section, the angle from the circle's center line indicates hue, while the distance from the circle's center represents saturation.

Because some color-related settings in PICTURE PROFILE use this color space concept, familiarizing yourself with this concept will likely make it easier for you to understand how those settings should be used.



DETAIL

The DETAIL function processes video signals to emphasize image outlines. It can be used to make the subject standout clearly and enhance the fineness of the overall image. The function also deals with the image texture, affecting the appearance of coarse surfaces and transparent materials, for example.

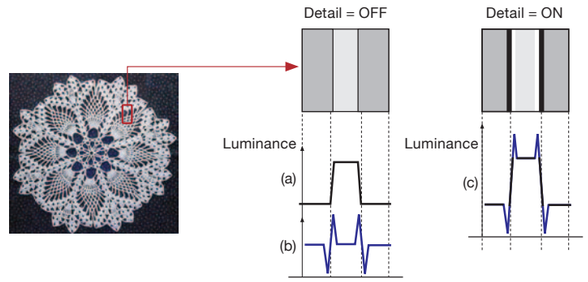
DETAIL is also a very important image setting when shooting people. Its settings can change the atmosphere by determining the way face wrinkles and skin tones look.

But used inappropriately, the DETAIL function may lead to a loss of image texture or highly visible image noise. By understanding the principles of DETAIL signal processing as shown below, you should be able to use this function effectively.

Concept of DETAIL

DETAIL is a type of signal processing that emphasizes image edges. In the example below, there is a large luminance variation between the lace pattern and the background. In the charts below, whose vertical axes represent luminance, (a) shows the change in luminance levels in the image section inside the red square. The DETAIL function generates (b) from (a). (b) serves as the basis of the DETAIL signal and combines with (a). The resulting (c) represents (a) with the DETAIL signal applied, emphasizing both the white and black edges in the image.

Because the DETAIL function emphasizes image outlines and makes the image look sharper, it is sometimes referred to as the sharpness function.



Using PICTURE PROFILE presets

The NEX-FS100 camcorder comes equipped with multiple PICTURE PROFILE factory presets. By using these presets, you can match the image texture with other types of camcorders, or create an image texture that is similar to that of cinematic film.

- **PP1, PP2:** Standard settings equivalent to PICTURE PROFILE=OFF.
- **PP3:** Setting for simulating image characteristics of Sony broadcast camcorders. Equivalent to PP3 on the HXR-NX5.
- **PP4:** Setting for coloring faithful to ITU-709 standard. A new setting introduced for the first time on the NEX-FS100.
- **PP5:** Setting for image characteristics similar to those of normal cine negative film for shooting. Equivalent to PP5 on the HXR-NX5.
- **PP6:** Setting for image characteristics similar to those of normal cine print film for screening. Equivalent to PP6 on the HXR-NX5.

PICTURE PROFILE Settings

Settings for basic coloring

GAMMA

You can select a gamma curve from the following presets.

- **STANDARD:** Standard gamma curve
- **CINEMATONE1:** Setting for gamma curve similar to that of normal cine negative film for shooting
- **CINEMATONE2:** Setting for gamma curve similar to that of normal cine print film for screening
- **ITU709:** Setting for gamma curve equivalent to that of ITU-709 standard. Gain level at 4.5 for low luminance areas.

COLOR MODE

You can change color characteristics.

- **STANDARD:** Standard color setting
- **CINEMATONE1:** Mode for color characteristics similar to those of normal cine negative film for shooting
- **CINEMATONE2:** Mode for color characteristics similar to those of normal cine print film for screening
- **PRO:** Mode for color characteristics similar to STANDARD setting of SONY broadcast camcorders (When used in combination with the ITU709 GAMMA setting)
- **ITU709 MTX:** Mode for color characteristics equivalent to those of ITU-709 standard
- **LEVEL:** If you set the mode [TYPE] to anything other than [STANDARD], you can adjust the level of coloring difference from STANDARD mode. The larger the number, the bigger the difference from the STANDARD mode.
  1(Weaken the effect of the selected color mode and make color characteristics similar to those of the STANDARD mode) ~8 (Use the color characteristics of the selected color mode fully)

TIPS
By combining the CINEMATONE1/2, PRO and ITU709 MTX color modes with the CINEMATONE1/2 and ITU709 gamma settings, you can create overall characteristics that are closer to those of the referenced film or image types.

Settings for adjusting contrast

BLACK LEVEL

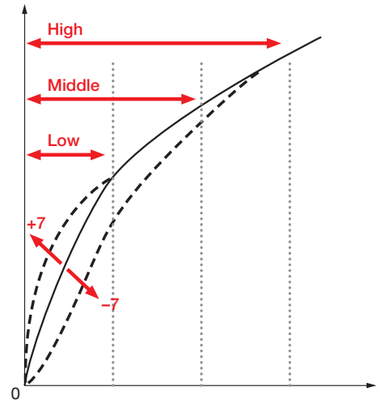
As the name indicates, this setting adjusts the black level of the image. As an image effect, you can emphasize black to create a type of image that would give a hard impression, or you can weaken black to give the image a soft impression. Shifting BLACK LEVEL toward the minus direction emphasizes the black color in the image, while changing the level toward the plus direction would weaken the black color. For example, if you want to simulate an old film, or capture winter morning fog, the black level set value should be increased. If you decrease the level set value, gradations in dark areas will be discarded, making the areas appear in crisp black.

TIPS
When using multiple fixed camcorders to shoot the same subject from different angles, the balance between subject and background often varies. This balance variation may cause the black color on the subject to appear different when camcorders are switched. But this is an optical illusion. If it occurs, you can correct it by adjusting BLACK LEVEL to make the black color look the same.

BLACK GAMMA

The BLACK GAMMA setting lets you alter the shape of the gamma curve and adjust gradations in dark areas in the image.

- **RANGE:** This controls the luminance range that BLACK GAMMA influences. The LOW setting affects the range up to almost black, while the HIGH setting extends the range up to gray. RANGE should be set lower when you want to control the quality of dark areas. If you want to adjust the overall image tone, RANGE should be set higher. At first, it may be a good idea to start from the LOW setting.
- **LEVEL:** Increasing LEVEL set value brightens the image, whereas decreasing set value makes the image darker. For example, if you set RANGE at LOW and decrease LEVEL set value, you can create an image with dark areas that are similar to the ones seen in films. Unlike BLACK LEVEL, BLACK GAMMA LEVEL adjusts luminance softly.



BLACK GAMMA (+7)

BLACK GAMMA (0)

BLACK GAMMA (–7)

PICTURE PROFILE

KNEE

This changes the tone expression in high brightness areas.

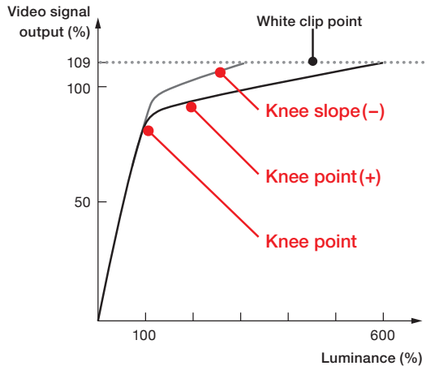
- **MODE**
  - AUTO: Automatically adjusts the KNEE settings based on what is selected in the following AUTO SET function.
  - MANUAL: Follows the KNEE settings selected in the following MANUAL SET function.
- **AUTO SET**
  - MAX POINT → 90% → 100%

  Determines the maximum knee point level (white level). The knee slope is automatically adjusted according to the MAX POINT setting.
  Selecting 100% is ideal under most circumstances. A lower setting will turn white grayish, while a higher setting will discard gradations in high luminance areas. So, the basic choice for AUTO SET is to keep it at 100%.
  - SENSITIVITY → LOW-MIDDLE-HIGH

  Changes the luminance level at which KNEE setting automatic adjustment kicks in.
  LOW: KNEE setting automatic adjustment starts at lower input signal levels than normal.
  HIGH: KNEE setting automatic adjustment starts at higher input signal levels than normal.
- **MANUAL SET**
  - POINT → 75% ~ 105%

  Sets the position of the KNEE point output level.
  - SLOPE → –5% ~ +5%

  Determines the inclination of the KNEE slope.
  A negative SLOPE setting results in a milder KNEE slope angle. This boosts the dynamic range, but reduces the ability to reproduce rich gradations.
  A positive SLOPE setting makes the knee slope inclination steeper. This shrinks the dynamic range, but bolsters the ability to express gradations.



TIPS

In general, the KNEE point is set roughly between 85% and 100%, which is said to match the luminance levels of human skin.
The knee point and knee slope should be viewed as a set. In principle, a higher setting for the KNEE point and a milder KNEE slope should be selected for video-like sharp highlights. If softer film-like highlight expressions are desired, the KNEE point should be set lower in combination with a steeper KNEE slope. In practical terms, you should move the KNEE point and the KNEE slope up and down in opposite directions to each other while checking the gradations in high luminance areas until you find the ideal settings.

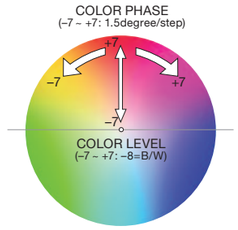
Settings for adjusting coloring

COLOR LEVEL

COLOR LEVEL deals with saturation in the color space and makes washed out colors appear more vivid. Settings can be adjusted between –7 (Grow pale in color) ~ +7 (Grow rich in color) . There is also a –8: Shoot in black & white setting. A higher set value results in more vivid colors, while a lower set value presents faded colors. COLOR LEVEL should be adjusted in tandem with contrast. Bright and vivid settings produce video-like images, while dark and vivid settings result in film-like images. The combination of bright and light creates pastel tones, whereas dark and light settings create artistic finishes.

COLOR PHASE

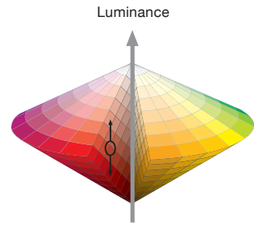
COLOR PHASE controls Hue in the color space. A single step in Hue amounts to a roughly 1.5-degree rotation in the color wheel. As you rotate the color wheel to the left or right, the colors shift such as from red to yellow, green, aqua, blue and purple. Because this setting affects all colors, it is difficult to use COLOR PHASE for a particular intention. Please refer to this setting when matching coloring strictly between different cameras.
Settings can be adjusted between –7 (Greenish) ~ +7 (Reddish) .

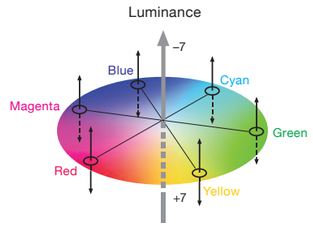


COLOR DEPTH

COLOR DEPTH shifts brightness (luminance) in deep colors (high saturation areas in the color space). A higher set value lowers luminance while deepening the color. A lower set value increases luminance, making the color look paler. The deeper the saturation, the bigger the change will be. Hardly any change can be seen if colors are close to achromatic. You can adjust color depth between –7 and +7 individually for [R (Red)], [G (Green)], [B (Blue)], [C (Cyan)], [M (Magenta)] and [Y (Yellow)].

Color	Range
R	–7 (Shallower red) ~ +7 (Deeper red)
G	–7 (Shallower green) ~ +7 (Deeper green)
B	–7 (Shallower blue) ~ +7 (Deeper blue)
C	–7 (Shallower cyan) ~ +7 (Deeper cyan)
M	–7 (Shallower magenta) ~ +7 (Deeper magenta)
Y	–7 (Shallower yellow) ~ +7 (Deeper yellow)





R+

±0

R–

TIPS

With previous camcorders, the color strength was changed by adjusting the COLOR LEVEL settings (saturation). But this only enhanced apparent vividness of colors. With the NEX-FS100, it is possible to express deep, dark colors by using COLOR DEPTH.
Because each of the six colors — R (Red), G (Green), B (Blue), C (Cyan), M (Magenta), Y (Yellow) — can be adjusted individually, you can use COLOR DEPTH to emphasize only the colors you want.

PICTURE PROFILE

DETAIL

As described in “Information essential for making the most of PICTURE PROFILE,” DETAIL is a function that emphasizes image edges. By altering the following manual settings, image processing can be varied to create different impressions from the same subject. Because settings other than LEVEL are quite complex, we recommend you start by adjusting only the LEVEL setting first.

LEVEL

Determines the strength of DETAIL image processing to be applied.
–7 (Weak) ~ +7 (Strong)

DETAIL / OFF

DETAIL / ON

TIPS

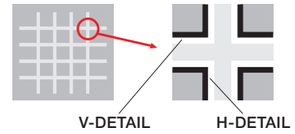
- If you apply too much DETAIL, the subject’s natural atmosphere may be undermined, as its transparency may be lost or its luster may be altered, for example.
  Excessive DETAIL when shooting shiny leaves, for instance, may result in the leaves looking as if they are made of plastic.
  It is also advisable to use DETAIL only modestly when shooting paintings. Because DETAIL makes image edges wider, the original texture of a subject consisting of very fine lines may be lost if too much DETAIL processing is applied. (Example: Thin-laced curtains)
- Please also be aware that DETAIL may fatten up the edges of noise particles that appear under a high GAIN setting, and may make such particles highly noticeable. In such cases, however, you can adjust the amount of DETAIL processing on the noise particles by using the later mentioned CRISPENING function.
- The image edges become more visible when viewed on large screens. It may be advisable to ease off on DETAIL if you plan to view the image on large TVs or screens.

MANUAL SET → ON/OFF

- **O N :** The DETAIL level can be adjusted by using the following settings.
- **OFF:** The DETAIL level will be adjusted automatically depending on camera settings.

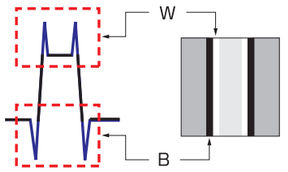
V/H BALANCE

- Changes the balance between Vertical (V) DETAIL and Horizontal (H) DETAIL.
- Vertical (V) DETAIL boosts image edges by expanding them upward and downward. Horizontal (H) DETAIL emphasizes image outlines by thickening them left and right.
- The results of DETAIL processing may appear differently among TVs, computer displays and other types of display monitors. Please adjust V/H BALANCE as needed.
- To emphasize the impression of a subject that has many horizontal elements, such as a human face (with eyes and mouth), you can increase the proportion of Vertical (V) DETAIL by lowering the setting (selecting a lower set value).
- –2: Stronger Vertical (V) DETAIL ~ +2: Stronger Horizontal (H) DETAIL



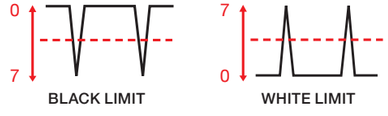
B/W BALANCE

- Changes the balance between the amount of black DETAIL for low-luminance areas and the amount of white DETAIL for high-luminance areas.
- TYPE1 (Higher proportion of black DETAIL) ~ TYPE5 (Higher proportion of white DETAIL).



LIMIT

- Restricts the amount of black DETAIL for low-luminance areas and white DETAIL for high-luminance areas by setting a maximum value.
  The LIMIT setting cannot be set independently for black DETAIL and white DETAIL.
- 0 (Strongly restricted) ~ 7 (No restriction)



TIPS

- B/W BALANCE and LIMIT adjust the amount of black DETAIL and white DETAIL added to image edges.
- Black DETAIL adds such impressions as “power,” “hardness,” and “presence” to the subject. But it may bring undesirable results because it emphasizes wrinkles and pores.
- White DETAIL gives the subject “clean” and “glossy” impressions. You can increase the proportion of white DETAIL and reduce that of black DETAIL when shooting jewelry and glass objects to stress their clear, transparent nature.
- CRISPENING
  - Reduces DETAIL that is added to visual noise to prevent noise from being emphasized.
  - You can use the CRISPENING function when you want to apply DETAIL to the subject while keeping noise as unnoticeable as possible.
  - CRISPENING can be adjusted between 0 ~ 7.
    A larger set value results in less DETAIL.
- HI-LIGHT DTL (High Light DETAIL)
  - Adjusts the DETAIL level for bright subjects.
  - You can use this to emphasize the edges of a bright subject in front of a high-luminance background.
  - 0 (Smaller DETAIL amount) ~ 4 (Larger DETAIL amount)

Settings for correcting white balance

WB SHIFT

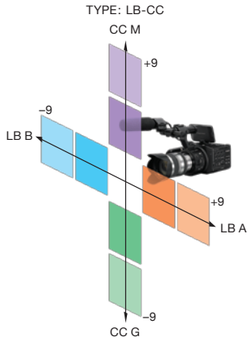
Fine-tunes white balance or creates an effect that is similar to using a color filter. Two types of adjustment methods — LB-CC and R-B — are available. We recommend you start with the LB-CC adjustment method. A higher set vale leads to warmer colors, while a lower setting creates colder colors. Please make sure you adjust white balance first.

FILTER TYPE → LB-CC (Light Balancing - Color Correcting)

- **LB (COL TEMP):** Adds an effect similar to applying a color temperature adjustment filter
  –9 (Blue: Bluish) ~ +9 (Amber: Reddish)

  NOTE: Approx. 100K/step
- **CC (MG/GR):** Adds an effect similar to applying a color correction filter
  –9 (CCG: Green) ~ +9(CCM: Magenta)

  NOTE: 1 step is equivalent to 2.5 in color correction filter number.



Original

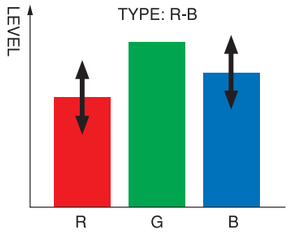
LB–

Original

CC+

FILTER TYPE → R-B

- Alters the R (Red) or B (Blue) level in the video signal.
  –9 (Lowest level) ~ +9 (Highest level)



FILTER TYPE R-B (R=+9)

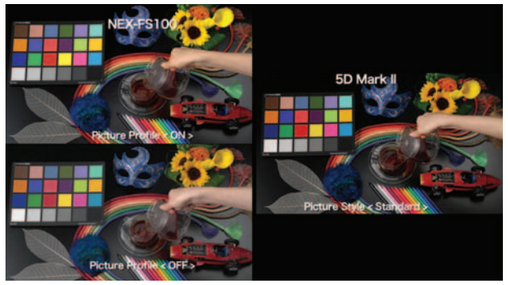
FILTER TYPE R-B (±0)

FILTER TYPE R-B (B=+9)

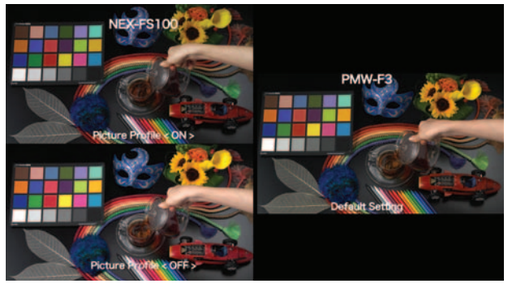
PICTURE PROFILE

Matching color tone with other models

By utilizing the PICTURE PROFILE function, you can use different cameras simultaneously with the NEX-FS100 or create your own world by creatively using color tones along with the bokeh effect. For example, you can even recreate the color tone of the Canon 5D Mark II, which has a distinct color setting. You can also nearly match the color tones when you are using the NEX-FS100 with the Sony PMW-F3 or other models.



5D Mark II Picture Style: Standard

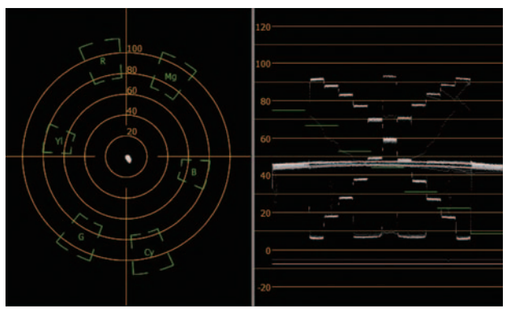


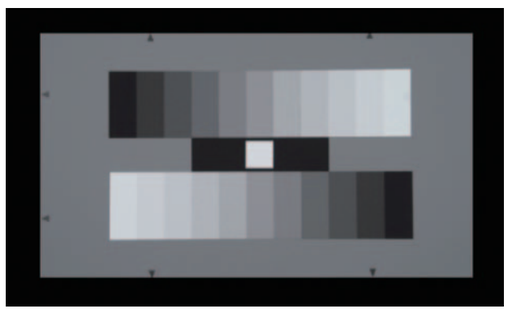
PMW-F3 Default Setting

In the image examples above, the difference in color tones is clear between the bottom left photos, depicting an image captured using the NEX-FS100's initial setting (PICTURE PROFILE = Off), and the images to their right, which show images from the 5D Mark II and PMW-F3, respectively. But the upper left images show largely identical color tones, indicating it is possible to match the color tones of the NEX-FS100 with those of other cameras by adjusting PICTURE PROFILE settings.

To carry out this type of adjustment, you need a precisely calibrated picture monitor, a color chart and a grayscale chart. If you can make adjustments while looking at a waveform/vector monitor, you can complete the task in a shorter amount of time.

Quite often, there is not enough time for adjusting the color tone on the scene. And the color temperature changes depending on the weather when you are outdoors. So, it would be necessary to complete the color tone adjustment under indoor lighting before shooting starts, and then save the results in memory. This way, you only need to fine-tune some settings while checking the monitor on the scene. Waveform/vector monitors are expensive. You can use a similar function in nonlinear editing software for color tone adjustments. Because you need to shoot an image and import it into the editing software multiple times to make adjustments, it will take a little time. But you can make the adjustments as long as you have necessary charts.





For your reference, PICTURE PROFILE settings that were used to match the NEX-FS100's color tone with that of the Canon 5D Mark II and Sony PMW-F3 are provided below. Please note that actual color tones may differ depending on various conditions. So, we recommend you use the data as a starting point and make further adjustments of your own.

FFS100 PP Settings
(for matching color tone with Canon 5D MK's PictureStyle=Standard setting)

Black Level	–15
Gamma	ITU-709
Black Gamma	Range Low Level +4
Knee	Manual Point 75% Slope 0
Color Mode	ITU-709 Matrix Level +1
Color Level	+3
Color Phase	–4
Color Depth	R –3 G –7 B –4 C –6 M –7 Y –5
Detail	+7

FS100 PP Settings
(for matching color tone with Sony PMW-F3's Picture Profile=Off setting)

Black Level	–4
Gamma	CINETONE1
Black Gamma	Range High Level +7
Knee	Manual Point 105.0% Slope –4
Color Mode	ITU-709 Matrix Level +6
Color Level	–5
Color Phase	–3
Color Depth	R 0 G +4 B –3 C +1 M –3 Y +3
Detail	+4

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