

3CCD color camera

HV-F130GV

Operation Manual



Thank you for purchase this fine Hitachi Kokusai Electric CCD camera.
Before using the camera, please read this operation manual carefully.
There is a possibility that the revised edition is exhibited on web.
Please confirm by web shown in an Installation Guide.

Hitachi Kokusai Electric Inc.

RoHS Compliant

These products comply with the requirement of the RoHS (Restriction of the use of Certain Hazardous Substances in Electrical and electronic Equipment) Directive 2002/95/EC.

EU Declaration of Conformity (No. KV-0393A)

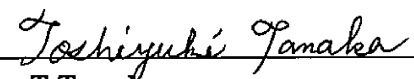
1	Apparatus model/Product (product, type, batch or serial number): HV-F130GV / sample001	
2	Name and address of the manufacturer or his authorised representative:	Manufacturer: Hitachi Kokusai Electric Inc. 2-15-12 Nishi-shimbashi, Minato-ku, Tokyo 105-8039, Japan Authorised representative in Europe : Hitachi Kokusai Electric Europe GmbH Siemensstr.9 D-63263 Neu-Isenburg Germany
3	This declaration of conformity is issued under the sole responsibility of the manufacturer.	
4	Object of the declaration (identification of apparatus allowing traceability;)	CCD Camera : Model HV-F130GV
5	The object of the declaration described above is in conformity with the Union harmonisation legislation listed in section 6 :	
6	Applied Union harmonised legislation and references to the relevant harmonisation standards used, including the date of the standard, or references to the other technical specifications, including the date of the specification, in relation to which conformity is declared:	
	Documents No	Title
	Directive 2014/30/EU EU harmonized Standards	EU EMC Directive (March 2014) EN 61000-6-3:2007/A1:2011/AC:2012 EN 61000-6-1:2007
	Directive 2011/65/EU EU harmonized Standards	EU RoHS Directive (July 2011) EN50581 : 2012
7	Notified body involved ---	
8	Additional information: ---	
	Signed for and on behalf of: Hitachi Kokusai Electric Inc.	
	(place and date of issue):	2-15-12 Nishi-shimbashi, Minato-ku, Tokyo 105-8039, Japan 11 July, 2016
	(name,function) (signature):	 T.Tanaka Senior Manager Product Quality Assurance Department Quality Assurance Division Hitachi Kokusai Electric Inc.

Table of Contents

1. Overview	2
2. Standard composition	2
3. Features	3
4. Section name and functions.....	4
5. Camera mounting (Attention :Hot!).....	4
6. Lens.....	4
7. Connector & LED	5
8. Representative example of video output scheme	6
9. System example.....	7
10. Functions and operations.....	9
10.1. DeviceControl Category	9
10.2. ImageFormatControl Category	13
10.3. AcquisitionControl Category	16
10.4. DigitalIOControl Category	19
10.5. CounterAndTimerControl Category.....	20
10.6. AnalogControl Category.....	21
10.7. LUTControl Category.....	25
10.8. AutoLevelControl Category	26
10.9. PixelCorrection Category	27
10.10. DigitalNoiseReduction Category	28
10.11. AutoSetupStatus Category	28
10.12. TransportLayerControl Category.....	28
10.13. GigEVision Category.....	29
10.14. UserSetControl Category.....	32
11. Trigger mode	33
12. UsetSetSave and data save timing.....	35
13. Digital output.....	37
14. Trigger operation and timing chart.....	38
14.1. TriggerMode and ExposureMode are set to OFF	38
14.2. TriggerMode is set to OFF and ExposureMode is set to Timed or PresetTimed mode	40
14.3. TriggerMode is set to ON and ExposureMode is set to Timed or PresetTimed	43
14.4. TriggerMode is set to ON and ExposureMode is set to TriggerWidth.....	45
15. Input / Output signal.....	47
16. Delay of photocoupler	47
17. Spectral response.....	48
18. Specifications	49
19. Dimensions.....	50

1. Overview

HV-F130GV is high precision 3CCD progressive scan color camera, which has a C mount prism, 1/3 inch 1.3M pixels square CCD and Gigabit Ethernet interface. The camera can be powered from the LAN cable by PoE (Power over Ethernet)

2. Standard composition

Check when unpacking

Camera	1
Installation guide	1
Plug for DC IN/SYNC connector (HR10A-10P-12S)	1

Optional accessories

- (1) 12 pin plug HR10A-10P-12S(01)
- (2) Junction box JU-F30
- (3) LAN cable (CAT5E or CAT6)

In the CE Marking region, use a high flexibility shielded cable (recommended C5E(S-HFR)(K)-HSL-1: Oki). Refer to page 8.

(4) Camera cable

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

In the CE Marking region, use the shield type and attach clamp filter (ZCAT 2035-0930A: TDK) at both ends (camera and video processor ends). Refer to page 8

Note : When not using the specified junction box, LAN cable, camera cable and clamp filter, malfunctions may be caused.

3. Features

•High resolution and color fidelity

The 1/3-inch 1.3 million pixels square lattices progressive scan CCD and dichroic prism for RGB color achieves a high resolution picture and good color reproduction.

•Small and lightweight

Although it is 3CCD Camera, it is compact and lightweight. (55(W) x 55(H) x 89(D) mm / approx. 320g.)

•Gigabit Ethernet

By adoption of Gigabit Ethernet interface, high-speed connection of maximum of 1 Gbps can be possible. Moreover, by using hub or switcher, construction of multiple camera system can be easily performed. It is also possible to 100m.

•GigE Vision™ correspondence

Based on Industrial camera interface standard GigE Vision, a maximum of 1Gbps high speed data transmit is available and suitable for image processing.

•GenICam™ correspondence

Development of camera control system is easy because industrial camera control API "GenICam" lead EMVA (European Machine Vision Association).

•Various picture quality enhancement

Independent size color masking is the Hitachi innovation for optimizing color balance. Saturation and hue of 6 colors (Red, Green, Blue, Cyan, Magenta and Yellow) can be adjusted independently to deliver the best color in image capture, microscope and other applications.

In-out gradation control can be arbitrarily adjusted by using LUT.

•Auto shading correction

Color shading due to aberration of the lens is automatically compensated or reduced.

•Versatile CCD drive functions

Video frame capture on demand using external trigger signal

Long integration mode (max. 10 seconds)

Variable shutter mode (min. 1/100,000 second)

Auto electronic shutter mode

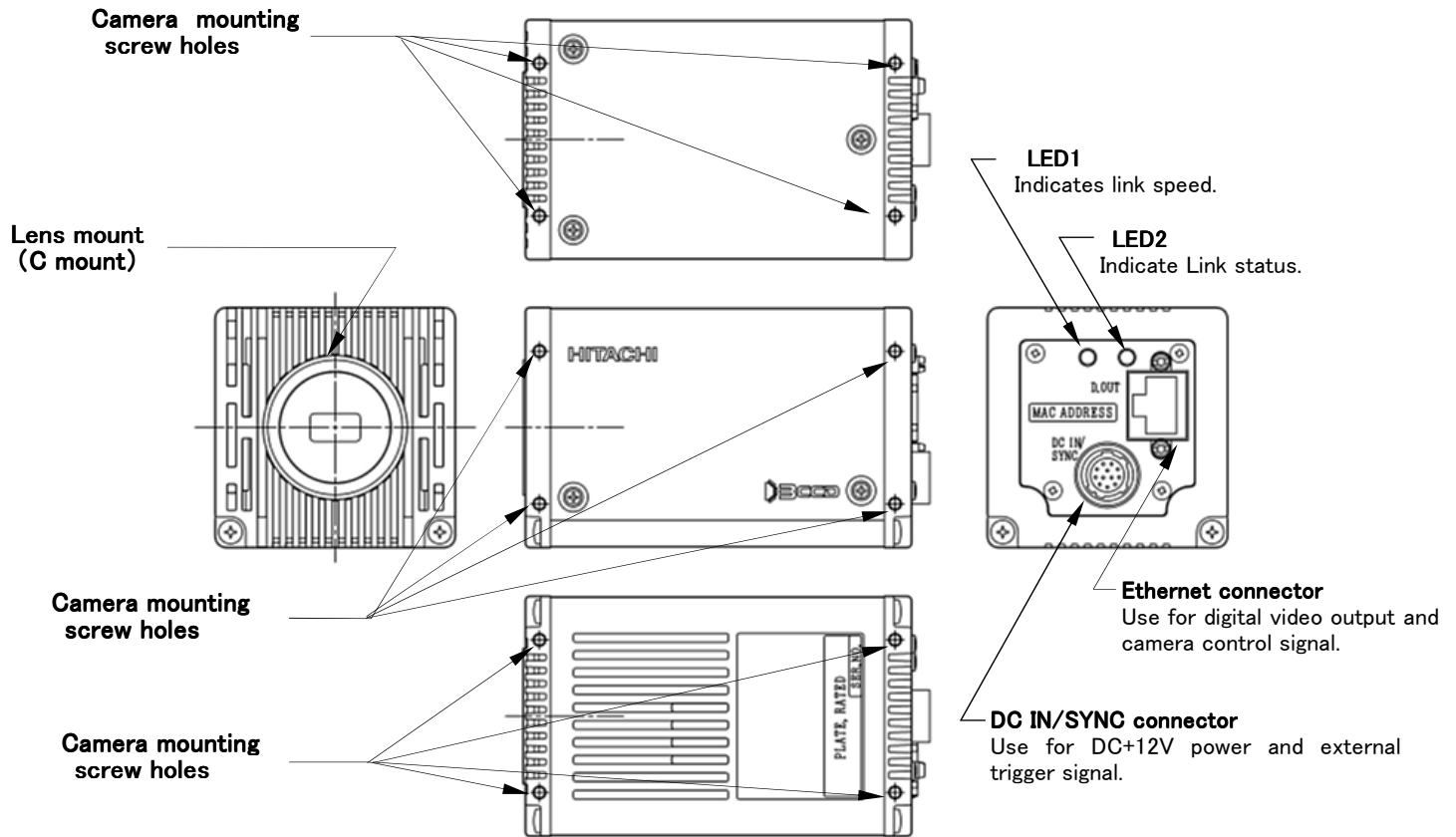
•Power over type Ethernet

Power supply can be input via Ethernet cable.

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

GenICam™ is a trademark of EMVA (European Machine Vision Association). Ethernet is a trademark of XEROX Corporation.

4. Section name and functions



5. Camera mounting (Attention :Hot!)

The camera chassis will become a very high temperature by high data rate. Please be careful about handling so that you don't get burned.

Please don't touch the camera a power supply is supplied with. Please wait a moment until a camera gets cold after stopping supply of a power supply.

When doing the handling which touches a camera, a heat sink is needed.

The heat sink size : Like a size of t10mm x 135mm x 135mm by aluminum plate.

6. Lens

CAUTION

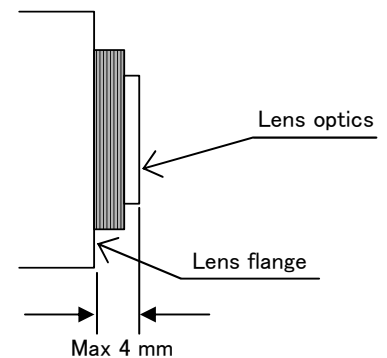
Observe the dimensions of the lens mounting selection as illustrated at the right.

If the dimensions are not observed, do not use such a lens, because the lens and the camera will be damaged.

Selecting a lens

The proper lens is important for obtaining adequate performance from the camera. Especially in the case of a three elements CCD system C mount camera, the lens incidence and exit distances are important. If separation is too short, color irregularity is apt to occur at the top and bottom of the image.

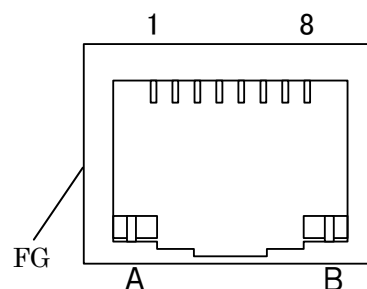
Conversely if too long, where the lens iris is a nearly fully open, resolution is impaired, while shading and flare can seriously detract from image quality. When using 3 CCD color system camera, it is also recommended to use a lens designed for this purpose.



7. Connector & LED

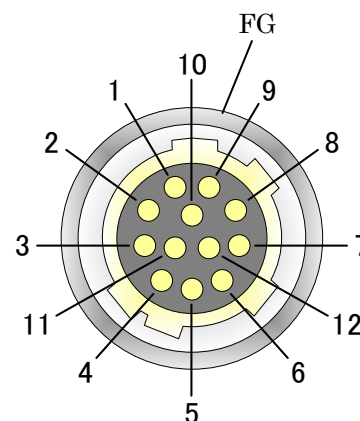
(1) Ethernet connector

PIN NO.	Signal
1	TRP1+
2	TRP1-
3	TRP2+
4	TRP3+
5	TRP3-
6	TRP2-
7	TRP4+
8	TRP4-
A	N.C.
B	N.C.
FG	GND



(2) DCIN/SYNC connector

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



Connector (matching camera: SNH-10-12(RPCB) SANWOO or equivalent

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

Please connect the FG/1 and 3/5 pin to the ground because camera may break down.

Please connect the ground to the ground terminal of the power supply, personal computer, etc.

Please do not power 2pin and PoE at the same time.

TRIG are input using digital isolation, and FLASH/VD OUT is output by digital Isolation, therefore 12 pin are isolate from FG/1/3/5 pin.

When the system requirement should be connect to GND and that doesn't need isolation, please connect 12pin to FG/1/3/5 pin.

(Note) Please do not unplug and insert cable (digital out cable) with a power supplied to a camera.

Install clamp filter (ZCAT2035-0930A: TDK) at both ends (camera and video processor ends) in the CE marking region.

Please do not input any signal to N.U. pin because machine may break down.

(3) LED1,2

Status	LED1	LED2
Unlinked	Off lit.	Off lit.
1Gb Linked	Green lit.	Green lit or blinking green.
100Mb Linked	Red lit.	Green lit or blinking green.
The Camera IP address was determined It is maintained until the first detection command from the pc viewer is received	Orange lit.	Green lit.

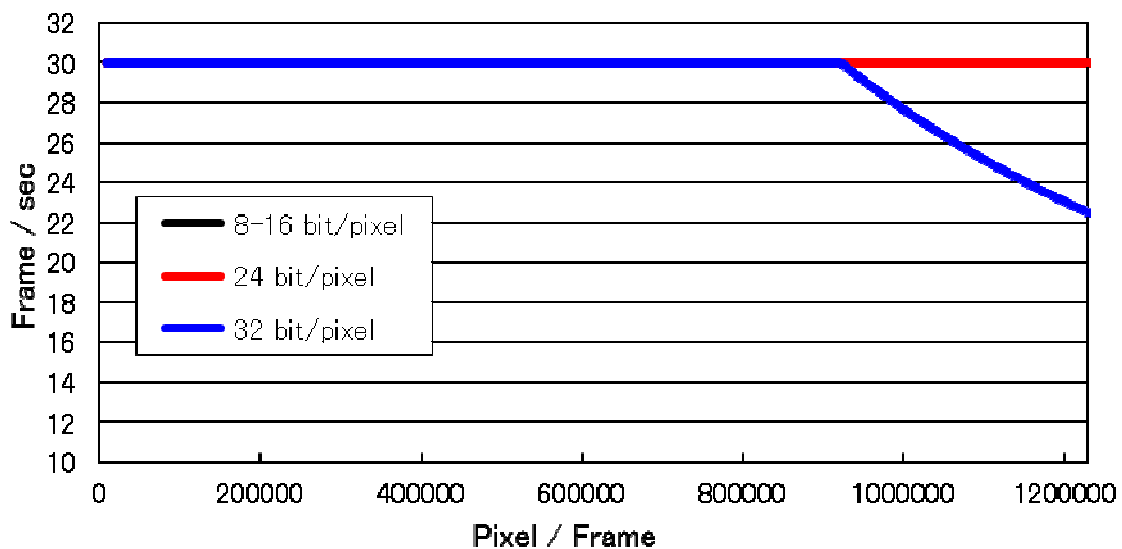
8. Representative example of video output scheme

Word length of data	Horizontal resolution	Vertical resolution	Frame rate	Approved standards
24bit(R:8bit, G:8bit, B:8bit)	1280 (R,G,B)	960 (R,G,B)	約 30FPS	GVSP_PIX_RGB8_PACKED, GVSP_PIX_BGR8_PACKED
32bit(R:10bit, G:10bit, B:10bit)	1280 (R,G,B)	960 (R,G,B)	約 25FPS	GVSP_PIX_BGR10V1_PACKED
16bit(Y:8bit, U:8bit, V:8bit)	1280 (Y)	960 (Y)	約 30FPS	GVSP_PIX_YUV422_PACKED

Frame rate is limited less than 1 GByte (Depends on the usage of band width of Giga Ether Net) by data amount acquired by multiplying of word length of data, horizontal resolution vertical resolution and frame rate.

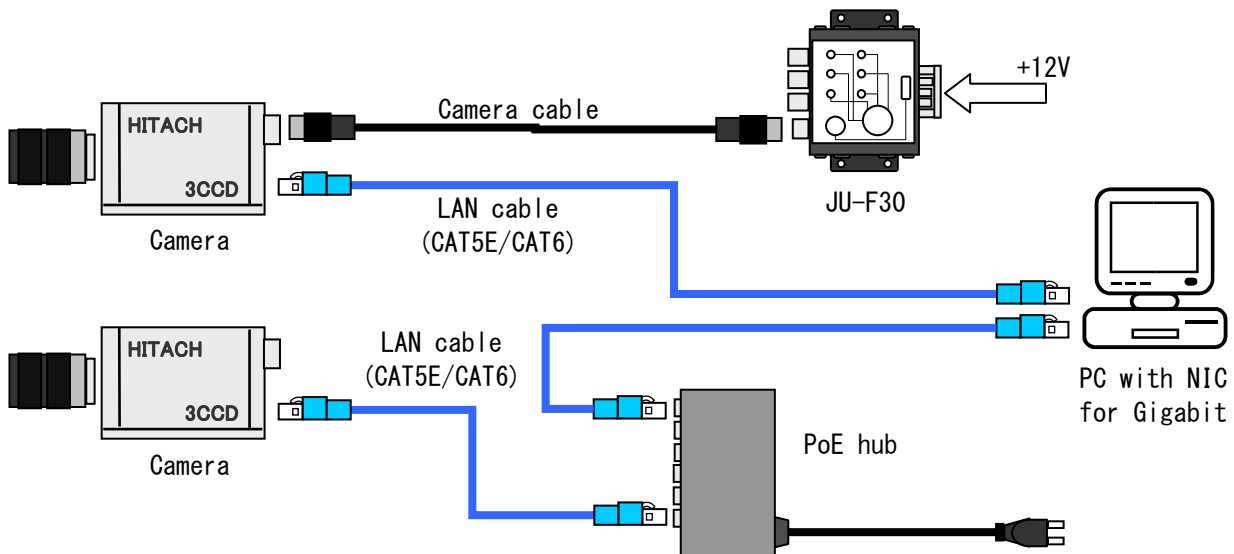
The number of pixel per 1 frame is multiplied value of width and height. The frame rate is represented by following figure.

Frame rate of 8–16 bit/pixel overlaps the frame rate of 24 bit/pixel.



9. System example

HV-F130GV connect to PC sing LAN cable.



(*) Note that following point when connecting the camera

- (1) Please connect the camera to device for Gigabit Ethernet (1000BASE-T).
- (2) Please use LAN cable of CAT5E or more (recommendation: CAT6 straight cable).
- (3) To the NIC for Jumbo frame is recommended to be used
Recommended NIC: Intel Pro1000 PT Desktop
- (4) When the camera is connected to Laptop PC, please use the one whose built-in LAN is Gigabit Ethernet (1000BASE-T) correspondence.
The external LAN card (CardBus32 or USB2.0) may not display the cameras ability because of the bus limitation.
- (5) Please connect the camera and PC by 1 to 1 as much as possible
Please use the device corresponded to Jumbo frame when using the switching hub etc.
- (6) Please confirm if the camera and the connected LAN port have same subnet.

Example-1: Same subnet --> Controllable

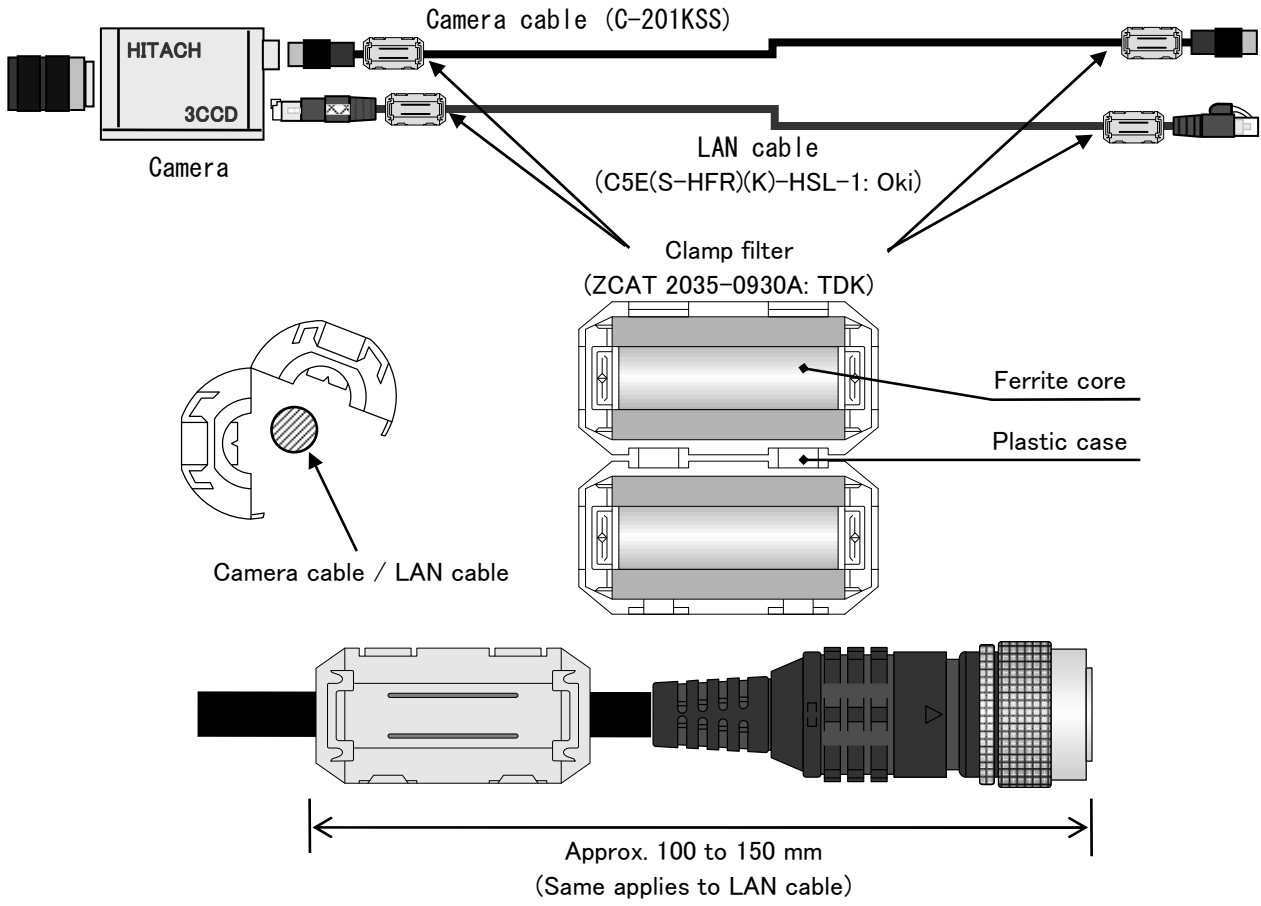
	IP address	Subnet mask	Subnet
Camera	192.168.1.100	255.255.255.0	192.168.1.0/24
LAN port	192.168.1.1	255.255.255.0	192.168.1.0/24

Example-2: Different subnet --> Uncontrollable

	IP address	Subnet mask	Subnet
Camera	192.168.1.100	255.255.255.0	192.168.1.0/24
LAN port	192.168.2.1	255.255.255.0	192.168.2.0/24

- (7) A striped noise might be caused according to the equipment (hub etc.) connected with the camera.
In that case, please try the following:
 - Connect the cable to another port of the equipment again.
 - Adjust the packet delay value of the camera. (Packet delay Feature Name "GevSCPD")
(e.g. 0 -> 2500.)

(8) In the CE Marking region, use following specified cables and clamp filters.



10. Functions and operations

Various mode setup and adjustment of HV-F130GV are performed by the remote control via Gigabit Ethernet. Operation and adjustment way of function utilized are described below.

“Standard” means the function based on GenICam™ Standard Feature Naming Convention (SFNC) and “Custom” means the original function. The software for GenICam™ can operate by using command name. Moreover, it can also be operated by reading /writing the value to address directly.

Each function and operation belongs to one of the following 5 kinds of data type.

Enumeration	: Enumerated type
Integer	: Integer type
Float	: Floating point type
Boolean	: Logical data type
Command	: Execute type
String	: Character string type

10.1. DeviceControl Category

▪ **Device Vendor Name : Vendor name of camera**

Feature name : DeviceVendorName (String / Standard)
Address : 00000048 h
Values (Read only) : “Hitachi Kokusai Electric Inc.”

▪ **Device Model Name : Model of camera**

Feature name : DeviceModelName (String / Standard)
Address : 00000068 h
Values (Read only) : “HV-F130GV”

▪ **Device Manufacturer Info : Vender information**

Feature name : DeviceManufacturerInfo (String / Standard)
Address : 000000A8 h
Values (Read only) : “www.hitachi-kokusai.co.jp”

▪ **Device Version : Version information of camera**

Feature name : DeviceVersion (String / Standard)
Address : 00000088 h
Values (Read only) : “1.0.0.0 (F:0.1.0.0)”

* different according to camera version

▪ **Device Firmware Version: Version information of firmware**

Feature name : DeviceFirmwareVersion (String / Standard)
Address : A00100A0 h
Values (Read only) : “1.0.0.0”

* different according to camera version

▪ **Device Serial Number: Serial number**

Feature name : DeviceSerialNumber (String / Standard)
Address : 000000D8 h
Values (Read only) : “12345678”

* different according to the camera

• **Device User ID : User programmable ID**

Feature name : DeviceUserID (String / Standard)
Address : 000000E8 h
Values(Factory setting Blank): Any null-terminated string (16 Byte)

• **Device Family Name : Family name of camera**

Feature name : DeviceFamilyName (String / Standard)
Address : A0010080 h
Values (Read only) : "GigEV CAMERA"

• **Device Type: Type of camera**

Feature name : DeviceType (Enumeration / Standard)
Address : A00100C0 h
Values (Read only) : 0 "Transmitter"

• **Device Scan Type : Scan type of image sensor**

Feature name : DeviceScanType (Enumeration / Standard)
Address : A00100D0 h
Values (Read only) : 0 "Areascan"

• **Device Clock Selector :Types of clocks to be referred by DeviceClockFrequency**

Feature name : DeviceClockSelector (Enumeration / Standard)
Address : A00100E4 h
Values : 0 "Sensor"

• **Device Clock Frequency : Clock frequency specified by DeviceClockSelector**

Feature name : DeviceClockFrequency (Float/ Standard)
Address : A00100E8 h
Values (Read only) : 45000000 [Hz]

• **Device Reset : Camera reset**

Feature name : DeviceReset (Command / Standard)
Address : A00100B0 h
Values (Write only) : 1 Camera is restarted by command "1"

• **Device TL Version Major : The version information of GigEVision Transport Layer**

Feature name : DeviceTLVersionMajor (Integer/ Standard)
Address : 0-15 bit of 00000000 h
Values (Read only) : 1

• **Device TL Version Minor : The version information of GigEVision Transport Layer**

Feature name : DeviceTLVersionMinor (Integer / Standard)
Address : 16-31bit of 00000000 h
Values (Read only) : 2

• **Device Registers Endianness : The endianness information of device register**

Feature name : DeviceRegistersEndianness (Enumeration / Standard)
Address : 0-bit of 00000004 h
Values (Read only) : 1 "Big" Big Endian

• **Device Character Set : The information of character code of this device**

Feature name : DeviceCharacterSet (Enumeration / Standard)
Address : 24-31bit of 00000004 h
Values (Read only) : 1 "UTF-8"

•**Device Link Selector : Select the Device Link Channel**

Feature name : DeviceLinkSelector (Integer / Standard)
Address : 00000600 h
Values (Read only) : 1

•**Device Link Speed : Link speed for data communication**

Feature name : DeviceLinkSpeed (Integer / Standard)
Address : 00000670 h
Values (Read only) : 100 "100 Mbps"
1000 "1 Gbps"

•**Device Event Channel Count : The supported number of events channel**

Feature name : DeviceEventChannelCount (Integer / Standard)
Address : 00000900 h
Values (Read only) : 1

•**Device Stream Channel Count : The supported number of streaming channel**

Feature name : DeviceStreamChannelCount (Integer / Standard)
Address : 00000904 h
Values (Read only) : 1

•**Device Link Heartbeat Timeout : The time setting of heart beat time**

Feature name : DeviceLinkHeartbeatTimeout (Float / Standard)
Address : A009001C h
Values (Factory setting 3000000) : 500000 to 100000000 [us]

•**Timestamp Latch : Latch of timestamp**

Feature name : TimestampLatch (Command / Standard)
Address : 00000944 h
Values (Write only) : 2 Timestamp count is latched to Timestamp Latch Value when 2 is written.

•**Timestamp Reset : Reset of timestamp**

Feature name : TimestampReset (Command / Standard)
Address : 00000944 h
Values (Write only) : 1 Current timestamp count is reset when 1 is written.

•**Timestamp Latch Reset : Time stamp counter reset after timestamp counter latched**

Feature name : TimestampLatchReset (Command / Custom)
Address : 00000944 h
Values (Write only) : 3 Timestamp count is latched to Timestamp Latch Value and current timestamp count is reset when 3 is written.

•**Timestamp Latch Value : Counter value of 64bit latched by TimestampLatch**

Feature name : TimestampLatchValue (Integer[64bit] / Standard)
Address : A0090014 h/ A0090018 h
Values (Read only) : 0 to 2⁶⁴ Latched timestamp count by Timestamp Latch is entered.

•**Device Link Heartbeat Mode : Heartbeattime mode enable/disable**

Feature name : DeviceLinkHeartbeatMode (Enumeration / Standard)
Address : 00000954 h
Values (Factory setting 0) : 0 "ON" Enable Heartbeattimeout.
1 "OFF" Disable Heartbeattimeout.

• **Device Stream Channel Endianness : Endianness of stream channel**

Feature name : DeviceStreamChannelEndianness (Enumeration / Standard)
Address : 2-bit of 0000D04 h
Values (Read only) : 0 "Little" Little Endian

10.2. ImageFormatControl Category

• **Sensor Width** : Valid horizontal pixel number of image sensor

Feature name : SensorWidth (Integer / Standard)
Address : A002F000 h
Values (Read only) : 1280

• **Sensor Height** : Valid vertical pixel number of image sensor

Feature name : SensorHeight (Integer / Standard)
Address : A002F004 h
Values (Read only) : 960

• **Width Max** : Maximum width of the image

Feature name : WidthMax (Integer / Standard)
Address : A002F008 h
Values (Read only) : 1280

• **Height Max** : Maximum height of the image

Feature name : HeightMax (Integer / Standard)
Address : A002F00C h
Values (Read only) : 2 to 960

***This value depends on the value of BinningVertical and PartialScanHeight.**

• **Width** : Set the actual image width

Feature name : Width (Integer / Standard)
Address : A0020000 h
Values (Factory setting 1280)
: 2 to Width Max – Offset X

***The width is set in increments of 2 pixels**

• **Height** : Set the actual image height

Feature name : Height (Integer / Standard)
Address : A0020004 h
Values (Factory setting 960)
: 2 to Height Max – Offset Y

***The height is set in increments of 2 pixels**

• **Offset X** : Set the horizontal offset

Feature name : OffsetX (Integer / Standard)
Address : A0020008 h
Values (Factory setting 0) : 0 to Width Max – Width

***The horizontal offset is set in increments of 2 pixels**

• **Offset Y** : Set the vertical offset

Feature name : OffsetY (Integer / Standard)
Address : A002000C h
Values (Factory setting 0) : 0 to Height Max – Height

***The vertical offset is set in increments of 2 pixels**

• **Binning Selector** : Selection of binning process

Feature name : BinningSelector (Enumeration / Standard)
Address : A002003C h
Values : 0 "Sensor"

• **Binning Vertical : Vertical binning setting**

Feature name : BinningVertical (Enumeration / Standard)
 Address : A0020010 h
 Values (Factory setting 1) : 1 "OFF" Disable Binning.
 : 2 "ON" Enable Binning.

• **Test Pattern : display test pattern**

Feature name : TestPattern (Enumeration / Standard)
 Address : A0020020 h
 Values (Factory setting 0) : 0 "OFF "
 : 1 "Horizontal Ramp"
 : 4 "Color bar"

• **Center Set X : Auto adjustment of Offset X to get horizontal center of image**

Feature name : CenterSetX (Command / Custom)
 Address : A002F010 h
 Values (Write only) : 1 CenterSetX is executed when 1 is written.

• **Center Set Y : Auto adjustment of Offset Y to get vertical center of image**

Feature name : CenterSetY (Command / Custom)
 Address : A002F014 h
 Values (Write only) : 1 CenterSetY is executed when 1 is written.

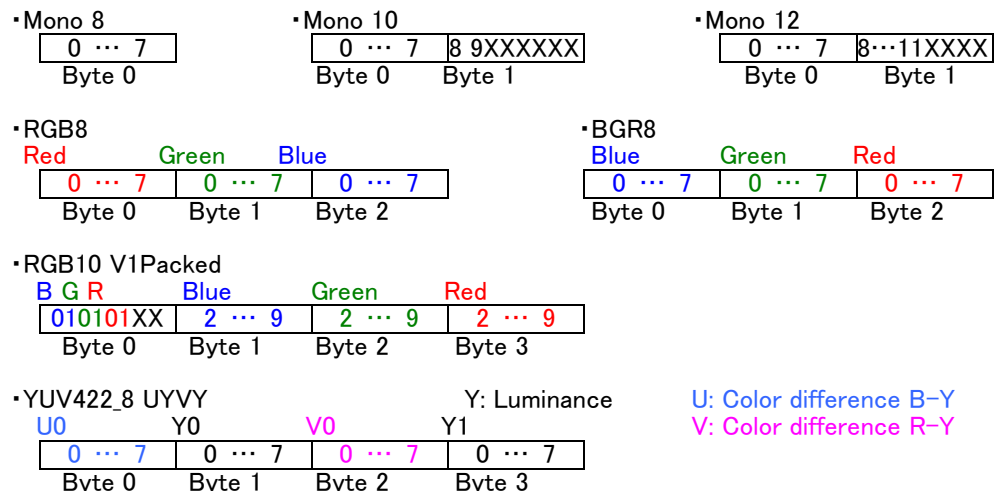
• **Max Size Set : Offset X and Offset Y are set to zero, and Width and Height are set to Max value respectively**

Feature name : MaxSizeSet (Command/ Custom)
 Address : A002F018 h
 Values (Write only) : 1 MaxSizeSet is executed when 1 is written.

• **Pixel Format : Set the pixel format**

Feature name : PixelFormat (Enumeration / Standard)
 Address : A0020014 h
 Values (Factory setting 02180014 h)
 : 01080001 h "Mono 8"
 : 01100003 h "Mono 10 "
 : 01100005 h "Mono 12"
 : 0210001F h "YUV422_8 UYVY"
 : 02180014 h "RGB8"
 : 02180015 h "BGR8"
 : 0220001C h "RGB10 V1Packed"

Pixel alignments of each Pixel format are following.



• **Partial Scan Mode : Partial scan mode enable/disable**

Feature name : PartialScanMode (Boolean / Custom)
Address : A0FF0100 h
Values (Factory setting 0) : 0 FALSE Disable Partial Scan.
: 1 TRUE Enable Partial Scan.

• **Partial Scan Offset Y : Offset of valid area of partial scan**

Feature name : PartialScanOffsetY (Integer / Custom)
Address : A0FF0104 h
Values (Factory setting 0) : 0 to Sensor Height - Partial Scan Height

• **Partial Scan Height : Width of valid area of partial scan**

Feature name : PartialScanHeight (Integer / Custom)
Address : A0FF0108 h
Values (Factory setting 960) : 100 to Sensor Height - Partial Scan Offset Y

10.3. AcquisitionControl Category

▪ **Acquisition Mode : AcquisitionMode setting**

Feature name : AcquisitionMode (Enumeration / Standard)
Address : A0030000 h
Values (Factory setting 1) : 1 "Continuous" Continuous image capture mode
2 "Multi Frame" Specified number of image capture mode
3 "Single Frame" Single frame capture mode

▪ **Acquisition Start : Start capture**

Feature name : AcquisitionStart (Command / Standard)
Address : A0030004 h
Values (write only) : 1 Image capture processing is started when 1 is written.

▪ **Acquisition Stop : Stop capture**

Feature name : AcquisitionStop (Command / Standard)
Address : A0030008 h
Values (write only) : 0 Image capture processing is stopped when 0 is written.

▪ **Acquisition Frame Count : Setting of the number of captured frame**

*** This function is enabled when Acquisition Mode is Multi Frame.**

Feature name : AcquisitionFrameCount (Integer / Standard)
Address : A003000C h
Values (Factory setting 1) : 1 to 255

▪ **Acquisition Frame Rate : Setting of framerate**

Feature name : AcquisitionFrameRate (Float / Standard)
Address : A0030010 h
Values (Factory setting 180.0) : 1.0 to 180.0 [Hz(fps)]
Maximum frame rate is changeable by 1 fps
An actual frame rate is decided by size of the picture.

▪ **Acquisition Frame Rate Enable : Set the frame rate**

Feature name : AcquisitionFrameRateEnable (Boolean / Standard)
Address : A0030014 h
Values (Factory setting 0) : 0 FALSE Not perform the frame rate functions.
1 TRUE Perform frame rate functions.

▪ **Current Frame Rate : Current actually frame rate**

Feature name : CurrentFrameRate (Float / Custom)
Address : A0F30100 h
Values (read only) : 1.0 to 180.0 [Hz] It is frame rate that camera actually drives.

▪ **Trigger Selector : Select the trigger action**

Feature name : TriggerSelector (Enumeration / Standard)
Address : A0030020 h
Values : 1 "Frame Start" Select this when using normal trigger mode.

• **Trigger Mode (related to Trigger Selector) : Select the mode selected at Trigger Selector**

Feature name : TriggerMode (Enumeration / Standard)
Address : A0030024 h
Values (Factory setting 0) : 0 "OFF" Set trigger mode selected at Trigger Selector to OFF.
1 "ON" Set trigger mode selected at Trigger Selector to ON.

• **Trigger Software (related to Trigger Selector) : Generate the software trigger selected at Trigger Selector**
***using when Trigger Source is Software**

Feature name : TriggerSoftware (Command / Standard)
Address : A0030028 h
Values (write only) : 1 Whenever 1 is written, the software trigger is generated.

• **Trigger Source (related to Trigger Selector) : Select the trigger source selected at Trigger Selector**

Feature name : TriggerSource (Enumeration / Standard)
Address : A003002C h
Values (Factory setting 0) : 0 "Line 1" Input trigger signal from 7 pin of DCIN/SYNC connector (TRIG).
7 "Software" Use software trigger.

• **Trigger Activation (related to Trigger Selector) : Select polarity of trigger signal selected at Trigger Selector**

Feature name : TriggerActivation (Enumeration / Standard)
Address : A0030030 h
Values (Factory setting 1) : 0 "Falling Edge" Falling of input signal is made into trigger signal.
1 "Rising Edge" Rising of input signal is made into trigger signal.

• **Trigger Delay (related to Trigger Selector) : Set the duration of trigger delay selected at Trigger Selector**

Feature name : TriggerDelay (Float / Standard)
Address : A0030034 h
Values (Factory setting 0) : 0 to 2,000,000 [Hz] A range and a step of trigger delay time was 0 to 2,000,000 us.

• **Exposure Mode : Setting of electric shutter**

Feature name : ExposureMode (Enumeration / Standard)
Address : A0030040 h
Values (Factory setting 0) : 0 "OFF" Shutter Off (exposure 1/30second)
1 "Timed" Shutter speed according to setting of ExposureTime.
2 "Trigger Width" It become ONE trigger mode. ***Refer to page 33 "Trigger mode"**
8 "Preset Timed" Shutter speed according to setting of ExposureTimePreset.

• **Exposure Time Preset : Setting of the Preset shutter**

Feature name : ExposureTimePreset (Enumeration / Custom)
Address : A0F30040 h
Values (Factory setting 1) : 1 "1/30s (33,333us)" Set the shutter speed to 1/30 second..
2 "1/60s (16,667us)" Set the shutter speed to 1/60 second..
3 "1/100s (10,000us)" Set the shutter speed to 1/100 second..
4 "1/250s (4,000us)" Set the shutter speed to 1/250 second..
5 "1/1,000s (1000us)" Set the shutter speed to 1/1,000 second..
6 "1/2,000s (500us)" Set the shutter speed to 1/2,000 second..
7 "1/10,000s (100us)" Set the shutter speed to 1/10,000 second..
8 "1/50,000s (20us)" Set the shutter speed to 1/50,000 second..

• **Exposure Time : Setting of the Variable shutter**

Feature name : ExposureTime (Float / Standard)

Address : A0030044 h

Values (Factory setting 33333.3)

: 10 to 10,000,000 [us] Set the shutter speed in the range from 1/100,000 to 10 second in us.

• **Exposure Auto : Setting of Auto Electric Shutter (AES)**

Feature name : ExposureAuto (Enumeration / Standard)

Address : A003004C h

Values (Factory setting 0) : 0 "OFF" AES is not performed and **Exposure Time (Preset)** is validated.

2 "Continuous" Shutter speed is automatically adjusted in the range from normal shutter to 1/100,000 second according to light source brightness

Adjustment range can be changeable by setting of Exposure Auto Lower Limit /Exposure Auto Upper Limit.

***This command priority to Exposure Time (Preset) command**

• **Exposure Auto Lower Limit : Lower limit of automatic adjustment range**

Feature name : ExposureAutoLowerLimit (Float / Custom)

Address : A0F30020 h

Values (Factory setting 10) : 10 to 33333.3 [us] Set limit value in the range from 1/100,000 second to normal shutter in us.

• **Exposure Auto Upper Limit : Upper limit of automatic adjustment range**

Feature name : ExposureAutoUpperLimit (Float / Custom)

Address : A0F30024 h

Values (Factory setting 33333.3)

: 10 to 33333.3 [us] Set limit value in the range from 1/100,000 second to normal shutter in us.

10.4. DigitalIOControl Category

•Line Selector : Select the line

Feature name : LineSelector (Enumeration / Standard)
Address : A0040000 h
Values : 0 "Line1 (7pin)" Setting of 7 pin of DCIN/SYNC connector.
1 "Line2 (10pin)" Setting of 10 pin of DCIN/SYNC connector.

•Line Inverter (related to Line Selector) : Invert the output signal selected at Line Selector

Feature name : LineInverter (Boolean / Standard)
Address : A0040004 h
Values (Factory setting 0) : 0 FALSE output signal is not inverted.
1 TRUE output signal is inverted.

•Line Mode (related to Line Selector) : Input/output of the line selected at Line Selector

Feature name : LineMode (Enumeration / Standard)
Address : A0040008 h
Values (Read only) : 0 "Input" It means selected line is using for input (when Line Selector is Line1).
1 "Output" It means selected line is using for output (when Line Selector is Line2).

•Line Source : Selection of the signal outputs from a 10 pin. *using when Line Mode is Output

Feature name : LineSource (Enumeration / Standard)
Address : A0040010 h
Values (Factory setting 0) : 0 "OFF" Nothing is output.
1 "Exposure Active" Flash pulse (strobe) is output.
2 "Timer1 Active" Adjusted flash pulse is output.
3 "Camera VD" VD signal is output.

•Line Format (related to Line Selector) : Invert the input/output signal

Feature name : LineFormat (Enumeration / Standard)
Address : A0040014 h
Values (read only) : 2 "TTL" It means selected line is TTL level signal (when Line Selector is Line2).
5 "Opto Coupled" It means selected line is Opto-Coupled (when Line Selector is Line1).

10.5. CounterAndTimerControl Category

• **Timer Selector : Select the timer to adjust strobe**

Feature name : TimerSelector (Enumeration / Standard)
Address : A0050000 h
Values : 0 "Timer 1"

• **Timer Duration (related to Timer Selector) : Set the duration of timer**

Feature name : TimerDuration (Float / Standard)
Address : A0050004 h
Values (Factory setting 0) : 0 "OFF" TimerDuration is disable
1 to 2,000,000 [us] Set the range from 0 μ sec to 2,000,000 us.

***When Value is 0 "Off", this width equals the width of exposure time. Otherwise the width is set by this value**

• **Timer Delay (related to Timer Selector): Set the delay of timer**

Feature name : TimerDelay (Float / Standard)
Address : A005000C h
Values (Factory setting 0) : 0 to 2,000,000 [us] Set the range from 0 us to 2,000,000 us.

• **Timer Trigger Source (related to Timer Selector) : Select timer trigger source**

Feature name : TimerTriggerSource (Enumeration / Standard)
Address : A0050020 h
Values : 1 "Exposure Start" Timer starts at the same time as the start of exposure.

• **Timer Trigger Activation (related to Timer Selector) : Select polarity of trigger signal selected at Timer Selector**

Feature name : TimerTriggerActivation (Enumeration / Standard)
Address : A0050024 h
Values : 1 "Rising Edge" Rising of input signal is made into trigger signal.

10.6. AnalogControl Category

•Gain Selector : Specify the signal used for gain adjustment

Feature name : GainSelector (Enumeration / Standard)
Address : A0070000 h
Values : 0 "All"

•Gain : Setting of master gain

Feature name : Gain (Float/ Standard)
Address : A0070008 h
Values (Factory setting 0) : 0.0 to 12.0 [dB]

***The value is changeable by 0.1 dB between the range 0.0 to 12.0 dB**

•Gain Auto : Adjust electrical sensitivity automatically (AGC)

Feature name : GainAuto (Enumeration / Standard)
Address : A007000C h
Values (Factory setting 0) : 0 "OFF"

Automatic gain control is not performed and **Gain** is validated.

2 "Continuous"

The video level is automatically adjusted in the range of 0 to 12.0dB.

Adjustment range can be changeable by setting of Gain Auto Lower Limit /Gain Auto Upper Limit.

***This command is given to priority more than Gain.**

•Gain Auto Lower Limit : Lower limit of automatic adjustment range

Feature name : GainAutoLowerLimit (Float / CustomStandard)
Address : A0F70028 h
Values (Factory setting 0) : 0.0 to 12.0 [dB] Adjust the gain level 0 to 12.0dB at intervals of 0.1dB.

•Gain Auto Upper Limit : Upper limit of automatic adjustment range

Feature name : GainAutoUpperLimit (Float / CustomStandard)
Address : A0F7002C h
Values (Factory setting 12): 0.0 to 12.0 [dB] Adjust the gain level 0 to 12.0dB at intervals of 0.1dB.

•Black Level Selector : Channel selection to adjust black level

Feature name : BlackLevelSelector (Enumeration / Standard)
Address : A0070010 h
Values : 0 "ALL"

•Black Level : Level adjust for master black

Feature name : BlackLevel (Float / Standard)
Address : A0070018 h
Values (Factory setting 0) : -64.0 to 63.0 Adjust the gain level -64.0 to 63.0 at intervals of 1.0.

•Paint Black Mode : Setting of paint black (color level of Red, Green and Blue can be separately varied)

Feature name : PaintBlackMode (Enumeration / Custom)
Address : A0FF002C h
Values (Factory setting 0) : 0 "OFF" Not perform the paint black functions.
1 "ON" Perform paint black functions.

•Paint Black Selector : Switch the color doing Paint black

Feature name : PaintBlackSelector (Enumeration / Custom)
Address : A0FF0030 h
Values : 1 "Red" Perform the paint black function about Red.
2 "Green" Perform the paint black function about Green.
3 "Blue" Perform the paint black function about Blue.

• **Paint Black (related to Paint Black Selector) : Adjust level of color selected at Paint Black Selector**

Feature name : PaintBlack (Integer / Custom)
 Address : A0FF0034 h
 Values (Factory setting 0) : 0 to 127 Adjust the color level of the color selected at Paint Black Selector in 128 steps.

• **Balance White Auto : Setting of auto white balance**

Feature name : BalanceWhiteAuto (Enumeration / Standard)
 Address : A0070020 h
 Values (Factory setting 0) : 0 "OFF" Automatic white adjustment is not performed and can adjust **Balance Ratio**
 1 "Once" Automatic white adjustment is performed that affects features on the **Balance Ratio**
 And after adjustment this feature automatically will turn to "Off".
 2 "Continuous" White balance is adjusted in real time (automatic tracking).

***This command is given to priority more than Balance Ratio**

• **Balance Ratio Selector : Switch the adjustment color (RED / BLUE)**

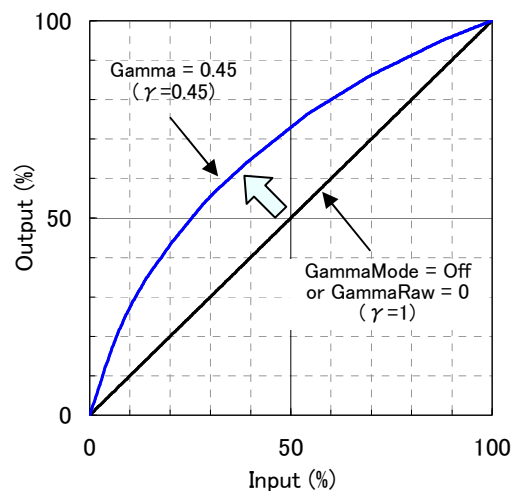
Feature name : BalanceRatioSelector (Enumeration / Standard)
 Address : A0070024 h
 Values : 0 "Red" Switch the color adjusted at Balance Ratio Red.
 2 "Blue" Switch the color adjusted at Balance Ratio Blue.

• **Balance Ratio (related to Balance Ratio Selector) : Adjust the RED / BLUE gain**

Feature name : BalanceRatio (Float / Standard)
 Address : A0070028 h
 Values (Factory setting 1.0): 0.5 to 2.0 Adjust the RED / BLUE gain range from x0.5 to x2.0 .

• **Gamma Mode : Gamma mode enable/disable**

Feature name : GammaMode (Enumeration / Custom)
 Address : A0F70010 h
 Values (Factory setting 0) : 0 "OFF" $\gamma=1.0$
 1 "ON" $\gamma=0.45$
 2 "ON (Special)" S-shaped gamma curve



• **Gamma : Adjust gamma correction level**

Feature name : Gamma (Float / Standard)
 Address : A0070030 h
 Values (Factory setting 1.0) : 1.0 to 0.45
 Gamma correction coefficient is set up in 1.0 to 0.45.

• **Knee Mode : Setting of knee**

Feature name : KneeMode (Enumeration / Custom)
 Address : A0F70040 h
 Values (Factory setting 0) : 0 "OFF" Not perform knee.
 1 "ON" Knee function provides natural graduation in bright portions.

• **Knee Point : Adjust knee point**

Feature name : KneePoint (Float / Custom)
 Address : A0F70044 h
 Values (Factory setting 75): 75 to 100 [%] Setting value toward 100% side increase start level of knee and 75% side decrease start level of knee.

• **Knee Slope : Adjust knee slope**

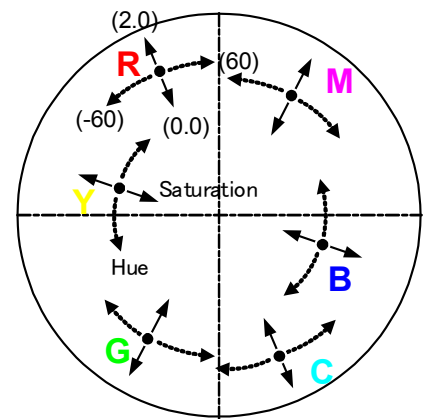
Feature name : KneeSlope (Float / Custom)
 Address : A0F70048 h
 Values (Factory setting 0.375): 0.375 to 1 Setting value toward 0.375 side intensify effective of knee and 1 side weaken effective of knee.

• **Sharpness : Adjust sharpness level**

Feature name : Sharpness (Integer / Custom)
 Address : A0F70050 h
 Values (Factory setting 0) : 0.0 to 8.0 Setting value toward 0.0 side reduces correction for soft contour and 8.0 side increase correction for sharper contours.

• **Masking Mode : Setting of 6 vector independent masking (primary color R G B and complementary color Ye Cy Mg saturation and hue can be separately varied).**

Feature name : MaskingMode (Enumeration / Custom) Adjust directivity on the hue circle by feature.
 Address : A0FF001C h
 Values (Factory setting 0) : 0 "OFF" Not perform masking functions.
 1 "ON" Perform masking functions.



• **Masking Selector : Select the color done masking**

Feature name : MaskingSelector (Enumeration / Custom)
 Address : A0F70070 h
 Values : 0 "Red" Perform masking function about Red.
 1 "Yellow" Perform masking function about Yellow.
 2 "Green" Perform masking function about Green.
 3 "Cyan" Perform masking function about Cyan.
 4 "Blue" Perform masking function about Blue.
 5 "Magenta" Perform masking function about Magenta.

• **Masking Saturation (related to Masking Selector) : Adjust saturation of the color selected at Masking Selector**

Feature name : MaskingSaturation (Float / Custom)
 Address : A0F70074 h
 Values (Factory setting 1.0) : 0.0 to 2.0 Adjust the saturation of the color selected at Masking Selector

• **Masking Hue (related to Masking Selector) : Adjust hue of the color selected at Masking Selector**

Feature name : MaskingHue (Float / Custom)
 Address : A0F70078 h
 Values (Factory setting 0.0) : -60.0 to 60.0 Adjust the hue of the color selected at Masking Selector.

Masking Selector	Toward -60 side ...	Toward 60 side ...
Red	Come near to Yellow	Come near to Magenta
Yellow	Come near to Green	Come near to Red
Green	Come near to Cyan	Come near to Yellow
Cyan	Come near to Blue	Come near to Green
Blue	Come near to Magenta	Come near to Cyan
Magenta	Come near to Red	Come near to Blue

• **Shading Correction** : **Correct unevenness on the surface chromatically and luminously.**

Feature name : ShadingCorrection (Boolean / Custom)

Address : A0F700A0 h

Values (Factory setting 0) : 0 FALSE Disable correction of shading.
1 TRUE Enable correction of shading

• **Shading Detect** : **Detect unevenness on the surface**

Feature name : ShadingDetect (Command / Custom)

Address : A0F700A4 h

Values (write only) : 1 When 1 is written, start shading detection.
The camera takes an object of gray flat screen
that detect unevenness on the surface chromatically and luminously.

10.7. LUTControl Category

•LUT Enable : Setting of look up table

Feature name : LUTEnable (Boolean / Standard(*))
Address : A0080004 h
Values (Factory setting 0) : 0 FALSE Disable look-up-table feature.
1 TRUE Enable look-up-table feature.

(*) With this camera, a setup of TRUE/FALSE is applied to a total color regardless of the state of LUT Selector.

•LUT Selector : Switch the color (All/Red/Green/Blue) doing adjustment.

Feature name : LUTSelector (Enumeration / Standard)
Address : A0080000 h
Values : 0 "All" The LUTValue affects adjustment on all color of RGB.
1 "Red" The LUTValue affects adjustment on the color of Red.
2 "Green" The LUTValue affects adjustment on the color of Green.
3 "Blue" The LUTValue affects adjustment on the color of Blue.

•LUT Index (related to LUT Selector) : Video level before look-up-table.

Feature name : LUTIndex (Integer / Standard)
Address : A0080008 h
Values : 0 to 255 Setting original input video level 0 to 100% by 256 steps

•LUT Value (related to LUT Selector and LUT Index) : Video level after look-up-table.

Feature name : LUTValue (Integer / Standard)
Address : A008000C h
Values : 0 to 255 Setting conversion output video level by 256 steps for the INDEX value.

Note : When LUT Selector sets "All", data-write affects all colors on RGB,
and read data is LUT Value of Red.

10.8. AutoLevelControl Category

•**ALC Adjust : Setting value of video level when AGC or AES is ON**

Feature name : ALCAAdjust (Float / Custom)
Address : A0070080 h
Values (Factory setting 1) : 0 to 4 Setting value toward 0 side decrease convergence level
and 4 side increase convergence level.

•**ALC Gate Width : Setting the width of optical measurement area for AES and AGC**

Feature name : ALCGateWidth (Float / Custom)
Address : A0070084 h
Values (Factory setting 100) : 5 ~ 100 – ALC Gate Offset X [%]

•**ALC Gate Height : Setting the Height of optical measurement area for AES and AGC**

Feature name : ALCGateHeight (Float / Custom)
Address : A0070088 h
Values (Factory setting 100) : 5 ~ 100 – ALC Gate Offset Y [%]

•**ALC Gate Offset X : Setting the horizontal offset of optical measurement area for AES and AGC**

Feature name : ALCGateOffsetX (Float / Custom)
Address : A007008C h
Values (Factory setting 0) : 0 ~ 100 – ALC Gate Width [%]

•**ALC Gate Offset Y : Setting the vertical offset of optical measurement area for AES and AGC**

Feature name : ALCGateOffsetY (Float / Custom)
Address : A0070090 h
Values (Factory setting 0) : 0 ~ 100 – ALC Gate Height [%]

•**ALC GATE DISP : ALC gate displayed/hidden**

Feature name : ALCGateDisp (Enumeration / Custom)
Address : A0070094 h
Values (Factory setting 0) : 0 "OFF" ALC Gate is hidden.
1 "ON" ALC Gate is displayed.

10.9. PixelCorrection Category

•White Spot Correction Mode : White spot correct mode enable/disable

Feature name : WhiteSpotCorrectMode (Enumeration / Custom)
Address : A0FF00A0 h
Values : 0 "OFF" Disable correction of white spot noise.
1 "ON" Enable correction for stored white spots.

•White Spot Correction Selector : Color setting of threshold of white spot correct mode

Feature name : WhiteSpotCorrectSelector (Enumeration / Custom)
Address : A0FF00B0 h
Values : 0 "Red"
1 "Green"
2 "Blue"

•White Spot Correction Level : Threshold of white spot detection

Feature name : WhiteSpotCorrectLevel (Integer /Custom)
Address : A0FF00A4 h
Values : 1 to 99 [%] Set the white spot detection threshold between 1% and 99% of the video level.

•White Spot Correct Detect : Detect the white spot

Feature name : WhiteSpotCorrectDetect (Command / Custom)
Address : A0FF00A8 h
Values (write only) : 1 When 1 is written, start white spot detection
The pixel having video level that exceeds White Spot Correction Level is judged as white spot.

•White Spots Correct Count : The number of white spot detection

Feature name : WhiteSpotCorrectCount (Integer/ Custom)
Address : A0FF00B4 h
Values (Read only) : 0 ~ 4095

10.10. DigitalNoiseReduction Category

•Digital Noise Reduction Mode : Noise reduction mode enable/disable

Feature name : DigitalNoiseReductionMode (Enumeration / Custom)
Address : A0FF0180 h
Values (Factory setting 0) : 0 "OFF" Disable digital noise reduction.
1 "ON" Enable digital noise reduction.

10.11. AutoSetupStatus Category

•Auto Setup Type : This feature shows the type of autoseup which performed recently.

Feature name : AutoSetupType (Enumeration / Custom)
Address : A0FF0200 h
Values(read only) : 0 "Idle" Not perform auto setup function.
1 "White Balance" The function that operated recently is BalanceWhiteAuto .
4 "Auto Shading" The function that operated recently is ShadingDetect.
6 "Pixel Correction" The function that operated recently is WhiteSpotCorrectDetect.

•Auto Setup Result : Results of auto adjustment

Feature name : AutoSetupResult (Enumeration / Custom)
Address : A0FF0208 h
Values(read only) : 0 "OK"
1 "Error"
19 "Error Low Light"
20 "Error High Light"
255 "Busy"

Refer to following table for meaning of each value.

Error code	Countermeasure
0	Normally finished (Also in not performing, it becomes this value.)
1	Retry the function.
19	Increase the intensity of illumination, turn lens iris to ward open direction, or increase the gain to provide a proper video level.
20	Decrease the intensity of illumination, turn lens iris toward closed direction, or decrease the gain to provide a proper video level.
255	Under automatic adjustment.

Description : This feature shows the executing result of the auto setup function.

10.12. TransportLayerControl Category

•Payload Size :

Feature name : PayloadSize (Integer / Standard)
Address : A0090010 h
Values (Read only) : Data size for 1 frame of the picture at Byte.

10.13. GigEVision Category

•Gev MAC Address : MAC address of camera

Feature name : GevMACAddress (Integer[64bit] / Standard)
Address : 00000008 h /0000000C h
Values (Read only) : XXXXXXXXXXXX h * different according to the camera

•Gev Supported Option Selector : Information to check whether this camera supports the specified option

Feature name : GevSupportedOptionSelector (Enumeration / Standard)
Address : A009F008 h
Values : 0 to 36

•Gev Supported Option : Used to reference and specify the existence of various option of GV

Feature name : GevSupportedOption (Boolean / Standard)
Address : A009F00C h
Values (Read only) : 0 FLASE Unsupported Option
 1 TRUE Supported Option

•Gev Current IP Configuration LLA : <bit:29> of LLA(AUTO IP) enable/disable

Feature name : GevCurrentIPConfigurationLLA (Boolean / Standard)
Address : 29-bit of 00000014 h
Values : 1 TRUE OS assigns IP arress by LLA
 * Unable to disable this value

•Gev Current IP Configuration DHCP : DHCP enable/disable

Feature name : GevCurrentIPConfigurationDHCP (Boolean / Standard)
Address : 30-bit of 00000014 h
Values (Factory setting 1) : 0 FALSE Disable assigning IP address by DHCP
 1 TRUE Enable assigning IP address by DHCP

•Gev Current IP Configuration Persistent IP : Enable or disable Persistent IP

Feature name : GevCurrentIPConfigurationPersistentIP (Boolean / Standard)
Address : 31-bit of 00000014 h
Values (Factory setting 0) : 0 FALSE Disable persistent IP address of the camera.
 1 TRUE Enable persistent IP address of the camera.

•Gev Current IP Address : Current IP address

Feature name : GevCurrentIPAddress (Integer / Standard)
Address : 00000024 h
Values (Read only) : IP address assigned to the camera

•Gev Current Subnet Mask : Current subnet mask

Feature name : GevCurrentSubnetMask (Integer / Standard)
Address : 00000034 h
Values (Read only) : Subnet mask assigned to the camera

•Gev Current Default Gateway : Current default gateway

Feature name : GevCurrentDefaultGateway (Integer / Standard)
Address : 00000044 h
Values (Read only) : Default gateway assigned to the camera

• **Gev First URL :**

Feature name : GevFirstURL (String / Standard)
Address : 00000200 h
Values (Read only) : Specify the first URL

• **Gev Second URL :**

Feature name : GevSecondURL (String / Standard)
Address : 00000400 h
Values (Read only) : Specify the second URL. (This camera has no value. (NULL))

• **Gev Persistent IP Address: Setting of fixed IP adress**

Feature name : GevPersistentIPAddress (Integer / Standard)
Address : 0000064C h
Values (Factory setting 192.168.10.10 (C0A80A0A h))

• **Gev Persistent Subnet Mask : Setting of sub net mask of fixed IP adress**

Feature name : GevPersistentSubnetMask (Integer / Standard)
Address : 0000065C h
Values (Factory setting 255.255.0.0 (FFFF0000 h))

• **Gev Persistent Default Gateway :Setting of default gateway of fixed adress**

Feature name : GevPersistentDefaultGateway (Integer / Standard)
Address : 0000066C h
Values (Factory setting 0.0.0.0 (00000000 h))

• **Gev CCP : Acces permission of application**

Feature name : GevCCP (Enumeration / Standard)
Address : 00000A00 h
Values (Read only) : 0 "Open"
: 1 "Exclusive"
: 2 "Control"

• **Gev SCDA : Destination IP address of stream channel**

Feature name : GevSCDA (Integer / Standard)
Address : 00000D18 h
Values :

• **Gev SCP Host Port : Port of GVSP**

Feature name : GevSCPHostPort (Integer / Standard)
Address : 16–31bit of 00000D00 h
Values : 0000 h ~ FFFF h

• **Gev SCPS Fire Test Packet : Transmission of test packet**

Feature name : GevSCPSFireTestPacket (Boolean / Standard)
Address : 0–bit of 00000D04 h
Values : 0 FALSE
: 1 TRUE This camera sends a test packet, and this value is set to 0.

• **Gev SCPS Do Not Fragment : Setting "do not fragment" bit of stream packet IP header**

Feature name : GevSCPSDoNotFragment (Boolean / Standard)
Address : 1–bit of 00000D04 h
Values (Factory setting 1) : 0 FALSE This camera sets 0 to "do not fragment" bit of stream packet IP header .
: 1 TRUE This camera sets 1 to "do not fragment" bit of stream packet IP header.

• **Gev SCPS Packet Size :**

Feature name : GevSCPSPacketSize (Integer / Standard)
Address : 16–31bit of 00000D04 h
Values (Factory setting 576) : 576 ~ 8192 Setting of data amount (BYTE) of 1 packet for transmission of image data

• **Gev SCPD : Packet delay**

Feature name : GevSCPD (Integer / Standard)
Address : 00000D08 h
Values (Factory setting 0) : 0 ~ 2,000,000 [10nsec/step] Delay time between packet transmission is changeable by 10ns

• **Gev Interface Selector : Selection of link of physical layer**

Feature name : GevInterfaceSelector (Integer / Standard)
Address : A0090004 h
Values : 0

• **Gev Stream Channel Selector : Selection of stream channel**

Feature name : GevStreamChannelSelector (Integer / Standard)
Address : A0090008 h
Values : 0

• **Gev SCP Interface Index: Current selected link of physical layer**

Feature name : GevSCPInterfaceIndex (Integer / Standard)
Address : A009000C h
Values (Read only) : 0

10.14. UserSetControl Category

•User Set Selector : Selection of saved or loaded channel

Feature name : UserSetSelector (Enumeration / Standard)
Address : A00A0000 h
Values : 0 "Default" Factory setting
1 "User Set 1" Channel 1
2 "User Set 2" Channel 2
3 "User Set 3" Channel 3
4 "User Set 4" Channel 4

•User Set Load (related to User Set Selector of USER SETS) : Load execution

Feature name : UserSetLoad (Command / Standard)
Address : A00A0004 h
Values (Write only) : 1 When 1 is written, load the memory channel selected at User Set Selector.

•User Set Save (related to User Set Selector of USER SETS) : Save execution

Feature name : UserSetSave (Command / Standard)
Address : A00A0008 h
Values (write only) : 1 When 1 is written, save to the memory channel selected at User Set Selector.
* "Default" cannot be saved

•User Set Default : Selection of loaded channel when camera reset or start

Feature name : UserSetDefault (Enumeration / Standard)
Address : A00A000C h
Values (Factory setting 0) : 0 "Default" Loading factory setting
1 "User Set 1" Loading the setting of Channel 1
2 "User Set 2" Loading the setting of Channel 2
3 "User Set 3" Loading the setting of Channel 3
4 "User Set 4" Loading the setting of Channel 4

11. Trigger mode

Trigger mode settings of HV-F130GV are following procedure.

1. Fixed shutter mode

When external trigger signal is POSITIVE (TriggerActivation: "RisingEdge"), after the trigger signal rise, exposure is start
The exposure time is set by the camera electronic shutter speed.

(A) Hardware Trigger

- (1) TriggerMode → "Off"
- (2) TriggerSelector → "FrameStart"
- (3) TriggerMode → "On"
- (4) TriggerSource → "Line1" / "Software"
- (5) TriggerActivation → "RisingEdge" / "FallingEdge"
- (6) ExposureMode → "Off" / "Timed" / "PresetTimed" : When Off, exposure = 1/30second. When Timed, using value of ExposureTime. When PresetTimed, using value of ExposureTimePreset.

(B) Software trigger

- (1) TriggerMode → "Off"
- (2) TriggerSelector → "FameStart"
- (3) TriggerMode → "On"
- (4) TriggerSource → "Software"
- (5) ExposureMode → "Off" / "Timed" / "PresetTimed" : When Off, exposure = 1/30second. When Timed, using value of ExposureTime. When PresetTimed, using value of ExposureTimePreset.

When actually operating, repeat (a) and (b) alternately.
TriggerSoftware → write "1"

Timing by the software-trigger.

Exposure by the value of ExposureTime.

2. ONE Trigger mode

When external trigger signal is POSITIVE (TriggerPolarity: "RisingEdge"), after the trigger signal rise, exposure is start.

The trigger signal width equals the exposure time.

Hardware trigger

- (1) TriggerMode → "Off"
- (2) TriggerSelector → "FrameStart"
- (3) TriggerMode → "On"
- (4) TriggerSource → "Line1" (Software is disable)
- (5) TriggerActivation → "RisingEdge" / "FallingEdge"
- (6) ExposureMode → "TriggerWidth"

4. Others

Operation of the camera by the combination of each setting value is shown a table below.

SETTING OPERATION		Exposure Mode	Exposure Time	Exposure Auto	TriggerMode [TriggerSelector]	TriggerSource [TriggerSelector]
		Normal mode	SHUTTER:OFF	Off	Don't Care	Off
MANUAL SHUTTER	Timed		10 us to 10 s	Off	Off	Don't Care
AUTO SHUTTER	Off or Timed		Don't Care	Continuous	Off	Don't Care
Trigger mode	SHUTTER:OFF	Off	Don't Care	Off	On	Line1(#7) or Software
	MANUAL SHUTTER	Timed	10 us to 10 s	Off	On	Line1(#7) or Software
	AUTO SHUTTER	Off or Timed	Don't Care	Continuous	On	Line1(#7) or Software
	PULSE WIDTH	TriggerWidth	Don't Care	Don't Care	On	Line1(#7)

12. UsetSetSave and data save timing

Each parameter of the camera is stored in UserSet 1 to 4 or common area.

Parameters saved in UserSet 1 to 4 are saved in UserSet 1 to 4 Selected by "UserSetSelector" by executing "UsetSetSave".

Common parameters are saved when value is changed or saved when "UsetSetSave" is executed.

Note. Please do not turn off the power until 5 seconds after UsetSetSave is executed.

Table A . Features saved in UserSetx

No	Category	Feature name	SAVE TIMING:
1-1	ImageFormatControl	Width	*A
1-2	ImageFormatControl	Height	*A
1-3	ImageFormatControl	OffsetX	*A
1-4	ImageFormatControl	OffsetY	*A
1-5	ImageFormatControl	BinningVertical	*A
1-6	ImageFormatControl	TestPattern	*A
1-7	ImageFormatControl	PixelFormat	*A
1-8	ImageFormatControl	PartialScanMode	*A
1-9	ImageFormatControl	PartialScanOffsetY	*A
1-10	ImageFormatControl	PartialScanHeight	*A
1-11	AcquisitionControl	AcquisitionMode	*A
1-12	AcquisitionControl	AcquisitionFrameCount	*A
1-13	AcquisitionControl	AcquisitionFrameRate	*A
1-14	AcquisitionControl	AcquisitionFrameRateEnable	*A
1-15	AcquisitionControl	TriggerMode	*A
1-16	AcquisitionControl	TriggerSource	*A
1-17	AcquisitionControl	TriggerActivation	*A
1-18	AcquisitionControl	TriggerDelay	*A
1-19	AcquisitionControl	ExposureMode	*A
1-20	AcquisitionControl	ExposureTimePreset	*A
1-21	AcquisitionControl	ExposureTime	*A
1-22	AcquisitionControl	ExposureAuto	*A
1-23	AcquisitionControl	ExposureAutoLowerLimit	*A
1-24	AcquisitionControl	ExposureAutoUpperLimit	*A
1-25	DigitalIOControl	LineInverter	*A
1-26	DigitalIOControl	LineSource	*A
1-27	CounterAndTimerControl	TimerDuration	*A
1-28	CounterAndTimerControl	TimerDelay	*A
1-29	AnalogControl	Gain	*A
1-30	AnalogControl	GainAuto	*A
1-31	AnalogControl	GainAutoLowerLimit	*A
1-32	AnalogControl	GainAutoUpperLimit	*A
1-33	AnalogControl	BlackLevel	*A
1-34	AnalogControl	PaintBlackMode	*A
1-35	AnalogControl	PaintBlack	*A
1-36	AnalogControl	BalanceWhiteAuto	*A
1-37	AnalogControl	BalanceRatio	*A
1-38	AnalogControl	GammaMode	*A
1-39	AnalogControl	Gamma	*A
1-40	AnalogControl	KneeMode	*A
1-41	AnalogControl	KneePoint	*A

1-42	AnalogControl	KneeSlope	*A
1-43	AnalogControl	Sharpness	*A
1-44	AnalogControl	MaskingMode	*A
1-45	AnalogControl	MaskingSaturation	*A
1-46	AnalogControl	MaskingHue	*A
1-47	AnalogControl	ShadingCorrection	*A
1-48	LUTControl	LUTEnable	*A
1-49	LUTControl	LUTValue	*A
1-50	AutoLevelControl	ALCAdjust	*A
1-51	AutoLevelControl	AlcGateWidth	*A
1-52	AutoLevelControl	AlcGateHeight	*A
1-53	AutoLevelControl	AlcGateOffsetX	*A
1-54	AutoLevelControl	AlcGateOffsetY	*A
1-55	DigitalNoiseReduction	DigitalNoiseReductionMode	*A

Table B . Features saved in Common area

No	Category	Feature name	SAVE TIMING:
2-1	DeviceControl	DeviceUserID	*B
2-2	GigEVision	GevCurrentIPConfigurationDHCP	*B
2-3	GigEVision	GevCurrentIPConfigurationPersistentIP	*B
2-4	GigEVision	GevPersistentIPAddress	*B
2-5	GigEVision	GevPersistentSubnetMask	*B
2-6	GigEVision	GevPersistentDefaultGateway	*B
2-7	UserSetControl	UserSetDefault	*B
2-8	DeviceControl	DeviceLinkHeartbeatTimeout	*A or *B
2-9	DeviceControl	DeviceLinkHeartbeatMode	*A or *B
2-10	GigEVision	GevSCPSDoNotFragment	*A or *B
2-11	GigEVision	GevSCPSPacketSize	*A or *B
2-12	GigEVision	GevSCPD	*A or *B
2-13	PixelCorrection	WhiteSpotCorrectCount	*A

SAVE TIMING

*A: It is saved when "UserSetSave" is executed.

*B: It is saved when the value is changed. (Immediate save)

13. Digital output

The method of setting of digital output is explained.

1. Flash out (strobe pulse)

This camera can output flash pulse when trigger mode or electric shutter mode,

(A) When output flash pulse at the same time as exposure time and without delay.

- (1) LineSelector → "Line2"
- (2) LineSource → "ExposureActive" ... (*1)
- (3) LineInverter → False / True ... (*1)

(B) When adjust delay or duration of flash pulse

- (1) LineSelector → "Line2"
- (2) LineSource → "Timer1Active" ... (*1)
- (3) LineInverter → False / True ... (*1)
- (4) TimerSelector → "Timer1"
- (5) TimerDuration → 0 to 2,000,000 ... (*2)
- (6) TimerDelay → 0 to 2,000,000
- (7) TimerTriggerSource → "ExposureStart"

(*1) Following table shows polarity of flash out signal

LineInverter	Output flash signal
False	
True	

(*2) When set to 0 → duration of flash pulse is equal to actual exposure time

2. VD out

This camera can output camera VD. It is used when synchronizing other camera.

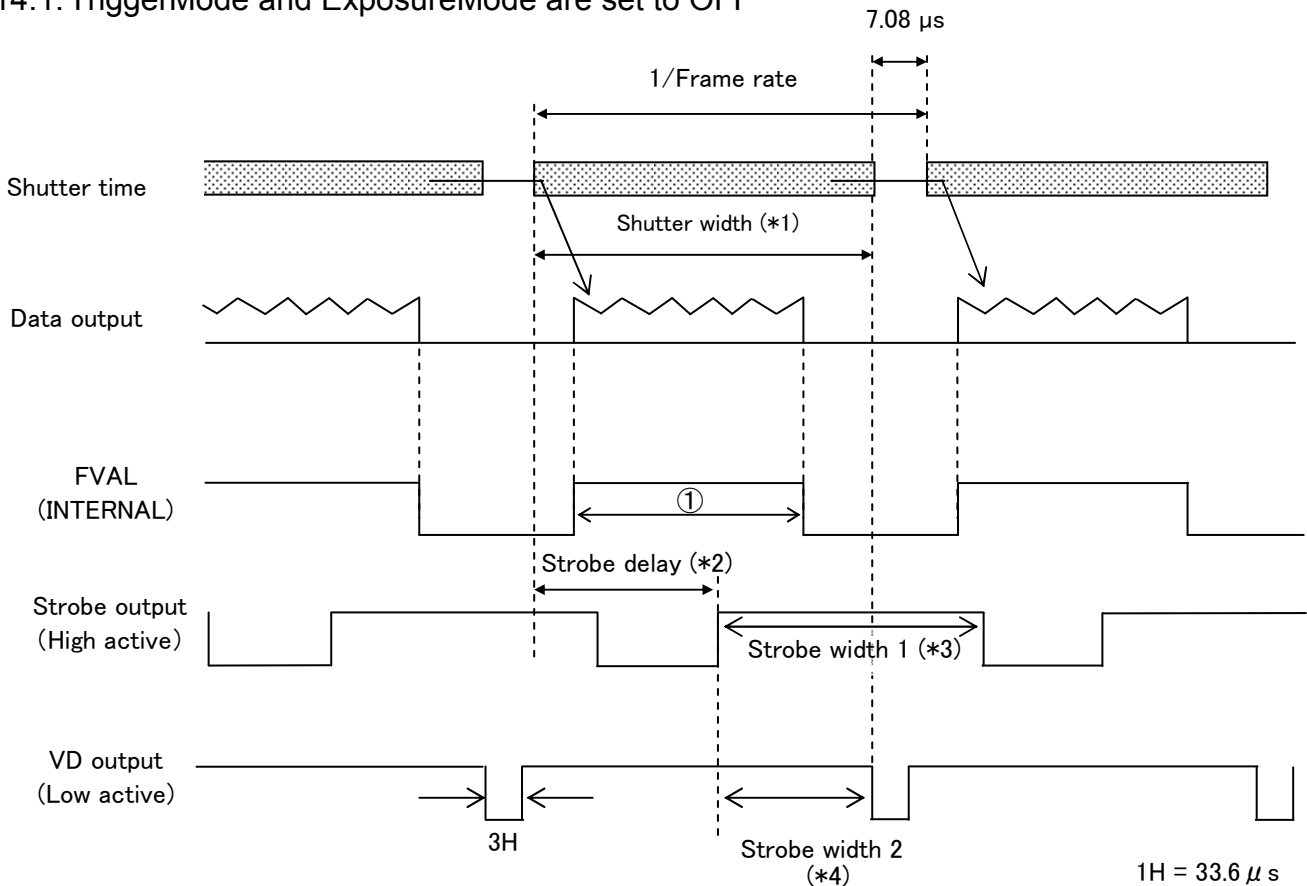
- (1) LineSelector → "Line2"
- (2) LineSource → "VD"

Following table shows polarity of VD signal

VD signal

14. Trigger operation and timing chart

14.1. TriggerMode and ExposureMode are set to OFF



(*1) Shutter width = $1 / \text{Frame rate} - 7.08 \mu s$

(*2) When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay is set to $0.0 \mu s$.
 When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation.
 Strobe delay = CounterAndTimeControl.TimerDelay * $1.0 \mu s$ (Note 14.1.1) (Note 14.1.3)

(*3) When DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to non-zero, Strobe width 1 is represented by following formula.
 Strobe width 1 = CounterAndTimeControl.TimerDuration * $1.0 \mu s$ (Note 14.1.2) (Note 14.1.3)
 When DigitalIOControl.LineSource is set to "ExposureActive" or DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to 0, Strobe width 1 is represented by following formula.
 Strobe width 1 = Shutter width (*1)

(*4) Strobe width 2 = Shutter width - Strobe delay = (*1) - (*2)

(Note 14.1.1) Set the strobe delay in the range from 0.0 to 2.0 seconds in us.

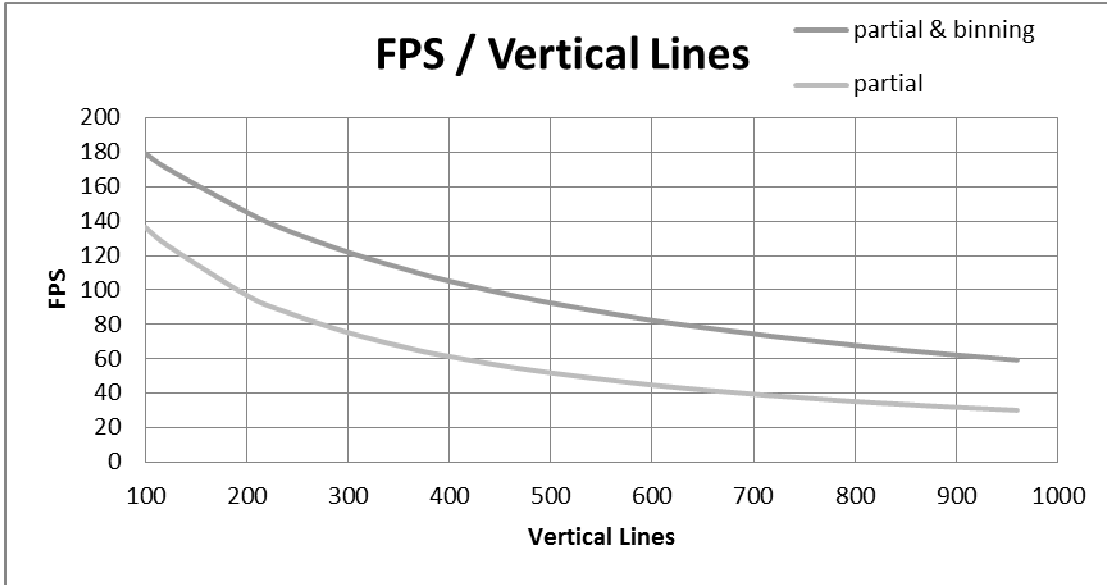
(Note 14.1.2) Set the strobe width in the range from 1.0u to 2.0 seconds in us.

(Note 14.1.3) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.

(Note 14.1.4) $[x]$ is Ceiling function.

PartialScanMode	OFF		ON (Note 14.1.4)	
	OFF	ON	OFF	ON
BinningVertical	OFF	ON	OFF	ON
①	960H	480H	(HEIGHT) H	$[(\text{HEIGHT}/2)] H$
1/Frame rate	990H	496H	$(19 + [(13 + \text{OFFSET})/9] + \text{HEIGHT} + [(966 - \text{HEIGHT} - \text{OFFSET})/9]) H$	$(10 + [(9 + \text{OFFSET})/9] + [(18 + \text{HEIGHT})/2] + [(961 - \text{HEIGHT} - \text{OFFSET})/9]) H$

The relationship between maximum frame rate and vertical lines for partial scan mode and partial scan and binning mode are shown in following graph.



Equation below is the formula for the "total number of lines by capture width (the decimal point is truncated)" and the "frame rate".

(1) Equation of total number of line for partial scan mode

$$\text{The total number of line} = 19 + [(13 + \text{OFFSET}) / 9] + \text{HEIGHT} + [(966 - \text{HEIGHT} - \text{OFFSET}) / 9]$$

(2) Equation of total number of line for partial scan and binning mode

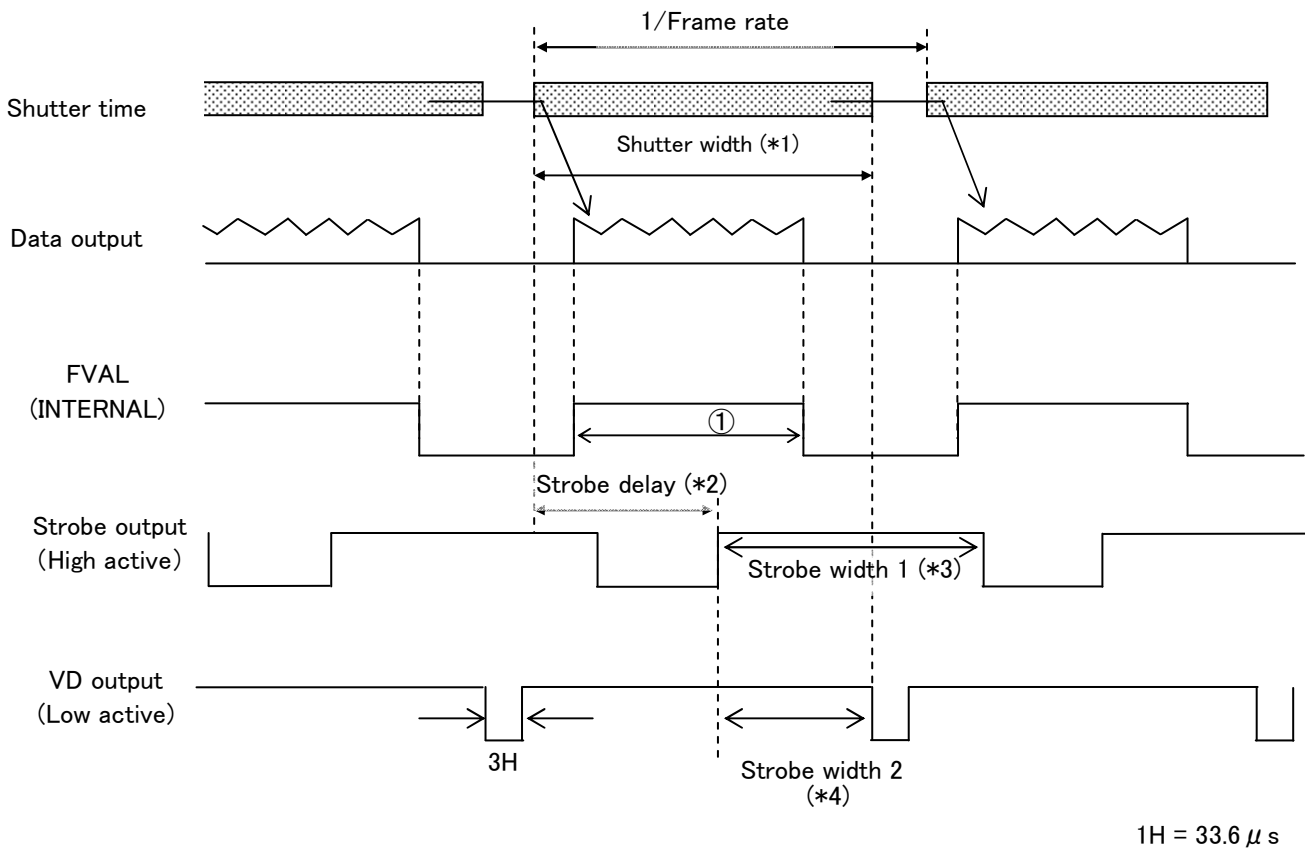
$$\text{The total number of line} = 10 + [(9 + \text{OFFSET}) / 9] + [(18 + \text{HEIGHT}) / 2] + [(961 - \text{HEIGHT} - \text{OFFSET}) / 9]$$

$$\text{Frame rate} = (45000000 / 1514) / \text{The total number of line}$$

*Notes on partial scan use

(Note 14.1.4) The capture start position + capture width, please use 960 H or less.

14.2. TriggerMode is set to OFF and ExposureMode is set to Timed or PresetTimed mode



- (*1) When AcquisitionControl.ExposureMode is set to "Timed", Shutter width is represented by following equation.
 Shutter width = AcquisitionControl.ExposureTime * 1.0 μ s (Note 14.2.1) (Note 14.2.2)
 When AcquisitionControl.ExposureMode is set to "PresetTimed", Shutter width is represented by following equation.
 Shutter width = AcquisitionControl.ExposureTimePreset
 Values: Preset1 "1/30sec", Preset2 "1/60sec", Preset3 "1/100sec", Preset4 "1/250sec",
 Preset5 "1/1000sec", Preset6 "1/2000sec", Preset6 "1/10000sec", Preset8 "1/50000sec"
- (*2) When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay is set to 0.0 μ s.
 When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation.
 Strobe delay = CounterAndTimeControl.TimerDelay * 1.0 μ s (Note 14.2.3) (Note 14.2.4)
- (*3) When DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is larger than 1, Strobe width 1 is represented by following equation. (Note 14.2.3) (Note 14.2.5)
 Strobe width 1 = CounterAndTimeControl.TimerDuration * 1.0 μ s
 When DigitalIOControl.LineSource is set to "ExposureActive" or
 DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to 0,
 Strobe width 1 is represented by following equation.
 Strobe width 1 = Shutter width = (*1)
- (*4) Strobe width 2 = Shutter width - Strobe delay = (*1) - (*2)

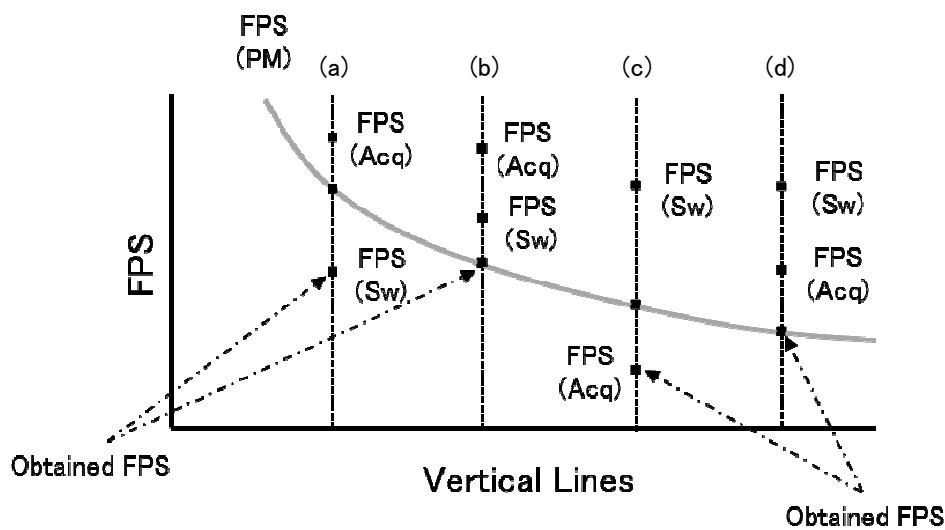
(Note 14.2.1)

- (a) When AcquisitionControl.AcquisitionFrameRate is smaller than 1/Shutter width and AcquisitionControl.AcquisitionFrameRate is smaller than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = AcquisitionControl.AcquisitionFrameRate
- (b) AcquisitionControl.AcquisitionFrameRate is smaller than 1/Shutter width and AcquisitionControl.AcquisitionFrameRate is larger than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = Frame rate of partial scan
- (c) Shutter width is larger than 1/AcquisitionControl.AcquisitionFrameRate and 1/Shutter width is smaller than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = 1/Shutter width
- (d) Shutter width is larger than 1/AcquisitionControl.AcquisitionFrameRate and 1/Shutter width is larger than the frame rate of partial scan, Frame rate is represented by following equation.
Frame rate = Frame rate of partial scan

These relationships are shown in following table and graph.

	(a)	(b)
Condition 1	$\text{AcquisitionControl.AcquisitionFrameRate} > 1/\text{Shutter width}$	
Condition 2	$1/\text{Shutter width} < \text{Partial Max Frame rate}$	$1/\text{Shutter width} \geq \text{Partial Max Frame rate}$
Obtained FPS	1/Shutter width	Partial Max Frame rate

	(c)	(d)
Condition 1	$\text{AcquisitionControl.AcquisitionFrameRate} < 1/\text{Shutter width}$	
Condition 2	$\text{AcquisitionControl.AcquisitionFrameRate} \leq \text{Partial Max Frame rate}$	$\text{AcquisitionControl.AcquisitionFrameRate} > \text{Partial Max Frame rate}$
Obtained FPS	AcquisitionControl.AcquisitionFrameRate	Partial Max Frame rate



- (PM) Maximum frame rate of partial scan mode: Partial Max Frame rate
- (Sw) Maximum frame rate required for exposure: 1/Shutter width
- (Acq) Frame rate set by AcquisitionControl.AcquisitionFrameRate by User: AcquisitionControl.AcquisitionFrameRate

(Note 14.2.2) Set the Strobe delay in the range from 10.0u to 2.0 seconds in us.

(Note 14.2.3) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.

(Note 14.2.4) Set the Strobe delay in the range from 0.0 to 2.0 seconds in us.

(Note 14.2.5) Set the Strobe delay in the range from 1.0us to 2.0 seconds in us.

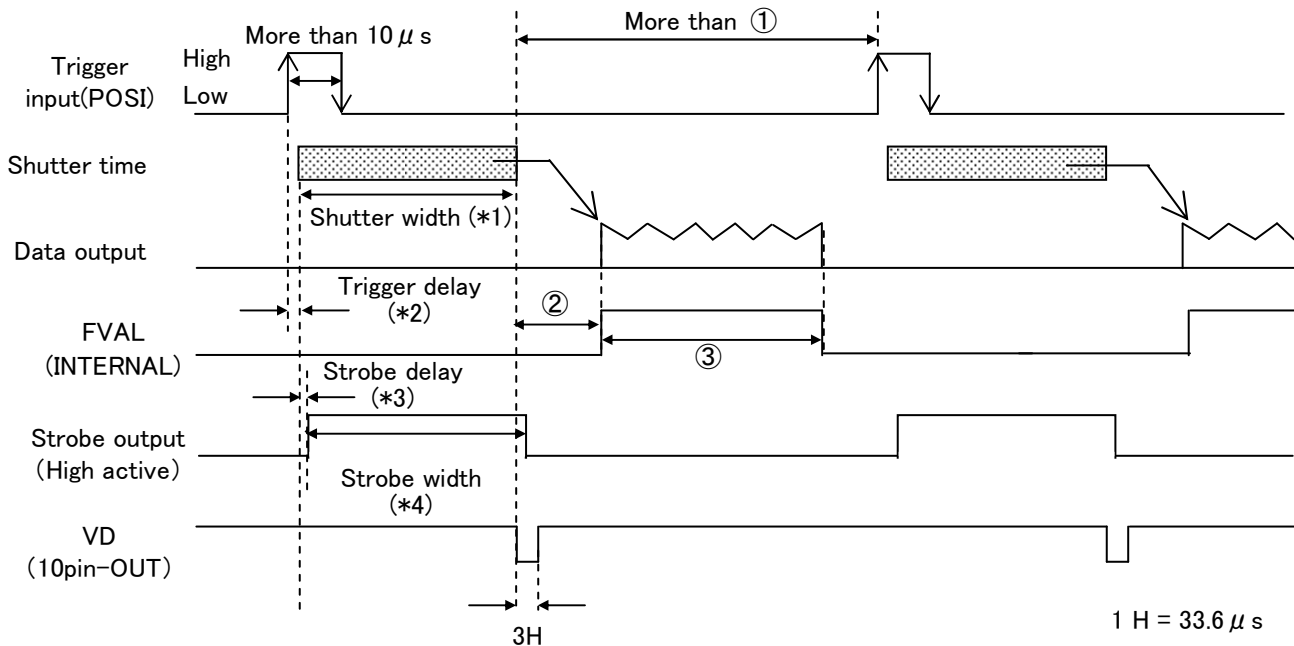
(Note 14.2.6) [x] is Ceiling function.

PartialScanMode	OFF		ON (Note 3.2.6)	
BinningVertical	OFF	ON	OFF	ON
①	960H	480H	(HEIGHT) H	$\lceil \text{HEIGHT}/2 \rceil$ H
1/Frame rate	992H	496H	$(19 + \lceil (13 + \text{OFFSET})/9 \rceil + \text{HEIGHT} + \lceil (966 - \text{HEIGHT} - \text{OFFSET})/9 \rceil)$ H	$(10 + \lceil (9 + \text{OFFSET})/9 \rceil + \lceil (18 + \text{HEIGHT})/2 \rceil + \lceil (961 - \text{HEIGHT} - \text{OFFSET})/9 \rceil)$ H

14.3. TriggerMode is set to ON and ExposureMode is set to Timed or PresetTimed

When external trigger signal is POSITIVE (high active), after the trigger signal rise, exposure is start.

The exposure time is set by the camera electronic shutter speed. The video output is obtained immediately after the end of fixed exposure.



(Note 14.3.1)

(*1) When AcquisitionControl.ExposureMode is set to "Timed", Shutter width is represented by following function. (Note 14.3.2)

Shutter width = AcquisitionControl.ExposureTime * 1.0 μs

When AcquisitionControl.ExposureMode is set to "PresetTimed"

Shutter width = AcquisitionControl.ExposureTimePreset

Values: Preset1 "1/30sec", Preset2 "1/60sec", Preset3 "1/100sec", Preset4 "1/250sec",

Preset5 "1/1000sec", Preset6 "1/2000sec", Preset6 "1/10000sec", Preset8 "1/50000sec"

(*2) Trigger delay = Rise time of photocoupler + 0.33 μs + AcquisitionControl.TriggerDelay * 1.0 μs. (Note 14.3.3)

(*3) When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation. (Note 14.3.3)

Strobe delay = CounterAndTimeControl.TimerDelay * 1.0 μs

When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay become 0.0 μs

(*4) When DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to non-zero, Strobe width is represented by following equation. (Note 14.3.4)

Strobe width = CounterAndTimeControl.TimerDuration * 1.0 μs

When DigitalIOControl.LineSource is set to "ExposureActive" or DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to zero, Strobe delay equal Shutter width like following equation.

Strobe width = Shutter width = (*1)

(Note 14.3.1) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.

(Note 14.3.2) Set the Shutter width in the range from 10.0u to 10.0 seconds in us.

(Note 14.3.3) Set the Strobe delay in the range from 0.0 to 2.0 seconds in us.

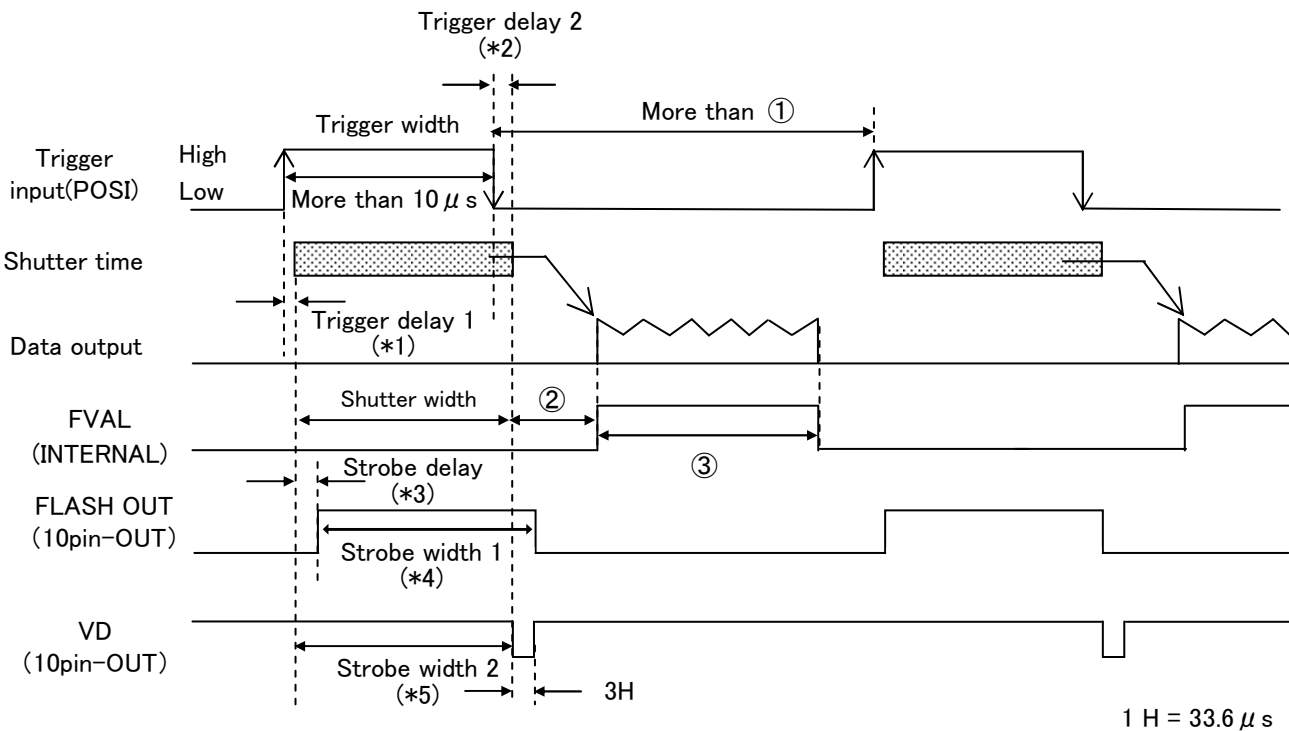
(Note 14.3.4) Set the Strobe width in the range from 1.0 to 2.0 seconds in us.

(Note 14.3.5) $\lceil x \rceil$ is Ceiling function

PartialScanMode	OFF		ON (Note 3.3.5)	
BinningVertical	OFF	ON	OFF	ON
①	992H	496H	$(19 + \lceil (13 + \text{OFFSET}) / 9 \rceil + \text{HEIGHT} + \lceil (966 - \text{HEIGHT} - \text{OFFSET}) / 9 \rceil) \text{ H}$	$(10 + \lceil (9 + \text{OFFSET}) / 9 \rceil + \lceil (18 + \text{HEIGHT}) / 2 \rceil + \lceil (961 - \text{HEIGHT} - \text{OFFSET}) / 9 \rceil) \text{ H}$
②	32H	23H	$(19 + \lceil (12 + \text{OFFSET}) / 9 \rceil) \text{ H}$	$(19 + \lceil (8 + \text{OFFSET}) / 9 \rceil) \text{ H}$
③	960H	480H	$(\text{HEIGHT}) \text{ H}$	$\lceil (\text{HEIGHT} / 2) \rceil \text{ H}$

14.4. TriggerMode is set to ON and ExposureMode is set to TriggerWidth

When external trigger signal is POSITIVE (high active), after the trigger signal rise, exposure is start. At the trigger signal falling edge, the internal VD signal is reset and the video data are transmitted. The trigger signal width equals the exposure time.



(Note 14.4.1)

(*1) Trigger delay 1 = Rise time of photocoupler + 0.26 μ s + AcquisitionControl.TriggerDelay * 1.0 μ s (Note 14.4.2)

(*2) Trigger delay 2 = Fall time of photocoupler + 4.38 μ s + AcquisitionControl.TriggerDelay * 1.0 μ s (Note 14.4.2)

(*3) When DigitalIOControl.LineSource is set to "Timer1Active", Strobe delay is represented by following equation.
Strobe delay = CounterAndTimerControl.TimerDelay * 1.0 μ s (Note 14.4.2)
When DigitalIOControl.LineSource is set to "ExposureActive", Strobe delay is set to zero.

(*4) When DigitalIOControl.LineSource is set to "Timer1Active", CounterAndTimeControl.TimerDuration is set to non-zero, Strobe width 1 is represented by following equation. (Note 14.4.3)
Strobe width 1 = CounterAndTimeControl.TimerDuration * 1.0 μ s
When DigitalIOControl.LineSource is set to "ExposureActive" or DigitalIOControl.LineSource is set to "Timer1Active" and CounterAndTimeControl.TimerDuration is set to zero, Strobe width equals Trigger width.
Strobe width 1 = Trigger width

(*5) Strobe width 2 = Shutter width - Strobe delay (*3) = Trigger width - (*1) + (*2) - (*3)

(Note 14.4.1) The setting value must be smaller than Frame rate. Otherwise, pulse signal could not be outputted.

(Note 14.4.2) Set the trigger and timer delays in the range from 0.0 to 2.0 seconds in us.

(Note 14.4.3) Set the Strobe width in the range from 0.0 to 2.0 seconds in us.

(Note 14.4.4) $\lceil x \rceil$ is Ceiling function

PartialScanMode	OFF		ON (Note 14.4.4)	
BinningVertical	OFF	ON	OFF	ON
①	992H	496H	$(19 + \lceil (13 + \text{OFFSET}) / 9 \rceil + \text{HEIGHT} + \lceil (966 - \text{HEIGHT} - \text{OFFSET}) / 9 \rceil) H$	$(10 + \lceil (9 + \text{OFFSET}) / 9 \rceil + \lceil (18 + \text{HEIGHT}) / 2 \rceil + \lceil (961 - \text{HEIGHT} - \text{OFFSET}) / 9 \rceil) H$
②	32H	32H	$(19 + \lceil (12 + \text{OFFSET}) / 9 \rceil) H$	$(19 + \lceil (8 + \text{OFFSET}) / 9 \rceil) H$
③	960H	480H	$(\text{HEIGHT}) H$	$\lceil (\text{HEIGHT} / 2) \rceil H$

15. Input / Output signal

1. Input signal

The level of the trigger signal input to HV-F130GV is as follows.

$$5Vp-p \pm 0.5V$$

2. Output signal

The level of VD/Flash pulse signal output from HV-F130GV is as follows.

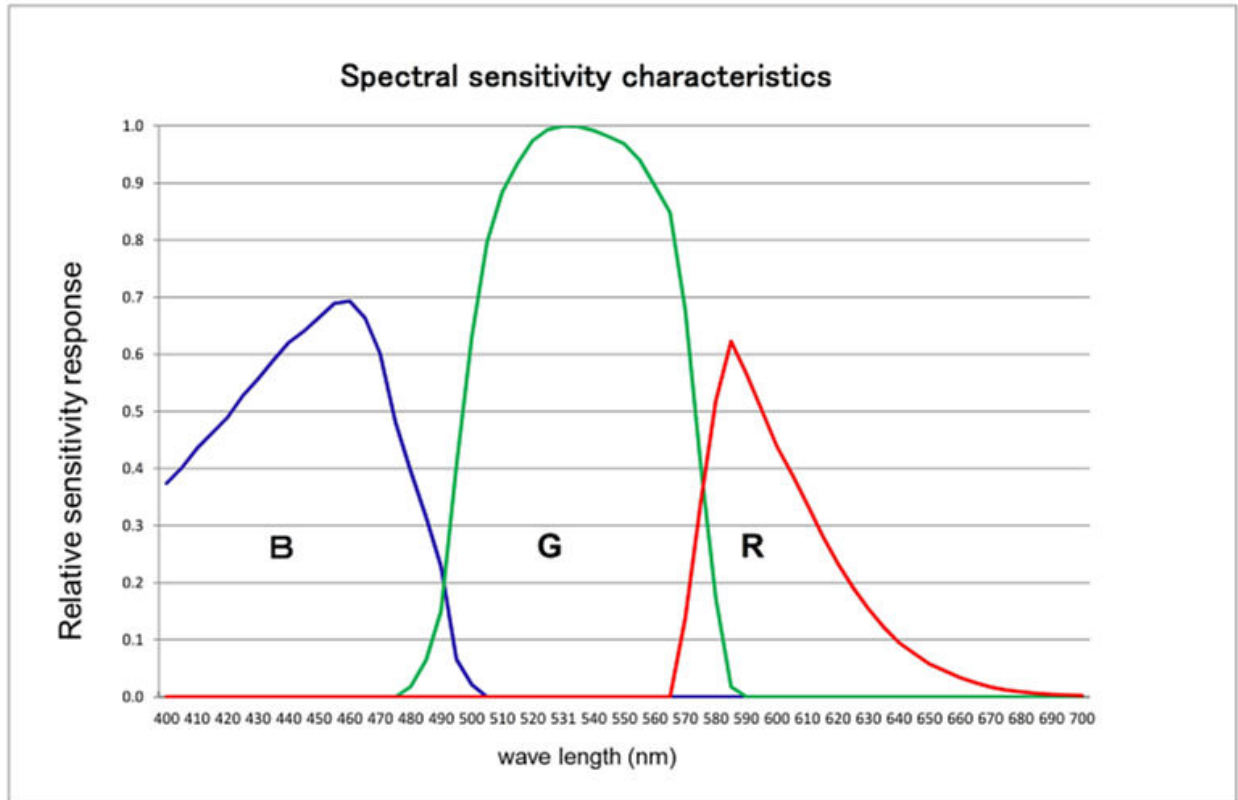
$$5Vp-p$$

16. Delay of photocoupler

The difference of the delay time for trigger signal of photocoupler implemented in HV-F130GV depends on input voltage as shown following table.

Voltage of input signal	The case of rising edge	The case of falling edge
5V	7.3~8.8 μ s	22.4~23.6 μ s
6V	5.3~5.6 μ s	31.4~34.5 μ s
7V	4.6~4.8 μ s	38.2~39.4 μ s
8V	3.8~4.1 μ s	41.3~41.4 μ s
9V	2.7~3.6 μ s	42.2~43.0 μ s
10V	2.5~2.8 μ s	44.3~44.6 μ s
11V	2.3~2.6 μ s	45.2~45.7 μ s
12V	2.2~2.5 μ s	45.8~46.6 μ s
13V	2.3~2.6 μ s	46.6~47.5 μ s
14V	2.2~2.5 μ s	47.1~48.2 μ s
15V	2.1~2.4 μ s	47.8~48.3 μ s
16V	2.1~2.3 μ s	48.3~48.7 μ s
17V	2.0~2.2 μ s	48.8~49.3 μ s
18V	2.0~2.2 μ s	48.9~49.3 μ s
19V	1.9~2.1 μ s	49.3~50.2 μ s
20V	1.9~1.9 μ s	49.8~50.5 μ s
21V	1.9~1.9 μ s	50.3~50.9 μ s
22V	1.8~1.9 μ s	50.7~51.2 μ s
23V	1.8~1.8 μ s	51.1~51.6 μ s
24V	1.8~1.8 μ s	51.8~52.1 μ s

17. Spectral response

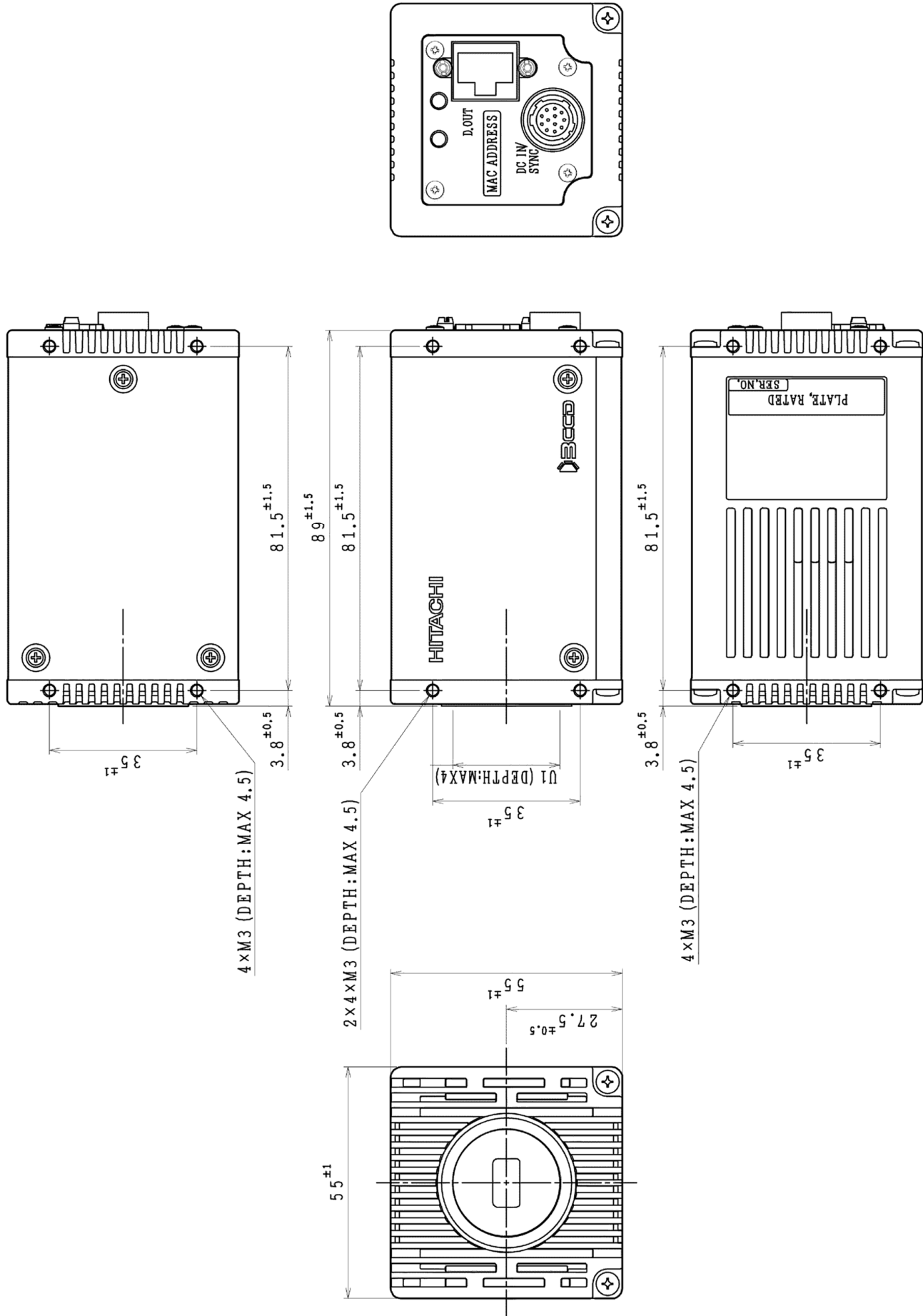


18. Specifications

Specifications of HV-F130GV are showing.

1)	Optical system	1/3-inch F1.9 prism with IR cut filter
2)	Imaging device	1/3-inch interline CCD
	Total pixels	1372 (H) x 986 (V)
	Effective pixels	1320 (H) x 976 (V)
	Active pixels	1280 (H) x 960 (V)
	Pixel pitch	3.75 μ m (H) x 3.75 μ m (V)
3)	Sensing area	4.80mm (H) x 3.60mm (V)
4)	Scanning system	Progressive scan
5)	Vertical scanning frequency	30.01 Hz
6)	Synchronization	Internal / VD external
7)	Lens mount	C mount (Mount surface projection less than 4.0mm)
8)	Fringe back	17.526mm (air conversion)
9)	Video output	
	Interface	Gigabit Ethernet
	Protocol	GigE Vision Version1.2 compliant
	Transmission speed	1Gbps
	Output data format	RGB 8/10bit BGR 8bit YUV422 8bit Mono 8/10/12 bit
	Max output image size	1280 (H) x 960 (V)
	Max frame rate	26 frames per second (RGB 8bit)
10)	Sensitivity	2000lx, F5.6, 3200K
11)	Minimum illumination	63lx (F1.9, Gain MAX)
12)	Electronic shutter	
	Preset	1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second
	Variable	10 to 1/100000 second
13)	External trigger function	
	Mode	OFF, Fixed shutter mode, ONE trigger mode
	Trigger input	From DCIN/SYNC 12pin connector
	Input level	5Vp-p \pm 0.5V
14)	Output signal	Strobe / VD : 5Vp-p
15)	Gamma	0.45 / 1.0 / LUT
16)	Gain	Manual / AGC : 0 to +12dB
17)	White balance	Manual / Once Auto / Continuous Auto
18)	Registration	Full screen 0.05% (not including lens response)
19)	Vertical contour correction	2H
20)	region of interest (ROI)	Selectable start position and width of picture grabbing in 2 pixels and 2 lines step
21)	Remote control	
	Control system	GigE Vision Version1.2, GENiCAM Version2.2 compliant
	Control items	TRIGGER, OUTPUT SIGNAL, SHUTTER SPEED, GAIN LEVEL, GAMMA, SHARPNESS, BLACKLEVEL, KNEE, ALC, WHITE BALANCE, MASKING, PAINT BLACK
22)	Power supply	DC12V \pm 1V / 48V (PoE: IEEE802.3af compliant)
23)	Power consumption	Approx.700mA(Approx.8.4W)
24)	Ambient temperature	
	Operating	0 to 40°C less than 90% RH (without dew condensation)
	Storage	-20 to 60°C less than 70% RH (without dew condensation)
25)	Vibration endurance	10 to 100Hz (24.5 m/s ²), sweep: 10 minutes, XYZ, 30minutes
26)	Shock endurance	392 m/s ² (vertical, horizontal, once each faze)
27)	Dimensions	55(W) x 55(H) x 89(D) mm (not including mount protrusions)
28)	Mass	Approx. 320g (not including the lens)
29)	Standard compositions	Camera, Installation guide, Plug for power supply

19. Dimensions



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