

Panasonic

AVCCAM Series

Professional Camera Recorder Catalog

April 2014



Memory Card Camera Recorder
AG-AC160A/AC130A



Memory Card Camera Recorder
AG-AF100A series



Memory Card Camera Recorder
AG-AC90



Memory Card Camera Recorder
AG-HMC80 series



Memory Card Portable Recorder
AG-HMR10
Compact Camera Head
AG-HCK10G

AVCCAM

File-based, Full-HD recording!
Strong support for professional image production.



AVCCAM 3-Year Warranty Repair Program*

* AVCCAM users qualify for a 3-year warranty on repairs.
Visit the website for details: www.panasonic.biz/sav/pass_e
* AG-HCK10G camera head is not included.

An Image Production System for the Age of Full-HD Multimedia

AVCCAM
SERIES



High-Quality AVCHD Recording and High-Efficiency File-Based Recording.
Providing a next-generation production environment with advanced technologies.

AVCHD Format for High-Quality

Efficient HD Recording

AVCHD

Panasonic AVCCAM camera recorders use the AVCHD format for tapeless recording with high image quality and low bit rates. This format complies with the latest H.264 motion image compression standard, and employs the High Profile standard to improve compression efficiency. Featuring twice the compression efficiency of HDV (MPEG-2), the AVCCAM series achieves extended HD recording.

	HDV	AVCHD
Pixel (H x V)	1440 x 1080	1920 x 1080
Compression Method	MPEG-2	MPEG-4 AVC/H.264

High-end AVCHD Image Quality

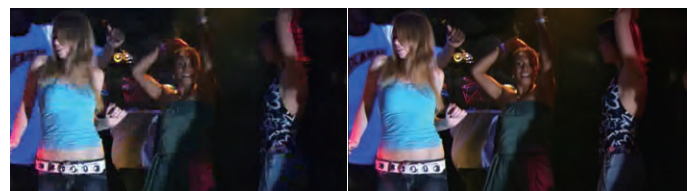
High Bit Rate of the Pro-use PH Mode

The AVCCAM series features the image-enhancing PH mode that Panasonic developed exclusively for AVCCAM camera recorders. It delivers a maximum AVCHD bit rate of 24 Mbps (average: 21 Mbps). Designed for professional image production, this mode lets you record the AVCCAM series 1920 x 1080 full-raster HD images.

Comparison of HD Recording Formats

More than twice as high compression efficiency as HDV (MPEG-2)

When a flash causes large contrast differences and reduces depth perception, HDV shows considerable block noise, while AVCHD in the PH mode minimize break-up.



Samples recorded with HDV

MPEG-2
(fixed block size)

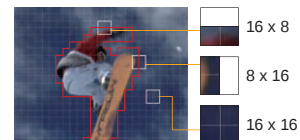
Blocks of the same size are used to process parts both with and without motion.



Samples recorded with AVCHD (PH mode)

MPEG-4 AVC/H.264
(variable block size)

Block size is precisely varied to match the size of the moving part contained in each block.



Recording Mode	Image Size (H x V)	Bit Rate	SD Memory Card ¹ recording time, per sheet						
			64 GB SDXC Memory Cards ¹		32 GB SDHC Memory Cards ¹				
			AG-AC160A/AC130A	AG-AF100A/AC90	AG-3DA1	AG-AC160A/AC130A	AG-AF100A/AC90	AG-HMC80	AG-HMR10
PS Mode²	1920 x 1080	Approx. 25 Mbps(Average), Max 28 Mbps	Approx. 5 hours 20 minutes ⁵	Approx. 5 hours 20 minutes	—	Approx. 2 hours 40 minutes ⁵	Approx. 2 hours 40 minutes	—	—
PH Mode²	1920 x 1080 1280 x 720	Approx. 21 Mbps(Average), Max 24 Mbps	Approx. 6 hours	Approx. 6 hours	Approx. 3 hours	Approx. 3 hours	Approx. 3 hours	Approx. 3 hours	Approx. 3 hours
PM Mode³	1280 x 720	Approx. 8 Mbps(Average)	Approx. 15 hours ⁶	—	—	Approx. 7 hours 30 minutes	—	—	Approx. 7 hours 30 minutes
HA Mode	1920 x 1080	Approx. 17 Mbps (Average)	Approx. 8 hours	Approx. 8 hours	—	Approx. 4 hours	Approx. 4 hours	Approx. 4 hours	Approx. 4 hours
HG Mode	1920 x 1080	Approx. 13 Mbps (Average)	—	—	—	—	—	Approx. 5 hours 20 minutes	Approx. 5 hours 20 minutes
HE Mode	1440 x 1080	Approx. 6 Mbps (Average)	Approx. 24 hours ⁶	Approx. 24 hours ⁶	—	Approx. 12 hours	Approx. 12 hours	Approx. 12 hours	Approx. 12 hours
DV Mode⁴	720 x 480 720 x 576 ⁵	Approx. 25 Mbps (Average)	Approx. 4 hours 16 minutes	—	—	Approx. 2 hours 8 minutes	—	—	—

¹: A Class 6 or higher SDXC/SDHC/SD Memory Card is required for DV recording. A Class 4 or higher SDXC/SDHC/SD Memory Card is required for recording in PH or HA mode. For other recording modes, use a Class 2 or higher SDXC/SDHC/SD Memory Card. (The use of a Panasonic SDXC/SDHC/SD Memory Card is recommended.) ²: PH mode is the highest quality in 1080i/720p, PS mode is the highest quality in 1080p. ³: AG-AC160A/AC130A only, HMR10 only when connected HCK10G. ⁴: AG-AC160A/AC130A only. ⁵: AG-AC160A only. Not support AG-AC130A. ⁶: The maximum continuous recording time is 12 hours.

Ease, Efficiency, Reliability

Large-capacity SDXC^{*1}/SDHC Memory Card

Unlike with videotape, there's no need for cueing with the SDXC^{*1}/SDHC Memory Card because recording automatically begins in a blank section of memory. Nor do you have to worry about accidentally recording over important footage. You can delete unwanted clips instantly right on the spot to preserve memory capacity. Editing after shooting is smooth and easy, with no need for digitizing.

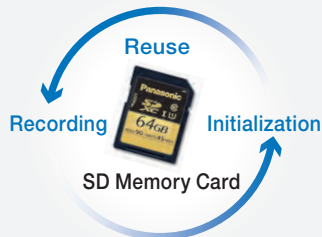
- The SDXC Memory Card is a large-capacity data storage device. The memory card features a high capacity more than 32 GB.

- SDXC^{*1}/SDHC Memory Cards are inexpensive and can be easily purchased on location when needed.



^{*1}: SDXC Memory Card cannot be used with AG-3DA1/HMR10A series.

The SD Memory Card
Helps Preserve
the Environment with Its
Reusability and Low
Power Consumption

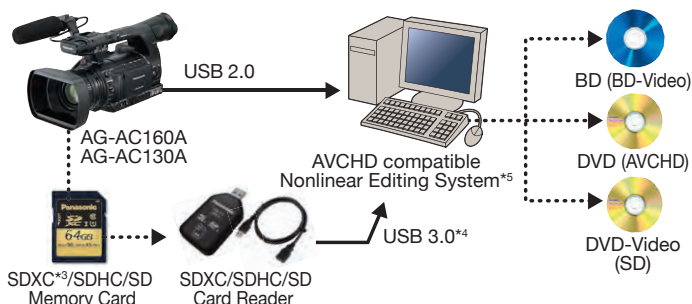


The AVCCAM series Enables a Speedy,
Efficient Image Production.

It Also Makes Video Packaging and
Internet Distribution^{*2} Smooth and Easy.

■ Nonlinear Editing

Compatibility with existing HD editing environments AVCHD files can be transferred at high speed by using the USB 3.0 interface to connect via SDXC^{*3}/SDHC/SD Memory Card reader to a Windows PC^{*4}. This dramatically improves productivity when compared with the time-consuming task of digitizing.



^{*2}: To distribute AVCHD files on the web, you may need to use a video distributing service on the web which is operated by other web publishers and supports AVCHD. For real-time web distribution, a real-time video encoder which is supplied by other manufactures may be required to use.

^{*3}: SDXC Memory Card cannot be used with AG-3DA1/HMR10A series.

^{*4}: Maximum reading speed with USB 3.0 reader for SDXC, SDHC, SD Memory Cards: 95 MB/s (using UHS-I (Ultra High Speed I) SDHC Memory Card. Speed depends on the hardware specifications of the Windows PC). When the reader connects to Mac or other devices which is not compatible with USB 3.0, its connection is USB 2.0. Connection with camera recorder is also USB 2.0. Some computers may not recognise the SDXC/SDHC Memory Card. If that occurs, use an SDXC/SDHC Memory Card reader.

^{*5}: Please see our website <<http://pro-av.panasonic.net/>> for information on the interoperability of nonlinear editing systems. Click on "Nonlinear Compatibility Information" For more detailed information, please see the website of the relevant manufacturer.

^{*6}: Panasonic does not guarantee the compatibility. Please refer to the latest Non-linear Compatibility Information at Panasonic web site. <http://pro-av.panasonic.net/>

■ 64 GB SDXC Class 10 Memory Card with Ultra-High Write Speed

With the UHS-I speed specification and maximum data transfer speed of up to 90 MB/s, the new Panasonic SDXC Memory Card brings superb performance when using with an professional camera recorder or transferring data to a PC.

Panasonic's SD memory cards include our unique Super Intelligent Controller to provide longer life and greater reliability. It keeps your important data safe under a wide range of usage conditions and potential accident situations.

As the number of rewrites increases, the length of time that data is saved decreases. This kind of use calls for Panasonic's SD cards with MLC flash memory. Compared with TLC (Triple-Layer Cell) flash memory, MLC flash memory can be rewritten up to 10 times as much. That means they last 10 times as long.

The ultra-high write speed up to 45 MB/s (UHS-I compliant) helps to capture those split-second shooting opportunities, with high-quality and high-speed consecutive shots.

Speed Performance			Speed Class
Mode	Read	Write	
UHS-I	Up to 90 MB/s (600x)*	Up to 45 MB/s* (300x)*	UHS Speed Class 1 U
High Speed	Up to 23 MB/s	Up to 23 MB/s	Speed Class 10 CLASS10

* The UHS-I mode read/write speed is only possible when using the UHS-I bus interface. When using the conventional High speed bus interface, the performance will be on High Speed mode. *x = 0.15 MB/s (MB/s = 1,000,000 byte/s)

Nonlinear Editing Software Capability Table

As of April 2014
(based on our investigations^{*6}).

Maker	Software	HD		SD		Remarks
		AVCHD	AVCHD Progressive	H.264	DV (AVI)	
Adobe	Premiere Pro 6	✓	✓	✓	✓	
Apple	Final Cut Pro X	✓	✓	✓	✓	
	Final Cut Pro 7.0.3	✓	✓	✓	✓	
Avid	Media Composer 7	✓	✓	✓	✓	
Glass Valley	EDIUS Pro 7	✓	✓	✓	✓	



AG-AC160A

Memory Card Camera Recorder



This high-end AVCCAM model provides Full-HD progressive and slow/quick-motion recording, LPCM audio, and HD SDI output.

* The mic shown in the photo is an option



- 22x (f = 28 mm to 616 mm, 35 mm equivalent) zoom lens with O.I.S. (Optical Image Stabilizer) and three manual operation rings – cam-driven zoom, focus and iris.
- Digital Zoom: 2x, 5x, 10x.
- 4-position (OFF, 1/4 ND, 1/16 ND, 1/64 ND) optical neutral density filter.
- 1/3 type 2.2 megapixel, high-sensitivity 3MOS (U.L.T. Image Sensors).
- DRS (Dynamic Range Stretch) provides a wider dynamic range.
- Seven selectable gamma modes, including Cine-like mode.
- 60 Hz*/1/50 Hz selector function.
- PH (Professional High-quality) mode for Full-HD (1920 x 1080) image recording with a high bit rate of 24 Mbps (average 21 Mbps).
- Supports AVCHD progressive (1080/60p and 1080/50p) recording (PS) mode, and HDMI supports 1080/60p or 50p output.
- 16 bit LPCM 2 channel Digital Audio Recording for high-quality sound.
- Records SD video into a DV-format file (AVI Type 2) with aspect conversion (Side Crop, Letterbox, Squeeze).
- VFR (Variable Frame Recording) function provides slow/quick-motion recording (1080 only).
- Dual Memory Card Slots provide Relay Recording*² and Simultaneous Recording.*³
- Supports SDXC/SDHC/SD Memory Cards.
- Versatile solid-state recording functions: Interval Rec,*⁴ Pre-Rec (3 sec), Shot Mark (OK/NG), Index (up to 100/clip) and Meta-data recording.*⁴
- Time Stamp for recording evidentiary depositions and procedures.
- High-Quality Color LCOS Viewfinder (approx. 1,226,000 dot equivalent) and LCD Monitor (approx. 921,000 dots).
- SMPTE Time-Code Recording and Synchro Function with TC preset in/out (video out).
- A Scene File Dial and three User Buttons for comfortable, easy operation.
- Simplified Waveform and Vectorscope Display.
- Two modes of Focus Assist (Focus-in-Red and Expand).
- Area Focusing and Area Iris Functions let you set a desired area as a target zone for focusing, iris adjustment and Y GET (brightness measurement).
- Two XLR audio inputs with 48 V phantom microphone compatibility.
- SDI output for HD or down-converted SD images (AVCHD mode only).
- HDMI output (AVCHD mode only), DV OUT (IEEE1394, DV mode only) and USB 2.0 (mini B).
- Down-converted SD video output from HDMI*⁵ or Video out with aspect conversion (Side Crop, Letterbox, Squeeze).
- Wired remote operation of Zoom, Iris, Focus, Rec Start/Stop and Index functions.



AG-AC160A/AC130A rear terminals

*AG-AC130A does not have SDI terminal



AG-AC130A

Memory Card Camera Recorder



This cost-effective model offers a wide field of view, high sensitivity, and high-quality HD recording.

* The mic shown in the photo is an option



- 22x (f = 28 mm to 616 mm, 35 mm equivalent) zoom lens with O.I.S. (Optical Image Stabilizer) and three manual operation rings – cam-driven zoom, focus and iris.
- Digital Zoom: 2x, 5x, 10x.
- 4-position (OFF, 1/4 ND, 1/16 ND, 1/64 ND) optical neutral density filter.
- 1/3 type 2.2 megapixel, high-sensitivity 3MOS (U.L.T. Image Sensors).
- DRS (Dynamic Range Stretch) provides a wider dynamic range.
- Seven selectable gamma modes, including Cine-like mode.
- PH (Professional High-quality) mode for Full-HD (1920 x 1080) image recording with a high bit rate of 24 Mbps (average 21 Mbps).
- Records SD video into a DV-format file (AVI Type 2) with aspect conversion (Side Crop, Letterbox, Squeeze).
- Dual Memory Card Slots provide Relay Recording*² and Simultaneous Recording.*³
- Supports SDXC/SDHC/SD Memory Cards.
- Versatile solid-state recording functions: Interval Rec,*⁴ Pre-Rec (3 sec), Shot Mark (OK/NG), Index (up to 100/clip) and Meta-data recording.*⁴
- Time Stamp for recording evidentiary depositions and procedures.
- High-Quality Color LCOS Viewfinder (approx. 1,226,000 dot equivalent) and LCD Monitor (approx. 921,000 dots).
- SMPTE Time-Code Recording and Synchro Function with TC preset in/out (video out).
- A Scene File Dial and three User Buttons for comfortable, easy operation.
- Simplified Waveform and Vectorscope Display.
- Two modes of Focus Assist (Focus-in-Red and Expand).
- Area Focusing and Area Iris Functions let you set a desired area as a target zone for focusing, iris adjustment and Y GET (brightness measurement).
- Two XLR audio inputs with 48 V phantom microphone compatibility.
- HDMI output (AVCHD mode only), DV OUT (IEEE1394, DV mode only) and USB 2.0 (mini B).
- Down-converted SD video output from HDMI*⁵ or Video out with aspect conversion (Side Crop, Letterbox, Squeeze).
- Wired remote operation of Zoom, Iris, Focus, Rec Start/Stop and Index functions.



AG-AC160A/AC130A side view

*1: 60 Hz is actually 59.94 Hz. *2: The AVCHD's maximum consecutive recording length is 12 hours. This cannot be extended even by using the Relay Recording function. *3: Simultaneous recording cannot be combined with Relay recording, VFR or Interval Rec. Also, Rec Check and Last Clip Delete will not operate during Simultaneous recording. *4: AVCHD mode only. *5: Down-converted signal on HDMI is 480p or 576p only.



AG-AF100A series

(-AF100A, -AF101A, -AF102A, -AF104A)
Memory Card Camera Recorder



This professional HD camera recorder with a Micro Four Thirds mount*¹ unleashes creativity in motion picture production.

The mic and the lens shown in the photo are options



- Micro Four Thirds system provides rich expression with a wealth of interchangeable lenses.*¹
- 4/3 type 12.4 megapixel MOS image sensor.
- Low-Pass Filter for high-quality HD motion images.
- High-performance 18 bit DSP (Digital Signal Processor).
- 4-position (OFF, 1/4 ND, 1/16 ND, 1/64 ND) optical neutral density filter.
- DRS (Dynamic Range Stretch) provides a wider dynamic range.
- Seven selectable gamma modes, including Cine-like mode.
- FILM CAM Mode provides VFR and indicates shutter opening angle (deg.) and ISO for movie production.
- 60 Hz²/50 Hz selector function.
- Supports AVCHD progressive (1080/60p and 1080/50p) recording (PS) mode, and HDMI supports 1080/60p or 50p output.
- PH (Professional High-quality) mode for Full-HD (1920 x 1080) image recording with a high bit rate of 24 Mbps (average 21 Mbps).
- 16 bit LPCM 2 channel Digital Audio Recording for high-quality sound.
- VFR (Variable Frame Recording) function provides slow/quick-motion recording (1080 only).
- Dual Memory Card Slots provide and Relay Recording.*³
- Supports SDXC/SDHC/SD Memory Cards.
- Versatile solid-state recording functions: Interval Rec,*⁴ Pre-Rec(3 sec), Shot Mark (OK/NG), Index (up to 100/clip) and Meta-data recording.*⁴
- High-Quality Color LCOS Viewfinder (approx. 1,226,000 dot equivalent) and LCD Monitor (approx. 921,000 dots).
- SMPTE Time-Code Recording and Synchro Function with TC preset in/out (video out).
- Three User Buttons for comfortable, easy operation.
- Simplified Waveform and Vectorscope Display.
- Two Focus Assist modes (Focus-in-Red and Expand).
- Area Focusing and Area Iris Functions let you set a desired area as a target zone for focusing, iris adjustment and Y GET (brightness measurement).
- Two XLR audio inputs with 48 V phantom microphone compatibility.
- HDMI output (AVCHD mode only) and USB 2.0 (mini B).
- SDI Output with 10 bit*⁵ (HD live output only) or 1080/24PsF.
- Down-converted SD video output from SDI, HDMI or Video out with aspect conversion (Side Crop,*⁶ Letterbox, Squeeze).
- Wired remote operation of Zoom, Iris, Focus, Rec Start/Stop and Index functions.
- Professional system design: detachable handle and grip, sensor marker, and measuring hook.



AG-AF100A rear terminals



AG-AC90

Memory Card Camera Recorder



This stylish AVCCAM model features a wide-angle/high-powered zoom lens and high-sensitivity BSI Type 3MOS Sensors.

* The mic shown in the photo is an option



- 12x (f = 29.8 mm to 383.7 mm, 35 mm equivalent) zoom lens with 5-Axis Hybrid O.I.S. (Optical Image Stabilizer) and three manual operation rings – zoom, focus and iris.
- Intelligent 25x Zoom and Digital Zoom: 2x, 5x, 10x.
- 1/4.7 type 2.68 megapixel (effective pixels) BSI (Back Side Illumination) 3MOS and 4x dense pixel shifting technology achieves high resolution.
- DRS (Dynamic Range Stretch) provides a wider dynamic range.
- Seven selectable gamma modes, including Cine-like mode.
- PH (Professional High-quality) mode for Full-HD (1920 x 1080) image recording with a high bit rate of 24 Mbps (average 21 Mbps).
- Supports AVCHD progressive (60 Hz model: 1080/60p, 50 Hz model: 1080/50p) recording (PS) mode, and HDMI supports Full-HD progressive signal output.
- Enables SD (standard definition) recording in AVCHD SA mode with aspect conversion (16:9 or Side Crop).
- Dual Memory Card Slots provide Auto-Switch Recording*⁷ and Back-Up Recording.*⁸
- Supports SDXC/SDHC/SD Memory Cards.
- Interval Rec, Pre-Rec (3 sec).
- Slide-Retractable 3.5 type hi-res LCD monitor (approx. 1,152,000 dots) with Touch Panel, and 0.61 cm (0.24 inches) EVF (263,000 dots).
- Two Scene Files and seven User Buttons for comfortable, easy operation.
- HD focus assist functions: Focus-in-Red, Push Auto, and Face Detection function.
- Built-in surround microphone supports DOLBY® DIGITAL 5.1 CREATOR.
- Two XLR audio inputs with 48 V phantom microphone compatibility.
- HDMI output and USB 2.0 (Type B).
- Down-converted SD video output from HDMI,*⁹ Mini D4 or Video out (AV Multi terminals).
- Wired remote operation of Zoom, Iris, Focus, Rec Start/Stop.



AG-AC90 terminals

*1: Panasonic does not guarantee the compatibility or performance of all lenses that are mountable on the AG-AF100A series. *2: 60 Hz is actually 59.94 Hz. *3: The AVCHD's maximum consecutive recording length is 12 hours. This cannot be extended even by using the Relay Recording function. *4: AVCHD mode only. *5: 10 bit signal is generated by a smoothing process. It is not a native 10 bit signal. *6: Side crop output cannot be selected when an SDI or HDMI output terminal is used. *7: Simple relay recording. When switching recording media, audio is interrupted for a maximum of 0.8 sec. The AVCHD's maximum consecutive recording length is 12 hours. This cannot be extended even by using the Relay Recording function. *8: "Back-Up Recording" is equivalent to "Simultaneous recording". It cannot be combined with Auto-Switch recording or Interval Rec. Also, Rec Check and Last Clip Delete will not operate during Back-Up recording. *9: Down-converted signal on HDMI is 480p or 576p only.



AG-HMC80 series (-HMC80, -HMC81, -HMC82, -HMC84) Memory Card Camera Recorder



DV/AVCHD switchable recording on an SD Memory Card.
All with shoulder-mount stability.



- 12x (f = 40.8 mm to 490 mm, 35 mm equivalent) zoom lens with O.I.S. (Optical Image Stabilizer) and manual focus ring.
- Digital Zoom: 2x, 5x, 10x.
- 1/4.1 type 3.05 megapixel progressive 3MOS sensors.
- DRS (Dynamic Range Stretch) provides a wider dynamic range.
- Seven selectable gamma modes, including Cine-like mode.
- PH (Professional High-quality) mode for Full-HD (1920 x 1080) image recording with a high bit rate of 24 Mbps (average 21 Mbps).
- Records SD video into a DV-format file (AVI Type 2) with aspect conversion (Side Crop, Letterbox, Squeeze).
- Supports SDXC/SDHC/SD Memory Cards.
- Versatile solid-state recording functions: Interval Rec,*¹ Pre-Rec (3 sec), Shot Mark (OK/NG) and Meta-data recording.*¹
- Time Stamp for recording evidentiary depositions and procedures.
- 2.7 type EVF/LCD monitor (approx. 230,000 pixels).
- Two Scene Files and Three User Buttons for comfortable, easy operation.
- Simplified Waveform display.
- HD focus assist functions: Center Zoom,*² Focus Bar, Push Auto, and Face Detection function.
- Two XLR audio inputs with 48 V phantom microphone compatibility.
- HDMI output (AVCHD mode only), DV OUT (IEEE1394, DV mode only), and USB 2.0 (Type B).
- Down-converted SD video output from HDMI,*³ Component (Mini D4) or Video out (AV Multi terminals) with aspect conversion (Side Crop, Letterbox, Squeeze).
- Wired remote operation of Zoom, Iris, Focus, and Rec Start/Stop.
- A shoulder pad for extra shooting stability.



AG-HMC80 side view



AG-HMC80 terminals



AG-HMR10 Memory Card Portable Recorder



AG-HCK10G Compact Camera Head

A handheld HD recorder with HD-SDI input/output, featuring versatile operation and Full-HD images.

High-quality, multi-angle shooting with a 3MOS system and Full-HD sampling for the AG-HMR10.



- Records HD SDI input signals or captures highly detailed images with an optional camera head (AG-HCK10G).
- 60 Hz*/50 Hz selector function.
- PH (Professional High-quality) mode for Full-HD (1920 x 1080) image recording with a high bit rate of 24 Mbps (average 21 Mbps).
- PH and PM (average 8 Mbps) modes support 720/60p or 50p.
- Supports SDHC/SD Memory Cards.
- Versatile solid-state recording functions: Pre-Rec (3 sec), Shot Mark (OK/NG) and Meta-data recording.
- Time Stamp for recording evidentiary depositions and procedures.
- SMPTE Time-Code (TC/UB) recording.
- Convenient playback functions: Resume Playback, Repeat Playback, etc.
- 3.5 type LCD monitor (approx. 210,000 pixels).
- Assignable User Button for comfortable, easy operation.
- Simplified Waveform and Vectorscope Display.
- HD SDI input/output, HDMI output, and USB 2.0 (Type B).
- Supports SDI embedded audio (2 ch), analog audio inputs (2 ch) from external stereo microphones or the stereo microphones built into the optional camera head (AG-HCK10G).
- Down-converted SD video output from SDI or HDMI*⁵ with aspect conversion (Side Crop, Letterbox, Squeeze).
- Wired remote operation of Zoom and Rec Start/Stop.
- The palm-size body weighs only about 691 g (1.52 lb)*⁶



AG-HMR10 terminals

Enables versatile operation when combined with the AG-HCK10G Camera Head (optional)*⁷

- Zoom, focus, iris, shutter speed and white balance adjustments, as well as camera setup, can all be made from the AG-HMR10.
- 12x (f = 40.8 mm to 490 mm, 35 mm equivalent) zoom lens with O.I.S. (Optical Image Stabilizer) and manual focus ring.
- Digital Zoom: 2x, 5x, 10x.
- 1/4.1 type 3.05 megapixel progressive 3MOS sensors.
- DRS (Dynamic Range Stretch) provides a wider dynamic range.
- Seven selectable gamma modes, including Cine-like mode.
- HD focus assist functions: Center Zoom*², Focus Bar, One-Push Auto Focus.

*1: AVCHD mode only. *2: "Center Zoom" display is equivalent to "Expand" display. *3: Down-converted signal on HDMI is 480p or 576p only. The AG-HMC80 cannot output HDMI, component and composite signals at the same time. *4: 60 Hz is actually 59.94 Hz. *5: Down-converted signal on HDMI is 480p or 576p only. *6: Including bundled battery. *7: Either the optional 3 m (9.84 ft) AG-C20003G or 20 m (65.62 ft) AG-20020G Camera Head Cable is required.



AG-3DA1

Memory Card Camera Recorder



The world's first*¹ integrated twin-lens
FULL HD 3D camera recorder.
File-based recording for efficient 3D production.



- Motorized 5.6x (f = 47.1 mm to 264 mm, 35 mm equivalent) twin zoom lens with two manual operation rings – zoom and focus.
- 1/4.1 type 2.07 megapixel (effective pixels) twin 3MOS system.
- Convergence Point Adjustment function for shooting stereo 3D images with natural-looking depth.
- Display functions (3D Guide, Convergence Point, L/R/Mix Image Selector) assist 3D image acquisition.
- Six selectable gamma modes, including Cine-like mode.
- 60 Hz*²/50 Hz selector function.
- Full-HD left-eye and right-eye images are recorded in sync onto two SDHC/SD Memory Cards.
- PH (Professional High-quality) mode for Full-HD (1920 x 1080) image recording with a high bit rate of 24 Mbps (average 21 Mbps).
- Versatile solid-state recording functions: Shot Mark(OK/NG) and Meta-data recording.
- 3.2 type LCD monitor (approx. 921,000 dots), and 1.14 cm (0.45 inches) high-res LCOS EVF (1,226,000 dot equivalent).
- SMPTE Time-Code (TC/UB) recording.
- Two User Buttons for comfortable, easy operation.
- Simplified Waveform and Vectorscope Display.
- Two Focus Assist modes (Focus Bar, Push Auto).
- Built-in stereo microphone.
- Two XLR audio inputs with 48 V phantom microphone compatibility.
- HD SDI simultaneous output with Sync-rec function and HDMI 3D output.*³
- Wired remote operation of Zoom, Iris, Focus, Rec Start/Stop and Convergence Point adjustment.
- Lightweight camera body (approx. 2.4 kg (5.3 lb)) provides superb mobility for low-angle shots.



AG-3DA1 rear terminals

*1: It has been available since August 2010, as an integrated twin-lens 3D camera recorder capable of recording Full-HD video onto memory cards (based on a Panasonic survey).

*2: 60 Hz is actually 59.94 Hz.

*3: HDMI output and HD SDI output cannot be used simultaneously.

Options

As of April 2014



VW-VBG130

Battery Pack
• 7.2 V 1,320 mAh/
1,250 mAh (typ./min.)



VW-VBG260

Battery Pack
• 7.2 V 2,640 mAh/
2,500 mAh (typ./min.)
(Supplied with the AVCCAM series)



VW-VBG6

Battery Pack
• 7.2 V 5,800 mAh/
5,400 mAh (typ./min.)



CGA-D54

Battery Pack
• 7.2 V 5,400 mAh



AG-B23

Battery Charger
• AC cable included



AG-C20003G 3m
AG-C20020G 20m
Camera Head
Option Cable



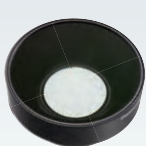
AG-MC200G

XLR microphone
• Sensitivity: -40 dB ±3.5 dB
(0 dB=1 V/Pa, at 1kHz)
• Maximum Input level: 127 dB
(1000 Hz, Distortion within 1%)
• S/N: More than 69 dB



VW-W4307H

Wide conversion
lens



VW-W4907H-K

Wide conversion
lens



VW-T4314H

Tele conversion
lens



VW-LF49N-K

Filter Kit

AG-SFU160G Upgrade Software Key

This upgrade key activates the following functions and enables a convenient workflow with Eye-Fi for AG-AC160A.

AG-SFU100

Upgrade software for
AG-AF100 series

*AG-SFU100 is not free
upgrade software



RP-SDB32GB1K



RP-SDB16GB1K



SDXC Memory Cards



RP-SDB08GB1K



BN-SDCMAB

RP-SDB32GB1K/SDB16GB1K/SDB08GB1K

Panasonic Professional SDHC Memory Cards

These professional SD Memory Cards are ideal for recording with AVCCAM Series models. Endurance remaining indication is possible using Card Checker software (free download) and the Panasonic USB 3.0 Reader/Writer BN-SDCMAB. The Super Intelligent Controller (SICS) further raises reliability for recording and storage. These professional SD Memory Cards also feature fast transfer speeds up to 90 MB/sec. in UHS-I mode, resistance to water, impacts, magnets, X-rays and temperature, and support QR code prints.

*These options are not available in some areas.

Upgrade Software Key AG-SFU160G

This upgrade key activates the following functions and enables a convenient workflow with Eye-Fi for AG-AC160A* AVCCAM handheld camera recorder.

* AG-SFU160G is exclusive upgrade software key for AG-AC160A. It doesn't support AG-AC160, AC130 and AC130A.

Features

1. During AG-AC160A is recording, the transmission by Eye-Fi holds. (Recording is prioritized.)
2. Adding Eye-Fi card setting menu.
3. Displaying a file transmission status.
4. Maximum recording file size changes from 4 GB (default) to 2 GB to meet the Eye-Fi standard.



AG-AC160A

Eye-Fi

slot1: Normal SD card
slot2: Eye-Fi card

AG-SFU160G UPGRADE SOFTWARE KEY Eye-Fi® Applications

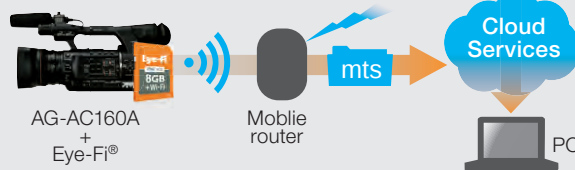
Transferring video files to nearby PC



AG-AC160A
+
Eye-Fi®

PC

Transferring video files to cloud services



AG-AC160A
+
Eye-Fi®

Mobile
router

Cloud
Services
PC

Interchangeable lens

As of April 2014

Panasonic Micro Four Thirds Lens

H-FS045200

LUMIX G VARIO
45-200mm/F4.0-F5.6/MEGA O.I.S.

H-FS014045

LUMIX G VARIO
14-45mm/F3.5-F5.6 ASPH./MEGA O.I.S.

H-F007014

LUMIX G VARIO
7-14mm/F4.0 ASPH.

H-VS014140

LUMIX G VARIO HD
14-140mm/F4.0-F5.8 ASPH./MEGA O.I.S.

H-H020A

LUMIX G
20mm/F1.7 ASPH.

H-F008

LUMIX G
FISHEYE 8mm/F3.5

H-ES045

LEICA DG MACRO-ELMARIT
45mm/F2.8 ASPH./MEGA O.I.S.

Panasonic Four Thirds Lens

L-ES014050

LEICA D VARIO-ELMARIT
14-50mm/F2.8-F3.5 ASPH./MEGA O.I.S.

L-RS014050

LEICA D VARIO-ELMAR
14-50mm/F3.8-F5.6 ASPH./MEGA O.I.S.

L-RS014150

LEICA D VARIO-ELMAR
14-150mm/F3.5-F5.6 ASPH./MEGA O.I.S.

L-X025

LEICA D SUMMILUX
25mm/F1.4 ASPH.

Panasonic Micro Four Thirds Lens

H-PS14042 **HD** MovieSupport

LUMIX G **X** VARIO PZ
14-42mm/F3.5-F5.6 ASPH./POWER O.I.S.

H-FS100300 **HD** MovieSupport

LUMIX G VARIO
100-300mm/F4.0-F5.6/MEGA O.I.S.

H-X025

LEICA DG SUMMILUX
25mm/F1.4 ASPH.

DMW-MA1

Mount adaptor
(for Four Thirds Lens)

H-PS45175 **HD** MovieSupport

LUMIX G **X** VARIO PZ
45-175mm/F4.0-F5.6 ASPH./POWER O.I.S.

H-H014 **HD** MovieSupport

LUMIX G
14mm/F2.5 ASPH.

*Panasonic does not guarantee the compatibility or performance of all lenses that are mountable on the AG-AF100 series. For compatible lens information, please refer to the Panasonic Website <<http://pro-av.panasonic.net/en/af100/index.html>>
*These options are not available in some areas.

Options Compatibility Chart

Product name	Model number	AG-AC160A/ AG-AC130A	AG-AF100A series	AG-AC90	AG-HMC80 series	AG-HMR10 AG-HCK10G	AG-3DA1
Battery Pack	VW-VBG130						
	VW-VBG260				✓	✓	
	VW-VBG6	✓	✓		✓		
	CGA-D54			✓			✓
Battery Charger	AG-B23			✓			✓
XLR microphone	AG-MC200G	✓	✓		✓		✓
SDXC Memory Card		✓	✓	✓			
SDHC Memory Card	RP-SDB32GB1K						
	SDB16GB1K/ SDB08GB1K	✓	✓	✓	✓	✓	✓
Wide conversion lens	VW-W4307H				✓	✓	
	VW-W4907H-K			✓			
Tele conversion lens	VW-T4314H				✓	✓	
Filter Kit	VW-LF49N-K			✓			
Camera Head Option Cable	AG-C20003G						
	AG-C20020G					✓	
Interchangeable lens/Mount adaptor			✓				
Upgrade software	AG-SFU100		*				
Upgrade Software Key	AG-SFU160G	✓ *AG-AC160A only					

*Upgrade software for AG-AF100 series. It is not available for AG-AF100A series.

■ Function Comparison Table

Feature	AG-AC160A	AG-AC130A	AG-AF100A series	AG-AC90	AG-HMC80 series	AG-HMR10/ AG-HCK10G	AG-3DA1
Lens System Angle of view, (35 mm equiv.)	Cam-driven/ Motorized 22x zoom (28 mm to 616 mm)	Cam-driven/ Motorized 22x zoom (28 mm to 616 mm)	Micro Four Thirds interchangeable lens (option)	Motorized 12x zoom (29.8 mm to 383.7 mm)	Motorized 12x zoom (40.8 mm to 490 mm)	Motorized 12x zoom (40.8 mm to 490 mm)	Motorized 5.6x twin zoom (47.1 mm to 264 mm)
Intelligent Zoom				Up-to 25x			
Digital Zoom	2x, 5x, 10x	2x, 5x, 10x		2x, 5x, 10x	2x, 5x, 10x	*HCK10 2x, 5x, 10x	
Optical Image Stabilizer	✓	✓		5 axis Hybrid	✓	*HCK10	
Manual Rings	3 rings [zoom, focus, iris]	3 rings [zoom, focus, iris]		3 rings [zoom, focus, iris]	1 ring [focus/iris]		2 rings [zoom, focus/iris]
Built-in ND Filters	4 position (OFF, 1/4, 1/16, 1/64)	4 position (OFF, 1/4, 1/16, 1/64)	4 position (OFF, 1/4, 1/16, 1/64)				
Image Pick-up Device (MP = Mega-pixels)	1/3 type 2.2 MP, MOS x3	1/3 type 2.2 MP, MOS x3	4/3 type 12.4 MP MOS x1	1/4.7 type 2.68 MP BSI MOS x3	1/4.1 type 3.05 MP MOS x3	1/4.1 type 3.05 MP MOS x3*HCK10	1/4.1 type 2.07 MP MOS x3 x2
DRS	✓	✓	✓	✓	✓	*HCK10	✓
Selectable Gamma Modes	7	7	7	7	7	7 *HCK10	6
Film Cam Mode			✓				
60 Hz*1/50Hz Switchable	✓		✓			✓	✓
Full HD Progressive Recording	PS mode		PS mode	PS mode			
PH (Pro-High) Mode	✓	✓	✓	✓	✓	✓	✓
720P Recording	PH/PM mode	PH/PM mode	PH/PM mode		PH/PM mode	PH/PM mode	
SD (Std-Def) Recording	DV(AVI Type II)	DV(AVI Type II)		SA mode (AVCHD)	DV(AVI Type II)		
16 bit LPCM Recording	✓		✓				
VFR	✓		✓				
SD Card Compatibility	SDXC/SDHC/SD	SDXC/SDHC/SD	SDXC/SDHC/SD	SDXC/SDHC/SD	SDHC/SD	SDHC/SD	SDHC/SD
Card Slot	2	2	2	2	1	1	2
Relay Recording	✓	✓	✓	Auto Switch Rec.*			
Simultaneous Recording	✓	✓		✓			3D (L/R)
Interval Rec	✓	✓	✓	✓	✓		
Pre-Rec (3 sec)	✓	✓	✓	✓	✓	✓	
Shot Mark (OK/NG)	✓	✓	✓			✓	✓
Index (up to 100/Clip)	✓	✓	✓			✓	
Meta-Data Recording	✓	✓	✓	✓	✓	✓	✓
Time Stamp Recording	✓	✓		✓	✓	✓	
Time-Code Generator/Reader	✓	✓	✓	✓	✓	✓	✓
Synchro Function with TC Preset In/Out (Video Out)	✓	✓	✓				
Scene File Dial	6 position dial	6 position dial	(6 scene files)	(6 scene files)	(2 scene files)		
User Buttons	3	3	3	7	3	3	2
Built-in Monitor	3.45 type LCD (921K dots)	3.45 type LCD (921K dots)	3.45 type LCD (921K dots)	Slide-retractable 3.5 type LCD with Touch Panel (1,152K dots)	2.7 type LCD/EVF (230KP = 690K dot equiv.)	3.5 type LCD (210KP = 630K dot equiv.)	3.2 type LCD (921K dots)
EVF	0.45 type LCOS (1,226K dot equiv.)	0.45 type LCOS (1,226K dot equiv.)	0.45 type LCOS (1,226K dot equiv.)	0.24 type LCOS (263K dot equiv.)			0.45 type LCOS (1.2M dot equiv.)
Waveform Display	✓	✓	✓		✓	✓	✓
Vectorscope Display	✓	✓	✓			✓	✓
3D Assist							3D Guide Convergence Point, L/R-MIX Monitor
Focus Assist	Focus Bar, Focus-In-Red, Expand, Push Auto	Focus Bar, Focus-In-Red, Expand, Push Auto	Focus Bar, Focus-In-Red, Expand, Push Auto	Focus-In-Red, Push Auto (User Buttons)	Focus Bar, Center Zoom, Push Auto	*HCK10 Focus Bar, Center Zoom, Push Auto	Focus Bar, Push Auto
Face Detection	✓	✓	✓	(iA)	✓		
Area Focusing and Area Iris	✓	✓	*Compatible lens only				
Built-in Microphone	Stereo	Stereo	Stereo	5.1 ch/Stereo	Stereo	Stereo*HCK10	Stereo
XLR AUDIO IN	✓	✓	✓	✓	✓		✓
SDI IN						✓	
SDI OUT	✓		✓			✓	2(L/R)
IEEE1394 (DV Terminal)	✓	✓			✓		
HDMI OUT	✓	✓	✓	✓	✓	✓	3D
USB 2.0	✓	✓	✓	✓	✓	✓	
Analog Video Outputs	✓	✓	✓	✓	✓	✓	
Down Converter (Aspect Conversion Mode)	(Side Crop, Letterbox, Squeeze)	(Side Crop, Letterbox, Squeeze)	(Side Crop, Letterbox, Squeeze)	(Side Crop, Letterbox, Squeeze)	(Side Crop, Letterbox, Squeeze)	(Side Crop, Letterbox, Squeeze)	
Wired Remote Control Terminals	Zoom, Rec-S/S, Focus, Iris, Index	Zoom, Rec-S/S, Focus, Iris, Index	Zoom, Rec-S/S, Focus, Iris, Index	Zoom, Rec-S/S, Focus, Iris	Zoom, Rec-S/S, Focus, Iris	Zoom, Rec-S/S	Zoom, Rec-S/S, Focus, Iris, Convergence
Wireless Remote Controller	✓	✓	✓	✓	✓	✓	

AG-AC160A/AC130A Specifications

General

Power Supply:	DC 7.2 V (when the battery is used) DC 7.3 V (when the AC adaptor is used)
Power Consumption:	AG-AC160A: 11.8 W (recording) AG-AC130A: 11.6 W (recording)
Operating Temperature:	0°C to 40°C (32°F to 104°F)
Operating Humidity:	10% to 80% (no condensation)
Weight:	Approx. 2.4 kg (5.3 lb), (Excluding the battery and accessories)
Dimensions (W × H × D):	180 mm × 195 mm × 438 mm (7 inches × 7-11/16 inches × 17-1/4 inches) (Excluding protruding parts)

Camera

Pickup Devices:	1/3 type progressive, 2.2 megapixel, 3MOS sensors
Effective Pixels:	1 920 (H) × 1 080 (V)
Lens:	Optical image stabilizer lens, 22x motorized zoom, F1.6 to F3.2 (f=3.9 mm to 86 mm), 35 mm conversion: 28 mm to 616 mm (16:9)
Filter Diameter:	72 mm
Optical System:	Prism color separation
ND Filter:	OFF, 1/4, 1/16, 1/64
Minimum Shooting Distance:	Approx. 1 m (Approx. 39-3/8 inches)
Gain Settings:	0/3/6/9/12/15/18/24*/30* dB *Assigned to the USER button (S.GAIN)
Digital Zoom:	2x/5x/10x, assigned to the USER button
Minimum Illumination:	0.4 lx (F1.6, gain 30 dB, shutter speed 1/30 seconds)
Shutter Speed : (Preset)	[59.94 Hz*1 mode of AG-AC160A and AG-AC130AP] 60i/60p: 1/60*, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000 sec. 30p: 1/30, 1/50*, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000 sec. 24p: 1/24, 1/50*, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000 sec. * Indicates value when shutter is OFF [50 Hz mode of AG-AC160A and AG-AC130AEJ/AEN] 50i/50p: 1/50*, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000 sec. 25p: 1/25, 1/50*, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000 sec. * Indicates value when shutter is OFF
Shutter Speed : (Synchro Scan)	[59.94 Hz*1 mode of AG-AC160A and AG-AC130AP] 60i/60p: 1/60.0 sec. to 1/249.8 sec. 30p: 1/30.0 sec. to 1/249.8 sec. 24p: 1/24.0 sec. to 1/249.8 sec. [50 Hz mode of AG-AC160A and AG-AC130AEJ/AEN] 50i/50p: 1/50.0 sec. to 1/250.0 sec. 25p: 1/25.0 sec. to 1/250.0 sec.
Shutter Speed : (Slow)	[59.94 Hz*1 mode of AG-AC160A and AG-AC130AP] 60i/60p: 1/8 sec., 1/15 sec., 1/30 sec. 30p: 1/8 sec., 1/15 sec., 24p: 1/6 sec., 1/12 sec. [50 Hz mode of AG-AC160A and AG-AC130AEJ/AEN] 50i/50p: 1/6 sec., 1/12 sec., 1/25 sec. 25p: 1/6 sec., 1/12 sec. *Only when the VFR MODE is OFF in the SCENE FILE screen
Shutter Speed : (Opening Angle)	[59.94 Hz*1 mode of AG-AC160A and AG-AC130AP] 3.0 degrees to 360.0 degrees, 0.5 degrees step [50 Hz mode of AG-AC160A and AG-AC130AEJ/AEN] 3.0 degrees to 360.0 degrees, 0.5 degrees step

Memory Card Recorder

Recording Format:	AG-AC160A: AVCHD Ver.2.0 standard (AVCHD Progressive) AG-AC130A: AVCHD standard (MPEG-4 AVC/H.264), AG-AC160A/AC130A: DV standard (AVI Type2)
Recording Media:	SD memory card (FAT12, FAT16 formats supported) 512 MB, 1 GB, up to 2 GB SDHC memory card (FAT32 format supported) 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 32 GB SDXC memory card (exFAT format supported) 48 GB, 64 GB, up to 2 TB

Video/Audio Recording (AVCHD mode)

Recording Video Signals:	[59.94 Hz*1 mode of AG-AC160A and AG-AC130AP] PS mode (AG-AC160A only): 1080/59.94p*1 PH mode: 1080/59.94i*1, 1080/29.97p*1, 1080/23.98pN*1*3, 720/59.94p*1, 720/29.97p*1, 720/23.98pN*1*3 PM mode: 720/59.94p*1, HA/HE mode: 1080/59.94i*1 [50 Hz mode of AG-AC160A and AG-AC130AEJ/AEN] PS mode (AG-AC160A only): 1080/50p PH mode: 1080/50i, 1080/25p, 720/50p, 720/25p PM mode: 720/50p, HA/HE mode: 1080/50i
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General

Video Bit Rate:	PS mode (AG-AC160A only) : Approx. 25 Mbps (VBR) PH mode: Approx. 21 Mbps (VBR) PM mode: Approx. 8 Mbps (VBR) HA mode: Approx. 17 Mbps (VBR) HE mode: Approx. 6 Mbps (VBR)
Interval Recording:	1 sec. /10 sec. /30 sec. /1 min. /2 min. interval, maximum 168 hours (1 week) recording *For the recording mode, PH 1080/24p (AG-AC160A, AG-AC130AP), or PH 1080/25p (AG-AC160A, AG-AC130AEJ/AEN) fixed
Variable Frame Rate: [AG-AC160A]	1080/24p, 1080/30p: 2*/6/9/12/15/18/20/21/22/24/25/26/ 27/28/30/32/34/36/40/44/48/54/60 fps (frames per second) 1080/25p: 2*/6/9/12/15/18/20/21/22/23/24/25/26/27/ 28/30/32/34/37/42/45/48/50 fps * Fixed on 0 dB gain and manual focus mode
Audio Recording Signal:	48 kHz/16 bit
Digital Audio Format:	[PS/PH mode of AG-AC160A] Linear PCM 2 ch / Dolby Digital 2 ch, switchable [PM/HA/HE modes of AG-AC160A and AG-AC130A] Dolby Digital 2 ch
Audio Bit Rate:	PS/PH mode: 384 kbps, PM/HA/HE mode: 256 kbps

DV Recording

Recording Video Signals:	[59.94 Hz*1 mode of AG-AC160A and AG-AC130AP] 480/59.94i*1, 480/29.97p*1, 480/23.98p*1 [50 Hz mode of AG-AC160A and AG-AC130AEJ/AEN] 576/50i, 576/25p
Audio Recording Signal:	48 kHz/16 bit, linear PCM (digital 2 ch),

Video Output

SDI OUT:	[AG-AC160A] BNC × 1, 0.8 V [p-p], 75 Ω, HD (AVCHD mode only) /SD switchable
HDMI OUT (AVCHD mode only):	HDMI Type A, VIERA Link not supported
VIDEO OUT:	Pin jack, 1.0 V [p-p], 75 Ω

Audio Input/Output

Built-in Microphone:	Stereo microphone
XLR Input:	XLR (3-pin) × 2 (INPUT1, INPUT2), LINE/MIC/48 V switchable, high impedance LINE: 0 dBu, MIC: -40/-50/-60 dBu (menu)
Audio Output:	[AG-AC160A] Pin jack × 2 (CH1, CH2), 600 Ω, 316 mV
SDI Output:	2 ch (linear PCM)
HDMI Output (AVCHD mode only):	2 ch (linear PCM), 5.1 ch (Dolby Digital)
Headphones:	3.5 mm diameter, stereo mini jack × 1
Speaker:	20 mm (round) × 1

Other Connectors

Camera Remote:	2.5 mm diameter, super mini jack × 1 (ZOOM S/S) 3.5 mm diameter, mini jack × 1 (FOCUS/IRIS)
INDEX Remote:	2.5 mm diameter, super mini jack × 1
TC PRESET IN/OUT:	VIDEO OUT terminal dual-purpose IN: 1.0 V to 4.0 V [p-p], 10 kΩ OUT: 2.0 V±0.5 V [p-p], low impedance
USB:	Type mini B connector (USB2.0 compliant)
DV OUT (DV mode only):	6 pin (IEEE1394 compliant), digital output only

Monitor

LCD Monitor:	87.63 mm (3.45 inches) LCD color monitor (Approx. 921,000 dots) (16:9)
Viewfinder:	11.43 mm (0.45 inches) LCD color monitor (Approx. 1,226,000 dots) (16:9)

Standard Accessories

AC adaptor*2, Battery charger*2 AC cord, DC cord, 5800/5400 (typ./min.) mAh battery pack, Wireless remote controller with button-type battery, Microphone holder, Eye cup, Shoulder strap, CD-ROM	
*1: The frame rates in the setup menu are 60p, 60i, 30p, and 24p.	
*2: Only AG-AC160AEJ and AG-AC130AEJ include AC adaptor and Battery charger separately.	
The AC adaptor of AG-AC160AP/ EN/AN and AG-AC130AP/ EN has both AC adaptor and Battery charger functions.	
*3: Native recording mode.	
Weight and dimensions are approximate. Specifications are subject to change without notice.	

AG-AF100A series Specifications

General

Power Supply:	DC 7.2 V (when the battery is used) DC 7.3 V (when the AC adaptor is used)
Power Consumption:	12.4 W (when recording)
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (no condensation)
Weight:	Approx. 1.3 kg (Approx. 2.9 lb) (Excluding the handle, grip, battery and accessories)
Dimensions (W × H × D):	163.4 mm × 195 mm × 290.4 mm (6-7/16 inches × 7-11/16 inches × 11-7/16 inches) (Including the handle and grip)

Camera

Pickup Device:	4/3 MOS fixed pickup device, single panel (primary color filter)
Picture Elements:	Effective picture elements: Approx. 12,400,000 pixels Single panel (16:9)
Image Size:	Valid image range: Approx. 17.8 mm (H) × Approx. 10.0 mm (V)
Lens:	Not included
Lens Mount:	Micro Four Thirds system Lens mount
ND Filter:	Clear, 1/4, 1/16, 1/64
Gain Settings:	[VIDEO CAM mode] -6 dB to 18 dB (3 dB step) [FILM CAM mode] ISO200 to ISO3200
Color Temperature settings:	ATW, ATW LOCK, preset 3 200 K, preset 5 600 K, preset VAR, Ach, Bch
Shutter Speed: (Preset)	[59.94 Hz] 60i/60p: 1/60 sec., 1/100 sec., 1/120 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. 30p: 1/30 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. 24p: 1/24 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. [50 Hz] 50i/50p: 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec. 25p: 1/25 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec., 1/500 sec., 1/1000 sec., 1/2000 sec.
Shutter Speed: (Syncro Scan)	[VIDEO CAM mode/ 59.94 Hz] 60i/60p: 1/60.0 sec. to 1/250.6 sec. 30p: 1/30.0 sec. to 1/250.6 sec. 24p: 1/24.0 sec. to 1/250.6 sec. [VIDEO CAM mode/ 50 Hz] 50i/50p: 1/50.0 sec. to 1/250.0 sec. 25p: 1/25.0 sec. to 1/250.0 sec. [FILM CAM mode] 10.0 d to 180.0 d to 360.0 d (0.5 d step)
Shutter Speed: (Slow)	[59.94 Hz] 60i/60p: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec., 1/30 sec.
VIDEO CAM mode only	30p: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec. 24p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec. [50 Hz] 50i/50p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec., 1/25 sec. 25p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec.
Normal Sensitivity:	F8.0 normal (2 000 lx, 3 200 K, 89.9 % reflex, 1080 59.94i)
Horizontal Resolution:	800 TV lines (at center standard)

Video/Recording/Playback

Recording Format:	AVCHD ver.2.0 (MPEG-4 AVC/H.264/AVCHD Progressive)
Recording Media*:	SD Memory Card: Up to 512MB, 1 GB, 2 GB (FAT12, FAT16) SDHC Memory Card: 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 32 GB (FAT32) SDXC Memory Card : 48 GB, 64 GB (exFAT) *However, above Class4 is supported in PH and HA modes, and above Class6 is supported at VFR recording and in PS mode.
Recording Format:	[59.94 Hz] PS mode: 1080/59.94p, PH mode: 1080/59.94i, 1080/29.97p, 1080/23.98p, 720/59.94p, 720/29.97p, 720/23.98p HA/HE mode: 1080/59.94i [50 Hz] PS mode: 1080/50p, PH mode: 1080/50i, 1080/25p, 720/50p, 720/25p, HA/HE mode: 1080/50i

Transmission Rate:	PS mode: Approx. 25 Mbps (VBR) PH mode: Approx. 21 Mbps (VBR) HA mode: Approx. 17 Mbps (VBR) HE mode: Approx. 6 Mbps (VBR)
Recording Time:	Approx. 12 hours (PH mode 1 920 × 1 080 or 1 280 × 720 with two 64GB SDXC memory cards)
Interval Recording:	Off/1 sec./10 sec./30 sec./1 min./2 min. * Recording mode is fixed to PH 1080/24p (59.94 Hz) and PH 1080/25p (50 Hz) and the maximum shooting time is 24 hours.
VFR Recording:	[1080/24p, 30p] 12/15/18/20/21/22/24/25/26/ 27/28/30/32/34/36/40/44/48/54/60 frame/sec. [1080/25p] 12/15/18/20/21/22/23/24/25/26/ 27/28/30/32/34/37/42/45/48/50 frame/sec.

Video Output

SDI (HD/SD):	BNC × 1, 0.8 V [p-p], 75 Ω [59.94 Hz] 1080/60i, 1080/24PsF, 720/60p, 480/60i [50 Hz] 1080/50i, 720/50p, 576/50i
HDMI:	HDMI × 1, (HDMI TypeA terminal), VIERA Link not supported [59.94 Hz] 1080/60p, 1080/60i, 720/60p, 480/60p [50 Hz] 1080/50p, 1080/50i, 720/50p, 576/50p
VIDEO:	RCA pin jack, 1.0 V [p-p], 75 Ω [59.94 Hz] 480/60i [50 Hz] 576/50i

Audio recording playback

Recording Format:	PS/PH mode: Dolby Digital/2 ch, linear PCM digital/2 ch switch HA/HE mode: Dolby Digital/2 ch
Sampling Frequency:	48 kHz
Encoding:	16 bit
Compressed Bit Rate:	Dolby Digital: PS/PH mode: 384 kbps, HA/HE mode: 256 kbps

Audio Input/Output

Built-in Microphone:	Stereo microphone
XLR Input:	XLR (3 pin) × 2 (INPUT 1, INPUT 2), LINE/MIC selectable, high impedance LINE: 0 dBu, MIC: -50 dBu/-60 dBu (menu selectable)
AUDIO Output:	RCA pin jack × 2 (CH1, CH2), 316 mV, 600 Ω
SDI Output:	2 ch (linear PCM)
HDMI Output:	2 ch (linear PCM), 5.1 ch (Dolby Digital)
Headphones:	3.5 mm diameter, stereo mini jack × 1
Speaker:	20 mm (round) × 1

Other Connectors

Camera Remote:	Super mini jack (2.5 mm diameter) (S/S) Mini jack (3.5 mm diameter) (FOCUS, IRIS)
INDEX Remote:	Super mini jack (2.5 mm diameter)
TC PRESET IN/OUT :	IN: 1.0 V to 4.0 V [p-p], 10 kΩ (also used for VIDEO OUT)
OUT:	OUT: 2.0 V ±0.5 V [p-p], low impedance
USB:	Card reader function (no copyright protection support) Type mini B connector (compliant with USB ver. 2.0)

Monitor

LCD Monitor:	87.63 mm (3.45 inches) wide LCD color monitor (Approx. 920,000 dots)
Viewfinder:	11.43 mm (0.45 inches) wide LCD color monitor (Approx. 1,226,000 dots equivalent)

Standard Accessories

Battery, AC adaptor/Battery charger, AC power supply cable/DC cable,
Wireless remote control and battery, Eye cup, Microphone holder,
Microphone holder screws, Microphone holder adaptor, Cable clamber.
Screws for cable clamber, Manuals, CD-ROM

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

AG-AC90 Specifications

General

Supply Voltage:	DC 7.2 V (when the battery is used) DC 12 V (when the AC adaptor is used)
Power Consumption:	12.9 W
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (no condensation)
Weight:	Approx. 1.50 kg (Approx. 3.3 lb/main unit only) Approx. 1.78 kg (Approx. 3.9 lb/with battery and an SD card)
Dimensions (W × H × D):	160 mm × 195 mm × 350 mm (6-5/16 inches × 7-11/16 inches × 13-1/16 inches) (Excluding protruding parts)

Camera

Pickup Devices:	1/4.7 type 3MOS image sensor Effective pixels: Approx. 8 040 K (Approx. 2 680 K × 3)
Lens:	Auto Iris optical zoom (Full range AF) F value (focal length): F1.5 to F2.8 (Focal length; 2.84 mm to 34.1 mm) 35 mm equivalent: Motion picture/Still picture; 29.8 mm to 383.7 mm (16:9) Minimum focus distance: Approx. 3.5 cm (1.4 inches) (Wide) Approx. 1.2 m (3.9 feet) (Tele)
Filter Diameter:	49 mm
Zoom:	12x optical zoom, 25x iA zoom, 2x/5x/10x digital zoom
Shutter Speed:	[59.94 Hz]
(at motion picture recording, manual mode)	60i/60p/30p: 1/30 sec. to 1/2000 sec. (auto slow shutter ON) 1/60 sec. to 1/2000 sec. (auto slow shutter OFF) 24p: 1/24 sec. to 1/2000 sec. (auto slow shutter ON) 1/50 sec. to 1/2000 sec. (auto slow shutter OFF) [50 Hz] 50i/50p/25p: 1/25 sec. to 1/2000 sec. (auto slow shutter ON) 1/50 sec. to 1/2000 sec. (auto slow shutter OFF)
Image Stabilizer Function:	Optical (hybrid optical image stabilizer, active mode)
Minimum Illumination:	Approx. 3 lx (iA mode, auto slow shutter ON)

Memory Card Recorder

Recording Format:	AVCHD version 2.0 compliant, AVCHD Progressive
Motion Picture Compression:	MPEG-4 AVC/H.264
Audio Compression:	Dolby Digital (5.1 ch/2 ch)
Recording Mode:	*Please see the table below.
Still Picture Recording Format:	JPEG corresponding (Design rule for Camera File system, based on Exif 2.2 standard)
Recording Media:	SD Memory Card, SDHC Memory Card, SDXC Memory Card

Video Output

AV Multi Output:	Component video output level: Y: 1.0 V [p-p], 75Ω Pb: 0.7 V [p-p], 75Ω Pr: 0.7 V [p-p], 75Ω AV video output level: 1.0 V [p-p], 75Ω
HDMI Output:	1080p/1080i/480p

Audio Input/Output

LINE:	2 ch (AV Multi terminal)
XLR Input:	XLR (3 pin) × 2 (INPUT1/INPUT2), LINE: 0 dBu MIC: -50/-60 dBu (switch with the menu)
HDMI Output:	Dolby Digital /Linear PCM
Headphones:	3.5 mm stereo mini jack
Microphone:	5.1 ch surround microphone (with zoom /focus microphone function) /stereo microphone

Other Connectors

USB:	Reader function (No copyright protection support) Hi-Speed USB (USB 2.0), USB terminal Type Mini B
Camera Remote:	2.5 mm diameter, super mini jack × 1 (ZOOM, REC S/S) 3.5 mm diameter, mini jack × 1 (FOCUS, IRIS)

Monitor

LCD Monitor:	88.9 mm (3.5 inches) wide LCD monitor (Approx. 1 152 K dots)
Viewfinder:	6.1 mm (0.24 inches) wide EVF (Approx. 263 K dots)

Standard Accessories

Battery pack, Battery charger, AC adaptor, AC cable (× 2), Eye cup, Remote control (Battery built-in), CD-ROM (Operating Instructions), USB cable, AV multi cable, Lens cap, Shoulder strap, Microphone holder, INPUT terminal cap (2 caps), Microphone holder adaptor, Microphone holder screws

Weight and dimensions are approximate.
Specifications are subject to change without notice.

Recording Mode	Bit Rate	Image Size (H × V)	Recording Format	Max. Recording Time
PS Mode	Approx. 25 Mbps (Average) /Max. 28 Mbps	1920 × 1080	[59.94 Hz] 1080/59.94p [50 Hz] 1080/50p	Approx. 10 hour 40 minutes
PH Mode	Approx. 21 Mbps (Average) /Max. 24 Mbps	1920 × 1080	[59.94 Hz] 1080/59.94i [50 Hz] 1080/50i	Approx. 12 hours*
			[59.94 Hz] 1080/29.97p	
			[59.94 Hz] 1080/23.98p [50 Hz] 1080/25p	
HA Mode	Approx. 17 Mbps (Average)	1920 × 1080	[59.94 Hz] 1080/59.94i [50 Hz] 1080/50i	Approx. 16 hours*
HE Mode	Approx. 6 Mbps (Average)	1440 × 1080	[59.94 Hz] 1080/59.94i [50 Hz] 1080/50i	Approx. 48 hours*
SA Mode	Approx. 9 Mbps (Average)	720 × 480 (NTSC)	[59.94 Hz] 480/59.94i	Approx. 33 hours*
		720 × 576 (PAL)	[50 Hz] 576/50i	

*When two 64 GB SDXC memory cards are used. The maximum continuous recording time is 6 hours regardless of the recording mode.

AG-HMC80 series Specifications

General

Power Supply:	DC7.2 V (when the battery is used), 7.3 V (when the AC adaptor is used)
Power Consumption:	11 W
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (no condensation)
Weight:	Approx. 3.2 kg (Approx. 7.06 lb) camera recorder only Approx. 3.3 kg (Approx. 7.28 lb) including SD Memory Cards, supplied battery
Dimensions (W × H × D):	267 mm × 233 mm × 458 mm (10-1/2 inches × 9-3/16 inches × 18-5/16 inches) (Excluding the projection part)

Camera

Pickup Devices:	3MOS (1/4.1 type progressive modes supported)
Effective Pixels:	Total: Approx. 3.05 megapixels × 3 Effective (video): Approx. 2.51 megapixels × 3 (16:9) Effective (still image): Approx. 2.32 megapixels × 3 (4:3), Approx. 2.65 megapixels × 3 (3:2), Approx. 2.51 megapixels × 3 (16:9)
Lens:	Lens with optical image stabilizer, motorized/manual mode switching, 12× zoom, F1.8 to F2.8 (f=4.0 mm to 48 mm) 35 mm equivalent (video): 40.8 mm to 490 mm (16:9) 35 mm equivalent (still image): 41.3 mm to 496 mm (3:2), 40.8 mm to 490 mm (16:9), 45.0 mm to 540 mm (4:3)
Filter Diameter:	43 mm
Optical Color Separation:	Prism system
ND Filter:	Automatic On/Off interlock with Iris
Minimum shooting distance:	Approx. 0.9 m (Approx. 35.43 inches)
Gain Selection:	<Motion Image> 0 dB to 24 dB (Variable in 1 dB step; USER button allocation; up to 34 dB using the High Gain setting) <Still Image> 0 dB to 18 dB (Variable in 1 dB step)
White balance:	ATW, ATW LOCK, preset 3 200 K, preset 5 600 K, Ach or Bch
Shutter Speed: (Preset)	[59.94 Hz] <Motion Image> 60i/60p: 1/60 sec. to 1/2000 sec. (7 steps) 30p: 1/30 sec. to 1/2000 sec. (8 steps) 24p: 1/24 sec. to 1/2000 sec. (8 steps) <Still Image> 1/2 sec. to 1/2000 sec. (16 steps) [50 Hz] <Motion Image> 50i/50p: 1/50 sec. to 1/2000 sec. (7 steps) 25p: 1/25 sec. to 1/2000 sec. (8 steps) <Still Image> 1/2 sec. to 1/2000 sec. (16 steps)
Shutter Speed: (Synchro Scan)	[59.94 Hz] 60i/60p: 1/60.0 sec. to 1/250.0 sec. 30p: 1/30.0 sec. to 1/250.0 sec. 24p: 1/24.0 sec. to 1/250.0 sec. [50 Hz] 50i/50p: 1/50.0 sec. to 1/250.0 sec. 25p: 1/25.0 sec. to 1/250.0 sec.
Shutter Speed: (Slow)	[59.94 Hz] 60i/60p: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec., 1/30 sec. 30p: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec. 24p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec. [50 Hz] 50i/50p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec., 1/25 sec. 25p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec.
Minimum Luminance:	Approx. 1 lx (Gain: 34 dB, Slow Shutter: 1/2 sec.)
Digital Zoom:	2x/5x/10x (Assigned to the USER button, for switching levels) (When set to 59.94 Hz: 1080/60i, 720/60p, 480/60i only; when set to 50 Hz: 1080/50i, 720/50p, 576/50i only)

Video Recording (AVCHD mode)

Recording Format:	AVCHD
Compression Method:	MPEG-4 AVC/H.264
Recording Media ¹ :	SD Memory Card : 512 MB, 1 GB, 2 GB (FAT12, FAT16) SDHC Memory Card : 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 32 GB (FAT32)
Recording Video Format:	[59.94 Hz] PH mode: 1080/60i, 1080/30p(over 60i), 1080/24p(native) 720/60p, 720/30p(over 60p) and 720/24p(native) HA, HG and HE mode: 1080/60i only [50 Hz] PH mode: 1080/50i, 1080/25p(over 50i), 720/50p, 720/25p(over 50p) HA, HG and HE mode: 1080/50i only
Transmission Rate:	PH mode: Approx. 21 Mbps (VBR), HA mode: Approx. 17 Mbps (VBR), HG mode: Approx. 13 Mbps (VBR), HE mode: Approx. 6 Mbps (VBR)
Recording Time:	Approx. 180 minutes (In PH mode with 1 920 × 1 080 pixels and using a 32 GB SDHC Memory Card)
Interval REC ² :	1 sec. / 10 sec. / 30 sec. / 1 min. / 2 min. / OFF
SD Memory Card:	Max. recordable clips per card: 900 (after formatting, without removing/inserting the card) Max. playable clips: 1 000 (up to 1 000 clips displayed)
Thumbnail View:	9 frames/page
Editing Functions:	Delete, write-protect
Formatting Function:	Yes

Video Recording (DV mode)

Recording Format:	DV
File Format:	AVI Type2
Recording Media ³ :	SD Memory Card: 512 MB, 1 GB, 2 GB (FAT12, FAT16) SDHC Memory Card: 4 GB, 8 GB, 16 GB, 32 GB (FAT32)
Recording Video Format:	480/60i, 480/30p (over 60i), 480/24p (over 60i)
Recording Time ³ :	Approx. 128 minutes (In DV mode, using a 32 GB SDHC Memory Card)
Interval REC ⁴ :	1sec. / 10sec. / 30sec. / 1min. / 2min. / OFF
SD Memory Card:	Max. recordable clips per card: 999 (after formatting, without removing/inserting the card) Max. playable clips: 999 (up to 999 clips displayed)
Thumbnail View:	12 frames/page
Editing Functions:	Delete
Formatting Function:	Yes

Still Picture⁵

Compression Method:	JPEG (DCF/Exif 2.2 standard), DPOF
Recording Media:	SD Memory Card: 8 MB, 16 MB, 32 MB, 64 MB, 128 MB, 512 MB, 1 GB, 2 GB (FAT12, FAT16) SDHC Memory Card: 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 32 GB (FAT32)
Recording Pixels:	[4:3] 9 megapixels / 8 megapixels / 5 megapixels / 0.3 megapixels [3:2] 10.6 megapixels / 7 megapixels / 4.5 megapixels [16:9] 10 megapixels / 6 megapixels / 3.5 megapixels
Quality:	Fine/Normal
Flach Function:	No
Number of Recordable	[4:3] 6 030 (9 M 3 520 × 2 640 pixels) ⁷
Still Pictures ⁶ (approx):	[3:2] 5 300 (10.6 M 3 984 × 2 656 pixels) ⁷ [16:9] 5 580 (10 M 4 224 × 2 376 pixels) ⁷

Video System (AVCHD mode)

Video Signals:	[59.94 Hz] 1080/60i, 720/60p [50 Hz] 1080/50i, 720/50p
HDMI Output:	HDMI × 1 (HDMI Type A terminal), [59.94 Hz] 1080/60i, 720/60p, 480/60p [50 Hz] 1080/50i, 720/50p, 576/50p (Not compatible with VIERA Link)
Component Output:	BNC × 3, Y: 1.0 V [p-p], 75 Ω, Pb/Pa: 0.7 V [p-p], 75 Ω
Composite Output ⁸ :	BNC × 1, 1.0 V [p-p], 75 Ω

Video System (DV mode)

Video Signals:	[59.94 Hz] 480/60i [50 Hz] 576/50i
Component Output:	BNC × 3, Y: 1.0 V [p-p], 75 Ω, Pb/Pa: 0.7 V [p-p], 75 Ω, 480/60i
Composite Output ⁸ :	BNC × 1, 1.0 V [p-p], 75 Ω

Audio System (AVCHD mode)

Compression Method:	Recording/Playback: Dolby Digital (2 ch)
Sampling Frequency:	48 kHz
Quantization:	16 bit
Compression Bit-rate:	PH mode: 384 kbps, HA, HG and HE mode: 256 kbps

Audio System (DV mode)

Video Signals:	Recording/Playback: Linear PCM (Digital/2 ch)
Sampling Frequency	48 kHz
Quantization	16 bit

Audio Input/Output

Internal Microphone:	Stereo microphone
XLR Input:	XLR (3 pin) × 2 (ch1, ch2), High impedance LINE/MIC switching LINE: 0 dBu, MIC: -50/-60 dBu (menu switching), MIC 48 V ON/OFF (switching)
Audio Output:	Output: 316 mV, 600 Ω, pin jack × 2 (ch1, ch2)
HDMI Output (AVCHD mode only):	2 ch (Linear PCM), 5.1 ch (Dolby Digital)
Headphone:	Stereo mini jack (3.5 mm diameter) × 1, -16 dBV (with 32 Ω load, Monitor VR max)
Internal Speaker:	20 mm (round) × 1
External Microphone Input:	-70 dBV (Mic sensitivity: -50 dB equivalent, 0 dB=1 V/Pa 1 kHz) Stereo mini jack (3.5 mm diameter) (Not compatible with plug-in power microphone)

Other Connectors

USB (AVCHD mode only):	Card reader function (no copyright protection support), USB Type B connector, USB 2.0-compliant, PictBridge-compatible
CAM REMOTE:	Super mini jack (2.5 mm diameter) (ZOOM, S/S), Mini jack (3.5 mm diameter) (FOCUS, IRIS)
DV (DV mode only):	6 pin (IEEE1394 format compliant), digital input/output

Viewfinder

LCD Monitor:	68.6 mm (2.7 inch), wide LCD color monitor (Approx. 230,000 pixels)
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Standard Accessories

AC adaptor/charger, 2,640 mAh battery pack (secure type), AC cable, DC cable (catch type), Wireless remote controller with button-type battery, Eye cup, Shoulder Strap, Grip belt, Lens hood (inner), CD-ROM, AVCCAM Restorer (Windows PC/Mac)
The following accessories are attached to the unit.
Large-sized lens hood with wide angle of view, Lens hood cap, XLR audio adaptor cap

- ¹1: SDHC/SD Memory Card (8 MB to 32 GB) can be used for storing/reading scene file and user file, and reading metadata. SDXC Memory Cards cannot be used with this product.
²2: Records only in PH mode, 1080/24p. The maximum recording interval is 24 hours.
SDXC Memory Cards cannot be used with this product.
³3: A Class 6 or higher SDHC or SD Memory Card is required for DV recording.
⁴4: Records only 480/60i. The maximum recording interval is 24 hours.
⁵5: Still shot is not available in DV mode.
⁶6: The number of recordable still pictures varies depending on the subject and whether both Fine and Normal mode pictures are included.
⁷7: Fine mode, using a 32 GB SDHC Memory Card.
⁸8: Shares analog component terminal (Y terminal) (SW switching).
Analog component signals and composite signals cannot be output at the same time.
*Weight and dimensions shown are approximate. Specifications are subject to change without notice.

AG-HMR10 Specifications

General

Power Supply:	DC7.2 V (when the battery is used), 7.3 V (when the AC adaptor is used)
Power Consumption:	11.7 W (when the optional AG-HCK10G Camera Head is connected) 6.5 W (in standalone condition)
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (no condensation)
Weight:	Approx. 580 g (Approx. 1.28 lb) (Excluding battery) Approx. 691 g (Approx. 1.52 lb) (Including bundled battery)
Dimensions (W × H × D):	96 mm × 52.6 mm × 133 mm (3-3/4 inches × 2-1/8 inches × 5-1/4 inches) (Excluding the projection)

Video Recording

Recording Format:	AVCHD
Compression Method:	MPEG-4 AVC/H.264
Recording Media*1:	SD Memory Card : 512 MB, 1 GB, 2 GB (FAT12, FAT16) SDHC Memory Card : 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 32 GB (FAT32)
Recording Video Format*2:	[59.94 Hz] PH mode: 1080/60i, 1080/30p*3 (over 60i), 1080/24p*3 (Native)*4, 720/60p, 720/30p*3 (over 60p) and 720/24p*3 (Native)*4, PM mode: 720/60p HA, HG and HE mode: 1080/60i only [50 Hz] PH mode: 1080/50i, 1080/25p*3 (over 50i), 720/50p and 720/25p*3 (over 50p), PM mode: 720/50p, HA, HG and HE mode: 1080/50i only
Transmission Rate:	PH mode: Approx. 21 Mbps (VBR, Max. 24 Mbps) PM mode: Approx. 8 Mbps (VBR) HA mode: Approx. 17 Mbps (VBR), HG mode: Approx. 13 Mbps (VBR) HE mode: Approx. 6 Mbps (VBR)
Recording Time:	Approx. 180 minutes (In PH mode with 1920 × 1080 pixels and using a 32 GB SDHC Memory Card)
SD Memory Card:	Max. recordable clips per card: 900 (after formatting, without removing/inserting the card) Max. playable clips: 1 000 (up to 1 000 clips displayed)
Thumbnail View:	8 frames/page
Editing Functions:	Delete, write-protect
Formatting Function:	Yes

Video System

Video Signals:	[59.94 Hz] 1080/60i, 720/60p [50 Hz] 1080/50i, 720/50p
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Video Input/Output

SDI Input:	HD SDI Input, BNC × 1, 0.8 Vp-p, 75 Ω
SDI Output:	HD SDI/SD-SDI Output, BNC × 1, 0.8 Vp-p, 75 Ω
AG-HCK10G Input:	20 pin dedicated terminal (connection with the AG-HCK10G)
HDMI Output:	HDMI Output × 1 (HDMI Type A terminal), [59.94 Hz] 1080/60i, 720/60p, 480/60p [50 Hz] 1080/50i, 720/50p, 576/50p (Not compatible with VIERA Link)

Audio System

Compression Method:	Recording/Playback: Dolby Digital/2 ch
Sampling Frequency:	48 kHz
Quantization:	16 bit
Compression Bit-rate:	PH mode: 384 kbps, HA, HG and HE mode: 256 kbps

Audio Input/Output

AG-HCK10G Input:	20 pin dedicated terminal (connection with the AG-HCK10G)
External	-70 dBV (Mic sensitivity: -50 dB equivalent, 0 dB=1 V/Pa 1 kHz)
Microphone Input:	Stereo mini jack (3.5 mm diameter) (Not compatible with plug-in power microphone)
HDMI Output:	2 ch (Linear PCM), 5.1 ch (Dolby Digital)
Headphones:	Stereo mini jack (3.5 mm diameter) × 1, 100 Ω -22 dBV (with 32 Ω load)
Built-in Speaker:	20 mm (round) × 1

Other Connectors

Camera Remote:	Super mini jack (2.5 mm diameter) × 1, for zoom and rec start/stop operations
USB:	Type mini B connector (compliant with USB ver. 2.0)

Monitor

LCD Monitor:	88.9 mm (3.5 inches), LCD color monitor (Approx. 210,000 pixels)
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Standard Accessories

AC adaptor/charger, 2,640 mAh/2,500 mAh (typ./min.) battery pack (secure type), AC cable, DC cable (catch type), CD-ROM, AVCCAM Restorer (Windows PC/Mac)

*1: SDHC/SD Memory Card (8 MB to 32 GB) can be used for reading metadata.

*2: When the system frequency has been changed, turn the unit's power off and then back on so that the setting takes effect.

*3: Selectable only when combined with the AG-HCK10G.

*4: In the Native mode, AG-HMR10 record only active frames.

AG-HCK10G Specifications

General

Power Supply:	DC8 V-9 V (Supplied from the AG-HMR10)
Power Consumption:	3.5 W
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (no condensation)
Weight:	Approx. 275 g (Approx. 0.61 lb)
Dimensions (W × H × D):	53.5 mm × 56 mm × 123.8 mm (2-1/8 inches × 2-1/4 inches × 4-7/8 inches) (Excluding the projection part)

CAMERA

Pick-up Device:	3MOS (1/4.1 type progressive modes supported)
Picture Elements:	Effective: Approx. 2.51 megapixels × 3 (16:9)
Lens:	Lens with optical image stabilizer, 12x zoom, F1.8 to F2.8 (f=4.0 mm to 48 mm), 35 mm equivalent: 40.8 mm to 490 mm (16:9)
Filter Diameter:	43 mm
Optical Color Separation:	Prism system
ND Filter:	Auto On/Off by IRIS
Minimum shooting distance:	Approx. 0.9 m (Approx. 35.43 inches)
Gain Selection:	0 dB to 34 dB (Variable in 1 dB steps)
White balance:	ATW, preset 3 200 K, preset 5 600 K, W.set
Shutter Speed (Preset):	[59.94 Hz] 60i/60p: 1/60 sec. to 1/2000 sec. (7 steps) 30p: 1/30 sec. to 1/2000 sec. (8 steps) 24p: 1/24 sec. to 1/2000 sec. (8 steps) [50 Hz] 50i/50p: 1/50 sec. to 1/2000 sec. (7 steps) 25p: 1/25 sec. to 1/2000 sec. (8 steps)
Shutter Speed (Synchro Scan):	[59.94 Hz] 60i/60p: 1/60.0 sec. to 1/250.0 sec. 30p: 1/30.0 sec. to 1/250.0 sec. 24p: 1/24.0 sec. to 1/250.0 sec. [50 Hz] 50i/50p: 1/50.0 sec. to 1/250.0 sec. 25p: 1/25.0 sec. to 1/250.0 sec.

Shutter Speed: (Slow)	[59.94 Hz] 60i/60p: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec., 1/30 sec. 30p: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec. 24p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec. [50 Hz] 50i/50p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec., 1/25 sec. 25p: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec.
Minimum Luminance:	Approx. 1 lx (Gain: 34 dB, Slow Shutter: 1/2 sec.)
Digital Zoom:	2x/5x/10x (When set to 59.94 Hz: 1080/60i, 720/60p only; when set to 50 Hz: 1080/50i, 720/50p only)

Video Recording

Recording Video Format*1:	[59.94 Hz] PH mode: 1080/60i, 1080/30p (over 60i), 1080/24p (native)*2, 720/60p, 720/30p (over 60p) and 720/24p (native)*2 (Recording with the AG-HMR10) PM mode: 720/60p HA, HG and HE mode: 1080/60i only [50 Hz] PH mode: 1080/50i, 1080/25p (over 50i), 720/50p and 720/25p (over 50p) PM mode: 720/50p HA, HG and HE mode: 1080/50i only
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Video Output

AG-HMR10 Output:	20 pin dedicated terminal (connection with the AG-HMR10)
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Audio Input

Internal Microphone:	Stereo microphone
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Standard Accessories

Lens cap (mounted to the AG-HCK10G), Lens hood (mounted to the AG-HCK10G)

*1: When the system frequency has been changed, turn the unit's power off and then back on so that the setting takes effect.

*2: In the Native mode, AG-HMR10 record only active frames.

* Weight and dimensions shown are approximate. Specifications are subject to change without notice.

AG-3DA1 Specifications

General

Power Supply:	DC 7.2 V (when the battery is used) DC 7.9 V (when the AC adaptor is used)
Power Consumption:	17 W (recording)
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (no condensation)
Weight:	Approx. 2.4 kg (Approx. 5.3 lb) (excluding battery)
Dimensions (W × H × D):	158 mm × 187 mm × 474 mm (Excluding the projecting part) (6-1/4 inches × 7-3/8 inches × 18-11/16 inches)

Camera

Pick-up Device:	1/4.1 type MOS solid-state image sensing device × 3 × 2
Picture Elements:	Effective picture elements: Approx. 2,070,000 pixels × 3 (16:9) × 2
Lens:	Motorized 5.6 x zoom, F1.8 (Wide) to F2.4 (Tele) Focal Length (f=4.2 mm to 23.5 mm) (35 mm equivalent: 47.1 mm to 264 mm), 16:9
Optical Color Separation:	Prism system
Optical Axis Interval :	Approx. 60 mm (Approx. 2-23/64 inches)
Minimum Shooting Distance:	Approx. 1.2 m (Approx. 47-1/4 inches) (all zoom range)
Gain Settings:	0 to 24 dB (variable in 1 dB steps)
Color Temperature Settings:	3 200 K/5 600 K preset, Ach, Bch
Shutter Speed: (Preset)	[59.94 Hz] 60i/60p: 1/60 sec., 1/100 sec., 1/120 sec., 1/250 sec. 30p: 1/30 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec. 24p: 1/24 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec. [50 Hz] 50i/50p: 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec. 25p: 1/25 sec., 1/50 sec., 1/60 sec., 1/120 sec., 1/250 sec.
Shutter Speed: (Synchro Scan)	[59.94 Hz] 60i/60p: 1/60.0 sec. to 1/250.0 sec. 30p: 1/30.0 sec. to 1/250.0 sec. 24p: 1/24.0 sec. to 1/250.0 sec. [50 Hz] 50i/50p: 1/50.0 sec. to 1/250.0 sec. 25p: 1/25.0 sec. to 1/250.0 sec.

Recording

Recording Specification:	AVCHD
Compression Method:	MPEG-4 AVC/H.264
Recording Media*1:	SD Memory Card: 512 MB, 1 GB, 2 GB (FAT12 and FAT16) SDHC Memory Card: 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 32 GB (FAT32)
Recording Format:	AVCHD PH mode [59.94 Hz] 1080/60i*2, 1080/30p*2 (over 60i*2) 1080/24p*2 (native*3), 720/60p*2 [50 Hz] 1080/50i, 1080/25p (over 50i), 720/50p
Transmission Rate:	Approx. 21 Mbps (VBR/PH mode)
Recording Time:	Approx. 180 minutes. (rough indication) with a Panasonic SDHC 32 GB Memory Card is used
SD Memory Card slot:	2 slots (for left/right)
SD Memory Card:	Maximum number of clips to be recorded continuously 200 clips (when formatting and recording continues without removing the card) Maximum number of clips to be played back: 200 clips (up to 200 clips can be displayed)
Thumbnail Display:	8 thumbnails/page
Editing Functions:	Delete, Protect

Video Output

HDMI Output:	HDMI type A connector × 1, HDMI (3D) 3D compatible (not compatible with VIERA Link) [59.94 Hz] 1080/60i*2 (Frame Packing) 1080/24p*2 (Frame Packing), 720/60p*2 (Frame Packing) 1080/60i*2, 720/60p*2, 480/60p*2 [50 Hz] 1080/50i (Frame Packing), 720/50p (Frame Packing) 1080/50i, 720/50p, 576/50p
HD SDI Output:	BNC × 2 (HD SDI 1/2 for L/R), 0.8 V [p-p], 75 Ω [59.94 Hz] 1080/60i*2, 1080/24PsF*2, 720/60p*2 [50 Hz] 1080/50i, 720/50p

Audio System

Compression Method:	Recording/playback: Dolby Digital/2
Sampling Frequency:	48 kHz
Quantization:	16 bit
Compressed Bit-Rate:	PH mode: 384 kbps

Audio Input/Output

Internal Microphone:	Stereo Microphone
XLR Input:	XLR 3 pin × 2 (INPUT 1, INPUT 2), High Impedance LINE: 0 dBu, MIC: -50 dBu/-60 dBu (selectable in menu)
HDMI Output:	2 ch (Linear PCM)
Headphones:	Stereo mini jack (3.5 mm diameter) × 1
Built-in Speaker:	20 mm (round) × 1

Other Connectors

Camera Remote:	Super mini jack (2.5 mm diameter) × 1 (ZOOM, REC S/S) Mini jack (3.5 mm diameter) × 1 (FOCUS, IRIS) Super mini jack (2.5 mm diameter) × 1 (CONV.)
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Monitor

LCD monitor:	81.3 mm (3.2 inches), LCD color monitor (Approx. 921,000 dots) (16:9)
Viewfinder:	11.4 mm (0.45 inches), LCD color viewfinder (Approx. 1,226,000 dots)(16:9)

Standard Accessories

Accessories:	AC adaptor with AC power supply cable, Battery (5,400 mAh × 1), Battery charger with AC power supply cable, Microphone holder with adapter and screws, Eye cup, Lens cap, Input terminal cover × 2, Screw spacer, CD-ROM (contents repair software)
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*1: SD/SDHC Memory card (8 MB to 32 GB) can be used for reading metadata. Use an SD/SDHC Memory Card of class 4 or above when recording. The SDXC card cannot be used.

*2: 24p=23.98p, 30p=29.97p, 60p=59.94p and 60i=59.94i

*3: In the Native mode, AG-3DA1 record only active frames.

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.



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* Availability of this extended service program and service content may depend on country/region and model.

* Not all repair work is covered by this extended warranty program.

* AG-HCK10G optional AVCCAM camera-head is out of coverage of this service program.

Please refer to the latest Nonlinear Compatibility Information, AVCHD Support and Download and Service Information, etc. on the Panasonic website.



For US Customers: www.panasonic.com/avccam
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Factories of AVC Networks Company have received ISO14001:2004-the Environmental Management System certification. (Except for 3rd party's peripherals.)