Nikon

D850

D-Movie Setting Guide

D850

En

Table of Contents

Tips and Tricks

Viewing Movies

Appendix

Making Movies: Workflow

1 Prepare.

Before shooting movies, learn the names and locations of camera controls as described in the following sections:

An optional AC adapter or battery pack is recommended for extended recording (for information on compatible accessories, see). Before proceeding to the next step, insert a battery and memory card and turn the camera on.
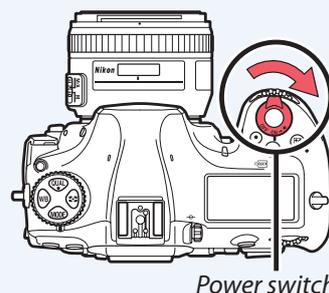
Power switch

2 Start movie live view and adjust camera settings.

Rotate the live view selector to 🎥 (movie live view) and press the 🔲 button.
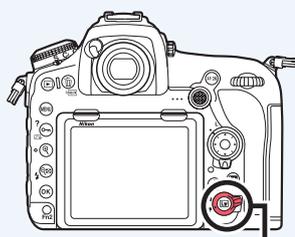
Live view selector
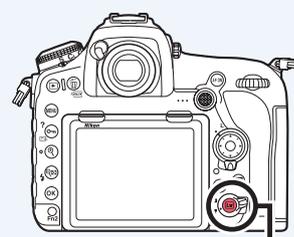
🔲 button

Adjust settings before recording. See the following topics:

❸ Start recording.

If you are using autofocus, focus before shooting. At default settings, the camera automatically detects and focuses on faces (⬚ face-priority AF); to focus instead on a selected area of the frame, choose a different AF-area mode (📖 30). To refocus, tap your subject in the monitor (you can also refocus using the **AF-ON** button or by pressing the shutter-release button halfway).

AF-ON button

To focus in manual focus mode, rotate the lens focus ring. If focus peaking is enabled (📖 35), objects that are in focus will be indicated by colored outlines, making focus easier to verify.

To start recording, press the movie-record button. If **Record movies** is selected for Custom Setting g1 (**Custom control assignment**) > **Shutter release button** (📖 35), you can instead start and end recording using the shutter-release button or an optional remote cord or wireless remote controller.

Movie-record button

See the following for additional information:

- Time-Lapse Movie Techniques .... 📖 41
- Slow-Motion Movies .... 📖 49
- HDMI Output .... 📖 50
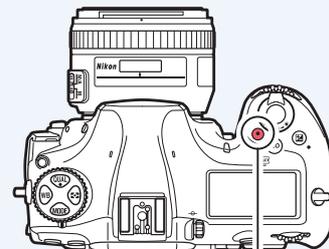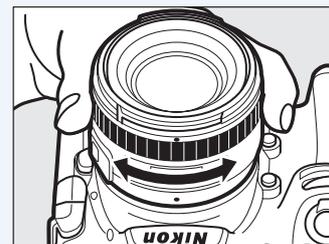
❹ End recording.

Press the movie-record button again to end recording, then press the ⬚ button to end live view.
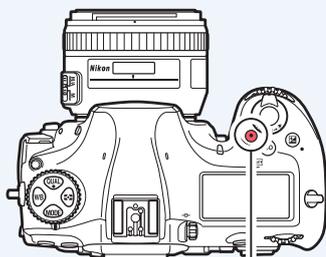
Movie-record button
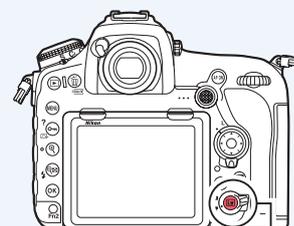
⬚ button

Frequently-Used Controls

The following controls are frequently used during movie recording:

Stereo microphone

Release mode dial lock release

Release mode dial

WB button

MODE button

⊙ button

Power switch

Shutter-release button

⊠ button

ISO button

Movie-record button

Control panel

Sub-command dial

Pv button

Fn1 button

Connector for external microphone

Headphone connector

USB connector

HDMI connector

AF-mode button

Focus-mode selector

🗑 (FORMAT) button

▶ button

Monitor

MENU button

Oⁿ (⊡/?) button

⊕ button

⊖⊞ (⚡) button

⊛ button

Fn2 button

Speaker

AF-ON button

Main command dial

Sub-selector

Multi selector

Focus selector lock

info button

i button

⊡ button

Live view selector

The Live View Display

The live view display offers exposure preview and controls for monitor brightness, headphone volume, and microphone sensitivity.

The Live View Display

The following are displayed in the monitor during live view and movie recording:
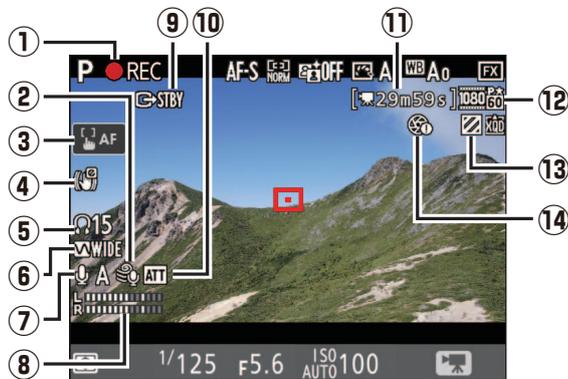
①	Recording indicator	Indicates that recording is in progress. ⬚ is displayed if movies cannot currently be recorded.
②	Wind noise reduction	Displayed when wind noise reduction is on (📖 27).
③	Touch AF icon	Enable or disable touch AF. When touch AF is enabled, focus point can be positioned and autofocus initiated by tapping monitor.
④	Electronic VR indicator	Displayed when electronic vibration reduction is on (📖 21).
⑤	Headphone volume	Volume of audio output to headphones. Displayed when third-party headphones are connected.
⑥	Frequency response	See page 27.
⑦	Microphone sensitivity	See page 26.
⑧	Sound level	Sound level for audio recording. Displayed in red if level is too high; adjust microphone sensitivity accordingly.
⑨	HDMI recording indicator	Displayed if movies are simultaneously being recorded to a device connected via HDMI (📖 50).
⑩	Attenuator indicator	Displayed when the attenuator is enabled (📖 26).
⑪	Time remaining	The recording time available for movies (📖 12).
⑫	Movie frame size	The frame size for movie recording (📖 12).
⑬	Highlight display indicator	Appears when highlight display is on.
⑭	"No power aperture" indicator	Indicates that power aperture is unavailable.

The Information Display: Movie Live View

Press the ⓘⁿᶠᵒ button to choose the information displayed in movie mode.

Information on *Information off* *Framing guides*

Virtual horizon *Histogram*

ⓘⁿᶠᵒ button

The Live View Display, Continued

⚠ Warnings

The warnings at right may be displayed during recording.

Temperature warning (displayed in red 30 s before live view ends)

No memory card
Low battery

⚠ The Count-Down Display

A count down will be displayed 30 s before live view ends automatically. The timer turns red if live view is about to end to protect the internal circuits or, if an option other than **No limit** is selected for Custom Setting c4 (**Monitor off delay**) > **Live view**, 5 s before the monitor is due to turn off automatically.

⚠ FIle Names

During recording, a new file is created when the current file reaches 4 GB. Normally displayed in white, the file name in the information display flashes amber 30 s and turns red 10 s before a new file is created.

The Virtual Horizon Display

The virtual horizon can be used to help level the camera when mounting it on a tripod. To view the virtual horizon in movie mode, use the ⓘⁿfo button as described on .

ⓘⁿfo *button*

The virtual horizon shows roll and pitch based on information from the camera tilt sensors. If the camera is tilted neither left nor right, the roll reference line will turn green, while if the camera is tilted neither forward nor back, the pitch reference line will turn green and a dot will appear in the center of the display. Each of the divisions in the gauge around the circumference of the display is equivalent to 5°.

Camera level	Camera tilted right	Camera tilted forward
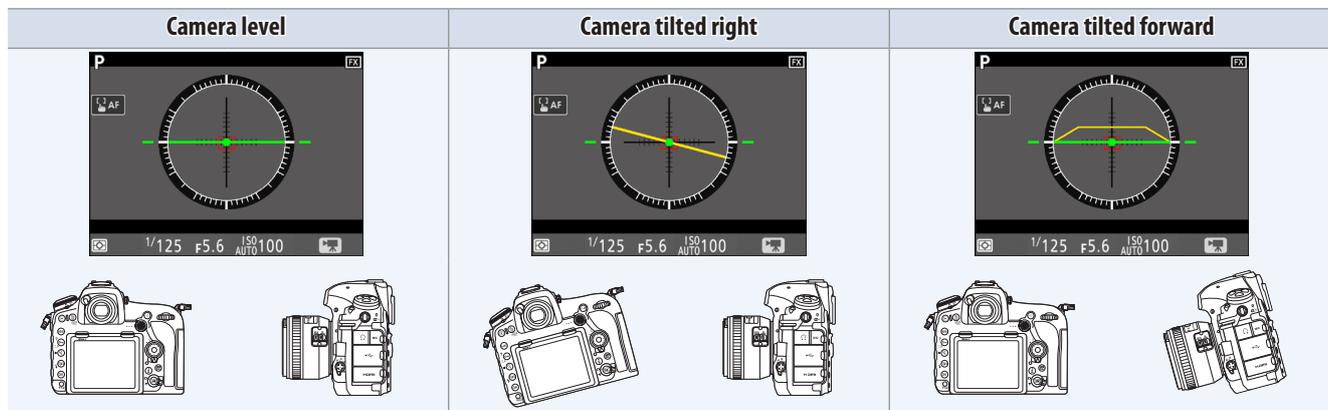
You can also view a virtual horizon using the **Virtual horizon** option in the setup menu.

> 📌 **The Virtual Horizon Display**
> The display is not accurate when the camera is tilted at a sharp angle forward or back. If the camera is unable to measure tilt, the gauge will vanish from the circumference of the display.

Accessing Movie Settings

Movie settings can be adjusted in movie mode using any of the following three methods: the *i*-button menu, movie-related controls, or the movie shooting menu.

The *i*-Button Menu

The options listed below can be accessed by pressing the *i* button in movie mode:

i button

Option	📖	Option	📖
Choose image area	20	Destination	33
Frame size/frame rate	12	Monitor brightness	39
Movie quality	12	Multi-selector power aperture	34
Active D-Lighting	25	Multi-selector exposure comp.	34
Microphone sensitivity	26	Highlight display	38
Attenuator	26	Headphone volume	28
Frequency response	27	Electronic VR	21
Wind noise reduction	27	Peaking level	32
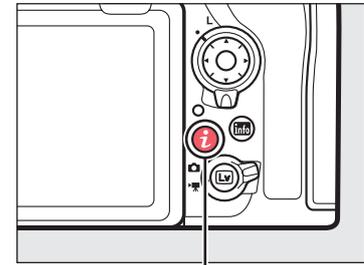
Settings can be adjusted without leaving live view, ensuring you never miss a shot. To use the *i* button:

1 Display the *i*-button menu.
With the camera in movie mode, press the *i* button to display the *i*-button menu.
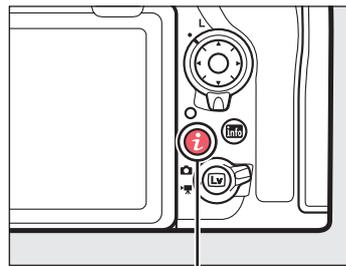
i button

2 Select the desired item.
Use the touch screen or navigate the menus using the multi selector, pressing ▲ or ▼ to highlight items and ▶ to view options for the highlighted item.
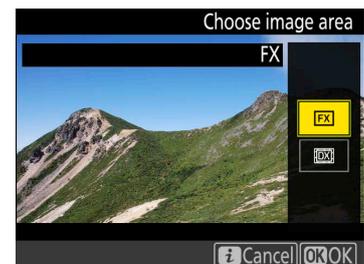
3 Select the desired option.
Select an option using touch-screen controls or by pressing ▲ or ▼ to highlight the desired option and pressing ⓞⓚ to select. The *i*-button menu will be displayed; to exit to the shooting display, press the *i* button again.

Workflow	Buttons and Icons	Settings	Tips and Tricks	Viewing Movies	Appendix

Accessing Movie Settings, Continued

Movie-Related Controls

The following controls can be used for movie recording:

Control	Setting	📖
MODE button	Exposure mode	23
WB button	White balance	14
🔲 button	Metering	22
🔳 button	Exposure compensation	24
ISO button	ISO sensitivity	13
🔒 (⌧/?) button	Picture Control	16
AF-mode button	AF mode and AF-area mode	29, 30

Settings can be adjusted without leaving live view, ensuring you never miss a shot.
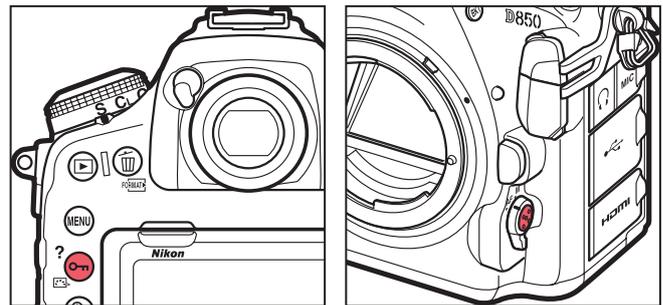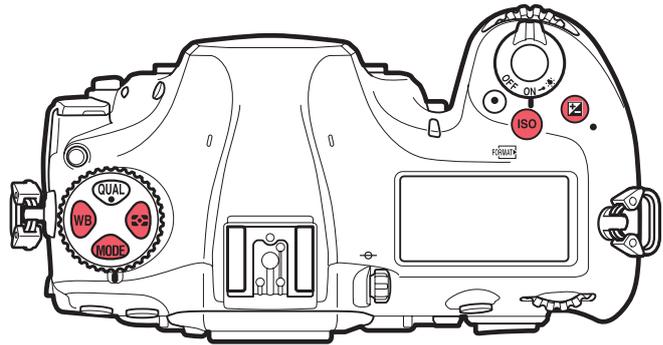
The Movie Shooting Menu

The movie shooting menu can be displayed by pressing the **MENU** button and selecting the 🎥 tab.

Option	📖	Option	📖
Reset movie shooting menu	—	**Manage Picture Control**	—
File naming	—	**Active D-Lighting**	25
Destination	33	**High ISO NR**	19
Image area	20	**Flicker reduction**	25
Frame size/frame rate	12	**Microphone sensitivity**	26
Movie quality	12	**Attenuator**	26
Movie file type	33	**Frequency response**	27
ISO sensitivity settings	13	**Wind noise reduction**	27
White balance	14	**Electronic VR**	21
Set Picture Control	16	**Time-lapse movie**	41

MENU *button*

```
          MOVIE SHOOTING MENU
  Reset movie shooting menu      --
  File naming                    DSC
  Destination                    ⎕XQD
  Image area                     --
  Frame size/frame rate          1080 P 60
  Movie quality                  HIGH
  Movie file type                MOV
  ISO sensitivity settings       --
```
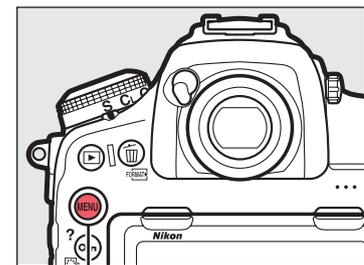
⚠️ Accessing Settings

Throughout this chapter, the means by which the settings discussed in each section can be accessed are indicated by check marks in a table like that shown at right.

***i*-button menu**	✔
Movie-related controls	—
Movie shooting menu	✔

Picture Quality

The settings covered in this section control movie picture quality.

Frame Size, Frame Rate, and Movie Quality

To choose a movie quality option and a frame size and rate for movie recording:

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

1 **Select the desired item.**

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⊙ or ⊙ to highlight **Frame size/frame rate** or **Movie quality** and press ⊙ to view options for the highlighted item.
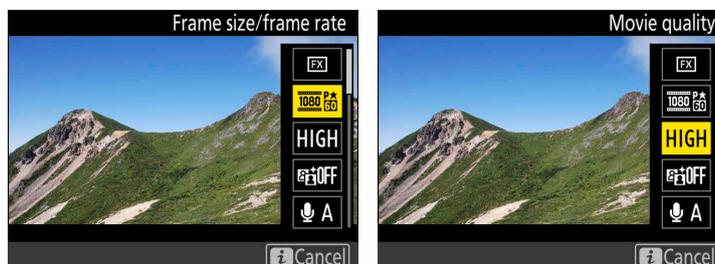
2 **Select the desired option.**

Press ⊙ or ⊙ to highlight the desired option and press ⊗ to select (frame size and rate options are listed below; the options available for **Movie quality** are "high" and "normal"). Press the *i* button to exit to the shooting display when settings are complete.
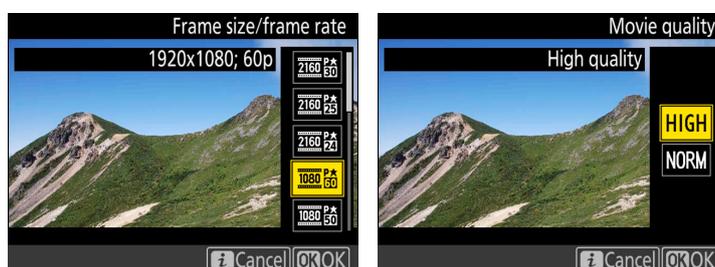
Together, **Frame size/frame rate** and **Movie quality** determine the maximum bit rate and maximum length, as shown in the following table.

	Maximum bit rate (Mbps)		
Frame size/frame rate [1]	Movie quality: ★ high	Movie quality: normal	Maximum length
3840 × 2160 (4K UHD); 30p	144	— [2]	
3840 × 2160 (4K UHD); 25p			
3840 × 2160 (4K UHD); 24p			
1920 × 1080; 60p	48	24	
1920 × 1080; 50p			
1920 × 1080; 30p	24	12	29 min. 59 s [3]
1920 × 1080; 25p			
1920 × 1080; 24p			
1280 × 720; 60p			
1280 × 720; 50p			
1920 × 1080; 30p ×4 (slow-mo)	— [4]	36	Recording: 3 min. Playback: 12 min.
1920 × 1080; 25p ×4 (slow-mo)			
1920 × 1080; 24p ×5 (slow-mo)	— [4]	29	Recording: 3 min. Playback: 15 min.

1. Actual frame rates for values listed as 60p, 30p, and 24p are respectively 59.94 fps, 29.97 fps, and 23.976 fps.
2. Movie quality fixed at "high".
3. Each movie will be recorded across up to 8 files of up to 4 GB each. The number of files and the length of each file vary with the options selected for **Frame size/frame rate** and **Movie quality**.
4. Movie quality fixed at "normal".

Picture Quality, Continued

ISO Sensitivity

When exposure mode **P**, **S**, or **A** is selected in movie mode, the camera adjusts ISO sensitivity automatically. You can, however, choose the upper limit to prevent the camera choosing too high a value. In exposure mode **M**, you also have the option of adjusting ISO sensitivity manually.

i-button menu	—
Movie-related controls	✔
Movie shooting menu	✔

■ Exposure Modes P, S, and A

The camera adjusts ISO sensitivity automatically in response to shooting conditions, choosing from values of from ISO 64 to (at default settings) Hi 2. The current value is displayed in the monitor and control panel.

■ Exposure Mode M

When the camera is in movie mode, you can enable or disable auto ISO sensitivity control by keeping the **ISO** button pressed and rotating the sub-command dial; the display shows **ISO AUTO** when auto ISO sensitivity control is enabled and **ISO** when it is disabled. When auto ISO sensitivity control is disabled, ISO sensitivity can be manually set to values between ISO 64 and Hi 2 by keeping the **ISO** button pressed while rotating the main command dial. Current ISO sensitivity settings are displayed in the monitor and control panel.

Sub-command dial

ISO button   Main command dial
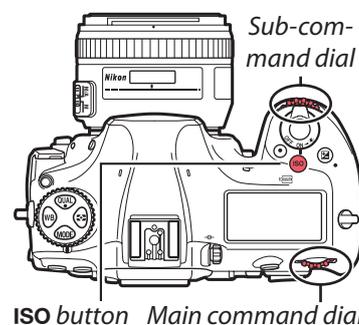
ISO sensitivity can also be adjusted using the **ISO sensitivity settings** item in the movie shooting menu. Use **Auto ISO control (mode M)** to enable or disable auto ISO sensitivity control and **ISO sensitivity (mode M)** to choose the value used when auto ISO sensitivity control is disabled.

■ Maximum Sensitivity

To prevent auto ISO sensitivity control setting ISO sensitivity too high, you can use the **ISO sensitivity settings** > **Maximum sensitivity** option in the movie shooting menu to select an upper limit. Choose from values between ISO 200 and Hi 2. The selected setting applies in modes **P**, **S**, and **A** and when auto ISO sensitivity control is enabled in mode **M**.
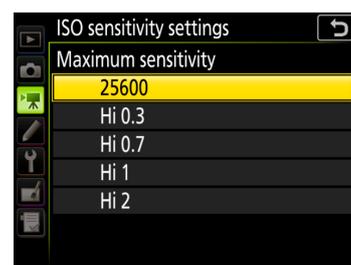
> **⚠ Auto ISO Sensitivity Control**
>
> At high ISO sensitivities, the camera may have difficulty focusing and noise (randomly-spaced bright pixels, fog, or lines) may increase. This can be prevented by choosing a lower value for **ISO sensitivity settings** > **Maximum sensitivity** in the movie shooting menu.

Picture Quality, Continued

White Balance

i-button menu	—
Movie-related controls	✔
Movie shooting menu	✔

Adjust white balance according to lighting conditions.

To select a white balance option without exiting movie mode, press the **WB** button and rotate the main command dial. The results of the new setting can be previewed in the monitor. When AUTO (**Auto**), ☀ (**Fluorescent**), **PRE** (**Preset manual**), or K (**Choose color temp.**) is selected, you can choose a sub-option, white balance preset, or color temperature by pressing the **WB** button and rotating the sub-command dial.

Sub-command dial

WB *button   Main command dial*
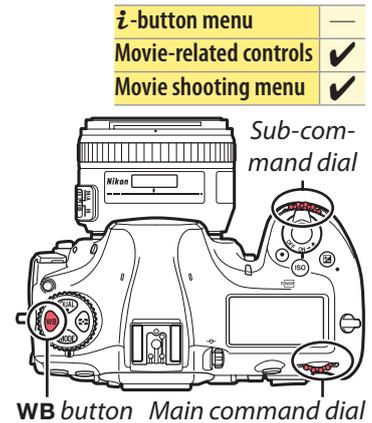
The current white balance setting is displayed in the monitor and control panel.

■ Fine-Tuning White Balance in Live View

To fine-tune white balance in live view, hold the **WB** button while using the multi selector. Press ◀ or ▶ to fine-tune white balance on the amber (A)–blue (B) axis and ▲ or ▼ to fine-tune on the green (G)–magenta (M) axis. When K (**Choose color temp.**) is selected, the **WB** button can be used to select the color temperature, although only for the amber (A)–blue (B) axis: keeping the the **WB** button pressed, press ◀ or ▶ to highlight a digit and press ▲ or ▼ to change. To fine-tune preset manual white balance or to fine-tune color temperature on the green (G)–magenta (M) axis, use the **White balance** option in the movie shooting menu.

> ⚠ **"Same as Photo Settings"**
> Choose **Same as photo settings** to use the white balance settings currently selected in the photo shooting menu.

Picture Quality, Continued

■ Measuring Preset Manual White Balance in Live View

Use preset manual white balance to measure a custom white balance value for the current light source and save it for later recall.

1 Set white balance to PRE (Preset manual).

Press the **WB** button and rotate the main command dial until **PRE** is displayed in the monitor.
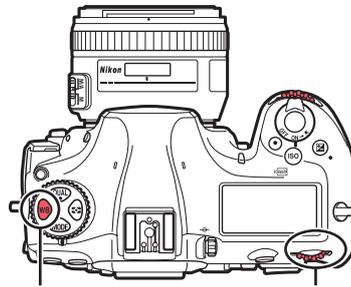
WB button   Main command dial

2 Select a preset.

Press the **WB** button and rotate the sub-command dial until the desired white balance preset (d-1 to d-6) is displayed in the monitor.

Sub-command dial
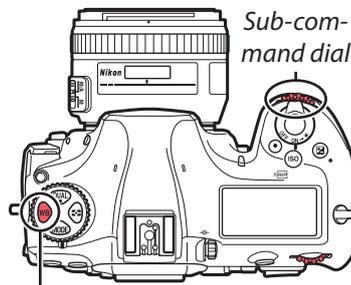
WB button

3 Select direct measurement mode.

Release the **WB** button briefly and then press the button until the **PRE** icon in the monitor starts to flash. A spot white balance target (□) will be displayed in yellow at the selected focus point.

4 Position the target over a white or grey area.

While **PRE** flashes in the display, use the multi selector to position the □ over a white or grey area of the subject. To zoom in on the area around the target for more precise positioning, press the ⌕ button. You can also measure white balance anywhere in the frame by tapping your subject in the monitor, in which case you can skip Step 5.

5 Measure white balance.

Press the center of the multi selector or press the shutter-release button all the way down to measure white balance.

6 Exit direct measurement mode.

Press the **WB** button to exit direct measurement mode.

15

Picture Controls

Choose a Picture Control according to the subject or type of scene. Choose **Same as photo settings** to use the Picture Control settings currently selected in the photo shooting menu, or select **Flat** to preserve details over a wide tone range, from highlights to shadows, maximizing the potential for tweaking in post-production. Using **Flat** with highlight-weighted metering minimizes loss of detail in highlights.

i-button menu	—
Movie-related controls	✔
Movie shooting menu	✔

To choose a Picture Control without exiting live view:

1 Display the Picture Control list.
In movie mode, press the 🔒 (☒/?) button to view a list of Picture Controls.
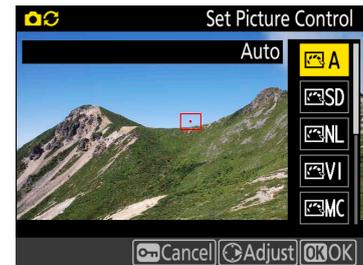
2 Select a Picture Control.
Press ⬆ or ⬇ to highlight one of the options listed below and press ⊛ to select the highlighted item and return to the shooting display. The display will immediately be updated to show the effects of the selected Picture Control.

A Auto	The camera automatically adjusts hues and tones based on the **Standard** Picture Control. The complexions of portrait subjects will appear softer, and such elements as the foliage and sky in outdoor shots more vivid, than in pictures taken with the **Standard** Picture Control.
SD Standard	Standard processing for balanced results. Recommended for most situations.
NL Neutral	Minimal processing for natural results. Choose for footage that you intend to process in post-production.
VI Vivid	Footage is enhanced for a vivid, photoprint effect with emphasis on primary colors.
MC Monochrome	Record monochrome footage.
PT Portrait	Footage of portrait subjects is processed to give skin a natural texture and rounded feel.
LS Landscape	Choose for vibrant landscapes and cityscapes.
FL Flat	Details are preserved over a wide tone range, from highlights to shadows. Choose for footage that will later be extensively processed or retouched.

16

■ Modifying Picture Controls in Live View

Individual Picture Control parameters can be fine-tuned without leaving live view.

1 Display the Picture Control list.

In movie mode, press the ⚷ (⌨/**?**) button to view a list of Picture Controls.
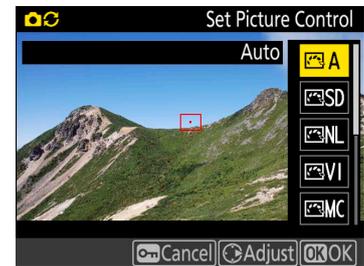
2 Select a Picture Control.

Highlight the desired Picture Control and press ▷.
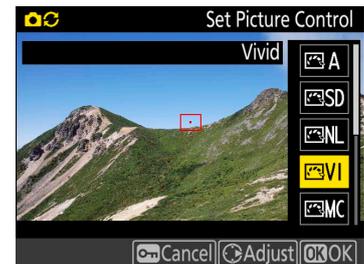
3 Adjust settings.

Press ▲ or ▼ to highlight a setting (see below), then press ◀ or ▷ or tap ◀ or ▶ in the monitor to choose a value in increments of 1, or rotate the sub-command dial or tap `0.25` or `0.25` to choose a value in increments of 0.25 (the options available vary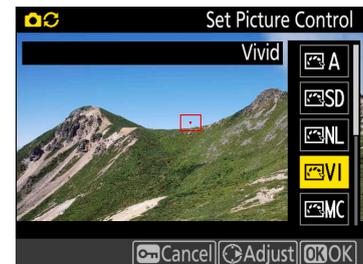 with the Picture Control selected). Repeat this step until all settings have been adjusted, or select a preset combination of settings using **Quick adjust**. Default settings can be restored by pressing the 🗑 (FORMAT) button.
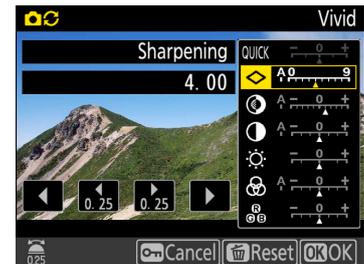
■ Picture Control Settings

Quick adjust		Mute or heighten the effect of the selected Picture Control.
Manual adjustments	**Sharpening**	Control the sharpness of outlines. Select **A** to adjust sharpening automatically according to the type of scene.
	Contrast	Adjust contrast manually or select **A** to let the camera adjust contrast automatically.
	Brightness	Raise or lower brightness without loss of detail in highlights or shadows.
	Saturation	Control the vividness of colors. Select **A** to adjust sharpening automatically according to the type of scene.
	Hue	Adjust hue.
	Filter effects	Simulate the effect of color filters on monochrome footage.
	Toning	Choose the tint used in monochrome footage.

4 Save changes.

Press ⓞⓚ to save changes.

⚠️ Modified Picture Controls

Picture Controls that have been modified from default settings are shown by an asterisk ("✳").
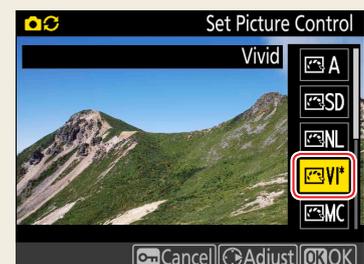
Picture Quality, Continued

⚠ The "⌧A Auto" Picture Control

If ⌧A **Auto** is selected for **Set Picture Control**, settings can be adjusted in the range **A–2** to **A+2**. Rotating the sub-command dial has no effect.

⚠ "A" (Auto)

Results for auto sharpening, contrast, and saturation vary with exposure and the position of the subject in the frame. Use a type G, E, or D lens for best results.

⚠ Clarity

The **Clarity** Picture Control setting does not apply to movies.

⚠ Previous Settings

The ▲ indicator under the value display in the Picture Control setting menu indicates the previous value for the setting. Use this as a reference when adjusting settings.

⚠ Filter Effects (Monochrome Only)

The options in this menu simulate the effect of color filters on monochrome footage. The following filter effects are available:

Y (yellow) **O** (orange) **R** (red)	Enhances contrast. Can be used to tone down the brightness of the sky in landscape photographs. Orange produces more contrast than yellow, red more contrast than orange.
G (green)	Softens skin tones. Can be used for portraits.

⚠ Toning (Monochrome Only)

Pressing ▼ when **Toning** is selected displays saturation options. Press ◄ or ► to adjust saturation. Saturation control is not available when **B&W** (black-and-white) is selected.

High ISO Noise Reduction

Selecting an option other than **Off** for **High ISO NR** in the movie shooting menu reduces noise (randomly-spaced bright pixels), particularly in movies shot at high ISO sensitivities. Choose the amount of noise reduction performed from **High**, **Normal**, and **Low**, but note that edges may soften and the picture may lose definition at higher settings. If **Off** is selected, noise reduction will be performed only as required and never at an amount as high as when **Low** is selected.

i-button menu	—
Movie-related controls	—
Movie shooting menu	✔

High ISO NR

High
Normal
Low
Off

19
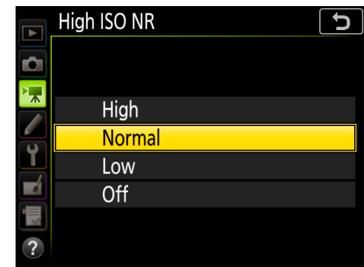
Picture Quality, Continued

Image Area

Choose the size of the area on the image sensor used to record movies. Select **FX** to shoot movies in what is referred to as "FX-based movie format", **DX** to shoot in "DX-based movie format".

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

The differences between the two formats are shown in the illustration. The sizes of the areas recorded are approximately 35.9 × 20.2 mm (FX-based movie format) and 23.5 × 13.2 mm (DX-based movie format). Movies shot with a DX-format lens and **On** selected for **Image area** > **Auto DX crop** in the movie shooting menu are recorded in DX-based movie format, as are all movies (regardless of the lens used or the option selected for **Image area** > **Choose image area**) with a frame size of **1920 × 1080 (slow-mo)**.

FX   *DX*

To choose the image area without leaving live view:

❶ Select Choose image area in the *i*-button menu.
With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⊕ or ⊖ to highlight **Choose image area** and press ⊛ to view options.

❷ Select the desired option.
Press ⊕ or ⊖ to highlight the desired option and press ⊛ to select. Press the *i* button to exit to the shooting display when settings are complete.
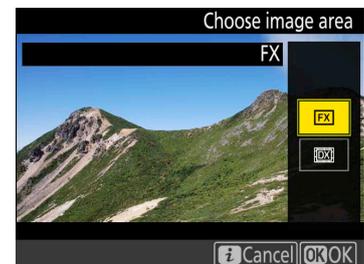
> ⚠️ **Custom Control Assignment**
> If **Choose image area** has been assigned to a control using Custom Setting g1 (**Custom control assignment**, 📖 35), you can also select the image area by pressing the control and rotating a command dial.
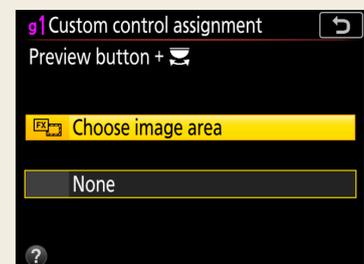
Picture Quality, Continued

Electronic Vibration Reduction

To choose whether to enable electronic vibration reduction in movie mode:

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

1 **Select Electronic VR in the *i*-button menu.**

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⊙ or ⊙ to highlight **Electronic VR** and press ⊙ to view options.
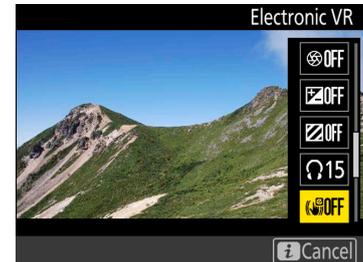
2 **Select the desired option.**

Press ⊙ or ⊙ to highlight the desired option and press ⊛ to select. Press the *i* button to exit to the shooting display when settings are complete.
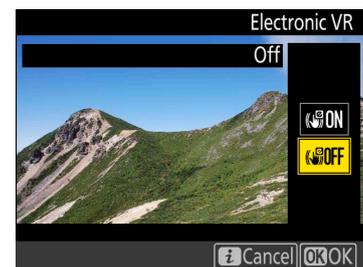
⚠ Electronic Vibration Reduction

Electronic vibration reduction cannot be used with focus peaking (📖 32) or at a frame size (📖 12) of 1920 × 1080 (slow-mo) or 3840 × 2160. Enabling electronic vibration reduction:

• Reduces the size of the movie crop, slightly increasing the apparent focal length
• May cause distortion at the edges of the frame
• May result in a slight delay before the image in the display follows the movement of the camera when the camera is panned horizontally or vertically

21

Exposure

This section is devoted to settings that affect exposure.

Metering

i-button menu	—
Movie-related controls	✔
Movie shooting menu	—

Metering determines how the camera sets exposure.

To choose a metering option, press the ◉ button and rotate the main command dial until the desired setting is displayed in the monitor and control panel.
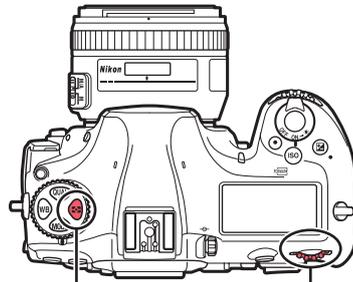
◉ *button*   *Main command dial*

The following options are available:

◙	Matrix	Produces natural results in most situations. Camera meters wide area of the frame and sets exposure according to tone distribution, color, composition, and distance information.
◉	Center-weighted	Camera meters entire frame but assigns greatest weight to center area. Classic meter for portraits; recommended when using filters with an exposure factor (filter factor) over 1×.
⊡*	Highlight-weighted	Camera assigns greatest weight to highlights. Use to reduce loss of detail in highlights, for example when filming spotlit performers on-stage.

> ⚠ **Spot Metering**
> Spot metering cannot be used with movies.

Exposure Mode

Exposure mode determines how the camera adjusts shutter speed and aperture to obtain the desired exposure.

i-button menu	—
Movie-related controls	✔
Movie shooting menu	—

To choose the exposure mode, press the **MODE** button and rotate the main command dial until the desired option appears in the monitor or control panel.
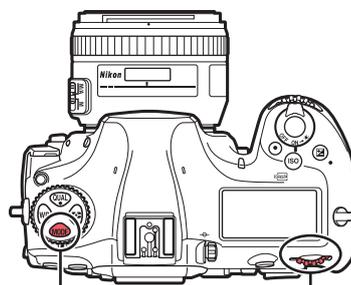
MODE button   Main command dial

The exposure settings that can be adjusted manually in each exposure mode are indicated below by check marks. Note that shutter speed cannot be adjusted manually in mode **S**, making mode **S** equivalent to mode **P** when the camera is in movie mode.

Exposure mode	Exposure settings		
	Aperture	Shutter speed	ISO sensitivity[1]
P, S	—	—	—[2]
A	✔	—	—[2]
M	✔	✔	✔[3]

1. The upper limit when **On** is selected for **Electronic VR** in the movie shooting menu is ISO 25600.
2. The upper limit for ISO sensitivity can be selected using the **ISO sensitivity settings** > **Maximum sensitivity** option in the movie shooting menu.
3. If **On** is selected for **ISO sensitivity settings** > **Auto ISO control (mode M)** in the movie shooting menu (13), the upper limit for ISO sensitivity can be selected using the **Maximum sensitivity** option.

If the image in the monitor seems over- or under-exposed in mode **P** or **S**, exit and restart live view or switch to mode **A** and adjust aperture until the desired result is achieved.

⚠ Shutter Speed (Mode M)

In exposure mode **M**, shutter speed can be set to values between ¹⁄₂₅ s and ¹⁄₈₀₀₀ s (the slowest available shutter speed varies with the frame rate, 12).

⚠ Power Aperture

When mode **A** or **M** is selected in movie mode, aperture can be adjusted using the multi selector or custom controls (power aperture, 34, 35).

Exposure, Continued

Exposure Compensation

i-button menu	—
Movie-related controls	✔
Movie shooting menu	—

Exposure compensation is used to alter exposure from the value suggested by the camera, making pictures brighter or darker.

To choose a value for exposure compensation, press the ⟷ button and rotate the main command dial until the desired value is displayed in the monitor or control panel. The current value can be confirmed by pressing the ⟷ button.

⟷ *button*

Main command dial
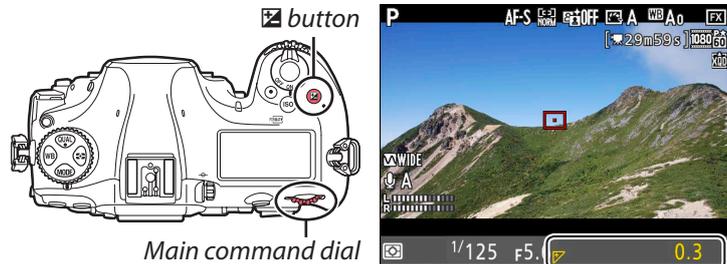
If **Multi selector exposure comp.** is enabled, exposure compensation can also be set using the multi selector (☐ 34).

Exposure compensation is adjusted in increments of ⅓ EV. In general, positive values make the subject brighter while negative values make it darker. Normal exposure can be restored by setting exposure compensation to ±0.0. Exposure compensation is not reset when the camera is turned off.

> ### ✏ Exposure Mode M
> In exposure mode **M**, exposure compensation affects only the exposure indicator; shutter speed and aperture do not change.

Active D-Lighting

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

Active D-Lighting preserves details in highlights and shadows, creating photographs with natural contrast. Use for high-contrast scenes, for example when photographing brightly lit outdoor scenery through a door or window or taking pictures of shaded subjects on a sunny day. To adjust Active D-Lighting without leaving live view:

❶ Select Active D-LIghting in the *i*-button menu.

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⬆ or ⬇ to highlight **Active D-Lighting** and press ▶ to view options.
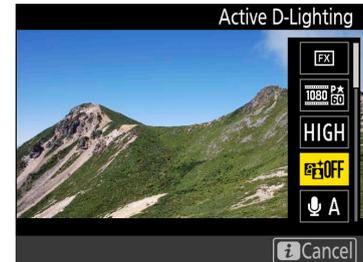
❷ Select the desired option.

Press ⬆ or ⬇ to highlight the desired option and press ⓞⓚ to select. Press the *i* button to exit to the shooting display when settings are complete.
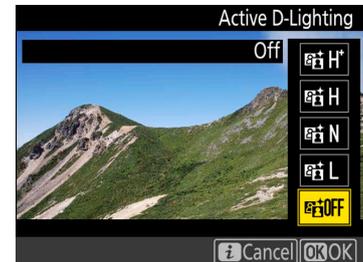
> ⚠ **Active D-Lighting and Movies**
> Active D-Lighting cannot be combined with focus peaking (📖 32) and does not apply at a frame size of 1920 × 1080 (slow-mo) or 3840 × 2160 (📖 12).

Flicker Reduction

i-button menu	—
Movie-related controls	—
Movie shooting menu	✔

Use the **Flicker reduction** option in the movie shooting menu to reduce flicker and banding when shooting under fluorescent or mercury-vapor lighting during live view or movie recording. Choose **Auto** to allow the camera to automatically choose the correct frequency, or manually match the frequency to that of the local AC power supply.
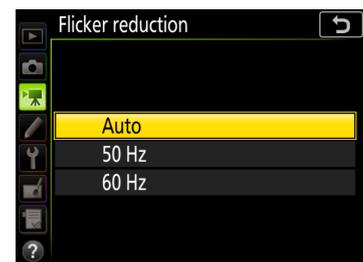
> ⚠ **Flicker Reduction**
> If **Auto** fails to produce the desired results and you are unsure as to the frequency of the local power supply, test both the 50 and 60 Hz options and choose the one that produces the best results. Flicker reduction may not produce the desired results if the subject is very bright, in which case you should try choosing a smaller aperture (higher f-number). To prevent flicker, select mode **M** and choose a shutter speed adapted to the frequency of the local power supply: ⅟₁₂₅ s, ⅟₆₀ s, or ⅟₃₀ s for 60 Hz; ⅟₁₀₀ s, ⅟₅₀ s, or ⅟₂₅ s for 50 Hz.

Audio

Read this section for information on adjusting audio settings when recording sound with movies.

Microphone Sensitivity

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

Turn the built-in or external microphones on or off or adjust microphone sensitivity.

1 **Select Microphone sensitivity in the *i*-button menu.**

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press 🔼 or 🔽 to highlight **Microphone sensitivity** and press ▶ to view options.
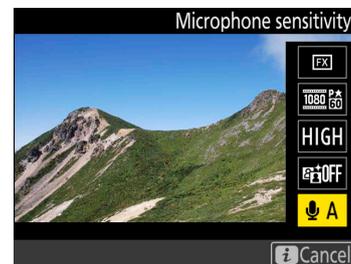
2 **Select the desired setting.**

Press 🔼 or 🔽 to choose the desired setting and press ⓞ to select. Choose a setting between 1 and 20 (the higher the value, the higher the sensitivity) or select **Auto sensitivity** to adjust sensitivity automatically. To disable audio recording, choose **Microphone off**. Press the *i* button to exit to the shooting display when settings are complete.
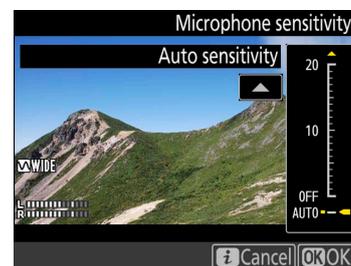
> 🔔 **Nikon Microphones**
> Two models of external microphone are available from Nikon:
> • **The ME-1 Stereo Microphone**: Connect the ME-1 to the camera microphone jack to record stereo sound and reduce the chance of picking up equipment noise (such as the sounds produced by the lens during autofocusing).
> • **The ME-W1 Wireless Microphone**: Use this wireless Bluetooth microphone for off-camera recording.

Attenuator

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

Enable the attenuator to reduce microphone gain and prevent audio distortion when recording movies in loud environments.

1 **Select Attenuator in the *i*-button menu.**

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press 🔼 or 🔽 to highlight **Attenuator** and press ▶ to view options.

2 **Select the desired option.**

Press 🔼 or 🔽 to highlight the desired option and press ⓞ to select. Press the *i* button to exit to the shooting display when settings are complete.

Frequency Response

Choose the range of frequencies to which the built-in microphone or external microphones respond.

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

❶ Select Frequency response in the *i*-button menu.

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⬆ or ⬇ to highlight **Frequency response** and press ▶ to view options.
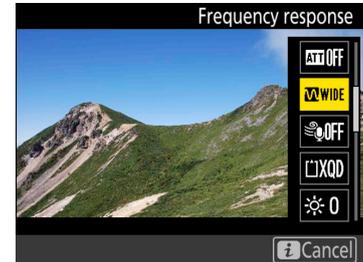
❷ Select the desired option.

Press ⬆ or ⬇ to highlight the desired option and press ⓞⓚ to select. If **Wide range** is selected, the microphone will respond to a wide range of frequencies, from music to the bustling hum of a city street. Choose **Vocal range** to bring out human voices. Press the *i* button to exit to the shooting display when settings are complete.
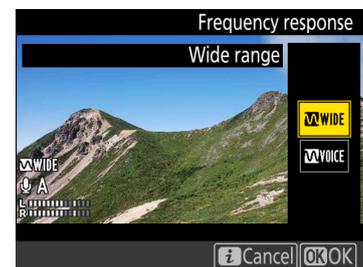
Wind Noise Reduction

Select **On** to enable the built-in microphone's low-cut filter, reducing noise produced by wind blowing over the microphone (note that other sounds may also be affected).

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

**❶ Select Wind noise reduction in the *i*-button menu.**

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⬆ or ⬇ to highlight **Wind noise reduction** and press ▶ to view options.
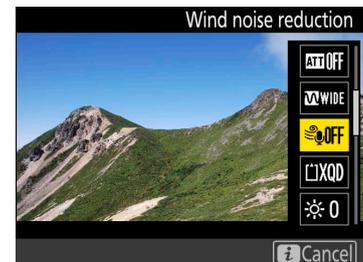
❷ Select the desired option.

Press ⬆ or ⬇ to highlight the desired option and press ⓞⓚ to select. Press the *i* button to exit to the shooting display when settings are complete.
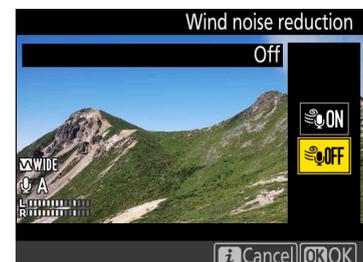
> ⚠️ **External Microphones**
>
> The camera wind noise reduction option does not apply to external microphones. Wind-noise reduction for optional stereo microphones that support this feature can be enabled or disabled using microphone controls.

27

Audio, Continued

Headphone Volume

Adjust the volume for third-party headphones.

i-button menu	✔
Movie-related controls	—
Movie shooting menu	—

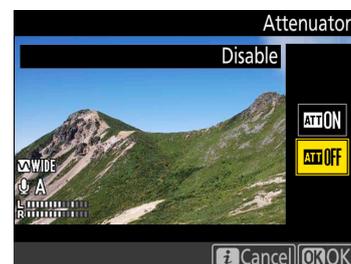**1 Select Headphone volume in the *i*-button menu.**

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⊕ or ⊕ to highlight **Headphone volume** and press ⊕ to view options.

2 Select the desired setting.

Press ⊕ or ⊕ to choose the desired volume and press ⊛ to select. Press the *i* button to exit to the shooting display when settings are complete.

> **⚠ Headphones**
>
> Sound recorded at high microphone sensitivities may play back at high volumes; particular care should be taken when headphones are used.

Focus

This section covers the focus settings used when recording movies.

Focus Mode

i-button menu	—
Movie-related controls	✔
Movie shooting menu	—

Use the focus-mode selector to choose whether the camera focuses in autofocus or manual focus mode. Select **AF** for autofocus, **M** for manual focus.
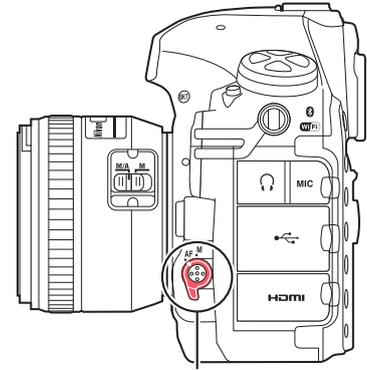
Focus-mode selector

AF Mode

i-button menu	—
Movie-related controls	✔
Movie shooting menu	—

AF mode determines how the camera focuses when the focus-mode selector is rotated to **AF**.

To choose the AF mode, press the AF-mode button and rotate the main command dial until the desired setting is displayed in the monitor.
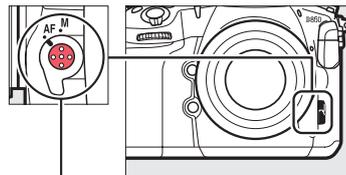
AF-mode button
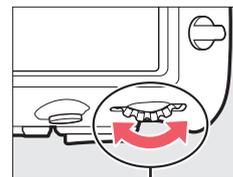
Main command dial

Choose from the following settings:

AF-S	**Single-servo AF**: For stationary subjects. Touch the monitor to focus on the selected subject. You can also focus using the **AF-ON** button or by pressing the shutter-release button halfway.
AF-F	**Full-time-servo AF**: For moving subjects. The camera adjusts focus continuously until you touch the monitor or press the shutter-release button halfway. Focus locks until you lift your finger from the display or release the shutter-release button. You can also focus using the **AF-ON** button.

Focus, Continued

AF-Area Mode

AF-area mode determines how the camera selects the focus point for autofocus.

i-button menu	—
Movie-related controls	✔
Movie shooting menu	—

To choose the AF-area mode, press the AF-mode button and rotate the sub-command dial until the desired setting is displayed in the monitor.
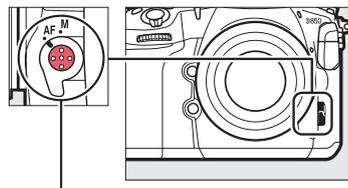
AF-mode button

Sub-command dial

Choose from the following options:

(icon)	**Face-priority AF**: The camera automatically detects and focuses on portrait subjects; the selected subject is indicated by a double yellow border (if multiple faces are detected, the camera will focus on the closest subject; to choose a different subject, tap the subject in the monitor or use the multi selector). If the camera can no longer detect the subject (because, for example, the subject has turned to face away from the camera), the border will no longer be displayed.
(icon) WIDE	**Wide-area AF**: Use for hand-held shots of landscapes and other non-portrait subjects. Use touch controls or the multi selector to move the focus point anywhere in the frame, or press the center of the multi selector to position the focus point in the center of the frame.
(icon) NORM	**Normal-area AF**: Focus on a selected spot in the frame. Use touch controls or the multi selector to move the focus point anywhere in the frame, or press the center of the multi selector to position the focus point in the center of the frame. A tripod is recommended.
(icon) PIN	**Pinpoint AF**: As for normal-area AF, except that a smaller focus point is used for pinpoint focus on smaller targets.
(icon)	**Subject-tracking AF**: To start focus tracking, touch your subject in the monitor or position the focus point over your subject and press the center of the multi selector; the focus point will track the selected subject as it moves through the frame. While tracking is in progress, touching the monitor anywhere will cause the camera to focus on the current subject. To end tracking, press the center of the multi selector. Note that the camera may be unable to track subjects if they move quickly, leave the frame or are obscured by other objects, change visibly in size, color, or brightness, or are too small, too large, too bright, too dark, or similar in color or brightness to the background.

⚠ Using Autofocus in Live View

Use an AF-S or AF-P lens. The desired results may not be achieved with other lenses or teleconverters. Note that in live view, autofocus is slower and the monitor may brighten or darken while the camera focuses. The focus point may sometimes be displayed in green when the camera is unable to focus. The camera may be unable to focus in the following situations:

• The subject contains lines parallel to the long edge of the frame
• The subject lacks contrast
• The subject in the focus point contains areas of sharply contrasting brightness, or includes spot lighting or a neon sign or other light source that changes in brightness
• Flicker or banding appears under fluorescent, mercury-vapor, sodium-vapor, or similar lighting
• A cross (star) filter or other special filter is used
• The subject appears smaller than the focus point
• The subject is dominated by regular geometric patterns (e.g., blinds or a row of windows in a skyscraper)
• The subject is moving

⚠ Live View Zoom Preview

Press the 🔍 button to magnify the view in the monitor up to a maximum of about 16×. A navigation window will appear in a gray frame at the bottom right corner of the display. Use the multi selector to scroll to areas of the frame not visible in the monitor, or press 🔍 (⚡) to zoom out. Focus zoom is not available during movie recording.

If **Zoom on/off** is selected for Custom Setting f2 (**Multi selector center button**) > **Live view**, you can also use the center of the multi selector to zoom in on the view in the monitor. Choose the initial zoom setting from **Low magnification (50%)**, **1:1 (100%)**, and **High magnification (200%)**. The zoom display will center on the active focus point. Note that regardless of the option selected, pressing the center of the multi selector when subject-tracking AF is in effect will select the subject in the active focus point for focus tracking; to zoom in, use the 🔍 button.

Focus, Continued

Focus Peaking

If you enable focus peaking when recording movies in manual focus mode, objects that are currently in focus will be indicated by colored outlines.

i-button menu	✔
Movie-related controls	—
Movie shooting menu	—
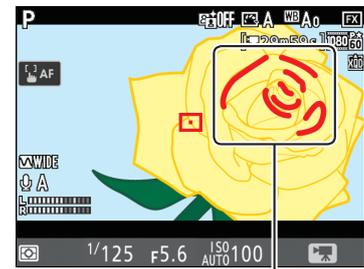
Area in focus

To enable or disable focus peaking without leaving live view:

1 **Select Peaking level in the *i*-button menu.**
With the camera in movie mode, press the *i* button to display the *i*-button menu. Press 🔼 or 🔽 to highlight **Peaking level** and press ▶ to view options.

2 **Select the desired option.**
Press 🔼 or 🔽 to highlight the desired option and press ⓞⓚ to select. Choose from **3** (high sensitivity), **2** (standard), **1** (low sensitivity), and **Off**; the higher the setting, the greater the depth shown as being in focus. Press the *i* button to exit to the shooting display when settings are complete.

> **⚠ Focus Peaking**
> The peaking color can be selected using Custom Setting d8 (**Peaking highlight color**). Choose from **Red**, **Yellow**, **Blue**, and **White**. Focus peaking cannot be used with Active D-Lighting (📖 25) or electronic vibration reduction (📖 21) and is not displayed at a frame size of 1920 × 1080 (slow-mo) or 3840 × 2160.

Storage

Choose a memory card and format for movie recording.

Destination

i-button menu	✔
Movie-related controls	—
Movie shooting menu	✔

To choose the slot used for movie recording when two memory cards are inserted:

❶ Select Destination in the *i*-button menu.
With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⊕ or ⊖ to highlight **Destination** and press ⊕ to view options.
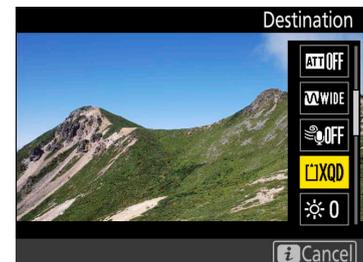
❷ Select the desired option.
Press ⊕ or ⊖ to highlight the desired option and press ⊛ to select. The menu shows the time available on the card in the highlighted slot; recording ends automatically when no time remains on the card in the current slot. Press the *i* button to exit to the shooting display when settings are complete.
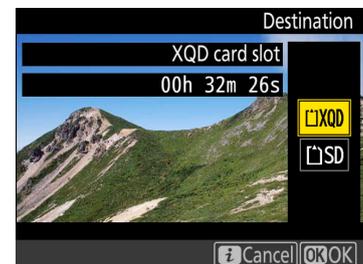
> **⚠ The Movie Shooting Menu**
> The destination can also be selected using the **Destination** option in the movie shooting menu.

Movie File Type

i-button menu	—
Movie-related controls	—
Movie shooting menu	✔

The **Movie file type** option in the movie shooting menu is used to choose the format in which movies are recorded. Choose from:
- **MOV**: Record movies in the Apple QuickTime format often used for movies distributed via the Internet.
- **MP4**: Record movies in an ISO/IEC-compliant format that can be viewed on many cellphones and smartphones.

Quality is not affected by the option selected.
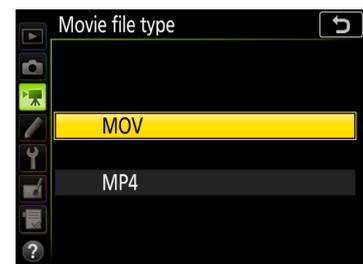
Controls and Displays

The settings discussed in this section affect movie controls and displays.

Multi-Selector Power Aperture

i-button menu	✔
Movie-related controls	—
Movie shooting menu	—

Enabling this option allows aperture to be adjusted using the multi selector, helping prevent the clicking sounds made by the command dials being recorded with the movie. Press ▲ to widen the aperture, ▼ to narrow the aperture. The adjustment is smooth and continuous, as are the resulting changes to depth of field and the like during filming.

1 **Select Multi-selector power aperture in the *i*-button menu.**
With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ▲ or ▼ to highlight **Multi-selector power aperture** and press ▶ to view options.
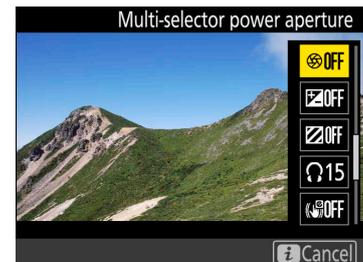
2 **Select the desired option.**
Press ▲ or ▼ to highlight the desired option and press ⓞ to select. Press the *i* button to exit to the shooting display when settings are complete.
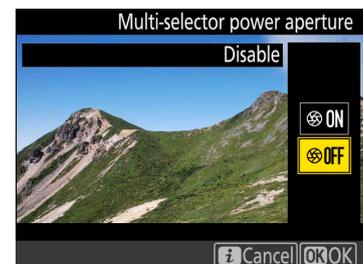
> ⚠️ **Power Aperture**
> Power aperture can also be assigned to custom controls using Custom Setting g1 (**Custom control assignment**, 📖 35). Power aperture is available only in exposure modes **A** and **M** and cannot be used while photo shooting info is displayed (a 🔅 icon indicates that power aperture can not be used). The display may flicker while aperture is adjusted.

Multi-Selector Exposure Compensation

i-button menu	✔
Movie-related controls	—
Movie shooting menu	—

Enabling this option allows exposure compensation to be adjusted by pressing ▲ or ▼, helping prevent the clicking sounds made by the command dials being recorded with the movie.

1 **Select Multi selector exposure comp. in the *i*-button menu.**
With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ▲ or ▼ to highlight **Multi selector exposure comp.** and press ▶ to view options.

2 **Select the desired option.**
Press ▲ or ▼ to choose the desired option and press ⓞ to select. Press the *i* button to exit to the shooting display when settings are complete.
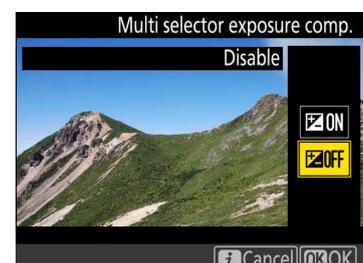
Custom Control Assignments

Use Custom Setting g1 (**Custom control assignment**) to choose the roles played by camera controls during movie recording.

i-button menu	—
Movie-related controls	—
Movie shooting menu	—

1 **Select Custom Setting g1 (Custom control assignment).**

In the Custom Settings menu, highlight Custom Setting g1 (**Custom control assignment**) and press ⊛. You will be prompted to choose a control.

2 **Select a control.**

Highlight a control using the multi selector and press ⊛. Options marked with 🎥 icons are used to choose the function performed by pressing the control and rotating a command dial, while the other options are used to choose the function performed when the control is pressed without rotating a command dial.

3 **Choose the function assigned to the selected control.**

Press ⊕ or ⊕ to highlight the desired function and press ⊛ to select.

■ Press

The options listed at right are used to choose the function performed by pressing the control.

Pv	**Pv** *button*
Fn1	**Fn1** *button*
Fn2	**Fn2** *button*
⊚	*Center of sub-selector*
⬳	*Shutter-release button*

The functions that can be assigned to these controls are:

Option	Pv	Fn1	Fn2	⊚	⬳
◯ Power aperture (open)	✔	—	—	—	—
⊛ Power aperture (close)	—	✔	—	—	—
⊯ Exposure compensation +	✔	—	—	—	—
◢ Exposure compensation –	—	✔	—	—	—
⬆ Index marking	✔	✔	✔	✔	—
📷ℹ View photo shooting info	✔	✔	✔	✔	—
🔒 AE/AF lock	—	—	—	✔	—

Option	Pv	Fn1	Fn2	⊚	⬳
🔒 AE lock only	—	—	—	✔	—
🔒 AE lock (Hold)	—	—	—	✔	—
🔒 AF lock only	—	—	—	✔	—
📷 Take photos	—	—	—	—	✔
🎥 Record movies	—	—	—	—	✔
None	✔	✔	✔	✔	—

35

Controls and Displays, Continued

Each of these functions are described in turn below.

◎	Power aperture (open)	Aperture widens while the **Pv** button is pressed. Use in combination with Custom Setting g1 (**Custom control assignment**) > **Fn1 button** > **Power aperture (close)** for button-controlled aperture adjustment.
⊗	Power aperture (close)	Aperture narrows while the **Fn1** button is pressed. Use in combination with Custom Setting g1 (**Custom control assignment**) > **Preview button** > **Power aperture (open)** for button-controlled aperture adjustment.
▽	Exposure compensation +	Exposure compensation increases while the **Pv** button is pressed. Use in combination with Custom Setting g1 (**Custom control assignment**) > **Fn1 button** > **Exposure compensation –** for button-controlled exposure compensation.
◢	Exposure compensation –	Exposure compensation decreases while the **Fn1** button is pressed. Use in combination with Custom Setting g1 (**Custom control assignment**) > **Preview button** > **Exposure compensation +** for button-controlled exposure compensation.
⊡	Index marking	Press the control during movie recording to add an index at the current position. Indices can be used when viewing and editing movies.
⬛ⁱ	View photo shooting info	Press the control to display photo shooting data in place of movie recording information. Press again to return to the movie recording display.
🔒	AE/AF lock	Focus and exposure lock while the control is pressed.
🔒	AE lock only	Exposure locks while the control is pressed.
🔒	AE lock (Hold)	Exposure locks when the control is pressed, and remains locked until the control is pressed a second time or the standby timer expires.
🔒	AF lock only	Focus locks while the control is pressed.
📷	Take photos	Press the shutter-release button all the way down to end movie recording and take a photograph with an aspect ratio of 16:9.
🎥	Record movies	Press the shutter-release button halfway to start live view. You can then press the shutter-release button halfway to focus (autofocus mode only) and press it all the way down to start or end recording. The shutter-release button cannot be used for other purposes while the live view selector is rotated to 🎥. To end live view, press the 🔳 button. The shutter-release button on an optional wireless remote controller or remote cord functions in the same way as the camera shutter-release button.
	None	Pressing the control has no effect.

⚠ **Power Aperture**

Power aperture is available only in exposure modes **A** and **M** and cannot be used while photo shooting info is displayed (a ⊗ icon indicates that power aperture cannot be used). The display may flicker while aperture is adjusted.

⚠ **"Record Movies"**

Interval timer photography is not available when **Record movies** is selected for **Shutter-release button**.

■ Press + 🖫

Options marked with 🖫 icons are used to choose the function performed by pressing the control and rotating a command dial. The following options are available:

🖫	**Choose image area**	Press the control and rotate a command dial to select the image area. The image area cannot be changed during shooting.
	None	No operation is performed when the command dials are rotated while the control is pressed.

🖫	**Pv** *button +* 🖫
🖫	**Fn1** *button +* 🖫
🖫	*Center of sub-selector +* 🖫

> ⚠️ **"Press" and "Press + 🖫"**
>
> Certain roles cannot be assigned simultaneously to both the "press" and "press + 🖫" functions for some controls. Assigning such a role to "press" when it is already assigned to "press + 🖫" sets the "press + 🖫" option **None**, while assigning such a role to "press + 🖫" when it is already assigned to "press" sets the "press" option **None**.

Controls and Displays, Continued

Highlight Display

When highlight display is enabled in the *i*-button menu, highlights (bright areas of the frame) are indicated by shading when the camera is in movie mode.

i-button menu	✔
Movie-related controls	—
Movie shooting menu	—

1 **Select Highlight display in the *i*-button menu.**

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ▲ or ▼ to highlight **Highlight display** and press ▶ to view options.
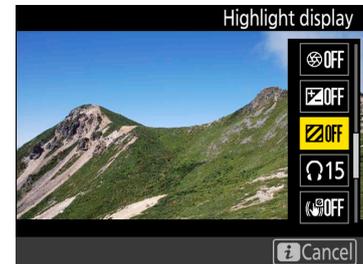
2 **Select the desired setting.**

Press ▲ or ▼ to highlight **Pattern 1** or **Pattern 2** and press ⊛ to select. Press the *i* button to exit to the shooting display when settings are complete.

Highlights

Pattern 1   Pattern 2
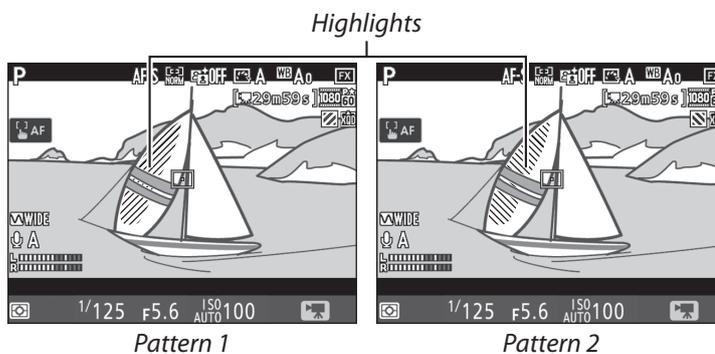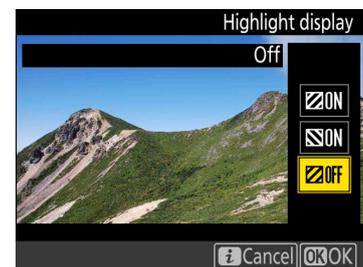
⚠️ **Highlight Display**

Enabling highlight display disables focus peaking (📖 32). The level of brightness needed to trigger the highlight display can be selected using Custom Setting g2 (**Highlight brightness**). Choose from settings between 180 and 255; the lower the value, the greater the range of brightnesses that will be shown as highlights. If 255 is selected, the highlight display will show only areas that are potentially overexposed.

Workflow	Buttons and Icons	Settings	Tips and Tricks	Viewing Movies	Appendix

Controls and Displays, Continued

Monitor Brightness

Follow the steps below to adjust monitor brightness when the camera is in movie mode.

i-button menu	✔
Movie-related controls	—
Movie shooting menu	—

❶ Select Monitor brightness in the *i*-button menu.

With the camera in movie mode, press the *i* button to display the *i*-button menu. Press ⊕ or ⊖ to highlight **Monitor brightness** and press ⊕ to view options.
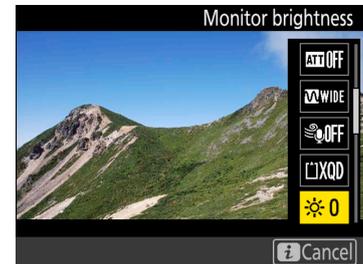
❷ Adjust brightness.

Press ⊕ or ⊖ to choose the desired brightness and press ⊛ to select (note that this affects live view only and has no effect on photographs or movies or on the brightness of the monitor for menus or playback). Press the *i* button to exit to the shooting display when settings are complete.
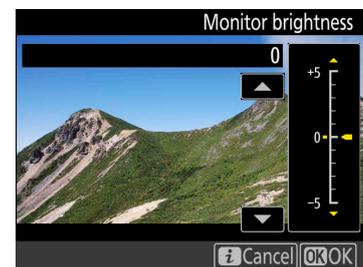
> **⚠ Menus and Playback**
>
> The brightness of the monitor for menus and playback can be adjusted using the **Monitor brightness** option in the setup menu.

Controls and Displays, Continued

Monitor Off Delay

Custom Setting c4 (**Monitor off delay**) determines how long the monitor remains on when no operations are performed. To prevent the monitor turning off during live view photography and movie recording, select **No limit** for Custom Setting c4 (**Monitor off delay**) > **Live view**.

i-button menu	—
Movie-related controls	—
Movie shooting menu	—

❶ **Select Custom Setting c4 (Monitor off delay).**
In the Custom Settings menu, highlight Custom Setting c4 (**Monitor off delay**) and press ⊙.
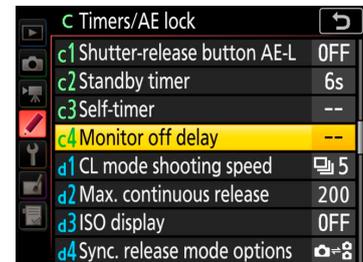
❷ **Choose an item.**
Press ⊙ or ⊙ to highlight the item for which you wish to set the monitor off delay and press ⊙ to select. You can choose different delays for playback, menus, the information display, image review, and live view.
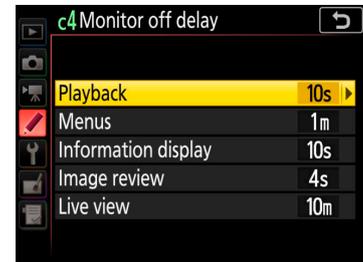
❸ **Select a monitor off delay.**
Press ⊙ or ⊙ to highlight the desired monitor off delay and press ⊛ to select. Choose shorter monitor-off delays for longer battery life.
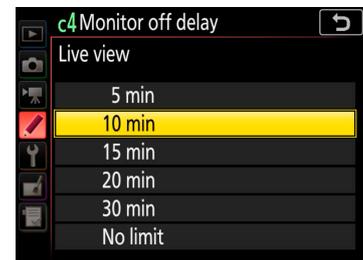
Time-Lapse Movie Techniques

Time-lapse movies are created from photographs shot automatically at preset intervals. The resulting movie is viewed at a much higher rate than the frames are captured, speeding the apparent passage of time. The camera offers two options that can be used to create time-lapse movies: the **Time-lapse movie** option in the movie shooting menu and the **Interval timer shooting** option in the photo shooting menu. Although both are used to automatically record a preset number of shots at a preset interval, they differ in the following respects:

	Time-lapse movie	Interval timer shooting
Description	The camera automatically takes photos at a preset interval and uses the resulting frames to generate a silent time-lapse movie.	The camera automatically takes photos at a preset interval, generating the raw materials for a time-lapse movie created using third-party movie-editing software.
Frame size	Up to 3840 × 2160. The options available are the same as those for **Frame size/frame rate** in the movie shooting menu.	Up to 8256 × 5504, selected using the **Image size** option in the photo shooting menu.

"Time-Lapse Movie"

Follow the steps below to film silent time-lapse movies using the **Time-lapse movie** option in the movie shooting menu.

> **⚠ Before Shooting**
>
> Before shooting a time-lapse movie, take a test shot at current settings and view the results in the monitor. Time-lapse movies are shot using the movie crop; to check the composition, press the ⊞ (🗲) button in the **Time-lapse movie** display (to return to the **Time-lapse movie** display, press the ⊞/🗲 button again). For consistent coloration, choose a white balance setting other than **AUTO** (auto) or ☀**A** (natural light auto).
>
> We recommend using a tripod and disabling lens vibration reduction (VR). Mount the camera on a tripod before shooting begins. To ensure that shooting is not interrupted, use an optional AC adapter and power connector or a fully-charged battery. To prevent light entering via the viewfinder interfering with photographs and exposure, close the viewfinder eyepiece shutter.
>
> **⚠ Restrictions**
>
> Time-lapse cannot be combined with some camera features, including live view, movie recording, long time exposures (bulb or time photography), the self-timer, bracketing, HDR (high dynamic range), multiple exposure, interval timer photography, and focus shift.

1 **Select Time-lapse movie.**
Highlight **Time-lapse movie** in the movie shooting menu and press ▶ to display time-lapse movie settings.

MOVIE SHOOTING MENU	
Frequency response	WIDE
Wind noise reduction	OFF
Electronic VR	OFF
Time-lapse movie	OFF

Time-lapse movie	↩
Start	
Interval	00 : 00' 05"
Shooting time	00 : 25' 00"
Exposure smoothing	ON
Silent photography	OFF
00' 05. 1" / 10' 00. 0"	
	Interrupt→OK
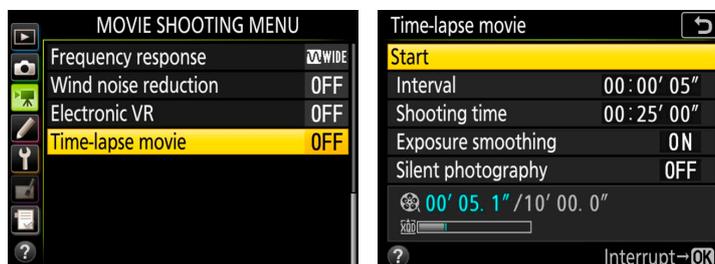
Time-Lapse Movie Techniques, Continued

❷ Adjust time-lapse movie settings.
Adjust the following settings:

- **Interval:** The interval (in minutes and seconds) should be longer than the slowest anticipated shutter speed.

Time-lapse movie
Start
Interval   00:00′ 05″ ▶
Shooting time   00:25′ 00″
Exposure smoothing   ON
Silent photography   OFF
🎞 00′ 05. 1″ /10′ 00. 0″
? ⊕⊠Framing

Time-lapse movie
Interval
00 : 00 ′ 05 ″
🎞 00′ 05. 1″ /10′ 00. 0″
OK OK

Highlight **Interval** *and press* ▶.   *Choose an interval and press* ⊛.

- **Shooting time:** The total shooting time (in hours and minutes) can be up to 7 hours and 59 minutes.

Time-lapse movie
Start
Interval   00:00′ 05″
Shooting time   00:25′ 00″ ▶
Exposure smoothing   ON
Silent photography   OFF
🎞 00′ 05. 1″ /10′ 00. 0″
? ⊕⊠Framing

Time-lapse movie
Shooting time
00 : 25 ′ 00 ″
🎞 00′ 05. 1″ /10′ 00. 0″
OK OK
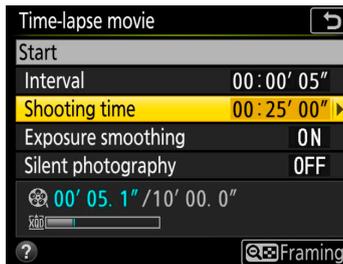
Highlight **Shooting time** *and press* ▶.   *Choose a shooting time and press* ⊛.

- **Exposure smoothing:** Select **On** to smooth abrupt changes in exposure in modes other than **M** (note that exposure smoothing only takes effect in mode **M** if auto ISO sensitivity control is on). Large changes in subject brightness during shooting may result in apparent variations in exposure, in which case it may be necessary to shorten the interval between shots.

Time-lapse movie
Start
Interval   00:00′ 05″
Shooting time   00:25′ 00″
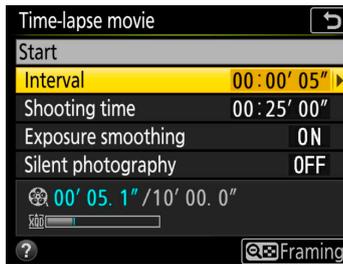Exposure smoothing   ON ▶
Silent photography   OFF
🎞 00′ 05. 1″ /10′ 00. 0″
? ⊕⊠Framing

Time-lapse movie
Exposure smoothing

On

Off

Highlight **Exposure smoothing** *and press* ▶.   *Highlight an option and press* ⊛.

- **Silent photography:** Select **On** to reduce wear on the shutter mechanism and silence the shutter during shooting; the only time the sound of the shutter or mirror will be heard is when the mirror is raised or lowered at the start and end of shooting. Some camera features will be disabled, including ISO sensitivities of Hi 0.3 through Hi 2.0 (☐ 13), flash photography, exposure delay mode, long exposure noise reduction, and flicker reduction (☐ 25).
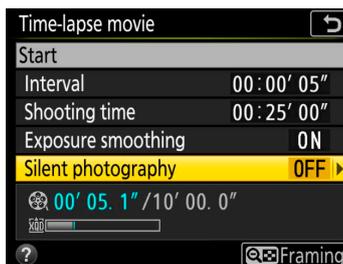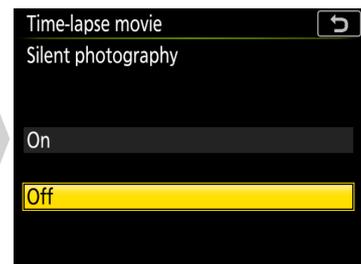
Time-lapse movie
Start
Interval   00:00′ 05″
Shooting time   00:25′ 00″
Exposure smoothing   ON
Silent photography   OFF ▶
🎞 00′ 05. 1″ /10′ 00. 0″
? ⊕⊠Framing

Time-lapse movie
Silent photography

On

Off

Highlight **Silent photography** *and press* ▶.   *Highlight an option and press* ⊛.

- **Image area**: Choose the image area used for time-lapse recording.
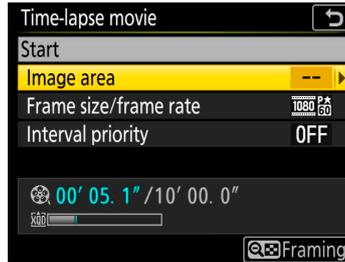
*Highlight **Image area** and press ⊙.*

Highlight an option and press ⊛.

- **Frame size/frame rate**: Choose the frame size and rate at which the final movie will play back.
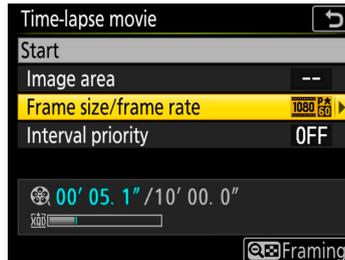
*Highlight **Frame size/frame rate** and press ⊙.*
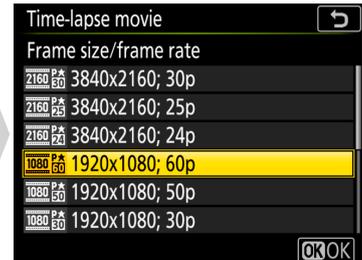
Highlight an option and press ⊛.

- **Interval priority**: Choose **On** to prioritize interval timing over exposure time, but note that time-lapse recording will end if the camera cannot focus or the shutter release is otherwise disabled.
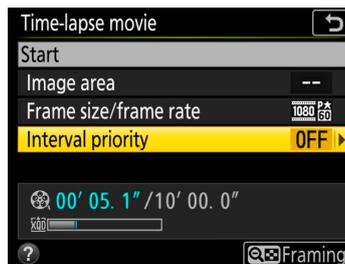
*Highlight **Interval priority** and press ⊙.*
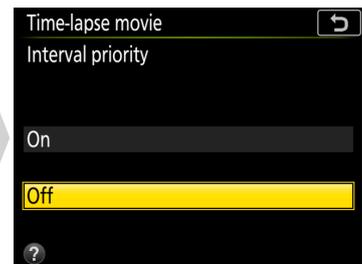
Highlight an option and press ⊛.

❸ **Start shooting.**

Highlight **Start** and press ⊛. Shooting starts after about 3 s, after which the camera will take photographs at the selected interval for the selected shooting time. When complete, time-lapse movies are recorded to the memory card selected for **Destination** in movie shooting menu (📖).

43

Time-Lapse Movie Techniques, Continued

⚠ Extending the Metering System's Lower Limit

Enabling both exposure smoothing and silent photography extends the lower limit of the exposure metering system downward by −3 EV, allowing exposure mode **A** to be used with subjects—such as the stars coming out as the sky darkens from dusk, or the sky brightening from night to dawn—that vary so greatly in brightness that they cannot be shot in mode **M** .

⚠ During Shooting

During shooting, INTVL will flash and the time-lapse recording indicator will be displayed in the control panel. The time remaining (in hours and minutes) appears in the shutter-speed display immediately before each frame is recorded. At other times, the time remaining can be viewed by pressing the shutter-release button halfway. Regardless of the option selected for Custom Setting c2 (**Standby timer**), the standby timer will not expire during shooting.
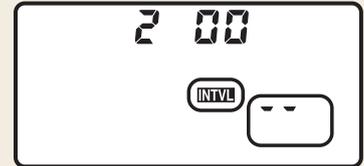
To view current time-lapse movie settings or end shooting, press the **MENU** button between shots. The data displayed in the time-lapse movie menu while shooting is in progress include exposure smoothing, the interval, and the time remaining. These settings cannot be changed while shooting is in progress, nor can pictures be played back or other menu settings adjusted.

■ Ending Shooting

To end shooting before all the frames are taken, highlight **Off** in the time-lapse movie menu and press ⊛, or press ⊛ between frames. A movie will be created from the frames shot to the point where shooting ended. Note that shooting will end and no movie will be recorded if the power source is removed or disconnected or the destination memory card is ejected. A beep does not sound when time-lapse recording ends.

⚠ Time-Lapse Movies

Because shutter speed and the time needed to record the image to the memory card may vary from shot to shot, the interval between a shot bein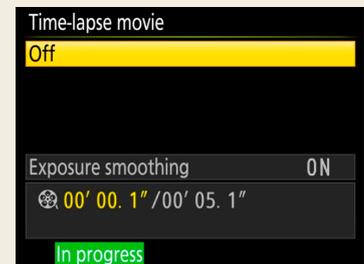g recorded and the start of the next shot may vary. Shooting will not begin if a time-lapse movie cannot be recorded at current settings (for example, if the memory card is full, the interval or shooting time is zero, or the interval is longer than the shooting time).

Shooting may end if camera controls are used or settings are changed or HDMI cable is connected. A movie will be created from the frames shot to the point where shooting ended. To end shooting and record a photograph, press the shutter-release button all the way down.

⚠ Image Review

The ▶ button cannot be used to view pictures while shooting is in progress, but the current frame will be displayed for a few seconds after each shot if **On** is selected for **Image review** in the playback menu. Other playback operations cannot be performed while the frame is displayed.

⚠ Calculating the Length of the Final Movie

The total number of frames in the final movie can be calculated by dividing the shooting time by the interval and rounding up. The length of the final movie can then be calculated by dividing the number of shots by the frame rate selected for **Frame size/frame rate**. A 48 frame movie recorded at **1920 × 1080; 24p**, for example, will be about two seconds long. The maximum length for time-lapse movies is 20 minutes.

"Interval Timer Shooting"

Follow the steps below to create time-lapse movies using the **Interval timer shooting** option in the photo shooting menu. Before proceeding, be sure to select a release mode other than $\circlearrowleft$ (self-timer).

> ⚠ **Before Shooting**
>
> Before beginning interval timer photography, take a test shot at current settings and view the results in the monitor. Once settings have been adjusted to your satisfaction, close the viewfinder eyepiece shutter to prevent light entering via the viewfinder interfering with photographs and exposure.
>
> Before choosing a starting time, select **Time zone and date** in the setup menu and make sure that the camera clock is set to the correct time and date.
>
> We recommend using a tripod and disabling lens vibration reduction (VR). Mount the camera on a tripod before shooting begins. To ensure that shooting is not interrupted, be sure the camera battery is fully charged. If in doubt, charge the battery before use or use an AC adapter and power connector (available separately).

❶ **Select Interval timer shooting.**
Highlight **Interval timer shooting** in the photo shooting menu and press ⊕ to display interval timer settings.
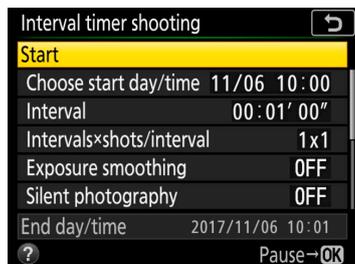
❷ **Adjust interval timer settings.**
Adjust the following settings:

- **Choose start day/time:** To start shooting immediately, select **Now**. To start shooting at a chosen date and time, select **Choose day/time**, then choose the date and time and press ⊛.
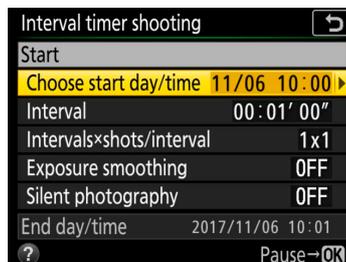
*Highlight **Choose start day/time** and press ⊕.*
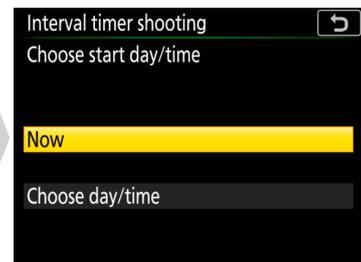
Highlight an option and press ⊛.

- **Interval:** The interval (in minutes and seconds) should be longer than the time needed to take the shots for each interval, including the time needed for the flash to charge between shots, if applicable. The camera may skip intervals that are too short to allow the selected number of shots to be recorded.

*Highlight **Interval** and press ⊕.*

Choose an interval and press ⊛.

Time-Lapse Movie Techniques, Continued

- **Intvl×shots/interval**: Choose the number of intervals and the number of shots per interval. In **S** (single frame) mode, the photographs for each interval will be taken at the rate chosen for Custom Setting d1 (**CL mode shooting speed**).
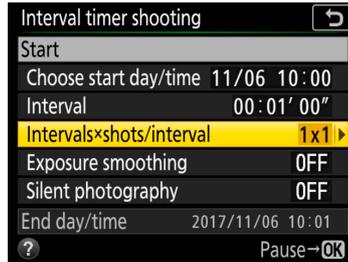
*Highlight **Intvl×shots/interval** and press ▶.*

Choose the number of intervals and shots/interval and press ⓞ.

- **Exposure smoothing**: Select **On** to smooth abrupt changes in exposure in modes other than **M** (note that exposure smoothing only takes effect in mode **M** if auto ISO sensitivity control is on). Large changes in subject brightness during shooting may result in apparent variations in exposure, in which case it may be necessary to shorten the interval between shots.

*Highlight **Exposure smoothing** and press ▶.*
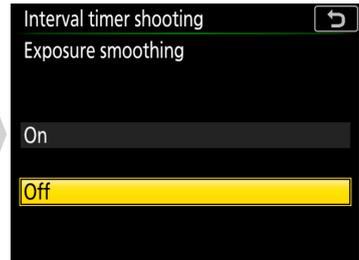
Highlight an option and press ⓞ.

- **Silent photography**: Select **On** to reduce wear on the shutter mechanism and silence the shutter during shooting; the only time the sound of the shutter or mirror will be heard is when the mirror is raised or lowered at the start and end of shooting. Some camera features will be disabled, including ISO sensitivities of Hi 0.3 through Hi 2.0 (□ 13), flash photography, exposure delay mode, flicker reduction (□ 25), bracketing, and multiple exposure.
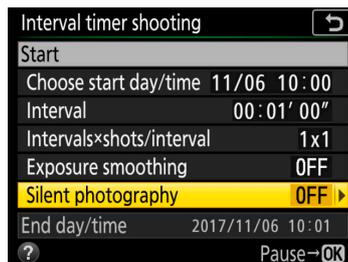
*Highlight **Silent photography** and press ▶.*
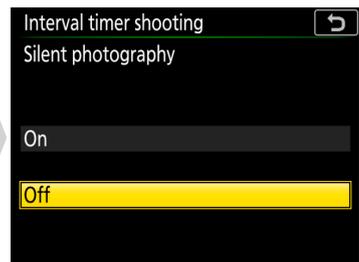
Highlight an option and press ⓞ.

- **Interval priority**: Choose **On** to prioritize interval timing over exposure time, but note that shooting will end if the camera cannot focus or the shutter release is otherwise disabled.
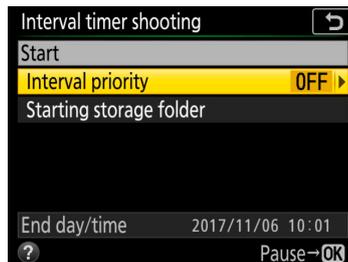
*Highlight **Interval priority** and press ▶.*
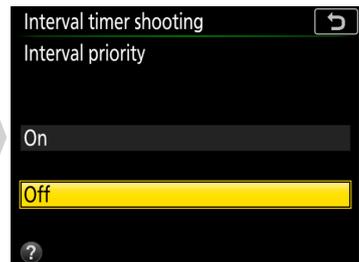
Highlight an option and press ⓞ.

- **Starting storage folder**: Select **New folder** to create a new folder for each sequence shot using interval timer photography, and **Reset file numbering** to reset file numbering to 0001 when a new folder is created.
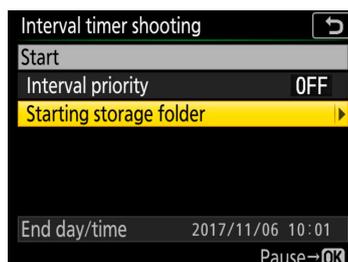
*Highlight **Starting storage folder** and press ▶.*
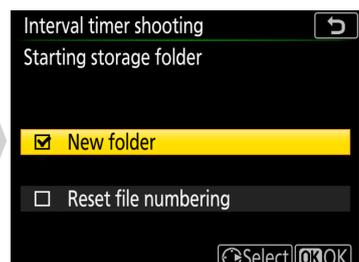
Highlight option and press ▶ to select or deselect. Press ⓞ to proceed.

③ Start shooting.

Highlight **Start** and press ⊛. The first series of shots will be taken at the specified starting time, or after about 3 s if **Now** was selected for **Choose start day/time** in Step 2. Shooting will continue at the selected interval until all shots have been taken.

Interval timer shooting	↺
Start	
Choose start day/time	11/06 10:00
Interval	00:01' 00"
Intervals×shots/interval	1x1
Exposure smoothing	OFF
Silent photography	OFF
End day/time	2017/11/06 10:01
?	Pause→OK

④ Create a time-lapse movie.

This step requires third-party software that supports time-lapse movie creation. Use the software to import photos taken using interval timer shooting and create a time-lapse movie.

■ Pausing Interval Timer Photography

Interval timer photography can be paused between intervals by pressing ⊛ or selecting **Pause** in the interval timer menu.

■ Resuming Interval Timer Photography

To resume shooting immediately, select **Restart** in the interval timer menu.

Interval timer shooting	↺
Restart	
Off	
Choose start day/time	
Exposure smoothing	OFF
End day/time	2017/11/06 10:01
Pause	
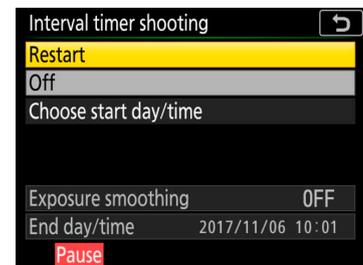
*Highlight **Restart** and press ⊛.*

To resume shooting at a specified time:

Interval timer shooting	↺
Restart	
Off	
Choose start day/time	▶
Exposure smoothing	OFF
End day/time	2017/11/06 10:01
? Pause	

Interval timer shooting	↺
Choose day/time	
Start date H M	
11/06 10 : 10	
End day/time	2017/11/06 10:11
Pause	OK OK

Interval timer shooting	↺
Restart	
Off	
Choose start day/time	
Exposure smoothing	OFF
End day/time	2017/11/06 10:01
Pause	
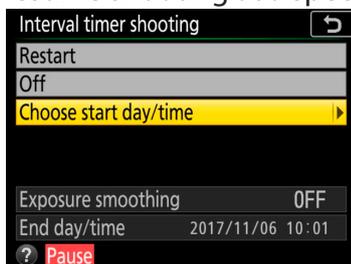
*In the interval timer menu, highlight **Choose start day/time** and press ▶.* *Choose a starting date and time and press ⊛.* *Highlight **Restart** and press ⊛.*
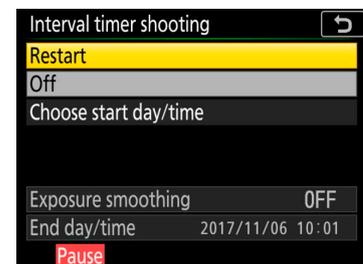
■ Ending Interval Timer Photography

To end interval timer photography before all the photos are taken, select **Off** in the interval timer menu.

⚠ Out of Memory

If the memory card is full, the interval timer will remain active but no pictures will be taken. Resume shooting after deleting some pictures or turning the camera off and inserting another memory card.

⚠ Extending the Metering System's Lower Limit

Enabling both exposure smoothing and silent photography extends the lower limit of the exposure metering system downward by −3 EV, allowing exposure mode **A** to be used with subjects—such as the stars coming out as the sky darkens from dusk, or the sky brightening from night to dawn—that vary so greatly in brightness that they cannot be shot in mode **M** .

Time-Lapse Movie Techniques, Continued

⚠ During Shooting

During interval timer photography, the 🔲 icon will flash in the control panel. Immediately before the next interval begins, the shutter speed display will show the number of intervals remaining, and the aperture display will show the number of shots remaining in the current interval. At other times, the number of intervals remaining and the number of shots in each interval can be viewed by pressing the shutter-release button halfway.
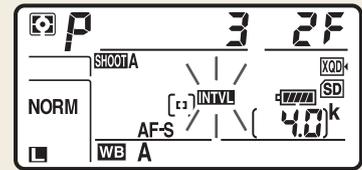
Settings can be adjusted, the menus used, and pictures played back while interval timer photography is in progress. The monitor will turn off automatically about four seconds before each shot. Note that changing camera settings while the interval timer is active may cause shooting to end.

⚠ Release Mode

Regardless of the release mode selected, the camera will take the specified number of shots at each interval.

⚠ Interval Timer Photography

If the interval is too short, the number of photos taken may be less than the total listed in Step 2 (the number of intervals multiplied by the number of shots per interval) or the flash may fire at less than the power needed for full exposure. Interval timer photography cannot be combined with some camera features, including live view, movie recording, time-lapse movies, long-time exposures (bulb or time photography), and focus shift. In addition, interval timer photography is not available when **Record movies** is selected for Custom Setting g1 (**Custom control assignment**) > **Shutter-release button** (📖 35). Note that because the shutter speed, frame rate, and time needed to record images may vary from one interval to the next, the time between the end of one interval and the beginning of the next may vary. If shooting cannot proceed at current settings (for example, if a shutter speed of **bu Lb** or **--** is currently selected in manual exposure mode, the interval is zero, or the start time is in less than a minute), a warning will be displayed in the monitor.

The camera focuses before each shot. If **AF-S** is selected and the camera is unable to focus, the camera will either end interval timer photography (**On** selected **Interval priority**) or skip to the next interval (**Off** selected **Interval priority**) if no photograph is taken after eight seconds.

Interval timer shooting will pause when ⟳ (self-timer) is selected or if the camera is turned off and then on again (when the camera is off, batteries and memory cards can be replaced without ending interval timer photography). Pausing shooting does not affect interval timer settings.

⚠ Bracketing

Adjust bracketing settings before starting interval timer photography. If exposure, flash, or ADL bracketing is active while interval timer photography is in effect, the camera will take the number of shots in the bracketing program at each interval, regardless of the number of shots specified in the interval timer menu. If white balance bracketing is active while interval timer photography is in effect, the camera will take one shot at each interval and process it to create the number of copies specified in the bracketing program. Note that bracketing cannot be used during interval timer photography when **On** is selected for **Interval priority**.

Slow-Motion Movies

To record silent slow-motion movies, select **1920 × 1080; 30p ×4 (slow-mo)**, **1920 × 1080; 25p ×4 (slow-mo)**, or **1920 × 1080; 24p ×5 (slow-mo)** for **Frame size/frame rate** (📖 12). Slow-motion movies are recorded at 4 or 5 times the rated speed and play back at the rated speed. Movies shot at **1920 × 1080; 30p ×4 (slow-mo)**, for example, are recorded at a frame rate of roughly 120 fps and play back at around 30 fps, meaning that 10 seconds recording produces about 40 seconds of footage.

Recording   ▭   *Approximately 10 seconds*

Playback   ▭▭▭▭   *Approximately 40 seconds*

Recording and playback speeds are shown below.

| Frame size/frame rate	Recording speed	Playback speed
1080 🎞 **1920 × 1080; 30p ×4 (slow-mo)**	120p (119.88 fps)	30p (29.97 fps)
1080 🎞 **1920 × 1080; 25p ×4 (slow-mo)**	100p (100 fps)	25p (25 fps)
1080 🎞 **1920 × 1080; 24p ×5 (slow-mo)**	120p (119.88 fps)	24p (23.976 fps)

🔅 Slow-Motion Movies

When a slow-motion option is selected, quality is fixed at "normal" and the image area is fixed at DX, regardless of the lens used or the option selected for **Image area** > **Choose image area** in the movie shooting menu (📖 20). Movies shot with face-priority AF, pinpoint AF, or subject-tracking AF selected for AF-area mode are recorded using wide-area AF.

HDMI Output

The camera can be connected to HDMI devices for high-definition movie playback and recording.

Connecting to an HDMI Device

The camera can be connected to high-definition video devices using an optional High-Definition Multimedia Interface (HDMI) cable available from Nikon or a third-party type C HDMI cable. Always turn the camera off before connecting or disconnecting the cable.

Connect to high-definition device (choose cable with appropriate connector)

Connect to camera
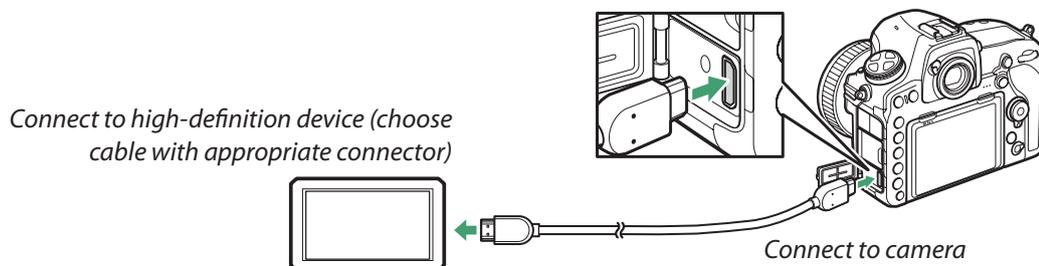
HDMI Options

The **HDMI** option in the setup menu controls output resolution and offers a variety of advanced HDMI options.

■ **Output Resolution**
Choose the format for images output to the HDMI device. If **Auto** is selected, the camera will automatically select the appropriate format.

■ **External Recording Control**
Enabling external recording control allows camera controls to be used to start and stop recording when the camera is connected via HDMI to a third-party recorder that supports the Atomos Open Protocol (the Atomos SHOGUN, SHOGUN STUDIO, SHOGUN FLAME, SHOGUN INFERNO, NINJA BLADE, NINJA FLAME, NINJA INFERNO, and SUMO). An icon will be displayed in the camera monitor: ⏻STBY is displayed in live view, while ⏻REC is displayed during movie recording (note that camera controls cannot be used for movie recording when 3840 × 2160 or 1920 × 1080 slow-mo is selected for frame size; use the controls on the recorder).

During recording, check the recorder and recorder display to ensure that footage is being saved to the device. The camera will end output to the device if the monitor turns off automatically after recording has started; to ensure that recording is not interrupted, select an option for Custom Setting c4 (**Monitor off delay**) > **Live view** that is longer than the intended recording time. If a memory card is inserted in the camera, movies will be recorded both to the memory card and to external device, but note that recording will not begin in the event of a card error or if the card is write-protected and will end when the memory card is full or if recording stops automatically for any reason. Note that depending on the recorder, you may need to adjust recorder settings; for more information, see the manual provided with the recorder.
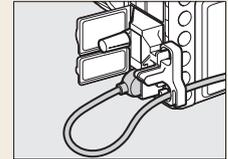
■ **Advanced**

Selecting **Advanced** displays the following options:

Output range	**Auto** is recommended in most situations. If the camera is unable to determine the correct RGB video signal output range for the HDMI device, you can choose from the following options: • **Limited range**: For devices with an RGB video signal input range of 16 to 235. Choose this option if you notice loss of detail in shadows. • **Full range**: For devices with an RGB video signal input range of 0 to 255. Choose this option if shadows are "washed out" or too bright.
Output display size	Choose horizontal and vertical frame coverage for HDMI output from 95% or 100%.
Live view on-screen display	If **Off** is selected when the camera is connected to an HDMI device, shooting information will not be displayed in the monitor during live view photography. Note that regardless of the option selected, shooting information is not displayed at movie frame sizes of 1920 × 1080 (slow-mo) or 3840 × 2160.
Dual monitor	Choose **On** to mirror the HDMI display on the camera monitor, **Off** to turn the camera monitor off to save power (note that regardless of the option selected, the camera monitor remains on at movie frame sizes of 1920 × 1080 slow-mo or 3840 × 2160). **Dual monitor** turns on automatically when **Live view on-screen** display is **Off**.

⚠ **The HDMI/USB Cable Clip**

To prevent accidental disconnection, attach the supplied clip to HDMI cables or to the supplied USB cable as shown (the illustration shows an HDMI cable; note that the clip may not fit all third-party HDMI cables). Keep the monitor in the storage position when using the cable clip.

Viewing Tips

Some tips for viewing movies:

Ten-Second Advance/Rewind

Rotate the main command dial one click to advance or rewind 10 seconds.

Skipping to an Index or the Last/First Frame

If you added index markers during recording, you can skip to the next or previous index frame by rotating the sub-command dial during playback. If there are no intervening index markers, the sub-command dial will take you to the last or first frame.

> ⚠ **Index Marking**
> If **Index marking** is assigned to a control using Custom Setting g1 (**Custom control assignment**, 📖 35), you can press the selected control during recording to add indices that can be used to locate frames during editing and playback. Up to 20 indices can be added to each movie.

Slow-Motion Playback

To view a movie in slow motion starting from the current playback position, pause playback and then press 🔽.

Using the Touch Screen

The touch screen offers the following movie playback controls:

■ **Play/Pause/Resume**

Tap the ▶ icon to start playback and tap the monitor to pause or resume.

▶ icon

■ **Skip**

Tap the progress bar to skip to the selected position and pause playback. You may find this useful when attempting to find a specific scene in a long movie.

Progress bar
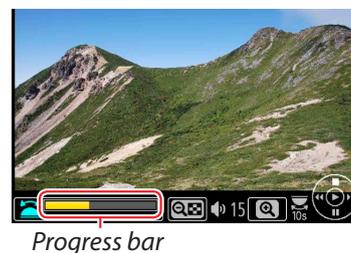
■ **Volume Control**

Tap the 🔍⊠ or 🔍 icon during playback to adjust the volume.

Volume control
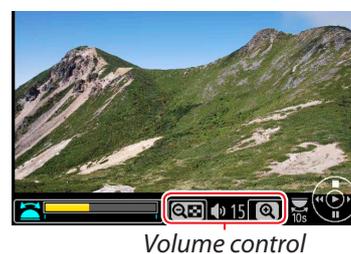
Joining Movie Files Together

Each movie recorded with the D850 may consist of up to 8 files of up to 4 GB in size. These files can be joined together in ViewNX-i.
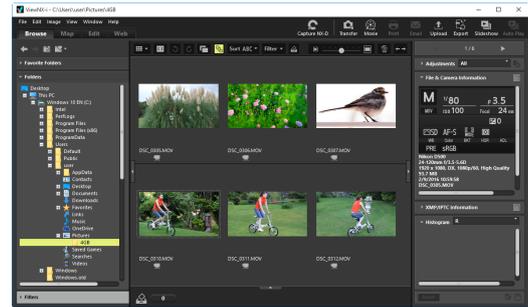
1 **Select the files in the movie.**
Right-click any of the files in the movie and choose **Select set of continuous movies** to select all the movie's component files.
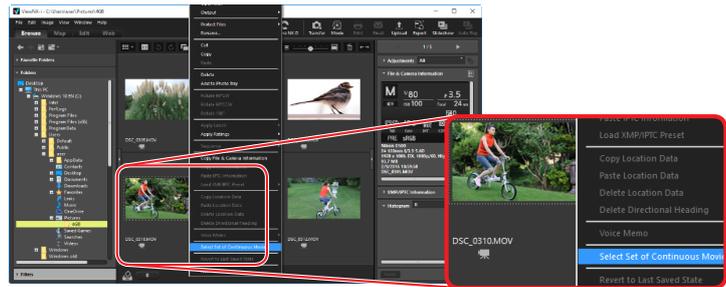
2 **Launch ViewNX-Movie Editor.**
Click the 🔘 (movie) button to launch ViewNX-Movie Editor.
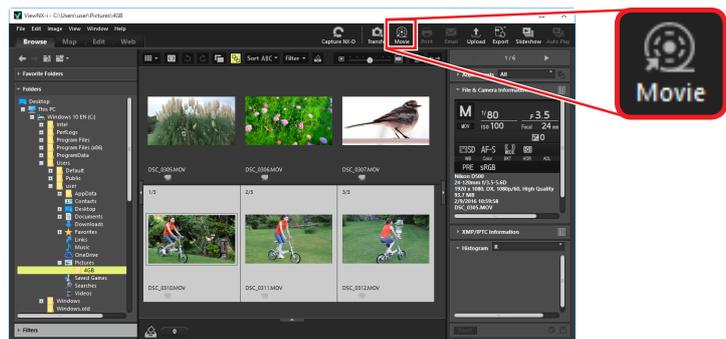
3 **Click Combine movies.**
The options at right will be displayed. Click **Combine movies**.
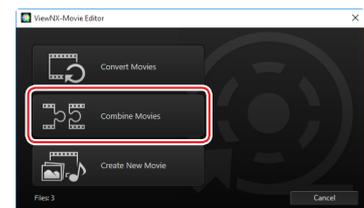
4 **Save the movie.**
Choose a destination and file name and click **Output**.
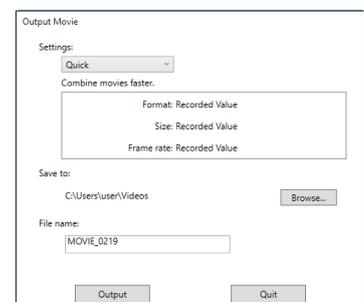
Image Sensor Cleaning

If you suspect that dirt or dust on the image sensor is appearing in photographs, you can clean the sensor using the **Clean image sensor** option in the setup menu.

1 **Position the camera base down.**
So that image sensor cleaning has the maximum possible effect, hold the camera base down as shown in the illustration.
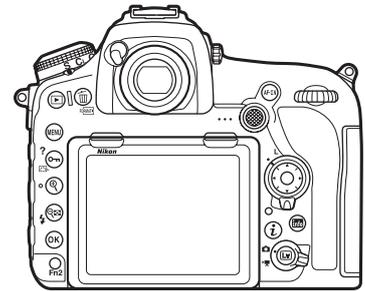
2 **Select Clean image sensor > Clean now.**
Select **Clean image sensor** in the setup menu, then highlight **Clean now** and press ⊛ to begin image sensor cleaning. While cleaning is in progress, 𝚋𝚞𝚂𝚈 will flash in the control panel and no other operations can be performed. Do not remove or disconnect the power source until cleaning ends and the setup menu is displayed.

SETUP MENU
Non-CPU lens data	№. 1
Clean image sensor	--
Lock mirror up for cleaning	--
Image Dust Off ref photo	--
Image comment	OFF
Copyright information	OFF
Beep options	--
Touch controls	ON
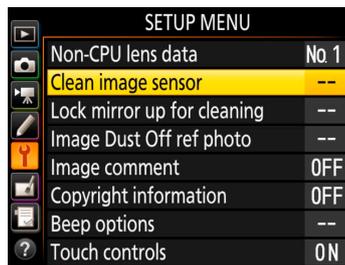
Highlight **Clean image sensor** *and press* ▶.

Clean image sensor
Clean now
Clean at startup/shutdown   ON/OFF
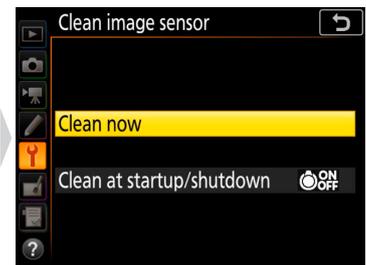
Highlight **Clean now** *press* ⊛.

Troubleshooting

Some things to note when filming.

Keeping the Camera Cool

If live view is used continuously for extended periods, the camera's internal temperature will rise, causing noise (bright spots, randomly-spaced bright pixels, or fog) to appear in images. Use live view only when taking pictures. Note that live view does not end when menus are displayed; unless you intend to resume shooting immediately, exit live view before using the menus.

Image Artifacts

Flicker, banding, or distortion may be visible in the monitor and in the final movie under fluorescent, mercury vapor, or sodium lamps, when power aperture is in use, or if the camera is panned horizontally or an object moves at high speed through frame. Jagged edges, color fringing, moiré, and bright spots may also appear. Bright bands may appear in some areas of the frame with flashing signs and other intermittent light sources or if the subject is briefly illuminated by a strobe or other bright, momentary light source. Noise (randomly-spaced bright pixels, fog, or lines) and unexpected colors may be more noticeable if you zoom in on the view through the lens during live view.

The **Flicker reduction** option (25) in the movie shooting menu can be used to reduce flicker under fluorescent, mercury vapor, or sodium lamps. The desired results may not be obtained if the subject is very bright, in which case you should try a smaller aperture (higher f-number).

Ending Recording

If the maximum length is reached, the memory card fills, the battery runs low, the live view selector is rotated to C, the lens is removed, or the camera overheats, filming will end automatically and all footage shot to that point will be saved. No movie will be recorded if the battery is removed during filming.

Troubleshooting, Continued

Unavailable Menu Options

Menu items that are grayed out can sometimes be accessed by changing camera settings.

■ Movie Shooting Menu

Image area (📖 20)	Not available if slow-mo is selected for **Frame size/frame rate** (📖 12).
Frame size/frame rate (📖 12)	Not available if **Image area** is assigned to a control using Custom Setting g1 (**Custom control assignment**, 📖 35).
Movie quality (📖 12)	Not available if 4K UHD or slow-mo is selected for **Frame size/frame rate** (📖 12).
White balance (📖 14)	
Preset manual	
Copy from existing photograph	• Check that a memory card is selected as the destination and that it is inserted, formatted, undamaged, and contains at least one photo. • Ensure the selected preset is not protected. • Wait for recording (including multiple exposure photography) to end.
Set Picture Control (📖 16)	
Auto	
Clarity	Does not apply to movies.
Standard	
Clarity	Does not apply to movies.
Neutral	
Quick adjust	Not available in movie mode.
Clarity	Does not apply to movies.
Vivid	
Clarity	Does not apply to movies.
Monochrome	
Clarity	Does not apply to movies.
Portrait	
Clarity	Does not apply to movies.
Landscape	
Clarity	Does not apply to movies.
Flat	
Quick adjust	Not available in movie mode.
Clarity	Does not apply to movies.
Custom Picture Controls 1–9	
Quick adjust	Not available in movie mode.
Clarity	Does not apply to movies.
Contrast	Not available if the Picture Control uses a custom tone curve edited using Picture Control Utility 2.
Brightness	

Manage Picture Control	Wait for recording (including multiple exposure photography) to end.
Auto	
Clarity	Does not apply to movies.
Standard	
Clarity	Does not apply to movies.
Neutral	
Quick adjust	Not available in movie mode.
Clarity	Does not apply to movies.
Vivid	
Clarity	Does not apply to movies.
Monochrome	
Clarity	Does not apply to movies.
Portrait	
Clarity	Does not apply to movies.
Landscape	
Clarity	Does not apply to movies.
Flat	
Quick adjust	Not available in movie mode.
Clarity	Does not apply to movies.
Custom Picture Controls 1–9	
Quick adjust	Not available in movie mode.
Clarity	Does not apply to movies.
Contrast	Not available if the Picture Control uses a custom tone curve edited using Picture Control Utility 2.
Brightness	
Load/save	• Check that the memory card is inserted, formatted, and undamaged. • Exit image transfer mode.
Delete from card **Copy to card**	Ensure that the memory card is not write protected.
Active D-Lighting	Not available if 4K UHD or slow-mo is selected for **Frame size/frame rate** (📖 12) or if focus peaking is enabled (📖 32).
Microphone sensitivity (📖 26) **Attenuator** (📖 26) **Frequency response** (📖 27)	Not available if slow-mo is selected for **Frame size/frame rate** (📖 12).
Wind noise reduction (📖 27)	Not available with external microphones or if slow-mo is selected for **Frame size/frame rate** (📖 12).

Time-lapse movie (📖 **41**)	• Use a CPU lens. • End multiple exposure, interval timer, focus shift, bracketing, and HDR photography. • Set the camera clock. • Exit image transfer mode. • Disconnect the HDMI cable. • Choose a shutter speed other than bulb or time. • Disable the negative digitizer.
Start time	• Check that the shooting time is longer than the Interval. • Ensure there is enough space on the memory card to record the time-lapse movie. • Wait for recording to end. • End image upload. • If 4K UHD is selected for **Frame size/frame rate**, confirm that the total length of the movie (calculated by dividing the shooting time by the interval to determine the number of frames and then dividing the number of frames by the frame rate) is less than 3 minutes.
Electronic VR (📖 **21**)	Not available if 4K UHD or slow-mo is selected for **Frame size/frame rate** (📖 **12**) or if focus peaking is enabled (📖 **32**).

■ The *i*-Button Menu (Movie Mode)

See page 56 for items that are also included in the movie shooting menu.

Monitor brightness (📖 **39**)	If the camera is connected to an HDMI device, select **On** for **HDMI** (📖 **50**) > **Advanced** > **Dual monitor**.
Multi-selector power aperture (📖 **34**)	Select **Off** for **Multi-selector exposure comp.**.
Multi-selector exposure comp. (📖 **34**)	Select **Off** for **Multi-selector power aperture**.
Peaking level (📖 **32**)	• Select **Off** for **Electronic VR** (📖 **21**), **Active D-Lighting** (📖 **25**), and **Highlight display** (📖 **38**). • Select an option other than 4K UHD or slow-mo for **Frame size/frame rate** (📖 **12**).

■ The *i*-Button Menu (Movie Recording)

Microphone sensitivity (📖 **26**)	Not available in slow-motion movie mode or during recording if **Off** was selected when recording began.
Off	Not available during recording if an option other than **Off** was selected when recording began.
Attenutator (📖 **26**) **Frequency response** (📖 **27**)	Not available in slow-motion movie mode or if recording began with **Off** selected for microphone sensitivity.
Wind noise reduction (📖 **27**)	Not available with external microphones, in slow-motion movie mode, or if recording began **Off** with selected for microphone sensitivity.
Multi-selector power aperture (📖 **34**)	Select **Off** for **Multi-selector exposure comp.**.
Multi-selector exposure comp. (📖 **34**)	Select **Off** for **Multi-selector power aperture**.
Peaking level (📖 **32**)	Not available during recording if recording began with 4K UHD or slow-mo selected for **Frame size/frame rate** (📖 **12**) or **Off** selected for **Electronic VR** (📖 **21**), **Active D-Lighting** (📖 **25**), or **Highlight display** (📖 **38**).

■ The Photo Shooting Menu

Interval timer shooting (📖 **45**)	• Set the camera clock. • Exit image transfer mode. • End negative digitizer, time-lapse, and focus shift photography.
Start	• End multiple exposure photography. • Choose a release mode other than ⟳ (self-timer). • If **Record movies** is selected for Custom Setting g1 (**Custom control assignment**) > **Shutter-release button** (📖 **35**), rotate the live view selector to ◯ (photo live view).
Silent photography	End bracketing and multiple exposure photography.
Interval priority	End bracketing.

D850 Movie Specifications

Image sensor

Image sensor	35.9 × 23.9 mm CMOS sensor
Total pixels	46.89 million
Dust-reduction system	Image sensor cleaning, Image Dust Off reference data (Capture NX-D software required)

Storage

Media	XQD and SD (Secure Digital) memory cards and UHS-II compliant SDHC and SDXC memory cards

Movie

Metering system	TTL exposure metering using main image sensor
Metering mode	Matrix, center-weighted, or highlight-weighted
Frame size (pixels) and frame rate	• 3840 × 2160 (4K UHD); 30p (progressive), 25p, 24p • 1920 × 1080; 60p, 50p, 30p, 25p, 24p • 1280 × 720; 60p, 50p • 1920×1080 (slow-mo); 30p ×4, 25p ×4, 24p ×5 Actual frame rates for 60p, 50p, 30p, 25p, and 24p are 59.94, 50, 29.97, 25, and 23.976 fps respectively; quality selection available at all sizes except 3840 × 2160 (when quality is fixed at ★) and 1920 × 1080 slow-mo (when quality is fixed at "normal")
Video sampling rate	• **Internal**: 4 : 2 : 0, 8-bit • **HDMI output**: 4 : 2 : 2, 8-bit
File format	MOV, MP4
Video compression	H.264/MPEG-4 Advanced Video Coding
Audio recording format	48 kHz, 16-bit, linear PCM, AAC
Audio recording device	Built-in stereo or external microphone; sensitivity adjustable
ISO sensitivity (Recommended Exposure Index)	• **Exposure modes P, S, and A**: Auto ISO sensitivity control (ISO 64 to Hi 2) with selectable upper limit • **Exposure mode M**: Auto ISO sensitivity control (ISO 64 to Hi 2) available with selectable upper limit; manual selection (ISO 64 to 25600 in steps of ⅓, ½, or 1 EV) with additional options available equivalent to approximately 0.3, 0.5, 0.7, 1, or 2 EV (ISO 102400 equivalent) above ISO 25600
Active D-Lighting	Can be selected from **Same as photo settings**, **Extra high**, **High**, **Normal**, **Low**, or **Off**
Other options	Index marking, time-lapse movies, electronic vibration reduction

White balance

White balance	Same as photo settings, Auto (3 types), natural light auto, incandescent, fluorescent (7 types), direct sunlight, cloudy, shade, preset manual (up to 6 values can be stored, spot white balance measurement available during live view), choose color temperature (2500 K–10,000 K), all with fine-tuning

Picture Control

Picture Control System	Same as photo settings, Auto, Standard, Neutral, Vivid, Monochrome, Portrait, Landscape, Flat; selected Picture Control can be modified; storage for custom Picture Controls

Monitor

Monitor	8-cm/3.2-in., approx. 2359k-dot (XGA) tilting TFT touch-sensitive LCD with 170° viewing angle, approximately 100% frame coverage, and manual monitor brightness control

Interface

USB	SuperSpeed USB (USB 3.0 Micro-B connector); connection to built-in USB port is recommended
HDMI output	Type C HDMI connector
Audio input	Stereo mini-pin jack (3.5 mm diameter; plug-in power supported)
Audio output	Stereo mini-pin jack (3.5 mm diameter)

Power source

Battery	One EN-EL15a rechargeable Li-ion battery; EN-EL15 can also be used, but note that less footage can be recorded on a single charge than with an EN-EL15a
Battery pack	Optional MB-D18 multi-power battery pack with one rechargeable Nikon EN-EL18b Li-ion battery (available separately), one rechargeable Nikon EN-EL15a Li-ion battery, or eight AA alkaline, Ni-MH, or lithium batteries. An MH-26a or MH-26 battery charger and a BL-5 battery-chamber cover (both available separately) are required when using EN-EL18b batteries. EN-EL18a, EN-EL18, and EN-EL15 batteries are also supported, but note that less footage can be recorded on a single charge with an EN-EL18 than with an EN-EL18b/EN-EL18a, and that less footage can be recorded on a single charge with an EN-EL15 than with an EN-EL15a.
AC adapter	EH-5c/EH-5b AC adapter; requires EP-5B power connector (available separately)

Tripod socket

Tripod socket	¼ in. (ISO 1222)