4M

FCB-EW9500H (HDMI)

Full HD

FCB-EV9500M (MIPI)
FCB-EV9500L (LVDS)

STARVIS

Overview

A new color camera block that achieves higher visibility by adopting new lens, image sensor, and ISP by Japanese manufacturer.
Experience 30x enhanced optical zoom in a compact size even with the larger 1/1.8 sensor.
The camera can be used in a wide variety of scenes, including environments with harsh conditions, in particular the new super image stabilizer has greatly improved blur suppression compared to conventional models.
Select from a lineup of 3 models: 4M model (HDMI output) and full HD models (MIPI or LVDS output) in the same sized housing.

Three major features

■ High Resolution

Utilizing a 4M sensor and sharp lens, achieve superior resolution and accurate image representation with the evolved AF/AE/AWB functions even in low light environments.
Combined with enhanced optical zoom achieve a high image quality from the Wide end to the Tele end.

Conventional Model　FCB-EW9500H

■ High Sensitivity

STARVIS

Through introduction of new cell structures and circuit technology, the series efficiently uses light, achieving twice the sensitivity compared to conventional image sensors.
Consequently, clear images can be captured even during the night and in dark environments.

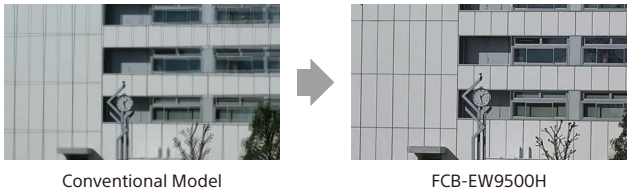
Conventional Model　FCB-EW9500H

■ Super Image Stabilize

Enables capturing of highly precise video with reduced blurring even in harsh environments with strong vibrations by greatly improving blur suppression and image stabilizer.
Equipped with the “Super” and “Super+ (plus)”* modes.

*Available during full HD or HD output

“Super” Mode



Conventional Model　FCB-EW9500H

■ New 30x Enhanced Optical Zoom

30x Enhanced Optical Zoom

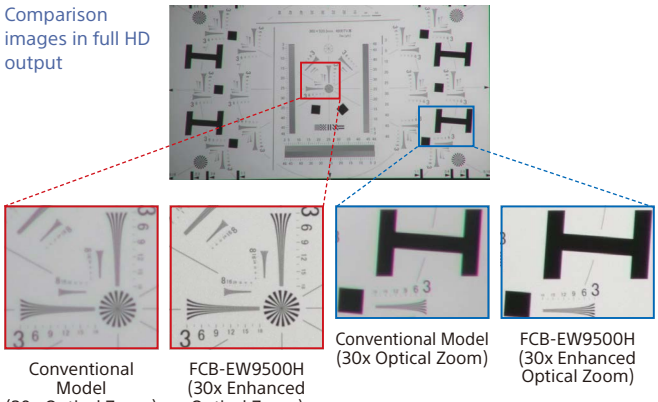
Using a compact lens designed for resolutions up to 8M the camera maximizes the coverage of the 4M sensor. The newly designed lens provides high resolution and low aberration, making it capable of capturing high resolution images that span from the Tele end from the screen center to the surrounding edges.
There is no image deterioration using the 30x enhanced optical zoom. Experience full sharpness and dramatically reduced chromatic aberration in full HD output and also achieve images with sharp resolution during 4M output.

Compared to the 30x optical zoom, the volume ratio is reduced by 45% *, supporting a more compact housing design.

* Our simulation ratio

45% reduction in volume ratio compared to the 30x optical zoom

Comparison images in full HD output



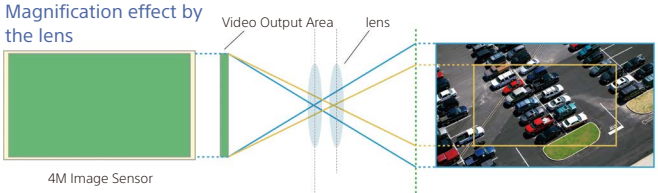
Conventional Model (30x Optical Zoom)

FCB-EW9500H (30x Enhanced Optical Zoom)

Conventional Model (30x Optical Zoom)

FCB-EW9500H (30x Enhanced Optical Zoom)

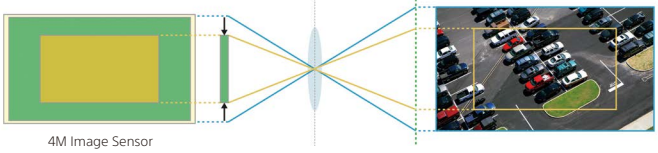
Magnification effect by the lens



Zoom by combining 8M compatible lens and 4M image sensor

The magnifying effect of the zoom lens and the magnifying effect obtained by narrowing the pixels used while making the best use of the effective pixels of the 4M image sensor are combined to obtain the same effect as the optical zoom.

Magnification effect by the image sensor

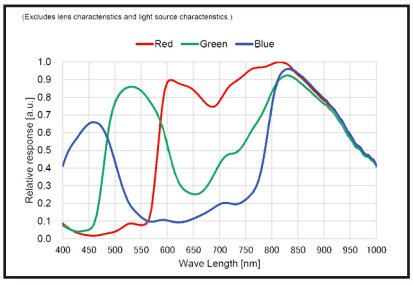


■ Equipped with an approximately 417 million-effective-pixel, 1/1.8-type high sensitive, AR-coated (anti-reflective coating) CMOS sensor

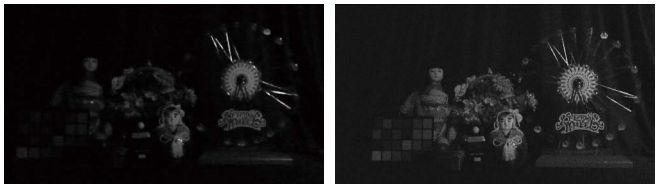
STARVIS

With a high spectral sensitivity value in near infrared to infrared, it is especially effective for security uses. Furthermore, the AR coating minimizes the ghost phenomenon and enables capturing of images without missing crucial information even during the night and in dark environments.

Spectral Sensitivity



Comparison images when 0.03lx Halogen 1/30s ICR: ON HS: OFF



Conventional Model

FCB-EW9500H

Ghost reduction effect

Conventional Model

FCB-EW9500H

■ Super Image Stabilizer

Applying a wide correction area using 4M pixels the camera series suppresses blurs from strong vibrations and rotational vibrations compared to conventional models. There are 2 modes available to select from based on the scale of vibrations.

■ Super

Suppresses strong vibrations with a wider correction area compared to conventional electronic vibration suppressors.

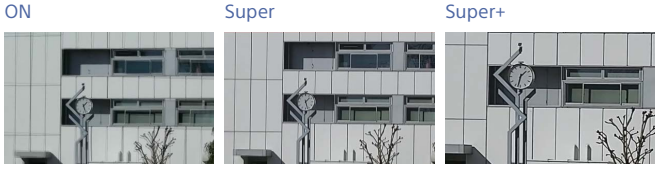
■ Super+

By employing a wider correction area than “Super,” “Super+” suppresses intense vibrations that cannot be suppressed with “Super.”

Potential application:

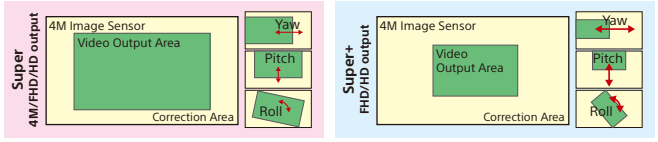
Shipboard, attachments for ITS surveillance, on bridges, drones, vehicles, etc.

ON Super Super+



Conventional Model

FCB-EW9500H



■ Flare reduction with the new iris

Diamond flares and ghosts that occur on lenses disrupts focusing and deteriorates the image quality.
The new lens adopts 7 blades compared to the conventional 2 blades, improving this phenomenon by generating fine circular flares, and thus greatly improving image quality.

7 blades iris

Conventional Model

FCB-EW9500H: 7 blades iris

Fine circular flare

■ Color image acquisition during ICR ON

On conventional models, only black and white images are achieved while the IR cut filter was removed.
The new ICR ON COLOR function enables the camera to capture shots with color even when the IR cut filter is removed.
It is effective for color visibility in dark environments.

* The precision of color reproduction varies depending on the light source and brightness.

Comparison images when 0.03lx Halogen 1/4s ICR:ON COLOR HS:OFF

Conventional Model

FCB-EW9500H

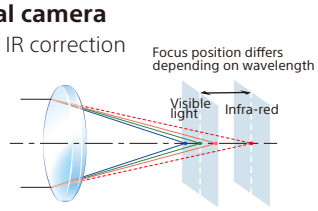
Advanced AF performance

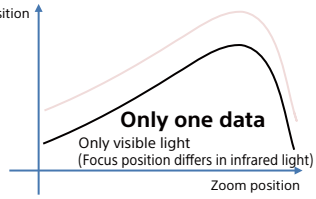
IR Correction

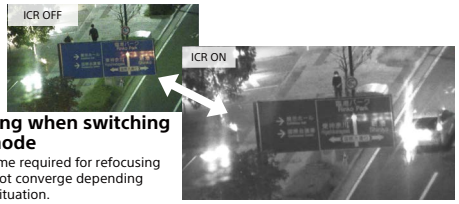
IR Correction minimizes deviation in focus when switching from visible light to infrared light and makes the focusing operation quicker and smoother which makes the camera series more suitable for monitoring applications.

General camera

Without IR correction





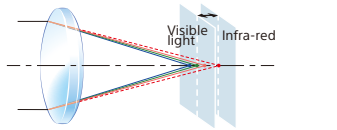


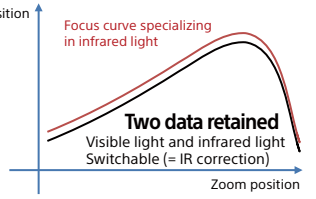
Blurring when switching the mode
Some time required for refocusing
It may not converge depending on the situation.

General camera

FCB-9500 Series

With IR correction





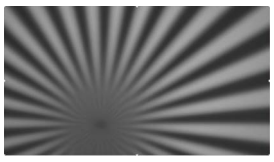
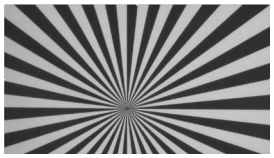
In focus immediately after switching
In focus specializing in visible light and infrared light
Almost in focus even when switching the data
Quicker refocusing operation

FCB-EW9500H

These are the simplified images of the physical phenomena only and do not imply quantitative values.

Sophisticated AF algorithm

Sony's proprietary AF algorithm enables zoom and focus at the same time in difficult conditions.

Difficult conditions	**Dark environments with a mixture of visible light and IR light**	**Environments with locally strong light sources**
Shooting condition Camera Mode	ICR ON Switching wide and tele	ICR OFF Switching wide and tele
General camera Cannot zoom and focus at the same time. Cannot refocus after defocusing.		
FCB-9500 Series Zoom and focus at the same time in difficult conditions Algorithm design minimizes defocusing		

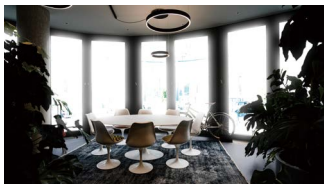
■ Spot Focus · Spot AE · Spot AWB

Enables functioning of AF, AE, and AWB only in specified areas within the screen. Enables independent specification of any rectangle of the entire screen divided in 6 x 8.
For example, if the subject location is specified with Spot AE, enables capturing of images with Exposure effects reduced even if brightness changes occur outside the specified frame.

■ Wide Dynamic Range (Wide-D)

Wide-D mode is a function for dividing an image into several blocks for correcting blocked-up shadows and blown-out highlights in accordance with the intensity difference. It enables image acquisition in which portions ranging from dark to light can be recognized, even when capturing a subject with a large intensity difference that is backlit or includes extremely light regions of interest.

OFF



* image

ON

* image

■ Visibility Enhancer (VE)

Depending on the imaging scene, the Visibility Enhancer function makes the darker part of a camera image brighter, and automatically correct brightness and contrast to show brig parts clearly.

■ Low Focal Plane Distortion Image

The image warp that occurs when capturing rapidly moving subjects are reduced.

■ Defog (low/mid/high)

When the surrounding area of the subject is foggy and low contrast, the defog mode will reduce the effects of the fog and make the subject appear clearer. You can select from four levels: OFF, Low, Middle and High. The effect level can be automatically adjusted according to the fog density.

■ Noise Reduction (NR)

The NR function removes noise (both random and nonrandom) to provide clearer images.

■ Privacy Zone Masking

Privacy Zone masking protects private objects and areas such as house windows, entrances, and exits which are within the camera's range of vision but not subject to surveillance. Privacy zone masking can be masked on the monitor to protect privacy.
• Mask can be displayed on 8 places per screen
• Individual on/off zone masking settings.

■ StableZoom™

"StableZoom" is a function for performing correction using the Image Stabilizer function in accordance with the zoom ratio, and smoothly zooming up to approximately 36× using a combination of the optical zoom and digital zoom.

■ Picture Effect

• E-FLIP • Freeze • Black & White (Monochrome Image)

■ Auto ICR

Auto ICR Mode automatically switches the settings needed for attaching or removing the IR Cut Filter. With a set level of darkness, the IR Cut Filter is automatically disabled (ICR On), and the infrared sensitivity is increased. With a set level of brightness, the IR Cut Filter is automatically enabled (ICR Off). Also, on systems equipped with an IR light, the internal data of the camera is used to make the proper decisions to avoid malfunctions. Auto ICR Mode operates with the AE Full Auto setting. When the Auto ICR Color Mode is set, the color is added.

■ Spot Light Avoidance

Avoid AF /One push AF focus issues when shooting a subject with a bright, spot light source, such as an outdoor light with Spot Light Avoidance.
For example, when shooting outdoors at night with a surveillance camera, the camera may not focus due to the bright light. In that situation, using the Spot Light Avoidance function, reduces the impact of bright lights and you can focus with the AF / One push AF.

Other Functions

* For the setting values, refer to the technical manual.

■ Focus

Equipped with various focus modes.

■ AE (Auto Exposure Mode)

■ White Balance

Equipped with various modes.

■ Motion Detection (MD)

This function instructs the camera to detect movement within the monitoring area and then send an alarm signal automatically.

■ Custom Preset

The camera shooting conditions can be stored and recalled. The settings are recalled when the power is turned on.

■ Position Preset

Using the position preset function, 16 sets of camera shooting conditions can be stored and recalled. This function allows you to achieve the desired status instantly, even without adjusting the various items each time.

■ Title Display

■ Temperature Readout

The camera unit's internal temperature can be read from temperature sensor in stabled in the circuit board. Use it as a reference value.

Pin assignment

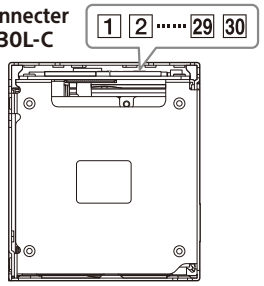
FCB-EW9500H

Pin No.	Name	[I/O]: Note
1	GND	
2	HD_CN	[O]: TMDS Clock -
3	HD_CP	[O]: TMDS Clock +
4	GND	
5	HD_0N	[O]: TMDS Data 0 -
6	HD_0P	[O]: TMDS Data 0 +
7	GND	
8	HD_1N	[O]: TMDS Data 1 -
9	HD_1P	[O]: TMDS Data 1 +
10	GND	
11	HD_2N	[O]: TMDS Data 2 -
12	HD_2P	[O]: TMDS Data 2 +
13	GND	
14	NC	
15	NC	
16	NC	
17	NC	
18	NC	
19	NC	
20	NC	
21	NC	
22	NC	
23	NC	
24	VISCA RXD	[I]: CMOS 3.3[V] (Low: Max1.0[V], High; Min2.3[V]) 5.5V tolerant
25	VISCA TXD	[O]: CMOS 3.3[V] (Low: Max0.1[V], High; Min2.4[V])
26	RESET	[I]: Reset LOW (GND), Unreset: OPEN (High Impedance)
27	DC IN	[I]: 7 to 12[V] DC
28	DC IN	[I]: 7 to 12[V] DC
29	DC IN	[I]: 7 to 12[V] DC
30	DC IN	[I]: 7 to 12[V] DC

Note

The HDMI output during 4M output is 2.0 specification. When directly connecting the HDMI output of the FCB to a monitor or other device, control signal processing is required.

Digital output connecter
KEL Co. USL00-30L-C



FCB-EV9500M

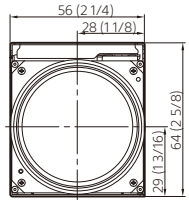
Pin No.	Name	[I/O]: Note
1	GND	
2	NC	
3	NC	
4	GND	
5	NC	
6	NC	
7	GND	
8	NC	
9	NC	
10	GND	
11	NC	
12	NC	
13	GND	
14	CSID3N	[O]: MIPI CSI 3 -
15	CSID3P	[O]: MIPI CSI 3 +
16	CSID2N	[O]: MIPI CSI 2 -
17	CSID2P	[O]: MIPI CSI 2 +
18	CSICN	[O]: MIPI CSI Clock -
19	CSICP	[O]: MIPI CSI Clock +
20	CSID1N	[O]: MIPI CSI 1 -
21	CSID1P	[O]: MIPI CSI 1 +
22	CSID0N	[O]: MIPI CSI 0 -
23	CSID0P	[O]: MIPI CSI 0 +
24	VISCA RXD	[I]: CMOS 3.3[V] (Low: Max1.0[V], High; Min2.3[V]) 5.5V tolerant
25	VISCA TXD	[O]: CMOS 3.3[V] (Low: Max0.1[V], High; Min2.4[V])
26	RESET	[I]: Reset LOW (GND), Unreset: OPEN (High Impedance)
27	DC IN	[I]: 7 to 12[V] DC
28	DC IN	[I]: 7 to 12[V] DC
29	DC IN	[I]: 7 to 12[V] DC
30	DC IN	[I]: 7 to 12[V] DC

FCB-EV9500L

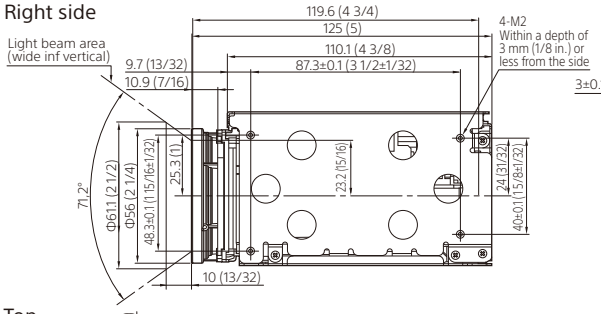
Pin No.	Name	Level
1	TXOUT3+	
2	TXOUT3–	
3	TXCLKOUT+	
4	TXCLKOUT–	
5	TXOUT2+	
6	TXOUT2–	
7	TXOUT1+	
8	TXOUT1–	
9	TXOUT0+	
10	TXOUT0–	
11	GND	
12	TxD	CMOS 3.3 V (Low: Max 0.1 V, High: Min 2.4 V)
13	RxD	CMOS 3.3 V (Low: Max 1.0 V, High: Min 2.3 V), 5.5 V tolerant
14	DC IN	7 to 12 V DC
15	DC IN	7 to 12 V DC
16	DC IN	7 to 12 V DC
17	DC IN	7 to 12 V DC
18	DC IN	7 to 12 V DC
19	GND	
20	GND	
21	TXOUT7+	Single out mode: open
22	TXOUT7–	Single out mode: open
23	TXOUT6+	Single out mode: open
24	TXOUT6–	Single out mode: open
25	NC	
26	RESET	Reset: Low (GND), Reset release: Open (High Impedance)
27	TXOUT5+	Single out mode: open
28	TXOUT5–	Single out mode: open
29	TXOUT4+	Single out mode: open
30	TXOUT4–	Single out mode: open

Dimensions

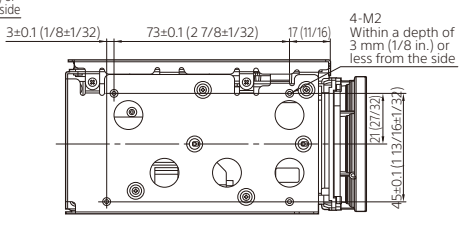
Front



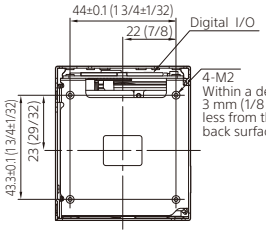
Right side



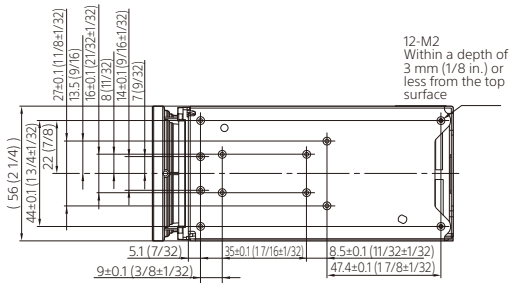
Left side



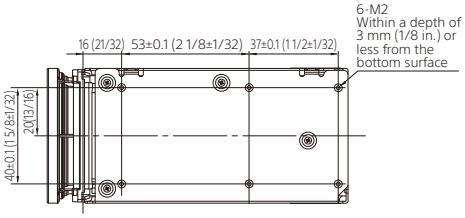
Back



Top



Bottom



単位 : mm

Specifications

	FCB-EW9500H (4M · HDMI)	FCB-EV9500M (Full HD · MIPI)	FCB-EV9500L (Full HD · LVDS)
Basic Specifications			
Image Sensor (Number of effective pixels)	1/1.8-type STARVIS™ CMOS Sensor (Approx. 4.17M pixels)		
Output Image Size (H x V)	2688x1512 *1 2560x1440 *1 1920x1080, 1280x720	1920x1080, 1280x720	
Signal System	2160p/60, 2160p/59.94, 2160p/50, 2160p/30, 2160p/29.97, 2160p/25, 1080p/60, 1080p/59.94, 1080p/50, 1080p/30, 1080p/29.97, 1080p/25, 1080i/60, 1080i/59.94, 1080i/50, 720p/60, 720p/59.94, 720p/50, 720p/30, 720p/29.97, 720p/25	1080p/60, 1080p/59.94, 1080p/50, 1080p/30, 1080p/29.97, 1080p/25, 1080i/60, 1080i/59.94, 1080i/50, 720p/60, 720p/59.94, 720p/50, 720p/30, 720p/29.97, 720p/25	
Minimum Illumination (50%, High Sensitivity Mode ON)	ICR-Off mode: 0.009 lx (Shutter Speed: 1/30 s), 0.0012 lx (Shutter Speed: 1/4 s or 1/3 s) ICR-On mode: 0.00008 lx (Shutter Speed: 1/30 s), 0.000005 lx (Shutter Speed: 1/4 s or 1/3 s, 30%)		
Minimum Illumination (50%, High Sensitivity Mode OFF)	ICR-Off mode: 0.09 lx (Shutter Speed: 1/30 s), 0.012 lx (Shutter Speed: 1/4 s or 1/3 s) ICR-On mode: 0.00063 lx (Shutter Speed: 1/30 s)		
Recommended Illumination	100 lx to 100,000 lx		
Image S/N	50 dB (Weight On)		
Gain	Auto/Manual (0 dB to 50.0 dB), 0 to 28 steps		
Shutter Speed	1/1 to 1/10000 s, 22 steps		
Sync System	Internal		
Exposure Control	0 dB to ± 10.5 dB, 15 steps		
Backlight Compensation	Yes		
Gamma	Standard / Straight gamma		
Aperture Control	16 steps		
White Balance	Auto, ATW, Indoor, Outdoor, One Push WB, Manual WB, Outdoor Auto, Sodium Vapor Lamp (Fix/Auto/Outdoor Auto), Spot AWB		
AE (Auto Exposure Mode)	Full Auto, Manual, Priority mode (shutter/iris), EV compensation, Spot AE, Slow AE		
Zoom	30x Enhanced Optical Zoom 36x StableZoom *2 *3 12x Digital Zoom	30x Enhanced Optical Zoom 36x StableZoom *2 12x Digital Zoom	30x Enhanced Optical Zoom 36x StableZoom *2 12x Digital Zoom
Lens (wide to tele)	f = 6.5 mm to 162.5 mm, F1.6 to 4.8		
Zoom Mode	Standard Mode / Variable Mode / Direct Mode		
Zoom Movement Speed			
Wide end to Tele end	5.3 s (Focus Tracking ON), 2.8 s (Focus Tracking OFF)		
Wide end to Digital 12x tele	6.6 s (29.97p/59.94p), 6.9 s (25p/50p)		
Digital wide to Digital 12x tele	1.4 s (29.97p/59.94p), 1.6 s (25p/50p)		
Focusing System	Auto Focus (Normal AF, Interval AF, Zoom Trigger AF [Sensitivity: normal, low]), Manual (Standard, Variable, Direct), One Push Trigger, Full Scan One Push Trigger, Near Limit, ICR-on Correction, Spot Focus		
Focus Movement Time	∞ to Near: 1.4 s		
Horizontal Viewing Angle	58.1° to 2.3°		
Minimum Object Distance (wide end to tele end)	100 mm to 1200 mm		
Camera Features			
Auto ICR	Yes:ON (B&W/Color)		
Wide Dynamic Range (Wide-D)	Yes		
Visibility Enhancer	Yes		
Defog	Yes (low/mid/high)		
Noise Reduction	Yes (3D + 2D / Independent setting (3D, 2D))		
Progressive Scan Mode	Yes		
Image Stabilization	Yes: Super image stabilizer (Super / Super+ *3)		
Spot Light Avoidance	Yes		
Motion Detection	Yes		
Privacy Zone Masking	Yes		
Alarm	Yes		
Slow AE Response	Yes		
Picture Effects	Black White (Monochrome Image)		
Picture Freeze	Yes		
Electronic-Flip (E-FLIP)	Yes		
Mirror Image	Yes		
Slow Shutter	Yes		
Temperature Readout	Yes		
Title Display	Yes (20 characters / line, max. 11 lines)		
Camera Mode Display	Yes (English)		
Interface			
Video Output	Digital : Y/Pb/Pr 4:2:2 (HDMI) Y:8bit, C:8bit RGB 4:4:4 (HDMI) R:8bit G:8bit B:8bit	Digital : Y/Pb/Pr 4:2:2 (MIPI) Y:8bit, C:8bit RGB 4:4:4 (MIPI) R:8bit G:8bit B:8bit *4	Digital : Y/Pb/Pr 4:2:2 (LVDS) (Y: 8 bit, C: 8 bit, Vsync, Hsync, Field, Clock) (SMPTE274M/SMPTE296M)
Camera Control Interface	VISCA protocol (CMOS 3.3V Level, 5.5V tolerance); Baud Rate : 9.6 kbps, 19.2 kbps, 38.4 kbps, 115.2 kbps, Stop bit: 1 bit		
General			
Power Requirements	7.0 V to 12.0 V DC		
Power Consumption	4.6 W (When motor operates: 6.3 W)	4.7 W (When motor operates: 6.8 W)	5.5 W (When motor operates: 7.8 W)
Operating Temperature	-5 °C to +60 °C (23 °F to +140 °F)		
Storage Temperature	-20 °C to +60 °C (–4 °F to +140 °F)		
Operating Humidity	20% to 80% (Absolute humidity: 36 g/m³)		
Storage Humidity	20% to 95% (Absolute humidity: 36 g/m³)		
Dimensions (W x H x D)	56.0 x 64.0 x 125 mm (2 1/4 × 2 5/8 × 5 in.)		
Mass	Approx. 439 g (15 oz.)		Approx. 456 g (16 oz)

*1 The 2688 x 1512 or 2560 x 1440 image with surrounding black frame is output in 2160p signal system.
*2 StableZoom increases the magnification by combining optical zoom and digital zoom.
*3 FCB-EW9500H: For 1080p, 1080i, and 720p only.
*4 Y/Pb/Pr is not supported for 1080i/60, 1080i/59.94, 1080i/50.