Hitachi Kokusai Electric Inc.

HITACHI

High precision digital processing

3CCD progressive scan color camera
HV-F31/F22

IEEE 1394

camera link

Outline

Camera Link
HV-F31CL : 1/3" XGA (1024×768)
30 frame/second
HV-F22CL : 1/2" SXGA (1360×1024)
15 frame/second
IEEE1394
HV-31F : 1/3" XGA (1024×768)
7.5 frame/second (RGB)
HV-22F : 1/2" SXGA (1360×1024)
7.5 frame/second (RGB)

Features

• Excellent color in image capture

• High resolution

• Auto shading correction

• Independent six color adjustment

• IEEE1394 IIDC(Ver. 1.30) / Camera Link

Example Applications

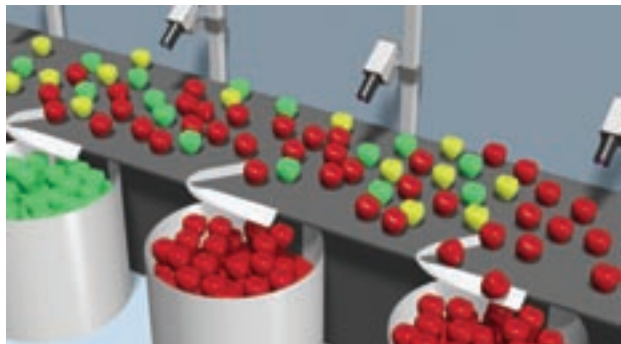HV-F31 and HV-F22 are designed for a wide range of applications.

■ Printing Check Detection of uneven printing

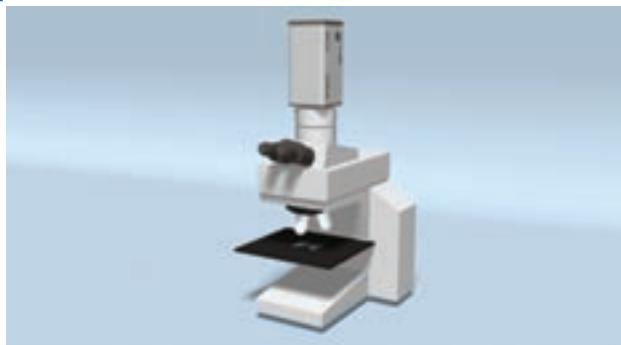

■ Fruit Check Check on fruit damage and ripening

■ Car Body Coating Check on uneven coating and scratches

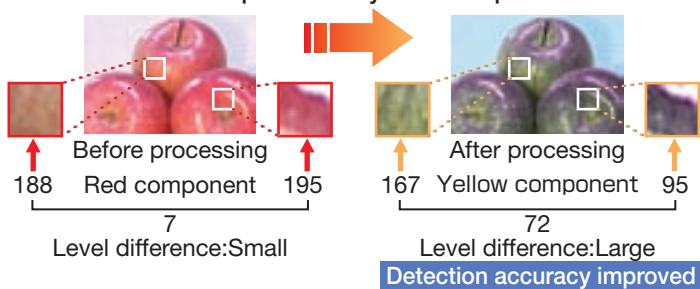

■ Biological Microscope Observation of cells

Merits of 3-CCD Camera

Color Detection
(optimum for check on uneven printing and fruits)

Subtle color differences are detectable by processing (emphasis or subtraction) of a specific color using 6-color independent masking.

- **Example of improved detection accuracy on apple ripening level**

Comparison after subtraction of a red component and emphasis of a yellow component

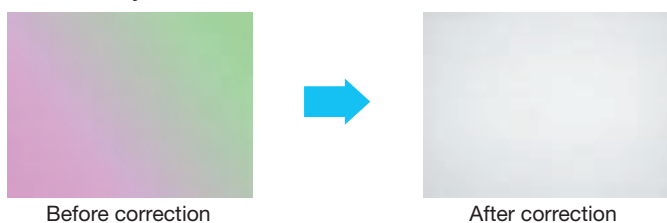| Before processing	After processing
188 Red component 195	167 Yellow component 95
7	72
Level difference:Small	Level difference:Large
	Detection accuracy improved

(Note) This camera is not used for output of the above numeral (resolution in 8bit). It is output of a processed image.
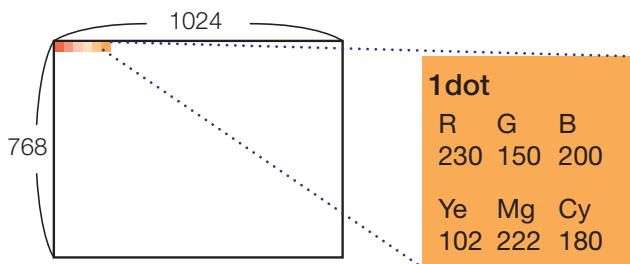
- Because arithmetic operation is performed inside the camera, it will not apply a load to the CPU of equipment, so high-speed image processing is ensured.

6color Independent Masking

1024

768

1dot

R	G	B
230	150	200

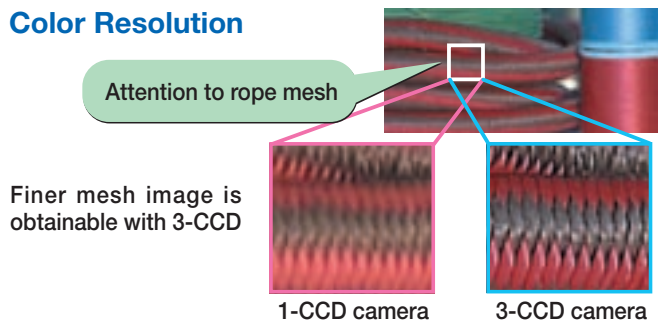| Ye	Mg	Cy
102	222	180

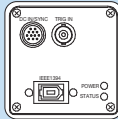Each color of R,G,B,Ye,Mg and Cy can be represented and changed as an independent numeric value.

Colors are freely changeable and the foloowing are available.

- ●Detection of a specific color
  - ·Natural color reproduction
  - ·Red alone changed

Auto Shading

Color shading (uneven color) due to lens and lighting can be automatically corrected.

Before correction   After correction

Color Resolution

Attention to rope mesh

Finer mesh image is obtainable with 3-CCD

1-CCD camera   3-CCD camera

Comparison of Interfaces

	HV-F31CL/F22CL	HV-F31F/F22F
Interface	Camera Link	IEEE1394
Cable length	10m	4.5m
Connector	26P×2(medium configuration) ※ Base configuration applicable	6Pin(with lock)
Transmissible Data volume	900Mbps(medium configuration) 700Mbps(base configuration)	400Mbps
Remote control	CameraLink API	IIDC
Rear view		

Caution For power supply from IEEE1394, contact the sales representative.

IEEE1394

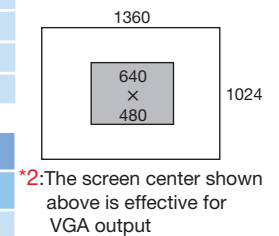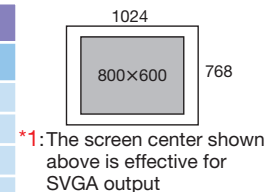■ **Features** •Direct PC connection without using a frame grabber board

•Small-diameter cable

•Multiple cameras connectable by use of hub

■ **Specifications** •Compatible OHCI, 400Mbps

•Non-compression

•Conforming with IIDC1.3

Transmission Format

The HV-F31F/F22F cameras allow transmission of an image with its size changed by remote operation.

HV-F31F

Camera mode		Frame Rate	bit/pixel	bit/ch
XGA(1024×768)	YUV	15	16	8
	RGB	7.5	24	8
SVGA(800×600) *1	YUV	30	16	8
	RGB	15	24	8
XGA(1024×768)	RGB	3.75	48	10

HV-F22F

Camera mode		Frame Rate	bit/pixel	bit/ch
SXGA(1280×960)	YUV	7.5	16	8
	RGB	7.5	24	8
VGA(640×480) *2	YUV	30	16	8
	RGB	30	24	8
SXGA(1360×1024)	YUV	7.5	16	8
	RGB	7.5	24	8
	RGB	1.875	48	10

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

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

HV-F31CL

Camera mode		Frame Rate	bit/pixel	bit/ch
XGA(1024×768)	RGB	30	30	10

HV-F22CL

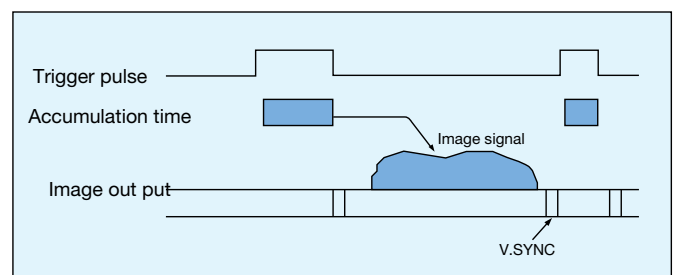| Camera mode		Frame Rate	bit/pixel	bit/ch
SXGA(1360×1024)	RGB	15	30	10

Application

Various camera functions, such as a Shutter, Gamma, Masking, etc, are available for adjustment through the easy to use GUI software which is included with the camera.

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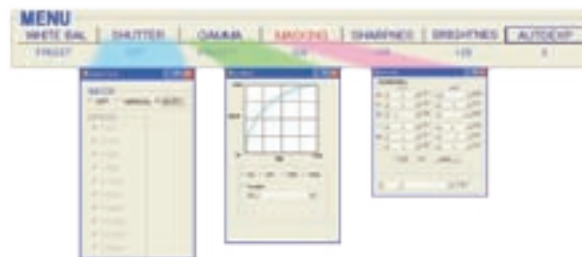
Frame On-demand function

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

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

Trigger pulse

Accumulation time

Image signal

Image out put

V.SYNC

RGB spectral response characteristics

HV-F22 spectral response characteristics
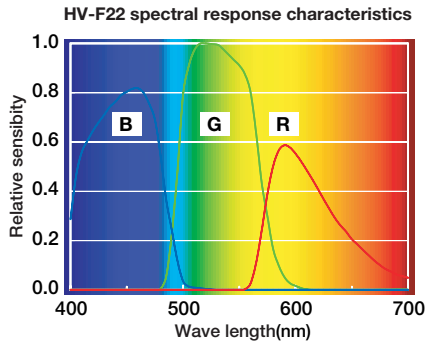
Pin arrangement

■ Camera Link (HV-F31CL/F22CL)

3M 10226-2200VE

	connector1				connector2		
1	GND	14	GND	1	GND	14	GND
2	X0−	15	X0+	2	Y0−	15	Y0+
3	X1−	16	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	ExtVD[CC1]−	22	ExtVD[CC1]+	9	NC	22	NC
10	Trig[CC2]+	23	Trig[CC2]−	10	NC	23	NC
11	ExtHD[CC3]−	24	ExtHD[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 55395-0611

1	+12V IN
2	GND
3	TPB−
4	TPB+
5	TPA−
6	TPA+

■ 12pin(common)
HIROSE HR10A-10R-12PB(01)

1	GND	7	VD IN
2	+12V IN	8	GND
3	GND	9	TRIG(H)
4	FLASH OUT	10	TRIG(C)
5	GND	11	+12V IN
6	HD IN	12	GND

When using lens

Caution !
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≦ ΓΓ4.0mm(HV-F22)

Lens flange face
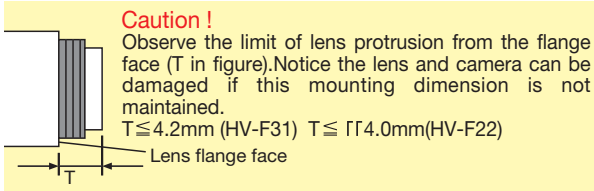
Specifications

	HV-F31	HV-F22
Frame rate	30f/s(F31CL)15f/s(F31F)	15f/s(F22CL)7.5f/s(F22F)
Pixel Clock	28.8MHz	
CCD	1/3"	1/2"
Imaging area	4.76(H)×3.57(V) mm	6.32(H)×4.76(V) mm
Effective pixels	1024(H)×768(V)	1360(H)×1024(V)
Unit cell size	4.65(H)×4.65(V)um Square pixel	
Gain	AGC(0～+12dB)	
Trigger	One trigger mode	
Shutter	1/100,000～1/30～4(seconds)	1/100,000～1/15～4(seconds)
Ambient	operating 0～+40℃(+32 ° F to +104° F)	
Vibration	29 m/s2 (3 G)	
Shock	490 m/s2 (50 G)	
Power supply	12V nominal Approx.9W	
Dimensions	65(W)×65(H)×130(D) mm	
Mass	Approx. 600 g (21 oz) (not including lens)	

Dimension

※All models common dimension

2-1/4"UNC(DEPTH:7)
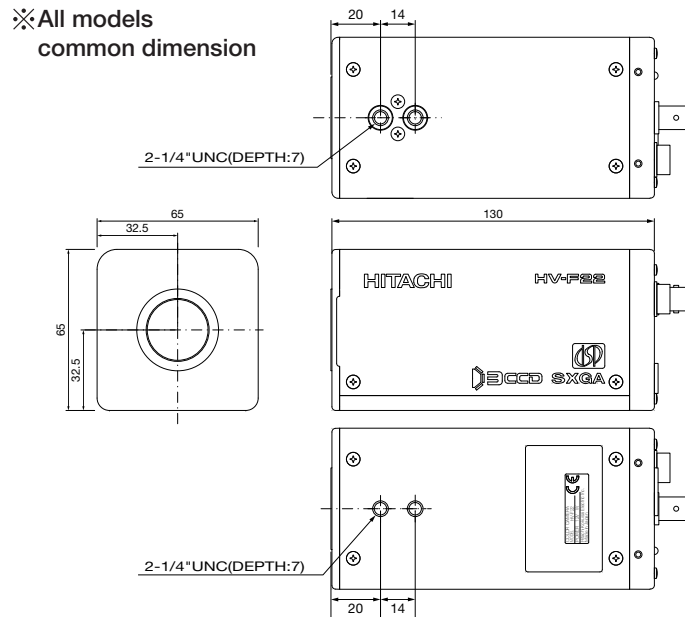
Standard Composition

Camera 1
Operation Manual 1
Sample Software 1
 (CD-ROM)

Optional Accessories

IEEE1394Cable 1
Junction Box 1
 (JU-M1A)

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

These Specifications are subject to change without notice.

Hitachi Kokusai Electric Inc.

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