

# Industrial Video Cameras



Machine Vision

Microscope

Teleconferencing

Traffic Management

Medical






Surveillance









Model	CCD Size	Effective pixels	Frame Rate	Output (Interface)	Dimensions	Notes	Page
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**High Resolution Progressive Scan Black and White Cameras**

 KP-F200SCL	1/1.8	UXGA (1628 x 1236)	15 fps	CameraLink	29 x 29 x 29	SDR Connector	3
 KP-F200CL-S1 KP-F200CL KP-F200	1/1.8	UXGA (1628 x 1236)	30 fps	CameraLink	58 x 58 x 48		5
			24 fps	CameraLink			
			24 fps	LVDS/Analog			
 KP-F140F	1/2	SXGA (1392 x 1040)	15 fps	IEEE1394.b	44 x 44 x 54		4
 KP-F120CL KP-F120F KP-F120	2/3	SXGA (1392 x 1040)	30 fps	CameraLink	58 x 58 x 59		6
			15 fps	IEEE1394			
			30 fps	LVDS/Analog			
 KP-F100BCL KP-F100B	2/3	SXGA (1392 x 1040)	15 fps	CameraLink	44 x 44 x 78		7
				LVDS/Analog			





**Progressive Scan Black and White Cameras**

 KP-F80SCL	1/3	XGA (1034 x 779)	36 fps	CameraLink	29 x 29 x 29	SDR Connector	3
			60 fps				
 KP-F30SCL	1/3	VGA (659 x 494)	60 fps	CameraLink	29 x 29 x 29		3
 KP-F83F	1/3	XGA (1034 x 779)	30 fps	IEEE1394.b	44 x 44 x 54		4
			60 fps				
 KP-F30 KP-F33 KP-F37 KP-F38 KP-F80	1/3	VGA (659 x 494)	60 fps	Analog	29 x 29 x 38.5		9
			30 fps				
			70 fps				
			80 fps				
			80 fps				
			30 fps				

**Compact Black and White Cameras**





 KP-M20	1/2	EIA: 380 k (768 x 494)	EIA: 60 field/s	EIA/CCIR	29 x 29 x 38.5		9
	1/3	CCIR: 440 k (752 x 582)	CCIR: 50 field/s				
 KP-M1A KP-M2A KP-M3A	2/3	EIA: 380 k (768 x 494)	EIA: 60 field/s	EIA/CCIR	44 x 29 x 72		8
	1/2	CCIR: 440 k (752 x 582)	CCIR: 50 field/s				
	1/3	CCIR: 440 k (752 x 582)	CCIR: 50 field/s				
 KP-M2R	1/2	EIA: 380 k (768 x 494)	EIA: 60 field/s	EIA/CCIR	44 x 29 x 72	Near infrared	8
		CCIR: 440 k (752 x 582)	CCIR: 50 field/s				
 KP-MB/MC Series	1/2, 1/3	EIA: 380 k (768 x 494)	EIA: 60 field/s	EIA/CCIR		MB: Separate type MC: Side lens type	8
		CCIR: 440 k (752 x 582)	CCIR: 50 field/s				

**3CCD Color Cameras**

 HV-F22CL HV-F22F HV-F31CL HV-F31F	1/2	SXGA (1392 x 1040)	15 fps	CameraLink	65 x 65 x 130	RGB10bit	17-18
	1/2	SXGA (1392 x 1040)	7.5 fps	IEEE1394			
	1/3	XGA (1024 x 768)	30 fps	CameraLink			
	1/3	XGA (1024 x 768)	15 fps	IEEE1394			
 HV-D20	1/3	440 k (752 x 582)	50 field/s	PAL	65 x 65 x 80		19
 HV-D30	1/3	NTSC: 380 k (768 x 494)	NTSC: 60 field/s	NTSC/PAL	65 x 65 x 80		19
		PAL: 440 k (752 x 582)	PAL: 50 field/s				
 HV-D27A HV-D37A	1/2	NTSC: 380 k (768 x 494)	NTSC: 60 field/s	NTSC/PAL	38.5 x 46 x 42	detachable head	20
	1/3	PAL: 440 k (752 x 582)	PAL: 50 field/s				

Model	CCD Size	Effective pixels	Frame Rate	Output (Interface)	Dimensions	Notes	Page
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**Progressive Scan, Interlace Color Cameras**

 KP-FD140F	1/2	SXGA (1392 x 1040)	15fps	IEEE1394.b	44 x 44 x 54		13
		VGA (659 x 494)	60fps				
 KP-FD30/M KP-FD30CL	1/2	VGA (659 x 494)	60fps	Analog CameraLink	58 x 58 x 48	Switchable progressive or Interlace M type: built in frame memory	15-16
 KP-D20A KP-D20B KP-D20BP-S3	1/3	NTSC: 380 k (768 x 494)	NTSC: 60 field/s	NTSC / PAL	44 x 44 x 49	12 pin type, PAL type only	14
	1/2	PAL: 440 k (752 x 582)	PAL: 50 field/s				
	1/2	440 k (752 x 582)	50 field/s				
 KP-D20B-S6	1/2	NTSC: 380 k (768 x 494)	NTSC: 60 field/s	NTSC / PAL	58 x 44 x 49	Right angle type	14
		PAL: 440 k (752 x 582)	PAL: 50 field/s				


**EM-CCD Cameras**

 KP-E500	1/2	320k (658 x 489)	60 field/s	NTSC	78 x 63 x 170	Bkack and White	11
						Color	12

**Box Type Color Cameras**

 HV-D5W	2/3	460k (948 x 485)	60 Field/s	NTSC	98 x 105 x 180	16:9/4:3 switchable	21
 HV-D15AS	1/2	NTSC: 380 k (768 x 494)	NTSC: 60 field/s	NTSC/PAL	80 x 83 x 134	SDI output	21
		PAL: 440 k (752 x 582)	PAL: 50 field/s				
 DK-H31	2/3	2.07 M (1920 x 1080)		HDTV	98 x 105 x 180	HD-SDI output	22

**CCD Camera Module**

 BE-IR/B Series BE-101B-S1/S2 BE-201/211/212/301 Series	10					
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Accessories: Tripod Adaptor, Camera Cable, C/CS Adaptor, Dummy GlassAC Adaptor	22
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Technical Data: IEEE1394 System connection figure, Junction box connection example	24
List for Frame Grabber Board	25
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List of Accessories	27

**Interface Table**

	Resolution	Interface					
		IEEE1394.b	IEEE1394	Mini Camera Link	Camera Link	LVDS/Analog	EIA/CCIR
Black and White Cameras	UXGA (2.01M)			KP-F200SCL (3P)	KP-F200CL-S1 (5P)	KP-F200 (5P)	
	SXGA (1.45M)	KP-F140F (4P)	KP-F120F (6P)		KP-F120CL (6P)/ KP-F100BCL (7P)	KP-F120 (6P)/ KP-F100B (7P)	
	XGA (805k)	KP-F83F (4P)		KP-F80SCL (3P)		KP-F80 (9P)	
Color Cameras	VGA (330k)	KP-F32F (4P)		KP-F30SCL (3P)		KP-F30/33/37/38 (9P)	KP-M20/M30 (9P) M1A/M2A/M3A/M2R/ MB/MC series (8P)
	SXGA (1.45M)	KP-FD140F (13P)	HV-F22F (17P)		HV-F22CL (17P)		
	XGA (805k)		HV-F31F (17P)		HV-F31CL (17P)		
	VGA (330k)	KP-FD32F (13P)			KP-FD30CL (15P)	HV-D20/D30 (19P) HV-D27A/D37A (20P) KP-FD30/M (15P) KP-D20A/D20B/ D20B-S6/D20BP-S3 (14P)	

\*Except EM-CCD series and Box type Cameras



# Mini-CameraLink Ultra-Compact Progressive Scan Black and White CCD Camera

## KP-F200SCL / F80SCL / F30SCL



Miniature 29mm cube progressive scan monochrome cameras made possible by the adoption of a Mini-CameraLink connector.

**KP-F200SCL:** 2.01 million pixels at 15 frames per second

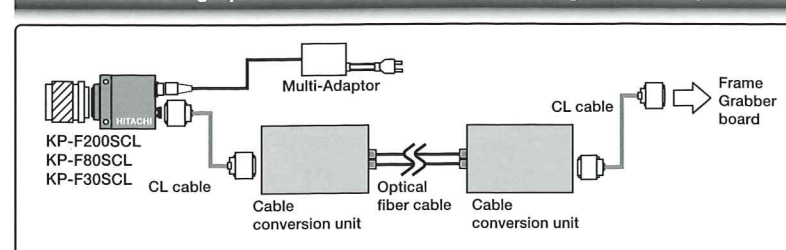
**KP-F80SCL:** 805,000 pixels at 36 frames per second

**KP-F30SCL:** 330,000 pixels at 60 frames per second

### Main Specifications

	KP-F200SCL	KP-F80SCL	KP-F30SCL
<b>Imaging device</b>	1/1.8-inch interline CCD	1/3-inch interline CCD	1/3-inch interline CCD
<b>Total pixels</b>	1688 (H) x 1248 (V)	1077 (H) x 788 (V)	692 (H) x 504 (V)
<b>Effective pixels</b>	1628 (H) x 1236 (V)	1034 (H) x 779 (V)	659 (H) x 494 (V)
<b>Pixel pitch</b>	4.4 μm (H) x 4.4 μm (V) [square lattice]	4.65 μm (H) x 4.65 μm (V) [square lattice]	7.4 μm (H) x 7.4 μm (V) [square lattice]
<b>Imaging area</b>	7.16 mm (H) x 5.44 mm (V)	4.81 mm (H) x 3.62 mm (V)	4.88 mm (H) x 3.66 mm (V)
<b>Scanning system</b>	Non-interlaced		
<b>Aspect ratio</b>	4 : 3		
<b>Frame rate</b>	15frames/second (full pixel readout)	36frames/second (full pixel readout)	60frames/second (full pixel readout)
<b>Scanning frequency</b>	Horizontal: 18.75 kHz Vertical: 15 Hz	Horizontal: 28.346 kHz Vertical: 36 Hz	Horizontal: 31.468 kHz Vertical: 60 Hz
<b>Synchronization</b>	Internal		
<b>Lens mount</b>	C mount		
<b>Flange focal distance</b>	17.526 mm		
<b>Video output</b>	Digital output Camera Link Data : Base configuration 10bit or 8bit x 1 CLK=36.000MHz		
<b>Electronic shutter speed</b>	1/15, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second factory setting is off (1/15 second) or variable shutter (minimum 1/100000 seconds)	1/36, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second factory setting is off (1/36 second) or 1 variable shutter (minimum 1/100000 seconds)	1/60, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second factory setting is off (1/60 second) or variable shutter (minimum 1/100000 seconds)
<b>Gamma compensation</b>	Y=1		
<b>Frame on demand</b>	Remote setting (fixed shutter, and one trigger) Factory setting is all off	Remote setting (fixed shutter, one trigger, and reset control mode) Factory setting is all off	Remote setting (fixed shutter, one trigger, and reset control mode) Factory setting is all off
<b>Power supply voltage</b>	DC12V ±1V		
<b>Current consumption</b>	Approx. 210 mA	Approx. 160 mA	Approx. 160 mA
<b>Ambient</b>	operating: 0 to +40 °C (+32 to ; 104 °F), less than 90 % RH storage: -10 to +50 °C (+14 to +122 °F), less than 70 % RH *If operated continuously, be sure to use at less than +40 °C (104 °F) for long term stable performance.		
<b>Vibration endurance</b>	98 m/s <sup>2</sup> (10 to 60Hz, amplitude: 0.98mm constant / 60 to 200Hz, amplitude: variable) (10 to 150Hz, sweep: 1 min, XYZ, 30 min)		
<b>Shock endurance</b>	686 m/s <sup>2</sup> (Drop test, once each top, bottom, left and right)		
<b>External dimensions</b>	29(W) x 29(H) x 29(D) mm		
<b>Mass</b>	Approx. 53 g		
<b>Remote control</b>			
<b>Signal system</b>	1. Control system: Start-stop synchronization system 2. Transmission rate: 9600 bps 3. Data length: 8 bits 4. Start bit: 1 5. Stop bits: 1 6. Parity: None 7. Bit transfer: LSB first		
<b>Communications</b>	Full control by remote control software, data send/receive by text data transfer to control system camera microprocessor (BSC system handshake)		
<b>Control items</b>	1. Shutter speed 2. FD (frame on demand): ON/OFF 3. Mode: Fixed shutter, One trigger, Reset control mode (except KP-F200SCL) 4. Digital output: 10 bit / 8 bit 5. Gain: 0 to 18 dB 6. HD reset: ON/OFF (factory setting is ON) 7. Partial scan		

### Connection using optical cable transmission for long distance operation



### Main Features

- **Ultra Compact 29 mm cube camera with mini SDR type CameraLink connector**  
The small SDR connector for digital output allows the camera size to be drastically reduced to a 29 mm cube. This reduction in camera size permits use in vision systems where space is at a premium.
- **High resolution and high frame rates**  
**KP-F200SCL** 2.01 million pixels for high resolution (UXGA) at 15 frames per second.  
Designed for high Resolution Inspection.  
**KP-F80SCL** 805,000 pixels for a high frame rate of 36 frames per second at standard resolution (VGA).  
Designed for high speed and high resolution inspection.  
**KP-F30SCL** 330,000 pixels for a high frame rate of 60 frames per second at standard resolution (VGA).  
Designed for high speed inspection.
- **Remote operation by serial control**
  - Selectable 10 or 8 bit per pixel output at the CameraLink connector.
  - Variable Speed Shutter
  - Frame on demand function

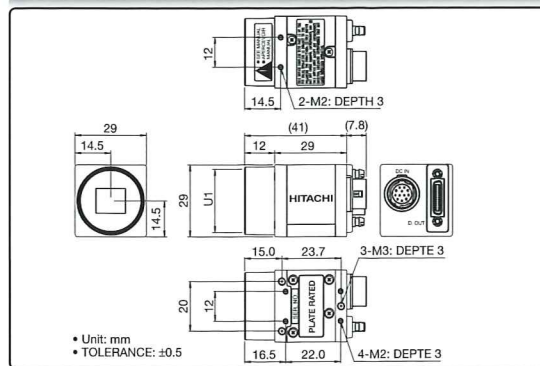
### Standard Composition

- (1) Camera
- (2) Operation instruction

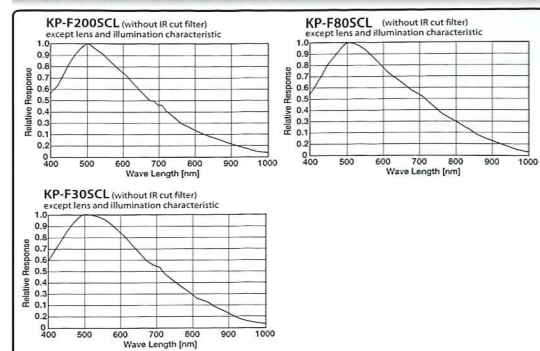
### Optional accessories

- (1) 12 pin plug ..... HR10A-10P-12S(01)
- (2) Multi-adaptor ..... JC-100
- (3) Dummy glass (AR coated) ..... ARC1214
- (4) Camera cable (Molded type) ..... 2 m C-201KSM  
..... 5 m C-501KSM  
..... 10 m C-102KSM
- (5) Tripod adaptor ..... TA-F200S

### Dimensions



### Spectral sensitivity characteristic



# IEEE1394.b Interface Progressive Scan Black and White Cameras

## KP-F140F / F83F / F32F



High speed progressive scan monochrome cameras featuring the IEEE 1394.b interface.

**KP-F140F:** 1.45 million pixels at 15 frames per second

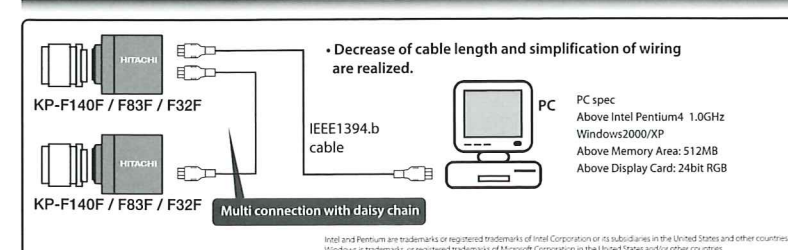
**KP-F83F:** 805,000 pixels at 30 frames per second

**KP-F32F:** 330,000 pixels at 60 frames per second

### Main Specifications

	KP-F140F	KP-F83F	KP-F32F
<b>Imaging device</b>	1/2-inch interline CCD	1/3-inch interline CCD	1/2-inch interline CCD
<b>Total pixels</b>	1434 (H) x 1050 (V)	1079(H) x 789(V)	692(H) x 504(V)
<b>Effective pixels</b>	1392 (H) x 1024 (V)	1034(H) x 779(V)	656(H) x 492(V)
<b>Pixel size</b>	4.65 μm (H) x 4.65 μm (V)	4.65 μm (H) x 4.65 μm (V)	9.9 μm (H) x 9.9 μm (V)
<b>Scanning system</b>	Progressive scan		
<b>Synchronization</b>	Internal / external (auto selection)		
<b>Video signal output</b>	Interface IEEE1394.b (FireWire800) Protocol IEEE1394-based Digital Camera Specification Version 1.31 compliant		
<b>Transfer rate</b>	800 / 400 / 200Mbps		
<b>Image format</b>	MONO8 / MONO16		
<b>Image size</b>	1360(H) x 1024(V) 1280(H) x 960(V) 1024(H) x 768(V) 800(H) x 600(V) 640(H) x 480(V)	1024(H) x 768(V) 800(H) x 600(V) 640(H) x 480(V)	656(H) x 492(V) 640(H) x 480(V)
<b>Frame rate</b>	15fps Mono8, 1360 x 1024	30fps Mono8, 1024 x 768	60fps Mono8, 656 x 492
<b>Standard sensitivity</b>	2000 lx F8	2000 lx F8	2000 lx F5.6
<b>Gain</b>	Auto / Manual (0dB to 18dB)		
<b>Electric shutter</b>	Auto (AES) / Manual (VARIABLE) 1/100,000 second to 10 second		
<b>External trigger shutter</b>	Mode Fixed shutter (Mode0), One trigger (Mode1) Reset control (Mode14), VD Sync (Mode15) Via IEEE1394 cable (Software trigger)		
<b>Input</b>	Our company original method (Hardware trigger)		
<b>Power supply</b>	Approx. 4.1W (DC+12V)	Approx. 3.2W (DC+12V)	Approx. 3.5W (DC+12V)
<b>Gamma</b>	OFF / LUT		
<b>Sharpness</b>	Adjustable		
<b>Brightness</b>	Adjustable		
<b>Time stamp</b>	OFF/ON		
<b>Cycle timer sync</b>	OFF/ON		
<b>Daisy chain</b>	Possible. Even if there is no repeater. If two are connected, the frame rate become half		
<b>Lens mount</b>	C mount (Flange-back adjustment)		
<b>Power supply</b>	DC+8V to +30V (Via IEEE1394 cable)		
<b>Ambient temperature</b>	Operating -10 °C to +50 °C, 30 to 80%RH Note: If operated continuously, be sure to use at 0 °C to +40 °C (104 °F) for long term stable performance. Storage -20 °C to +60 °C / 20 to 90 %RH		
<b>Vibration endurance</b>	68.56m/s <sup>2</sup> (10 to 200 Hz 30 minutes each on XYZ axes) *Please do not add the strong vibration over long time.		
<b>Shock endurance</b>	490.3m/s <sup>2</sup> (vertical, horizontal, once each faze)		
<b>Dimensions</b>	44(W) x 44(H) x 54(D)mm (not including lens)		
<b>Mass</b>	Approx. 130g (not including lens)		

### System Configuration



### Main Features

- **IEEE1394.b Interface**
  - The IEEE1394.b interface allows direct high speed data transfer between the camera and the PC using a small 8 conductor cable.
  - The 800 Mbps transfer speed of the IEEE-1394.b interface permits higher frame rates for high resolution cameras.
  - Multiple cameras can share the IEEE-1394.b bus using a simple daisy chain connection.
- **High resolution and high frame rates**  
**KP-F140F** 1.45 million pixels for high resolution at 15 frames per second.  
Designed for high Resolution Inspection.  
**KP-F83F** 805,000 pixels for a high frame rate of 30 frames per second at standard resolution.  
Designed for high speed and high resolution inspection.  
**KP-F32F** 330,000 pixels for a high frame rate of 60 frames per second at standard resolution.  
Designed for high speed inspection.
- **Various functions**
  - Electronic shutter
  - External sync
  - Trigger
  - Partial scan
  - Daisy chain
  - Remote control

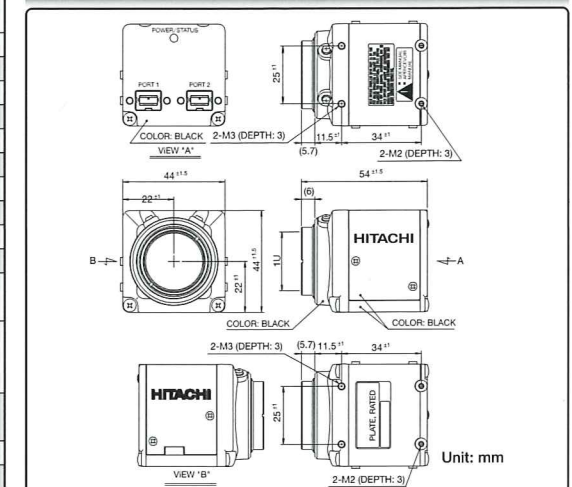
### Standard Composition

- (1) Camera
- (2) CD-ROM (operation manual, driver software)

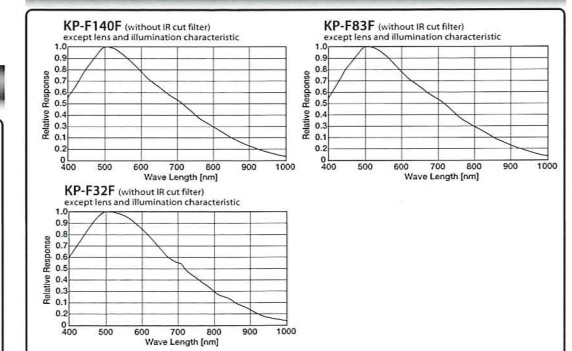
### Optional accessories

- (1) IEEE1394 Cable
- (2) Tripod Adaptor

### Dimensions



### Spectral sensitivity characteristic





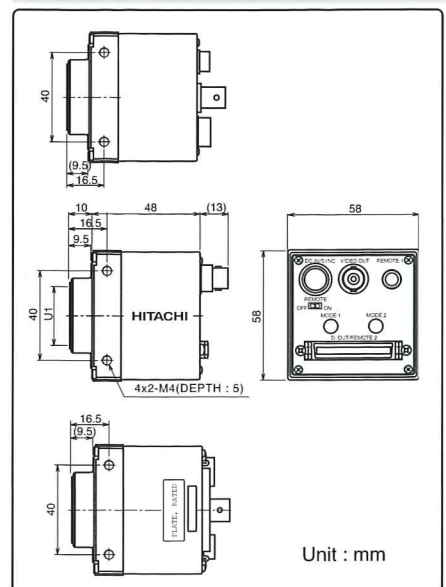
# High-resolution Progressive scan Monochrome CCD Camera

## KP-F200CL / F200CL-S1 / F200



Small, high resolution progressive scan 2.01 million pixel CCD camera with full pixel readout at 24 frames per second.

### Dimensions



### Main Features

- High speed read out:** Full pixel independent readout : 24frames/second (F200CL/F200) 30frames/second (F200CL-S1) Partial Scan: Read out up to over 190 frames/second max
- High resolution:** 1/1.8-inch CCD Effective pixels 1628(H)x1236(V) and square lattice pixels.
- Digital output:** Camera-Link (KP-F200CL/200CL-S1) EIA-644 optionally (KP-F200)
- Full frame shutter:** Higher resolution in the vertical direction is ensured for moving objects.
- Multi step electronic shutter:** 8 steps electronic shutter from 1/24 (1/30:F200CL-S1) second to 1/50000 second.
- Frame on demand:** An external trigger signal input can be used to capture an image at a desired timing for instant view or processing.
- RS-232C control:** Frame on demand, Partial Scan, etc. by RS-232C control or rear panel switch.

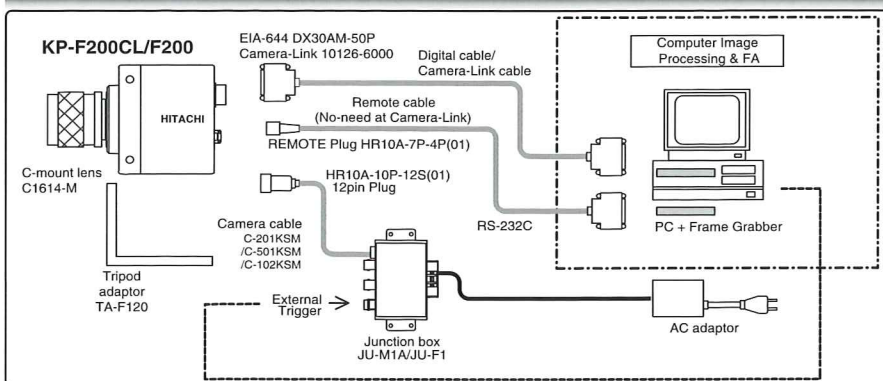
### Standard Composition

- (1) Camera
- (2) Operation instructions

### Optional accessories

- (1) 12 pin plug HR10A-10P-12S(01)
- (2) Junction box JU-M1A/JU-F1
- (3) Dummy glass (AR coated) ARC1214
- (4) Camera cable (Molded type) 2m C-201KSM 5m C-501KSM 10m C-102KSM
- (5) Tripod adaptor TA-F120

### KP-F200CL / F200 System



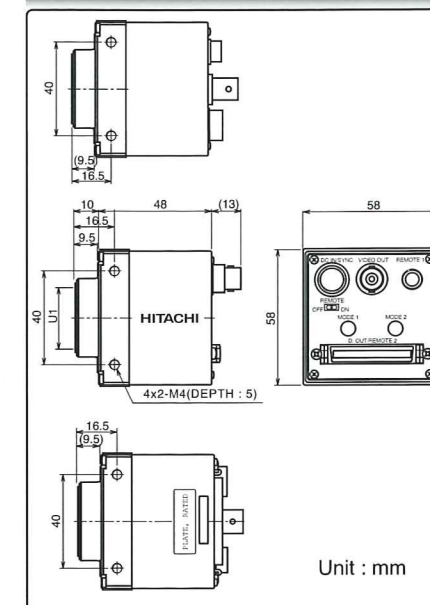
# High-resolution Progressive scan Monochrome CCD Camera

## KP-F120 / F120CL / F120F



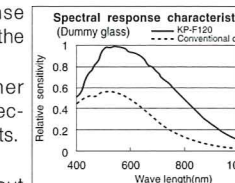
Progressive scan, 30 frame per second and high resolution camera

### Dimensions

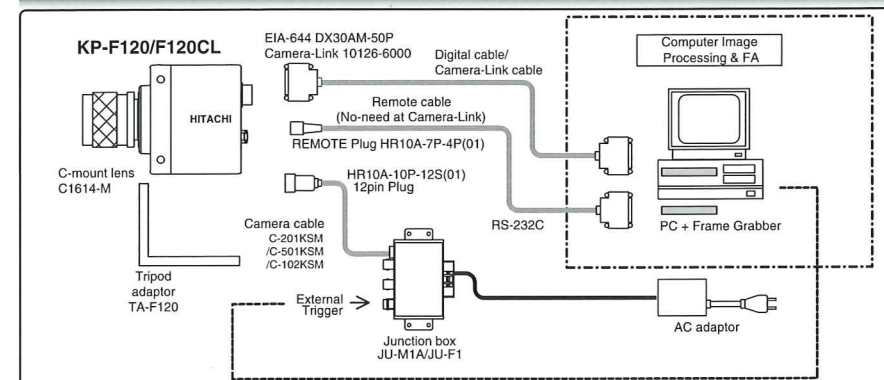


### Main Features

- High speed readout:** Full pixel independent readout: 30 frame/second. (F120F: 15 frame/second) Partial Scan : Read out up to over 190 frames/second max.
- High resolution:** 2/3-inch CCD with 1392(H) X 1040(V) effective square lattice pixels.
- Digital/Analog output:** An EIA-644 digital output is provided. Camera-Link (KP-F120CL), IEEE1394 (KP-F120F)
- Multi-step electronic shutter:** 8 steps electronic shutter from 1/30 to 1/50000 second.
- Near infrared sensitivity :** Extended spectral response allows use of the camera in the near infrared region.
- Full frame shutter:** Higher resolution in the vertical direction is insured for moving objects.
- Frame on demand:** An external trigger signal input can be used to capture an image at a desired timing for instant viewer processing.
- RS-232C Control:** Frame on demand, Partial Scan, Trigger input pulse invert, etc. by RS-232C control or rear panel switch.



### KP-F120 / F120CL System



### Main Specifications

Imaging device	1/1.8-inch interline CCD
Effective pixels	1628(H) x 1236(V)
Pixel pitch	4.4µm(H) x 4.4µm(V) (square lattice)
Imaging area	7.16mm(H) x 5.94mm(V)
Scanning system	Progressive
Aspect ratio	4 : 3
Frame rate	24 f/s (F200/F200CL), 30f/s (F200CL-S1)
Scanning frequency	Horizontal : 30kHz, Vertical : 24Hz
Synchronization	Internal/external (HD/VD) internal : F200CL-S1
Lens mount	C-mount
Flange focal distance	17.526mm
Video output	Digital output : Camera-Link (EIA-644 optionally : KP-F200)
External sync input	HD/VD LVDS level (F200CL), HD/VD TTL level negative (F200)
Electronic shutter	1/50000, 1/10000, 1/2000, 1/1000, 1/250, 1/125, 1/60, 1/24 (1/30: F200CL-S1) second
Gamma correction	Gamma = 1
Frame on demand	External switch setting
Power supply	12 ± 1 VDC
Power Consumption	Approx. 450mA: F200CL/F200 460mA: F200CL-S1
Ambient, operating storage	0 to 40°C (+32 to +104°F), less than 90 % RH -10 to 50°C (+14 to +122°F), less than 70 % RH
Vibration endurance	29.4m/s <sup>2</sup> , 10 to 200 Hz 30 minutes each on XYZ axes
Shock endurance	294 m/s <sup>2</sup> (vertical, horizontal, once each face)
Dimensions	58(W) x 58(H) x 48(D)mm
Mass	Approx. 220g

### Rear Panel Switches

The rear panel includes switches for electronic shutter data, readout rate, and frame on demand on/ off and modes switches.



SW POS	MODE 1	MODE 2		
		(1)	(2)	(3)
0	Normal mode	0	0 dB	1/24 16H
1	Normal shutter mode	1	1 dB	1/60 32H
2	One trigger mode	2	2 dB	1/125 64H
3	Two trigger mode	3	3 dB	1/250 128H
4	Fixed shutter mode	4	4 dB	1/1000 256H
5	Partial scan (Normal mode) (READ POS. : CENTER)	5	5 dB	1/2000 512H
6	Partial scan (Normal mode) (READ POS. : UPPER)	6	6 dB	1/10000 512H
7	Partial scan (One trigger mode) (READ POS. : CENTER)	7	7 dB	1/50000 512H
8	Partial scan (One trigger mode) (READ POS. : UPPER)	8	8 dB	1/50000 512H
9	Normal mode	9	9 dB	1/50000 512H
A	Normal mode	A	10 dB	1/50000 512H
B	Normal mode	B	11 dB	1/50000 512H
C	Normal mode	C	12 dB	1/50000 512H
D	Normal mode	D	13 dB	1/50000 512H
E	Normal mode	E	14 dB	1/50000 512H
F	Normal mode	F	15 dB	1/50000 512H

(1), (2), (3) of MODE 2 can be selected  
(1) : SW POS. of MODE1 : 0, 2, 3, 9 to F (Gain)  
(2) : SW POS. of MODE1 : 1, 4 (Shutter speed)  
(3) : SW POS. of MODE1 : 5 to 8 (Partial scan)

### Main Specifications

Imaging device	2/3-inch interline CCD
Effective pixels	1392(H) x 1040(V)
Pixel pitch	6.45µm(H) x 6.45µm(V) (square lattice)
Imaging area	8.98mm(H) x 6.71mm(V)
Scanning system	Progressive
Aspect ratio	4 : 3
Frame rate	30f/s (F120/F120CL), 15f/s (F120F)
Horizontal Scanning	frequency: 30.07kHz (F120/F120CL), 15.035kHz (F120F)
Synchronization	Internal/external (automatic switching)
Lens mount	C-mount
Flange focal distance	17.526mm
Video output	Digital output or analog output for image checking Digital output (standard) EIA-644
External sync input	HD/VD TTL level negative input impedance: 10 kΩ LVDS level (F120CL)
Electronic shutter	1/50000, 1/10000, 1/2000, 1/1000, 1/250, 1/125, 1/60, 1/30 second
Gamma correction	Gamma = 1
Frame on demand	External switch setting
Standard sensitivity	400 lx F4 3200K
Power supply	12 ± 1 VDC
Current consumption	400mA approx.
Ambient, operating storage	0 to 40°C (+32 to +104°F), less than 90 % RH -10 to 50°C (+14 to +122°F), less than 70 % RH
Vibration endurance	29.4m/s <sup>2</sup> , 10 to 55 Hz 30 minutes each on XYZ axes
Shock endurance	294 m/s <sup>2</sup> (vertical, horizontal, once each face)
Dimensions	58(W) x 58(H) x 48(D)mm
Mass	220g (7.8 oz) approx.

### Rear Panel Switches

The rear panel includes switches for electronic shutter data, readout rate, and frame on demand on/ off and modes switches.



SW POS	MODE 1	MODE2	MODE 2		
			(1)	(2)	(3)
0	Normal mode		0	0 dB	1/30 16H
1	One trigger mode		1	1 dB	1/60 32H
2	Two trigger mode		2	2 dB	1/125 64H
3	Quad speed mode		3	3 dB	1/250 128H
4	Quad speed mode + One trigger mode	(1)	4	4 dB	1/1000 256H
5	Smear reduction mode + one trigger mode		5	5 dB	1/2000 512H
6	Smear reduction mode + two trigger mode		6	6 dB	1/10000 512H
7	Smear reduction mode+ Quad speed mode+ One trigger mode		7	7 dB	1/50000 512H
8	Normal shutter mode		8	8 dB	1/50000 512H
9	Fixed shutter mode	(2)	9	9 dB	1/50000 512H
A	Smear reduction mode fixed shutter mode		A	10 dB	1/50000 512H
B	Partial scan (Normal mode) (READ POS. : CENTER)		B	11 dB	1/50000 512H
C	Partial scan (Normal mode) (READ POS. : UPPER)	(3)	C	12 dB	1/50000 512H
D	Partial scan (Normal mode) (READ POS. : UPPER)		D	13 dB	1/50000 512H
E	Partial scan (Normal mode) (READ POS. : UPPER)		E	14 dB	1/50000 512H
F	Twice speed mode	(1)	F	15 dB	1/50000 512H



# High-resolution Progressive scan Monochrome CCD Camera

## KP-F100B / F100BCL

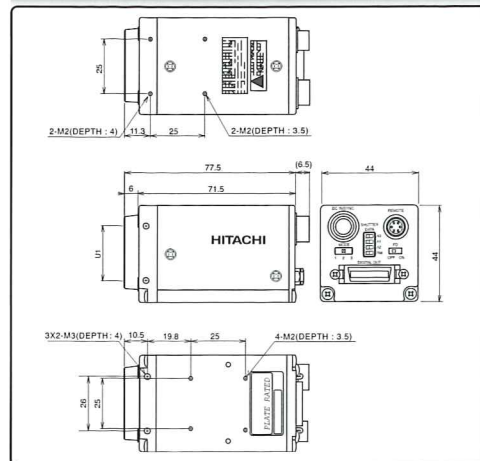


Small size, RS-232C control, Effective picture elements number 1.45 million, Progressive scan with full pixel independent readout

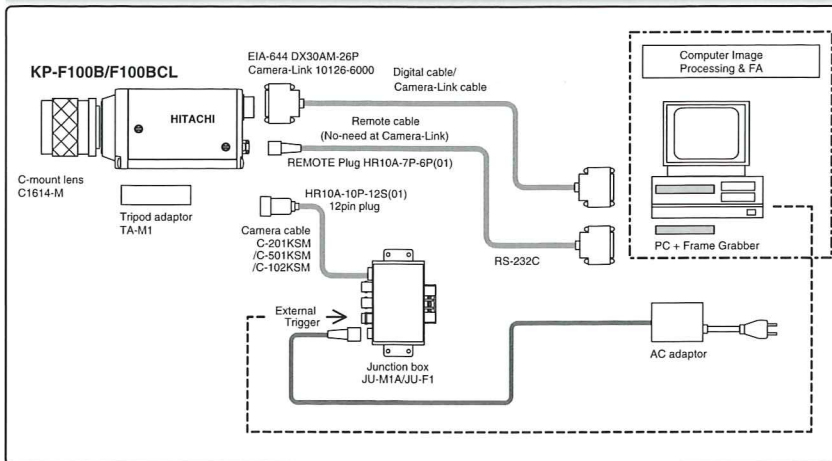
### Main Features

- High resolution:** High grade 2/3-inch CCD with 1392(H)x1040(V) effective square lattice pixels. UV : from 240 nm approx. to 930 nm approx. sensitivity CCD (1/2-inch)
- Digital output and analog output:** An EIA-644 digital output is provided. Camera-Link (KP-F100BCL)
- Frame on demand:** An external trigger signal input can be used to capture an image at a desired timing for instant view or processing. The capture time can be adjusted by the trigger and shutter.
- RS-232C Control:** The self-contained CPU permits using RS-232C control for setting each function, Frame on demand, Trigger input pulse invert, etc. The functions can also be set from rear panel switches.
- Multi step electronic shutter up to 1/50000 second**

### Dimensions



### KP-F100B / F100BCL System



### Main Specifications

Imaging device	2/3-inch interline CCD
Effective pixels	1392(H) x 1040(V)
Pixel pitch	6.45(H)x6.45(V) (square lattice)
Imaging area	8.71(H) x 6.90(V) mm
Scanning system	Progressive
Aspect ratio	4 : 3
Frame rate	15 frames/second (full pixel readout)
(RC-232C change)	30 fps (2V pixels simultaneous readout)
Horizontal Scanning frequency	16 kHz UV : 7.98 kHz
Synchronization	Internal/external (automatic switching)
Lens mount	C-mount
Flange focal distance	17.526mm
Video output	Digital output or analog output for image checking Digital output Camera-Link or EIA-644 single channel
External sync input	HD/VD TTL level negative (F100B), HD/VD LVDS level (F100BCL) Input impedance : 1kΩ, Frequency deviation: ±1%
Electronic shutter	1/50000, 1/10000, /4000, 1/2000, 1/1000, 1/250, 1/125, 1/30 second
Frame on demand	External switch setting off, fixed shutter, two trigger and one trigger
Standard sensitivity	400 lx F4 3200K
Power supply	12 ±1 VDC
Current consumption	320mA approx.
Ambient, operating	0 to 40°C (+32 to +104°F), less than 90 % RH
Storage	-10 to 50°C (+14 to +122°F), less than 70 % RH
Vibration endurance	29.4m/s <sup>2</sup> , 10 to 55 Hz 30 minutes each on XYZ axes
Shock endurance	294 m/s <sup>2</sup> (vertical, horizontal, once each face)
Dimensions	44(W) x 44(H) x 78(D)mm
Mass	180g (6.3 oz) approx.

### Standard Composition

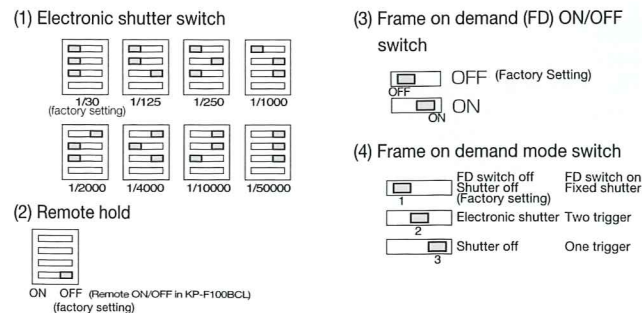
- Camera
- Operating instructions

### Optional accessories

- Tripod adaptor ..... TA-M1
- 6 pin Remote plug ..... HR10A-7P-6P
- 12 pin plug ..... HR10A-10P-12S(01)
- D.OUT connector (26pins) ..... EIA-644 DX30AM-26P  
Camera-Link 0126-6000
- Junction box ..... JU-M1A/JU-F1
- Dummy glass (AR coated) ..... ARC1214
- Camera cable (molded type) ..... 2m C-201KSM  
5m C-501KSM  
10m C-102KSM

### Rear Panel Switches

The rear panel includes switches for electronic shutter data, readout rate, and frame on demand on/off and mode switches.



# Black-and-White CCD Camera

## KP-M1A / M2A / M3A



Black-and-white CCD camera featuring high sensitivity, high resolution and high performance. A variety of functions are provided.

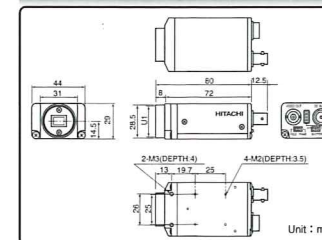
### Standard Composition

- Camera body
- Operation manual

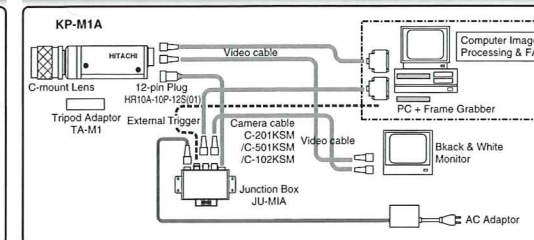
### Optional Accessories

- Tripod adaptor ..... TA-M1
- 12 pin plug ..... HR10A-10P-12S(01)
- Junction box ..... JU-M1A
- Dummy glass (AR-coated) ..... ARC1214
- Camera cable (molded type) ..... 2m C-201KSM  
5m C-501KSM  
10m C-102KSM

### Dimensions



### KP-M1A System



### Main Specifications

Imaging device	KP-M1A: 2/3-inch CCD KP-M2A: 1/2 inch KP-M3A: 1/3 inch CCD
Effective pixels	EIA: 768(H) x 494(V) CCIR: 752(H) x 582(V)
Sync system	Int./Ext (auto switching)
Resolution	570 lines (H), 485 lines (V)
S/N	56dB
Minimum illumination	0.3 lx, F1.4
AGC, Gamma	Switchable
Electronic shutter	1/120(CCI), 1/100(EIA), to 1/10,000
External trigger	Field on demand Restart and reset (optionally)
Lens mount	C-mount
Power supply	12 VDC
Dimensions	44(W) x 29(H) x 72(D) mm
Mass	120g approx.

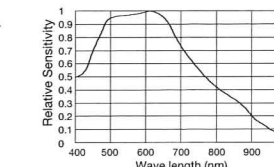
# Near infrared sensitive Black-and-White CCD Camera

## KP-M2R



The KP-M2R is a compact, lightweight, black and white camera using 1/2-inch CCD with sensitivity in the near infrared spectrum.

KP-M2R Spectral response characteristics



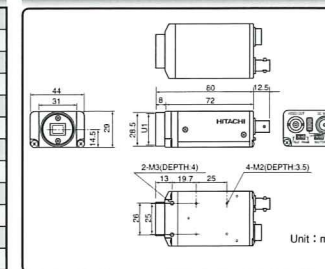
### Optional Accessories

- Tripod adaptor ..... TA-M1
- 12 pin plug ..... HR10A-10P-12S(01)
- Junction box ..... JU-F1
- Camera cable (molded type) ..... 2m C-201KSM  
5m C-501KSM  
10m C-102KSM

### Main Specifications

Imaging device	1/2-interline CCD
Effective pixels	EIA: 768(H) x 494(V) CCIR: 752(H) x 582(V)
Sync system	Int./Ext (auto switching)
Standard sensitivity	200 lx, F4, 3200K
Resolution	570 lines (H), 485 lines (V)
S/N	56 dB
Minimum illumination	0.3 lx, F1.4, AGC, GAMMA ON, NO filter
External trigger	Field on demand
Lens mount	C mount
Power supply	12 VDC
Dimensions	44(W) x 29(H) x 87(D) mm
Mass	120g approx.

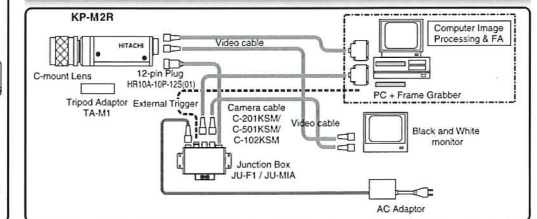
### Dimensions



### Standard Composition

- Camera (with dummy glass)
- Operation manual

### KP-M2R System



# Black-and-White CCD Camera

## KP-MB1A / MC1A / MC2A



Black-and-white CCD camera featuring compact, high performance and a variety of functions for image processing.

- KP-MB1A : Separate type
- KP-MC1A/MC2A : Side lens type

### Standard Composition

- Camera body
- Operation manual

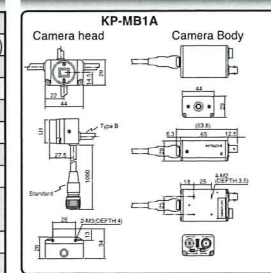
### Optional accessories

- Tripod adaptor ..... TA-M1
- 12 pin plug ..... HR10A-10P-12S(01)
- Junction box ..... JU-M1A
- Camera cable (molded type) ..... 2m C-201KSM  
5m C-501KSM  
10m C-102KSM

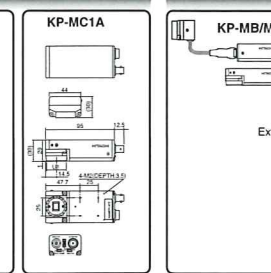
### Main Specifications

Imaging device	KP-M1A: 2/3-inch KP-MC2A: 1/2-inch
Effective pixels	EIA: 768(H) x 494(V) CCIR: 752(H) x 582(V)
Sync system	Int./Ext (auto switching)
Resolution	570 lines (H), 485 lines (V)
S/N	56 dB
Minimum illumination	0.3 lx, F1.4
AGC, Gamma	Switchable
Electronic shutter	1/100 to 1/10,000 second
External trigger	Field on demand Restart and Reset (optionally)
Lens mount	C mount
Power supply	12 VDC

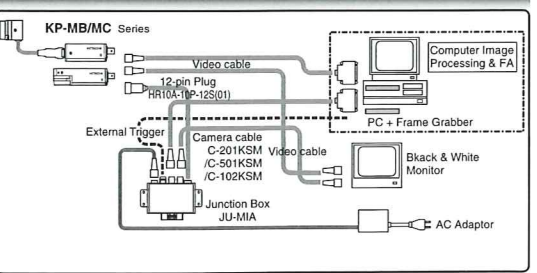
### Dimensions



### KP-MB / MC System



### KP-MB / MC System





## Very small Progressive Scan Black-and-White CCD Camera

### KP-F30 / F33 / F37 / F38 / F80



Ultra compact series of progressive scan analog output cameras featuring high sensitivity, high resolution, and external trigger capability with frame rates from 30 fps to 80 fps.

KP-F30: 60fps KP-F33: 30fps KP-F37: 70fps KP-F38: 80fps  
KP-F80: 30fps KP-F30/F33/ F37/F38: VGA KP-F80: XGA

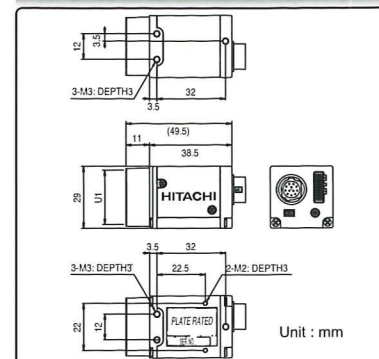
Main Specifications	
Imaging device	1/3-inch interline CCD
Effective pixels	F30/F33/F37/F38: 659(H)x494(V) F80: 1034(H) x 779(V)
Horizontal scanning frequency	F30: 31.468 kHz F33: 15.734 kHz F37: 36.713 kHz F38: 41.958 kHz F80: 23.622 kHz
Vertical scanning frequency	F30: 59.94 Hz F33: 29.97 Hz F37: 69.93 Hz F38: 79.92 Hz F80: 29.83 Hz
Sync system	Int./Ext. (auto selection)
External trigger	Frame on demand
Lens mount	C mount
Power supply	12 VDC
Dimensions	29(W)x29(H)x38.5(D)mm
Mass	Approx. 55g

Standard Composition	
(1) Camera (with IR cut filter)	
(2) Operation manual	

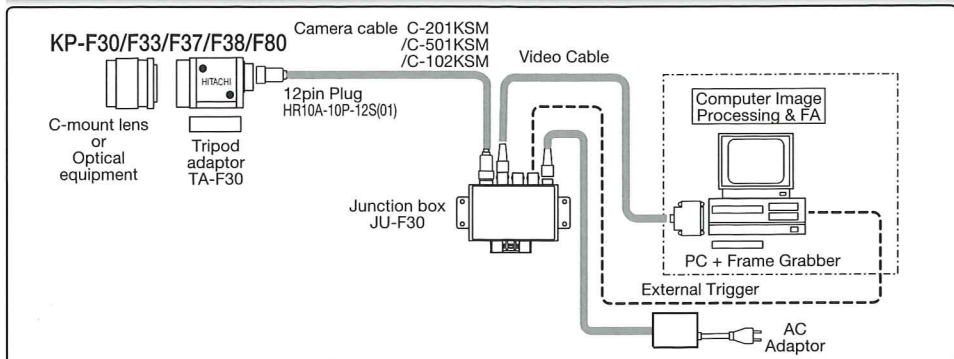
  

Optional Accessories	
(1) Tripod adaptor	TA-F30
(2) 12-pin plug	HR10A-10P-12S(01)
(3) Junction box	JU-F30
(4) Dummy glass	ARC1214
(5) Camera cable (molded type)	
	2m C-201KSM
	5m C-501KSM
	10m C-102KSM

#### Dimensions



#### KP-F30 / F33 / F37 / F38 / F80 System



## Very small Black-and-White CCD Camera

### KP-M20 / M30



Very small black and white CCD camera of 29mm square type body featuring high sensitivity, high resolution and high performance and a variety functions.

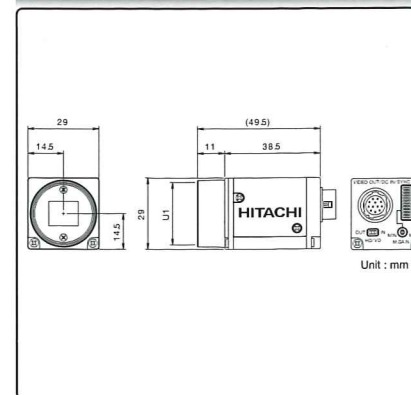
Main Specifications	
Imaging device	KP-M20:1/2-inch interline CCD KP-M30:1/3-inch interline CCD
Effective pixels	EIA : 768(H) x 494(V) CCIR : 752(H) x 582(V)
Sync system	Int./Ext.(automatic selection)
Resolution	570 lines (H), 485 lines (V)
S/N	60dB
Minimum illumination	0.3 lx, F1.4
Electronic shutter	1/120(CCIR), 1/100(EIA) to 1/10,000
Lens mount	C mount
Power supply	12 VDC Approx. 1.4W
Dimensions	29(W)x29(W)x38.5(D) mm
Mass	55g Approx.

Standard Composition	
(1) Camera (with IR cut filter)	
(2) Operation manual	

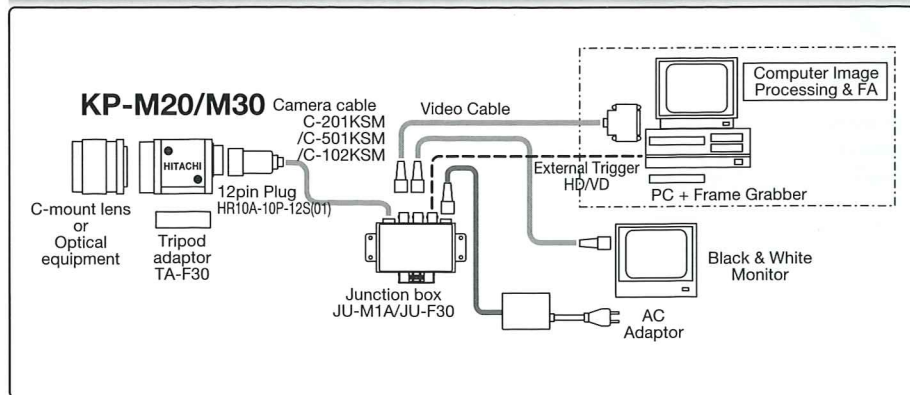
  

Optional Accessories	
(1) Tripod adaptor	TA-F3
(2) 12-pin plug	HR10A-10P-12S(01)
(3) Junction box	JU-M1A/JU-F30
(4) Dummy glass	ARC1214
(5) Camera cable (molded type)	
	2m C-201KSM
	5m C-501KSM
	10m C-102KSM

#### Dimensions



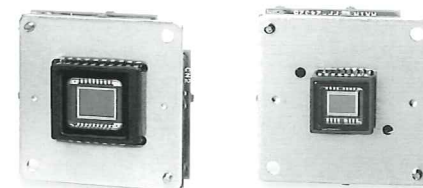
#### KP-M20 / M30 System



## Near infrared sensitive Black-and-White CCD Camera Module

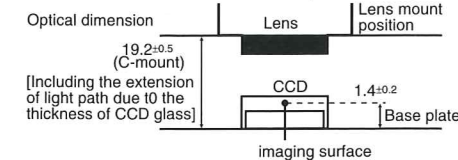
For OEM

### BE-IR20/IR21/IR30/IR31/B20/B21/B30/B31

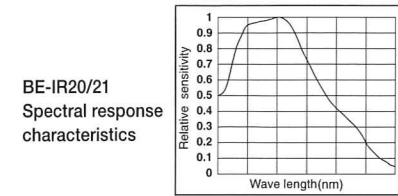


BE-IR20/21 BE-IR30/31

BE-IR20/21/30/31 are ultra compact black-and-white TV camera modules designed for use in narrow space. BE-IR20/21/30/31 have near infra-red sensitivity. BE-B20/21/30/31 have visible ray sensitivity.

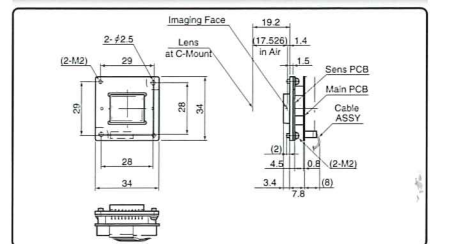


Main Specifications	
Imaging device	BE-IR20/21/B20/B21 : 1/2 BE-IR30/31/B30/B31 : 1/3
Effective pixels	EIA : 768(H) x 494(V) CCIR : 752(H) x 582(V)
Sync system	BE-IR20/30/B20/B30 : int. BE-IR21/31/B21/B31 : ext.
Auto electronic shutter	Standard to 1/10,000 second
AGC	Gamma changeable
Power supply	9 VDC 160 mA approx.
Dimensions	34(W) x 34(H) x 9(D) mm
Mass	17g approx.



BE-IR20/21 Spectral response characteristics

#### Dimensions (BE-IR20/IR21)



#### Standard Composition

- Camera module
- Interface cable

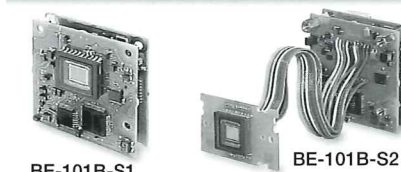
#### Optional Accessories

- Board lens (IR30/31 only)
- CS-mount adaptor (IR30/31 only)
- C-mount adaptor (IR30/31 only / CS-mount adaptor needed)

## Black-and-White CCD Camera Module

For OEM

### BE-101B-S1 / S2



BE-101B-S1

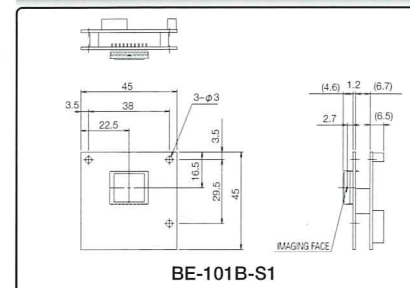
BE-101B-S2

BE-101B-S1 is a 1/2-inch black-and-white camera module that features external control of shutter speed selection. BE-101B-S2 is sensor separation type. They are designed to be ultra-compact and can be installed in a narrow space.

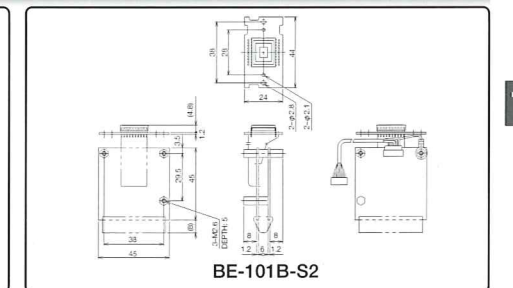
#### Standard Composition

- Camera module
- Interface cable

#### Dimensions



BE-101B-S1



BE-101B-S2

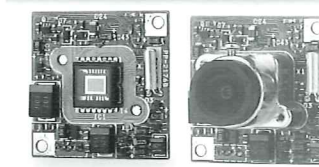
#### Main Specifications

Imaging device	1/2-inch Interline CCD
Effective pixels	768(H) x 494(V)
Scanning frequency	15.734kHz(H) 59.94Hz(V)
Sync system	Internal/external (auto)
Resolution	570 lines (H), 485 lines (V)
S/N	56dB
Minimum illumination	0.3 lx, F1.4
Power supply	12VDC 160 mA approx.
Dimensions	45(W) x 45(H) x 20(D) mm
Mass	25g approx.

## Black-and-White CCD Camera Module

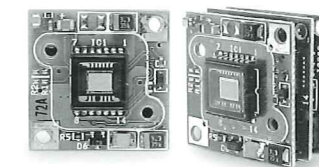
For OEM

### BE-201 / 211 / 212 / 301 Series



BE-201A

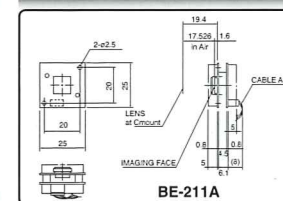
BE-201B



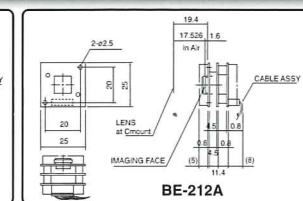
BE-211A

BE-212A

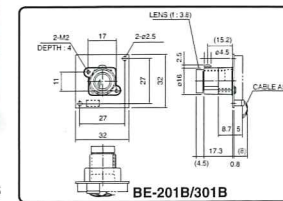
#### Dimensions



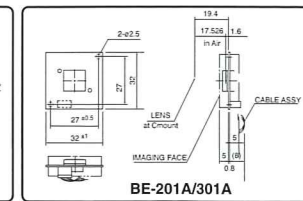
BE-211A



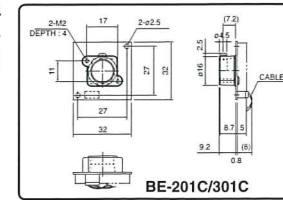
BE-212A



BE-201B/301B



BE-201A/301A



BE-201C/301C

#### Main Specifications

Imaging device	BE-301: 1/3-inch BE-201/211/212: 1/4-inch
Effective pixels	EIA: 510(H) x 492(V) CCIR: 500(H) x 582(V)
Sync system	Internal (BE-212A/B: external)
Resolution	380 lines (H), 485 lines (V)
S/N	46dB
Minimum illumination	0.5 lx, F1.4
Auto electronic shutter	1/10,000 second to standard exposure
AGC	+18dB MAX
Power supply	9VDC 110mA approx.(201: 100mA)
Dimensions	201/301 Type A: 32(W)x32(H)x11(D)mm Type B: 32(W)x32(H)x23(D)mm Type C: 32(W)x32(H)x15(D)mm 211 Type A: 25(W)x25(H)x16(D)mm Type B: 25(W)x25(H)x28(D)mm Type C: 25(W)x25(H)x20(D)mm 201/301 Type A: 25(W)x25(H)x21(D)mm Type B: 25(W)x25(H)x33(D)mm Type C: 25(W)x25(H)x25(D)mm
Mass	201/211/301 Type A: 6g Type B: 17g Type C: 10g 212 Type A: 7g Type B: 18g Type C: 11g

#### Standard Composition

- Camera module
- Interface cable

#### Optional Accessories

- Board lens (Type B only)
- Pin-hole lens (Type C only)
- CS-mount adaptor (Type C only)
- C-mount adaptor (Type C only / CS-mount adaptor needed)



# EM-CCD High Sensitivity Black and White Camera

## KP-E500



The KP-E500 uses a new EM-CCD with electron multiplication to realize exceptional sensitivity. In a full motion mode of operation the camera has an exceptional sensitivity of 0.0003 lx. Sensitivity is further increased to 0.000005 lx in the accumulation mode.

### Main Features

- For Even Greater Sensitivity A Monochrome Version of the Camera is Available Allowing Use in Even Lower Light Levels

In the normal mode of operation the camera provides higher sensitivity as compared to a normal camera. In the accumulation mode unmatched sensitivity is achieved allowing use in extremely low light situations.

- Monochrome in full motion mode 0.0003 lx
- Monochrome accumulation mode 0.000005 lx

- Electron Multiplication used in the EM-CCD Improves Performance While Reducing Technical Issues

Typical high sensitivity cameras use an Image Intensifier Tube that is subject to burn in, afterimage (lag) and short life span. These problems are eliminated with the use of the EM-CCD.

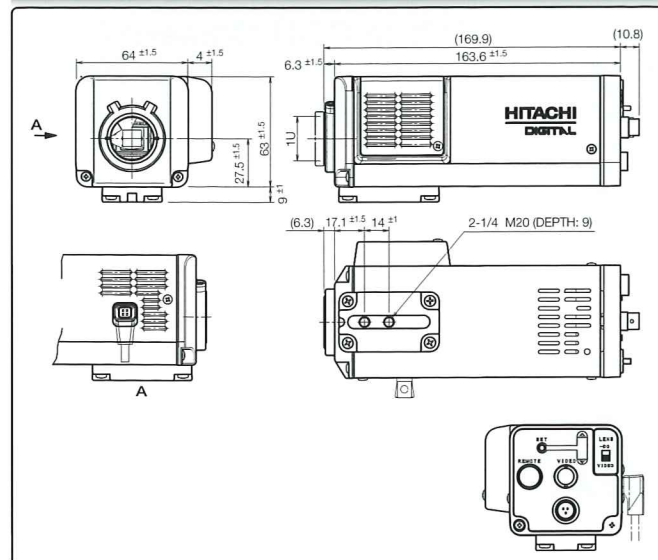
### Standard Composition

- (1) Camera
- (2) Operation manual
- (3) DC Plug

### Optional Accessories

- (1) AC Adaptor IA-60a-HK + C-501ES

### Dimensions



### Main Specifications

Imaging device	1/2-inch EM-CCD
Total pixels	680(H) x 500(V)
Effective pixels	658(H) x 489(V)
Imaging area	6.58(H) x 4.89(V) mm
Pixel pitch	10.0(H) x 10.0(V) μm (Square pixel)
Scanning system	2 : 1 Interlace
Scanning frequency	Horizontal 15.734 kHz Vertical 59.94 Hz
Synchronization	Internal
Video output	
VBS output	Video 0.7 Vp-p Plus terminal nature
Sync	0.3 Vp-p Negative polarity
Burst	0.3 Vp-p, More than 8 cycles
Impedance	75 Ω Un-balancing.
Signal-processing system	Digital processing (Input 10 bit)
Signal to noise ratio (S/N)	50 dB or more (luminosity signal, Gamma OFF, minimum gain, without detail boost)
Resolution	Horizontal: 480 lines Vertical: 350 lines (In the central part)
Minimum photographic subject illumination	0.0003 lx (Monochrome in full motion, maximum sensitivity setup, F1.4, 50 IRE) 0.000005 lx (Monochrome 64 time accumulation, maximum sensitivity setup, F1.4, 50 IRE)
Sensitivity (Gain) setup	Auto or a manual (factory set-AUTO)
Electronic shutter	Shutter: 7 steps /AES (factory set-OFF) OFF(1/60), 1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 sec
Accumulation magnification setup	Auto or a fixed change is possible. (factory set-OFF) 2, 4, 6, 8, 10, 16, 32, 64 times
Backlight compensation	An ON/OFF change is possible (factory set-OFF) Light-measurement area: Nine area to selection is possible.
The output for auto iris lenses	(Square shape 4 pin, JEITA conformity) A galvanometer system/video signal
Camera title character display	A display is possible to 22 characters in an alphanumeric character and a sign A setup to either of two upper and lower sides of a screen is possible in the position of a character.
Picture quality adjustment menu	Following to the menu indication of the picture, various picture quality adjustments and mode selection are possible
DNR	Change of AUTO / MANU (8 steps) (factory set-AUTO)
Power supply voltage	DC 12V ±1 V
Current consumption	Approximately 1.5 A (excluding lens load)
Lens mount	The C / CS mount (flange back adjustment mechanism it is attached)
Ambient, operating	- 10 °C - + 50 °C / 30 - 80% RH *when in order for you to use with the efficiency which long time is stabilized, it continues uses by all means +40 °C please use at below.
Ambient, storage	Retention: 20 °C - + 60 °C / 20 - 90% RH
Vibration endurance	24.5 m/s <sup>2</sup> (10 - 200Hz XYZ direction each 30 minute) *Please do not add the strong vibration over long time.
External dimensions	78(W) x 63(H) x 170(D) mm (The lens and the projection section are excluded)
Mass	Approximately 610g (The lens is excluded)

# EM-CCD High Sensitivity Color Camera

## KP-DE500



The KP-DE500 uses a new EM-CCD with electron multiplication to realize high sensitivity up to 100 times that of a normal camera. In a full motion color mode of operation the camera has an exceptional sensitivity of 0.009 lx. Sensitivity increases to 0.00015 lx in the color accumulation mode.

### Main Features

- 100 Times More Sensitive Than A Normal Camera

A new 1/2 inch EM-CCD with electron multiplication is used to achieve exceptional sensitivity.

- Color in full motion mode 0.009 lx
- Color accumulation mode 0.00015 lx
- Monochrome in full motion mode 0.0005 lx
- Monochrome accumulation mode 0.000008 lx

- Hitachi Technology Enables Superior Image Reproduction In Low Light Levels

Thermoelectric cooling used on the EM-CCD to reduce the effects of dark current noise along with a new digital signal processor (DSP) that provides digital noise reduction of the luminous signal yields sharp clear pictures with a high S/N ratio.

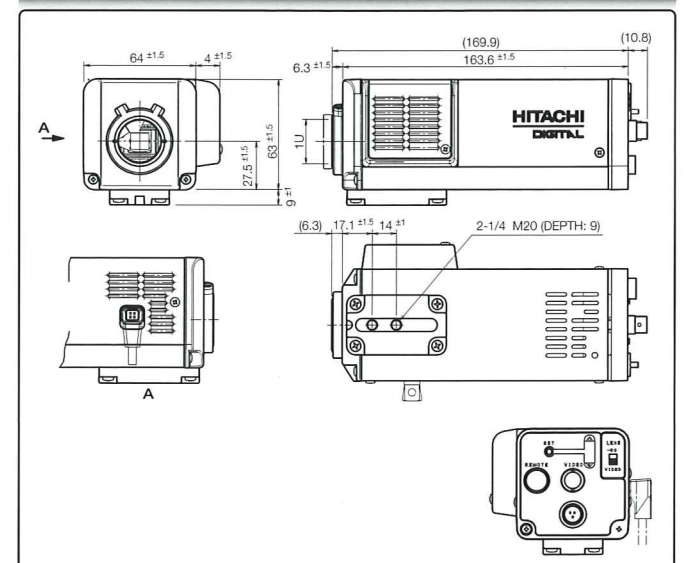
### Standard Composition

- (1) Camera
- (2) Operation manual
- (3) DC Plug

### Optional Accessories

- (1) AC Adaptor IA-60a-HK + C-501ES

### Dimensions



### Main Specifications

Imaging device	1/2-inch EM-CCD
Total pixels	680(H) x 500(V)
Effective pixels	658(H) x 489(V)
Imaging area	6.58(H) x 4.89(V) mm
Pixel pitch	10.0(H) x 10.0(V) μm (Square pixel)
Scanning system	2 : 1 Interlace
Scanning frequency	Horizontal 15.734 kHz Vertical 59.94 Hz
Synchronization	Internal
Video output	
VBS output	Video 0.7 Vp-p Plus terminal nature
Sync	0.3 Vp-p Negative polarity
Burst	0.3 Vp-p, More than 8 cycles
Impedance	75 Ω Un-balancing.
Signal-processing system	Digital processing (Input 10 bit)
Signal to noise ratio (S/N)	50 dB or more (luminosity signal, Gamma OFF, minimum gain, without detail boost)
Resolution	Horizontal: 480 lines Vertical: 350 lines (In the central part)
Minimum photographic subject illumination	0.009 lx (Color in full motion, maximum sensitivity setup, F1.4, 50 IRE) 0.0005 lx (Monochrome in full motion, maximum sensitivity setup, F1.4, 50 IRE) 0.00015 lx (Color 64 time accumulation, maximum sensitivity setup, F1.4, 50 IRE) 0.000008 lx (Monochrome 64 time accumulation, maximum sensitivity setup, F1.4, 50 IRE)
Sensitivity (Gain) setup	Auto or a manual (factory set-AUTO)
Electronic shutter	Shutter: 7 steps /AES (factory set-OFF) OFF(1/60), 1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 sec
Accumulation magnification setup	Auto or a fixed change is possible. (factory set-OFF) 2, 4, 6, 8, 10, 16, 32, 64 times
Backlight compensation	An ON/OFF change is possible (factory set-OFF) Light-measurement area: Nine area to selection is possible.
The output for auto iris lenses	(Square shape 4 pin, JEITA conformity) A galvanometer system/video signal
White balance control	From the following three modes to selection (factory set-ATW) ATW: The mode which follows automatically AWC: The mode which holds a white balance after an automatic setup MANUAL: They are red and the mode which carries out blue gain adjustment and unites a white with manual operation
Camera title character display	A display is possible to 22 characters in an alphanumeric character and a sign A setup to either of two upper and lower sides of a screen is possible in the position of a character.
B/W Mode	OFF: The output mode is fixed to color. On: Monochrome mode in high sensitivity AUTO: Automatic switching between the color and monochrome output modes based on luminous level. Selectable in three stages from HI, MID, and LOW.
Picture quality adjustment menu	Following to the menu indication of the picture, various picture quality adjustments and mode selection are possible
DNR	Change of AUTO / MANU (8 steps) (factory set-AUTO)
Power supply voltage	DC 12V ±1 V
Current consumption	Approximately 1.5 A (excluding lens load)
Lens mount	The C / CS mount (flange back adjustment mechanism it is attached)
Ambient, operating	- 10 °C - + 50 °C / 30 - 80% RH *when in order for you to use with the efficiency which long time is stabilized, it continues uses by all means +40 °C please use at below.
Ambient, storage	Retention: 20 °C - + 60 °C / 20 - 90% RH
Vibration endurance	24.5 m/s <sup>2</sup> (10 - 200Hz XYZ direction each 30 minute) *Please do not add the strong vibration over long time.
External dimensions	78(W) x 63(H) x 170(D) mm (The lens and the projection section are excluded)
Mass	Approximately 610g (The lens is excluded)



# IEEE1394.b Interface Progressive Scan Color Cameras

## KP-FD140F / FD140F-S1 / FD32F



The KP-FD140F and the KP-FD32F are progressive scan color cameras using the latest IEEE1394.b interface for high speed data transfer at 800Mbps. Daisy chain connection allows for easy multiple camera operation.

**KP-FD140F:** 1.45 million pixels at 15 frames per second  
**KP-FD32F:** 330,000 pixels at 60 frames per second

**KP-FD140F-S1:** White exterior for medical use

### Main Specifications

	KP-FD140F	KP-FD32F
<b>Imaging device</b>	1/2-inch interline CCD	
<b>Total pixels</b>	1434 (H) x 1050 (V)	692 (H) x 504 (V)
<b>Effective pixels</b>	1392 (H) x 1024 (V)	656 (H) x 492 (V)
<b>Pixel size</b>	4.65 μm (H) x 4.65 μm (V)	9.9 μm (H) x 9.9 μm (V)
<b>Color filter</b>	RGB primary color mosaic filters	
<b>Scanning system</b>	Progressive scan	
<b>Synchronization</b>	Internal / external (auto selection)	
<b>Video signal output</b>		
<b>Interface</b>	IEEE1394.b (FireWire800)	
<b>Protocol</b>	IEEE1394-based Digital Camera Specification Version 1.31 compliant	
<b>Transfer rate</b>	800 / 400 / 200 Mbps	
<b>Image format</b>	RGB24 / RGB48 / YUV4:2:2 / RAW8 / RAW16 MONO8 / MONO1	
<b>Image size</b>	1360 (H) x 1024 (V) 1280 (H) x 960 (V) 1024 (H) x 768 (V) 800 (H) x 600 (V) 640 (H) x 480 (V)	656 (H) x 492 (V) 640 (H) x 480 (V)
<b>Frame rate</b>	15 fps (1360 x 1024)	60 fps (656 x 492)
<b>Standard sensitivity</b>	2000 lx F8	2000 lx F5.6
<b>Gain</b>	Auto / Manual (0 dB to 18 dB)	
<b>Electric shutter</b>	Auto (AES) / Manual (VARIABLE) 1/100,000 second to 10 second	
<b>External trigger shutter Mode</b>	Fixed shutter (Mode0), One trigger (Mode1) Reset control (Mode14), VD Sync (Mode15)	
<b>Input</b>	Via IEEE1394 cable (Software trigger) Our company original method (Hardware trigger)	
<b>Power supply</b>	Approx. 4.1 W (DC+12 V)	Approx. 3.5 W (DC+12 V)
<b>White balance</b>	ATW / MANUAL / One-Push	
<b>Gamma</b>	OFF / LUT	
<b>Masking</b>	OFF / ON (6 color independent masking)	
<b>Saturation</b>	Adjustable	
<b>Sharpness</b>	Adjustable	
<b>Brightness</b>	Adjustable	
<b>Time stamp</b>	OFF/ON	
<b>Cycle timer sync</b>	OFF/ON	
<b>Daisy chain</b>	Possible. Even if there is no repeater. If two are connected, the frame rate become half.	
<b>Lens mount</b>	C mount (Flange-back adjustment)	
<b>Power supply</b>	DC +8 V to +30 V (Via IEEE1394 cable)	
<b>Ambient temperature</b>		
<b>Operating</b>	-10 °C to +50 °C, 30 to 80 %RH Note: If operated continuously, be sure to use at 0 °C to +40 °C (104 °F) for long term stable performance.	
<b>Storage</b>	-20 °C to +60 °C / 20 to 90 %RH	
<b>Vibration endurance</b>	68.56 m/s <sup>2</sup> (10 to 200 Hz 30 minutes each on XYZ axes) *Please do not add the strong vibration over long time.	
<b>Shock endurance</b>	490.3 m/s <sup>2</sup> (vertical, horizontal, once each faze)	
<b>Dimensions</b>	44 (W) x 44 (H) x 54 (D) mm (not including lens)	
<b>Mass</b>	Approx. 130 g (not including lens)	

### Main Features

- IEEE1394.b Interface**
  - The IEEE1394.b interface allows direct high speed data transfer between the camera and the PC using a small 8 conductor cable.
  - The 800 Mbps transfer speed of the IEEE-1394.b interface permits higher frame rates for high resolution cameras.
  - Multiple cameras can share the IEEE-1394.b bus using a simple daisy chain connection.
- High resolution and high frame rates**
  - KP-FD140F** 1.45 million pixels for high resolution at 15 frames per second. Designed for high Resolution Inspection.
  - KP-FD32F** 330,000 pixels for a high frame rate of 60 frames per second at standard resolution. Designed for high speed inspection.
- Various functions**
  - Electronic shutter
  - Hardwired Trigger
  - White balance
  - Daisy chain
  - External sync
  - Partial scan
  - Independent 6 color masking
  - Remote control

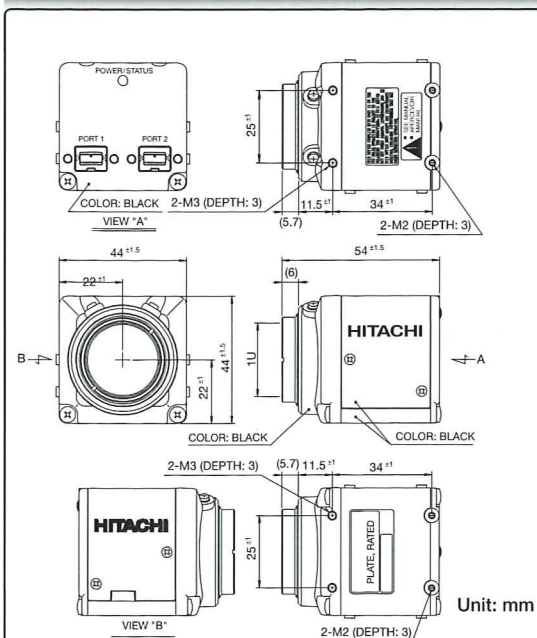
### Standard Composition

- Camera
- CD-ROM (operation manual, driver software)

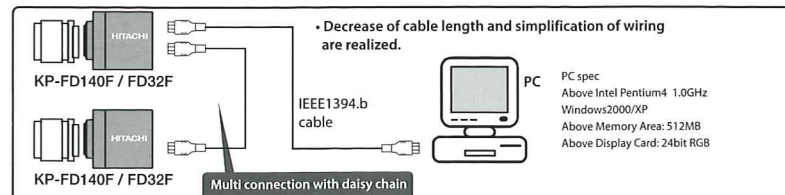
### Optional accessories

- IEEE1394 Cable
- Tripod Adaptor

### Dimensions



### System Configuration



Intel and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Windows is a trademark or registered trademark of Microsoft Corporation in the United States and for other countries.

# Very small CCD Color Camera

## KP-D20A / D20B / D20B-S6 / D20BP-S3



KP-D20A/B

KP-D20B-S6

The KP-D20A/B is a compact multi purpose CCD color camera, featuring high sensitivity and high image quality in a package measuring just 44(W) x 44(H) x 49(D) mm. An on-screen menu system allows optimum adjustment of camera parameters to meet the imaging application.

**KP-D20B-S6** : Right angle type, only a DC type lens can be used for auto-iris.

**KP-D20BP-S3** : 12pin type, PAL type only

### Main Specifications

<b>Imaging device</b>	KP-D20A : 1/3-inch KP-D20B : 1/2-inch
<b>Effective pixels</b>	NTSC : 768(H) x 494(V) PAL : 752(H) x 582(V)
<b>Horizontal resolution</b>	480 TV lines
<b>S/N</b>	over 50 dB
<b>Minimum illumination</b>	KP-D20A : 0.8 lx KP-D20B : 0.3 lx
<b>Video signal output</b>	VBS, Y/C
<b>RS-232C control</b>	Possible
<b>Text display</b>	Possible
<b>Electronic shutter mode</b>	AES and from standard to 1/30,000 s
<b>AGC</b>	from 0 to 31 dB
<b>Digital zoom</b>	Enlarged 4 times smoothly
<b>Backlight compensation</b>	Sensing areas selectable from 9 areas
<b>Lens mount</b>	C/CS-mount (C/CS-mount adaptor optionally)
<b>Power supply</b>	12 VDC 220 mA approx.
<b>Dimensions</b>	44(W) x 44(H) x 49(D) mm D20B-S6: 58(W) x 44(H) x 49(D) mm
<b>Mass</b>	130g approx. D20B-S6 170g approx.

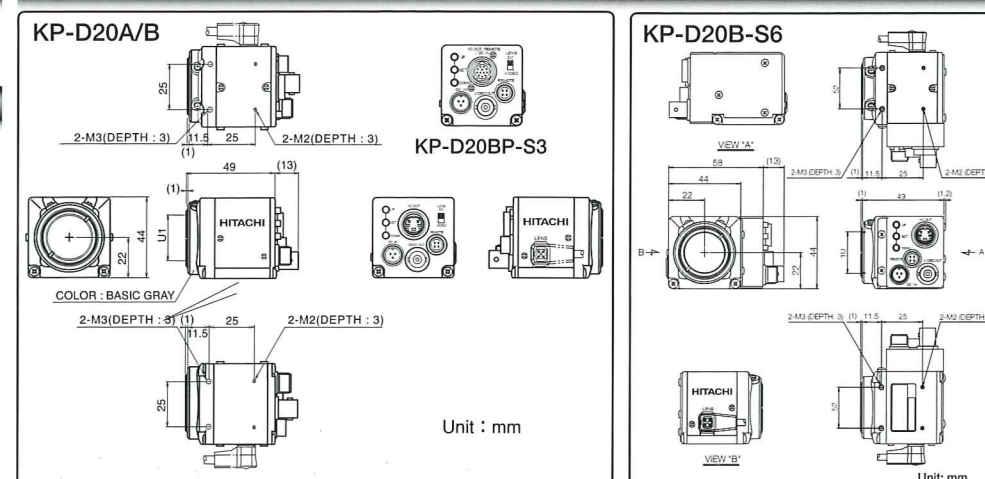
### Standard Composition

- Camera body
- Operation instructions

### Optional accessories

- Tripod adaptor  
TA-D20AB
- C/CS-mount adaptor  
LA-D20AB
- Remote plug  
HR10A-7P-4P(01)
- Lens plug  
E4-191J-100
- DC in plug  
R03-P3F
- Remote Y/C plug (D20BP-S3 only)  
HR10A-10R-12S(01)

### Dimensions



### Pin arrangement

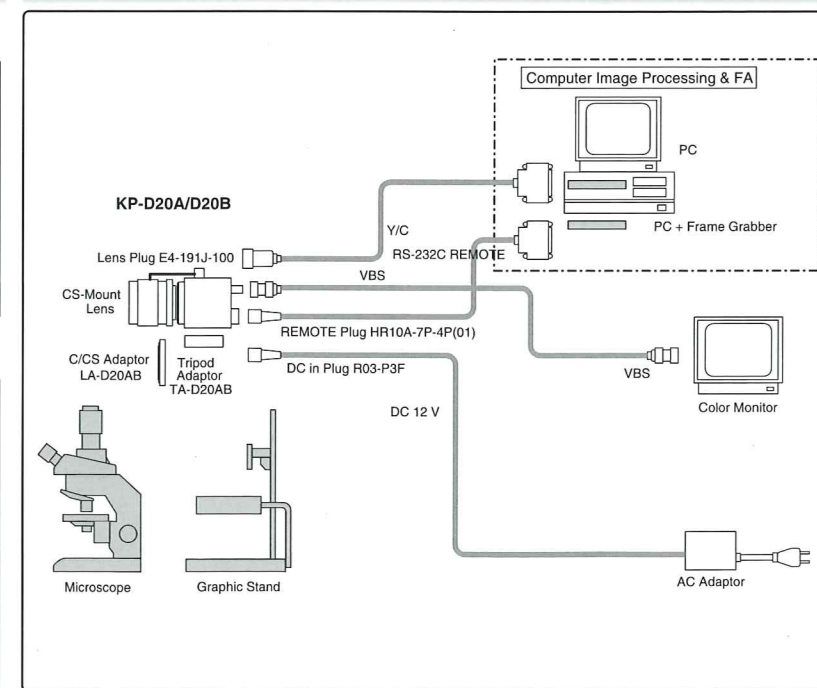
**LENS connector** (Plug : E4-191J-100)    **REMOTE connector** (Plug : HR10A-7P-4P)    **Y/C connector**

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	+12V Out/damp	1	NC	1	Y GND
2	NC/Damp	2	IN SD IN	2	C GND
3	VIDEO/Drive	3	OUT SD OUT	3	Y OUT
4	GND/Drive	4	GND	4	C OUT

**12V IN connector** (Plug : R03-P3F)    **12pin Remote Y/C plug (D20BP-S3 only)** (Plug : HR10A-10P-12S(01))

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	7	RX input		
2	+12V IN	8	GND (C)		
3	NC	9	C output		
		10	GND		
		11	+12V		
		12	GND (RX)		

### KP-D20A/B System







KP-FD30 series is a 1/2 inch format progressive scan camera with an RGB output. Its compact size and numerous functions allow its use in a wide variety of applications.

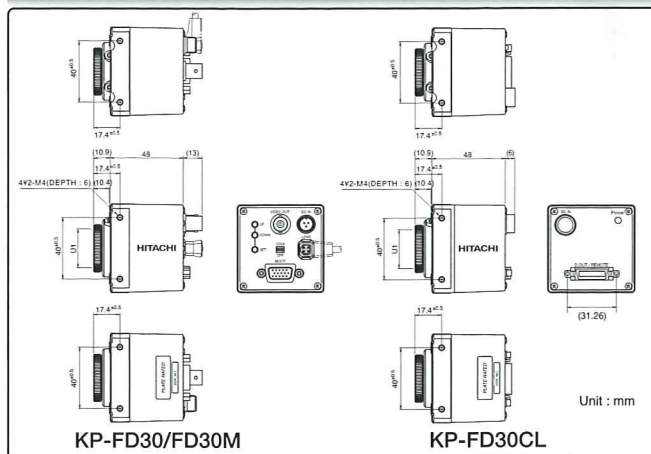
**Main Features**

- Suitable for the image-processing equipment input  
Small lightweight size, RGB output and various image processing function.
- High resolution and high color fidelity  
By adoption of the progressive scan CCD image sensor and RGB primary color mosaic filter, the picture of high vertical resolution and high color fidelity can be acquired.
- New digital signal processor (DSP)
- Various CCD drive functions
- NTSC output (only KP-FD30)
- The still picture continuation output (only KP-FD30M)

**Main Specifications**

Imaging device	1/2-inch interline CCD
Effective pixels	659(H) x 494(V)
Pixel pitch	9.9(H) x 9.9(V) μm (square lattice)
Imaging area	7.48(H) x 6.15(V) mm
Scanning system	Progressive scan (VGA mode) (Switch change) 2:1 interlace (NTSC mode)
Scanning frequency	Horizontal : 31.468 kHz Vertical : 59.94 Hz
Synchronization	Internal/external (HD/VD auto selection)
Internal sync output	HD/VD 2Vp-p/75Ω Negative
External sync output	HD/VD 2Vp-p/75Ω Negative
External trigger input	Low 0 VDC, High 2 to 5 VDC (only VGA mode)
Video signal output	RGB (G on SYNC) Y/C (only NTSC mode) VBS (only NTSC mode)
S/N	More than 50dB (AGC, enhancer and gamma off)
Resolution(center)	Horizontal : 440TV lines Vertical : 480TV lines (VGA mode) 350TV lined (NTSC mode)
Standard sensitivity	2,000 lx (F5.6, 100IRE)
Minimum illumination	10 lx (F1.4, AGC ON, 50IRE)
Gain	AGC OFF/ON, Manual Gain at AGC OFF, Limit Gain Adjustable at AGC ON
Electronic shutter	High speed : 11 steps OFF(1/60), 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000 Low speed : 27 steps OFF(1/60), 1/15, 1/10, 1/7.5, 1/6, 1/5, 1/3.75, 1/3, 1/2.5, 1/1.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.5, 7.0, 7.5, 8.0 second AES 1/60 to approx. 1/50,000 second (Response : SLOW NORMAL FAST) VARIABLE Approx. 1H steps from 1/60 to 1/10,000 second
Power supply	DC 12V±10% Approx. 360mA(FD30) 370mA(FD30M) 220mA(FD30CL)
Lens mount	C/CS-mount (Flange-back adjustment)
Ambient temperature	Operating: -10°C to +50°C, 30 to 80%RH Storage: -20°C to +60°C, 20 to 90%RH
Vibration endurance	68.6m/s <sup>2</sup> (10 to 200Hz, 30 minutes each on XYZ axes)
Shock endurance	490.3m/s <sup>2</sup> (vertical, horizontal, once each direction)
Dimensions	58(W) x 58(H) x 48(D) mm (not including lens and protrusions)
Mass	Approx. 220g (without lens)

**Dimensions**

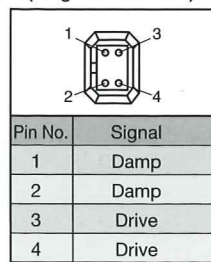


**Pin arrangement KP-FD30/FD30M**

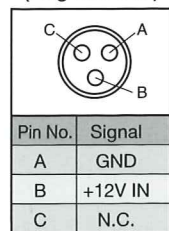
Plug KEC-15P (Housing)  
(Pin contact JK-SP2140) (Cover JK-C151C)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	R/C OUT	6	VIDEO GND	11	GND
2	G/Y OUT	7	VIDEO GND	12	RXD
3	B/VBS OUT	8	VIDEO GND	13	HD IN/HD OUT/SYNC
4	WE OUT	9	UNREG+12V IN	14	VD IN/VD OUT
5	GND	10	TRIG IN	15	TXD

Lens connector  
(Plug: E4-191J-100)



12V IN connector  
(Plug: R03-P3F)



**Pin arrangement KP-FD30CL**

DIGITAL OUT (Camera Link)  
Connector: 10226-5202JL(3M)

Pin No.	Signal	Pin No.	Signal
1	GND	14	GND
2	TXOUT 0(-)	15	TXOUT 0(-)
3	TXOUT 1(-)	17	TXOUT 1(-)
4	TXOUT 2(-)	18	TXOUT 2(-)
5	TXCLKOUT(-)	19	TXOUT 3(-)
6	TXOUT 3(-)	20	SerTC(-)
7	SerTC(+)	21	SerTFG(+)
8	SerTFG(-)	22	NC [CC1(+)]
9	NC [CC1(-)]	23	Trig(+)[CC2(+)]
10	Trig(+)[CC2(+)]	24	NC [CC3(+)]
11	NC [CC3(-)]	25	NC [CC4(-)]
12	NC [CC4(+)]	26	GND
13	GND		

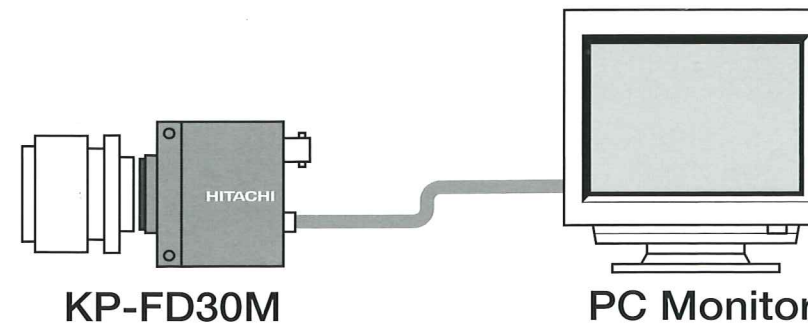
DC IN Plug  
Plug: HR10A-10P-12S(01)

Pin No.	Signal
1	GND(+12V)
2	DC +12V
3	GND(VBS)
4	VBS OUT
5	GND(TX/RX)
6	TX* or HD-in
7	RX* or VD-in
8	GND
9	-
10	GND(+12V)
11	+12V
12	GND

(\*): It is usable to switch the inside SW of a camera (cf. operation instruction).

**PC monitor direct connection (KP-FD30M)**

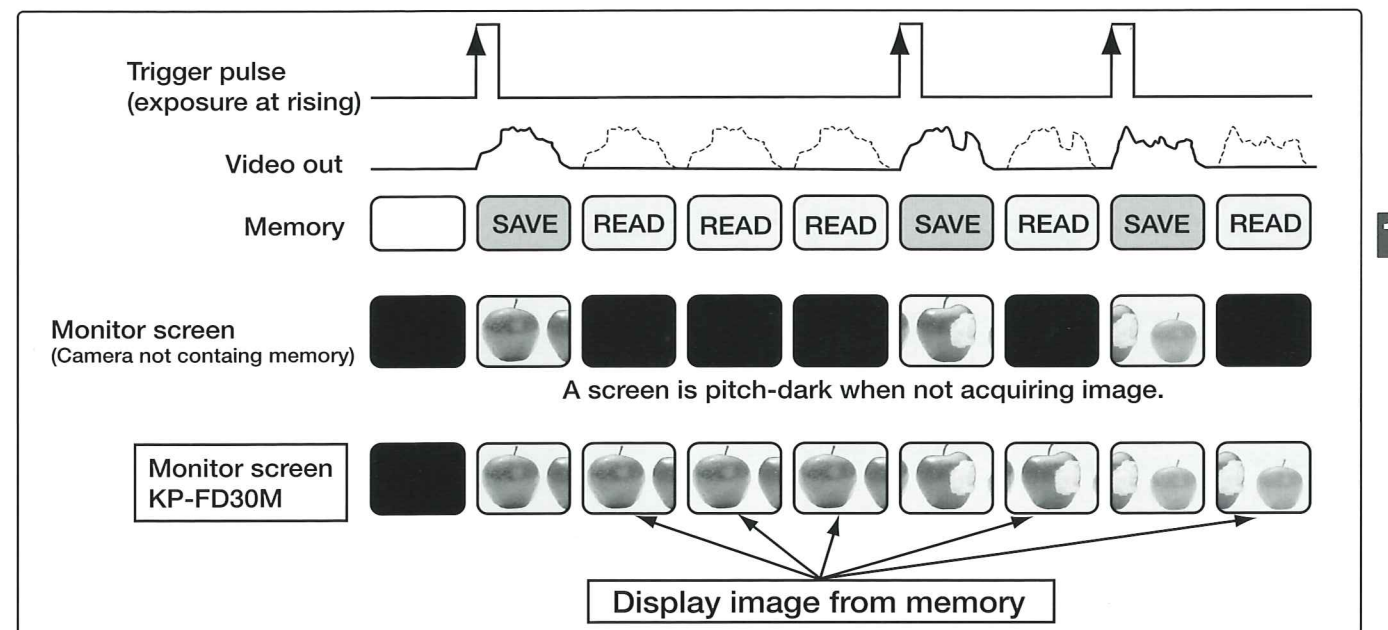
KP-FD30M can be connected to PC monitor directly with RGB cable. 60 frames per second image can be displayed without PC.



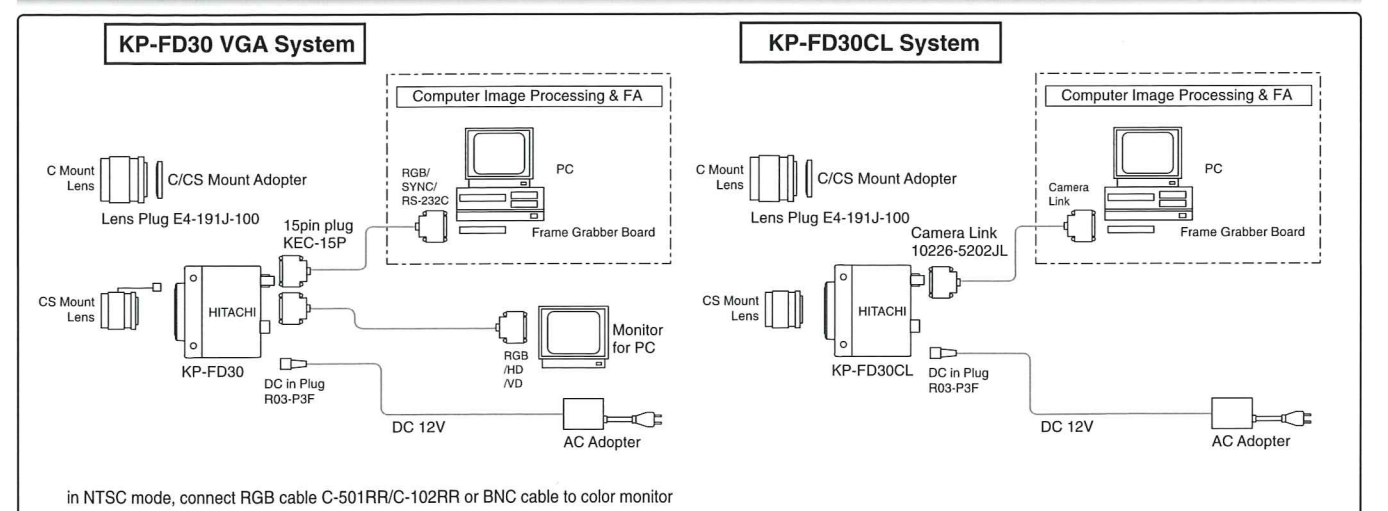
\* KP-FD30 can be also connected when not using external trigger.

**The still picture continuation output (KP-FD30M)**

KP-FD30M contains the memory function. A built in frame memory allows continuous video output during low speed shutter or external trigger modes of operation, eliminating the need of a PC and frame grabber for visual inspection.



**KP-FD30/FD30CL System**



in NTSC mode, connect RGB cable C-501RR/C-102RR or BNC cable to color monitor

**Standard Composition**

- (1) Camera body
- (2) Operation instructions
- (3) C/CS-mount adaptor

**Optional Accessories**

- (1) Lens plug 4 pin JEITA ..... E4-191J-100
- (2) DC in plug ..... R03-P3F
- (3) RGB cable(5m) ..... C-501RR
- (4) RGB cable(10m) ..... C-102RR



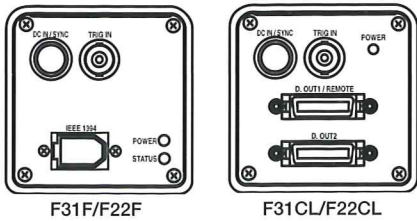


The Hitachi HV-F series cameras are high precision 3CCD progressive scan color cameras, featuring a single chip digital processing LSI, a C mount prism, square pixel CCDs, and an IEEE1394 or Camera-Link digital output.

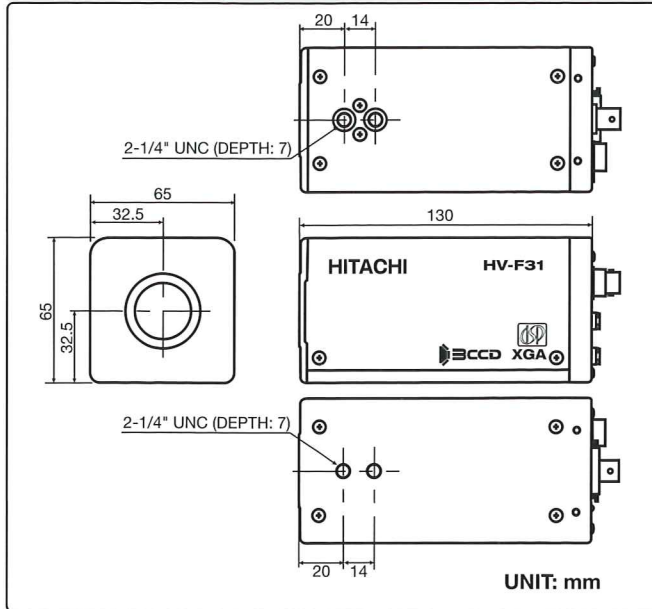
HV-F31F/F22F : IEEE1394

HV-F31CL/F22CL : Camera Link (Medium configuration / Base configuration)

IEEE1394	Camera Link
HV-F31F : 1/3" XGA (1024x768) 15 frame/second	HV-F31CL : 1/3" XGA (1024x768) 30 frame/second
HV-F22F : 1/2" SXGA (1360x1024) 7.5 frame/second	HV-F22CL : 1/2" SXGA (1360x1024) 15 frame/second



### Dimensions

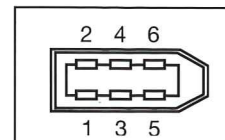


### Pin arrangement

Camera Link Medium configuration (HV-F31CL/F22CL)  
3M: 10226-2210VE

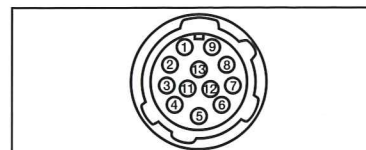
D. Out / Remote				D. Out 2			
Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	14	GND	1	GND	14	GND
2	X0-	15	X0+	2	Y0-	15	Y0+
3	X1-	15	X1+	3	Y1-	16	Y1+
4	X2-	17	X2+	4	Y2-	17	Y2+
5	Xclk-	18	Xclk+	5	Yclk-	18	Yclk+
6	X3-	19	X3+	6	Y3-	19	Y3+
7	SerTC+	20	SerTC-	7	NC	20	NC
8	SerTFG-	21	SerTFG+	8	NC	21	NC
9	NC[CC1]-	22	NC[CC1]+	9	NC	22	NC
10	Trig[CC2]+	23	Trig[CC2]-	10	NC	23	NC
11	NC[CC3]-	24	NC[CC3]+	11	NC	24	NC
12	NC[CC4]+	25	NC[CC4]-	12	NC	25	NC
13	GND	26	GND	13	GND	26	GND

IEEE1394 (HV-F31F/F22F)  
molex: 55395-3611



Pin No.	Signal
1	+12V IN
2	GND
3	TPB-
4	TPB+
5	TPA-
6	TPA+

12pin (Common)  
HIROSE: HR10A-10R-12PB(01)



Pin No.	Signal	Pin No.	Signal
1	GND	7	VD IN
2	+12V IN	8	GND
3	GND	9	TRG(H)
4	FLASH OUT	10	TRG(C)
5	GND	11	+12V IN
6	HD IN	12	GND

### Main Features

- The best color in image capture
- High resolution
- Auto shading correction
- Independent six color masking
- External trigger shutter

### Main Specifications

	HV-F31	HV-F22
Optical system	1/3-inch F2.2 prism	1/2-inch F1.6 prism
Imaging system	RGB 3CCD	
Imaging device	1/3-inch interline CCD	1/2-inch interline CCD
Total pixels	1077(H) X 788(V)	1434(H) X 1050(V)
Effective pixels	1024(H) X 768(V)	1360(H) X 1024(V)
Imaging area	4.76(H) X 3.57(V) mm	6.32(H) X 4.76(V) mm
Unit cell size	4.65(H) X 4.65(V) μm square pixel	
Pixel clock	28.8MHz	
Frame rate	30f/s(F31CL) 15f/s(F31F)	15f/s(F22CL) 7.5f/s(F22F)
Scanning system	Progressive scan	
Sync system	Internal/External (automatically switched by HD/VD)	
Standard sensitivity	2000lx F5.6	2000lx F8
Gamma correction	0.45/1.0 (on/off)	
Vertical contour correction	2H	
Lens mount	C mount (flange back: 17.526 mm in air)	
Sensitivity selection	Manual / AGC (0 to +12dB)	
Sharpness (detail) control functions	Sharpness level, width	
Shutter	1/100,000 to 1/30 to 4 (second)	1/100,000 to 1/15 to 4 (second)
Trigger	Pre-select exposure mode / Pulse width control exposure mode	
Ambient temperature	Operating : 0 to +40°C	
Vibration	29 m/s <sup>2</sup>	
Shock	490 m/s <sup>2</sup>	
Power supply	12 V	
Power Consumption	8W (F31F), 6.5W (F31CL)	8.5W (F22F), 6.5W (F22CL)
Dimensions	65(W) X 65(H) X 130(D) mm	
Mass	Approx. 600 g (21 oz) (not including lens)	

### Transmission Format

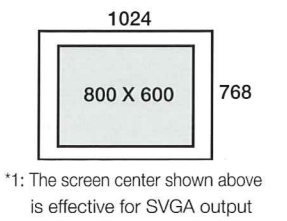
The HV-F31F/F22F cameras allow remote selection of the image size to match resolution and frame rate to the imaging application.

#### • HV-F31F

Camera mode	Frame Rate	bit / pixel	bit / ch	
XGA (1024X768)	YUV	15	16	8
	RGB	7.5	24	8
SVGA (800X600) *1	YUV	30	16	8
	RGB	15	24	8
XGA (1024X768)	RGB	3.75	48	10

#### • HV-F22F

Camera mode	Frame Rate	bit / pixel	bit / ch	
SXGA (1280X960)	YUV	7.5	16	8
	RGB	7.5	24	8
VGA (640X480) *2	YUV	30	16	8
	RGB	30	24	8
SXGA (1360X1024)	YUV	7.5	16	8
	RGB	7.5	21	8
	RGB	1.875	48	10



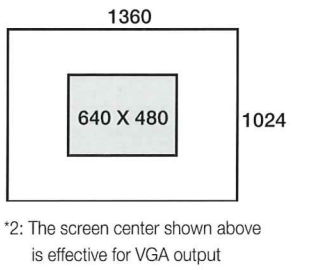
\*1: The screen center shown above is effective for SVGA output

#### • HV-F31CL

Camera mode	Frame Rate	bit / pixel	bit / ch	
XGA (1024X768)	RGB	30	30	10
Medium Configuration				
XGA (1024X768)	RGB	30	24	8
Base Configuration				

#### • HV-F22CL

Camera mode	Frame Rate	bit / pixel	bit / ch	
SXGA (1360X1024)	RGB	15	30	10
Medium Configuration				
SXGA (1360X1024)	RGB	15	24	8
Base Configuration				



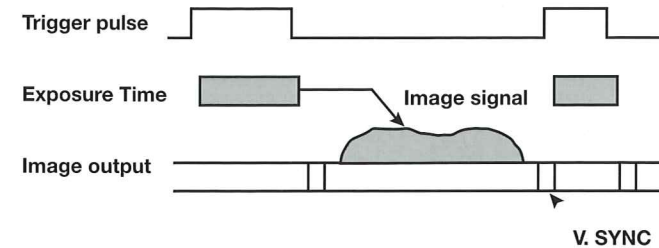
\*2: The screen center shown above is effective for VGA output

### Frame-on-demand function

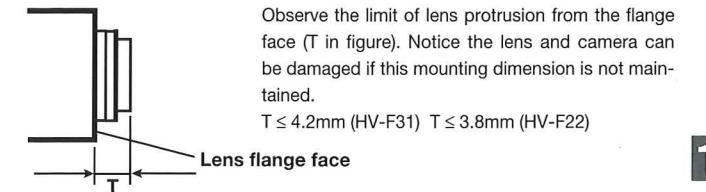
An image can be acquire at a desired timing by external input of a trigger signal.

#### • One-trigger mode

When a signal trigger pulse is input, exposure will start at the rising edge of the pulse and will end at the trailing. Then, V.SYNC will be reset immediately followed by output of the image. Pulse width corresponds to the exposure time.



### When using lens



Observe the limit of lens protrusion from the flange face (T in figure). Notice the lens and camera can be damaged if this mounting dimension is not maintained.  
T ≤ 4.2mm (HV-F31) T ≤ 3.8mm (HV-F22)

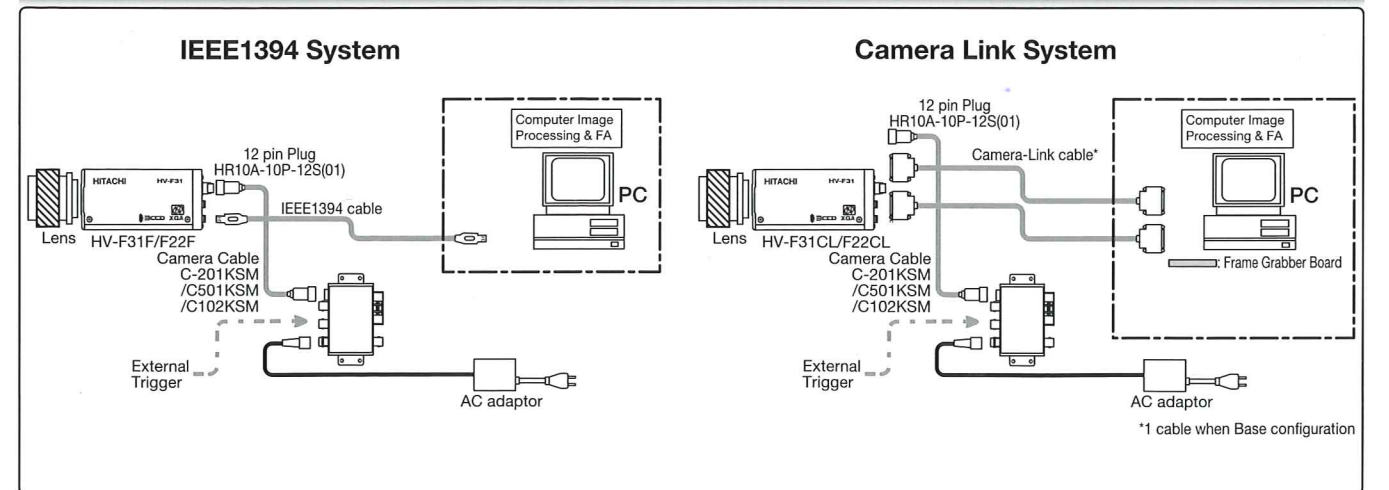
### Standard Composition

- (1) Camera
- (2) Operation manual
- (3) Sample Software (CD-ROM)

### Optional Accessories

- (1) IEEE1394-Cable
- (2) Camera cable (molded type)
  - 2m C-201KSM
  - 5m C-501KSM
  - 10m C-102KSM
- (2) Junction Box ..... JU-M1A

### HV-F31F / F31CL / F22F / F22CL System



\*1 cable when Base configuration



# High-resolution C-Mount 3 CCD Color Camera

## HV-D30 / D20



The HV-D30/D20 are compact, High Performance, Multi Purpose Cameras featuring 12 bit A/D converters and a 3 million gate DSP. A 3rd generation digital signal processor (DSP) enables the camera to achieve its small size, low power consumption, and high stability.

### Main Features

- Auto Shading Compensation (ASC)
- External Trigger functions
- Continuous operation of AGC, Auto Electronic Shutter (AES) and auto lens iris with micro computer.
- RS-232C control

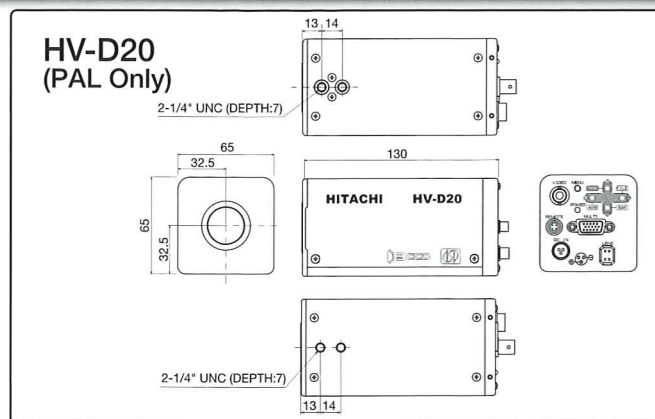
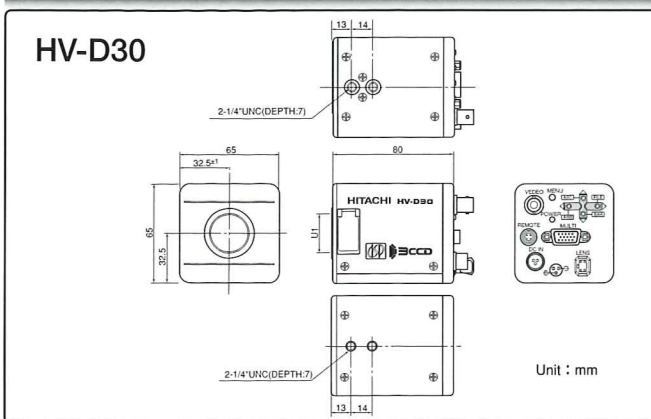
### Standard Composition

- (1) Camera
- (2) Accessories
  - Power plug (R03-P3F)
  - Operation manual

### Optional Accessories

- (1) RGB cable (5m) C-501RR
- (2) RGB cable (10m) C-102RR
- (3) Remote control box RC-Z3
- (4) Level converter JU-C20
- (5) Junction box (max 8 camera) JU-Z2

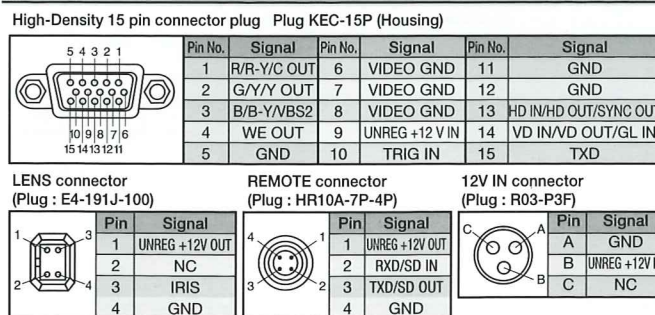
### Dimensions



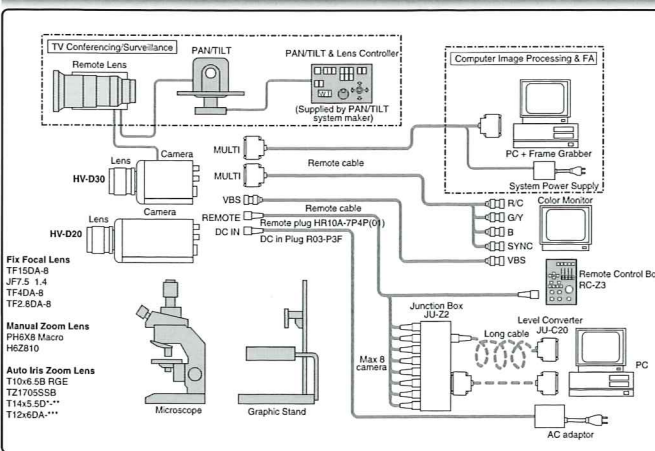
### Main Specifications

	HV-D30	HV-D20
Color system	NTSC, PAL	PAL only
Optical system	1/3-inch, F2.2 prism	1/2-inch, F1.6 prism
Imaging system	R, G, B 3CCD	
Picture elements	1/3-inch interline CCD	1/2-inch interline CCD
Total pixels	NTSC 811(H) x 508(V) PAL : 795(H) x 596(V)	
Effective pixels	NTSC 768(H) x 494(V) PAL : 752(H) x 582(V)	
Scanning system	2:1 interlace	
Sync system	Internal/external (VBS, BBS or HD/VD auto selection)	
Horizontal resolution	800TV lines, luminance signal center (Y out and DTL off)	
S/N	NTSC 64dB (DNR: ON), 61dB (DNR: OFF) PAL 62dB (DNR: ON), 59dB (DNR: OFF) (Y OUT, Y=1, DTL : OFF, GAIN : 0dB)	
Standard sensitivity	2000lx, F9.5	2000lx, F11
Minimum illumination	0.9lx (50IRE, F2.2, GAIN: +24dB, DIGITAL GAIN: +12dB)	
Gamma correction	0.45/1.0 (ON/OFF)	
Lens mount	C mount (flange back 17.25mm in air)	
Sensitivity selection	AGC (0 to +24dB) or GAIN (0 to +24dB step 1dB or step 3dB on remote control menu)	
CCD drive functions	1/100(1/60 PAL), 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/20000, 1/40000, 1/100000 second	
Lockscan	NTSC 1/60.38 to 1/2039 second (step 1H), to 1/100000 second (step approx. 10% video level) PAL 1/50.31 to 1/2024 second (step 1H), to 1/100000 second (step approx. 10% video level)	
Long time integration	Frame/field integration selection NTSC 1/30 to approx. 8 seconds (1frame step) PAL 1/25 to approx. 8 seconds (1frame step) (external image memory needed for continuous image)	
Power supply voltage	12 V rated (stable operation at 10.5 to 15 VDC (ripple and noise absent))	
Power consumption	Approx. 4.5W	Approx. 5.0W
Dimensions	65(W)x65(H)x80(D)mm	65(W)x65(H)x130(D)mm
Mass	400g approx. (not including lens)	450g approx. (not including lens)
Ambient temperature	Operating -10 to +45°C (+14 to +113°F) Storage -20 to +60°C (-4 to +140°F)	

### Pin arrangement



### HV-D30/D20 System



# Very small detachable head 3CCD Color Camera

## HV-D27A / D37A



### Main Specifications

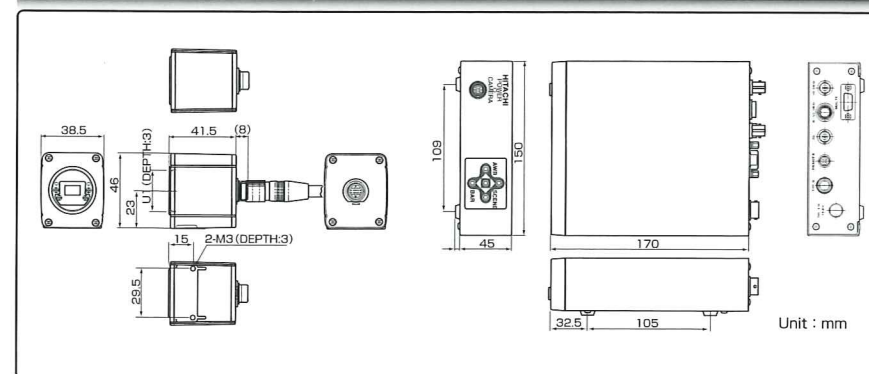
Imaging device	HV-D27A 1/2-inch HV-D37A 1/3-inch
Effective pixels	NTSC : 768(H) x 494(V) PAL : 752(H) x 582(V)
Horizontal resolution	HV-D27A 800 TV lines HV-D37A 750 TV lines
Standard Sensitivity	2000 lx, F11
S/N (DNR ON)	HV-D27A NTSC : 62dB PAL : 59dB HV-D37A NTSC : 60dB PAL : 57dB
Lens mount	C-mount
Power supply	12 VDC
Dimensions	Head 38.5(W)x46(H)x42(D) mm
Mass	Head 90 g approx.

HV-D27A/37A is a 3 CCD color camera featuring a very small remote head and a CCU with a one-chip DSP circuit that handles the signal from processing to encoder.

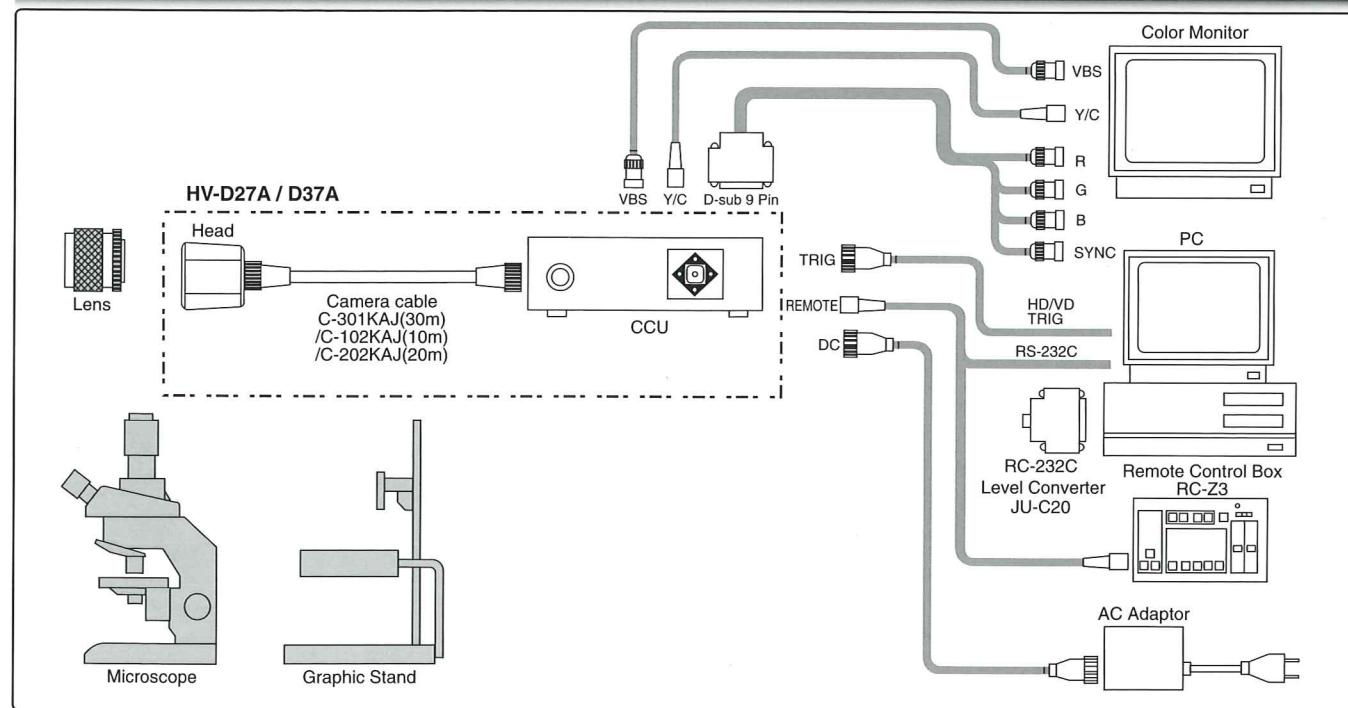
### Main Features

- High picture quality and high stability by utilizing 14 bit digital signal processing (DSP)
- Auto Shading Compensation (ASC)
- External Trigger functions
- Continuous operation of AGC and Auto Electronic Shutter (AES) with micro computer.
- RS-232C control

### Dimensions



### HV-D27A / D37A System





### 3CCD Color Camera

Not available in Europe, NTSC only

## HV-D5W



#### Main Specifications

Imaging device	2/3-inch 510,000-pixel inter-line CCD
Horizontal resolution	750 TV lines
S/N	65db (DNR ON)
Standard Sensitivity	2000 lx, F11
Minimum Illumination	1 lx (F1.4, +18dB, ultra-gain)
Power supply	12 VDC 12.5W Approx.
Dimensions	98(W)x105(H)x180(D)mm
Mass	1.5kg Approx.

#### Main Features

- Image enhancements from digital processing Switchable between 16:9 and 4:3 Dyna chroma and auto knee Flesh tone detail etc.
- 6 vector independently variable masking and linear matrix. Four scene file memories
- Serial digital output (SDI) DI-D5 (optionally)
- Remote filter wheel FD-Z5 (optionally)

#### Standard Composition

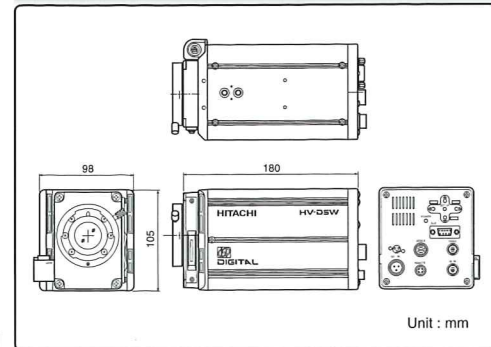
- Camera head HV-D5W
- Operation manual

#### Optional Accessories

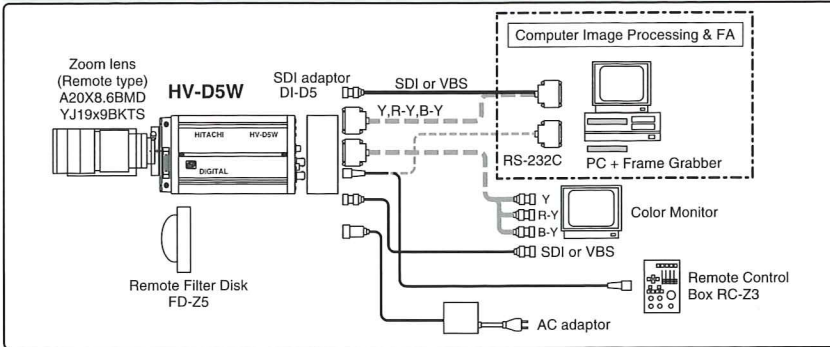
- SDI adaptor DI-D5
- Remote filter disk FD-Z5
- Remote control box RC-Z3

HV-D5W is 3CCD Color Camera with 2/3-inch 16:9 wide aspect CCD, switchable between 16:9 and 4:3

#### Dimensions



#### System Configuration



### HDTV Digital Color Camera

Not available in Europe, NTSC only

## DK-H31



#### Standard Composition

- Camera head DK-H31
- Lens mount cap
- Operation manual

#### Optional Accessories

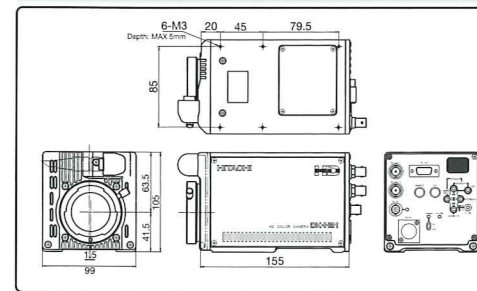
- Camera control panel RC-Z3/RU-3300N
- AC adaptor IA-60a (I.D.X)

#### Main Specifications

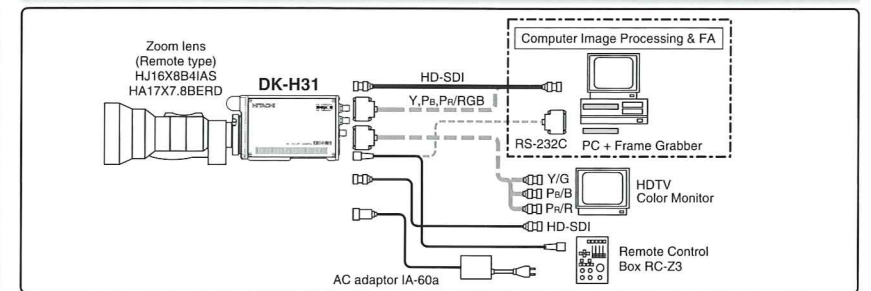
Effective pixels	1920(H) x 1080(V)
Scan format	1080 / 59.94i, 50i
Horizontal resolution	1000 TV lines Y out
S/N	54 dB HD-SDI out
Standard sensitivity	2000 lx, F8
Minimum illumination	0.05 lx (F1.4, +18dB, Integration mode)
Versatile CCD drive functions	Electronic shutter (6 steps), Charge control frame mode, etc.
Improved operation ease	Real-time auto white balance, Intelligent automatic level control (ALC)
Remote control	Possible
Power supply	12 VDC
Dimensions	99(W) x 105(H) x 155(D) mm
Mass	1.5 kg approx.

The use of three 2/3-inch CCD's with 2.2 million pixels each and a single chip DSP with 1.8 M gates provide excellent picture quality and stability. The DK-H31 combines high S/N with an HD-SDI output in a small light weight head.

#### Dimensions



#### System Configuration



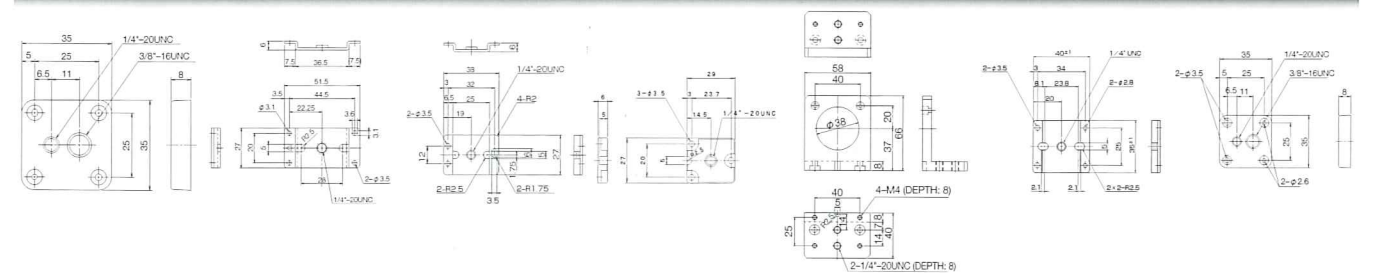
### Accessories Tripod Adaptor

## TA-M1/F3/F30/F200S/120/FD140/D20AB

Tripod adaptors allow the cameras to be mounted to a tripod.



#### Dimensions



### Accessories Camera Cable

## C-201KSM/501KSM/102KSM



The camera cable is used for connecting camera and junction box. Supply 12VDC or external trigger signal to camera.

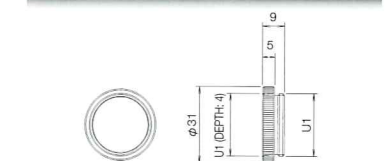
- Molded type
- C-201KSM 2m
  - C-501KSM 5m
  - C-102KSM 10m

### Accessories C/CS Adaptor

## LA-D20AB

C to CS mount adapter. 5mm adapter ring used when C mount lenses are used on a CS mount camera.

#### Dimensions

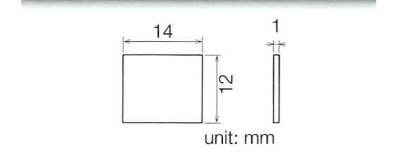


### Accessories Dummy Glass

## ARC1214

Dummy glass is attached instead of IR-cut filter when acquiring near infrared range.

#### Dimensions



### 3 CCD Color Camera with Serial Digital Output

## HV-D15AS



#### Main Specifications

Optical system	1/2-inch, F1.4 prism
Imaging devices	1/2-inch interline CCD
Effective pixels	NTSC:768(H) x 494(V) PAL :752(H) x 582(V)
Horizontal resolution	850 TV lines
S/N (DNR ON)	NTSC:65dB PAL:63dB
Standard sensitivity	2000lx, F11
Minimum illumination	0.3 lx
Power supply	12 V, approx. 8.5W
Dimensions	80(W)x85(H)x134(D)mm
Mass	900g approx.

#### Standard Composition

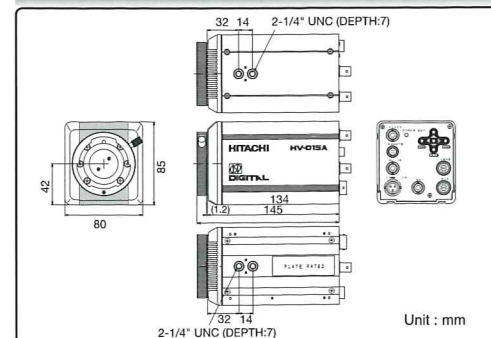
- Camera head (HV-D15AS)
- Lens mount cap
- Power plug (RM12BRG-3S)
- Operation manual

#### Optional Accessories

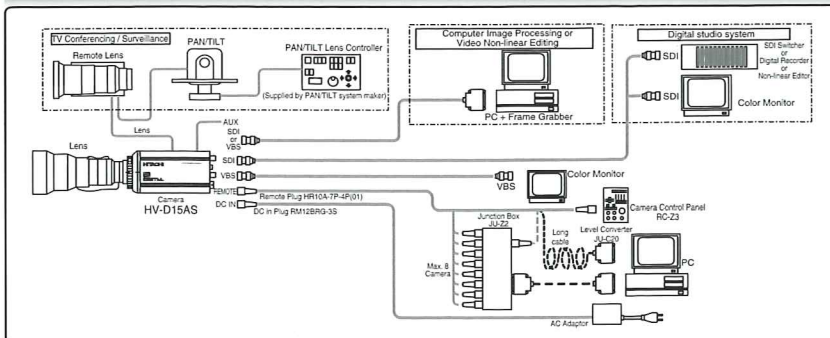
- Remote control box RC-Z3
- Level converter JU-C20
- Junction box (max. 8 cameras) JU-Z2

The Hitachi HV-D15AS is a High-Performance, Multi-purpose Camera with Serial Digital Interface (SDI) video output. Superb picture quality is attained through advanced technology implementation of a Hitachi designed and manufactured 3-million gate, 3rd generation Digital Signal Processor and use of 12-bit analog to digital converters. Hitachi's HV-D15AS establishes a new benchmark for compact size, low-power consumption and high-reliability color camera.

#### Dimensions



#### System Configuration

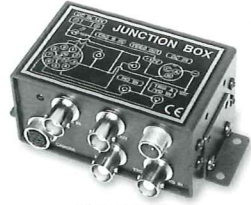




## Accessories Junction Box

### JU-M1A/F30 JC-100

Junction box is used for supplying power or synchronization signal to a camera.



JU-M1A

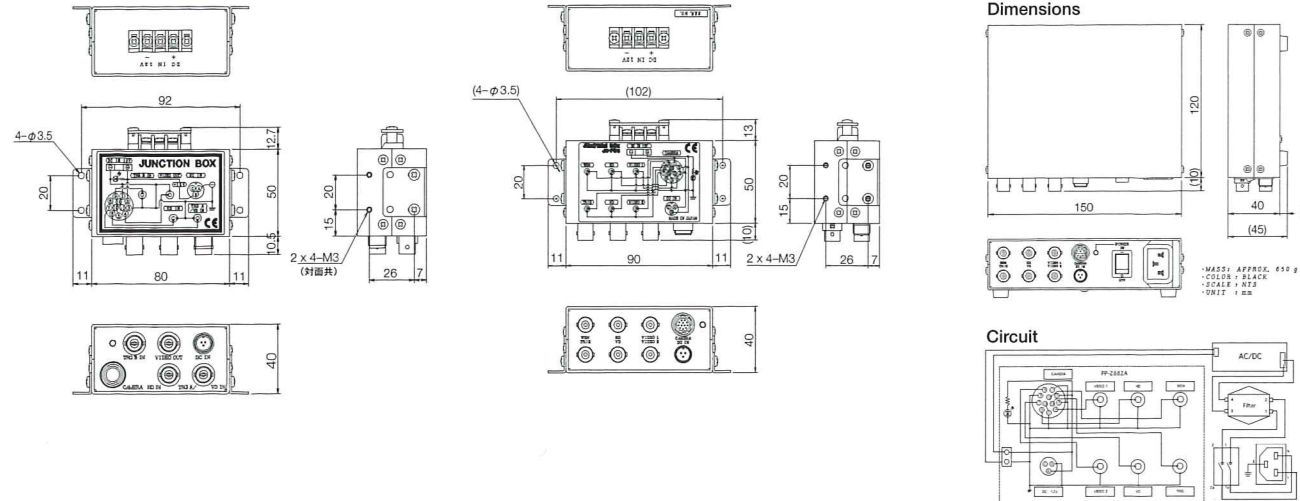


JU-F30



JC-100 with AC cable

#### Dimensions



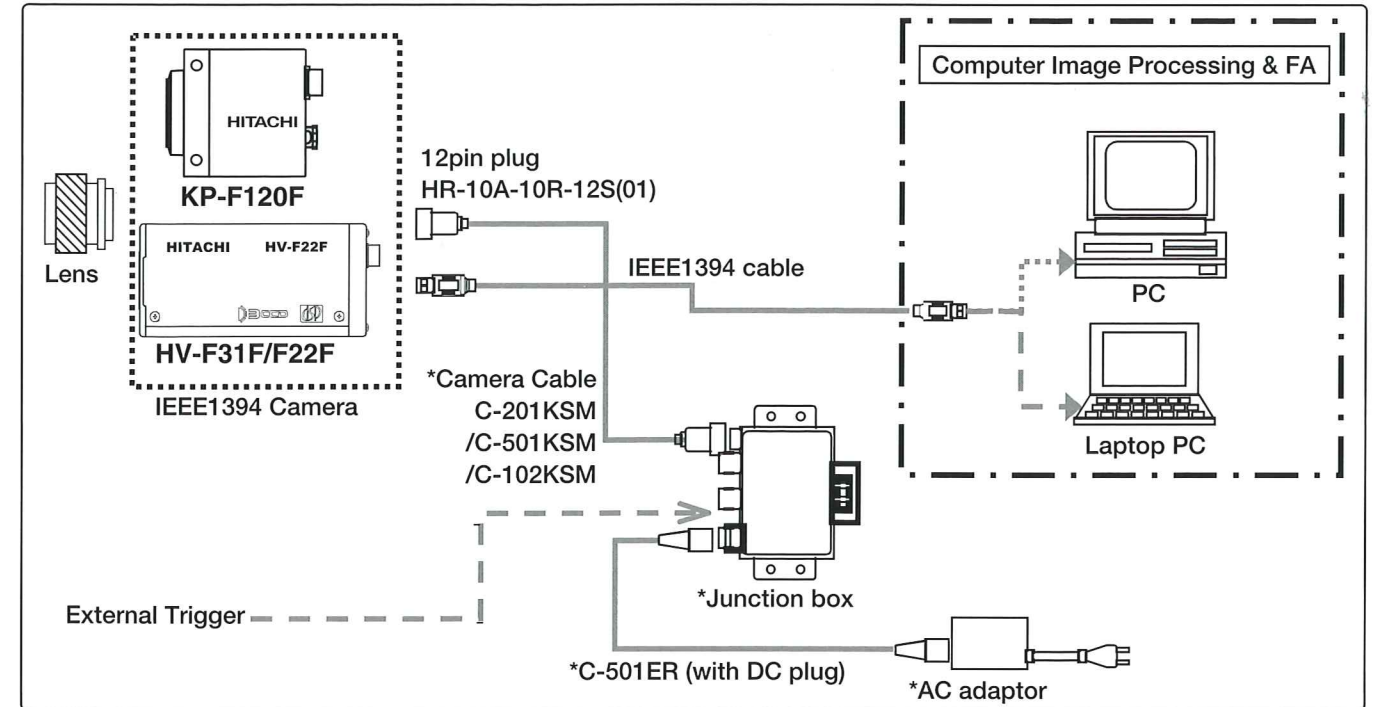
## Technical Data

### IEEE1394 System connection figure

An image is acquired by IEEE1394 camera can without frame grabber board.

An image can be displayed on a monitor and setup can be performed with attached viewer software.

When developing original software, please use SDK (Software Developer Kit).



\* When power can be supplied by PC, the Camera cable, Junction box and AC adaptor are not required.

## 23 Accessories AC Adaptor

### AP-C20/130 UD-240/M1 IA-60A (-HK)

Supplies DC12V to Camera



AP-130



UD-240



UD-M1

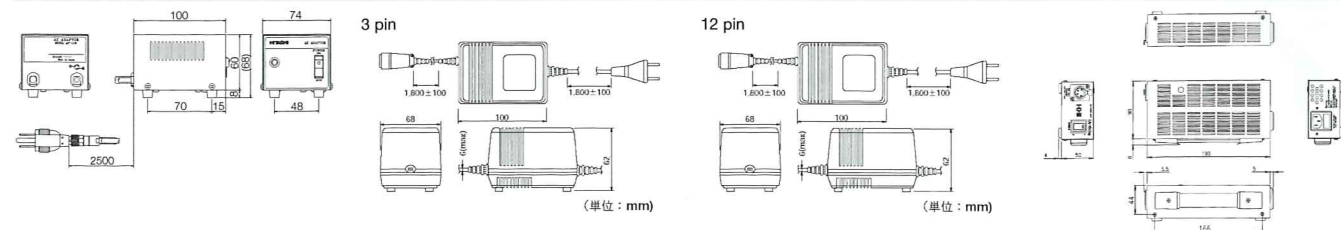


IA-60a (-HK)

#### Main Specifications

Input Voltage	AC100 V, 50/60 Hz	Input Voltage	AC100 V, 50/60 Hz	Input Voltage	AC100 V, 50/60 Hz	Input Voltage	AC100V to 240V
Output Voltage	DC +12V ±1V	Output Voltage	DC +13V	Output Voltage	DC +13V	Output Voltage	DC 12.5V to 16.0V Adjustable HK type: 12.5V (factory setting)
Output Current	350 mA	Output Current	500 mA	Output Current	500 mA	Output Current	500 mA
Power Consumption	Approx. 8 W	Power Consumption	Approx. 16 VA	Power Consumption	Approx. 16 VA	Power Consumption	Max. 80VA
Ambient Temperature	0 to 40 °C	Ambient Temperature	-10 to +45 °C	Ambient Temperature	-10 to +45 °C	Ambient Temperature	-10 to +45 °C
Dimensions	74(W) x 60(H) x 100(D) mm	Dimensions	79(W) x 104(H) x 60(D) mm (without cord and projection)	Dimensions	79(W) x 104(H) x 60(D) mm (without cord and projection)	Dimensions	90(W) x 50(H) x 190(D)mm
Mass	800 g (without power cord)	Mass	0.35 kg (without power cord)	Mass	0.35 kg (without power cord)	Mass	Approx. 850g (without power cord)
Standard Composition	Body, Operation Manual	Standard Composition	Body, Operation Manual	Standard Composition	Body, Operation Manual	Standard Composition	Body, Operation Manual

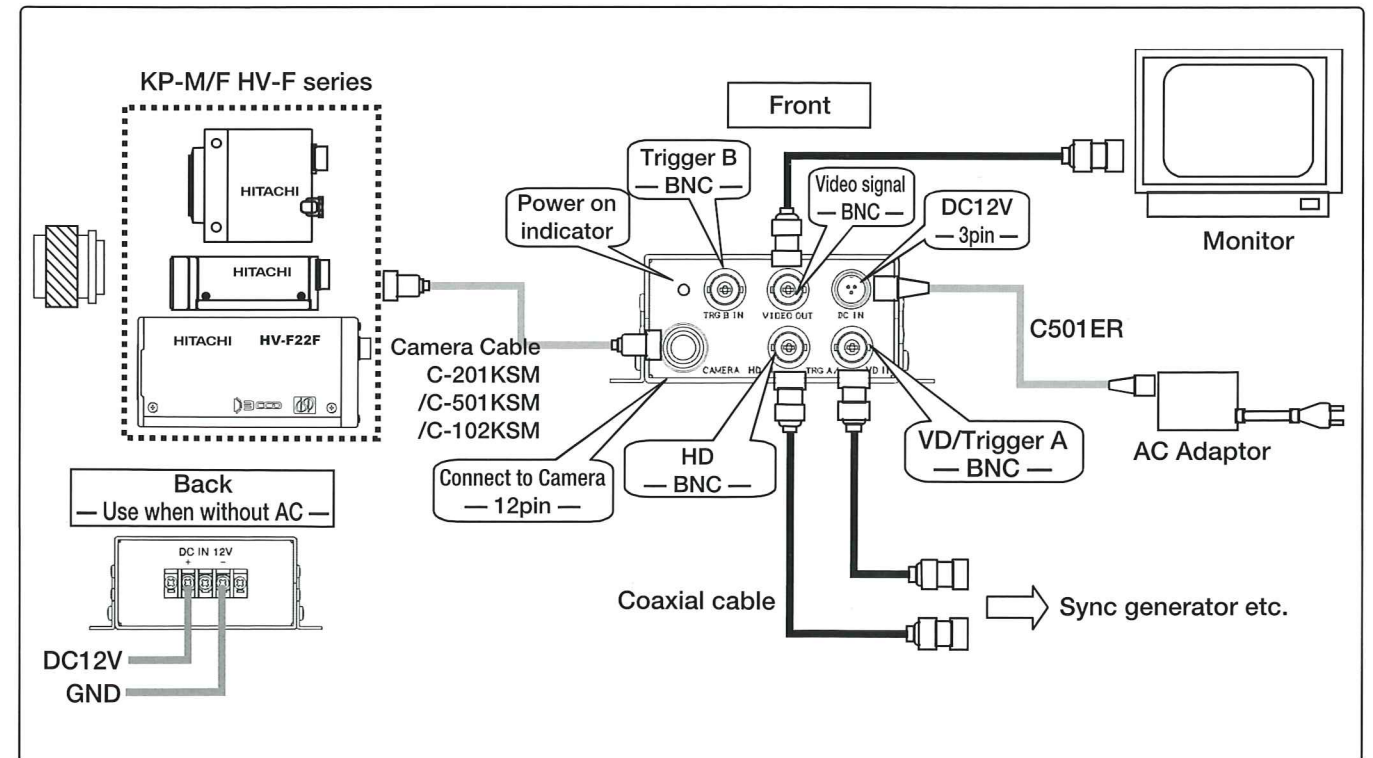
#### Dimensions



## Technical Data

### Junction box connection example

Example showing connection of Junction Box JU-M1A and camera.





# List for Frame Grabber Board

Board Maker	Model	Interface	Color				Black and White																					
			3CCD		1CCD	Mega-pixel			Progressive			Interlace																
			HV-F31CL	HV-F31CL-S1	HV-F22CL	HV-F22CL-S1	HV-D30	HV-D27A / 37A	KP-FD30/M	KP-FD30CL	KP-D20A/B	KP-F200SCL	KP-F200CL-S1	KP-F200CL	KP-F200	KP-F120	KP-F120CL	KP-F100B	KP-F100BCL	KP-F30SCL	KP-F30	KP-F33	KP-F38	KP-F80	KP-F2A	KP-M20 / M30	KP-M22 / 32	KP-M1A / M2A / M3A
Cognex (USA)	MVS-8600	CL																										
CORECO (CANADA)	MVS-8504	Analog																										
	PC-DIG	LVDS																										
	PC-CAMLINK	CL																										
	PC2-CAMLINK	CL																										
	PC2-VISION	Analog																										
	VIPER Digital	LVDS																										
	VIPER CAMLINK	CL																										
	X64-CL	CL (Base)																										
	X64-CL Full	CL (Full)																										
	X64-LVDS	LVDS																										
	X64-AN	Analog																										
Epix (USA)	PIXCI SV5	Analog																										
	PIXCI-D2X	LVDS																										
	PIXCI-CL1	CL																										
	PIXCI-CL2	CL																										
Euresys (BELGIUM)	GrabLink Value	CL (Base)																										
	GrabLink Avenue	CL (Base)																										
	GrabLink Expert2	CL (Base • Mid)																										
	DOMINO Series	Analog																										
Matrix Vision (FRANCE)	mvGAMMA-CL	CL (Base)																										
	mvGAMMA-G	Analog (Monochrome)																										
	mvTITAN-CL	CL (Base/Mid)																										
	mvTITAN-DIG	LVDS																										
	mvTITAN-G1	Analog (Monochrome)																										
	mvTITAN-RGB/G4	Analog (RGB)																										
	mvTITAN-C8/C16	Analog (TV)																										
	mvDELTA	Analog																										
	mvSIGMA	Analog																										
	PCImage-SDIG	LVDS																										
Matrox (CANADA)	Odyssey XCL	CL																										
	Helios-XA	Analog																										
	Helios-XCL	CL																										
	Solios XA	Analog																										
	Solios XCL	CL																										
	ORION	Analog (TV)																										
	METEOR II	Analog (TV)																										
	METEOR II-MC	Analog																										
	METEOR II-Digital	LVDS																										
	METEOR II-CL	CL																										
	CRONOS-PLUS	Analog																										
Mu-Tech (USA)	MV-1500	LVDS																										
	MV-1000	Analog (TV)																										
	MV-510	Analog																										
National Instruments (USA)	PCI-1424																											
	PCI-1428																											
AVALDATA (JAPAN)	APC-3328	Analog (RGB)																										
	APC-3322A	Analog																										
	APC-335	Analog																										
	APC-3310A	LVDS																										
	APC-3310CL	CL (Base)																										
	APC-3316	CL (Full)																										
GRAPHIN (JAPAN)	IPM-8540A	Analog																										
	IPM-8560D	LVDS																										
	IPM-8560CL	CL (Medium)																										
	IPM-8530CL	CL (Full)																										
FAST (JAPAN)	FHC3310	LVDS																										
	FHC3310CL	CL																										
	FVC04	CL (Base)																										
MICRO-TECHNICA (JAPAN)	MTPCI-DC2	Analog (Color TV Format)																										
	MTPCI-TL	CL (Base)																										
Linx (JAPAN)	GINGA++M2/M4	Analog																										
	GINGAdigital-LV	LVDS																										
	GINGAdigital-CL2	CL (Base/Mid)																										
Renesas Northern Japan Semiconductor (JAPAN)	VP-910A	Analog																										
	NVP-930N	Analog																										
	NVP-930CL	CL (Base)																										
	NVP-935N	Analog																										
	NVP-935CL	CL (Base)																										
Hitachi information & Control Solutions (JAPAN)	IP-5000	Analog																										
	IP-5010	Analog																										
	IP-7000	Analog																										
	IP-7500	Analog																										
DECSYS (JAPAN)	DS-3400	Analog (Option: Digital)																										
	DS-3200	Analog (Option: Digital)																										

\*1: KP-F33-S1 is the ◎ \*2: KP-F80-S1 is ※ ,too \*3: HV-D30 is ◎ ,too  
 ◎ : Board maker official support ○ : Local confirmation at Hitachi Kokusai Electric or each board agency ※ : During confirmation

# List for Optional Lens

## PENTAX CO., LTD.



C1614-M



C2514-M



C3516-M

	High Resolution	Manual Iris	Fixed Focal Lens	Manual Zoom lens
Model	C1614-M	C2514-M	C3516-M	H6Z810
Image Format	2/3 type	2/3 type	2/3 type	1/3 type
Focal Length	16mm	25mm	35mm	8 to 48mm
Maximum Relative Aperture	F1.4	F1.4	F1.6	F1
Iris range	F1.4 to 16	F1.4 to 16	F1.6 to 16	F1 to F22
Horizontal Angle of View	30.97°	20.00°	14.76°	32.99 to 5.86°
M.O.D.	0.25m	0.25m	0.4m	1.2m
Mount	C	C	C	C
Size	ø29.5 x 33.2mm	ø29.5 x 33.2mm	ø29.5 x 33.2mm	ø57 x 95mm
Mass	Approx. 63g	Approx. 55g	Approx. 64g	Approx. 430g

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 FAX : +49-40-561-92-334  
 Mail : cctv@pentax.de

## FUJINON Co., Ltd.



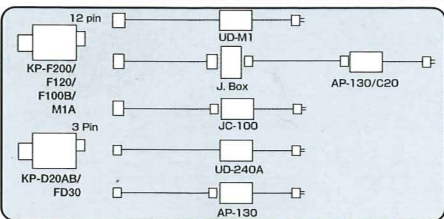
	Lens for 3CCD camera		



# List of Accessories

		Color						Black and White									
		3CCD			1CCD			Mega-pixel			Progressive			Interlace			
		HV-F22CL / F22CL-S1 HV-F31CL / F31CL-S1	HV-D30 / D20	HV-D27A / D37A	KP-FD30 / FD30M	KP-FD30CL	KP-D20A / B	KP-F200SCL	KP-F200 KP-F200CL / 200CL-S1	KP-F120 / F120CL	KP-F100B KP-F100BCL	KP-F30SCL	KP-F30 / F33 / F37 KP-F38 / F80	KP-F2A (Legacy model) KP-F3 / F3W / F3-S2 (Legacy model)	KP-M20 / M30	KP-M1A / M2A KP-M3A / M2R	KP-MB1A / MB1B KP-MC1A / MC2A
AC Adaptor with Junction (*2)	JC-100	○															
AC Adaptor (*2)	AP-130					○											
	AP-C20 (*1)		○	○	○	○											
	UD-240A				○	○											
	UD-M1																
Junction Box	JU-M1A																
	JU-F1																
	JU-Z2		○	○													
	JU-F30																
C/CS-mount Adaptor	LA-D20AB																
Tripod Adaptor	TA-F200S																
	TA-M1																
	TA-F3																
	TA-F30																
	TA-120																
	TA-D20AB																
	TA-D20AB																
Camera Cable	C-201KSM																
	C-501KSM	○															
	C-102KSM																
Camera Cable	C-301KAJ																
	C-102KAJ			○													
	C-202KAJ																
RGB Cable	C-501RR/ C-102RR		○		○												
	C-501RR/ C-102RR		○		○												
15pin Plug	KEC-15P		○		○												
12pin Plug	HR10A-10P-12S	○															
6pin Plug	HR10A-7P-6P																
4pin Plug	HR10A-7P-4P		○	○													
Lens Plug	E4-191J-100		○		○												
DC Plug	R03-P3F		○	○	○												
Dummy Glass	ARC1214																
Remote Control	RC-Z3	○	○														
CameraLink Cable 2m	14B26-S2LB-200-0LC																
CameraLink Cable 3m	14B26-S2LB-300-0LC																
CameraLink Cable 5m	14B26-S2LB-500-0LC	○				○											
CameraLink Cable 10m	14B26-S2LB-A00-0LC																
Mini-CameraLink Cable 2m	1MA26-3560-00C-200																
Mini-CameraLink Cable 3m	1MA26-3560-00C-300																
Mini-CameraLink Cable 5m	1MA26-3560-00C-500																
Mini-CameraLink Cable 10m	1MA26-3560-00C-A00																

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\*IEEE1394 type cameras are not listed above.  
 (\*1): Use AP-C20 by a combination with C-501ER (B constitution)  
 (\*2): In AC adaptor use ○: AC adaptor is available alone  
 ○: Junction BOX is necessary  
 (\*3): For CameraLink Cameras

**CAUTION:** To ensure safe operation, please read the instruction manual before using this product.

These Specifications are subject to change without notice.

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