

Gigabit Ethernet Progressive scan CCD color camera HV-F32GV Specifications (Tentative)

RoHS Compliant
Directive 2002/95/EC

1. General

The HV-F32GV is an VGA high precision 3CCD progressive scan color camera, which has single chip digital processing LSI, a C mount prism, three 1/3-inch 330,000 pixels square CCDs.

Our original digital image signal processing technology performs the high picture quality signal processing and the picture compensating functions, beyond the capability of the other conventional analog cameras.

By adoption of Gigabit Ethernet interface, high-speed connection of maximum of 1 Gbps can be possible.

2. Outstanding features

(1) High performance color reproduction

The 1/3-inch 330,000 pixels square lattice progressive scan CCD and the dichroic prism for RGB color achieve a resolution of VGA (660(H) x 494(V)) picture and good color reproduction.

(2) Small-sized camera

The camera is given new externals. Therefore, the camera has the realization of small-sized shape of 55 (W) x 55 (H) x 89 (D) mm.

(3) Gigabit Ethernet interface

Gigabit Ethernet IEEE802.3ab (1000BASE-T) support

High-speed serial interface Gigabit Ethernet is supported and direct connection is possible to PC by the diameter cable of thin as compared with parallel output. It is possible to 100m.

GigE Vision (Ver. 1.00) support

Based on Industrial camera interface standard GigE Vision, a maximum of 2Gbps high speed data transmit is available and suitable for image processing. (When using 2 connectors)

Gen<i>Cam (Ver. 1.00) support

Development of camera control system is easy because industrial camera control API "Gen<i>Cam" lead EMVA (European Machine Vision Association).

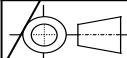
PoE support

Power supply can be input via Ethernet cable (Power over Ethernet).

When not connected to PoE, the power supply can be input from the DC IN/SYNC connector.

GigE Vision™ and the distinctive logo are trademarks of AIA (Automated Imaging Association).

Ethernet is a trademark of XEROX Corporation.

-	Sep.17,2015	(first edition)				K.Kageshita	K.Kageshita
SYMBOL	DATE	DESCRIPTION				(DRAWN)	DESIGNED
MODEL HV-F32GV		TOLERANCE		Prod. Code - Order No.			
DESIGNED	DATE	APPROVED	DATE	UNIT		TITLE HV-F32GV	
CHECKED	DATE	STORED	DATE	SCALE		REV. 0	
Hitachi Kokusai Electric						DWG. No. E400509878	
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(4) C mount lens adapter

The de facto industry standard C mount lens adapter allows choosing from a various type of lenses and optical systems.

(5) Digital processing for various picture quality enhancements

- Independent six colors masking is the Hitachi innovation for optimizing color balance. The saturation and the hue of 6 colors (Red, blue, green, cyan, magenta and yellow) are adjusted independently to deliver the best color in image capture, microscope and other applications.
- It is equipped with the in out gradation control function using LUT. Other than normal gamma 0.45 conversion, the function can set the conversion of in out gradation using look up table (LUT) as a user option.

(6) Auto shading correction (ASC)

Color shading due to the aberration of C mount lens is automatically compensated (reduced).

(7) Versatile CCD drive functions

- Video frame capture on demand using external trigger signal.
- Long integration mode.
- Auto electronic shutter (AES) mode for stabilized video level.

(8) Versatile imaging functions

- Four application files.

User settings provided for sharpness(detail), masking etc.

- Scene color temperature is detected in dynamic for automatic white balance adjustment.

By varying the detection area in a scene, the whole white balance can be controlled in only the area. Thus, even if a light source of a different color temperature enters the scene (e.g., situation often occurs in a retail showroom suddenly exposed to outdoor lighting when the entrance door opens), white balance is not severely disturbed.

- Auto exposure (ALC : auto level control)

It can respond the changes in extremely high light by the digital measurement and AGC (Automatic gain control), AES control using micro computer. In addition, AUTO EXPOSURE (ALC) setting level and the peak/average of the AUTO EXPOSURE(ALC) characteristics can be set through menu screen.

- Gain control

AGC(Automatic gain control) and manual gain control are available to select.

- Master black, R/B black, and R/B gain are variable.

(9) LED indicator

A power supply status and a communication status can be checked in RJ-45 connector LED.

3. Specifications

A	(1) Imaging device (sensor type)	1/3-inch progressive scan interline CCD (x 3 sensors)
	Effective pixels (Active area)	660 (H) x 494 (V) (x 3 sensors for RGB) : Resolution
	Pixel size	7.4 μm square lattice
	- scanning area (Pixel area)	4.884mm (H) x 3.656mm (V)
	- Readout type, Transfer type	progressive scan, Interline transfer
	(2) Scanning mode	full pixel sequential scan
	(3) Scanning frequency	Horizontal : 101.14kHz / Vertical : 200.27Hz / Pixel : 60.0MHz
B	(4) Optical system	1/2-inch F2.2 prism with IR cut filter
	(5) Lens mount	C mount Mount surface projection less than 4.0mm

(Lens selection guideline)

Use the lens less than 4.0mm as the projection item from the lens flange surface.

To obtain a good picture image by high resolution and few chromatic aberration, it is necessary to choose an appropriate high resolution 3CCD type lens.

When using lens other than 1/3 type, there may be vignetting or insufficiency of light around the image or occurrence of flare in the image, in this case combinational lens selection is necessary.

C	(6) Flange focal distance	17.526 mm (Air conversion)	
	(7) Sensitivity	2000 lx, F4, light source halogen lamp temp.: 3200K Shutter : 1/200s, Gain 0dB	
	(8) Gamma	0.45 / 1.0 / LUT (Look Up Table : user customizable)	
	(9) Gain	Manual : 0 to 12 dB / AGC : 0 to 12 dB (with limit setting)	
	(10) White balance	Manual / One-push Auto / Continuance Auto	
	D	(11) Video output	Gigabit Ethernet IEEE802.3ab(1000BASE-T) standard GigE Vision Camera Interface Standard for Machine Vision Version 1.00 support Control : Gen<i>Cam Version 1.00 support
		(12) Video output format	24bit (R:8bit, G:8bit, B:8bit) : 200FPS Table is described later.
		(13) Quantization level information	Maximum data : 255 (8bit), 1023 (10bit), 4095 (12bit) Video 100% white : 255 (8bit), 1023 (10bit), 4095 (12bit) Video 0% black : 0, Minimum data : 0

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A	(14) Electric shutter speed		OFF / Auto (AES) / Manual (VARIABLE)	
	Variable shutter mode		Exposure time : approx. 1/100,000 to 1/200 second	
	AES mode		Exposure time : approx. 1/100,000 to 1/200(shutter OFF) second	
	Long time integration mode		Exposure time : approx. 1/200 to 10 seconds (1 frame steps)	
	(15) Sync system		Internal / VD external	
B	(16) External trigger shutter			
	Input mode		Fixed shutter : adjustable for polarity and delay One trigger : adjustable for polarity and delay VD Sync Reset: negative, frequency Approx. 200.27Hz	
	Input path		Via Gigabit Ethernet cable (Software trigger) DC IN / SYNC connector (Hardware trigger)	
	Input level		5Vp-p ± 0.5V	
	Output		strobe signal VD output : negative, frequency Approx. 200.27Hz	
	Synchronous output		DCIN/SYNC connector	
	Output level		5Vp-p	
C	(17) Registration		Full screen 0.05% (not including lens response)	
	(18) Vertical contour correction		2H	
	(19) Sharpness (DTL)		Level, WIDTH	
	(20) Color masking		OFF / ON (6 color independent masking)	
	(21) Paint black		Adjustable	
	(22) Black level		Adjustable	
	(23) Knee		Adjustable (Knee point and Knee slope)	
D	(24) Power supply		DC+12V ± 1V (input from DC IN / SYNC connector) 48 V (PoE)	
	(25) Power consumption		DC+12V Approx. 700mA (Approx. 8.4W)	
	(26) Ambient temperature		(without dew condensation)	
	Performance		0 to +40°C (+32 to +104 F), less than 90 % RH	
	Operation		-10 to +40°C (+14 to 104 F), less than 90 % RH	
	Storage		-20 to +60°C (-4 to 140 F), less than 70 % RH (without dew condensation)	
E	(27) External dimensions		55(W) x 55(H) x 89(D) mm (not including protrusions)	
	(28) Mass		Approx. 350g (without lens)	
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(29) Remote control

(a) Control system

Gigabit Ethernet IEEE802.3ab(1000BASE-T) support

(b) Communications control system

Gen<i>Cam Version 1.00 support

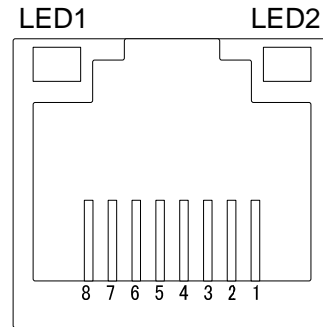
(c) Control items

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|---------------------------------|--|
| 1. Variable shutter | 10 to 1/100,000 second |
| 2. Trigger Mode | Fixed shutter, One trigger, VD reset |
| 3. Gain | |
| 4. AUTO EXPOSURE | |
| 5. White balance | |
| 6. Gamma | |
| 7. 6 vector independent masking | |
| 8. Paint black | |
| 9. Sharpness | |
| 10. Brightness | |
| 11. 24bit / 30bit / 36bit | Factory setting: 24bit |
| 12. Trigger pulse polarity | Factory setting: POS |
| 13. Trigger input | Software or DCIN/SYNC connector
Factory setting: DC IN / SYNC |
| 14. Output signal | OFF, FLASH OUT and VD OUT
Factory setting: OFF |
| 15. Application files | |

6. Specification of Digital output connector

(1) Gigabit Ethernet connector1/connector2

PIN NO.	Signal
1	TRP1+
2	TPR1-
3	TRP2+
4	TPR3+
5	TRP3-
6	TRP2-
7	TRP4+
8	TRP4-



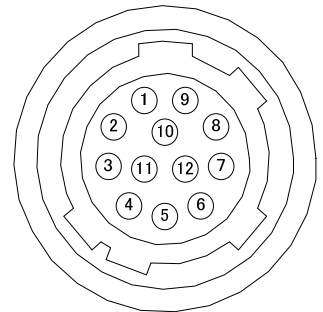
Connector : RJ-45

*LED Status

STATUS	LED 1	LED 2
Power ON	Green Light On	Yellow Light On
1Gb transmission	Green Light On	Yellow Blink On
100Mb transmission	Red Light On	Yellow Blink On

(2) 12-pin connector

PIN NO.	Signal	PIN NO.	Signal
1	GND (+12V)	7	TRIG-A / VD (H) IN
2	+12V	8	TRIG-B (C) IN
3	GND	9	TRIG-B (H) IN
4	N.C.	10	FLASH A / VD OUT
5	GND	11	N.C.
6	FLASH B OUT	12	TRIG-A / VD (C) IN



Connector (camera side) : SAMWOO SNH-10-12 (RPCB) or equivalent

Plug (matching cable plug) : Hirose HR10A-10P-12S (01) or equivalent

Please do not unplug and insert cable (camera cable) with a power supplied to a camera. Install clamp filter (ZCAT 2035-0930A: TDK) at both ends (camera and video processor ends) in the CE marking region.

Please do not connect 1 pin and 3/5 pin when using PoE. When connecting it, PoE may stop the power supply. And do not use PoE with power supply on 12-pin connector. TRIG-A/VD and TRIG-B are photo coupler input, 8/12/5 pin is isolated with 1/3 pin. When 8/12/5 pin is connected to GND, please connect to 3 pin.

Note: Please do not input any signal to N.C. pin because machine may break down.

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7. Video output format (main format pattern)

Data length	Horizontal Pixels	Vertical Pixels	FRAME RATE	support standard format
24bit(R:8bit, G:8bit, B:8bit)	660 (R,G,B)	494 (R,G,B)	Approximately 187.76FPS	GVSP_PIX_RGB8_PACKED, GVSP_PIX_BGR8_PACKED
32bit(R:10bit, G:10bit, B:10bit)	660 (R,G,B)	494 (R,G,B)	Approx.140.82FPS	GVSP_PIX_BGR10V1_PACKED
48bit(R:12bit, G:12bit, B:12bit)	660 (R,G,B)	494 (R,G,B)	Approx.93.88FPS	GVSP_PIX_BGR12_PACKED
16bit(Y:8bit, U:8bit, V:8bit)	660(Y)	494 (Y,U,V)	Approx.200FPS	GVSP_PIX_YUV422_PACKED
24bit(Y:10bit, U:10bit, V:10bit)	660(Y)	494 (Y,U,V)	Approx.187.66FPS	(original format) YUV422_10bit
24bit(Y:12bit, U:12bit, V:12bit)	660(Y)	494 (Y,U,V)	Approx.187.76FPS	(original format) YUV422_12bit

Frame rate can not be output until the multiplied data of frame rate, horizontal pixels, vertical pixels and data length is less than 1GByte(The maximum amount of data depends on how to use the band of Gigabit Ether Net).

8. External view

Technical drawings of the Hitachi E400509878 video output module. The drawings include a top view, a front view, a rear view, and a side view. Dimensions are provided in millimeters and inches. Key features include a DC IN SYNC port, an Ethernet port, and a label with 'PLATE RATED' and 'SER. NO.' information. The mass is noted as approximately 350g.

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Notice:

These specifications are subject to change without prior notice due to product improvement. Confirm the most recent specifications at time of order.

Hitachi Kokusai Electric certifies this product complies with the standard warranty conditions of Hitachi Kokusai Electric, and that quality control is implemented to the extent required to comply with these conditions.

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Warranty and service:

- 1) The guarantee period is two year after the data purchase. However, the defects due to erroneous use or intentional act are excluded.
- 2) As the defect after expiration of the guarantee period, where product repair is possible, repair will be performed at charge.
- 3) The present Warranty pertains only to the camera unit. Secondary malfunctions attributable to camera failure as well as expenses incurred by disassembly and reassembly of the related system, are beyond the scope of this Warranty.
- 4) Compensation for loss of business, loss or damage to software, database and other contingent losses are beyond the scope of this Warranty.
- 5) Hitachi Kokusai Electric Inc. is not liable for the losses caused when the equipment is used in a system, use for business trades, production process, medical fields, crime prevention applications, etc.
- 6) The parts used in the equipment have their respective lives. The lives of such parts will be shortened under the environments of high temperature or high humidity. When the stable operation is required for a long time, it is recommended to perform periodical maintenance and inspection every year or every two years.

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