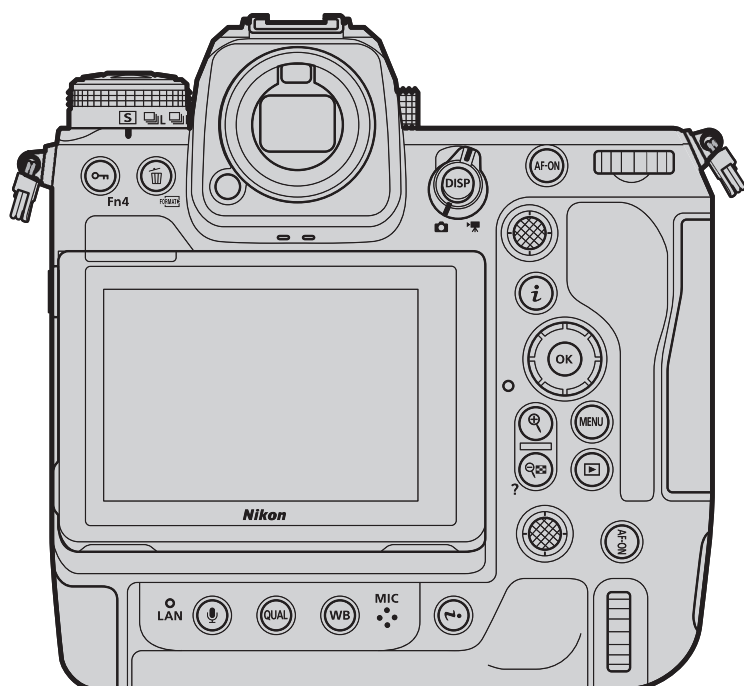


# ***Nikon***



# **Z 9 Professional**

**Setting Guide**  
**—Video Edition—**  
**Revision 1.0**



**En**

# Camera Firmware

This guide is for camera “C” firmware version 2.xx.

## Viewing the Firmware Version and Updating Firmware

You can view the firmware version and update the camera firmware via [Firmware version] in the setup menu. The firmware can be updated using either a computer or a smart device (smartphone or tablet).

- **Using a computer:** To check for updates, visit the Nikon Download Center at the URL below. Information on performing updates is available on the firmware download page.  
<https://downloadcenter.nikonimglib.com>
- **Using a smart device:** Once you have paired the camera and smart device using the SnapBridge app, the app will notify you when a new firmware update is available, allowing you to download it to the camera memory card. Information on performing updates is available via the online help for the SnapBridge app. Note that you may not be notified of updates as soon as they are available.

## Changes to Video-Related Features in “C” Firmware Version 2.xx

Camera “C” firmware version 2.xx includes the following changes to the video-related features available in firmware version 1.xx (changes to other features are not listed):

### ■ Video Recording

- The borders of the shooting display now turn red during video recording (☞ [6](#), [65](#)).

### ■ Video File Types

- RAW options are now available for [Video file type] in the video recording menu (☞ [20](#)).

### ■ Video Quality

- [Video quality (N-RAW)] has been added to the video recording menu (☞ [24](#)).
- [Extended oversampling] has been added to the video recording menu (☞ [26](#)).

### ■ Exposure

- [Extended shutter speeds (mode M)] has been added to the Custom Settings menu in position g9 (☞ [41](#)).

### ■ Focus

- [Wide-area AF (C1)] and [Wide-area AF (C2)] have been added to the options available for AF-area mode (☞ [43](#)).
- [Focus point selection speed] has been added to the Custom Settings menu in position a14 (☞ [47](#)).

### ■ Controls and Displays

- [View video info] has been added to the options available for Custom Setting g1 [Customize i menu] (☞ [57](#)).
- Custom Setting g2 [Custom controls] now supports additional controls and roles (☞ [58](#)).
- [Fine ISO control (mode M)] has been added to the Custom Settings menu in position g8 (☞ [61](#)).
- [Brightness information display] has been added to the Custom Settings menu in position g14 (☞ [63](#)).
- The [Histogram] options for Custom Setting g15 [Custom monitor shooting display] and g16 [Custom viewfinder shooting display] have been replaced by [Brightness information] (☞ [64](#)).
- [Red REC frame indicator] has been added to the Custom Settings menu in position g17 (☞ [65](#)).
- [Auto temperature cutout] has been added to the setup menu (☞ [66](#)).

### ■ HDMI Output

- [1080i (interlaced)] has been added to [HDMI] > [Output resolution] in the setup menu (📖 [68](#)).

### ■ Video Playback

- [Save consecutive frames] has been added to the options available in the **i** menu while video playback is paused (📖 [75](#)).

Changes and additions are indicated throughout this guide by **UPDATE** icons.

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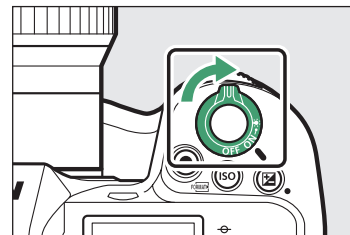
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## The Video Recording Workflow

### 1 Prepare.

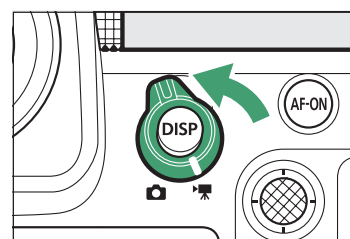
Before making videos, learn the names and locations of camera controls and insert a battery and memory card.

- The supplied EH-7P charging AC adapter or an optional AC adapter is recommended for extended recording. The camera can also be powered via USB. For more information, see the description of the setup menu [USB power delivery] option in the *Z 9 Reference Guide*, available from the Nikon Download Center's Z 9 product page ([https://downloadcenter.nikonimglib.com/en/products/589/Z\\_9.html](https://downloadcenter.nikonimglib.com/en/products/589/Z_9.html)).
- Once you're ready to proceed, turn the camera on.



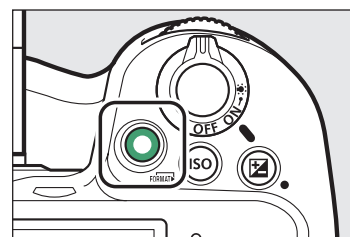
### 2 Select video mode by rotating the photo/video selector to .

The camera is now ready to record. Adjust recording settings as desired.

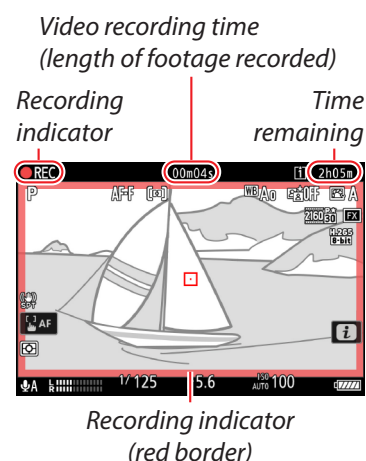


### 3 Press the video-record button to start recording.

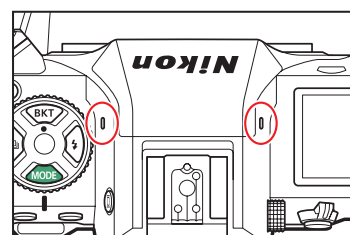
- Press the video-record button to start recording.
- You can also start recording via a control chosen using Custom Setting g2 [Custom controls] ([58](#)).



- A recording indicator will be displayed and the borders of the shooting display will turn red. The shooting display also shows the time remaining, or in other words the approximate amount of new footage that can be recorded to the memory card.



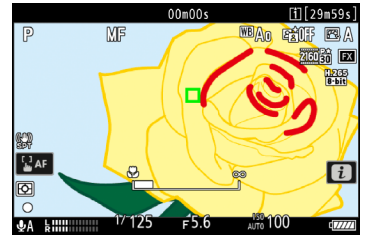
- Sound is recorded via the video microphone. Do not cover the video microphone during recording.



#### 4 Adjust focus as required.

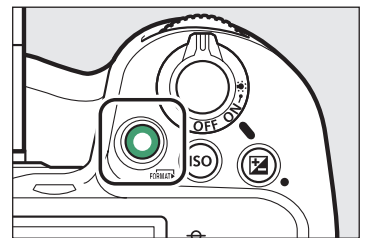
In the default focus mode—**AF-F**—the camera adjusts focus automatically. No particular action is required on your part, as the camera will adjust focus continuously in response to subject movement or changes in composition.

- To focus on a new subject, tap it in the monitor. The camera will also automatically refocus on subjects in focus points chosen using the multi selector.
- To focus in modes **AF-S** and **AF-C**, press the **AF-ON** button or press the shutter-release button half-way.
- When **MF** is selected for focus mode, you can adjust focus by rotating the lens focus ring or control ring. If **[ON]** is selected for Custom Setting a13 **[Focus peaking]** > **[Focus peaking display]**, objects that are in focus will be indicated by colored outlines.



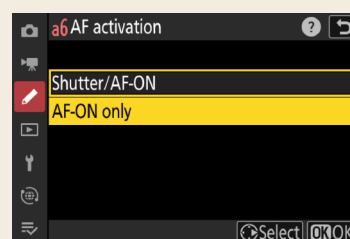
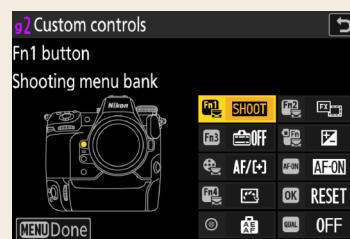
#### 5 Press the video-record button to end recording.

Press the video-record button again to end recording.



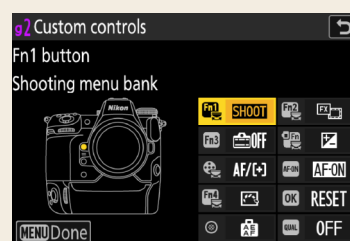
### ⚡ Using Other Controls for Video Recording

- You can start and end video recording using a control that has been assigned **[Record videos]** via Custom Setting g2 **[Custom controls]**. **[Record videos]** can be assigned to (📖 [58](#)):
  - the focus-mode button,
  - the shutter-release button,
  - the **AF-ON** button,
  - the center of the sub-selector,
  - the **OK** button,
  - the **AF-ON** button for vertical shooting, or
  - the center of the vertical multi selector.
- If, after assigning **[Record videos]** to the shutter-release button, you would prefer that the camera not focus at the start of recording, select **[AF-ON only]** for Custom Setting a6 **[AF activation]**.



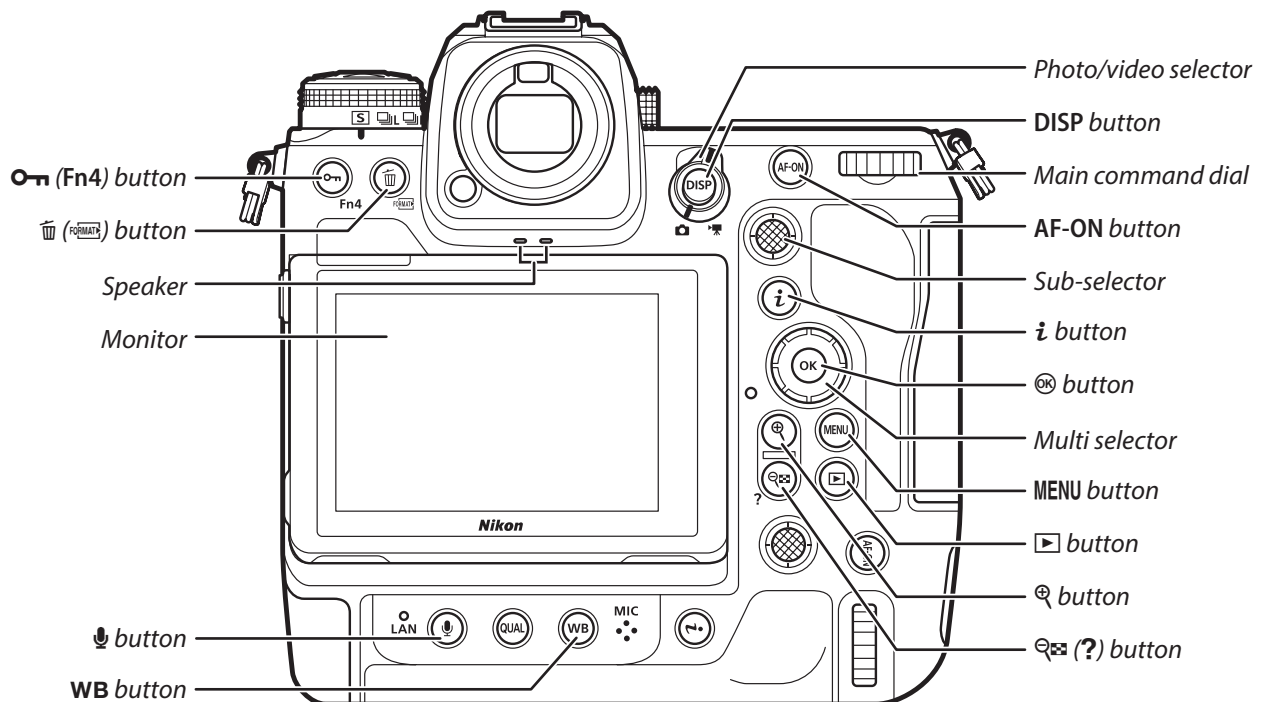
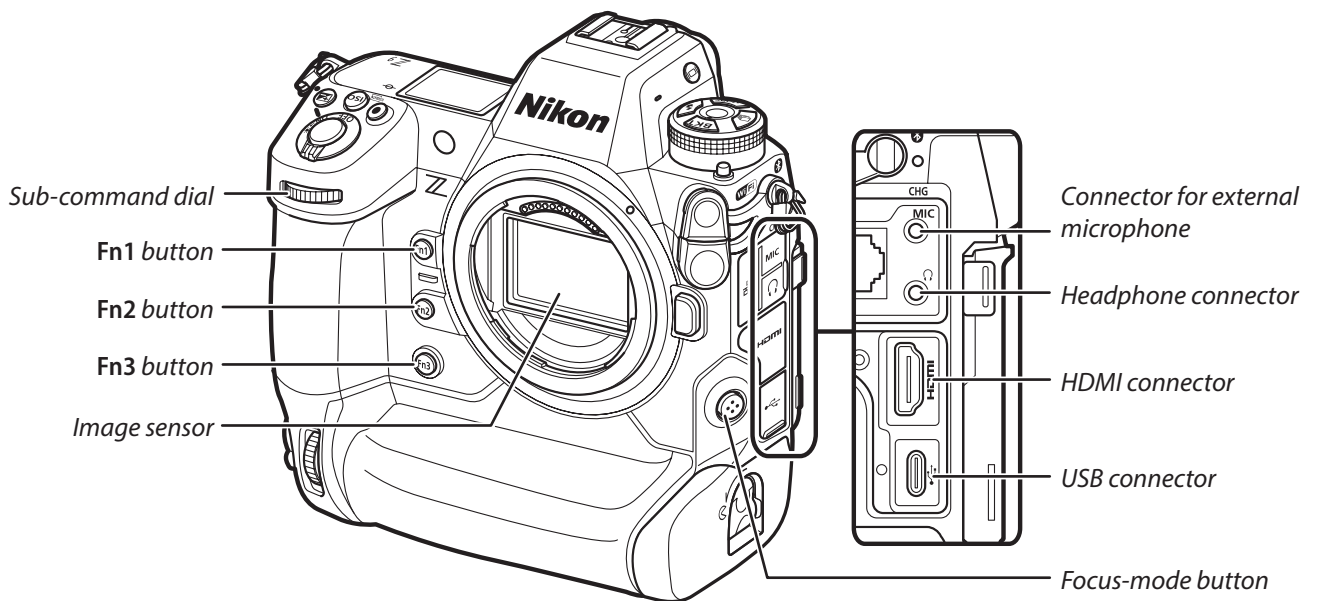
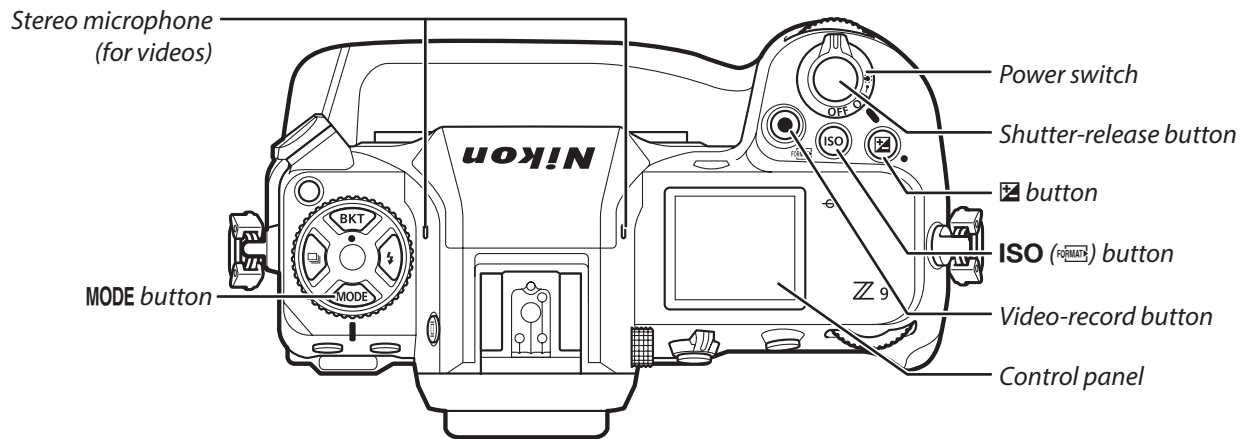
### ⚡ Starting and Ending Recording Remotely

When **[Record videos]** is selected for Custom Setting g2 **[Custom controls]** > **[Shutter-release button]**, the shutter-release buttons on MC-36A remote cords and other remote release accessories can be used to start and stop video recording.





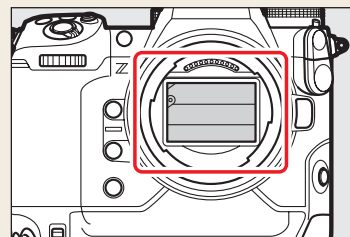
# Frequently-Used Controls



### ⚡ Dust on the Image Sensor

Dust on the image sensor can greatly complicate the post-production process, particularly when it comes to video. For this reason, we recommend that, before exchanging lenses or the like, you configure the sensor shield to close when the camera is turned off. This can be accomplished by selecting [**Sensor shield closes**] for [**Sensor shield behavior at power off**] in the setup menu.

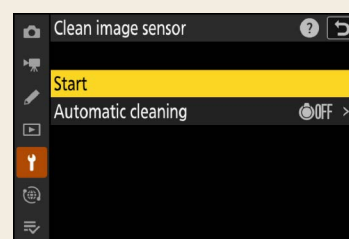
- Camera startup times may increase.
- The shield can be damaged by touching it when it is closed.
- When exchanging lenses with the shield closed, be sure to insert the lens perpendicular to the mount. If inserted at an angle, lenses could contact the sensor shield and damage the shield or the image sensor.



### ⚡ Image Sensor Cleaning

The [**Clean image sensor**] option in the setup menu vibrates the image sensor to remove dirt and dust.

- Highlight [**Start**] and press **OK** to start image sensor cleaning. Camera controls cannot be used while cleaning is in progress. Do not remove or disconnect the power source.
- To configure the camera to automatically perform image sensor cleaning at shutdown, select [**Automatic cleaning**] > [**Clean at shutdown**]. Automatic image sensor cleaning can be interrupted by using camera controls while shutdown is in progress.
- If image sensor cleaning is performed several times in succession, image sensor cleaning may be temporarily disabled to protect the camera's internal circuitry. Cleaning can be performed again after a short wait.
- Dust and dirt that cannot be removed using image sensor cleaning can be removed by a Nikon-authorized service representative.



# The Video Recording Display

Exposure for videos and photos shot in video mode can be previewed in the monitor and viewfinder. The explanation that follows concentrates mostly on the monitor.

## The Shooting Display

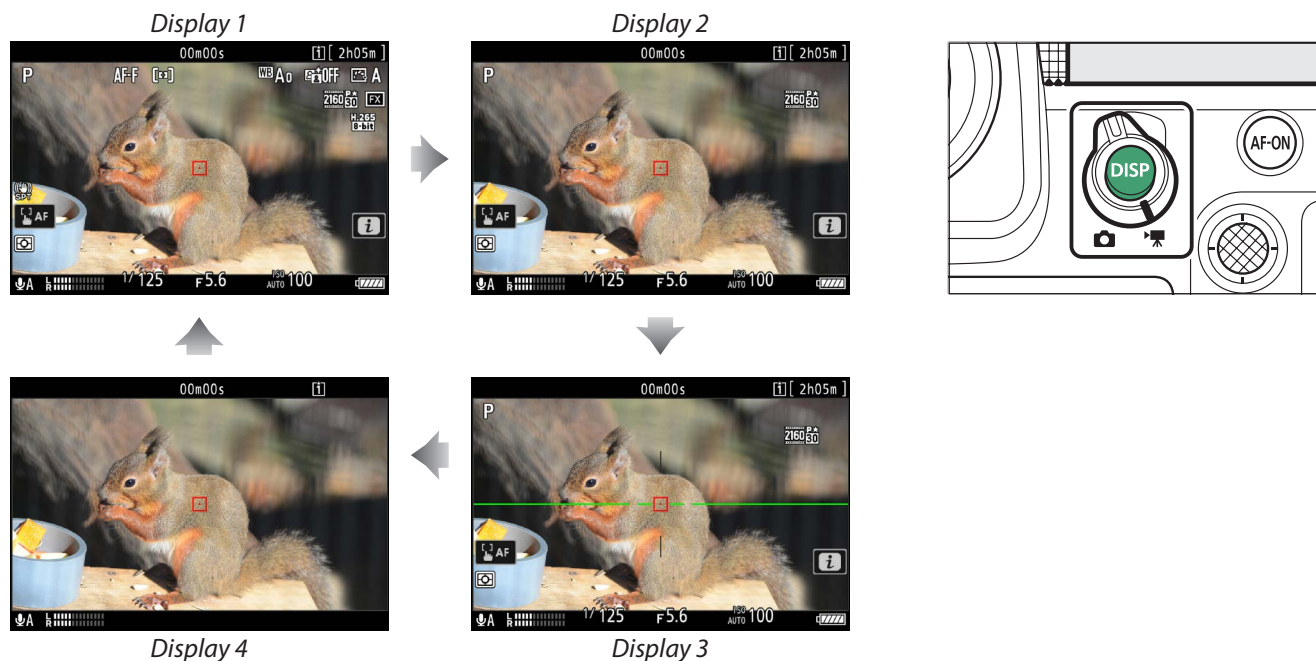
The following are displayed in the monitor in video mode:



① <b>Recording indicator</b>	Indicates that recording is in progress. A “no video” indicator (🚫) is displayed if videos cannot currently be recorded.
② <b>External recording control</b>	Displayed if video is simultaneously being recorded to a device connected via HDMI (📺 72).
③ <b>Video recording time</b>	The time elapsed from the start of recording.
④ <b>Frame size and rate</b>	The frame size (in pixels) and frame rate for video recording (📺 22).
⑤ <b>Time remaining</b>	The recording time available for videos (📺 19).
⑥ <b>Video file type</b>	The video file type (📺 20).
⑦ <b>Sound level</b>	The sound level for audio recording. Displayed in red if the level is too high. Reduce microphone sensitivity.
⑧ <b>Microphone sensitivity</b>	The current microphone sensitivity (📺 50) setting.
⑨ <b>Touch shooting</b>	Enable or disable touch AF. <ul style="list-style-type: none"> <li>When [👆 AF Touch AF] is enabled, the focus point can be positioned and autofocus initiated by tapping the monitor.</li> <li>When [👆 Position focus point] is enabled, tapping the monitor positions the focus point but does not initiate autofocus.</li> </ul>
⑩ <b>Vibration reduction indicator</b>	The current vibration reduction setting (📺 36).
⑪ <b>Electronic VR indicator</b>	Displayed when electronic vibration reduction is on (📺 37).
⑫ <b>Headphone volume</b>	Displayed when third-party headphones are connected. Shows the volume of the audio output to the headphones.
⑬ <b>Zebra pattern</b>	Used to indicate selected tone ranges (📺 62).

## The Information Display: Video Mode

Press the **DISP** button to choose the information displayed in video mode. The type and content of the displays available vary with the options chosen for Custom Settings g15 [Custom monitor shooting display] and g16 [Custom viewfinder shooting display] ( 64).



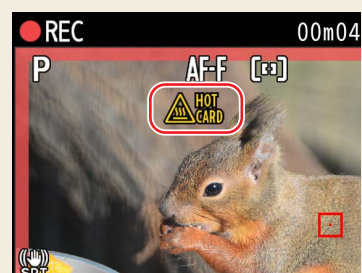
### ⚡ Temperature Warnings

- If the camera temperature becomes elevated, a temperature warning and count-down timer will be displayed.
- Although video recording does not end when the temperature warning is displayed, when the count-down timer reaches zero, the shooting display will turn off and the camera will power down after saving the current footage to the memory card.
- The timer turns red when the thirty second mark is reached. In some cases, the timer may be displayed immediately after the camera is turned on.
- Turn the camera off if the shooting display turns off due to the camera overheating. To cool the camera, we recommend that you shade it from direct sunlight using a parasol, towel, or the like.
- The temperature at which the count-down timer is displayed can be selected using the [Auto temperature cutout] item in the setup menu, which offers a choice of [Standard] and [High] ( 66).



### ⚡ Memory Card High-Temperature Warning

- Increases in the temperature of the memory cards may be accompanied by a memory card high-temperature warning in the shooting display. Wait for the memory cards to cool and the warning to clear from the display before handling the camera or memory cards.
- Video recording does not end when a memory card high-temperature warning is displayed. The camera does not turn off automatically and a count-down timer will not be displayed.



## ■ Customizing the Displays

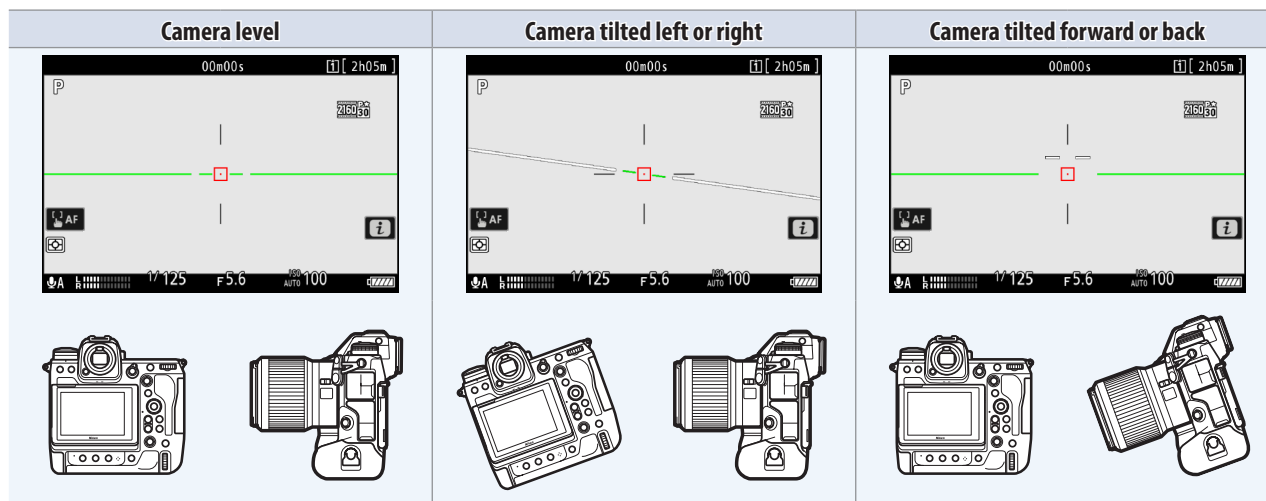
The indicators shown in the displays can be chosen using Custom Settings g15 [Custom monitor shooting display] and g16 [Custom viewfinder shooting display]. For more information, see “[Custom Shooting Displays](#)” (□ 64). The options available are listed below.

<b>SIMPLE</b> [Basic shooting info]	View the shooting mode, shutter speed, aperture, and other basic shooting info.	
<b>DETAIL</b> [Detailed shooting info]	View the focus mode, AF-area mode, white balance, and other detailed shooting info.	
 [Touch controls]	View options that can be accessed via touch controls, including touch AF and the <b>i</b> menu. • This option cannot be accessed via Custom Setting g16 [Custom viewfinder shooting display].	
 [Virtual horizon]	Enable the virtual horizon. The display type can be selected using Custom Setting d17 [Virtual horizon type].	
 [Brightness information] <b>UPDATE</b>	View an RGB histogram or wave-form monitor. The display type can be selected using Custom Setting g14 [Brightness information display].	
 [Framing grid]	Enable the framing grid.	
 [Center indicator]	Display crosshairs at the center of the frame.	

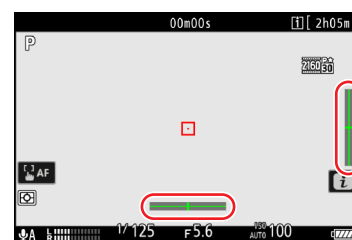
### ■ The Virtual Horizon Display

The virtual horizon can be used to help level the camera. It can be used, for example, to level the camera when it is mounted on a tripod. At default settings, it can be viewed by pressing the **DISP** button to cycle to Display 3.

- The indicators are displayed in green when the camera is level.



- The display type can be selected using Custom Setting d17 [Virtual horizon type]. If [Type B] is selected, the roll indicator will appear at the bottom of the display and the pitch indicator at its right edge.




### 🔧 The Virtual Horizon Display

Note that the display may not be accurate when the camera is tilted at a sharp angle forward or back. The camera will not display pitch and roll indicators when held at angles at which tilt cannot be measured.




## ■ Quick Display Selection


Controls can be assigned display-related functions using Custom Setting g2 [Custom controls].

-  [Live view info display off]: Pressing the control hides indicators in the shooting display. Press again to view indicators.




-  [Framing grid]: Pressing the control displays a framing grid. Press the control again to turn the display off. The display type can be selected using Custom Setting g13 [Grid type].







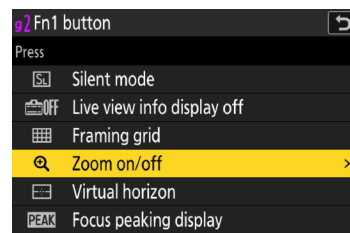
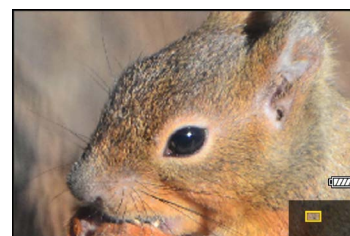
-  [Virtual horizon]: Pressing the control displays the virtual horizon. Press the control again to turn the display off. The display type can be selected using Custom Setting d17 [Virtual horizon type].



## ■ Using Zoom in Video Mode

To zoom in on the display in video mode (to a maximum of approximately 16×), press the  button.


- Use the  and  (?) buttons to zoom in and out.
- A navigation window will appear at the bottom right corner of the display.
- Use the multi selector to scroll to areas of the frame not visible in the display.
- Press  during recording to zoom the display in 50%, 100% (1:1), or 200%. Press  (?) to zoom out.
- 50% zoom is not available at a frame size of 1920 × 1080.
- Zoom is not available during RAW recording.
- When viewing videos, you can zoom in on the current frame while playback is paused.
- When shooting in video mode, you can also zoom in on the current focus point using a control assigned [Zoom on/off] via Custom Setting g2 [Custom controls]. The zoom ratio can be chosen from [Low magnification (50%)], [1 : 1 (100%)], and [High magnification (200%)].













## Accessing Video Settings

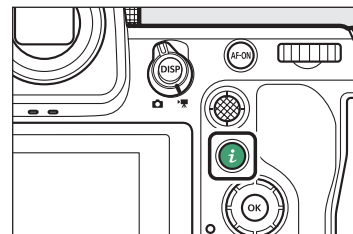
Video settings can be adjusted in video mode using any of the following three methods: the **i** button menu, video-related controls, or the video recording menu.

### The **i**-Button Menu

- To display the video **i** menu, rotate the photo/video selector to  and either press the **i** button or tap the **i** icon.

Option	
[Set Picture Control]	 <a href="#">31</a>
[White balance]	 <a href="#">28</a>
[Frame size/frame rate]	 <a href="#">22</a>
[Microphone sensitivity]	 <a href="#">50</a>
[AF-area mode/subj. detection]	 <a href="#">43, 44</a>
[Focus mode]	 <a href="#">42</a>

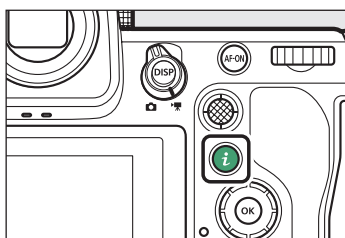
Option	
[Electronic VR]	 <a href="#">37</a>
[Vibration reduction]	 <a href="#">36</a>
[Shooting menu bank]	—
[Custom controls]	 <a href="#">58</a>
[Airplane mode]	—
[Destination]	 <a href="#">19</a>



### ■ Using the **i** Button

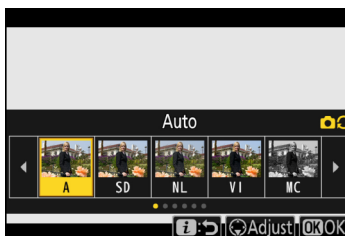
- With the camera in video mode, press the **i** button.

- Available settings will be displayed.
- If desired, you can navigate the menu using touch controls after pressing the **i** button.



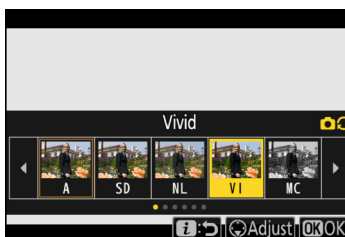
- Highlight the desired item and press **OK**.

- Options for the selected item will be displayed.



- Press  or  to highlight the desired option and press **OK** to select.

- The menu shown in Step 1 will be displayed.
- To exit to the shooting display, press the **i** button again.




### Using the Command Dials

Items for which the camera displays an on-screen guide can be adjusted by highlighting them in the **i** menu and rotating a command dial. In some cases, adjustments can be made using both the main and sub-command dials.






### Customizing the **i** Menu

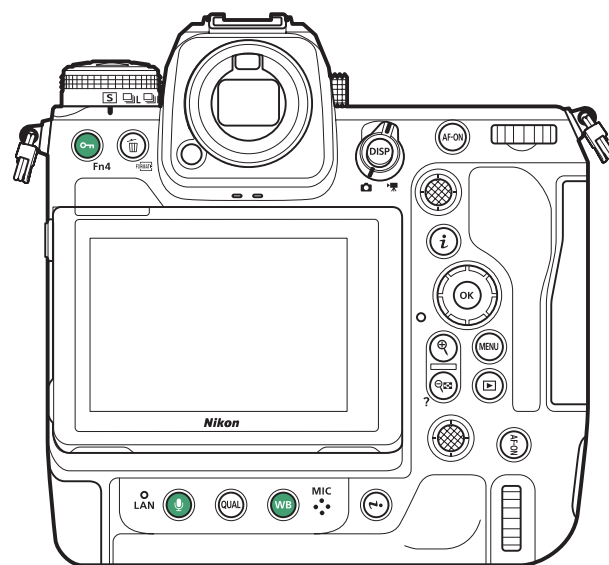
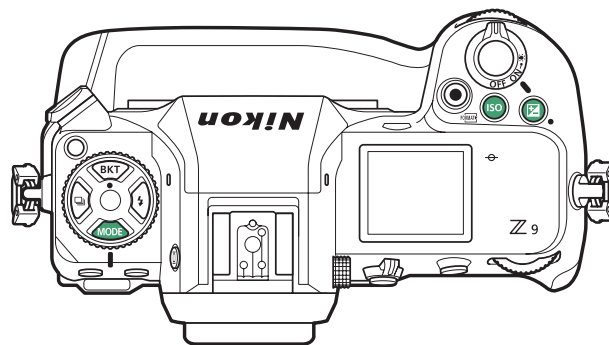
The items displayed in the video-mode **i** menu can be chosen using Custom Setting g1 [**Customize **i** menu**] ( [55](#)).



## Video-Related Controls






















The following controls can be used for video recording:

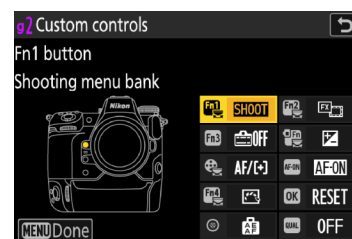
Control	Setting	
MODE button	Shooting mode	<a href="#">38</a>
 button	Exposure compensation	<a href="#">39</a>
ISO button	ISO sensitivity	<a href="#">26</a>
Fn2 button	Image area	<a href="#">25</a>
Focus-mode button	Focus and AF-area mode	<a href="#">42, 43</a>
 (Fn4) button	Picture Control	<a href="#">31</a>
 button	Microphone sensitivity	<a href="#">50</a>
WB button	White balance	<a href="#">28</a>



### Custom Controls

The following controls can be assigned video-related functions using Custom Setting g2 [Custom controls]. For more information, see “Custom Controls” ([58](#)).

 [Fn1 button]	 [AF-ON button for vertical shooting]
 [Fn2 button]	 [Vertical multi selector center]
 [Fn3 button]	 [Command dials]
 [Fn button for vertical shooting]	 [Shutter-release button]
 [Focus mode button]	 [Lens Fn2 button]
 [AF-ON button]	 [Lens Fn button]
 [Protect/Fn4 button]	 [Lens control ring]
 [OK button]	 [Lens Fn ring (clockwise)] <a href="#">UPDATE</a>
 [Sub-selector center]	 [Lens Fn ring (counterclockwise)] <a href="#">UPDATE</a>
 [QUAL button]	 [Lens memory set button] <a href="#">UPDATE</a>
 [Audio button]	

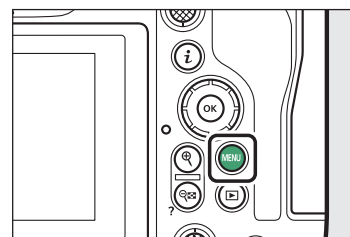


## The Video Recording Menu

The video recording menu can be displayed by pressing the **MENU** button and selecting the **📷** tab.

Item	
[Shooting menu bank]	—
[Extended menu banks]	—
[Storage folder]	—
[File naming]	—
[Destination]	📖 <a href="#">19</a>
[Video file type]	📖 <a href="#">20</a>
[Frame size/frame rate]	📖 <a href="#">22</a>
[Video quality (N-RAW)] <b>UPDATE</b>	📖 <a href="#">24</a>
[Image area]	📖 <a href="#">25</a>
[Extended oversampling] <b>UPDATE</b>	📖 <a href="#">26</a>
[ISO sensitivity settings]	📖 <a href="#">26</a>
[White balance]	📖 <a href="#">28</a>
[Set Picture Control]	📖 <a href="#">31</a>
[Manage Picture Control]	—
[HLG quality]	📖 <a href="#">34</a>
[Active D-Lighting]	📖 <a href="#">65</a>
[High ISO NR]	📖 <a href="#">34</a>
[Vignette control]	📖 <a href="#">34</a>

Item	
[Diffraction compensation]	📖 <a href="#">35</a>
[Auto distortion control]	📖 <a href="#">35</a>
[Video flicker reduction]	📖 <a href="#">40</a>
[Metering]	📖 <a href="#">41</a>
[Focus mode]	📖 <a href="#">42</a>
[AF-area mode]	📖 <a href="#">43</a>
[AF subject detection options]	📖 <a href="#">44</a>
[Vibration reduction]	📖 <a href="#">36</a>
[Electronic VR]	📖 <a href="#">37</a>
[Microphone sensitivity]	📖 <a href="#">50</a>
[Attenuator]	📖 <a href="#">51</a>
[Frequency response]	📖 <a href="#">51</a>
[Wind noise reduction]	📖 <a href="#">51</a>
[Mic jack plug-in power]	📖 <a href="#">52</a>
[Headphone volume]	📖 <a href="#">52</a>
[Timecode]	📖 <a href="#">53</a>
[External rec. cntrl (HDMI)]	📖 <a href="#">72</a>



### 🔑 Accessing Settings

Throughout this chapter, the means by which the settings discussed in each section can be accessed are listed in tables like that below. The methods that can be used are indicated by check marks (✓) and those that cannot by dashes (—).

<b>i-button menu</b>	✓
<b>Camera controls</b>	—
<b>Other menus</b>	✓

- The items that can be accessed via the **i**-button menu can be chosen using Custom Setting g1 [**Customize **i** menu**] (📖 [55](#)).
- “Camera controls” includes controls to which the function in question has been assigned using Custom Setting g2 [**Custom controls**] (📖 [58](#)).

# Storage

Choose a memory card and format for video recording.

## Destination

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

i-button menu	✓
Camera controls	—
Other menus	✓

- 1
- With the camera in video mode, press the **i** button and then highlight [Destination] and press **OK**.

  - Options will be displayed.
  - You can also select an option using the command dials before pressing the **OK** button.



- 2
- Press **Left** or **Right** to highlight the desired option and press **OK** to select.

  - The menu shows the time available on each card.
  - Recording ends automatically when no time remains on the current card.
  - Overflow and backup storage are not available during video recording.
  - To exit to the shooting display, press the **i** button again.

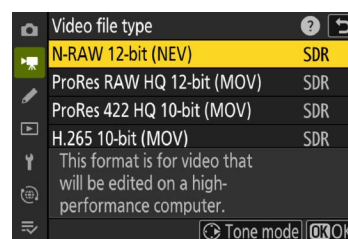


## Video File Type

Choose the video encoding and file type.

The selection can be made using **[Video file type]** in the video recording menu. You have a choice of NEV, MOV, and MP4 formats.

i-button menu	—
Camera controls	—
Other menus	✓



Option	Description	Tone mode	Inter-frame compression	Audio recording format	YCbCr/Bayer
<b>[N-RAW 12-bit (NEV)]</b> <small>UPDATE</small>	This option assumes the footage will later undergo RAW processing and editing using a professional high-performance computer system of the type typically employed for editing video. • The camera simultaneously records an H.264 8-bit MP4 video (proxy video) at a frame size of 1920 × 1080 for playback on the camera.	[SDR]	—	Linear PCM	Bayer
<b>[ProRes RAW HQ 12-bit (MOV)]</b> <small>UPDATE</small>		[N-Log]			
<b>[ProRes 422 HQ 10-bit (MOV)]</b>		[SDR]			
	Choose for footage destined for editing post-production.	[N-Log]	Long GOP	ACC	YCbCr (4:2:2)
<b>[H.265 10-bit (MOV)]</b>	This option assumes the footage will later undergo editing using a professional high-performance computer system of the type typically employed for editing video.	[SDR]			
<b>[H.265 8-bit (MOV)]</b>	This format offers superior compression.	[HLG]			
<b>[H.264 8-bit (MP4)]</b>	A widely-supported file type.	[N-Log]			
		[SDR]			YCbCr (4:2:0)

### ■ Tone Mode

To choose the tone mode, highlight **[N-RAW 12-bit (NEV)]**, **[ProRes RAW HQ 12-bit (MOV)]**, **[ProRes 422 HQ 10-bit (MOV)]**, or **[H.265 10-bit (MOV)]** and press . The tone mode for videos shot using **[H.265 8-bit (MOV)]** and **[H.264 8-bit (MP4)]** is fixed at [SDR].

Option	Description
[SDR]	This mode supports a normal range of brightnesses (dynamic range).
[HLG]	This mode supports HDR (high dynamic range). It has a wider dynamic range than SDR. • It is available only when <b>[H.265 10-bit (MOV)]</b> is selected for <b>[Video file type]</b> .
[N-Log]	This mode uses Nikon's unique log curve. Choose for pictures with a wide dynamic range. 3D LUTs for use with N-Log curves can be applied post-production for footage that displays beautifully on monitors that support Rec. 709.

### ■ Video Quality UPDATE

When **[N-RAW 12-bit (NEV)]** is selected, video quality can be selected using **[Video quality (N-RAW)]** in the video recording menu.

**■ RAW Video UPDATE**

The following restrictions apply when [N-RAW 12-bit (NEV)] or [ProRes RAW HQ 12-bit (MOV)] is selected for [Video file type] in the video recording menu.

- ISO sensitivities of Hi 0.3 through Hi 2.0 are not available.
- [Active D-Lighting], [High ISO NR], [Diffraction compensation], and [Electronic VR] are not available in the video recording menu.
- The options selected for [Extended oversampling], [Set Picture Control], [Vignette control], and [Auto distortion control] in the video recording menu do not apply.
- RAW videos cannot be edited on the camera.
- Regardless of the option selected for [HDMI] > [Output resolution] in the setup menu, the maximum output resolution is 1920 × 1080.

# Picture Quality

The settings covered in this section control video picture quality.

## Frame Size/Frame Rate

Choose the video frame size (in pixels) and frame rate.

i-button menu	✓
Camera controls	—
Other menus	✓

### ■ Choosing a Frame Size and Frame Rate

- 1

With the camera in video mode, press the **i** button and then highlight [Frame size/frame rate] and press **OK**.

  - Options will be displayed.
  - The options available for frame size vary with the settings chosen for [Video file type] in the video recording menu. See the table below for more information.
  - You can also select an option using the command dials before pressing the **OK** button.
- 2

Press **←** or **→** to highlight the desired option and press **OK** to select.

  - To exit to the shooting display, press the **i** button again.



### ■ Frame Size and Rate Options for RAW Video

Consult the table below for information on the [Frame size/frame rate] options available when [N-RAW 12-bit (NEV)] or [ProRes RAW HQ 12-bit (MOV)] is selected.

Option	Video file type	
	N-RAW 12-bit	ProRes RAW HQ 12-bit
[[FX] 8256×4644; 60p]	✓	—
[[FX] 8256×4644; 50p]	✓	—
[[FX] 8256×4644; 30p]	✓	—
[[FX] 8256×4644; 25p]	✓	—
[[FX] 8256×4644; 24p]	✓	—
[[FX] 4128×2322; 120p]	✓	—
[[FX] 4128×2322; 100p]	✓	—
[[FX] 4128×2322; 60p]	✓	✓
[[FX] 4128×2322; 50p]	✓	✓
[[FX] 4128×2322; 30p]	✓	✓
[[FX] 4128×2322; 25p]	✓	✓
[[FX] 4128×2322; 24p]	✓	✓
[[DX] 5392×3032; 60p]	✓	—
[[DX] 5392×3032; 50p]	✓	—
[[DX] 5392×3032; 30p]	✓	✓
[[DX] 5392×3032; 25p]	✓	✓
[[DX] 5392×3032; 24p]	✓	✓
[[2.3×] 3840×2160; 120p]	✓	—
[[2.3×] 3840×2160; 100p]	✓	—
[[2.3×] 3840×2160; 60p]	—	✓
[[2.3×] 3840×2160; 50p]	—	✓

- Regardless of the setting chosen for [Image area] > [Choose image area] in the video recording menu, “FX” options will be recorded using the [FX] image area and “DX” options using the [DX] image area. Choosing a “2.3×” option increases the apparent focal length by approximately 2.3× when compared to FX format.
- DX-based video format is selected automatically when a DX lens is attached. “FX” options cannot be selected.

## ■ Frame Size and Rate Options for Other Video Formats

Consult the table below for information on the [Frame size/frame rate] options available when [ProRes 422 HQ 10-bit (MOV)], [H.265 10-bit (MOV)], [H.265 8-bit (MOV)], or [H.264 8-bit (MP4)] is selected.

Option <sup>1</sup>	Video file type			
	ProRes 422 HQ 10-bit	H.265 10-bit	H.265 8-bit	H.264 8-bit
[7680×4320; 30p] <sup>2,3</sup>	—	✓	✓	—
[7680×4320; 25p] <sup>2,3</sup>	—	✓	✓	—
[7680×4320; 24p] <sup>2,3</sup>	—	✓	✓	—
[3840×2160; 120p] <sup>2,4</sup>	—	✓	✓	—
[3840×2160; 100p] <sup>2,4</sup>	—	✓	✓	—
[3840×2160; 60p] <sup>4</sup>	✓	✓	✓	—
[3840×2160; 50p] <sup>4</sup>	✓	✓	✓	—
[3840×2160; 30p] <sup>4</sup>	✓	✓	✓	—
[3840×2160; 25p] <sup>4</sup>	✓	✓	✓	—
[3840×2160; 24p] <sup>4</sup>	✓	✓	✓	—
[1920×1080; 120p] <sup>2</sup>	✓	✓	✓	—
[1920×1080; 100p] <sup>2</sup>	✓	✓	✓	—
[1920×1080; 60p]	✓	✓	✓	✓
[1920×1080; 50p]	✓	✓	✓	✓
[1920×1080; 30p]	—	✓	✓	✓
[1920×1080; 25p]	—	✓	✓	✓
[1920×1080; 24p]	—	✓	✓	✓

<sup>1</sup> The actual frame rate may differ from that shown. The actual frame rates are: 120p: 119.88 fps; 100p: 100 fps; 60p: 59.94 fps; 50p: 50 fps; 30p: 29.97 fps; 25p: 25 fps; 24p: 23.976 fps.

<sup>2</sup> Fixes [Electronic VR] in the video recording menu at [OFF].

<sup>3</sup> Videos are recorded in 8K UHD. Not available with DX lenses.

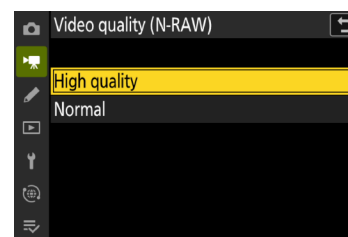
<sup>4</sup> Videos are recorded in 4K UHD.

## UPDATE Video Quality (N-RAW)

Choose a video quality option when filming footage with [N-RAW 12-bit (NEV)] selected for [Video file type] in the video recording menu.

Settings can be adjusted using [Video quality (N-RAW)] in the video recording menu. Choose from [High quality] and [Normal].

i-button menu	—
Camera controls	—
Other menus	✓



### ⚡ “High Quality” Versus “Normal”

[High quality] features a bit rate approximately 1.6 to 2 times higher than [Normal], resulting in larger files. [Normal] is recommended when recording to memory cards with slow transfer speeds, as the higher bit rate for [High quality] necessitates higher transfer speeds.



## Choose Image Area

Choose the image area. Select **[FX]** to shoot videos in what is referred to as “FX-based video format”, **[DX]** to shoot in “DX-based video format”.

i-button menu	✓
Camera controls	✓
Other menus	✓

### ■ Video Image Area Options

The illustration shows the crops used for filming videos. Regardless of the option selected, the aspect ratio is 16:9.

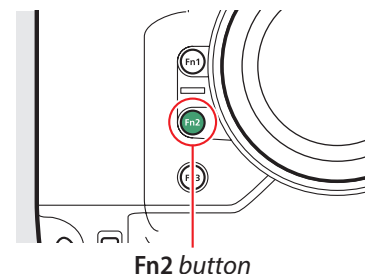
- Select **[FX]** to shoot videos in what is referred to as “FX-based video format”, **[DX]** to shoot in “DX-based video format”.
- The image area for videos recorded with **[N-RAW 12-bit (NEV)]** or **[ProRes RAW HQ 12-bit (MOV)]** selected for **[Video file type]** in the video recording menu is determined by the option chosen for **[Frame size/frame rate]**. The option selected for **[Image area] > [Choose image area]** in the video recording menu does not apply.
- Selecting **[DX]** for **[Choose image area]** or mounting a DX lens on the camera with **[3840×2160; 120p]**, **[3840×2160; 100p]**, **[1920×1080; 120p]**, or **[1920×1080; 100p]** chosen for **[Frame size/frame rate]** increases the apparent focal length by approximately 2.3× when compared to FX format.
- The sizes of the different crops are as follows.

Format	Size
FX-based video format	Approx. 35.9 × 20.2 mm
DX-based video format	Approx. 23.5 × 13.2 mm
2.3×	Approx. 16.7 × 9.4 mm

- DX-based video format is selected automatically when a DX lens is attached.
- When 7680 × 4320 is selected for frame size, image area is fixed at **[FX]**. The frame size changes to 3840 × 2160 when a DX lens is attached.
- Selecting **[ON]** for **[Electronic VR]** in the video recording menu reduces the size of the crop.

### ■ Choosing the Image Area

The image area can be selected by holding the **Fn2** button and rotating a command dial.



- The option currently selected is shown by an icon in the display.



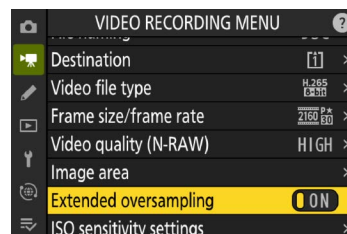
**UPDATE Extended Oversampling**

Selecting [ON] optimizes image readout for improved image quality when [3840×2160; 60p] or [3840×2160; 50p] is chosen for [Frame size/frame rate] in the video recording menu.

Settings can be adjusted using [Extended oversampling] in the video recording menu.

- Note that the drain on the battery increases when [ON] is selected.
- Extended oversampling does not apply to RAW footage filmed with [ON] selected.

i-button menu	—
Camera controls	—
Other menus	✓

**ISO Sensitivity**

Videos recorded in modes P, S, and A are shot using auto ISO sensitivity (ISO AUTO). You can, however, select an upper limit to prevent the camera choosing too high a value. In mode M, you also have the option of adjusting ISO sensitivity manually.

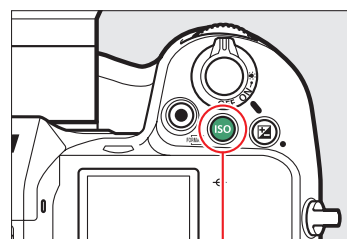
i-button menu	✓
Camera controls	✓
Other menus	✓

**■ Modes P, S, and A.**

- The camera adjusts ISO sensitivity automatically in response to shooting conditions, choosing from values of from ISO 64 to Hi 2.0; the chosen value is shown in the shooting display and control panel.
- ISO sensitivities of Hi 0.3–Hi 2.0 are not available during RAW video recording.

**■ Mode M**

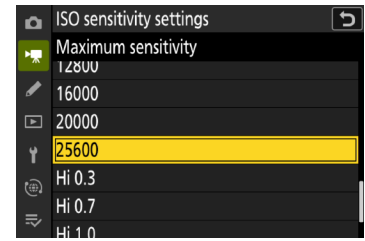
- Auto ISO sensitivity control can be enabled or disabled by holding the **ISO** button and rotating the sub-command dial; the display shows **ISO AUTO** when auto ISO sensitivity control is enabled and **ISO** when it is disabled. If desired, auto ISO sensitivity control can also be enabled or disabled using [ISO sensitivity settings] > [Auto ISO control (mode M)] in the video recording menu.
- When auto ISO sensitivity control is disabled (i.e., when **ISO** appears in the shooting display and control panel), ISO sensitivity can be manually set to values between ISO 64 and Hi 2.0 by holding the **ISO** button and rotating the main command dial. If desired, ISO sensitivity can also be adjusted using [ISO sensitivity settings] > [ISO sensitivity (mode M)] in the video recording menu. ISO sensitivities of Hi 0.3 – Hi 2.0 are not available during RAW video recording.
- If [On (1/6 EV)] is selected for Custom Setting g8 [Fine ISO control (mode M)], ISO sensitivity in the range ISO 64 to 25600 can be adjusted in increments of 1/6 EV (61).
- Your selection will be shown in the shooting display and control panel.



ISO button

### ■ 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 video recording menu to select an upper limit from values between ISO 200 and Hi 2.0.
- The maximum ISO sensitivity for videos recorded with [ON] selected for [Electronic VR] in the video recording menu is ISO 25600.
- The selected setting applies in modes **P**, **S**, and **A** and in mode **M** when [ON] is selected for [Auto ISO control (mode M)].









### ⚠ Cautions: Auto ISO Sensitivity Control

- At high ISO sensitivities, “noise” (randomly-spaced bright pixels, fog, or lines) may increase. Noise can be reduced by selecting [High], [Normal], or [Low] for [High ISO NR] in the video recording menu (📖 [34](#)).
- At high ISO sensitivities, the camera may have difficulty focusing.
- The foregoing can be prevented by choosing a lower value for [ISO sensitivity settings] > [Maximum sensitivity] in the video recording menu.
- The minimum values available for [Maximum sensitivity] and [ISO sensitivity (mode M)] when [HLG] is selected for video tone mode are ISO 800 and 400, respectively.
- The minimum values available for [Maximum sensitivity] and [ISO sensitivity (mode M)] when [N-Log] is selected for video tone mode are ISO 1600 and 800, respectively.

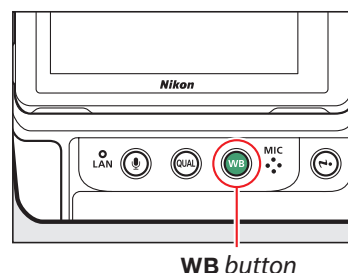
## White Balance

Adjust white balance according to lighting conditions.




### ■ Adjusting White Balance

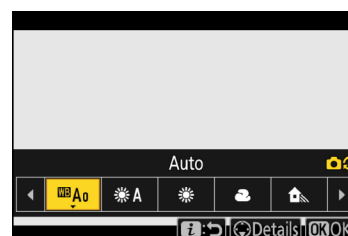
- Hold the **WB** button and rotate the main command dial. The effect of the chosen setting can be previewed in the shooting display.
- When **AUTO** (auto) or  (fluorescent) is selected, you can choose an **AUTO** (auto) or  sub-option by holding the **WB** button and rotating the sub-command dial.
- When **K** (choose color temperature) is selected, you can choose the color temperature by rotating the sub-command dial.
- When preset manual is selected, you can choose a white balance preset by rotating the sub-command dial.
- White balance can be fine-tuned by holding the **WB** button and pressing , , , or .
- Your selection is shown in the shooting display.

i-button menu	✓
Camera controls	✓
Other menus	✓



### ■ Fine-Tuning White Balance from the i Menu

- Pressing  when [White balance] is highlighted in the **i** menu displays a list of white balance options. If an option other than **K** [Choose color temperature] is highlighted, fine-tuning options can be displayed by pressing . Any changes to fine-tuning options can be previewed in the shooting display.
- Tap the arrows in the display or use the multi selector to fine-tune white balance.
- Press  to save changes and return to the **i** menu.



#### "Same as Photo Settings"

To use the option currently selected for photos, choose [Same as photo settings] for [White balance] in the video recording menu.

### ■ “Auto” and “Natural Light Auto”: Locking Auto White Balance

You can temporarily lock auto white balance when shooting in [Auto] and [Natural light auto] modes. This can, for example, be used to prevent colors changing when you zoom in on subjects wearing reds, greens, or other bright colors.

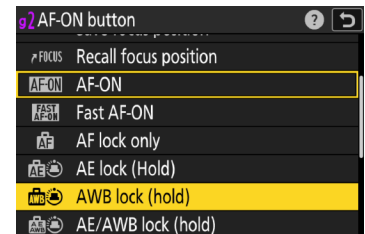


*White balance in close shot is adjusted to reflect colors of objects visible in frame, potentially lending shot a color cast.*



*Using auto white-balance lock (AWB-L) to lock auto white balance before starting close shot eliminates color cast.*

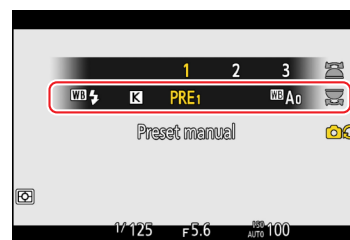
- Assigning [AWB lock (hold)] to a control using Custom Setting g2 [Custom controls] lets you lock white balance at the touch of a button. If desired, you can assign [AE/AWB lock (hold)] to a control to lock both white balance and exposure ([58](#)).
- The lock ends when the control to which [AWB lock (hold)] or [AE/AWB lock (hold)] is assigned is pressed a second time or the standby timer expires.



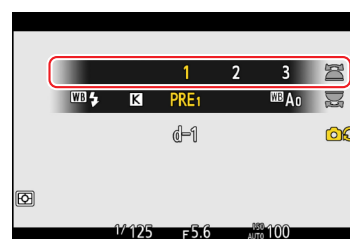
### ■ Measuring a New Value for Preset Manual White Balance

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

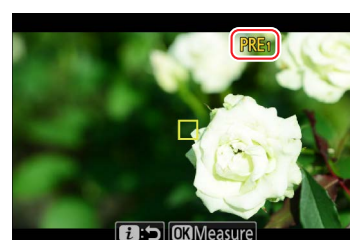
- 1 Hold the **WB** button and rotate the main command dial to select **PRE**.



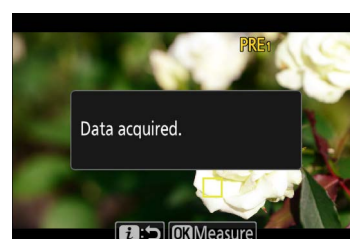
- 2 Hold the **WB** button and rotate the sub-command dial until the destination preset is displayed.
  - Choose from presets d-1 through d-6.



- 3 Release the **WB** button briefly and then press it again to select direct measurement mode.
  - The **PRE** icon in the shooting display will flash.
  - A white balance target (□) will be displayed in yellow in the center of the frame.



- 4 While **PRE** flashes in the display, use the multi selector to position the □ over a white or gray area of the subject.
  - To zoom in on the area around the □ for more precise positioning, press the **Q** button.
  - Position the target (□) using the multi selector.
  - To measure white balance, press the shutter-release button all the way down or press **OK**.
  - You can also position the target (□) and measure white balance by tapping the display.



- 5 Press the **i** button to exit direct measurement mode.

## Picture Controls

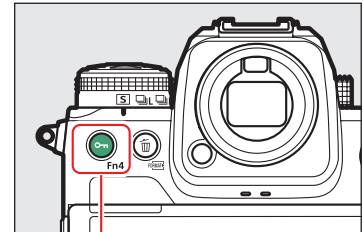
Choose a Picture Control according to the subject or type of scene. Choose **[Same as photo settings]** to use the option currently selected for photos. **[Flat]** preserves details over a wide tone range, from highlights to shadows, making it a good choice for footage that will be tweaked in post-production. Combining this option with highlight-weighted metering minimizes loss of detail in highlights.

i-button menu	✓
Camera controls	✓
Other menus	✓

### ■ Choosing a Picture Control

Hold the **Fn4** button and rotate the main command dial to choose a Picture Control.

- The shooting display will immediately be updated to show the effects of the selected Picture Control.
- When a Creative Picture Control is selected, the effect level can be chosen by holding the **Fn4** button and rotating the sub-command dial.
- The camera will exit to the shooting display.



**Fn4** button

<b>A</b> <b>[Auto]</b>	The camera automatically adjusts settings based on the <b>[Neutral]</b> Picture Control to optimize contrast and outlines for videos. • Recommended for most situations.
<b>SD</b> <b>[Standard]</b>	Choose for results that give more priority to resolution than does <b>[Auto]</b> .
<b>NL</b> <b>[Neutral]</b>	Minimal processing for natural results. • Choose for photographs that will later be processed or retouched.
<b>VI</b> <b>[Vivid]</b>	Pictures are enhanced for a vivid, photoprint effect. • Choose for photographs that emphasize primary colors.
<b>MC</b> <b>[Monochrome]</b>	Take monochrome photographs.
<b>PT</b> <b>[Portrait]</b>	Smooth complexions for natural-looking portraits.
<b>LS</b> <b>[Landscape]</b>	Shoot vibrant landscapes and cityscapes.
<b>FL</b> <b>[Flat]</b>	Details are preserved over a wide tone range, from highlights to shadows. • Choose for photographs that will later be extensively processed or retouched.
<b>01–20</b> <b>[Creative Picture Control]</b>	Creative Picture Controls offer unique combinations of hue, tone, saturation, and other settings tuned for particular effects. • Choose from a total of 20 options, including <b>[Dream]</b> and <b>[Morning]</b> .

### ⚡ HLG and N-Log Recording

- Picture Controls are not available in **[HLG]** and **[N-Log]** video tone modes. Settings for HLG recording can be adjusted using **[HLG quality]** in the video recording menu ([34](#)).
- Picture Controls are not applied to RAW footage.



## ■ Modifying Picture Controls from the *i* Menu

- Highlighting [Set Picture Control] in the *i* menu and pressing **OK** displays a Picture Control list. To modify a Picture Control while previewing the effects in the shooting display, highlight it in the Picture Control list and press **OK**.
- Press **Left** or **Right** to highlight settings. Press **Up** or **Down** to choose a value in increments of 1, or rotate the sub-command dial to choose a value in increments of 0.25.
- The options available vary with the Picture Control selected.
- To abandon any changes and start over from default settings, press the **FORMAT** button.
- Press **OK** to save changes.



## ⚠ Modified Picture Controls

Picture Controls that have been modified from default settings are indicated by an asterisk ("\*").



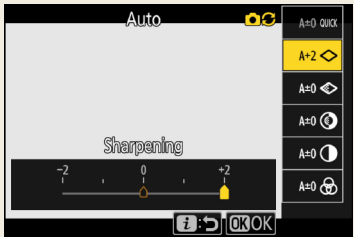
## ■ Picture Control Settings

[Effect level]		Mute or heighten the effect of Creative Picture Controls.
[Quick sharp]		Use [Quick sharp] to quickly adjust levels for balanced [Sharpening], [Mid-range sharpening], and [Clarity]. These parameters can also be adjusted individually.
Manual adjustments	[Sharpening]	Control the sharpness of details and outlines.
	[Mid-range sharpening]	Adjust the sharpness of patterns and lines in the range between [Sharpening] and [Clarity].
	[Clarity]	Adjust overall sharpness and the sharpness of thicker outlines without affecting brightness or dynamic range.
[Contrast]		Adjust contrast.
[Brightness]		Raise or lower brightness without loss of detail in highlights or shadows.
[Saturation]		Control the vividness of colors.
[Hue]		Adjust hue.
[Filter effects]		Simulate the effect of color filters on monochrome pictures.
[Toning]		Choose the tint used in monochrome pictures.
[Toning] (Creative Picture Control)		Choose the shade of color used for Creative Picture Controls.



**The [A Auto] Picture Control**

Settings can be adjusted in the range [A-2] to [A+2].

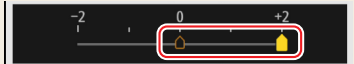


**[A] (Auto)**

- Selecting the **A** (auto) option available for some settings lets the camera adjust the setting automatically.
- Results vary with exposure and the position of the subject in the frame.

**The Δ Indicator**

The Δ indicator under the value display in the Picture Control setting menu indicates the previous value for the setting. You'll find that this comes in handy when making adjustments with reference to the previous value.






**[Monochrome] > [Filter Effects]**

Choose from the following **[Filter effects]**:

[Y] (yellow)*	These options enhance contrast and can be used to tone down the brightness of the sky in landscape photographs. Orange [O] produces more contrast than yellow [Y], red [R] more contrast than orange.
[O] (orange)*	
[R] (red)*	
[G] (green)*	Green softens skin tones. Use for portraits and the like.

\* The term in parentheses is the name of the corresponding third-party color filter for black-and-white photography.

**Toning (Monochrome Only)**

Pressing  when an option other than [B&W] (black-and-white) is selected for [Toning] displays saturation options. Press  or  to adjust saturation.



## HLG Quality

Adjust HLG video image processing options for use when [HLG] is chosen for tone mode.

HLG quality can be adjusted using [HLG quality] in the video recording menu.

i-button menu	✓
Camera controls	—
Other menus	✓



### ■ HLG Quality Settings

[Quick sharp]	Use [Quick sharp] to quickly adjust levels for balanced [Sharpening], [Mid-range sharpening], and [Clarity]. These parameters can also be adjusted individually.
Manual adjustments	[Sharpening] Control the sharpness of details and outlines.
	[Mid-range sharpening] Adjust the sharpness of patterns and lines in the range between [Sharpening] and [Clarity].
	[Clarity] Adjust overall sharpness and the sharpness of thicker outlines without affecting brightness or dynamic range.
[Contrast]	Adjust contrast.
[Saturation]	Control the vividness of colors.
[Hue]	Adjust hue.

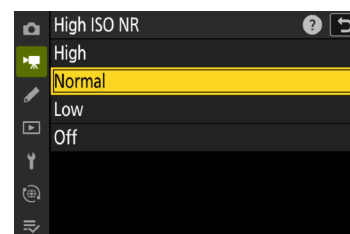
## High ISO NR

Reduce “noise” (randomly-spaced bright pixels) in videos recorded at high ISO sensitivities.

Choose a setting using the [High ISO NR] item in the video recording menu.

- To enable noise reduction at all ISO sensitivities, select [High], [Normal], or [Low]. The higher the sensitivity, the greater the effect.
- The amount of noise reduction performed can be selected from (in order from high to low) [High], [Normal], and [Low].
- 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. The amount of noise reduction performed is always lower than when [Low] is selected.
- High ISO noise reduction is not available during RAW recording.

i-button menu	—
Camera controls	—
Other menus	✓



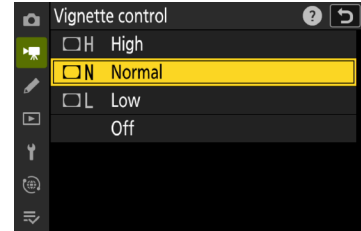
## Vignette Control

Vignette control reduces “vignetting”—a drop in brightness at the edges of the frame—by an amount that varies from lens to lens. Its effects are most noticeable at maximum aperture.

[Vignette control] is available in both the photo shooting and video recording menus. Changes to one apply to the other.

- To enable vignette control, select [High], [Normal], or [Low].
- The amount can be selected from (in order from high to low) [High], [Normal], and [Low].
- Vignette control is not applied to RAW footage.

i-button menu	—
Camera controls	—
Other menus	✓



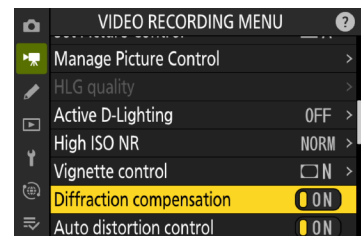
## Diffraction Compensation

Select [ON] to reduce diffraction at small apertures (high f-numbers).

[Diffraction compensation] is available in both the photo shooting and video recording menus. Changes to one apply to the other.

- Diffraction compensation is not available during RAW recording.

i-button menu	—
Camera controls	—
Other menus	✓



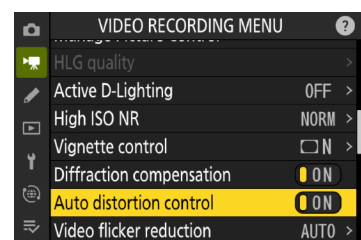
## Auto Distortion Control

Select [ON] to reduce barrel distortion when shooting with wide-angle lenses and pin-cushion distortion when shooting with long lenses.

[Auto distortion control] is available in both the photo shooting and video recording menus. Changes to one apply to the other.

- When [ON] is selected, auto distortion control will be applied only if the camera judges it necessary.
- Note that [ON] may be selected automatically with some lenses, in which case this item will be grayed out and unavailable.
- Auto distortion control is not applied to RAW footage.

i-button menu	—
Camera controls	—
Other menus	✓



Vibration Reduction

Choose whether to enable vibration reduction.

i-button menu	✓
Camera controls	—
Other menus	✓

■ Choosing a Vibration Reduction Option

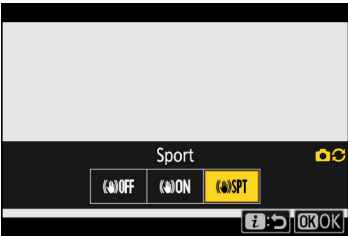
- 1

With the camera in video mode, press the **i** button and then highlight [Vibration reduction] and press **OK**.

  - Options will be displayed.
  - The options available vary with the lens. See the table below for more information.
  - Select [**Same as photo settings**] to use the option currently selected for photos.
  - You can also select an option using the command dials before pressing the **OK** button.
- 2

Press **Left** or **Right** to highlight the desired option and press **OK** to select.

  - To exit to the shooting display, press the **i** button again.



■ Vibration Reduction Options

<b>ON [Normal]</b>	Choose for enhanced vibration reduction when photographing static subjects.
<b>SPT [Sport]</b>	Choose when photographing athletes and other subjects that are moving rapidly and unpredictably. [Sport] is recommended for videos. Selecting [Sport] eliminates choppiness during recording.
<b>[Off]</b>	Vibration reduction is disabled.

⚠ Cautions: Using Vibration Reduction

- Vibration reduction may be unavailable with some lenses.
- We recommend that you wait for the image in the display to stabilize before shooting.
- If an F mount lens with a vibration reduction switch is attached via an optional FTZ II or FTZ mount adapter, [Vibration reduction] will be grayed out and unavailable. Use the lens switch for vibration reduction.

Electronic VR

Choose whether to enable electronic vibration reduction in video mode.

i-button menu	✓
Camera controls	—
Other menus	✓

- 1
- With the camera in video mode, press the **i** button and then highlight [Electronic VR] and press **OK**.
  - Options will be displayed.
  - You can also select an option using the command dials before pressing the **OK** button.



- 2
- Press **Left Arrow** or **Right Arrow** to highlight the desired option and press **OK** to select.
  - To exit to the shooting display, press the **i** button again.



⚡ Electronic Vibration Reduction

- Electronic vibration reduction is fixed at [OFF] at a frame size of 7680 × 4320 and at frame rates of 120p or 100p.
- Selecting [ON] reduces the size of the crop, slightly increasing the apparent zoom ratio.
- Selecting [ON] 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.
- Electronic vibration reduction is not available during RAW recording.

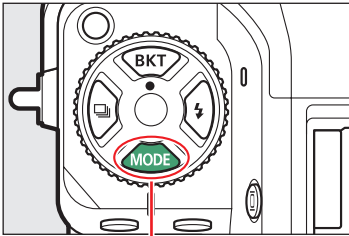
# Exposure

This section is devoted to settings that affect exposure.

## Shooting Mode

To choose a shooting mode, hold the **MODE** button and rotate the main command dial.

- The selected option is shown in the shooting display and control panel.



MODE button

i-button menu	—
Camera controls	✓
Other menus	—



- If the image in the display seems over- or under-exposed in mode **P** or **S**, switch to mode **A** and adjust aperture until the desired result is achieved.
- The exposure settings that can be adjusted during filming vary with the shooting mode:

	Aperture	Shutter speed	ISO sensitivity <sup>2</sup>
P, S <sup>1</sup>	—	—	— <sup>3</sup>
A	✓	—	— <sup>3</sup>
M	✓	✓	✓ <sup>4</sup>

1 Exposure control in mode **S** is the same as in mode **P**.  
2 The maximum ISO sensitivity for videos recorded with **[ON]** selected for **[Electronic VR]** in the video recording menu is ISO 25600.  
3 The upper limit for ISO sensitivity can be selected using the **[ISO sensitivity settings]** (☰ 26) > **[Maximum sensitivity]** item in the video recording menu.  
4 If **[ON]** is selected for **[ISO sensitivity settings]** > **[Auto ISO control (mode M)]** in the video recording menu, the upper limit for ISO sensitivity can be selected using **[Maximum sensitivity]**.

### ⚡ Shutter Speed (Mode M)

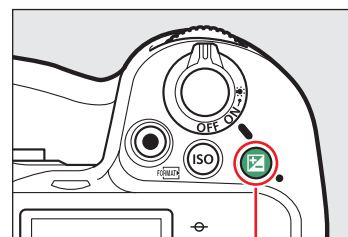
- In mode **M**, shutter speed can be set to values between  $\frac{1}{25}$  s and  $\frac{1}{32000}$  s. The slowest available shutter speed varies with the frame rate.
- When **[ON]** is selected for Custom Setting g9 **[Extended shutter speeds (mode M)]**, the shutter speed for frame rates of 60p to 24p can be set as slow as  $\frac{1}{4}$  s (📖 41).

## Exposure Compensation



Exposure compensation is used to alter exposure from the value suggested by the camera. It can be used to make pictures brighter or darker.

Hold the  button and rotate a command dial.

i-button menu	✓
Camera controls	✓
Other menus	—



Exposure Compensation button

-  icons appear in the shooting display and control panel. The current value is shown in the control panel. It can also be viewed in the shooting display by pressing the  button.
- Choose from values between  $-3$  EV and  $+3$  EV.
- At default settings, changes are made in increments of  $\frac{1}{3}$  EV. The size of the increments can be changed using Custom Setting b2 [EV steps for exposure cntrl].
- Higher values make the subject brighter, lower values darker.
- Normal exposure can be restored by setting exposure compensation to  $\pm 0.0$ . Exposure compensation is not reset when the camera is turned off.

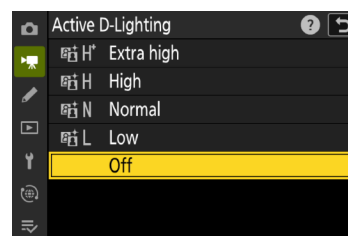


## Active D-Lighting

Preserve details in highlights and shadows, creating pictures 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.

Settings can be adjusted using **[Active D-Lighting]** in the video recording menu.

i-button menu	✓
Camera controls	✓
Other menus	✓



- The option currently selected is shown in the display during shooting.



### ⚡ Active D-Lighting

Active D-Lighting will be fixed at **[Off]** during RAW recording or when **[HLG]** or **[N-Log]** is selected for video tone mode.

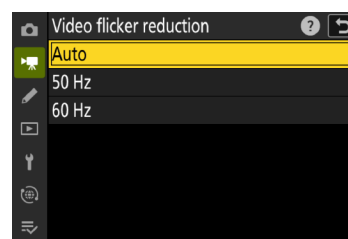
## Video Flicker Reduction

Reduce flicker and banding in the shooting display and in recorded footage when filming video under fluorescent or mercury-vapor lighting.

Settings can be adjusted using **[Video flicker reduction]** in the video recording menu.

- Choose **[Auto]** to allow the camera to automatically choose the correct frequency.
- If **[Auto]** fails to produce the desired results, select **[50 Hz]** or **[60 Hz]** according to the frequency of the local power supply. Choose **[50 Hz]** for areas with a 50 Hz power supply, **[60 Hz]** for areas with a 60 Hz power supply.
- Changes to **[Video flicker reduction]** also apply to the shooting display in photo mode.

i-button menu	—
Camera controls	—
Other menus	✓



### ⚡ Cautions: "Video 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. If this is the case, try choosing a smaller aperture (higher f-number).
- Tailoring shutter speed to minimize flicker may not produce the desired results in modes other than **M**, as the actual speed may not precisely match the value selected. If this is the case, select mode **M** and choose a shutter speed adapted to the frequency of the local power supply:
  - 50 Hz:  $\frac{1}{100}$  s,  $\frac{1}{50}$  s,  $\frac{1}{25}$  s
  - 60 Hz:  $\frac{1}{125}$  s,  $\frac{1}{60}$  s,  $\frac{1}{30}$  s

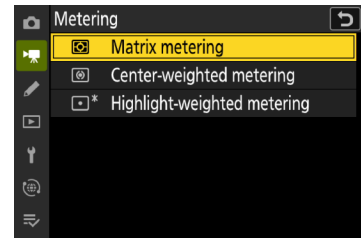


## Metering

Metering determines how the camera sets exposure.

Settings can be adjusted using **[Metering]** in the video recording menu.




i-button menu	✓
Camera controls	✓
Other menus	✓



- The option currently selected is shown in the shooting display.



### ■ Metering Options

 <b>[Matrix metering]</b>	The camera meters a wide area of the frame and sets exposure according to tone distribution, color, composition, and distance for results close to those seen by the naked eye.
 <b>[Center-weighted metering]</b>	The camera assigns the greatest weight to the center of the frame. This mode can, for example, be used with subjects that dominate the composition.
 <b>[Highlight-weighted metering]</b>	The camera assigns the greatest weight to highlights. Use this option to reduce loss of detail in highlights, for example when photographing spotlight performers on stage.

### 🔦 Spot Metering

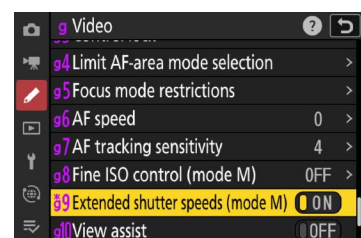
Spot metering cannot be used to record videos.

## **UPDATE** Extended Shutter Speeds (Mode M)

Extend the range of shutter speeds available in mode M.

When **[ON]** is selected for Custom Setting g9 **[Extended shutter speeds (mode M)]**, the shutter speed for frame rates of 60p to 24p can be set as slow as 1/4 s.

- Extended shutter speeds help keep ISO sensitivity low for shots of the night sky and other dark subjects.
- Videos recorded at slow shutter speeds when **[ON]** is selected will include repeated multiple copies of the same frames.
- Videos recorded at slow shutter speeds when **[ON]** is selected may be jerky or blurred. We recommend mounting the camera on a tripod when filming landscapes and other static subjects.



# Focus

This section covers the focus settings used when recording videos.

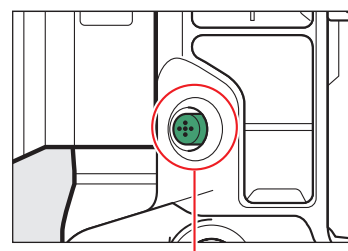
## Focus Mode

Choose how the camera focuses.

### ■ Choosing a Focus Mode

Hold the focus-mode button and rotate the main command dial.

i-button menu	✓
Camera controls	✓
Other menus	✓



Focus-mode button

- The option currently selected is shown in the shooting display and control panel.



### ■ Focus Mode Options

AF-S [Single AF]	Use with stationary subjects. • The camera focuses when the shutter-release button is pressed halfway or the <b>AF-ON</b> button is pressed. When the subject is in focus, the focus point will turn from red to green and focus will lock.
AF-C [Continuous AF]	Use for shots of athletes and other moving subjects. • The camera adjusts focus continuously in response to changes in the distance to the subject while the shutter-release button is pressed halfway or the <b>AF-ON</b> button is pressed.
AF-F [Full-time AF]	The camera adjusts focus continuously in response to subject movement or changes in composition. • The camera focuses when the shutter-release button is pressed halfway or the <b>AF-ON</b> button is pressed, at which point the focus point will turn from red to green and focus will lock.
MF [Manual focus]	Focus manually.

### ⚠ Cautions: Autofocus

- The camera may be unable to focus under the conditions listed below. Use manual focus if the camera is unable to focus because:
  - 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,
  - the focus point includes night-time 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, or
  - the subject is dominated by regular geometric patterns (e.g., blinds or a row of windows in a skyscraper).
- The display 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 take longer to focus when lighting is poor.

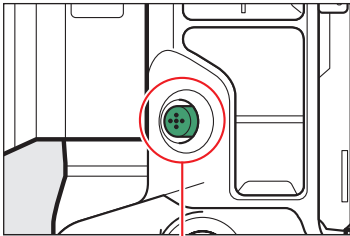
## AF-Area Mode

Choose how the camera selects the focus point for autofocus.

### ■ Choosing an AF-Area Mode

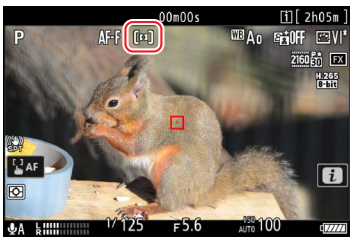
Hold the focus-mode button and rotate the sub-command dial.

i-button menu	✓
Camera controls	✓
Other menus	✓



Focus-mode button

- The option currently selected is shown in the shooting display and control panel.



### ■ AF-Area Mode Options

[] <b>[Single-point AF]</b>	The camera will focus on the subject in the selected focus point only.
<b>[Wide-area AF (S)]</b>	As for single-point AF except that the camera focuses on a wider area. Wide-area AF can be used to smooth focus for panning or tilting shots or when filming moving subjects.
<b>[Wide-area AF (L)]</b>	
<b>[Wide-area AF (C1)]</b> <small>UPDATE</small>	Choose the dimensions (measured in focus points) of the focus areas used for wide-area AF. A total of 12 options are available in video mode.
<b>[Wide-area AF (C2)]</b> <small>UPDATE</small>	<ul style="list-style-type: none"> <li>• The AF-area size can be selected by holding the focus-mode button and pressing  ,  ,  , or .</li> <li>• The size can also be selected using <b>[AF-area mode] &gt; [Wide-area AF (C1)]</b> and <b>[Wide-area AF (C2)]</b> options in the video recording menu.</li> </ul>
<b>[Subject-tracking AF]</b>	Track focus on a selected subject. <ul style="list-style-type: none"> <li>• Position the reticle over the target and start tracking by pressing the shutter-release button halfway or by pressing  or <b>AF-ON</b>; the focus point will track the selected subject as it moves through the frame.</li> <li>• To end tracking and select the center focus point, press .</li> </ul>
<b>[Auto-area AF]</b>	The camera automatically detects the subject and selects the focus area.

#### **Caution: Subject Tracking**

The camera may be unable to track subjects that are obscured by other objects or leave the frame.

AF Subject Detection Options

Choose the type of subject to which the camera gives priority when focusing using autofocus.

i-button menu	✓
Camera controls	—
Other menus	✓

■ Choosing a Subject Detection Option

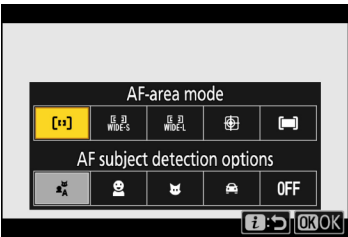
- 1
- With the camera in video mode, press the **i** button and then highlight [AF-area mode/subj. detection] and press **OK**.

  - Options will be displayed.
  - You can also select an option using the sub-command dial before pressing the **OK** button.



- 2
- Press **▲** or **▼** to highlight [AF subject detection options] and then press **◀** or **▶** to highlight the desired option and press **OK**.

  - To exit to the shooting display, press the **i** button again.
  - Subject detection is available when [Wide-area AF (S)], [Wide-area AF (L)], [Subject-tracking AF], or [Auto-area AF] is selected for [AF-area mode].



■ Subject Detection Options

[People]	Human faces detected by the camera are identified by a border indicating the focus point. If the camera detects the subject's eyes, the focus point will instead appear over one or the other of their eyes (face/eye-detection AF). If the subject looks away after their face is detected, the focus point will move to track their motion.	A screenshot of the camera's viewfinder showing a woman's face. A white square focus point is positioned over her right eye. The camera's status bar at the bottom shows "1/125 F5.6 100".
[Animal]	If a dog, cat, or bird is detected, the focus point will appear over the face of the animal in question (animal-detection AF). If the camera detects the subject's eyes, the focus point will instead appear over one or the other of their eyes. If the camera can detect neither face nor eyes, it will display a focus point over the detected animal.	A screenshot of the camera's viewfinder showing a cat's face. A white square focus point is positioned over the cat's face. The camera's status bar at the bottom shows "1/125 F5.6 100".
[Vehicle]	If a car, motorcycle, train, airplane, or bicycle is detected, the focus point will appear over the vehicle in question. <ul style="list-style-type: none"><li>In the case of trains, the camera will detect only the front end.</li><li>With planes, the camera will detect the body, nose, or cockpit depending on the aircraft's size.</li></ul>	A screenshot of the camera's viewfinder showing an airplane in flight. A white square focus point is positioned over the airplane's body. The camera's status bar at the bottom shows "1/125 F5.6 100".
[Auto]	The camera detects humans, animals, and vehicles and chooses a subject for focus automatically.	
[Subject detection off]	Subject detection disabled.	

**⚠ Caution: Face/Eye-Detection AF**

Face/eye detection may not perform as expected if:

- the subject's face is too large or small relative to the frame,
- the subject's face is too brightly or dimly lit,
- the subject is wearing glasses or sunglasses,
- the subject's face or eyes are obscured by hair or other objects, or
- the subject moves excessively during shooting.

**⚠ Cautions: Animal-Detection AF**

Animal detection may not perform as expected if:

- the subject's face is too large or small relative to the frame,
- the subject's face is too brightly or dimly lit,
- the subject's face or eyes are obscured by fur or the like,
- the subject's face and eyes are of similar colors, or
- the subject moves excessively during shooting.
- The camera may display a border around subjects that are not dogs, cats, or birds but which resemble these animals.
- The light from the AF-assist illuminator may adversely affect the eyes of some animals; when using animal-detection AF, select **[OFF]** for Custom Setting a12 **[Built-in AF-assist illuminator]**.

**⚠ Cautions: Vehicle-Detection AF**

Vehicle detection may not perform as expected with subjects that are:

- too large or small relative to the frame,
- too bright or too dark,
- partially hidden,
- similar in color to surrounding objects, or
- moving excessively.
- The camera may fail to detect vehicles of some shapes and colors. Alternatively, it may display a border around subjects that are not vehicles.

**⚠ Subject Detection**

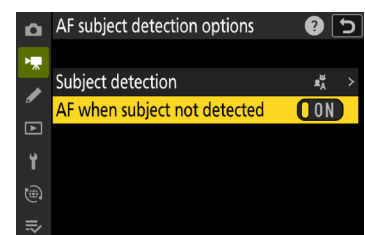
The performance of subject-detection may drop if either **[HLG]** or **[N-Log]** is selected for video tone mode.

**■ [AF When Subject Not Detected]**

Choose whether the camera focuses if unable to detect a subject of the type selected for **[Subject detection]** when **AF-F** is selected for focus mode.

This setting can be adjusted using **[AF subject detection options] > [AF when subject not detected]** in the video recording menu.

- **[ON]**: The camera will focus even if unable to detect a subject of the selected type.
- **[OFF]**: The camera will not focus if unable to detect a subject of the selected type.

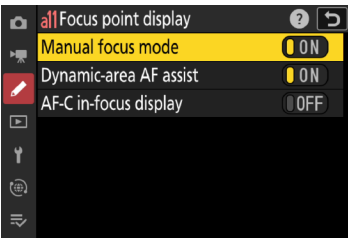


Focus Point Display

Choose focus point display options.

Settings can be adjusted using Custom Setting a11 [Focus point display].

i-button menu	—
Camera controls	—
Other menus	✓



Manual Focus Mode

Choose whether the focus point is displayed at all times in manual focus mode.

- [ON]: The focus point is displayed at all times in manual focus mode.
- [OFF]: The focus point is displayed only during focus point selection.

AF-C In-Focus Display

Choose whether the focus point changes color when the subject is in focus in focus mode AF-C.

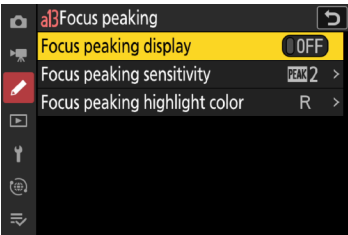
- [ON]: The focus point is displayed in green when the camera judges that the subject is in focus. This is a good choice in cases in which it is otherwise difficult to determine whether the subject is in focus.
- [OFF]: The active focus point is displayed in red or yellow at all times, whether or not the camera is in focus.

Focus Peaking

When focus peaking is enabled in manual focus mode, objects that are in focus are indicated by colored outlines in the display.

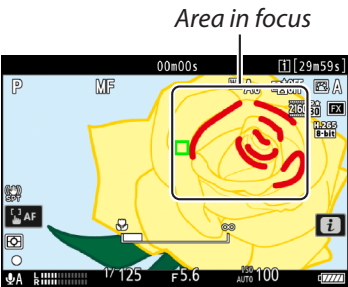
Settings can be adjusted using Custom Setting a13 [Focus peaking] > [Focus peaking display].

i-button menu	✓
Camera controls	✓
Other menus	✓



Focus Peaking Display

Select [ON] to enable focus peaking. This helps when it comes to determining what portions of the frame are currently in focus.



Focus Peaking Display

Using Custom Setting g2 [Custom controls], you can assign [Focus peaking] to a control and then use it to turn focus peaking on or off (58).

Focus Peaking Sensitivity

Choose the depth that will be shown as being in focus.

- Choose [3 (high sensitivity)] for greater depth and [1 (low sensitivity)] for reduced depth.

Focus Peaking Highlight Color

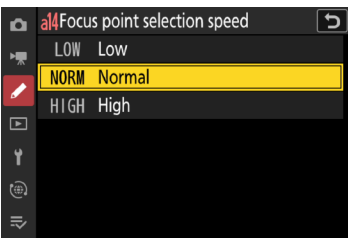
Choose the highlight color.

UPDATE Focus Point Selection Speed

Choose the speed at which the camera cycles through focus points while the multi selector or sub-selector is pressed.

Use Custom Setting a14 [Focus point selection speed] to choose from settings of [Low], [Normal], and [High].

i-button menu	—
Camera controls	—
Other menus	✓





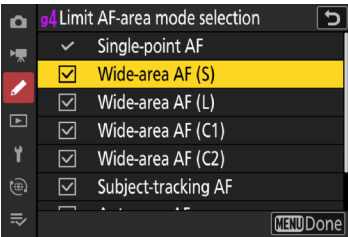
Limit AF-Area Mode Selection

Choose the AF-area modes that can be selected by pressing the focus-mode button and rotating the sub-command dial.

Settings can be adjusted using Custom Setting g4 [Limit AF-area mode selection].

- Only modes marked with a check (✓) can be selected by pressing the focus-mode button and rotating the sub-command dial.
- The check (✓) cannot be removed from [Single-point AF].

i-button menu	—
Camera controls	—
Other menus	✓



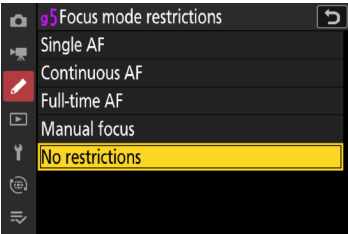
Focus Mode Restrictions

Limit focus-mode selection to a single focus mode.

Settings can be adjusted using Custom Setting g5 [Focus mode restrictions].

- If an option other than [No restrictions] is selected, the focus mode cannot be changed by holding the focus-mode button and rotating the main command dial, preventing unintended changes to focus mode.

i-button menu	—
Camera controls	—
Other menus	✓



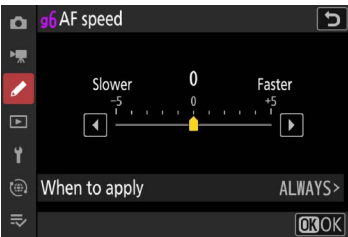
AF Speed

Choose the speed at which the camera focuses when the shutter-release button is pressed halfway or the AF-ON button is pressed in focus modes AF-F and AF-C.

Focus speed can be adjusted in the range -5 to +5 using Custom Setting g6 [AF speed].

- Choose higher values for faster focus, lower values for slower focus.

i-button menu	—
Camera controls	—
Other menus	✓



Use [When to apply] to choose when the selected option applies.

ALWAYS [Always]	The camera focuses at the selected speed at all times in video mode.
REC [Only while recording]	Focus is adjusted at the selected speed only while video recording is in progress. At other times, the camera focuses as quickly as possible.

**Lens Sounds**

The sound produced by the lens during focus operations increases with AF speed. The effect is particularly noticeable at a setting of **[+5]**, so choose lower values if you find the noise distracting.

**“AF-ON” and “Fast AF-ON”**

Among the roles that can be assigned using Custom Setting g2 **[Custom controls]** are **[AF-ON]** and **[Fast AF-ON]** (🔗 58).

- To focus at the speed selected for Custom Setting g6 **[AF speed]**, press a control that has been assigned **[AF-ON]** or press the shutter-release button halfway. To focus at maximum speed (equivalent to an **[AF speed]** setting of +5), regardless of the setting selected for Custom Setting g6, use a control that has been assigned **[Fast AF-ON]**.
- Assigning **[AF-ON]** and **[Fast AF-ON]** to two different controls lets you rack focus at different speeds depending on the situation. To rack focus slowly on human subjects and quickly on other subjects, for example, use the control assigned **[AF-ON]** for human subjects and the control assigned **[Fast AF-ON]** for other subjects.

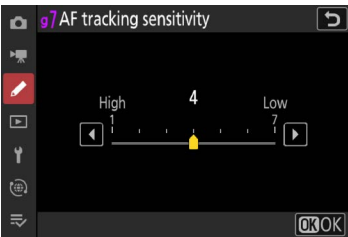
**AF Tracking Sensitivity**

Choose how quickly focus switches from one subject to another.

AF tracking sensitivity can be adjusted in the range 1 to 7 using Custom Setting g7 **[AF tracking sensitivity]**.

- Choose **[7] (Low)** to help maintain focus on your original subject.
- If the subject leaves the selected focus area when **[1] (High)** is selected, the camera will respond by quickly shifting focus to a new subject in the same area.

i-button menu	—
Camera controls	—
Other menus	✓



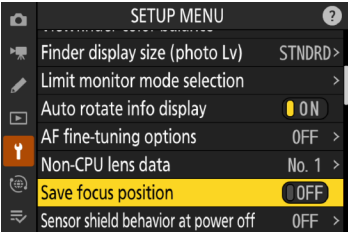
**Save Focus Position**

Choose whether the camera saves the current focus position when turned off and restores it when turned on.

Settings can be adjusted using **[Save focus position]** in the setup menu.

- When **[ON]** is selected, the camera will save the current focus position when turned off.

i-button menu	—
Camera controls	—
Other menus	✓



**Save Focus Position**


- Camera startup times may increase.
- Even when **[ON]** is selected, changes in temperature, zoom position, or other conditions while the camera is off may result in focus resuming from a different position when the camera is turned on.
- Similarly, note that even when **[OFF]** is selected, focus may resume from the previously-selected position depending on the state of the camera and lens.

# Audio

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

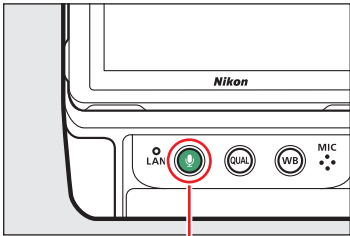
## Microphone Sensitivity

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

Microphone sensitivity can be adjusted by holding the  button and rotating a command dial.

- Choose a setting between 1 and 20. The higher the value, the higher the sensitivity; the lower the value, the lower the sensitivity.
- Select “auto” to adjust sensitivity automatically.
- To disable audio recording, choose [Microphone off].

i-button menu	✓
Camera controls	✓
Other menus	✓




 button

### Microphone Sensitivity

If the sound level is displayed in red, the volume is too high. Reduce microphone sensitivity.



### Using an External Microphone

- Audio can be recorded with videos using external microphones with 3.5 mm mini-jack plugs connected to the camera’s microphone connector.
- Use [Mic jack plug-in power] in the video recording menu to choose whether the power for the external microphone is supplied by the camera ( [52](#)).

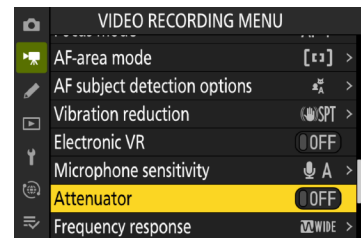
## Attenuator

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

Settings can be adjusted using **[Attenuator]** in the video recording menu.

- Select **[ON]** to reduce audio distortion when recording videos.

i-button menu	✓
Camera controls	—
Other menus	✓



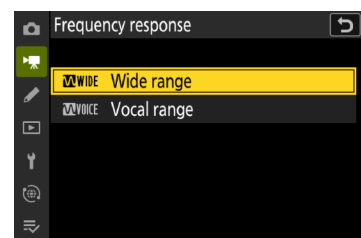
## Frequency Response

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

Settings can be adjusted using **[Frequency response]** in the video recording menu.

- **[Wide range]**: Record a wide range of frequencies. Choose for everything from music to the bustling hum of a city street.
- **[Vocal range]**: Choose for human voices.

i-button menu	✓
Camera controls	—
Other menus	✓



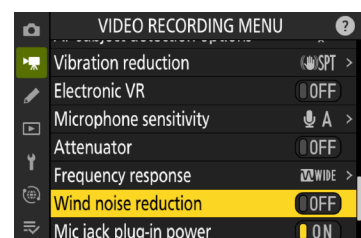
## Wind Noise Reduction

Enable the low-cut filter to reduce noise caused by wind blowing over the built-in microphone.

Settings can be adjusted using **[Wind noise reduction]** in the video recording menu.

- Select **[ON]** to enable wind-noise reduction.

i-button menu	✓
Camera controls	—
Other menus	✓



### ⚠ Wind Noise Reduction

- Note that other sounds may also be affected when **[ON]** is selected.
- Selecting **[ON]** for **[Wind noise reduction]** has no effect on optional stereo microphones. Wind-noise reduction for optional stereo microphones that support this feature can be enabled or disabled using microphone controls.

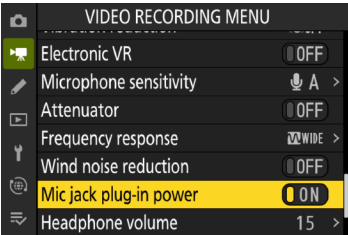
Microphone Jack Plug-in Power: Mic Jack Plug-in Power

Choose whether the camera powers external microphones.

Settings can be adjusted using [Mic jack plug-in power] in the video recording menu.

- The camera does not provide power to external microphones when [OFF] is selected.
- To prevent noise from interference generated by the power supply, we recommend turning plug-in power [OFF] when using microphones that do not require plug-in power.
- For information on whether your microphone requires plug-in power, consult the manufacturer.

i-button menu	—
Camera controls	—
Other menus	✓



Headphone Volume

Adjust headphone volume.

Settings can be adjusted using [Headphone volume] in the video recording menu.

- Press or to choose from values between 0 and 30.

i-button menu	✓
Camera controls	—
Other menus	✓



# Controls and Displays

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

## Timecode

To record time codes giving the hour, minute, second, and frame number for each frame when shooting videos, select **[On]** or **[On (with HDMI output)]** for **[Timecode]** > **[Record timecodes]** in the video recording menu. Time codes help you keep track of the current playback and edit position when editing video.

i-button menu	—
Camera controls	—
Other menus	✓

<b>[Record timecodes]</b>	<ul style="list-style-type: none"> <li>• <b>[On]</b>: Record time codes. The time code appears in the shooting display.</li> <li>• <b>[On (with HDMI output)]</b>: Time codes will be included with footage saved to external recorders connected to the camera via an HDMI cable. The camera supports Atomos SHOGUN, NINJA, and SUMO-series Monitor recorders.</li> <li>• <b>[Off]</b>: Time codes are not recorded.</li> </ul>
<b>[Count-up method]</b>	<ul style="list-style-type: none"> <li>• <b>[Record run]</b>: Time codes are incremented only while recording is in progress.</li> <li>• <b>[Free run]</b>: Time codes are incremented continuously. Time codes continue to be incremented while the camera is off.</li> </ul>
<b>[Timecode origin]</b>	<ul style="list-style-type: none"> <li>• <b>[Reset]</b>: Reset the time code to 00:00:00.00.</li> <li>• <b>[Enter manually]</b>: Enter the hour, minute, second, and frame number manually.</li> <li>• <b>[Current time]</b>: Set the time code to the current time as reported by the camera clock. Before proceeding, select <b>[Time zone and date]</b> in the setup menu and make sure that the camera clock is set to the correct time and date.</li> </ul>
<b>[Drop frame]</b>	Select <b>[ON]</b> to compensate for discrepancies between the frame count and the actual recording time at frame rates of 30 and 60 fps.

### ⚡ Time Codes

Time codes are not included in videos shot with **[H.264 8-bit (MP4)]** selected for **[Video file type]** in the video recording menu.

### ■ The Time Code Display

Time codes are displayed as follows:



The values for frame number vary with the currently-selected frame rate:

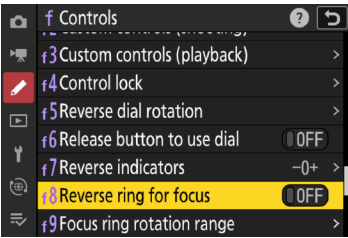
- 30, 60, or 120 fps: 00–29
- 25, 50, or 100 fps: 00–24
- 24 fps: 00–23

Reverse Ring for Focus

Choose whether to reverse the direction of rotation for lens focus or control rings during manual focus.

- Settings can be adjusted using Custom Setting f8 [Reverse ring for focus]. Select [ON] to reverse the ring rotation direction for manual focus.
- This setting is available when a Z mount lens is attached. It does not apply to F mount lenses connected via an FTZ II or FTZ mount adapter.
  - Certain Z mount lenses that can only be focused manually are not supported.

i-button menu	—
Camera controls	—
Other menus	✓

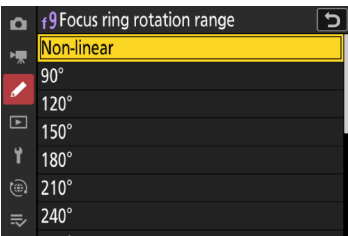


Focus Ring Rotation Range

Choose how far lens focus or control rings must be rotated to go all the way from the minimum focus distance to infinity.

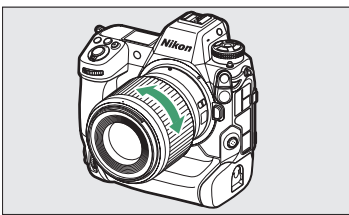
Settings can be adjusted using Custom Setting f9 [Focus ring rotation range].

i-button menu	—
Camera controls	—
Other menus	✓



[Non-linear]	The focus distance changes by a large amount when the ring is rotated rapidly and by a small amount when the ring is rotated slowly, without regard to how far the ring is rotated.
[90°]–[720°]	Choose how far the ring must be rotated to go all the way from the minimum focus distance to infinity.
[Max.]	Taking focus from the minimum focus distance to infinity requires rotating the ring the maximum distance permitted at current lens settings.

- To take focus from the minimum distance to infinity when, for example, [90°] is selected, the ring need only be rotated 90°. Larger values permit finer adjustments.



- If the lens does not support rotation range selection, [Focus ring rotation range] will be fixed at [Non-linear].

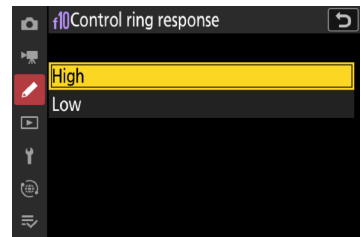
## Control Ring Response

Choose how responsive the lens control ring is when assigned the [Aperture], [Power aperture], [Exposure compensation], or [ISO sensitivity].

Settings can be adjusted using Custom Setting f10 [Control ring response]; choose from [High] and [Low].

- The function performed by the lens control ring can be selected using Custom Setting g2 [Custom controls].

i-button menu	—
Camera controls	—
Other menus	✓

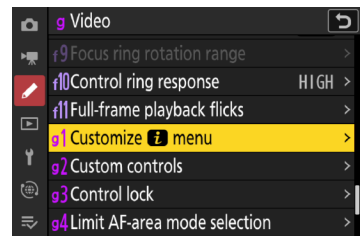


## Customize i Menu

Choose the items listed in the **i** menu displayed when the **i** button is pressed in video mode.

i-button menu	—
Camera controls	—
Other menus	✓

- 1 Highlight Custom Setting g1 [Customize **i** menu] and press **OK**.



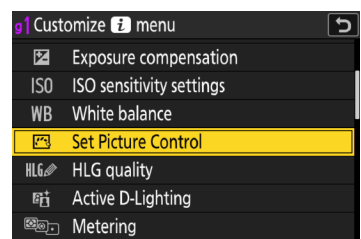
- 2 Highlight the position you want to change and press **OK**.

- A list of the items available for the selected position will be displayed.



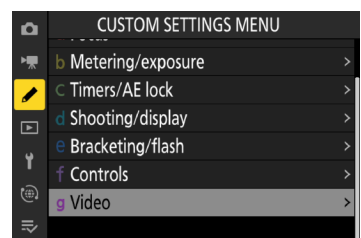
- 3 Highlight the desired item and press **OK**.

- The item will be assigned to the selected position and the options shown in Step 2 will be displayed.
- Repeat Steps 2 and 3 as desired.



- 4 Press the **MENU** button.

Changes will be saved and the Custom Settings menu will be displayed.



### The Still Photography **i** Menu

The items displayed in the photo-mode **i** menu can be chosen using Custom Setting f1 [Customize **i** menu].



## ■ Items That Can Be Assigned to the **i** Menu

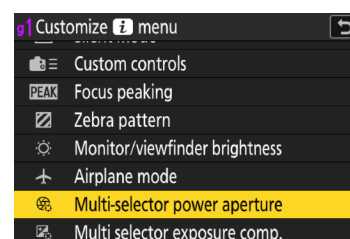
The following items can be assigned to the **i** menu for video mode.

<b>SHOOT</b>	[Shooting menu bank]		[Microphone sensitivity]
<b>CUSTOM</b>	[Select custom settings bank]	<b>ATT</b>	[Attenuator]
	[Choose image area]		[Frequency response]
<b>QUAL</b>	[Frame size/frame rate]		[Wind noise reduction]
	[Destination]		[Headphone volume]
	[Exposure compensation]		[Silent mode]
<b>ISO</b>	[ISO sensitivity settings]		[Custom controls]
<b>WB</b>	[White balance]	<b>PEAK</b>	[Focus peaking]
	[Set Picture Control]		[Zebra pattern]
<b>HLG</b>	[HLG quality]		[Monitor/viewfinder brightness]
	[Active D-Lighting]		[Airplane mode]
	[Metering]		[Multi-selector power aperture]
<b>AF/MF</b>	[Focus mode]		[Multi selector exposure comp.]
	[AF-area mode/subj. detection]	<b>RED</b>	[Warm display colors]
	[Vibration reduction]		[View video info] <b>UPDATED</b>
	[Electronic VR]		

## ■ Multi-Selector Power Aperture

Choose whether the multi selector can be used for power aperture. 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 videos. The adjustment is smooth and continuous, as are the resulting changes to depth of field and the like during filming.

- 1 Assign [Multi-selector power aperture] to the desired position using Custom Setting g1 [Customize **i** menu].



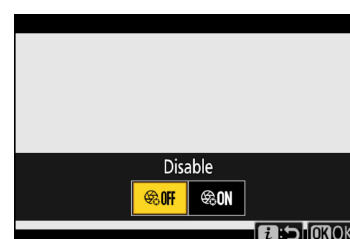
- 2 With the camera in video mode, press the **i** button and then highlight [Multi-selector power aperture] and press **OK**.

- Options will be displayed.
- You can also select an option using the command dials before pressing the **OK** button.



- 3 Press **Left** or **Right** to highlight the desired option and press **OK** to select.

- To exit to the shooting display, press the **i** button again.
- When [Enable] is selected, holding **Left** widens the aperture. Holding **Right** narrows the aperture.



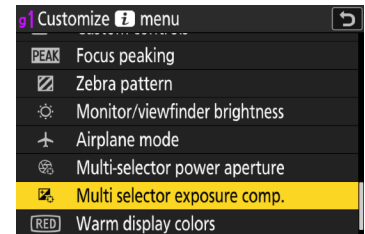
### Power Aperture

- Power aperture is available only in modes **A** and **M**.
- The display may flicker while aperture is adjusted.
- Power aperture can also be assigned to a control using Custom Setting g2 [Custom controls] (p. 58).

### ■ Multi-Selector Exposure Compensation: Multi Selector Exposure Comp.

Choose whether the multi selector can be used to adjust exposure compensation. Enabling this option allows exposure compensation to be adjusted using the multi selector, helping prevent the clicking sounds made by the command dials being recorded with videos.

- 1 Assign [Multi selector exposure comp.] to the desired position using Custom Setting g1 [Customize **i** menu].



- 2 With the camera in video mode, press the **i** button and then highlight [Multi selector exposure comp.] and press **OK**.

- Options will be displayed.
- You can also select an option using the command dials before pressing the **OK** button.



- 3 Press **Left** or **Right** to highlight the desired option and press **OK** to select.

- To exit to the shooting display, press the **i** button again.
- Selecting [Enable] allows exposure compensation to be set by pressing **Left** or **Right**.

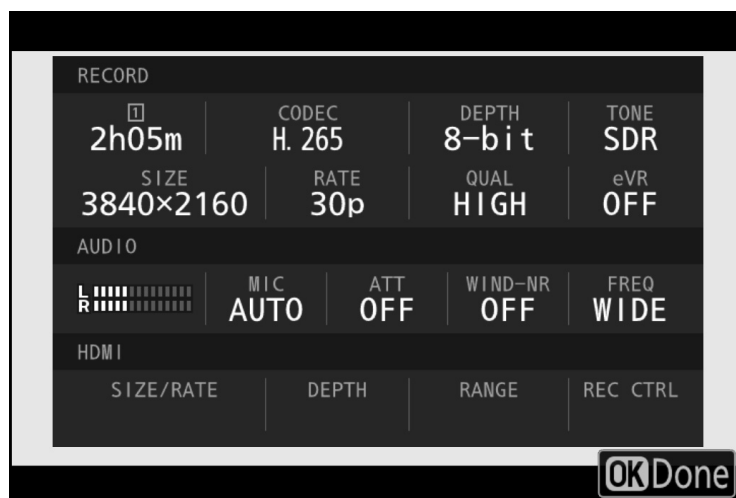


### ⚡ Exposure Compensation

Exposure compensation can also be assigned to a control using Custom Setting g2 [Custom controls] (58).

### ■ View Video Info **UPDATE**

View video recording settings. This option can be used to view but not to change the option selected.

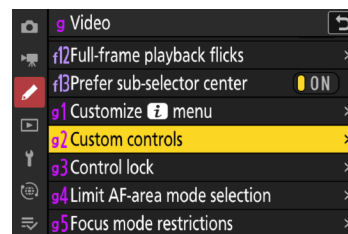


## Custom Controls

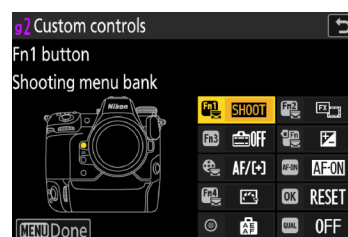
Use Custom Setting g2 [Custom controls] to choose the roles played by camera controls during filming.

i-button menu	✓
Camera controls	—
Other menus	✓

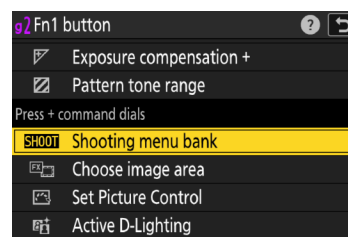
- 1 Highlight Custom Setting g2 [Custom controls] and press **OK**.
  - A list of controls will be displayed.



- 2 Highlight a control and press **OK**.



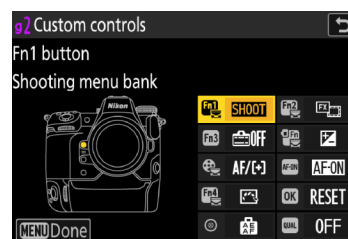
- 3 Highlight the desired function and press **OK**.



### Customizable Camera Controls

You can choose the roles played by the following controls:

[Fn1 button]	[AF-ON button for vertical shooting]
[Fn2 button]	[Vertical multi selector center]
[Fn3 button]	[Command dials]
[Fn button for vertical shooting]	[Shutter-release button]
[Focus mode button]	[Lens Fn2 button]
[AF-ON button]	[Lens Fn button]
[Protect/Fn4 button]	[Lens control ring]
[OK button]	[Lens Fn ring (clockwise)] <b>UPDATE</b>
[Sub-selector center]	[Lens Fn ring (counterclockwise)] <b>UPDATE</b>
[QUAL button]	[Lens memory set button] <b>UPDATE</b>
[Audio button]	



## ■ Roles That Can Be Assigned to Camera Controls

The roles that can be assigned to these controls are listed below.

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	Fn1	Fn2	Fn3	Fn4	AF-ON	Fn4	OK	Q	Q/AG	8	AF-ON	Q	Q/AG	L-Fn2	L-Fn	01	Fn	Fn	M-SET
[Exposure compensation]	—	—	—	✓	—	—	—	—	—	—	—	—	—	—	—	✓	—	—	—
ISO [ISO sensitivity]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	—	—	—
[Exposure setting]	—	—	—	—	—	—	—	—	—	—	—	—	✓	—	—	—	—	—	—
[Focus/AF-area mode selection]	—	—	—	—	—	—	—	—	—	—	—	—	✓	—	—	—	—	—	—
[Sub-command dial zoom role]	—	—	—	—	—	—	—	—	—	—	—	—	✓	—	—	—	—	—	—
[None]	✓	✓	✓	✓	—	✓	✓	✓	✓	✓	✓	✓	—	✓	✓	✓	✓	✓	✓

### ⚡ Power Aperture

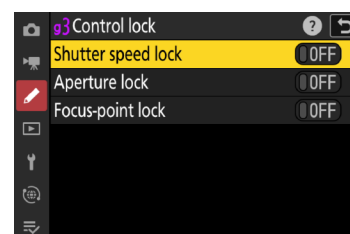
- Power aperture is available only in modes **A** and **M**.
- The display may flicker while aperture is adjusted.



## Control Lock

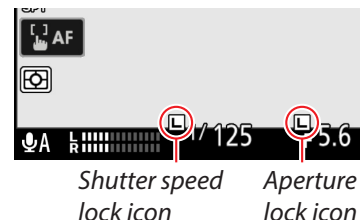
Lock exposure settings or focus-point selection during filming.

Settings can be adjusted using Custom Setting g3 [Control lock].

i-button menu	—
Camera controls	✓
Other menus	✓



[Shutter speed lock]	Select <b>[ON]</b> to lock shutter speed at its current value in mode <b>M</b> . <ul style="list-style-type: none"> <li>•  icons appear in the shooting display and control panel when shutter-speed lock is in effect.</li> </ul>
[Aperture lock]	Select <b>[ON]</b> to lock aperture at its current value in modes <b>A</b> and <b>M</b> . <ul style="list-style-type: none"> <li>•  icons appear in the shooting display and control panel when aperture lock is in effect.</li> </ul>
[Focus-point lock]	Select <b>[ON]</b> to lock focus-point selection on the currently-selected focus point. <ul style="list-style-type: none"> <li>• Focus point lock does not apply when <b>[Auto-area AF]</b> is selected for AF-area mode.</li> <li>• When <b>[Subject-tracking AF]</b> is selected, the focus point will track subject motion.</li> </ul>



Shutter speed  
lock icon

Aperture  
lock icon

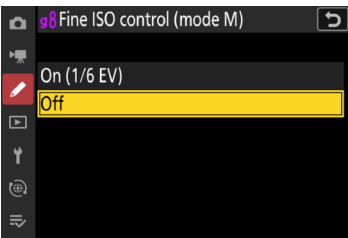
**UPDATE** **Fine ISO Control (Mode M)**

Choose the increments used for adjustments to ISO sensitivity during video recording in mode **M**.

Settings can be adjusted using Custom Setting g8 [Fine ISO control (mode M)]. Selecting [On (1/6 EV)] allows ISO sensitivity for videos to be adjusted in increments of 1/6 EV.

- The selected setting applies only in mode **M**.
- The range in which ISO sensitivity can be adjusted in increments of 1/6 EV is ISO 64 to 25600.

i-button menu	—
Camera controls	—
Other menus	✓



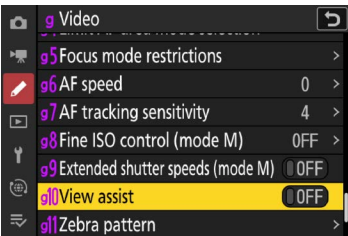
**View Assist**

Preview the effects of the [HLG] and [N-Log] tone modes during recording using simplified colors for enhanced contrast.

Settings can be adjusted using Custom Setting g10 [View assist]. Select [ON] to preview the effect using simplified colors.

- Colors in the actual recorded footage are unaffected.
- Contrast is also enhanced when HLG or N-Log footage is viewed on the camera.

i-button menu	—
Camera controls	—
Other menus	✓



View assist off



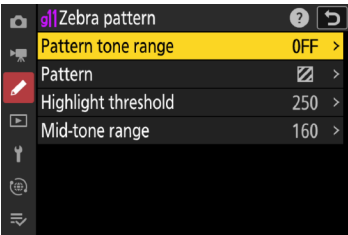
View assist on

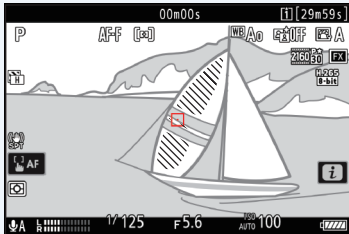
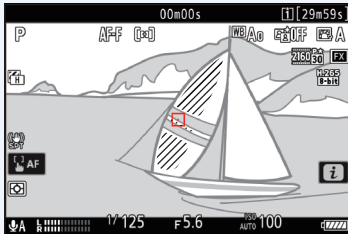
Zebra Pattern

Choose whether a zebra pattern is used to indicate selected tone ranges.

Settings can be adjusted using Custom Setting g11 [Zebra pattern].

i-button menu	✓
Camera controls	✓
Other menus	✓



[Pattern tone range]	<p>Choose the tone range shown by the zebra pattern.</p> <ul style="list-style-type: none"><li>• <b>[Highlights]</b>: Highlights (the brightest portions of the image) are shown by a zebra pattern. Highlights can be defined using <b>[Highlight threshold]</b>.</li><li>• <b>[Mid-tones]</b>: Mid-tones (areas of middling brightness) are shown by a zebra pattern. Mid-tones can be defined using <b>[Mid-tone range]</b>.</li><li>• <b>[Zebra pattern off]</b>: Turn off the zebra pattern display.</li></ul>
[Pattern]	<p>Choose a zebra stripe pattern ([Pattern 1] or [Pattern 2]).</p> <div></div> <p><i>Pattern 1</i> <i>Pattern 2</i></p>
[Highlight threshold]	<p>Choose the brightness needed to trigger the zebra display when <b>[Highlights]</b> is selected for <b>[Pattern tone range]</b>.</p> <ul style="list-style-type: none"><li>• Choose from values of from 120 to 255. The lower the value, the greater the range of brightnesses that will be shown as highlights.</li><li>• If 255 is selected, the display will show only areas that are potentially overexposed.</li></ul>
[Mid-tone range]	<p>Choose the brightness needed to trigger the zebra display when <b>[Mid-tones]</b> is selected for <b>[Pattern tone range]</b>.</p> <ul style="list-style-type: none"><li>• The <b>[Value]</b> around which the mid-tone range is defined can be anywhere from 0 to 255. <b>[Range]</b> is the range of brightnesses around this value.</li><li>• Press  or  to highlight items and press  or  to change.</li></ul>

⚠ Caution: Zebra Pattern

If both the zebra display and focus peaking are enabled in manual focus mode, only focus peaking will take effect. To view the zebra display in manual focus mode, select **[OFF]** for Custom Setting a13 **[Focus peaking]** > **[Focus peaking display]**.


⚡ Turning the Zebra Display On and Off Using Camera Controls

- Zebra pattern can be assigned to a control using Custom Setting g2 **[Custom controls]**. Pressing the control to which **[Pattern tone range]** is assigned cycles the zebra pattern display in the order **[Highlights]**, **[Mid-tones]**, and **[Zebra pattern off]**.
- The tone ranges displayed can be restricted using Custom Setting g12 **[Limit zebra pattern tone range]**. If **[Highlights]** or **[Mid-tones]** is selected, pressing the control to which **[Pattern tone range]** is assigned will display a zebra pattern only over areas in the selected tone range; pressing the control a second time hides the zebra pattern.

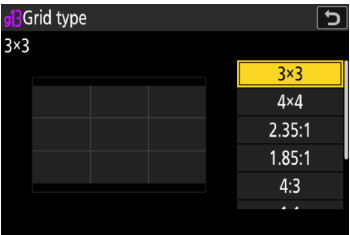
### Grid Type

Choose a framing grid for video mode.

The grid can be selected using Custom Setting g13 [Grid type]. It is displayed either by:


- pressing a control to which [Framing grid] has been assigned using Custom Setting g2 [Custom controls] or
- placing a check (☑) next to  in the Custom Setting g15 [Custom monitor shooting display] or g16 [Custom viewfinder shooting display] list.

i-button menu	—
Camera controls	—
Other menus	☑

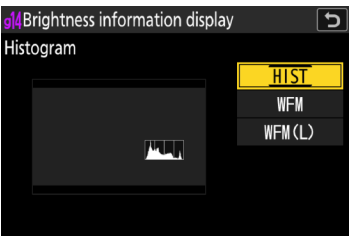


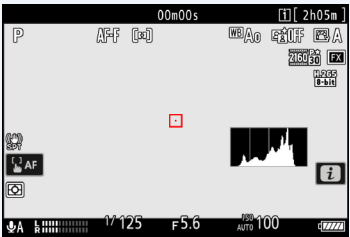
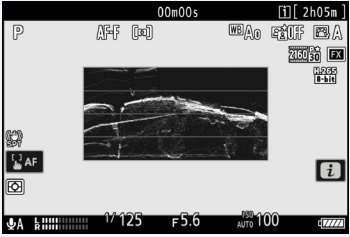
### UPDATE Brightness Information Display

Choose how the camera displays brightness information in video mode.

Settings can be adjusted using Custom Setting g14 [Brightness information display]. Brightness information is displayed when  (brightness information) is selected (☑) for Custom Setting g15 [Custom monitor shooting display] or g16 [Custom viewfinder shooting display].

i-button menu	—
Camera controls	—
Other menus	☑



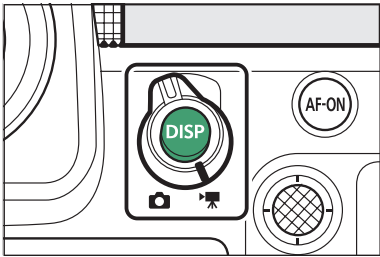
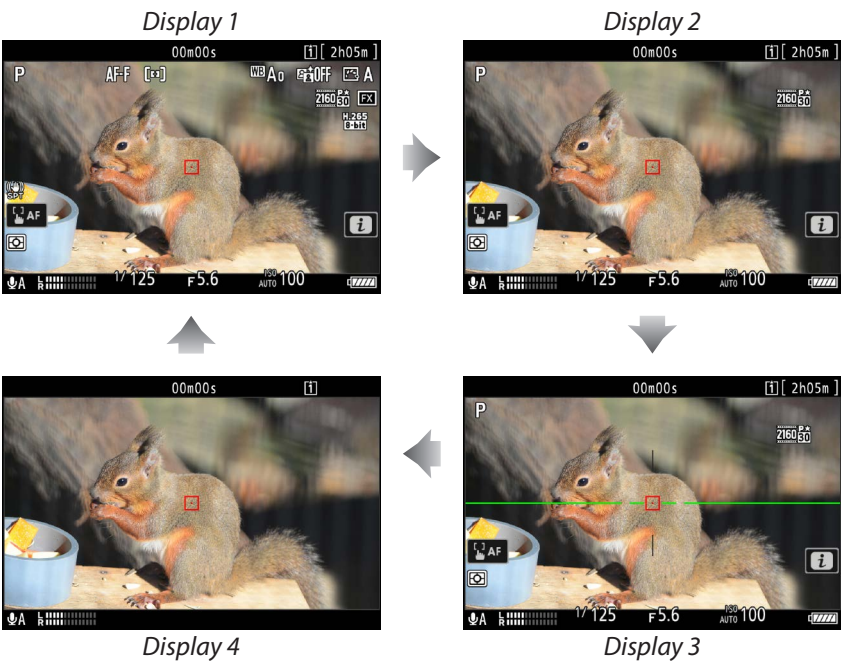
[Histogram]	Brightness information is displayed as an RGB histogram.	
[Wave-form monitor]	Brightness information is displayed as a wave-form monitor. The monitor can be displayed at either of two different sizes.	
[Wave-form monitor (large)]		



Custom Shooting Displays

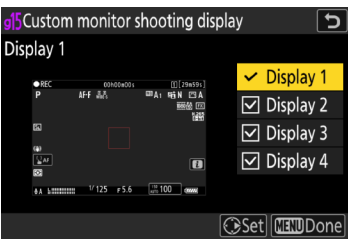
Choose the shooting displays accessible by pressing the **DISP** button in video mode. The displays can be tailored to different conditions.

i-button menu	—
Camera controls	—
Other menus	✓



The monitor and viewfinder displays can be customized using Custom Settings g15 [Custom monitor shooting display] and g16 [Custom viewfinder shooting display], respectively.

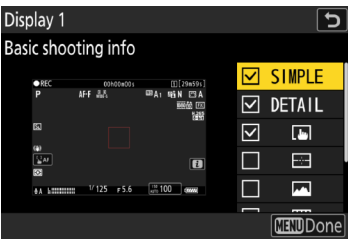
- Highlight items ([Display 2] through [Display 4], or in the case of Custom Setting g16, [Display 2] through [Display 3]) and press **OK** to select (✓) or deselect (□). Only displays marked with a check (✓) can be accessed by pressing the **DISP** button during shooting. [Display 1] cannot be deselected (□).



Customizing the Displays

To choose indicators that appear in displays [Display 1] through [Display 4] (or in the case of Custom Setting g16, [Display 1] through [Display 3]), highlight the corresponding option and press **OK**. You can then highlight options and press **OK** to select (✓) or deselect (□).

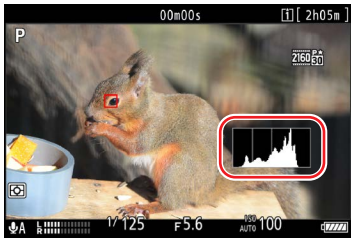
- Press **MENU** when changes are complete.



SIMPLE [Basic shooting info]	View the shooting mode, shutter speed, aperture, and other basic shooting info.
DETAIL [Detailed shooting info]	View the focus mode, AF-area mode, white balance, and other detailed shooting info.
[Touch controls]	View options that can be accessed via touch controls, including touch AF and the <b>i</b> menu. • This option cannot be accessed via Custom Setting g16 [Custom viewfinder shooting display].
[Virtual horizon]	Enable the virtual horizon. The display type can be selected using Custom Setting d17 [Virtual horizon type].
[Brightness information] <b>UPDATED</b>	View an RGB histogram or wave-form monitor.
[Framing grid]	Enable the framing grid.
[Center indicator]	Display crosshairs at the center of the frame.

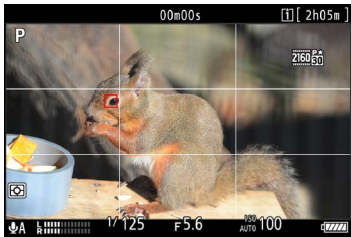
■ **Brightness Information** UPDATE

Selecting (☑) [Brightness information] displays brightness information. The display type can be selected using Custom Setting g14 [Brightness information display] (📖 [63](#)).



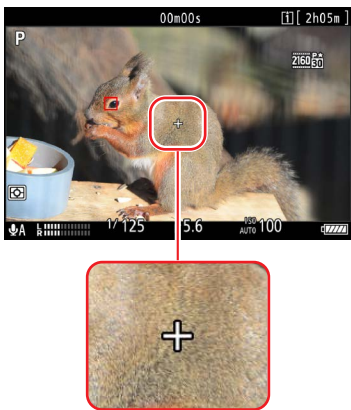
■ **Framing Grid**

Selecting (☑) [Framing grid] displays a framing grid. The type of grid can be selected using Custom Setting g13 [Grid type] (📖 [63](#)).



■ **Center Indicator**

Selecting (☑) [Center indicator] displays crosshairs at the center of the frame.

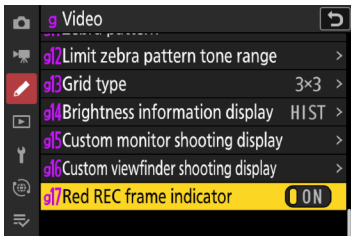


**UPDATE** ■ **Red REC frame indicator**

Choose whether a red border appears around the shooting display while video recording is in progress.

Settings can be adjusted using Custom Setting g17 [Red REC frame indicator]. When [ON] is selected, a red border will appear around the shooting display while video recording is in progress, helping prevent missed shots by alerting you when recording is in progress.

i-button menu	—
Camera controls	—
Other menus	☑



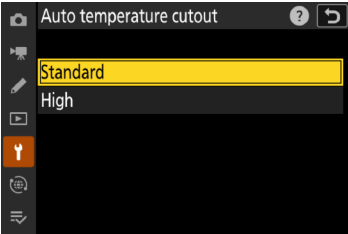
**UPDATE** **Auto Temperature Cutout**

The level at which the camera will turn off automatically as its internal temperature rises can be selected from [Standard] and [High].

Settings can be adjusted using [Auto temperature cutout] in the setup menu.

- When [Standard] is selected, the camera will display first a and then a icon as its internal temperature rises, switching to a count-down timer if the temperature increases still further.
- When [High] is selected, the camera will display , , and <sup>HIGH</sup> icons as its internal temperature rises, switching to a count-down timer if the temperature increases still further.
- When the count-down timer reaches zero, the shooting display will turn off and the camera will power down after saving the current footage to the memory card.

i-button menu	—
Camera controls	—
Other menus	✓




**⚠ Caution: "High"**

Although selecting [High] gives you more time before the camera shuts down, the camera may become hot to the touch. We recommend using a tripod or other equipment to reduce the time spent touching the camera.

**⚠ Cautions: When the Camera Is Hot**

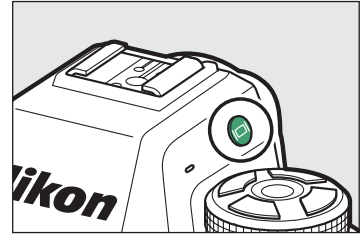
- In some cases, the count-down timer may be displayed the moment the camera is turned on, even when [High] is selected.
- Image quality may drop when the camera is hot.
- Memory cards inserted in a hot camera may also become hot. Wait for the temperature to drop before handling the camera or memory cards.

## Monitor Mode

Press the  (monitor mode) button to cycle between viewfinder and monitor displays. The choice of modes can be restricted if desired.

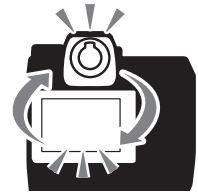
Press the  button to cycle through the displays as follows.

i-button menu	—
Camera controls	✓
Other menus	—

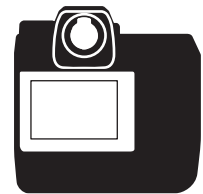


**[Automatic display switch]:** The camera automatically switches between the viewfinder and monitor displays based on information from the eye sensor.

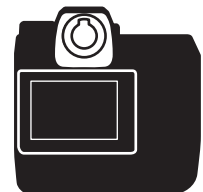
- In video mode, the eye sensor will not trigger the viewfinder while the monitor is tilted.



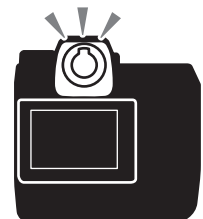
**[Viewfinder only]:** The monitor remains blank. The viewfinder is used for shooting, menus, and playback.








**[Monitor only]:** The monitor is used for shooting, menus, and playback. The viewfinder display will remain blank even if you put your eye to the viewfinder.

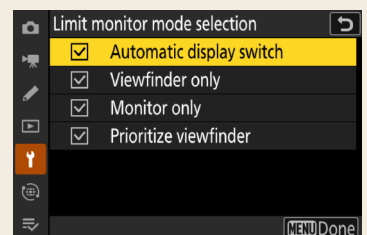


**[Prioritize viewfinder]:** In photo mode, placing your eye to the viewfinder turns the viewfinder on; the monitor remains off after you take your eye away. In video mode, this option functions in the same way as **[Automatic display switch]**.



### Limit Monitor Mode Selection

You can limit the choice of monitor modes available using the **[Limit monitor mode selection]** item in the setup menu. Highlight options and press  or  to select () or deselect (). Options marked with a check () can be selected via the monitor mode button.

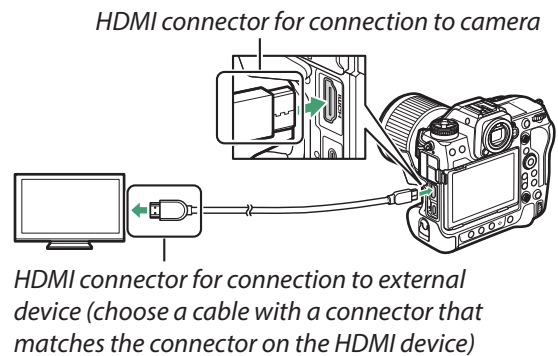


# HDMI Output

The camera can record video directly to connected HDMI recorders.

A third-party type A HDMI cable is required. The cable must be purchased separately. Always turn the camera off before connecting or disconnecting a cable.

- If a memory card is inserted in the camera when it is connected to a recorder, video will be recorded both to the recorder and the memory card. If no memory card is inserted, the footage will be recorded only to the external device.



## HDMI

Adjust settings for connection to HDMI devices.

Use [HDMI] in the setup menu.

i-button menu	—
Camera controls	—
Other menus	✓



### Options for Use When Connecting to External HDMI Recorders

[Output resolution]	<p>The format for output to HDMI devices can be selected from [Auto], [4320p (progressive)], [2160p (progressive)], [1080p (progressive)], [1080i (interlaced)], and [720p (progressive)].</p> <ul style="list-style-type: none"> <li>• Regardless of the option selected for [Output resolution], the maximum output resolution for RAW video is 1920 × 1080.</li> </ul>
[Output range]	<p>The RGB video signal input range varies with the HDMI device. [Auto], which matches the output range to the HDMI device, 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:</p> <ul style="list-style-type: none"> <li>• [Limited range]: For devices with an RGB video signal input range of 16 to 235. Choose this option if you notice a loss of detail in shadows.</li> <li>• [Full range]: For devices with an RGB video signal input range of 0 to 255. Choose this option if you notice that shadows are “washed out” or too bright.</li> </ul>
[Output shooting info]	<p>Choose whether shooting information is displayed on the HDMI device. If [ON] is selected, icons and other information in the shooting display will be recorded with the footage saved to external recorders.</p>
[Mirror camera info display]	<p>Choose whether the camera display remains on while an HDMI device is connected.</p> <ul style="list-style-type: none"> <li>• If [OFF] is selected, the display will remain off, reducing the drain on the camera battery.</li> <li>• [Mirror camera info display] will be fixed at [ON] while [OFF] is selected for [Output shooting info].</li> </ul>

### ■ When “Auto” Is Selected for Output Resolution

- When [Auto] is selected for [HDMI] > [Output resolution] in the setup menu, the camera automatically detects whether the external recorder supports the frame size and rate selected on the camera. If it does not, the camera will search for a supported resolution and frame rate. If no supported resolution and frame rate is found, output will be suspended.
- The camera searches for a supported resolution and frame rate in the order listed below.

Frame size/frame rate	Output resolution/frame rate search order	
	No memory card inserted in camera	Memory card inserted in camera
[7680×4320; 30p]	4320/30p → 2160/30p → 1080/30p	1080/30p
[7680×4320; 25p]	4320/25p → 2160/25p → 1080/25p	1080/25p
[7680×4320; 24p]	4320/24p → 2160/24p → 1080/24p	1080/24p
[3840×2160; 120p]	2160/120p → 1080/120p → 2160/60p → 1080/60p → 2160/30p → 1080/30p	1080/60p → 1080/30p
[3840×2160; 100p]	2160/100p → 1080/100p → 2160/50p → 1080/50p → 2160/25p → 1080/25p	1080/50p → 1080/25p
[3840×2160; 60p]	2160/60p → 1080/60p → 2160/30p → 1080/30p	2160/60p → 1080/60p → 2160/30p → 1080/30p
[3840×2160; 50p]	2160/50p → 1080/50p → 2160/25p → 1080/25p	2160/50p → 1080/50p → 2160/25p → 1080/25p
[3840×2160; 30p]	2160/30p → 1080/30p	2160/30p → 1080/30p
[3840×2160; 25p]	2160/25p → 1080/25p	2160/25p → 1080/25p
[3840×2160; 24p]	2160/24p → 1080/24p	2160/24p → 1080/24p
[1920×1080; 120p]	1080/120p → 1080/60p → 1080/30p	1080/120p → 1080/60p → 1080/30p
[1920×1080; 100p]	1080/100p → 1080/50p → 1080/25p	1080/100p → 1080/50p → 1080/25p
[1920×1080; 60p]	1080/60p → 1080/30p	1080/60p → 1080/30p
[1920×1080; 50p]	1080/50p → 1080/25p	1080/50p → 1080/25p
[1920×1080; 30p]	1080/30p	1080/30p
[1920×1080; 25p]	1080/25p	1080/25p
[1920×1080; 24p]	1080/24p	1080/24p

- Video will not be output at 1080i even when a recorder that supports this option is connected. Choose [1080i (interlaced)] for interlaced output.

## ■ When an Option Other Than “Auto” Is Selected for Output Resolution

The signal will be output at the selected resolution.

Frame size/frame rate	Output resolution/frame rate search order				
	4320p (progressive)	2160p (progressive)	1080p (progressive)	1080i (interlaced)	720p (progressive)
[7680×4320; 30p]	4320/30p	2160/30p	1080/30p	1080/60i	720/60p
[7680×4320; 25p]	4320/25p	2160/25p	1080/25p	1080/50i	720/50p
[7680×4320; 24p]	4320/24p	2160/24p	1080/24p	1080/60i	720/60p
[3840×2160; 120p]	—	2160/120p → 2160/60p → 2160/30p*	1080/120p → 1080/60p → 1080/30p*	1080/60i	720/60p
[3840×2160; 100p]	—	2160/100p → 2160/50p → 2160/25p*	1080/100p → 1080/50p → 1080/25p*	1080/50i	720/50p
[3840×2160; 60p]	—	2160/60p → 2160/30p*	1080/60p → 1080/30p*	1080/60i	720/60p
[3840×2160; 50p]	—	2160/50p → 2160/25p*	1080/50p → 1080/25p*	1080/50i	720/50p
[3840×2160; 30p]	—	2160/30p	1080/30p	1080/60i	720/60p
[3840×2160; 25p]	—	2160/25p	1080/25p	1080/50i	720/50p
[3840×2160; 24p]	—	2160/24p	1080/24p	1080/60i	720/60p
[1920×1080; 120p]	—	—	1080/120p → 1080/60p → 1080/30p*	1080/60i	720/60p
[1920×1080; 100p]	—	—	1080/100p → 1080/50p → 1080/25p*	1080/50i	720/50p
[1920×1080; 60p]	—	—	1080/60p → 1080/30p*	1080/60i	720/60p
[1920×1080; 50p]	—	—	1080/50p → 1080/25p*	1080/50i	720/50p
[1920×1080; 30p]	—	—	1080/30p	1080/60i	720/60p
[1920×1080; 25p]	—	—	1080/25p	1080/50i	720/50p
[1920×1080; 24p]	—	—	1080/24p	1080/60i	720/60p

\* Recording rate changes if original frame rate (120p, 100p, 60p, or 50p) is not compatible with frame rate chosen for external recorder.

### ⚠ Caution: Auto Output Resolution

HDMI output will be suspended if:

- output resolution is higher than the current frame size or
- the recorder does not support the selected output resolution.

### ⚠ Caution: “4320p (Progressive)” and “2160p (Progressive)”

If a memory card is inserted when [4320p (progressive)] or [2160p (progressive)] is selected for output resolution, footage filmed at a frame size of 7680 × 4320 or a frame size/frame rate of 3840 × 2160; 120p or 3840 × 2160; 100p will not be output via HDMI. Remove the memory card before recording footage to an external recorder.



### ■ YCbCr and Bit Depth

The YCbCr value and bit depth for footage output to external HDMI devices varies with the options selected for [Video file type] and [Frame size/frame rate] in the video recording menu.

Video file type	Frame size/frame rate	YCbCr and bit depth
N-RAW 12-bit (NEV)	8256×4644	<ul style="list-style-type: none"> <li>• Video mode (ready to record/recording in progress): 4:2:2 10-bit</li> <li>• Video playback: 4:2:2 8-bit</li> </ul>
	4128×2322	
	5392×3032	
	3840×2160	
ProRes RAW HQ 12-bit (MOV)	4128×2322	<ul style="list-style-type: none"> <li>• Video mode (ready to record/recording in progress): 4:2:2 10-bit</li> <li>• Video playback: 4:2:2 8-bit</li> </ul>
	5392×3032	
	3840×2160	
ProRes 422 HQ 10-bit (MOV)	3840×2160	4:2:2 10-bit
	1920×1080	
H.265 10-bit (MOV)	7680×4320	4:2:0 10-bit
	3840×2160 120p/100p	
	3840×2160 60p/50p/30p/25p/24p	4:2:2 10-bit
	1920×1080	
H.265 8-bit (MOV)	7680×4320	4:2:0 8-bit
	3840×2160 120p/100p	
	3840×2160 60p/50p/30p/25p/24p	4:2:2 8-bit
	1920×1080	
H.264 8-bit (MP4)	1920×1080	4:2:2 8-bit

### 🔧 Recording to External Recorders That Support a Bit Depth of 10 Bits

The HDMI signal will be output at a bit depth of 10 bits only to HDMI recorders that support this option.

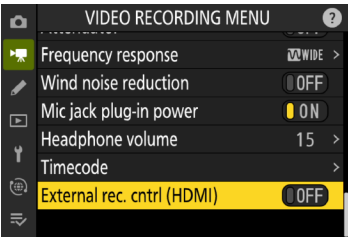


External Recording Control: External Rec. Cntrl (HDMI)

Choose whether camera controls can be used to start and stop recording on the external recorder.

Settings can be adjusted using [External rec. cntrl (HDMI)] in the video recording menu.





















i-button menu	—
Camera controls	—
Other menus	✓



- For information on whether your recorder supports external recording control, consult the manufacturer.
- The camera display will turn off automatically when the time selected for Custom Setting c3 [Power off delay] > [Standby timer] expires, ending HDMI output. When recording videos to an external device, select [Standby timer] and choose [No limit] or a time longer than the anticipated recording time.
- An icon appears in the camera display when [ON] is selected: STBY is displayed if no footage is currently being recorded, REC while videos are being recorded. During recording, check the recorder and recorder display to ensure that footage is being saved to the device.
- Note that selecting [ON] may disrupt the footage output to the device.

## Video Playback

Video playback controls are described below.

<b>Pause</b>	Press  to pause playback.
<b>Resume</b>	Press the  button to resume playback when playback is paused or during rewind/advance.
<b>Rewind/advance</b>	Press  to rewind,  to advance. Speed increases with each press, from 2x to 4x to 8x to 16x.
<b>Start slow-motion playback</b>	Press  while the video is paused to start slow-motion playback.
<b>Jog rewind/advance</b>	<ul style="list-style-type: none"> <li>• Press  or  while the video is paused to rewind or advance one frame at a time.</li> <li>• Keep  or  pressed for continuous rewind or advance.</li> </ul>
<b>Skip 10 s</b>	Rotate the sub-command dial one stop to skip ahead or back 10 s.
<b>Skip 10 frames</b>	Rotate the main command dial one stop to skip ahead or back 10 frames.
<b>Skip to last or first frame</b>	<ul style="list-style-type: none"> <li>• Keep  or  pressed to skip respectively to the first frame or last frame.</li> <li>• The first frame is indicated by a  in the top right corner of the display, the last frame by a .</li> </ul>
<b>Zoom in</b>	Press  to zoom in on the current frame while playback is paused.
<b>Adjust volume</b>	Press  to increase volume,  (?) to decrease.
<b>Edit video</b>	To display video  menu, pause playback and press the  .
<b>Exit</b>	Press  or  to exit to full-frame playback.
<b>Exit to shooting mode</b>	Press the shutter-release button halfway to return to shooting mode.

### Using the Command Dials

During video playback, the command dials can be used to skip ahead or back a few seconds or a few frames at a time.

#### ■ Skip 10 Seconds

Rotate the sub-command dial one stop to skip ahead or back 10 s.

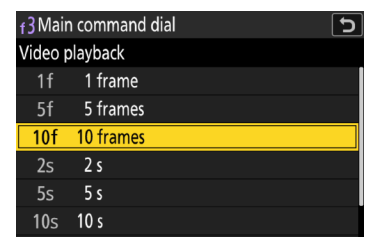
#### ■ Skip 10 Frames

Rotate the main command dial one stop to skip ahead or back 10 frames. Use this feature to review video footage in detail.

#### ■ Customizing the Command Dials for Video Playback

Choose the roles played by the command dials during frame advance.

Settings can be adjusted using Custom Setting f3 [Custom controls (playback)] > [Main command dial]/[Sub-command dial] > [Video playback].



[1 frame]	Advance or rewind a frame at a time.
[5 frames]	Advance or rewind 5 frames at a time.
[10 frames]	Advance or rewind 10 frames at a time.
[2 s]	Skip forward or back 2 s at a time.
[5 s]	Skip forward or back 5 s at a time.
[10 s]	Skip forward or back 10 s at a time.
[First/last frame]	Skip to the first or last frame.

## Video Stills

Stills can be created from individual frames of videos shot with [H.265 8-bit (MOV)] or [H.264 8-bit (MP4)] selected for [Video file type] in the video recording menu. You can create a single still from the current frame or a series of stills from a selected length of footage.

### Creating a Still from the Current Frame

- 1 Display a video full frame.

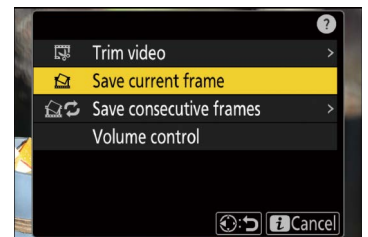


- 2 Pause the video on the desired frame.

- Press to pause playback.
- Your approximate position in the video can be ascertained from the video progress bar.
- Press or or rotate the command dials to locate the desired frame.



- 3 Press the button, then highlight [Save current frame] and press .



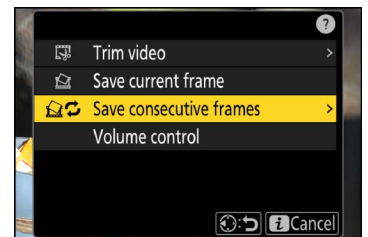
- This option is not available with videos recorded with [ProRes 422 HQ 10-bit (MOV)] or [H.265 10-bit (MOV)] selected for [Video file type] in the video recording menu.

#### [Save Current Frame]

- Stills are saved at the dimensions selected for [Frame size/frame rate] in the video recording menu when the video was recorded.
- They cannot be retouched.

**UPDATE** **Creating Stills from Selected Footage****1** Display a video full frame.**2** Pause the video on the desired frame.

- Press to pause playback.
- Your approximate position in the video can be ascertained from the video progress bar.
- Press or or rotate the command dials to locate the desired frame.

**3** Press the **i** button, highlight [Save consecutive frames], and press .**4** Choose a destination.

- Choose the destination.
- Press or to highlight a card slot and press .
- You will not be prompted to select the slot if only one memory card is inserted.

**5** Choose the length of footage.

Choose the length of footage that will be saved as stills.

**6** Press .

The selected footage will be saved as a series of JPEG stills. The number varies with the video frame rate.

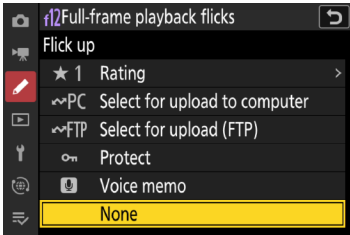
**! "Save Consecutive Frames"**

- Stills are saved at the dimensions selected for **[Frame size/frame rate]** in the video recording menu when the video was recorded.
- They cannot be retouched.

# Full-Frame Playback Flicks

Choose the role assigned to the flick up and flick down gestures during full-frame playback.

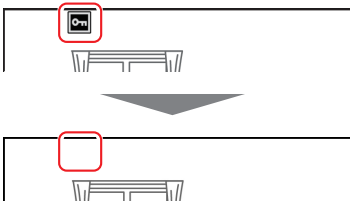
Settings can be adjusted using Custom Setting f12 [Full-frame playback flicks] > [Flick up] and [Flick down].



## Flick Up/Flick Down Options

★ [Rating]	Assign the current picture a pre-selected rating. <ul style="list-style-type: none"><li>The rating can be chosen by pressing . Choose from ratings of from zero to five stars, or select  to mark the picture as a candidate for later deletion.</li><li>Assigning different ratings to [Flick up] and [Flick down] helps you rate pictures quickly.</li></ul>
~PC [Select for upload to computer]	Mark the current picture for priority upload to a computer.
~FTP [Select for upload (FTP)]	Mark the current picture for priority upload to an FTP server.
🔒 [Protect]	Protect the current picture.
🗣️ [Voice memo]	Record and play voice memos. Voice memos cannot be added to videos.
[None]	Flicking up or down has no effect.

- Pictures selected by flicking up or down during playback are indicated by icons. The marking can be removed by flicking again in the same direction.



### Priority Upload Marking

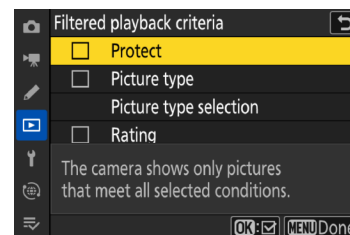
Choosing [Select for upload to computer] or [Select for upload (FTP)] allows priority upload marking to be added when the camera is connected to a computer or FTP server.

# Filtered Playback

View only pictures that meet the criteria chosen for [Filtered playback criteria].

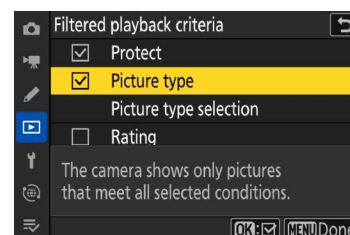
- 1 With the camera in playback mode, press the **i** button and then highlight [Filtered playback criteria] and press **OK**.

- Options will be displayed.



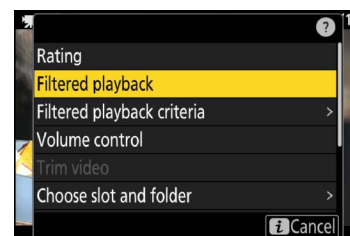
- 2 Highlight options using **▲** and **▼**.

- Press **OK** to select (☒) or deselect (☐)
- During filtered playback, only pictures that meet all the criteria selected (☒) for [Filtered playback criteria] will be displayed.
- Filtered playback criteria can also be selected using [Filtered playback criteria] in the playback menu.



- 3 Press the MENU button and select [Filtered playback].

- During filtered playback, a white border appears around the display.
- To end filtered playback, select [Filtered playback] again.



## Filtered Playback Criteria

[Protect]	<input checked="" type="checkbox"/> : Include protected pictures.
[Picture type]	<input checked="" type="checkbox"/> : Include pictures of the selected types.
[Rating]	<input checked="" type="checkbox"/> : Include pictures with selected ratings.
[Select for upload to computer]	<ul style="list-style-type: none"> <li>Select (<input checked="" type="checkbox"/>) [<b>Uploaded pictures</b>] to include pictures previously uploaded to a computer or ftp server.</li> <li>Select (<input checked="" type="checkbox"/>) [<b>Pictures not uploaded</b>] to include pictures that have yet to be uploaded.</li> <li>Select (<input checked="" type="checkbox"/>) both options to include both pictures that have and pictures that have not been uploaded.</li> </ul>
[Select for upload (FTP)]	
[Voice memo]	<input checked="" type="checkbox"/> : Include pictures with voice memos.
[Retouched pictures]	<input checked="" type="checkbox"/> : Include retouched pictures.

# Troubleshooting

### Image Artifacts

- You may notice the following in the shooting display during filming. These phenomena will also be visible in any footage recorded with the camera:
  - distortion during motion (individual subjects such as trains or cars moving at high speed through the frame may be distorted, or the entire frame may appear distorted when the camera is panned horizontally),
  - jagged edges, color fringing, *moiré*, or bright spots,
  - bright regions or bands in scenes lit by flashing signs and other intermittent light sources or when the subject is briefly illuminated by a strobe or other bright, momentary light source, or
  - flicker when power aperture is used during video recording.
- Banding caused by “flicker” may be visible in footage of scenes lit by such sources as fluorescent, mercury vapor, or sodium lamps. Flicker can be reduced using [Video flicker reduction] (📖 [40](#)) in the video recording menu. Flicker reduction may not produce the desired results if the subject is very bright. If this is the case, try choosing a smaller aperture (higher f-number).
- Note that noise (randomly-spaced bright pixels, fog, or lines) and unexpected colors may be more noticeable if you use the 🔍 button to zoom in on the view through the lens.

### Other Notes

- Video recording will end automatically if:
  - the maximum length is reached,
  - you switch shooting modes,
  - you switch modes using the photo/video selector,
  - the lens is removed, or
  - the camera’s internal temperature rises.
- The current video will not be saved if the battery is removed during recording.