Panasonic

Handbook

LUMIX S1H

INDEX

LUMIX S1H

Responding to the demanding requirements of videographers today,
the full-frame mirrorless camera LUMIX S1H offers an outstanding combination of
image quality, functionality and usability.

1

Dual Native ISO Technology

The 24.2MP CMOS sensor features Dual Native ISO technology, leveraging a dual-base ISO setting to minimize noise and maximize image quality from low to high sensitivity.

2

V-Log/V-Gamut with 14+ Stops of Dynamic Range

V-Log and V-Gamut come preinstalled. With 14+ stops of dynamic range and a wide color spectrum, performance rivals that of a VariCam professional cinema camera.

3

Multiple Recording Formats and Unlimited Recording

In addition to C4K/4K 60p/50p 4:2:0 10-bit and C4K/4K 30p/25p/24p 4:2:2 10-bit, the camera newly offers 6K/24p 4:2:0 10-bit in 3:2 and 5.9K 30p/25p/24p 4:2:0 10-bit in 16:9. Unlimited recording is offered on all settings.

4

RAW Data Output

With firmware version 2.1, 12-bit RAW video data with a maximum resolution of 5.9K can be output via HDMI to an external recorder.

5

Robust Video Expression Features

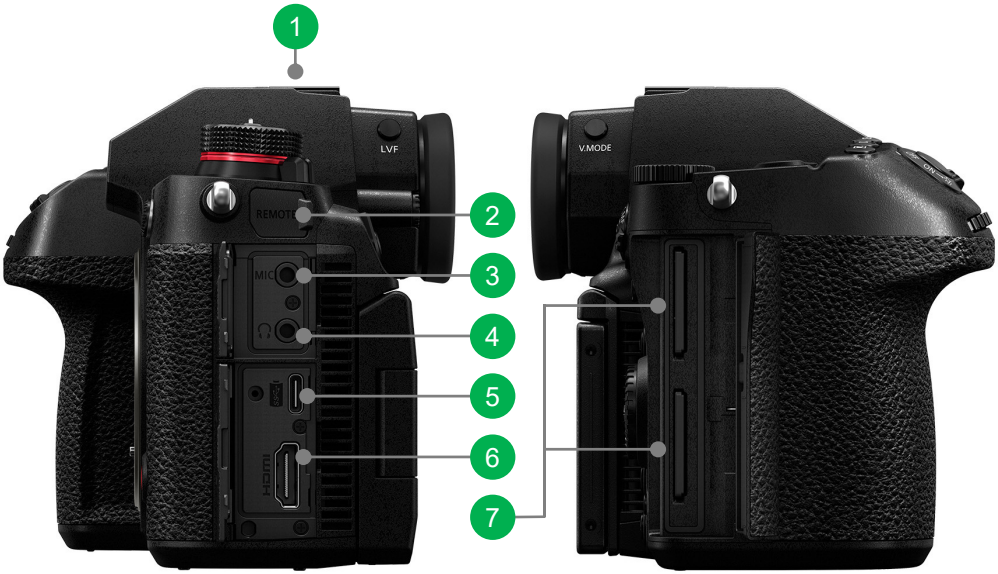
A variety of recording modes including 4:3 Anamorphic mode, VFR (variable frame rate), HFR (high frame rate) and 4K HDR are also provided.

1

Main Parts and Displays

Main Parts

Input-Output Terminal / Extended Capability 1 / 2



1	**Hot Shoe**	
2	**REMOTE Socket**	**Φ 2.5 mm**
3	**MIC Socket**	**Φ 3.5 mm Stereo Mini Jack** Mic Input (Plug-in Power) / Mic Input / Line Input Standard Input Level : -55dBV (Mic) / -10dBV (Line)
4	**Headphone Socket**	**Φ 3.5 mm Stereo Mini Jack**
5	**USB Port**	**USB 3.1 Type-C / Super Speed USB3.1 GEN1** Supports USB Power Delivery (9.0V / 3.0A)
6	**HDMI Socket**	**Type A**
7	**Card Slot 1 / 2**	**SD / SDHC / SDXC Memory Card** Compliant with UHS-I/UHS-II UHS Speed Class 3 Compliant with UHS-II Video Speed Class 90

Main Parts

Input-Output Terminal / Extended Capability 2/2

8	**Flash Synchro Socket** Use the flash with a synchronization voltage of 250V or less. **TC IN/OUT Socket** Use the bundled BNC conversion cable. Input: 1.0V to 4.0V [p-p], 10 kΩ, Output: 2.0V ± 0.5 V [p-p], low impedance
9	**Screw Hole for Function Expansion** Use the screw hole for attaching the lens or lens mount adaptor that can be secured with a screw.
10	**Focus Distance Reference Mark** Positioned coaxially with the strap eyelet in consideration of the attachment of a tape measure to the strap eyelet.
11	**Tripod Mount** Note : If you attempt to attach a tripod with a screw length of 5.5mm (0.22 inch) or more, you may not be able to securely fix it in place or it may damage the camera.
12	**Pinhole for Anti-rotation Pin of Video Tripod Mount**

Main Parts

Double Video Rec. Button

Video Rec/Stop can be operated with either button.

Video Rec. Button on the Top

When Handheld Shooting, Using a Tripod, etc.

Start and stop video recording using the shutter button can be enabled or disabled*. * Firmware must be updated to version 2.0 or later.

[⚙] > [AF] > 2 > [**Assign REC to Shutter Button**] > [**ON**]

Sub Video Rec. Button on the Front

When Using a Shoulder Rig, etc.

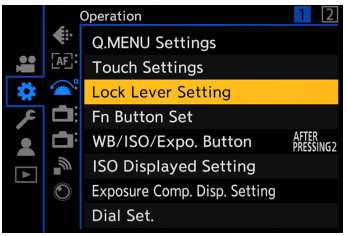
Main Parts

Operation Lock

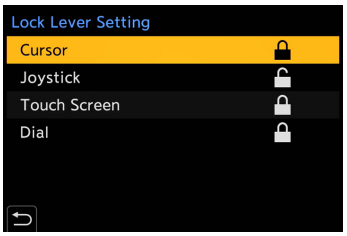
Set the operation lock lever to the [**LOCK**] position to disable operation, thus preventing operation errors.

When a malfunction such as an operation failure occurs, check this function first.

1 [⚙] > [🔧] > [**Lock Lever Setting**]



2 Select the operation function to disable.



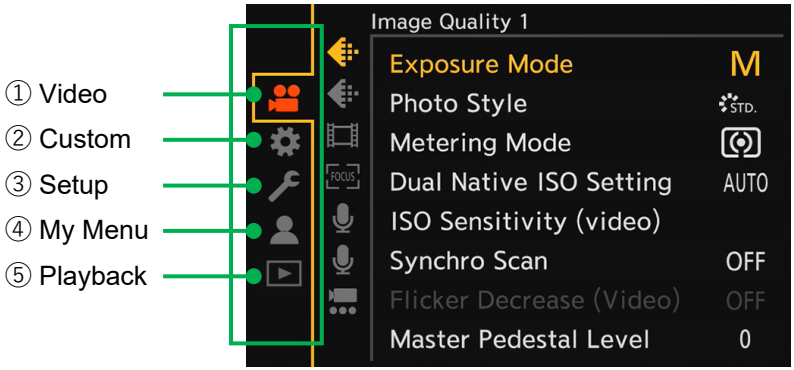
Cursor	Cursor Button, MENU/SET Button, Control Dial
Joystick	Joystick
Touch Screen	Touch Screen
Dial	Front Dial, Rear Dial, Control Dial

Displays

GUI Structure

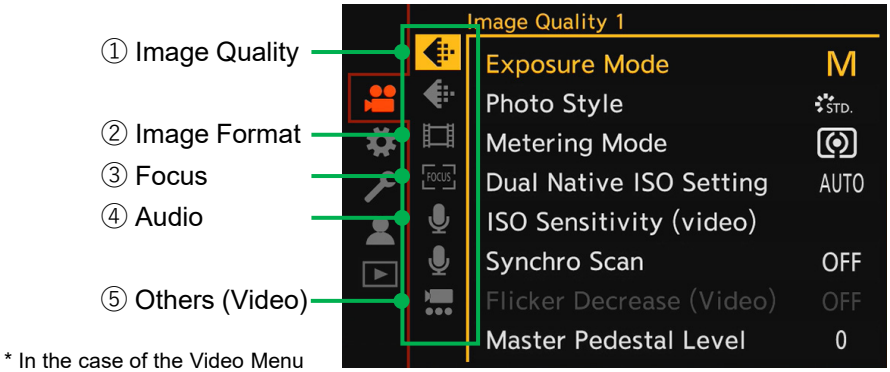
By Usage

Main Tab



Setting Sequence

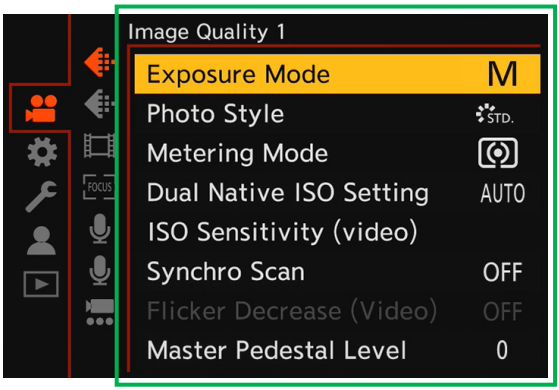
Sub Tab



* In the case of the Video Menu

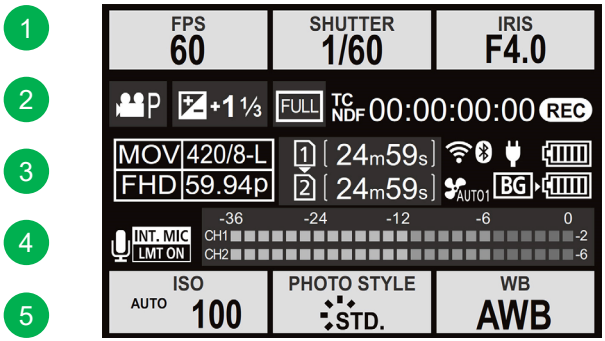
Shooting Usage Sequence

Menu Item



Displays

Control Panel Display * Creative Video Mode



1	FPS 60	Frame Rate / Variable Frame Rate
	SHUTTER 1/60	Shutter Speed
	IRIS F4.0	Aperture Value

2	P	Exposure Mode
	+1 1/3 MM +1	Exposure Compensation Value Manual Exposure Assist
	FULL	Image Area of Video
		Time Code TC NDF 00:00:00:00
	REC	Recording State

3	MOV 420/8-L FHD 59.94p	File Format / Recording Quality
	1 2	Card Slot Double Card Slot Function
	24m59s	Video Recording Time
		Wi-Fi / Bluetooth Connection State
	AUTO1	Fan Operating Mode
		Power Supply / Battery Indication
	BG	Battery Indication (Battery Grip)

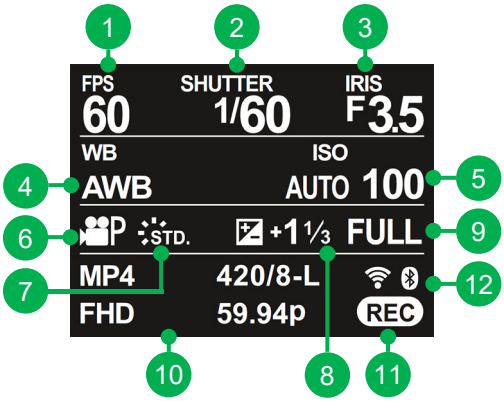
4	INT. MIC EXT. MIC	Built-in Microphone External Microphone
	96kHz/24bit XLR	XLR Microphone Adaptor Setting
	LMT ON	Sound Rec Level Limiter
		Mute
		Sound Recording Level

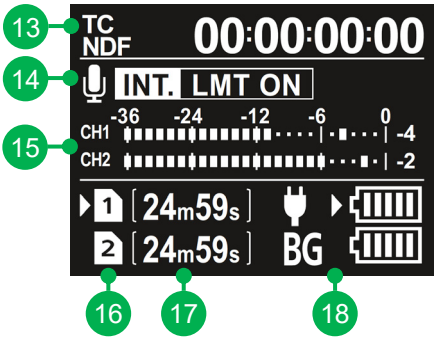
5	AUTO ISO 100	ISO / Dual Native ISO
	PHOTO STYLE STD. MON HDMI LUT V-Log MON HDMI MODE2 HLG	Photo Style LUT View Assist HLG View Assist
	WB AWB	White Balance

Displays

Status LCD Display * Creative Video Mode

Switchable between two display types





1	Frame Rate / Variable Frame Rate
2	Shutter Speed
3	Aperture Value
4	White Balance
5	ISO / Dual Native ISO Setting
6	Exposure Mode
7	Photo Style / Filter Settings
8	Exposure Compensation Value
9	Image Area of Video
10	Recording File Format / Recording Quality
11	Recording State
12	Wi-Fi / Bluetooth Connection State

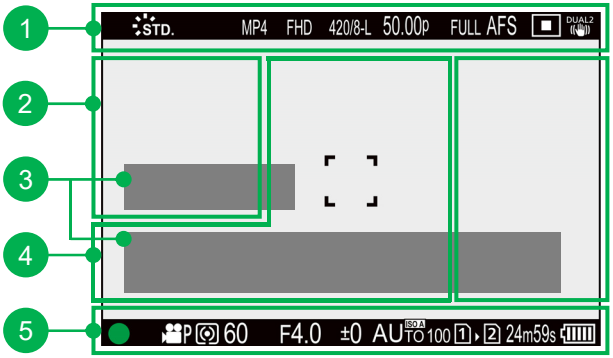
13	Time Code
14	Built-in Microphone External Microphone XLR Microphone Adaptor Setting Sound Rec Level Limiter
15	Sound Recording Level Display
16	Card Slot Double Card Slot Function
17	Video Recording Time
18	Battery Indication Power Supply

Use the [**Status-LCD Display (Video)**] of the Fn button.

In default settings, this is registered in the [**Fn1**] button.

Displays

LVF / Rear Monitor Display 1/2 * Creative Video Mode



1	AWBc AWBw WB 1 K1	White Balance
	AWB +	White Balance Adjustment
	STD.	Photo Style
	*POP	Filter / Filter Effect Adjustment
	MON LUT HDMI V-Log	LUT View Assist
	MON MODE2 HDMI HLG	HLG View Assist
	MOV FHD 420/8-L	Recording File Format Recording Quality
	59.94p 60/59.94p	Recording Frame Rate Variable Frame Rate
	AFS AFC MF	Focus Mode
	AFL	AF Lock
	P	Focus Peaking
	FULL S35mm PIXEL PIXEL	Image Area of Video
	C1	AF Mode

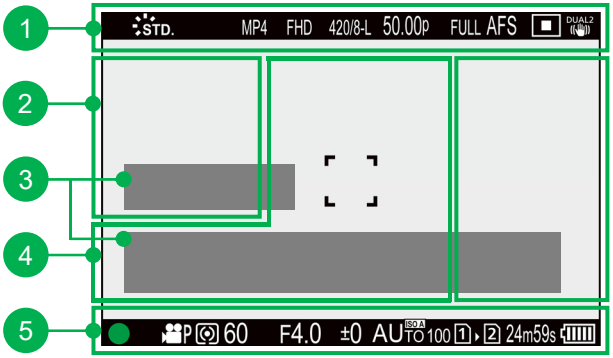
1		Wi-Fi Connection State
		Bluetooth Connection State
	GPS	Location Logging
	DUAL2 OFF DUAL2	Image Stabilizer
		Camera Shake Alert

2		Silent Mode
	2.0x	Anamorphic Desqueeze Display
		Loop Recording

3	TC 00:00:00:00	Time Code
	INT. MIC EXT. MIC	Built-in Microphone External Microphone
	96kHz/24bit XLR	XLR Microphone Adaptor Setting
	LMT ON LMT OFF	Sound Rec Level Limiter
		Mute
		Sound Recording Level
		Exposure Meter

Displays

LVF / Rear Monitor Display 2/2 * Creative Video Mode



4		Histogram
		AF Area
		Spot Metering Target
		Centre Marker
		Lock Lever
	XXmXXs	Elapsed Recording Time
		Image Being Sent

5	2019.12. 1 10:00:00	Time Stamp Recording
		Focus (Green) Recording State (Red)
	P	Recording Mode
	P	Program Shift
	AE	Metering Mode
	AEL	AE Lock
	60	Shutter Speed
	F4.0	Aperture Value
	+1/3	Exposure Compensation Value

	MM +1	Manual Exposure Assist
5	ISO 100	ISO / Dual Native ISO
	1 2	Card Access Indication (Red)
	1 ▸ 2	Card Slot Double Card Slot Function
	1 2	No Card
	1 FULL 2 FULL	Card Full
	XXmXXs	Video Recording Time Remaining recording time of one SD card
		Battery Indication
		Power Supply
	BG	Battery Grip

6		Temperature Rise Warning Icon
		Fan Error Warning Icon

Displays

Control Panel Display Selector

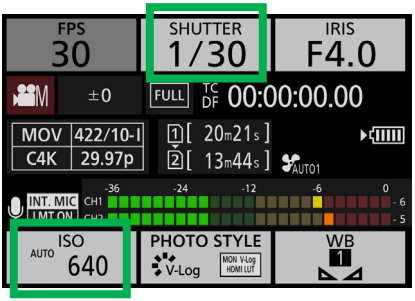
TIPS

Features an operation style familiar to users of video cameras or cinema cameras to support smooth video production.

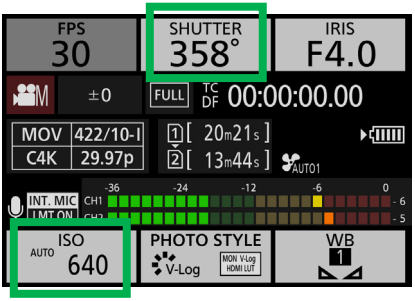
In Creative Video Mode

[🎥] > [⚙] > [**SS/Gain Operation**]

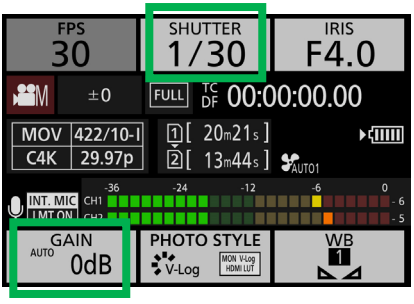
SEC / ISO



ANGLE / ISO



SEC / **dB**



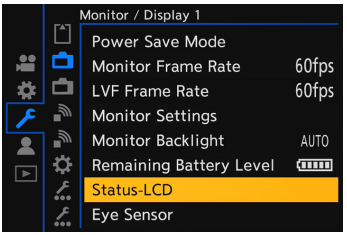
Displays

Status LCD Display Selector

TIPS

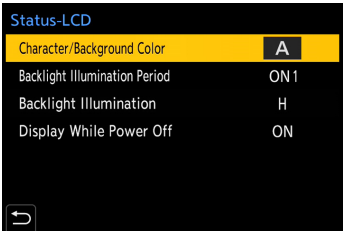
Enables the black/white reverse display of character (text) color and background color and the adjustment (2 steps) of backlight brightness.

1 [🔧] > [📷] > [**Status-LCD**]



2
- Character/Background Color
- Backlight Illumination Period*
- Backlight Illumination
- Display While Power Off

* Firmware must be updated to version 2.0 or later.



[Character/Background Color] > [Black]

[Character/Background Color] > [White]

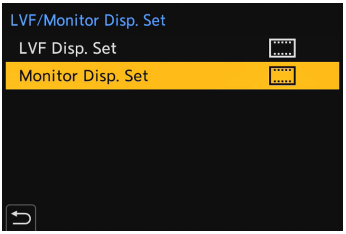
Displays

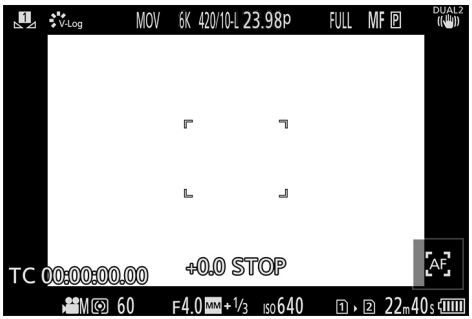
LVF / Rear Monitor Display Selector

Use to select whether to display the image on the entire screen or to show the information display outside the image frame.

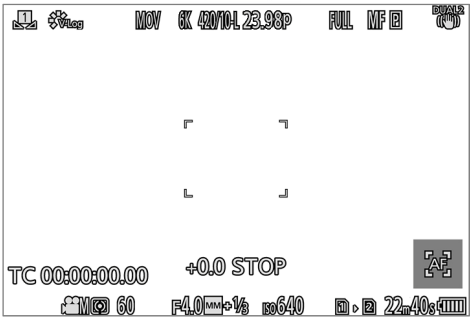
1 [⚙] > [📷] > [**LVF/Monitor Disp. Set**]

2 Select the LVF / Monitor Display Setting and set a desirable display style.





Display the icons outside of the image frame.



Display the icons within the image frame.

When you press the DISP. button, the icon can be hidden.

2

Video Recording Settings

Basic Setting

For Optimal Video Recording 1/2

Set the Creative Video mode to use all video functions.

Basic Setting

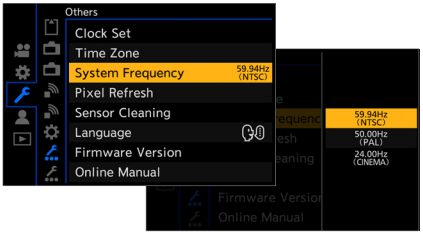
For Optimal Video Recording 2/2

Follow the steps 1 to 4 below for efficient setting.

1

[🔧] > [🔧] > [**System Frequency**]

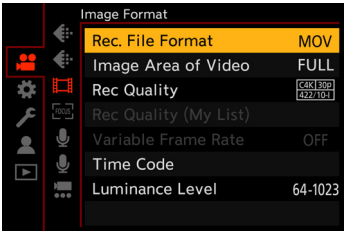
- 59.94Hz (NTSC)
- 50.00Hz (PAL)
- 24.00Hz (CINEMA)



2

[🎥] > [🎞] > [**Rec. File Format**]

- MOV
- MP4
- AVCHD

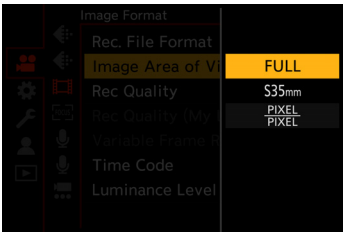


3

[🎥] > [🎞] > [**Image Are of Video**]

- FULL
- S35mm
- PIXEL/PIXEL

► **PAGE 92-93 : Image Area**

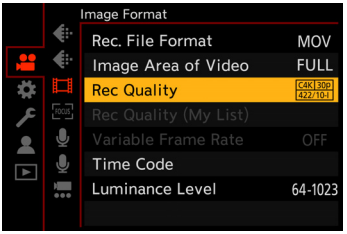


- This setting may become fixed depending on the [Rec Quality] setting.
- The setting changes automatically to [S35mm]
  When using Super 35mm or APS-C lenses.
  When [Image Circle] in [Lens Information] is set to [S35mm].

4

[🎥] > [🎞] > [**Rec Quality**]

► **PAGE 94-97 : ALL Rec Qualities**



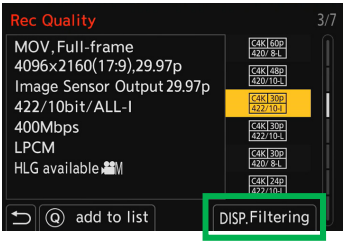
Basic Setting

Rec Quality Filtering 1/2

TIPS

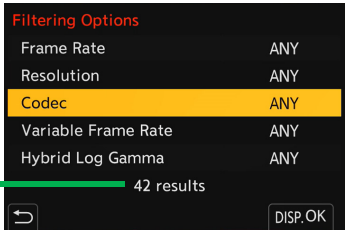
Applies filtering by condition to narrow down various Rec Quality setting options.

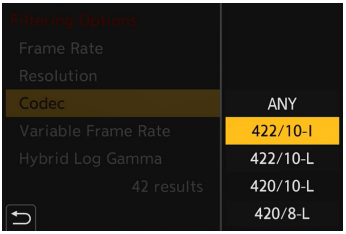
1 Press [**DISP. Filtering**] button.

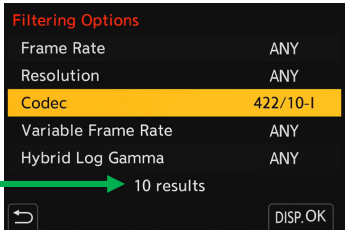


2 [**Filtering Options**]

- Frame Rate
- Resolution
- Codec
- Variable Frame Rate
- Hybrid Log Gamma







42 results to 10 results after filtering

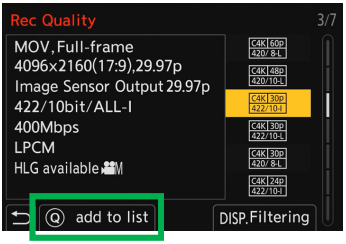
Basic Setting

Rec Quality Filtering 2/2

TIPS

Use to register frequently used settings in “My List.”

1 Press [**add to list**] button.



2 Select [**Yes**].

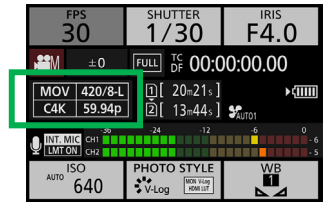
3 Registered to

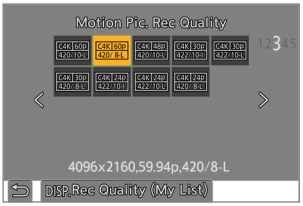
[ ] > [ ] > [**Rec Quality (My List)**]

Registered [**Rec Quality (My List)**] can be called up by touching the Control Panel.

- When not yet registered, the [Rec Quality] setting screen is displayed.
- Firmware must be updated to version 2.0 or later.

Touch

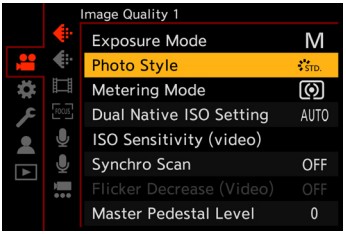




Log Recording

V-Log Mode

1 [ ] > [ ] > [**Photo Style**]



2 Select [**V-Log**]

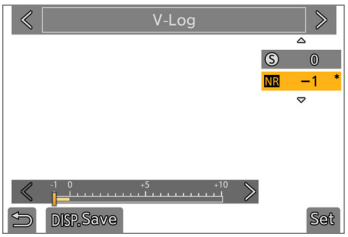


Image Quality Adjustment

Ⓢ Sharpness	0 to 10 / 0.5-step
NR Noise Reduction	-1*, 0 to 10 / 0.5-step

* Firmware must be updated to version 2.0 or later.

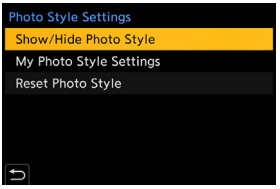
How to display frequently used Photo Styles Only

TIPS

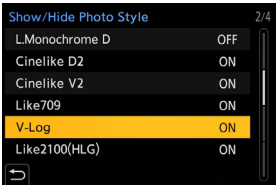
Each of the 14 Photo Styles can be set to either Show or Hide.

1 [ ] > [ ] > [**Photo Style Settings**]

2 [**Show/Hide Photo Style**]



3 Set only the modes you want to use to [**ON**].

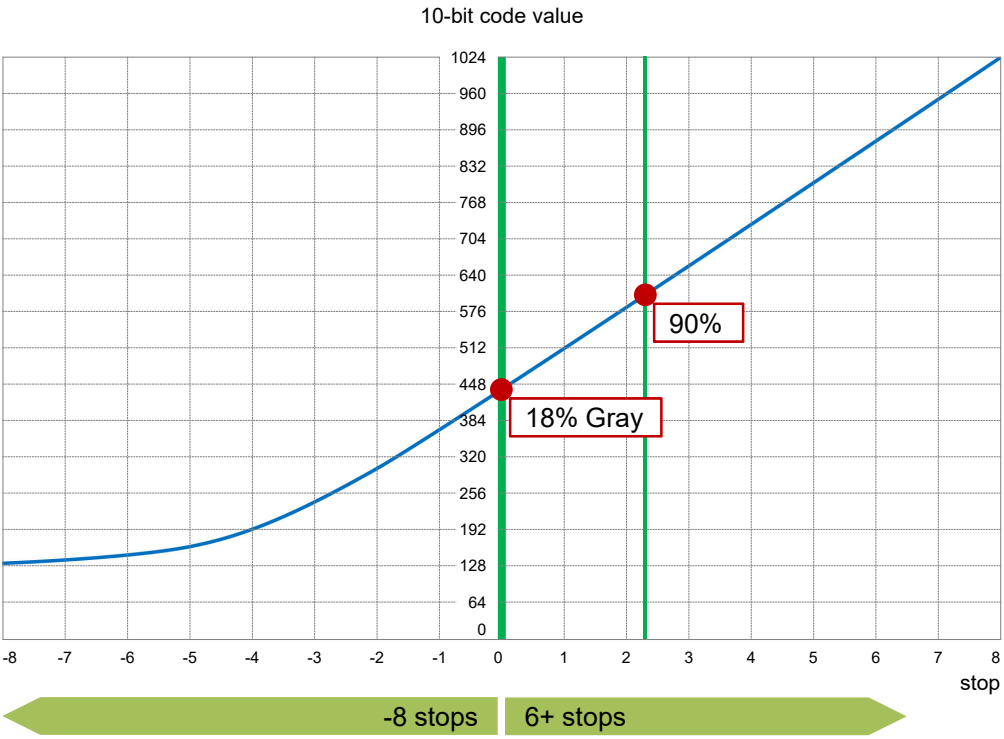


Log Recording

LUMIX S1H's V-Log Characteristics

The graph shows the LUMIX S1H's V-Log characteristics. It is designed to have the same characteristic as the original VARICAM's (35 and LT) curve. LUTs developed for VARICAM series can also be used for the LUMIX S1H's footage.

- The V-Log characteristics comply with "V-Log/V-Gamut REFERENCE MANUAL Rev.1.0"



	V-Log			
Input Reflection [%]	IRE [%]	Stop	10-bit Code Value	12-bit Code Value
0	**7.3**	**-**	**128**	**512**
18	**42**	**0.0**	**433**	**1732**
90	**61**	**2.3**	**602**	**2408**

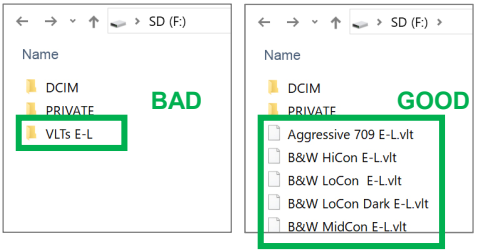
- When luminance is to be displayed by stop units, this camera calculates IRE 42% to 0 stop.

Log Recording

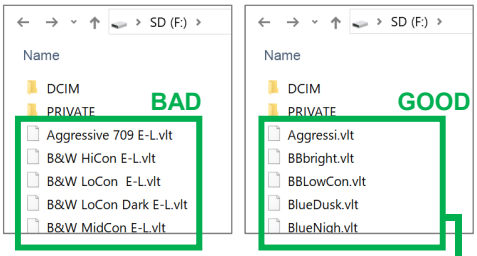
Applying a LUT to the Camera Monitor 1/2

1 Copy **LUT files (.VLT)** to root directory of a camera formatted SD Card.

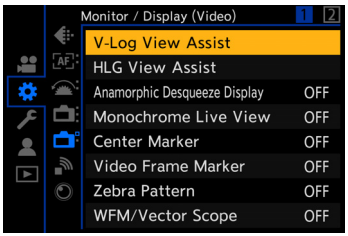
Note: Do not put the files in a folder, they must be in the root directory as shown.



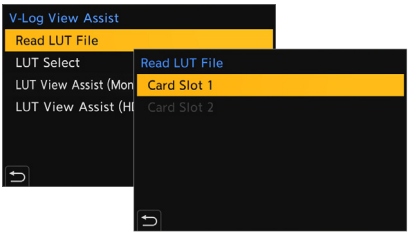
2 Change to file names consisting of up to 8 alphanumeric characters (excluding extension).



3 [⚙] > [📷] > [**V-Log View Assist**]

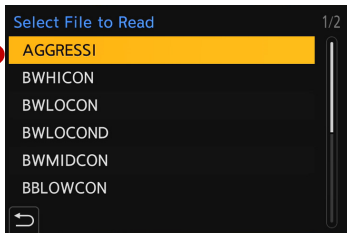


4 [**Read LUT File**] and select card slot



5 Import the LUT file

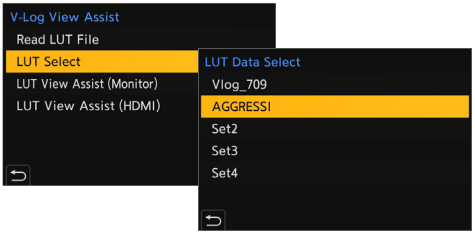
Note: Names of the files that were renamed in step 2 CANNOT be changed using the camera.



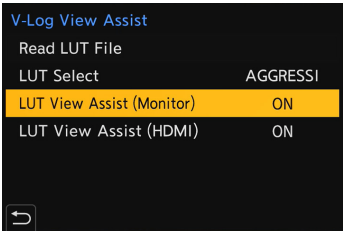
Log Recording

Applying a LUT to the Camera Monitor 2/2

6 Select [**LUT Select**] and choose the LUT you want to apply.



7 Select the application target (Monitor or HDMI).



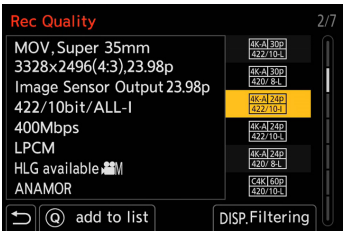
► **PAGE 53-54 : VariCam LUT Library / V-709 Conversion 3D-LUT**

Anamorphic

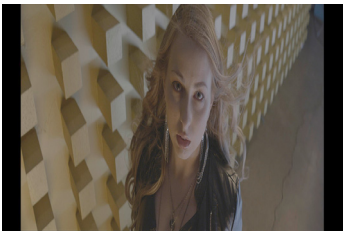
Anamorphic Video Recording 1/2

Enables anamorphic video recording using an anamorphic lens with a 4:3 aspect ratio.

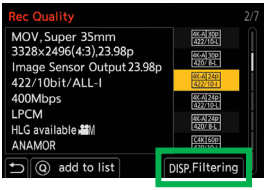
1 [📹] > [🎞] > [**Rec Quality**] > Select [**4K-A**]

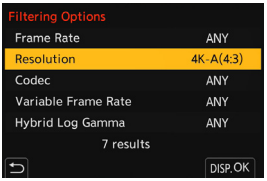


► **PAGE 51 : Anamorphic Lenses**



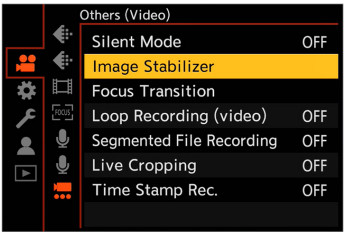
Filtering by [**4K-A**] can be applied.





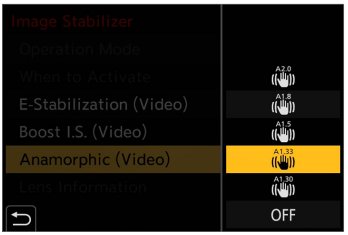
2 Set the type of image stabilizer most suitable for the mounted lens.

[📹] > [🎬] > [**Image Stabilizer**]



3 [**Anamorphic (Video)**]

- A 2.0
- A 1.8
- A 1.5
- A 1.33
- A 1.30



Anamorphic

Anamorphic Video Recording 2/2

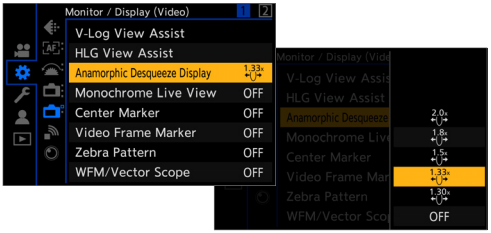
Displays on the monitor a simulation of image desqueezed to cinema scope size.

1

[⚙] > [📷] >

[**Anamorphic Desqueeze Display**]

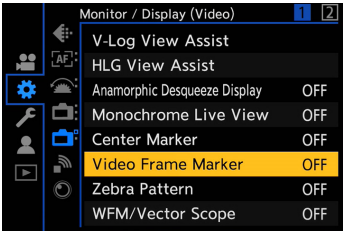
- A 2.0
- A 1.8
- A 1.5
- A 1.33
- A 1.30



2

Confirm the cropped angle of view.

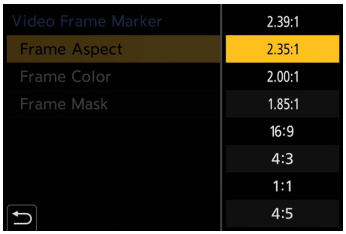
[⚙] > [📷] > [**Video Frame Maker**] > [**SET**]



3

[**Frame Aspect**]

2.39 : 1	CinemaScope
2.35 : 1	CinemaScope
2.00 : 1	Scope
1.85 : 1	VistaVision for USA
16 : 9	High Vision

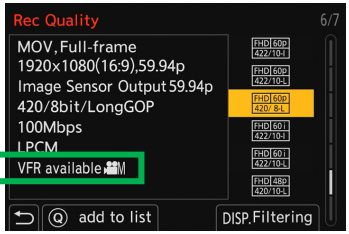


VFR / HFR

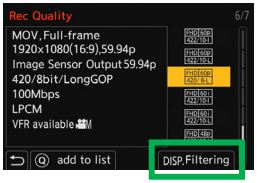
VFR Video Recording

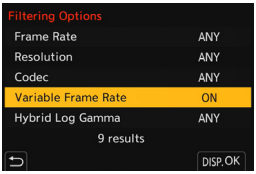
1 [🎥] > [🎞] > [**Rec Quality**] >

Select the mode indicated with [**VFR available**].

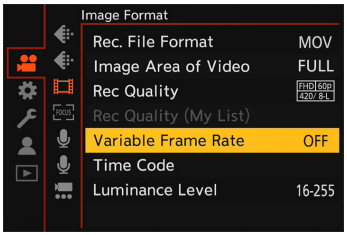


Filtering can be applied to display only VFR-compatible settings.

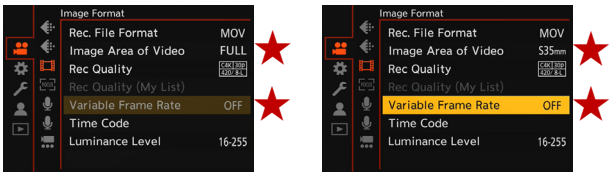




2 [🎥] > [🎞] > [**Variable Frame Rate**]

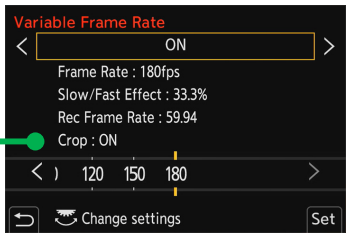


When selection cannot be made... ⇒ Change the [**Image Area of Video**] setting.



3 Select a frame rate.

The angle of view narrows if a frame rate over 150 fps is selected.



► **PAGE 98-99 : Degree of Effect**

VFR / HFR

HFR Video Recording

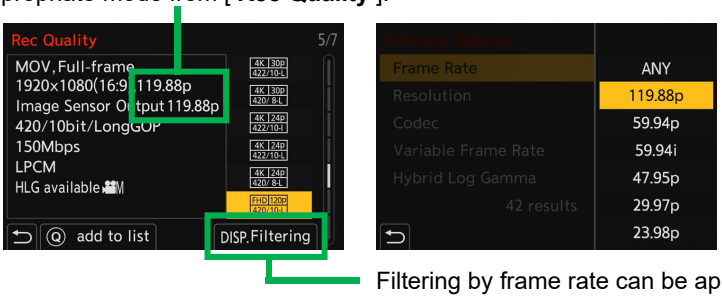
Records in MOV format with a high frame rate so that slow-motion videos can be created by converting the frame rate in post production.

	Sound Recording	AF	Recording Bitrate	Footage
VFR	**No**	**No**	**8-bit**	**Slow or Fast**
HFR	**Yes**	**Yes**	**10-bit**	**Same Time Axis**

MOV	59.94Hz	C4K 4K 4K-A	S35mm PIXEL/PIXEL	4:2:0 10-bit, LongGOP, HEVC	200Mbps	**47.95p**
		FHD	FULL S35mm PIXEL/PIXEL	4:2:0 10-bit, LongGOP, HEVC	150Mbps	**119.88p***
					100Mbps	**47.95p**
	50.00Hz	FHD	FULL S35mm PIXEL/PIXEL	4:2:0 10-bit, LongGOP, HEVC	150Mbps	**100.00p***
	24.00Hz	C4K 4K 4K-A	S35mm PIXEL/PIXEL	4:2:0 10-bit, LongGOP, HEVC	200Mbps	**48.00p**
		FHD	FULL S35mm PIXEL/PIXEL	4:2:0 10-bit, LongGOP, HEVC	100Mbps	**48.00p**

* When FULL or Super 35mm is selected.

Select the appropriate mode from [**Rec Quality**].



Filtering by frame rate can be applied.

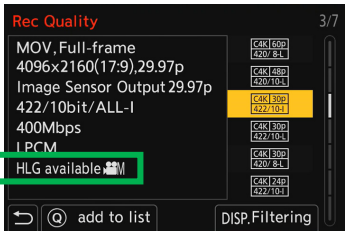
HDR

HLG Video Recording 1/2

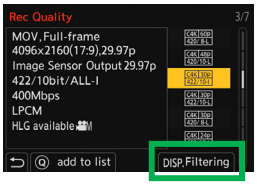
Records videos in HLG (Hybrid Log Gamma) HDR format.

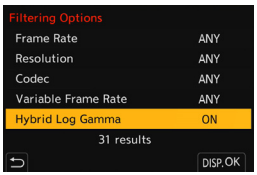
1 [🎥] > [🎞] > [**Rec Quality**] >

Select the mode indicated with [**HLG available**].

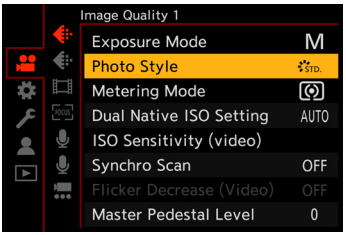


Filtering by HLG-compatible setting can be applied.





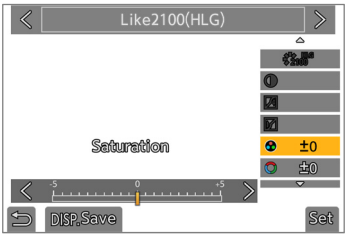
2 [🎥] > [⚙] > [**Photo Style**]



3 Select [**Like2100(HLG)**]

Image Quality Adjustment

Saturation	±5 / 0.5-step
Hue	±5 / 0.5-step
Sharpness	±5 / 0.5-step
Noise Reduction	±5 / 0.5-step



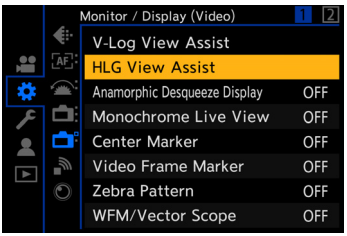
- “HLG (Hybrid Log Gamma)” is an international standard (ITU-R BT.2100) HDR format.

HDR

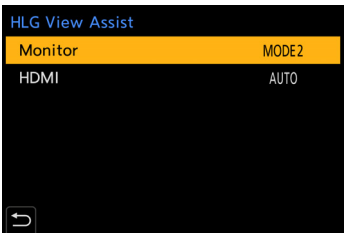
HLG Video Recording 2/2

Use to simulate the image that would be displayed on an HLG-compatible monitor.

1 [⚙] > [📷] > [**HLG View Assist**]



2 Select the display device.



The screen shows the converted color gamut and brightness.

AUTO * HDMI only	Applies the effect of [MODE2] when the camera is connected to a device that does not support HDR (HLG format).
MODE1	Converts with an emphasis on Bright Areas such as sky.
MODE2	Converts with an emphasis on the Brightness of a Main Subject.
OFF	No data conversion. * HLG images appear darker on devices that do not support the HLG format.

3

HDMI Output and TC IN/OUT

Ver. 2.1

RAW Data Output

With firmware version 2.1, 12-bit RAW video data with a maximum resolution of 5.9K can be output via HDMI to an external recorder.

Compatible External Recorder (As of July 2020)
ATOMOS Ninja V **4K HDR Monitor-Recorder** AtomosOS 10.52 or higher

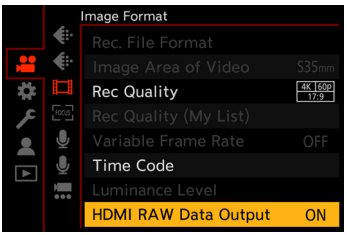
- Please contact ATOMOS for more information.

1 Connect the camera and the external recorder with an HDMI cable, and turn them on.

- Use a “High Speed HDMI cable” that has the HDMI logo on it, and that is described as "4K compatible".

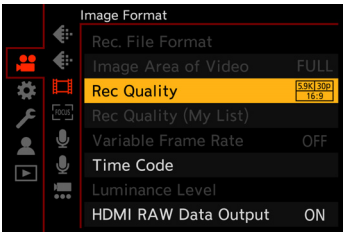
2 [🎥] > [🎞] >

[**HDMI RAW Data Output**] > [**ON**]



3 [🎥] > [🎞] > [**Rec Quality**]

► **PAGE 101 : Rec Qualities**

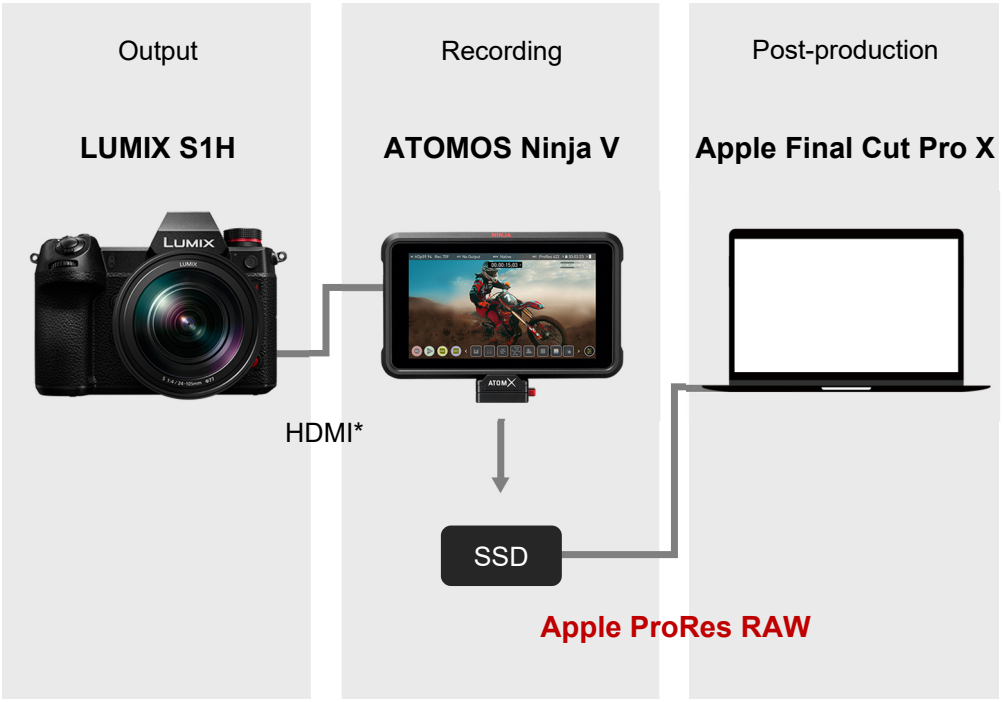


Note

- [Info Display] is not available. You can not output the camera information display to an external recorder.
- [Down Convert] is not available.
- Images equivalent to V-Log recording are displayed on the camera display.
- Only the [LUT View Assist (Monitor)] that applies the preset “Vlog_709” can be used.
- When using the [LUT View Assist (Monitor)], “709” will be displayed on the screen.

RAW Workflow

Please make sure you use an HDMI 2.0 cable which supports 18Gbps bandwidth so that the RAW data is fully input to an external recorder.



* All functions may not be available depending on the situation.

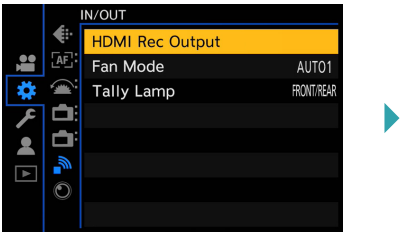
HDMI Rec Output / Down Convert

Output is according to the [Rec Quality].
YUV and bitrate are as follows.

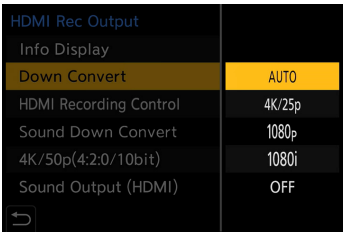
Recording to Card	HDMI Output
4:2:2 10-bit	**4:2:2 10-bit**
4:2:0 10-bit	**4:2:2 10-bit**
4:2:0 8-bit	**4:2:2 8-bit**

► **PAGE 102-103 : HDMI Output Image Quality**

Down-converting is also possible.



[⚙] > [📡] > [**HDMI Rec Output**]



[**Down Convert**]

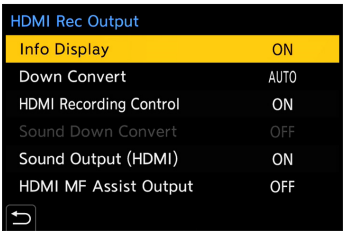
AUTO	Outputs by down-converting to match the connected device.
4K/30p (4K/25p)	Down-converts resolution to 4K and frame rate to 29.97p or 25p.
1080p	Down-converts resolution to FHD, and outputs as progressive.
1080i	Down-converts resolution to FHD, and outputs as interlaced.
OFF	Outputs at the resolution and recording frame rate of the [Rec Quality].

Note
- 6K / 5.9K / 5.4K video is output with 4K or FHD.
  To output during internal recording, firmware must be updated to version 2.0 or later.
- Anamorphic video is output with 4K or FHD.
- When set to High Frame Rate, the frame rate is down-converted for output.
- When set to a 4:3 or 3:2, black area is added to the images and they are output with a 16:9 aspect ratio.
- Output may be in 8-bit if you output to devices that do not support 10-bit.

Other HDMI Rec Output Features

Info Display

Output the camera information display to an external device connected by HDMI.



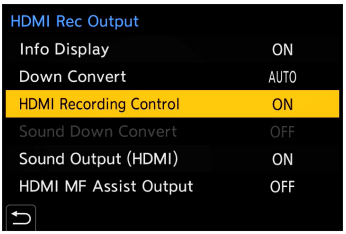
HDMI Recording Control

Recording Start / Stop control information is output to an HDMI-connected external recorder.

Please turn on the following setting:

[ ] > [ ] >

[**Time Code**] > [**HDMI Time Code Output**]

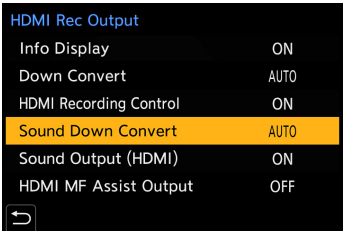


Sound Down Convert

When the DMW-XLR1* is attached, audio is down-converted to a format suitable for the connected HDMI external device before being output.

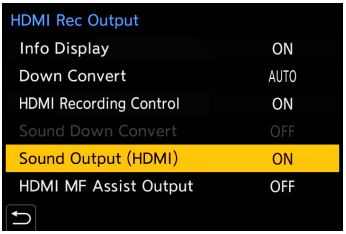
AUTO	Output is down-converted to match the connected device.
OFF	Output is according to the settings in [XLR Mic Adaptor Setting].

* Sold separately.



Sound Output (HDMI)

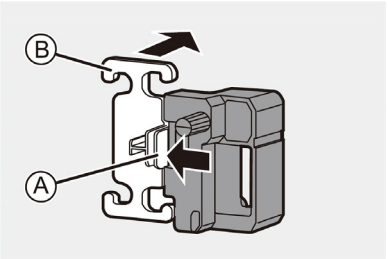
Sound output to HDMI-connected external devices can be turned ON or OFF.



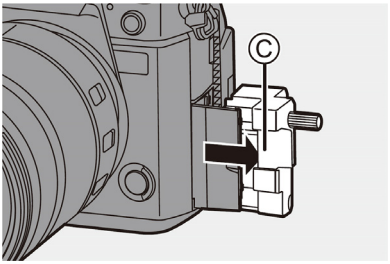
Attaching the Cable Holder 1/2

Use of the bundled cable holder prevents detachment of the cable and damage to the terminals. Put the camera on a stable surface to perform this task.

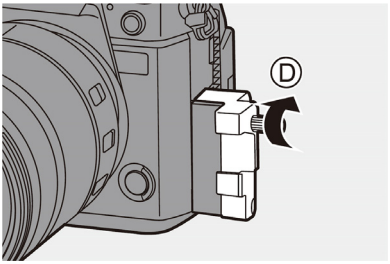
1 While pushing **A**, slide the clamp portion **B** of the cable holder to remove it.



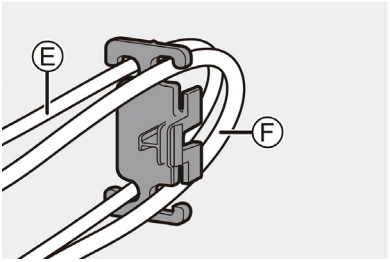
2 Open the door of the terminal section and slide the door into the part marked **C**.



3 Loosely mount the cable holder to the mount on the camera, and then rotate the screws in the direction of the arrows to secure the cable holder **D**.



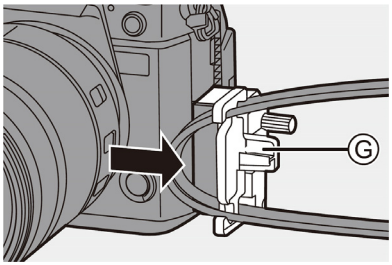
4 Fit the USB connection cable (C–C or A–C) **E** and HDMI cable **F** to the clamp.



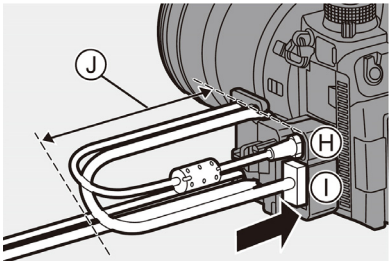
Note : Use a High-Speed HDMI cable (Type A-Type A plug, up to 1.5 m (4.9 feet)) with the HDMI logo. Cables that do not comply with the HDMI standards will not work.

Attaching the Cable Holder 2/2

5 Slide the clamp portion **G** to attach it to the cable holder.



6 Connect the USB connection cable (C–C or A–C) to the USB port **H**.



7 Connect the HDMI cable to the [HDMI] socket **I**.

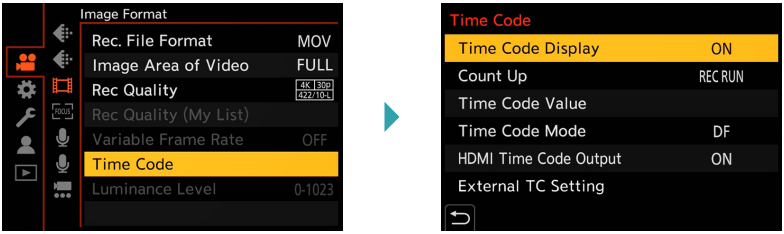
J Leave some slack so that this section has a length of at least 10 cm (0.33 feet).

8 **Removing the Cable Holder**

To remove the cable holder, follow the steps for attaching it in the reverse order.

Time Code

Record and input the time codes.



[ ] > [ ] > [**Time Code**]

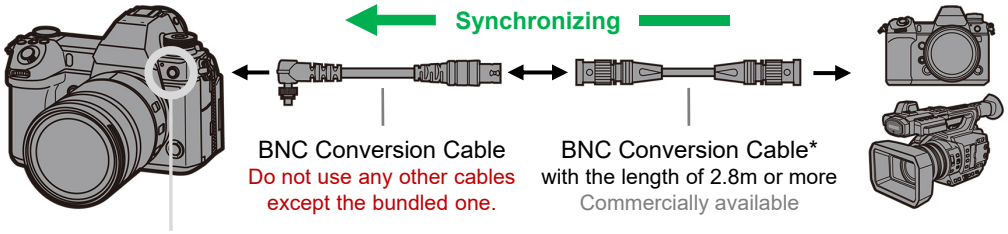
MOV or AVCHD only. MP4 is not compatible with time codes.

Time Code Display	The time code is displayed on the screen.
Count Up	Rec Run* / Free Run
Time Code Value	Reset / Manual Input / Current Time
Time Code Mode	DF (Drop Frame) / NDF (Non-Drop Frame)**
HDMI Time Code Output	The time code information and images are output together.
External TC Setting	The initial values of the time codes of the LUMIX S1H and external device are synchronized.

* When setting the [Variable Frame Rate], it will be set to [Rec Run].
** It will be set to [NDF] with the following settings.
When setting [50.00Hz (PAL)] or [24.00Hz (CINEMA)]. When setting 47.95 or 23.98p.

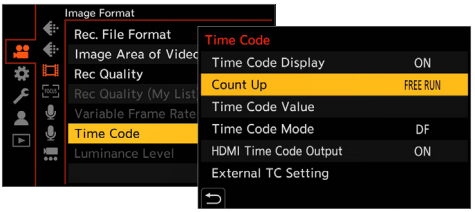
TC IN/OUT 1/3

The initial time code value can be synchronized.

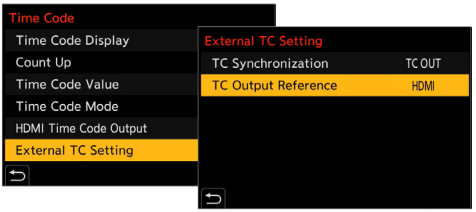


* We recommend using a 5C-FB equivalent double-shielded BNC cables.

1 [ ] > [ ] > [**Time Code**] > [**Count Up**] > [**FREE RUN**]

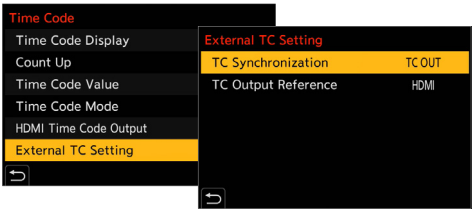


2 [**External TC Setting**] > Select [**TC Output Reference**]



Recording Reference	Output according to the shot images.
HDMI Reference	Slightly delays the signals according to the HDMI output when connected to an external device.

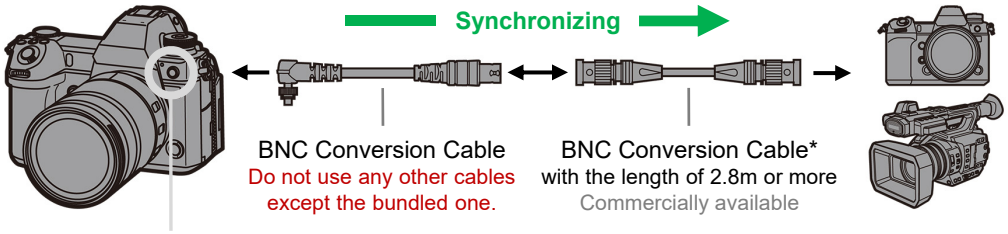
3 [**TC Synchronization**] > [**TC OUT**]



4 Operate the external device to synchronize the time code.

TC IN / OUT 2/3

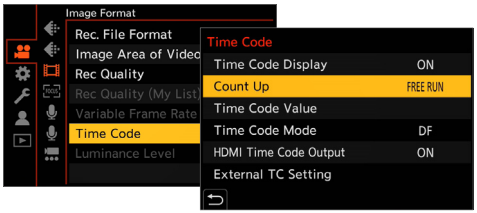
The initial time code value can be synchronized.



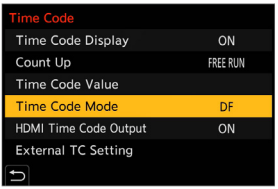
* We recommend using a 5C-FB equivalent double-shielded BNC cables.

1 Set the [**System Frequency**] and [**Rec Quality**] to match the external device.

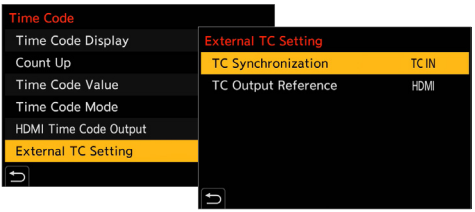
2 [🎥] > [🎞] > [**Time Code**] >
> [**Count Up**] > [**FREE RUN**]



3 Select [**Time Code Mode**]
to match the external device.



4 [**External TC Setting**] >
[**TC Synchronization**] > [**TC IN**]



5 Set the time code count method of the external device to Free Run, and output signal.
The LUMIX S1H is in a slave state, and the [TC] of the time code shown on the screen switches to [TC].

TC IN / OUT 3 / 3

Maintaining the Slave State

Even if you disconnect the BNC cable, the camera will remain in slave state.

Releasing the Slave State

Perform one of the following operations to release the camera from the slave state.
– Operate the camera ON/OFF switch.
– Switch the recording mode.
– Change the [System Frequency].
– Set the [Variable Frame Rate].
– Switch the [Rec Quality] between 47.95p/23.98p and a different recording frame rate.
– Change the following [Time Code] setting items
[Count Up], [Time Code Value], [Time Code Mode], [TC Synchronization].

Restoring the Slave State

To restore the slave state, reconnect the BNC cable to the external device while set as follows. The time code signal (LTC signal) can be input just by connecting.
– [M] mode
– [Count Up] : [Free Run]
– [TC Synchronization] : [TC IN]

Even when the system frequency differs between the camera and the external device, their initial time code values may be synchronized.
Bear in mind, however, that the time codes lose sync as they count up.

4

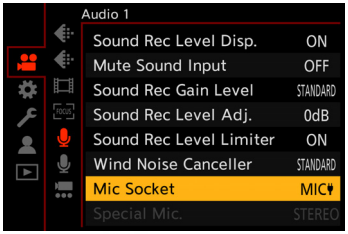
Audio Settings

Mic Input

The settings can be switched depending on the need for power supply.
They also support Line Input.

Φ 3.5mm Stereo Mini Jack

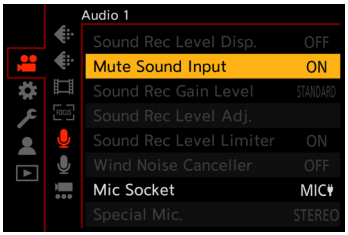
Input Settings Switching



[ ] > [ ] > [**Mic Socket**]

Mic Input Plugin Power	Power is supplied to an external mic by the camera.
Mic Input	Power is not supplied to an external mic by the camera.
Line Input	When connecting an external audio device for line output.

When Muting the Audio Input



[ ] > [ ] > [**Mute Sound Input**]

The audio input from the external microphone or XLR Microphone Adaptor DMW-XLR1* is muted.

- When recording the audio separately.
- For live streaming studio commentary.

* Sold separately.

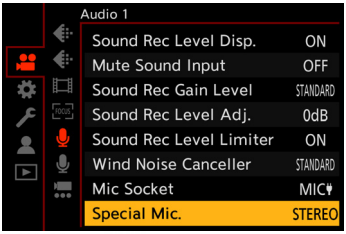
Stereo Microphone DMW-MS2 * Sold separately

When the DMW-MS2 is attached,
set the microphone's sound pickup range.

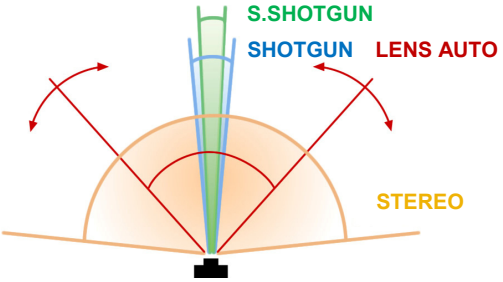
* Sold separately.

Sound Pickup Range Settings

The sound pickup range can be set according to the shooting intentions.



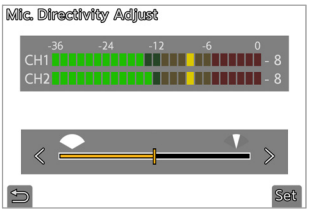
[ ] > [ ] > [**Special Mic.**]



STEREO	Picks up sound over a wide area.
LENS AUTO	Picks up sound from a range automatically set by the lens angle of view.
SHOTGUN	Picks up sound from a specific direction while preventing background noise.
S.SHOTGUN	Narrows the sound pickup range more than with [SHOTGUN].
MANUAL	Sets the range manually for sound pickup.

When Using Only the Manual Settings

A function can be assigned to the Fn button for quick access.



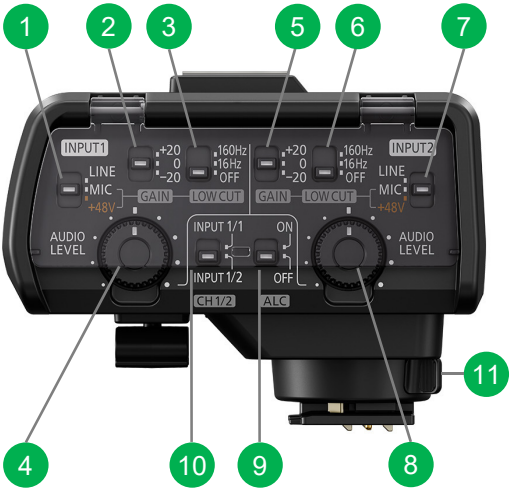
[ ] > [ ] > [**Fn Button Set**]

[**2**] > [**Mic. Directivity**]

XLR Microphone Adaptor DMW-XLR1 * Sold separately

- Attach the XLR microphone to record audio with high-grade stereo sound quality.
- Equipped with an external switch.
- Record lip-synced audio and video.
- Compatible with 4K video recording with High Resolution Audio (96kHz/24bit) (MOV only).
- Microphones that require phantom power can be used.

* The DMW-XLR1 cannot be used together with built-in microphone or φ3.5mm external microphone.



1	INPUT1	LINE/MIC/+48V Switch
2		GAIN Switch
3		LOW CUT Switch
4		AUDIO LEVEL Dial
5	INPUT2	GAIN Switch
6		LOW CUT Switch
7		LINE/MIC/+48V Switch
8		AUDIO LEVEL Dial
9	ALC Switch	
10	CH1/2 Switch	
11	Cable Holder	
12	XLR Terminal (INPUT1)	
13	XLR Terminal (INPUT2)	
14	Cable Holder	

High Resolution Audio Recording / Sound Down Convert

Compatible with 4K video recording with High Resolution Audio through the DMW-XLR1.*

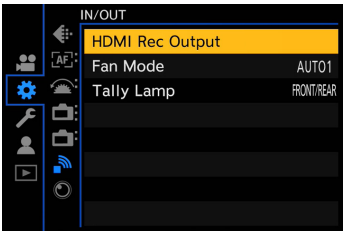
1 [ ] > [ ] > [**XLR Mic Adaptor Setting**]

2 Select [**96kHz/24bit**] or [**48kHz/24bit**]

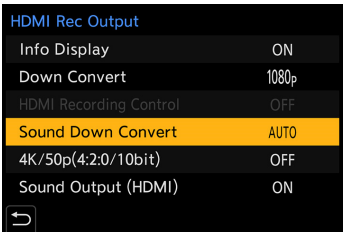
Only available when [Rec. File Format] is set to [MOV].

When the DMW-XLR1* is attached, audio is down-converted to a format suitable for the connected HDMI external device before being output.

1 [ ] > [ ] > [**HDMI Rec Output**]



2 Select > [**Sound Down Convert**]



AUTO	Output is down-converted to match the connected device.
OFF	Output is according to the settings in [XLR Mic Adaptor Setting].

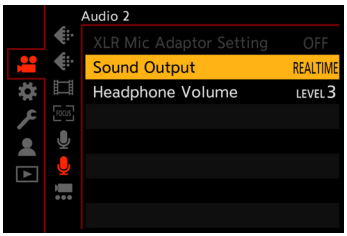
* Sold separately.

Headphone Settings

Set the audio output method and volume.

Φ3.5mm Headphone Jack

1 [🎥] > [🎙] > [**Sound Output**]

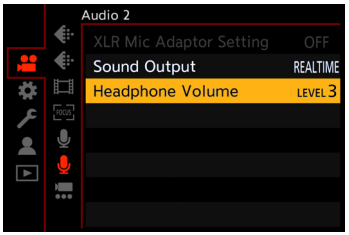


REALTIME	Audio without time lag. It may differ from the sound recorded in videos.
REC SOUND	Audio to be recorded in videos. Output sound may be delayed from actual sound.

The setting is fixed to [REC SOUND] in the following cases:

- During output of audio via HDMI.
- When [Special Mic.] is set to [LENS AUTO], [SHOTGUN], [S.SHOTGUN], or [MANUAL].
- When using an XLR Microphone Adaptor DMW-XLR1.

2 [🎥] > [🎙] > [**Headphone Volume**]



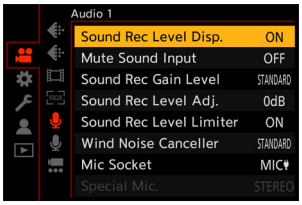
Adjustable in 15 stages.

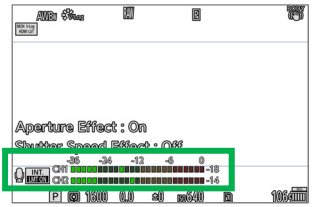
When headphones are connected, the Control Dial will change to a volume control function.

Other Audio Settings

Sound Rec Level Display

The recording level is displayed onto the shooting screen.





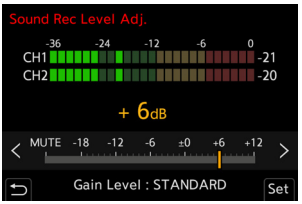
Sound Rec Gain Level *

STANDARD / LOW

When set to LOW, the sound input can be suppressed for recording in environments where the sound volume is high. (-12 dB).

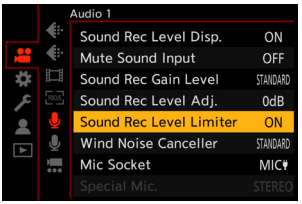
Sound Rec Level Adjustment *

Sound input level is adjustable in 32 levels. (-18 dB to +12 dB or mute).



Sound Rec Level Limiter *

The camera automatically adjusts the sound input level, and minimizes the crackling noise when the volume is high.



Wind Noise Canceller Wind Cut

When the external microphone is attached, the [Wind Noise Canceller] will change to [Wind Cut].

Wind Noise Canceller	Wind Cut
Built-in Microphone	External Microphone
HIGH / STANDARD / OFF	HIGH / STANDARD / LOW / OFF

* [Sound Rec Gain Level], [Sound Rec Level Adjustment] and [Sound Rec Level Limiter] are not available when the DMW-XLR1 is attached.

5

Expandability

Lenses

L-mount Native	Panasonic	LUMIX S Series
	Leica Camera	TL-Lenses
		SL-Lenses
	Sigma	L-mount

For the latest information, check the following support site:
https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/index.html

PL Mount	Leitz	Mount Adaptor	SL-PL-MOUNT ADAPTOR
		Lens	THALIA
			SUMMILUX-C
			SUMMICRON-C
			M 0.8
		Diopter	MACROLUX 114, 95
	Sigma	Mount Adaptor	SIGMA MOUNT CONVERTER MC-31
		Lens	FF Zoom Line
			High Speed Zoom Line
			FF High Speed Prime Line
			FF Classic Prime Line

Anamorphic	Vantage	1.30 x	Hawk V-Lite Anamorphics
	Holdan Limited	1.33 x	SLR Magic
	P+S TECHNIK	1.5 x	TECHNOVISION Classic
	Cooke Optics	1.8 x	Anamorphic/i Full Frame Plus
	Atlas Lens	2.0 x	Orion Series
	Xeen	2.0 x	Samyang

Screw Hole for Function Expansion

Use the screw hole for attaching the lens or lens mount adaptor that can be secured with a screw.

For more information, visit the website of the applicable manufacturer.

Rig Zacuto

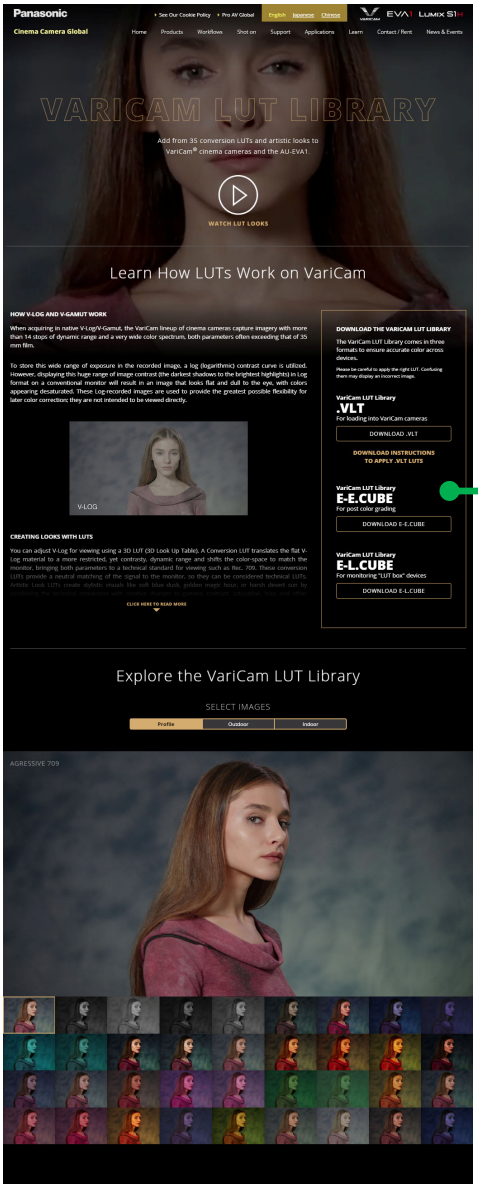
It is possible to extend the system according to the use case by combining it with various accessories.

1	Kameleon EVF
2	Axis Mini EVF Mount
3	Rod Lock
4	Extended Top Handle
5	Panasonic S1/S1R/S1H Cage

6	Gripper Battery
7	Polaris Baseplate
8	Polaris Shoulder Pad
9	Shorty Trigger Grips

VariCam LUT Library Free of Charge

35 conversion LUTs for VariCam® cinema cameras and AU-EVA1 can be downloaded free of charge for use in the LUMIX S1H.



The VariCam LUT Library comes in three formats to ensure accurate color across devices.

Note: Please be careful to apply the right LUT. Confusing them may display an incorrect image.

LUT Format	Purpose
.VLT	For loading into LUMIX and VariCam cameras.
E-E.CUBE	For post color grading.
E-L.CUBE	For monitoring "LUT box" devices.

https://pro-av.panasonic.net/en/cinema_camera_varicam_eva/support/lut/index.html

V-709 Conversion 3D-LUT Free of Charge

This LUT gives a V-709 finish to images recorded in V-Log.

With V-709, a cinematic VariCam Look can be brought to the monitor for on-site previewing. Even without color-grading processing on post-production, V-709 remains the best choice to create expressive images, especially for projects such as live events.

Note : This LUT comes in three formats to ensure accurate color across devices.
Please be careful to apply the right LUT. Confusing them may display an incorrect image.

LUT Format	Purpose
.VLT	Compatible with LUMIX and VariCam cameras
.Cube	Compatible with Final Cut Pro X, Premiere Pro, EDIUS, DaVinci Resolve, etc.
.TXT	Compatible with Quantel Pablo

* Output is in legal range only.

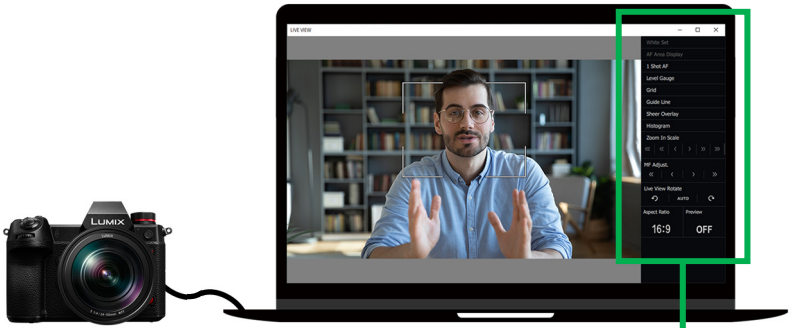
https://av.jpn.support.panasonic.com/support/global/cs/dsc/download/index3.html

► PAGE 24-25 : Applying a LUT to the Camera Monitor

LUMIX Tether for Streaming (Beta)

As “LUMIX Tether” is a software program designed for tethered shooting, GUIs are displayed with live view images on the PC monitor during USB tethering. However, these graphic items become a hindrance when the software is used to capture camera view for live streaming.

Live View Mode of “LUMIX Tether for Streaming (Beta)” enables displaying camera view only.



LUMIX Tether

LUMIX Tether for Streaming (Beta)

https://www.panasonic.com/global/consumer/lumix/lumixtether.html

LUMIX Webcam Software (Beta) for Windows / Mac

“LUMIX Webcam Software (Beta)” for Windows / Mac is **a one-stop webcam software** making it possible to use an applicable LUMIX camera as a webcam for purposes such as live streaming or video conferencing.

It is easy to feed the camera view over a **USB connection** in optimum output resolution (1280x960 or 1280x720) according to the application for live streaming or video conferencing.

No extra device is needed.

Windows Operating Environment	
OS	Windows 10 (64bit)
CPU	Intel CPU of 1 GHz or higher
Display	1024 x 768 pixels or more
RAM	2GB or more
HDD	Free space of 200 MB or more for installation
Interface	USB 3.0 / 3.1

Mac Operating Environment	
OS	Mac macOS 10.13, macOS 10.14, macOS 10.15
CPU	Intel CPU of 1 GHz or higher
Display	1024 x 768 pixels or more
RAM	2GB or more
HDD	Free space of 10 MB or more for installation
Interface	USB 3.0 / 3.1

https://www.panasonic.com/global/consumer/lumix/lumix_webcam_software.html

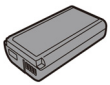
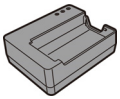
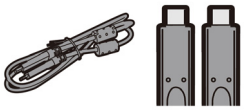
6

Power Supply and Recording Media

Fast Charging

Battery Charger

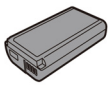
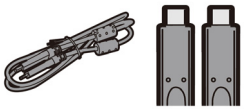
Charging Time **130** min FAST

				
Battery Pack DMW-BLJ31	Battery Charger DMW-BTC14	USB Connection Cable C-C	AC Adaptor	AC Mains Lead

USB Power Charging

When camera is turned **OFF**.

Charging Time **140** min FAST

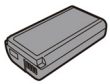
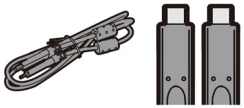
				
DC-S1H	Battery Pack DMW-BLJ31	USB Connection Cable C-C	AC Adaptor	AC Mains Lead

USB Power Supply while charging is possible.*

USB Power Charging

When camera is turned **OFF**.

Depends on the device

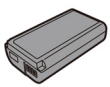
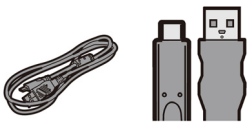
			• PC • Mobile battery, etc.
DC-S1H	Battery Pack DMW-BLJ31	USB Connection Cable C-C	

USB Power Supply while charging is possible* by using devices that support USB PD.**

USB Power Charging

When camera is turned **OFF**.

Depends on the device

			• PC • Mobile battery, etc.
DC-S1H	Battery Pack DMW-BLJ31	USB Connection Cable A-C	

* When the camera is ON, charging will take longer than when the camera is OFF.
** Use a device with an output of 9V / 3A (27W or more) that supports USB PD.
• USB Type-C™ and USB-C™ are trademarks of USB Implementers Forum.

About USB Power Supply : The battery must be installed in camera and retain some charge for feature to work.

Power Supply Battery Grip DMW-BGS1 (Sold Separately)

By using two batteries — one in the camera and the other in the grip* — the DMW-BGS1 enables extended battery life.

Separately sold parts must be purchased.

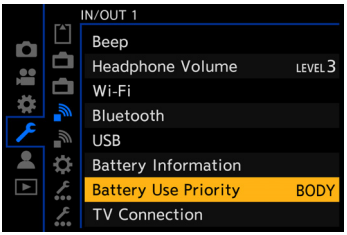
Battery Grip	DMW-BGS1
Battery Pack*	DMW-BLJ31

* No battery pack is bundled with the DMW-BGS1.

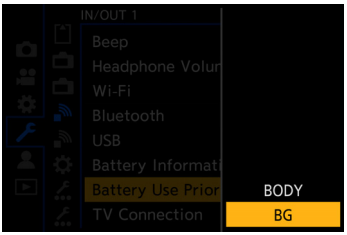
Hot-Swappable

1 [🔧] > [📶] > [**Battery Use Priority**]

* The order of USB power charging is also determined by this setting.

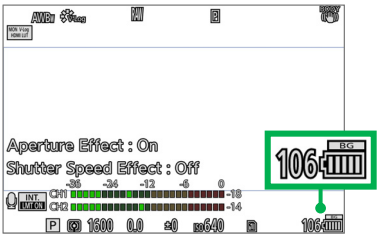


2 Select [**BG**]



3 When using the battery in the Battery Grip, [BG] is displayed on the monitor.

When this icon disappears, the battery of the battery grip can be replaced.

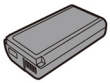


► PAGE 104 : DMW-BLJ31 Battery Life

Power Supply USB Power Supply

Convenient for video shooting with a fixed camera or during long shoots in the studio, this feature allows you to supply power to the camera.

DC-S1H



Battery Pack DMW-BLJ31

Battery must be installed and retain some charge for feature to work.

Bundled USB Connection Cable C-C

Use of Bundled Items

AC Adaptor

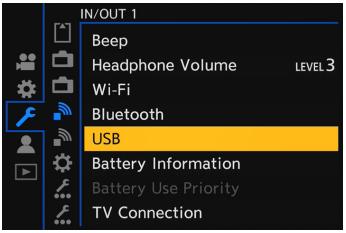
AC Mains Lead

Use of External Device*

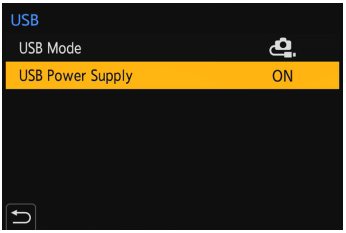
- PC
- Mobile battery, etc.

* When supplying power and charging at the same time, use a device with an output of 9V / 3A (27W or more) that supports USB PD. If connecting with devices that do not support USB PD, this will supply power only.

1 [🔧] > [📶] > [**USB**]



2 [**USB Power Supply**] > [**ON**]



Power Supply DC Coupler / AC Adaptor (Sold Separately)

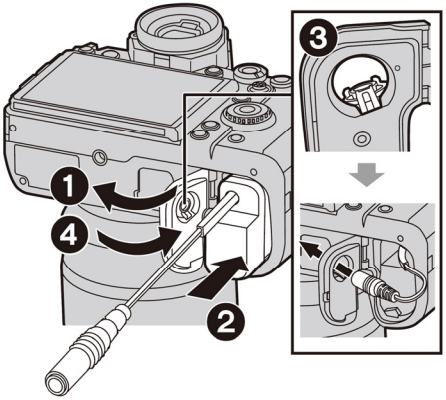
The AC Adaptor DMW-AC10 to the DC Coupler DMW-DCC16 also allow you to supply power to the camera.

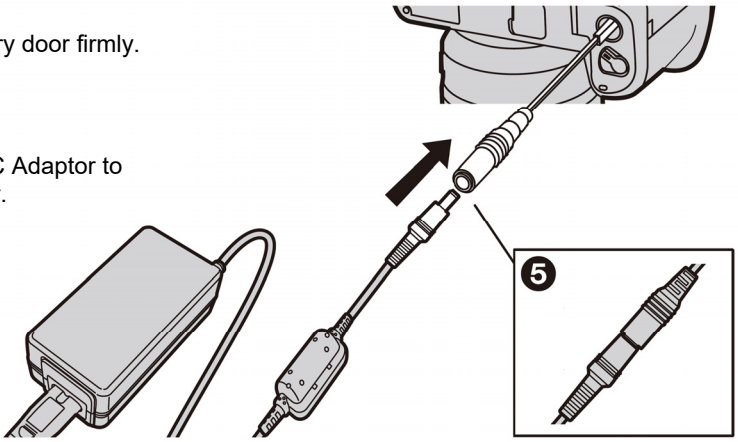
Separately sold parts must be purchased.

AC Adaptor	DMW-AC10
DC Coupler	DMW-DCC16

* The AC Adaptor DMW-AC10 and the DC coupler DMW-DCC16 cannot be used independently of one another.

1. Open the battery door.
2. Insert the DC Coupler paying attention to its direction.
3. Open the DC Coupler cover and then thread the cable.
4. Close the battery door firmly.
5. Connect the AC Adaptor to the DC Coupler.

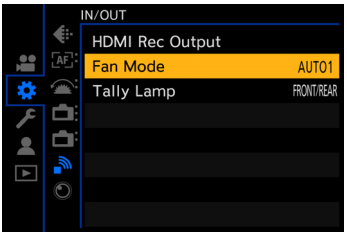




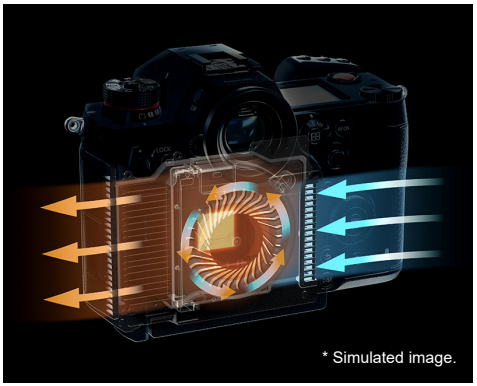
When the DC Coupler is being mounted, the DC Coupler cover opens, so the structure ceases to be dust and splash-resistant. Do not allow sand, dust and water droplets to adhere to or enter the camera. After use, confirm that no foreign objects are adhering to the DC Coupler cover, then firmly close the cover.

Cooling Fan for Unlimited Recording Time

The rise in the camera's temperature can be suppressed with the cooling fan and can be used for an unlimited time within the operating guaranteed temperature range.



[⚙] > [📶] > [**Fan Mode**]



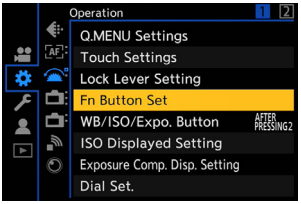
AUTO 1	Temperature Priority : The fan operation switches automatically according to the temperature of the camera.
AUTO 2	Low Noise Priority : The fan operation switches automatically according to the temperature of the camera.
STANDARD	The fan operates constantly at a standard speed.
LOW SPEED	The fan operates constantly at low speed.

Recommended Operating Temperature : -10°C to 40°C (14°F to 104°F)

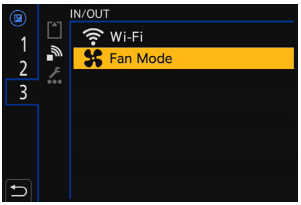
Permissible Relative Humidity : 10%RH to 80%RH

A function can be assigned to the Fn button for quick access.

[⚙] > [🔧] > [**Fn Button Set**]



[3] > [📶] > [**Fan Mode**]



Supported Memory Card 1/2

The following SD cards can be used with the LUMIX S1H.

SD	Memory Card 512 MB to 2 GB	• The camera supports SDHC/SDXC memory cards compliant with UHS Speed Class 3 of the UHS-I / UHS-II standard. • The camera supports SDHC/SDXC memory cards compliant with Video Speed Class 90 of the UHS-II standard. • Operation with the Panasonic cards on the left has been verified. SD XC V90 II
SDHC	Memory Card 4 GB to 32 GB	
SDXC	Memory Card 48 GB to 128 GB	

Select the appropriate SD Speed Class, UHS Speed Class and Video Speed Class according to the video bitrate.

Video Bitrate	Speed Class	Example of Indication
72 Mbps	Class 10	CLASS 10 10
	UHS Speed Class 1 or Higher	U1
	Video Speed Class 10 or Higher	V10
100 Mbps to 200 Mbps	UHS Speed Class 3	U3
	Video Speed Class 30 or Higher	V30
400 Mbps	Video Speed Class 60 or Higher	V60 V90

► PAGE 105-106 : Video Recording Time with Cards

- The SDXC/SDHC Memory Card can be used only if their logos are indicated on the equipment or in the operation manual. It cannot be used with equipment that supports only the SD Memory Card.
- SD, SDHC, and SDX Logos are trademarks of SD-3C,LLC.

Supported Memory Card 2/2

Create a new file and continue shooting with the following conditions.

MP4 / FHD

- When the continuous recording time exceeds 30 minutes.
- When the file size exceeds 4GB.

Alternative Method	Can shoot for an unlimited time with AVCHD.

MP4 / 4K / SDHC Memory Card

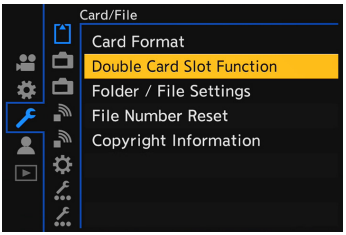
- When the continuous recording time exceeds 30 minutes.
- When the file size exceeds 4GB.

Alternative Method	Can shoot with a single file for a continuous recording time of up to 3 hours and 4 minutes or up to a file size of 96GB when using an SDXC Memory Card.

When continuing to record consecutively with Relay Rec

Double SD Card Slot

Equipped with two SD card slots and provides strong support for data management.

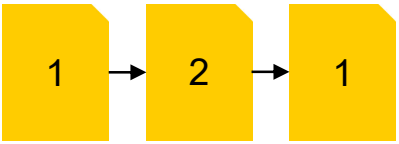


[ ] > [ ] > [**Double Card Slot Function**]

Relay Rec for Larger Capacity

This mode relays recording to the other card slot after the first card runs out of free space during recording. This mode supports HOT SWAP in video recording.

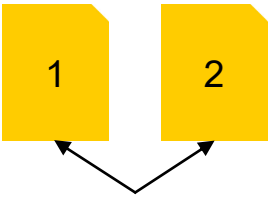
• This mode does not support AVCHD format and Loop Recording video.



Backup Rec

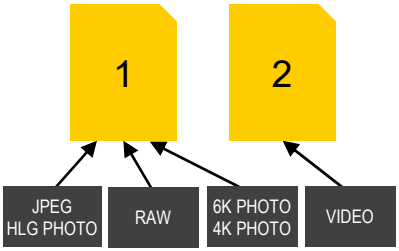
This mode records the same data to the two cards at the same time.

• This mode does not support AVCHD format and Loop Recording video. • Please use cards with the same Speed Class rating and capacity. • Video can only be recorded on a single card with using the combinations of SD or SDHC memory card, and SDXC memory card. • Folder and file number being the same.



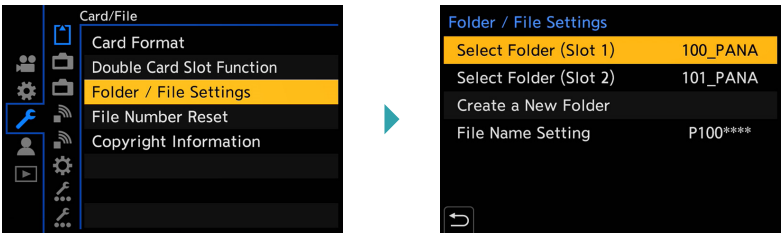
Allocation Rec for File Management

This mode allows you to specify the card slot to be used for recording still photographs and video.



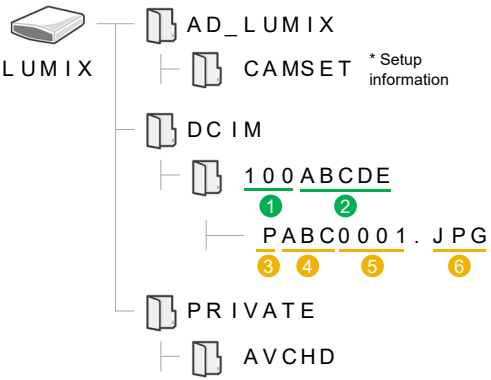
Folder and File Settings

The image's destination folder and file name can be freely set.



[ ] > [ ] > [**Folder / File Settings**]

Select Folder	The folder for storing the image can be selected.	
Create a New Folder	① is advanced and a new folder is created.	
	OK	② does not change
	Change	② changes
File Name Setting	**Folder Number Link**	④ is the same as ②
	User Setting	④ changes



Folder Name		
1	Folder Number	100 to 999
2	User-defined Segment	5 characters

File Name		
3	Color Space	P sRGB
		_ AdobeRGB
4	User-defined Segment	3 characters
5	File Number	0001 to 9999
6	File Format	

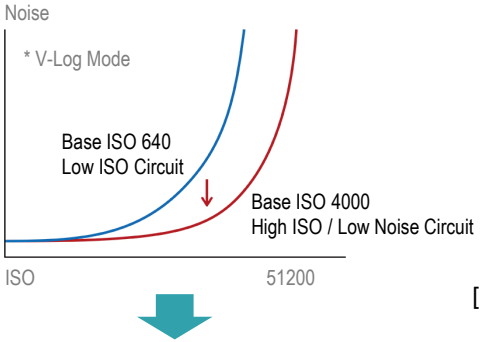
- [Select Folder] is not available when [Backup Rec] in [Double Card Slot Function] is being used.
- When [Double card Slot Function] is set to [Allocation Rec], [Select Folder (Slot 1)] and [Select Folder (Slot 2)] will be displayed.

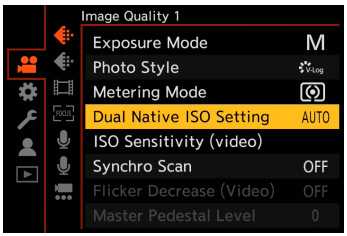
7

Video Shooting Assist Functions

Dual Native ISO

The Base ISO is automatically switched to achieve low noise with high ISO sensitivity.





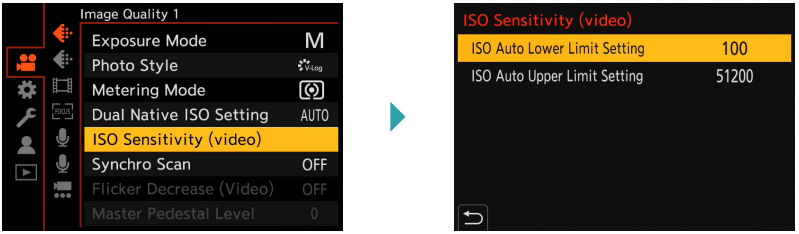
[ ] > [ ] > [**Dual Native ISO Setting**]

Switches automatically

Set to low or high sensitivity

	AUTO	LOW	HIGH
Normal	**Base ISO 100 / 640** Auto* / L.50 / 100-51200 / H.102400 / H.204800	**Base ISO 100** Auto* / L.50 / 100-800	**Base ISO 640** Auto* / L.320 / 640-51200 / H.102400 / H.204800
V-Log	**Base ISO 640 / 4000** Auto* / L.320 / 640-51200	**Base ISO 640** Auto* / L.320 / 640-5000	**Base ISO 4000** Auto* / L.2000 / 4000-51200
HLG	**Base ISO 400 / 2500** Auto* / 400-51200 / H.102400 / H.204800	**Base ISO 400** Auto* / 400-3200	**Base ISO 2500** Auto* / 2500-51200 / H.102400 / H.204800
Cinelike D2 Cinelike V2	**Base ISO 200 / 1250** Auto* / L.100 / 200-51200 / H.102400 / H.204800	**Base ISO 200** Auto* / L.100 / 200-1600	**Base ISO 1250** Auto* / L.640 / 1250-51200 / H.102400 / H.204800

* The upper and lower limits of ISO sensitivity can be set with the auto settings.



[ ] > [ ] > [**ISO Sensitivity (video)**]

Image Stabilizer 1/2

B.I.S. (Body) or O.I.S. (Lens) can be used depending on the mounted lens.
Panasonic lenses are compatible with the Dual I.S. 2.

- We recommend turning off the image stabilizer function when using a tripod.

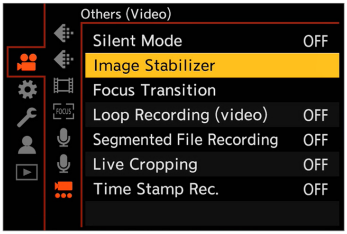
L-mount Native / PL Mount Lenses			
Panasonic Lenses	with	Image Stabilizer	DUAL2 **Body and Lens**
Other Companies' Lenses	with	Image Stabilizer	BODY Body
			BODY Body or Lens* LENS
Lenses	without	Image Stabilizer	Body

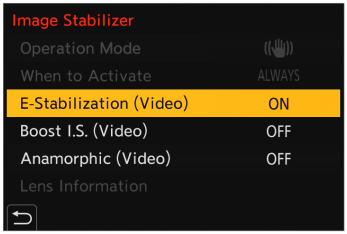
* Firmware must be updated to version 2.0 or later. Body I.S.(Image Stabilizer) suppresses roll movement.

All Lenses * Excluding when shooting 6K/5.9K/5.4K/VFR.	E-Stabilization (Video)

The 5-axis hybrid image stabilizer will work.

- The angle of view may become narrower when set to [ON].



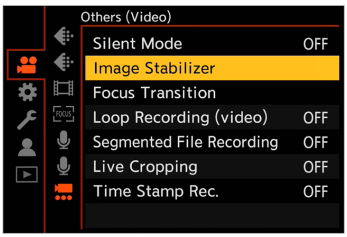


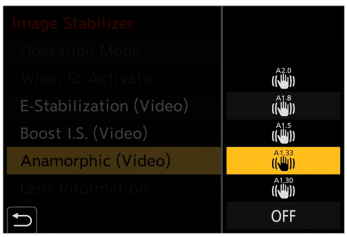
[ ] > [ ] > [**Image Stabilizer**] [**E-Stabilization (Video)**]

Anamorphic Lenses	Only when [BODY] is set.

Set the type of image stabilizer most suitable for the mounted lens.

- [Boost I.S. (video)] will be prioritized when [Boost I.S. (video)] is set.





A 2.0
A 1.8
A 1.5
A 1.33
A 1.30
OFF

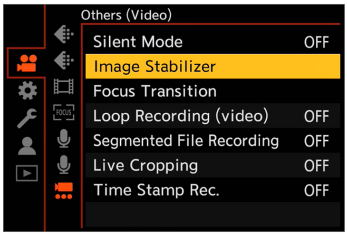
[ ] > [ ] > [**Image Stabilizer**] [**Anamorphic (Video)**]

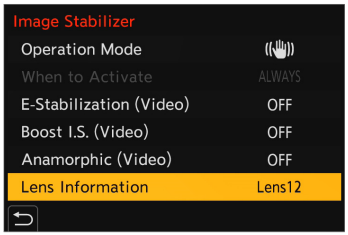
Image Stabilizer 2/2

Lens with no communication compatibility with a LUMIX camera	BODY Body

Register the lens information and accurately operate the image stabilization.

- In the default setting, the lens information for 6 lenses with a focal length of between 24mm and 135mm is registered.





[ ] > [ ] > [**Image Stabilizer**] [**Len Information**]

Image Circle	FULL / S35mm
Focal Length	Enter the focal length
I.S. Area	70% / 80% / 90% / 100% When selecting the four corners with ▲▼◀▶, the B.I.S. (body) will works. If vignetting occurs, set it to a narrower range.
Lens Name	Register the lens

Other Settings / Functions

Boost I.S. (Video)	This feature is NOT available when set to [LENS].

Increases the correction effects of the image stabilizer and maintains a stable composition when shooting at a fixed angle.

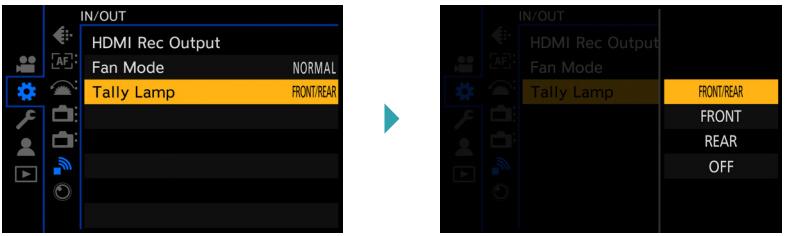
- When changing the composition during shooting, turn it [OFF] and then move the camera.
  If it is registered to the Fn button, it can be switched to [OFF] during shooting.

Operation Mode	The setting is switched to [Normal] in the [M] mode.
Body (B.I.S.) / Lens (O.I.S.)	This can be set when using other companies' lenses with an I.S..
When to Active	The setting is fixed to [Normal] in the [M] mode.

Tally Lamp

Tally lamps are equipped on the front and rear.
It will notify the camera operation to both the camera operator and the subject.

Select ON/OFF for both the front and rear, or individually.



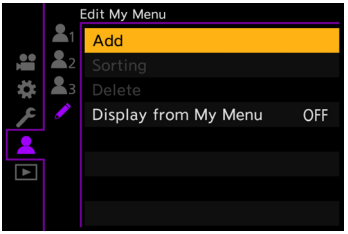
[⚙] > [📶] > [**Tally Lamp**]

Create My Menu

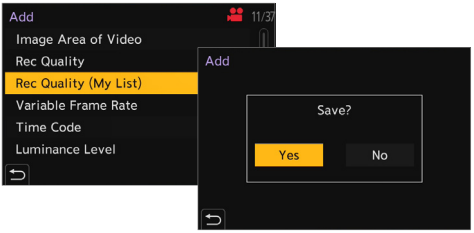
TIPS

Aggregate the frequently used settings to “My Menu” to call them out quickly.

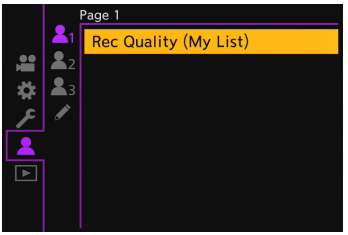
1 [ ] > [ ] > [**Add**]



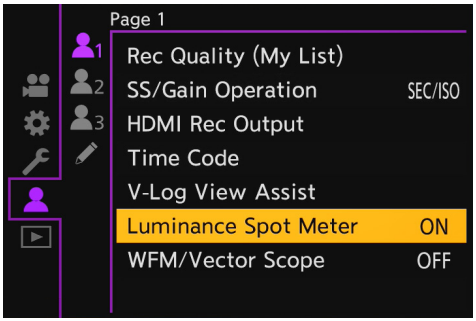
2 Select the items



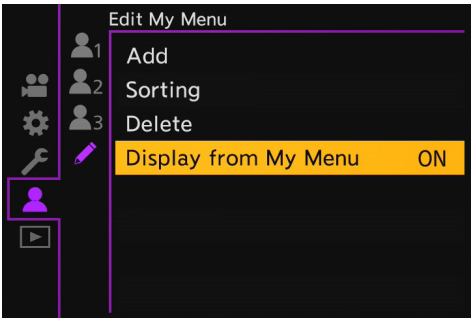
3 Registered to [1 / 2 / 3]



Create your own menu



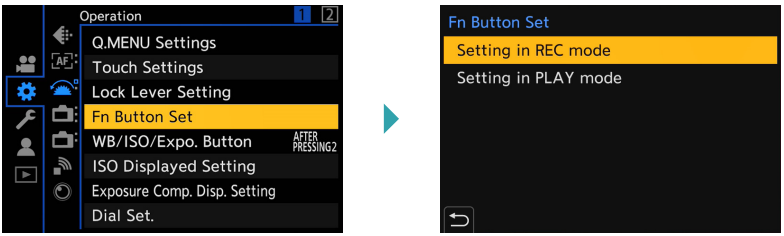
My Menu can be displayed preferentially



[ ] > [**Display from My Menu**] > [**ON**]

Assign to Fn Buttons

You can allocate various functions to the Fn buttons for quick recall.



[⚙] > [📡] > [**Fn Button Set**]

You can also press and hold the Fn button for two seconds to display this screen.
* This may not be displayed depending on the registered function and on the button type.

Max. **28** Buttons
* Max. 13 buttons in PLAY mode.

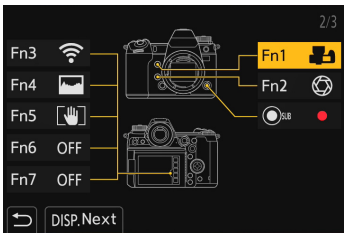
×

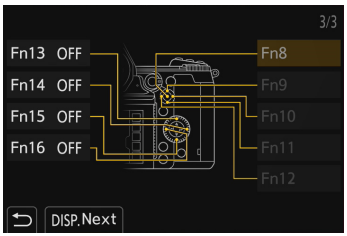
Max. **103** Rec Settings
* Max. 23 settings in PLAY mode.

▶

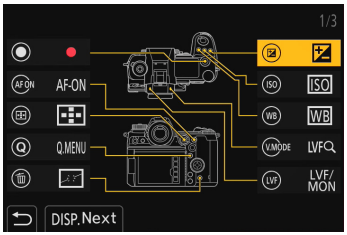
There's almost
No Limit
to customizing!

16 Fn Buttons





Other 11 Buttons



1 Fn Button

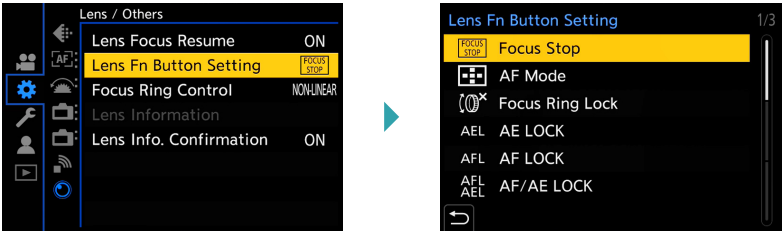
Battery Grip DMW-BGS1
(sold separately)

Lens Fn Button Setting

You can allocate the function to the focus button of an interchangeable lens.

- Firmware must be updated to version 2.0 or later.

Focus Button

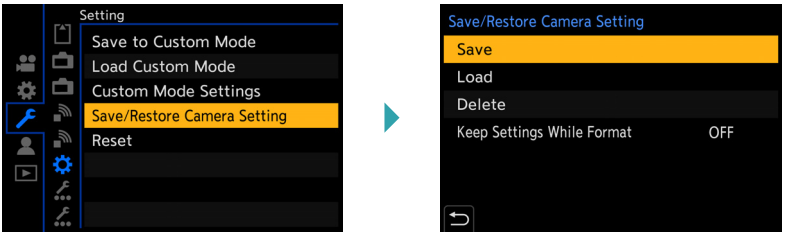


[⚙] > [◯] > [**Lens Fn Button Setting**]

Focus Stop	AF-Point Scope
AF Mode	Focus Area Set
Focus Ring Lock	Image Stabilizer
AE LOCK	Preview
AF LOCK	Preview Aperture Effect
AF/AE LOCK	No Setting
AF-ON	Off (Disable Press and Hold
AF-ON : Near Shift	Restore to Default
AF-ON : Far Shift	

Save/Restore Camera Setting

You can save the camera's settings information to a card and load it into another camera, which is useful when managing multiple cameras in a shoot.



[ ] > [ ] > [**Save/Restore Camera Setting**]

Save	Up to 10 settings information can be saved on a single card. The file name can be registered with any name.
Load	Loads the settings information on the card into the camera. Copying must be done between cameras of the same model (S1H⇔S1H).
Delete	Deletes settings information on the card.
Keep Settings While Format	Formats the card while keeping camera settings information stored on the card.

Video Frame Marker

TIPS

From anamorphic videos to vertical videos for social media.
Shoot while imaging the angle of view when cropping in post-production.

[⚙] > [📷] > [**Video Frame Maker**] > [**SET**]

1 Frame Aspect

2.39 : 1	CinemaScope
2.35 : 1	CinemaScope
2.00 : 1	Scope
1.85 : 1	VistaVision for USA
16 : 9	High definition
4 : 3	35mm silent film
1 : 1	Social Media
4 : 5	Social Media

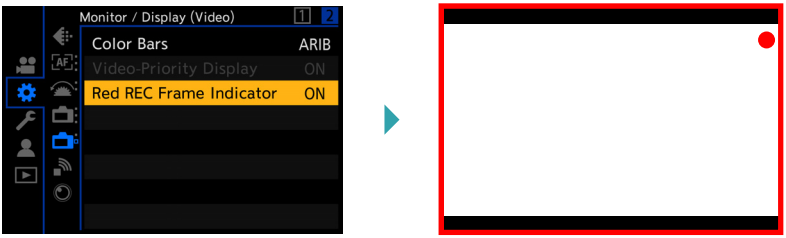
2 Frame Color

3 Frame Mask

100%
75%
50%
25%
OFF

Red REC Frame Indicator

A red border surrounds the frame as you record, helping you avoid mistakes such as forgetting to press the record button.

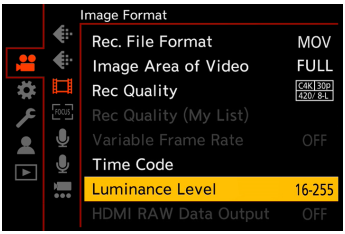


[⚙] > [📷] > 2 >

[**Red REC Frame Indicator**] > [**ON**]

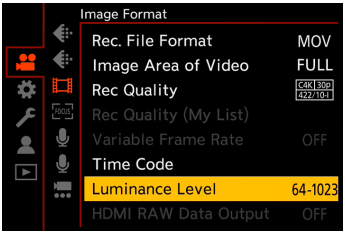
Measurement of Luminance Level : Luminance Level

The luminance level that can be selected depends on the bit rate.



When **8-bit** is selected
0-255
16-235
16-255

[ ] > [ ] > [**Luminance Level**]



When **10-bit** is selected
0-1023
64-940
64-1023

[ ] > [ ] > [**Luminance Level**]

The setting is fixed in the following cases:

AVCHD
-
16-235
16-255

V-Log	
8-bit	0-255
	-
	-
10-bit	0-1023
	-
	-

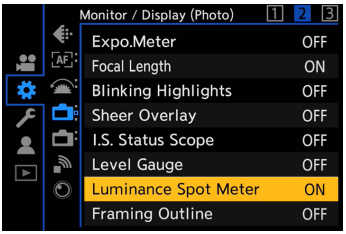
Like2100(HLG)
-
64-940
-

Measurement of Luminance Level : Spot Meter

1

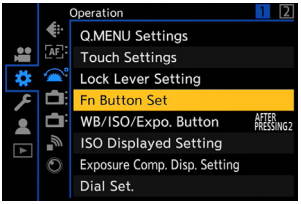
[⚙] > [📷] > [2] >

[**Luminance Spot Meter**] > [**ON**]

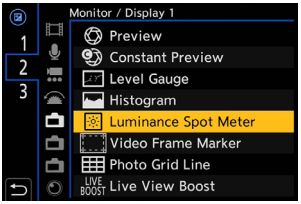


A function can be assigned to the Fn button for quick access.

[⚙] > [🎛] > [**Fn Button Set**]



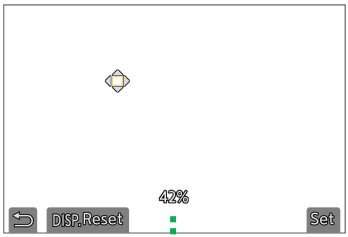
[2] > [📷] > [**Luminance Spot Meter**]



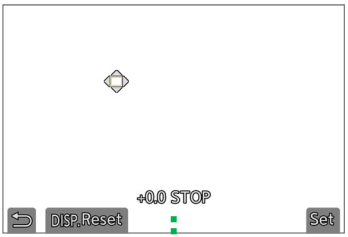
2

Select the position where you want to measure the luminance.

- Calculated as 0 Stop=42% (IRE)
- Measuring is possible in the range -7% to 109% (IRE).



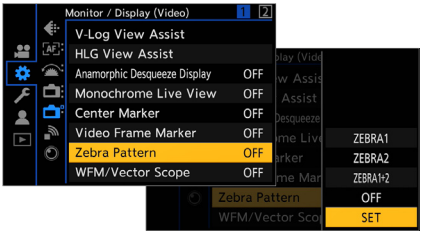
Usual Setting = %



V-Log = STOP

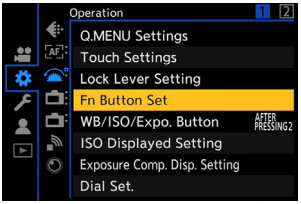
Measurement of Luminance Level : Zebra Pattern

1 [⚙] > [📷] > [**Zebra Pattern**] > [**SET**]

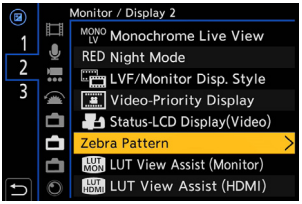


A function can be assigned to the Fn button for quick access.

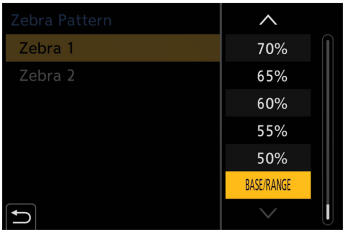
[⚙] > [〰] > [**Fn Button Set**]



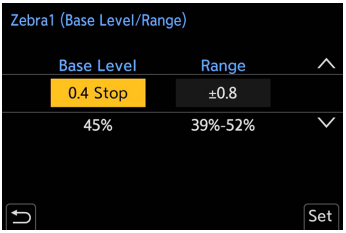
[2] > [📷] > [**Zebra Pattern**]



2 Select [**BASE/RANGE**]



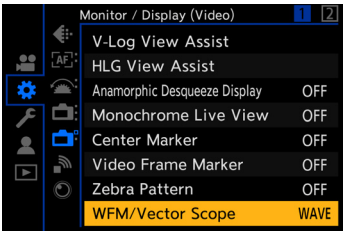
3 Set the reference brightness and the range to be indicated with a striped pattern.



	Usual Setting	V-Log
Base Level	0 to 109 %	-8 to 6.3 stop
Range	±1 to ±10 %	±0.2 to ±1.0 stop

- Calculated as 0 Stop=42% (IRE)

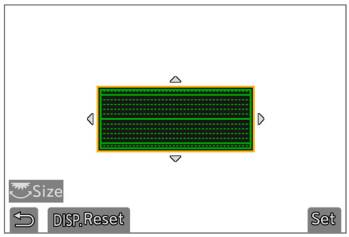
Wave Form Monitor / Vector Scope



[⚙] > [📷] > [**WFM/Vector Scope**]

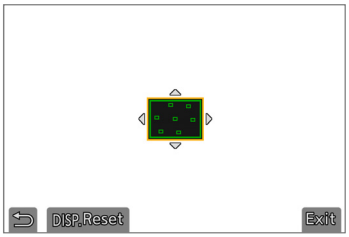
Wave Form Monitor

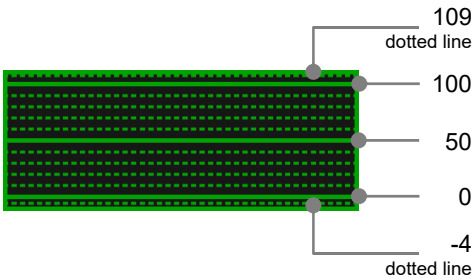
Variable (4 steps) / Moveable



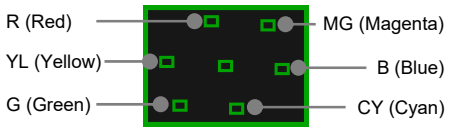
Vector Scope

Moveable





%, IRE (Institute of Radio Engineers)



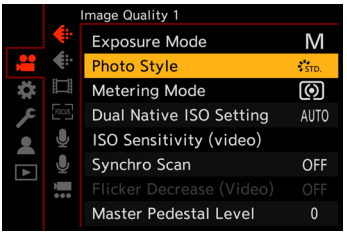
The waveform displayed on the camera indicates the luminance as values based on the conversions below:

- 0% (IRE): Luminance value 16 (8-bit)
- 100% (IRE): Luminance value 235 (8-bit)

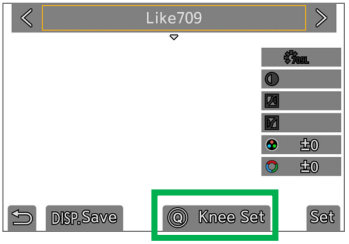
- The waveform and vector scope are not output through HDMI.
- When [WFM/Vector Scope] is set, [Histogram] does not work.

Like709 Gamma Curve / Knee Control

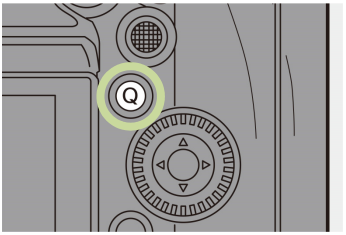
1 [] > [] > [**Photo Style**]



2 Select [**Like 709**]

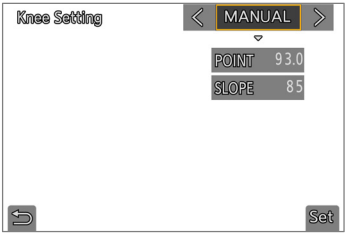


Touch [**Knee Set**] or press the [**Q**] button



3 Select a knee setting

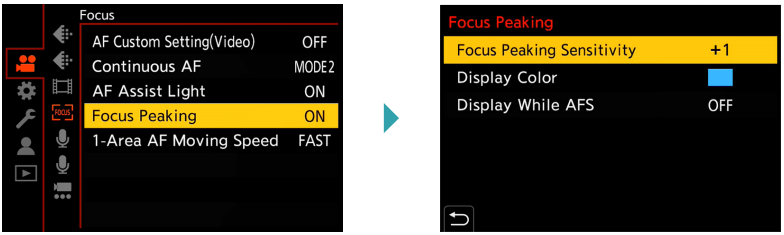
AUTO	Automatic adjustment
MANUAL	POINT : 80.0 to 107.0 SLOPE : 0 to 99
OFF	-



MF Assist / Peaking

Focus Peaking

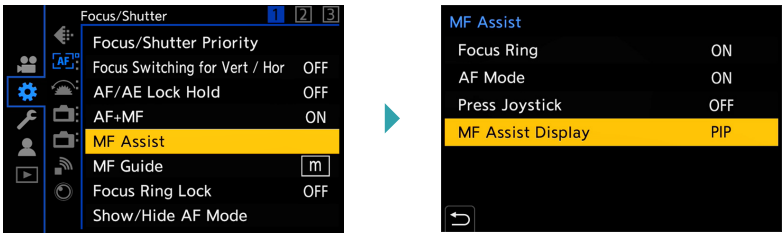
The focus peaking sensitivity and the display color of the in-focus portion can be set.



[🎥] > [FOCUS] > [**Focus Peaking**] > [**SET**]

MF Assist (Enlarged Screen)

The display method (full screen / windowed mode) and the operation method can be set.

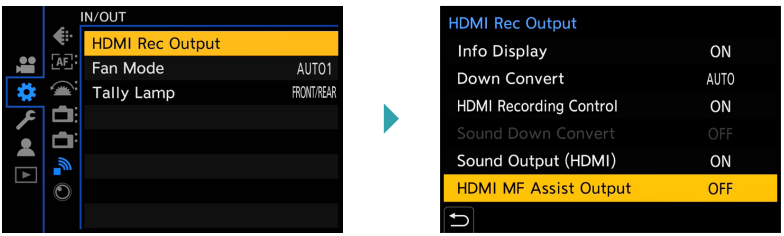


[⚙] > [AF] > [**MF Assist**]

HDMI MF Assist Output

* Firmware must be updated to version 2.0 or later.

HDMI output of the MF Assist (enlarged screen) can be turned ON or OFF.



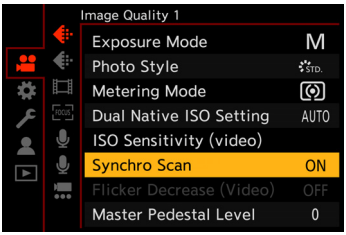
[⚙] > [📡] > [**HDMI Rec Output**]

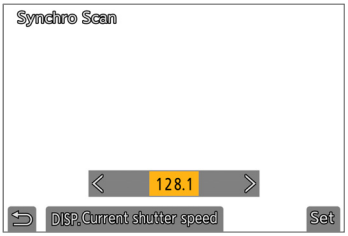
[**HDMI MF Assist Output**]

Synchro Scan / Master Pedestal Level

Synchro Scan

Fine-adjust the shutter speed to reduce flickering.

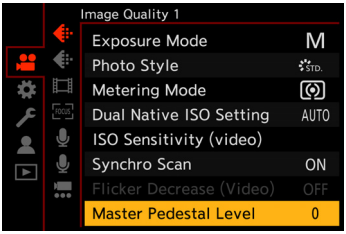


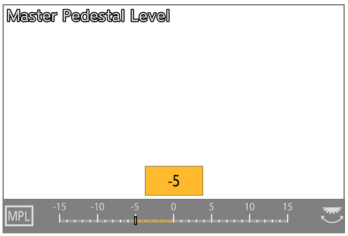


[ ] > [ ] > [**Synchro Scan**]

Master Pedestal Level

Adjusts the reference black level.



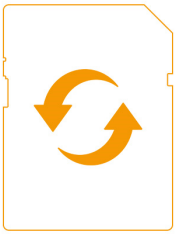


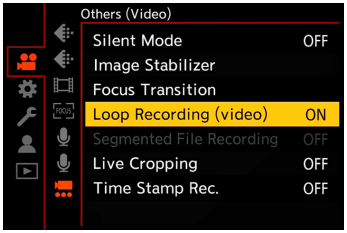
[ ] > [ ] > [**Master Pedestal Level**]

Loop Recording / Segment File Recording

Loop Recording

When the card is full, the camera continues the recording by deleting old data.
It can record up to 12 hours.



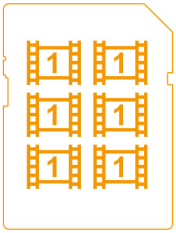


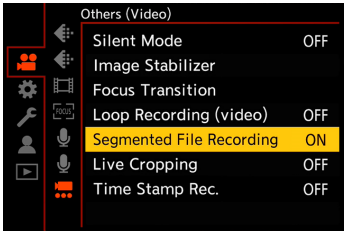
[ ] > [ ] > [**Loop Recording (video)**]

- [Loop Recording (video)] is not possible when there is insufficient free space on the card.
- When the following functions are being used, [Loop Recording (video)] is not available:
  – Recording quality with a bit rate of 400 Mbps
  – [Variable Frame Rate]
  – [Live Cropping]

Segment File Recording

This mode records video as 1-minute segments, making it useful for preventing the loss of data due to battery issues, etc.



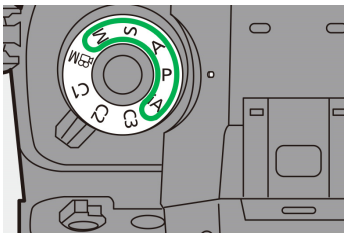


[ ] > [ ] > [**Segment File Recording**]

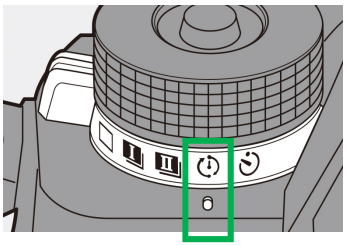
Time Lapse Video 1/2

The LUMIX S1H supports interval capture to create time lapse video in the camera body itself.

1 Set up for still picture shooting (P / A / S / M / iA).

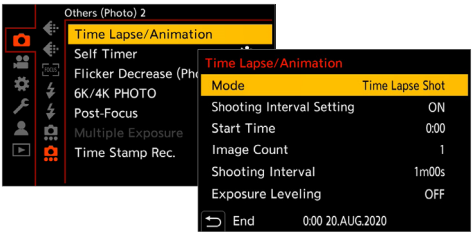


2 Set the drive mode dial to [⏱].



3 [📷] > [📷] >

[**Time Lapse / Animation**]



Mode	Time Lapse Shot / Stop Motion Animation
Shooting Interval Setting	ON / OFF
Start Time	Now / Start Time Set
Image Count Shooting Interval*	Sets the number of pictures and the shooting interval time.
Exposure Leveling	ON** (Automatically adjusts the exposure to prevent changes in brightness between consecutive frames.) / OFF

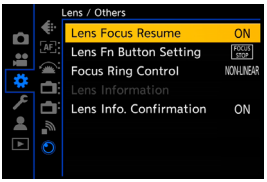
* Set the [Shooting Interval Setting] to [ON]. ** Set ISO sensitivity to [AUTO] in [M] mode.

Time Lapse Video 2/2

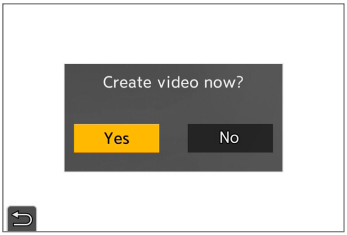
4 Start recording.

- When [Start Time Set] is set, the camera goes into sleep status until the start time.
- During recording standby, the camera goes into sleep status after a certain period of time.
- When the power is turned off, the battery and cards can be replaced. Turn on the power and press the shutter button fully to resume shooting. (Note that the images recorded after replacing the card will be saved as a separate group of images.)
- The recording stops automatically.

For long shooting intervals, we recommend setting [**Lens Focus Resume**] to [**ON**].

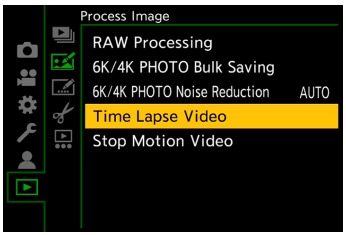


5 After the recording has stopped, select [**Yes**] to proceed to create a video.



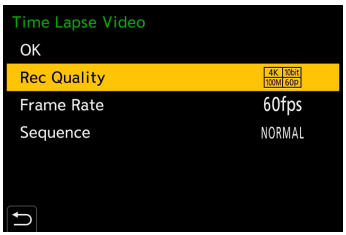
Even if you select [**No**], you can still create a video in the playback menu.

[▶] > [🖼] > [**Time Lapse Video**]



6 Set the options for creating a video.

OK	Creates a video
Rec Quality	► PAGE 100
Frame Rate	
Sequence	Normal / Reverse



8

Support

LUMIX PRO

The LUMIX Pro Services (LPS) program is designed for professional photographers, filmmakers and cinematographers. Our goal is to provide everything you count on to operate and grow a successful business with LUMIX.

Join LUMIX PRO and benefit from a range of services designed to support the requirements of the individual. All your benefits at a glance:

Fast Lane Repair And Service	Priority turn-around times on your service and repair requests with our Authorized Service Centers (turnaround times vary depending on your level of membership).
Hotline	A dedicated hotline number for LUMIX PRO in your country, so you can speak directly with a product expert.
Pick-up Service	Call your LUMIX PRO Services number or Log-In to your account to arrange pick-up for your service or repair (free shipping service vary depending on your level of membership).

To become a LUMIX PRO member you will need to provide us with some personal information and register your qualifying LUMIX equipment with us.

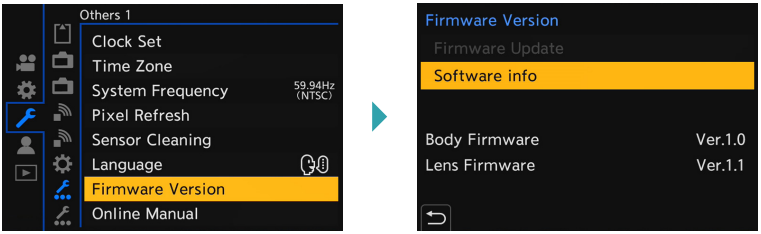
Click here for more information
https://lumixpro.panasonic.com/comingsoon/

Firmware Update

Regularly check the latest version of firmware available.

How to check the version of the firmware in your camera

[ ] > [ ] > [**Firmware Version**] > [**Software info**]



How to check the latest firmware version available

Visit the following website to check the latest version of firmware available. Follow the indicated procedure to update the firmware in your camera.

https://av.jpn.support.panasonic.com/support/global/cs/dsc/download/index4.html

Do not change the name of the firmware file (.bin or .plf).

Preparation Products

Charged Battery (50% or more)

* Updating may fail when the battery level is below 50%.

Memory Card

* Prepare memory card which is compliant with the model that you are using. * The memory card must have a free space larger than the file size. * Please format the memory card before use. If used for shooting while still kept the file in the memory card, it may cause decrease in number of recordable photos and/or malfunction of the camera. * When format is executed, all the data is deleted including protected images. Since the data cannot be recovered after formatting, check carefully before executing.

9

Appendix

Image Area of Video 1/2

FULL 6K 3:2	FULL 5.9K 16:9	FULL 5.4K 3:2

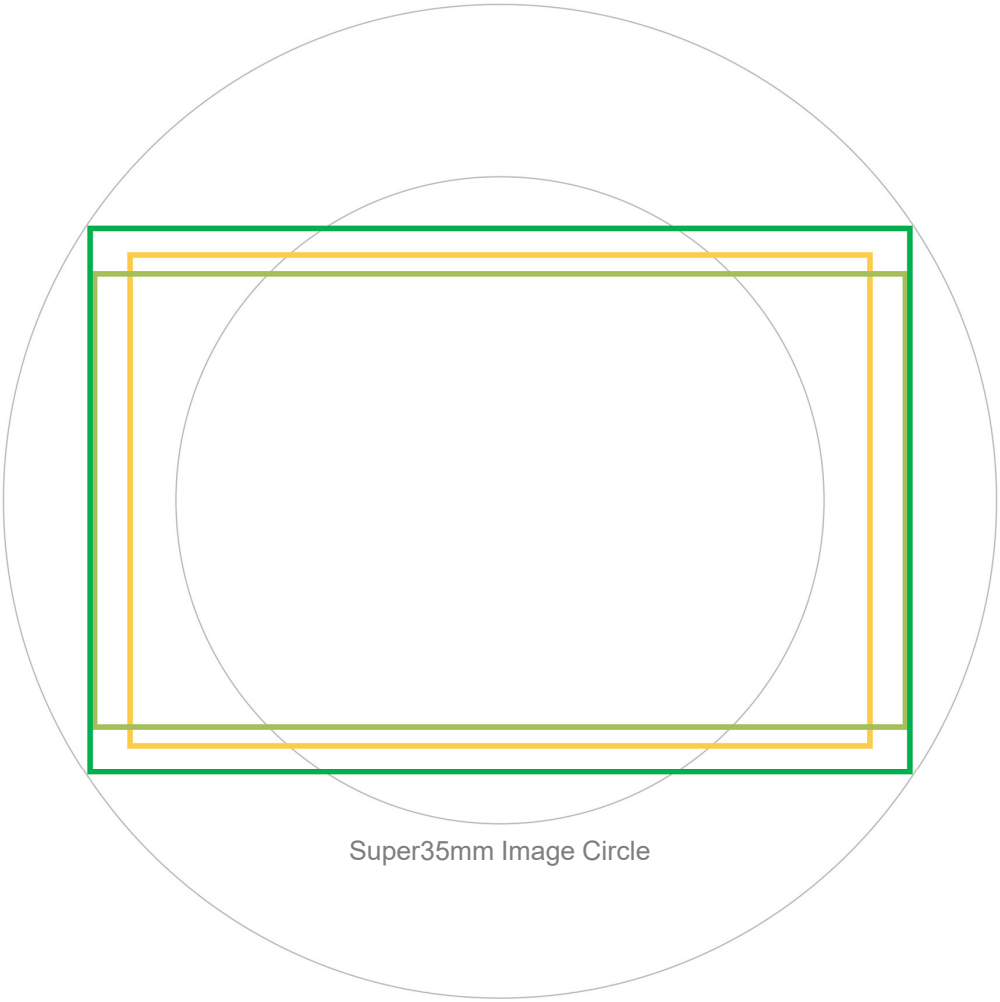
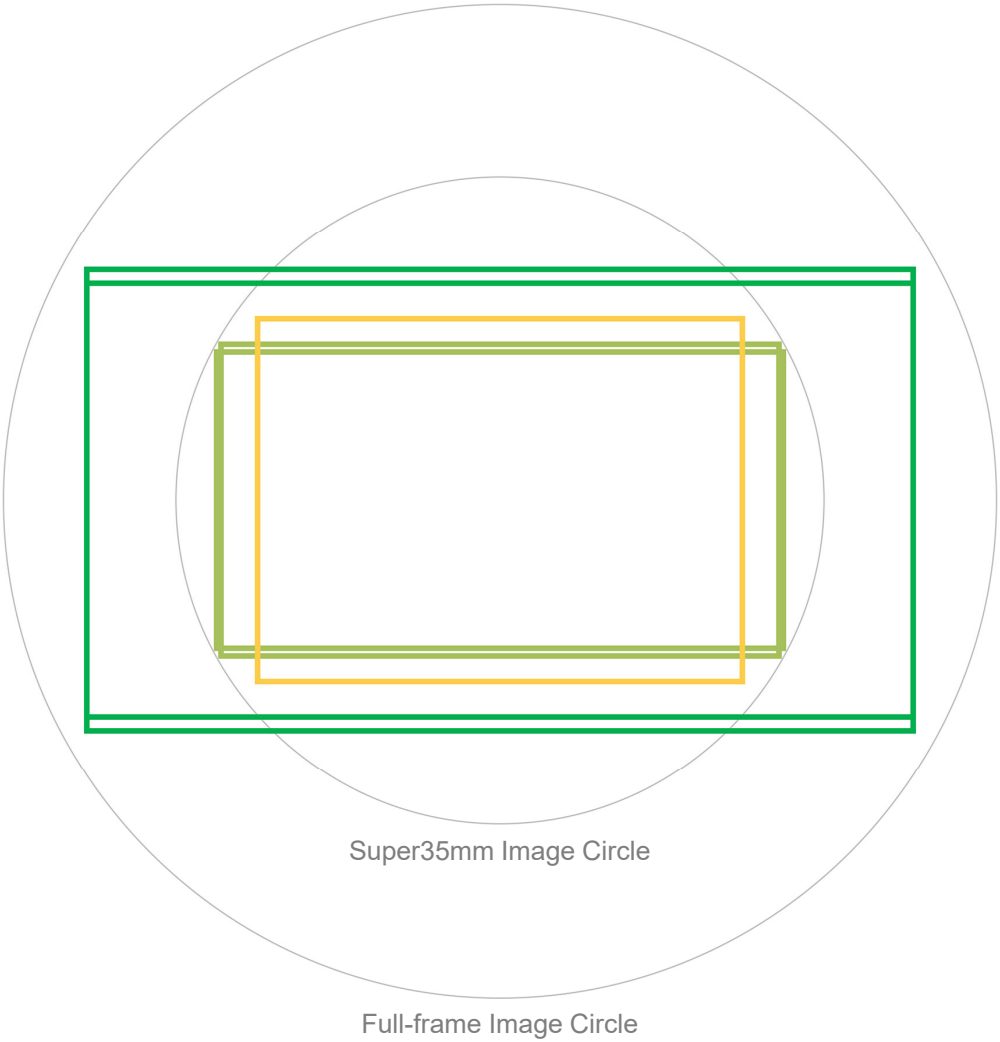


Image Area of Video 2/2

FULL	Super 35mm	Super 35mm
C4K / 4K / FHD	C4K / 4K / FHD	4K-A
17:9 16:9 16:9	17:9 16:9 16:9	4:3

The angle of view changes according to the [**Image Area of Video**] setting.



The setting changes automatically to [S35mm] when using Super 35mm or APS-C lenses, and when [Image Circle] in [Lens Information] is set to [S35mm].

Rec Quality 1/4

MOV		Codec		Bitrate	HLG	VFR	HFR	59.94Hz	50.00Hz	24.00Hz
FULL	6K 3:2	420 10-L	HEVC	200M	Yes	-	-	23.98p	-	24.00p
	5.4K 3:2	420 10-L	HEVC	200M	Yes	-	-	29.97p	25.00p	-
	5.9K	420 10-L	HEVC	200M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
	C4K	422 10-I	H.264	400M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		422 10-L	H.264	150M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 8-L	H.264	100M	-	-	-	29.97p 23.98p	25.00p	24.00p
	4K	422 10-I	H.264	400M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		422 10-L	H.264	150M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 8-L	H.264	100M	-	-	-	29.97p 23.98p	25.00p	24.00p
	FHD	422 10-I	H.264	200M	Yes	-	-	59.94p 29.97p 23.98p	50.00p 25.00p	24.00p
		420 10-L	HEVC	150M	Yes	-	HFR	119.88p	100.00p	-
		422 10-I	H.264	100M	Yes	-	-	59.94i	50.00i	-
		422 10-L	H.264	100M	Yes	-	-	59.94p 29.97p 23.98p	50.00p 25.00p	24.00p
		420 10-L	HEVC	100M	Yes	-	HFR	47.95p	-	48.00p
		420 8-L	H.264	100M	-	Yes	-	59.94p 29.97p 23.98p	50.00p 25.00p	24.00p
		422 10-L	H.264	50M	Yes	-	-	59.94i	50.00i	-

Rec Quality 2/4

MOV		Codec		Bitrate	HLG	VFR	HFR	59.94Hz	50.00Hz	24.00Hz
S35mm PIXEL/ PIXEL	C4K	422 10-I	H.264	400M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 10-L	HEVC	200M	Yes	-	-	59.94p	50.00p	-
		420 10-L	HEVC	200M	Yes	-	HFR	47.95p	-	48.00p
		422 10-L	H.264	150M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 8-L	H.264	150M	-	-	-	59.94p	50.00p	-
		420 8-L	H.264	100M	-	Yes	-	29.97p 23.98p	25.00p	24.00p
	4K	422 10-I	H.264	400M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 10-L	HEVC	200M	Yes	-	-	59.94p	50.00p	-
		420 10-L	HEVC	200M	Yes	-	HFR	47.95p	-	48.00p
		422 10-L	H.264	150M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 8-L	H.264	150M	-	-	-	59.94p	50.00p	-
		420 8-L	H.264	100M	-	Yes	-	29.97p 23.98p	25.00p	24.00p
	4K-A 4:3	422 10-I	H.264	400M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 10-L	HEVC	200M	Yes	-	HFR	47.95p	50.00p	48.00p
		422 10-L	H.264	150M	Yes	-	-	29.97p 23.98p	25.00p	24.00p
		420 8-L	H.264	150M	-	-	-	-	50.00p	-
		420 8-L	H.264	100M	-	Yes	-	29.97p 23.98p	25.00p	24.00p

Rec Quality 3/4

MOV		Codec		Bitrate	HLG	VFR	HFR	59.94Hz	50.00Hz	24.00Hz
S35mm PIXEL/ PIXEL	FHD	422 10-I	H.264	200M	Yes	-	-	59.94p 29.97p 23.98p	50.00p 25.00p	24.00p
		420 10-L	HEVC	150M	Yes	-	HFR	119.88p*	100.00p*	-
		422 10-I	H.264	100M	Yes	-	-	59.94i	50.00i	-
		422 10-L	H.264	100M	Yes	-	-	59.94p 29.97p 23.98p	50.00p 25.00p	24.00p
		420 10-L	HEVC	100M	Yes	-	HFR	47.95p	-	48.00p
		420 8-L	H.264	100M	-	Yes**	-	59.94p 29.97p 23.98p	50.00p 25.00p	24.00p
		422 10-L	H.264	50M	Yes	-	-	59.94i	50.00i	-

* Only when Super 35mm is selected. ** Only when Super 35mm is selected at 59.94p / 50.00p.

GLOSSARY

6K	5952 x 3968	3:2
5.4K	5376 x 3584	3:2
5.9K	5888 x 3312	16:9
C4K	4096 x 2160	17:9
4K	3840 x 2160	16:9
4K-A	3328 x 2496	4:3 (Anamorphic)
FHD	1920 x 1080	16:9

HLG	Hybrid Log Gamma
VFR	Variable Frame Rate
HFR	High Frame Rate

422 10-I	4:2:2 10-bit All-Intra
422 10-L	4:2:2 10-bit LongGOP
420 10-L	4:2:0 10-bit LongGOP
420 8-L	4:2:0 8-bit LongGOP

Rec Quality 4/4

MP4		Codec		Bitrate	HLG	VFR	HFR	59.94Hz	50.00Hz	24.00Hz
FULL	4K	420 10-L	HEVC	72M	Yes	-	-	29.97p 23.98p	25.00p	-
		420 8-L	H.264	100M	-	-	-	29.97p 23.98p	25.00p	-
	FHD	420 8-L	H.264	28M	-	-	-	59.94p	50.00p	-
		420 8-L	H.264	20M	-	-	-	29.97p	25.00p	-
		420 8-L	H.264	24M	-	-	-	23.98p	-	-
S35mm PIXEL/ PIXEL	4K	420 10-L	HEVC	100M	Yes	-	-	59.94p	50.00p	-
		420 10-L	HEVC	72M	Yes	-	-	29.97p 23.98p	25.00p	-
		420 8-L	H.264	100M	-	-	-	29.97p 23.98p	25.00p	-
	FHD	420 8-L	H.264	28M	-	-	-	59.94p	50.00p	-
		420 8-L	H.264	20M	-	-	-	29.97p	25.00p	-
		420 8-L	H.264	24M	-	-	-	23.98p	-	-

AVCHD		Codec		Bitrate	HLG	VFR	HFR	59.94Hz	50.00Hz	24.00Hz
FULL S35mm PIXEL/ PIXEL	FHD	420 8-L	AVCHD	28M	-	-	-	59.94p	50.00p	-
		420 8-L		17M	-	-	-	59.94i	50.00i	-
		420 8-L	AVCHD Progressive	24M	-	Yes	-	59.94i 29.97fps	50.00i 25.00fps	-
		420 8-L		24M	-	Yes	-	23.98p	-	-

VFR Variable Frame Rate 1/2

		C4K / 4K			4K-A		
		MOV					
		S35mm / PIXEL/PIXEL					
SLOW	7.5 x	-	-	-	-	-	-
		-	-	-	-	-	-
	7.0 x	-	-	-	-	-	-
		-	-	-	-	-	-
	6.0 x	-	-	-	-	-	-
		-	-	-	-	-	-
	5.0 x	-	-	-	-	-	-
		-	-	-	-	-	-
	4.0 x	-	-	-	-	-	-
		-	-	-	-	-	-
	3.0 x	-	-	-	-	-	-
		-	60	60	-	-	-
	2.0 x	60	-	48	-	50	48
		-	-	-	50	-	-
		45	37	36	45	37	36
		34	30	28	34	30	28
		32	27	26	32	27	26
	1.0 x	30p	25p	24p	30p	25p	24p
		28	23	22	28	23	22
		26	21	20	26	21	20
	2.0 x	15	-	12	15	-	12
		-	12	-	-	12	-
	12.0 x	-	-	2	-	-	2
		-	2	-	-	2	-
	15.0 x	2	-	-	2	-	-
	25.0 x	-	-	-	-	-	-
FAST	30.0 x	-	-	-	-	-	-

VFR Variable Frame Rate 2/2

		FHD										
		MOV								AVCHD		
		FULL / S35mm					PIXEL/PIXEL			ALL		
SLOW	7.5 x	-	-	-	-	180*	-	-	-	-	-	-
		-	-	-	180*	-	-	-	-	-	-	-
	7.0 x	-	-	-	175*	168*	-	-	-	-	-	-
		-	-	-	-	156*	-	-	-	-	-	-
	6.0 x	-	-	180*	150	144	-	-	-	-	-	-
		-	-	165*	-	132	-	-	-	-	-	-
	5.0 x	-	-	150	125	120	-	-	-	-	-	-
		-	-	135	-	108	-	-	-	-	-	-
	4.0 x	-	-	120	100	96	-	-	-	-	-	-
		-	180*	105	87	84	-	-	-	-	-	-
	3.0 x	180*	150	90	75	72	-	-	-	-	-	-
		150	-	75	62	60	-	60	60	-	60	60
	2.0 x	120	100	60	50	48	60	-	48	60	-	48
		-	-	-	-	-	-	-	-	-	-	-
		90	75	45	37	36	45	37	36	45	37	36
		64	54	34	30	28	34	30	28	34	30	28
		62	52	32	27	26	32	27	26	32	27	26
	1.0 x	60p	50p	30p	25p	24p	30p	25p	24p	30p	25p	24p
		58	48	28	23	22	28	23	22	28	23	22
		56	46	26	21	20	26	21	20	26	21	20
	2.0 x	30	25	15	-	12	15	-	12	15	-	12
		-	-	-	12	-	-	12	-	-	12	-
	12.0 x	-	-	-	-	2	-	-	2	-	-	2
		-	-	-	2	-	-	2	-	-	2	-
	15.0 x	-	-	2	-	-	2	-	-	2	-	-
	25.0 x	-	2	-	-	-	-	-	-	-	-	-
FAST	30.0 x	2	-	-	-	-	-	-	-	-	-	-

* The degree of effect varies depending on the recording format and frequency, and the angle of view narrows if a frame rate over 150 fps is selected.

Time Lapse Video

		Rec Quality			Frame Rate
59.94Hz	4K	420 10-L	100M	59.94p	60 / 30 / 15 / 10 / 7.5 / 6 / 3 / 1 fps
		420 8-L	100M	29.97p	30 / 15 / 10 / 7.5 / 6 / 3 / 1 fps
		420 10-L	72M	29.97p	30 / 15 / 10 / 7.5 / 6 / 3 / 1 fps
		420 8-L	100M	23.98p	24 / 12 / 8 / 6 / 4.8 / 2.4 / 1 fps
		420 10-L	72M	23.98p	24 / 12 / 8 / 6 / 4.8 / 2.4 / 1 fps
	FHD	420 8-L	28M	59.94p	60 / 30 / 15 / 10 / 7.5 / 6 / 3 / 1 fps
		420 8-L	20M	29.97p	30 / 15 / 10 / 7.5 / 6 / 3 / 1 fps
		420 8-L	24M	23.98p	24 / 12 / 8 / 6 / 4.8 / 2.4 / 1 fps
50.00Hz	4K	420 10-L	100M	50.00p	50 / 25 / 12.5 / 8.3 / 6.25 / 5 / 2.5 / 1 fps
		420 8-L	100M	25.00p	25 / 12.5 / 8.3 / 6.25 / 5 / 2.5 / 1 fps
		420 10-L	72M	25.00p	25 / 12.5 / 8.3 / 6.25 / 5 / 2.5 / 1 fps
	FHD	420 8-L	28M	50.00p	50 / 25 / 12.5 / 8.3 / 6.25 / 5 / 2.5 / 1 fps
		420 8-L	20M	25.00p	25 / 12.5 / 8.3 / 6.25 / 5 / 2.5 / 1 fps
24.00Hz		-			

RAW Data Output

Rec Quality				Bit Depth	59.94Hz	50.00Hz	24.00Hz
FULL	**5.9K**	16:9	5888 x 3312	12-bit	29.97p 23.98p	25.00p	-
S35mm	**4K**	17:9	4128 x 2176	12-bit	59.94p 29.97p 23.98p	50.00p 25.00p	-
	3.5K	4:3 Anamorphic	3536 x 2656	12-bit	29.97p 23.98p	50.00p 25.00p	-

HDMI output only.
It is not possible to record motion picture or still picture on the memory card in the camera unit.

HDMI Output Image Quality 1/2

HDMI Output Only

Setting			HDMI Output		
6K	3:2	5952 x 3968	**4K** with black area.	16:9	2880 x 2160
5.4K	3:2	5376 x 3584	**4K** with black area.	16:9	2880 x 2160
5.9K	16:9	5888 x 3312	**4K**	16:9	3840 x 2160
C4K	17:9	4096 x 2160	**C4K**	17:9	4096 x 2160
4K	16:9	3840 x 2160	**4K**	16:9	3840 x 2160
FHD	16:9	1920 x 1080	**FHD**	16:9	1920 x 1080
4K-A	4:3	3328 x 2496	**4K** with black area.	16:9	2880 x 2160
Bit Depth			Bit Depth		
4:2:2 10-bit			4:2:2 10-bit		
4:2:0 10-bit					
4:2:0 8-bit			4:2:2 8-bit		
Frame Rate			Frame Rate		
24p / 25p / 30p / 50p / 60p			24p / 25p / 30p / 50p / 60p		
48p / 100p / 120p (HFR)			24p / 50p / 60p		

HDMI Output Image Quality 2/2

Internal Rec with HDMI Output

Setting	Internal Rec	HDMI Output
6K 3:2 5952 x 3968	**6K** 3:2 5952 x 3968	Firmware Ver.2.0 **4K** 16:9 2880 x 2160 with black area.
5.4K 3:2 5376 x 3584	**5.4K** 3:2 5376 x 3584	Firmware Ver.2.0 **4K** 16:9 2880 x 2160 with black area.
5.9K 16:9 5888 x 3312	**5.9K** 16:9 5888 x 3312	Firmware Ver.2.0 **4K** 16:9 3840 x 2160
C4K 17:9 4096 x 2160	**C4K** 17:9 4096 x 2160	**C4K** 17:9 4096 x 2160
4K 16:9 3840 x 2160	**4K** 16:9 3840 x 2160	**4K** 16:9 3840 x 2160
FHD 16:9 1920 x 1080	**FHD** 16:9 1920 x 1080	**FHD** 16:9 1920 x 1080
4K-A 4:3 3328 x 2496	**4K-A** 4:3 3328 x 2496	**4K** 16:9 2880 x 2160 with black area.
Bit Depth	Bit Depth	Bit Depth
4:2:2 10-bit	4:2:2 10-bit	4:2:2 10-bit
4:2:0 10-bit	4:2:0 10-bit	
4:2:0 8-bit	4:2:0 8-bit	4:2:2 8-bit
Frame Rate	Frame Rate	Frame Rate
24p / 25p / 30p / 50p / 60p	24p / 25p / 30p / 50p / 60p	24p / 25p / 30p / 50p / 60p
48p / 100p / 120p (HFR)	48p / 100p / 120p (HFR)	24p / 50p / 60p

Charging Time and Battery Life DMW-BLJ31

Charging Time

Bundled Battery Charger		**130** min
USB Power Charging	With Bundled Accessories	**140** min
	External Equipment	Charging may take a while.
USB Power Supply While Charging*		Charging may take a while.

* USB PD compatible devices with 9V/3A output (more than 27W) can be used.
Panasonic does not guarantee the operation of all USB PD compatible devices.

Battery Life

		Continuous Recording Time with a Fully Charged Battery		Actual Recording Time* with a Fully Charged Battery	
		FULL	S35mm	FULL	S35mm
MOV	5.9K 30p 420 10-L	**120** min	-	**60** min	-
	4K 60p 420 10-L	-	**120** min	-	**60** min
	4K 30p 422 10-L	**120** min	**120** min	**60** min	**60** min
	FHD 120p 420 10-L	**140** min	**130** min	**70** min	**65** min
	FHD 60p 422 10-L				
	FHD 60p 420 8-L				
MP4	4K 60p 10bit 100M	-	**120** min	-	**60** min
	4K 30p 8bit 100M	**140** min	**130** min	**70** min	**65** min
	FHD 60p 8bit 28M	**160** min	**140** min	**80** min	**70** min
AVCHD	FHD 60i 17M	**160** min	**140** min	**80** min	**70** min

* The time available for recording when repeating actions such as turning the camera ON and OFF, starting/stopping, etc.

- The number of pictures that can be taken is according to the CIPA (Camera & Imaging Products Association) standards.
- Using a Panasonic SDHC memory card.
- Using the interchangeable lens (S-R24105).
- The number of pictures that can be taken and the available recording time vary depending on the surrounding environment and the usage conditions.
- For example, these will reduce in the following case: In low-temperature environments, such as on ski slopes.
- If the usage duration drops significantly even when the battery is fully charged, then the battery is at the end of its service life. Check the battery status and replace with a new battery.

Video Recording Time with Cards 1/2

59.94Hz				6K	5.9K	5.4K	4K-A	C4K	4K	FHD	64GB	128GB
MOV	30p	422	10-I	-	-	-	✔	✔	✔	-	21m	42m
	24p	422	10-I	-	-	-	✔	✔	✔	-		
	60p	422	10-I	-	-	-	-	-	-	✔	42m	1h 20m
	60p	420	10-L	-	-	-	-	✔	✔	-		
	48p	420	10-L	-	-	-	✔	✔	✔	-		
	30p	422	10-I	-	-	-	-	-	-	✔		
	30p	420	10-L	-	✔	✔	-	-	-	-		
	24p	422	10-I	-	-	-	-	-	-	✔		
	24p	420	10-L	✔	✔	-	-	-	-	-		
	120p	420	10-L	-	-	-	-	-	-	✔	56m	1h 50m
	60p	420	8-L	-	-	-	-	✔	✔	-		
	30p	422	10-L	-	-	-	✔	✔	✔	-		
	24p	422	10-L	-	-	-	✔	✔	✔	-		
	60p	422	10-L	-	-	-	-	-	-	✔	1h 25m	2h 45m
	60p	420	8-L	-	-	-	-	-	-	✔		
	60i	422	10-I	-	-	-	-	-	-	✔		
	48p	420	10-L	-	-	-	-	-	-	✔		
	30p	422	10-L	-	-	-	-	-	-	✔		
	30p	420	8-L	-	-	-	✔	✔	✔	✔		
	24p	422	10-L	-	-	-	-	-	-	✔		
	24p	420	8-L	-	-	-	✔	✔	✔	✔		
	60i	422	10-L	-	-	-	-	-	-	✔	2h 50m	5h 35m
MP4	60p	10bit	100M	-	-	-	-	-	✔	-	1h 25m	2h 45m
	30p	8bit	100M	-	-	-	-	-	✔	-		
	24p	8bit	100M	-	-	-	-	-	✔	-		
	30p	10bit	72M	-	-	-	-	-	✔	-	1h 55m	3h 55m
	24p	10bit	72M	-	-	-	-	-	✔	-		
	60p	8bit	28M	-	-	-	-	-	-	✔	4h 55m	9h 45m
	24p	8bit	24M	-	-	-	-	-	-	✔	5h 40m	11h 25m
	30p	8bit	20M	-	-	-	-	-	-	✔	6h 30m	13h 00m
AVCHD	60p		28M	-	-	-	-	-	-	✔	5h 00m	9h 55m
	30p		24M	-	-	-	-	-	-	✔	5h 45m	11h 35m
	24p		24M	-	-	-	-	-	-	✔		
	60i		17M	-	-	-	-	-	-	✔	8h 10m	16h 20m

* Video recording time is the total time of all the videos which have been recorded.

Video Recording Time with Cards 2/2

50.00Hz				6K	5.9K	5.4K	4K-A	C4K	4K	FHD	64GB	128GB
MOV	25p	422	10-I	-	-	-	✔	✔	✔		21m	42m
	50p	422	10-I	-	-	-	-	-	-	✔	42m	1h 20m
	50p	420	10-L	-	-	-	✔	✔	✔			
	25p	422	10-I	-	-	-	-	-	-	✔		
	25p	420	10-L	-	✔	✔	-	-	-			
	100p	420	10-L	-	-	-	-	-	-	✔	56m	1h 50m
	50p	420	8-L	-	-	-	✔	✔	✔	-		
	25p	422	10-L	-	-	-	✔	✔	✔	-		
	50p	422	10-L	-	-	-	-	-	-	✔	1h 25m	2h 45m
	50p	420	8-L	-	-	-	-	-	-	✔		
	50i	422	10-I	-	-	-	-	-	-	✔		
	25p	422	10-L	-	-	-	-	-	-	✔		
	25p	420	8-L	-	-	-	✔	✔	✔	✔		
	50i	422	10-L	-	-	-	-	-	-	✔	2h 50m	5h 35m
MP4	50p	10bit	100M	-	-	-	-	-	✔	-	1h 25m	2h 45m
	25p	8bit	100M	-	-	-	-	-	✔	-		
	25p	10bit	72M	-	-	-	-	-	✔	-	1h 55m	3h 55m
	50p	8bit	28M	-	-	-	-	-	-	✔	4h 55m	9h 45m
	25p	8bit	20M	-	-	-	-	-	-	✔	6h 30m	13h 00m
AVCHD	50p		28M	-	-	-	-	-	-	✔	5h 00m	9h 55m
	25p		24M	-	-	-	-	-	-	✔	5h 45m	11h 35m
	50i		17M	-	-	-	-	-	-	✔	8h 10m	16h 20m

24.00Hz				6K	5.9K	5.4K	4K-A	C4K	4K	FHD	64GB	128GB
MOV	24p	422	10-I	-	-	-	✔	✔	✔	-	21m	42m
	48p	420	10-L	-	-	-	✔	✔	✔	-	42m	1h 20m
	24p	422	10-I	-	-	-	-	-	-	✔		
	24p	420	10-L	✔	✔	-	-	-	-	-		
	24p	422	10-L	-	-	-	✔	✔	✔	-	56m	1h 50m
	48p	420	10-L	-	-	-	-	-	-	✔	1h 25m	2h 45m
	24p	422	10-L	-	-	-	-	-	-	✔		
	24p	420	8-L	-	-	-	✔	✔	✔	✔		

* Video recording time is the total time of all the videos which have been recorded.

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