

English



VISION:elite™

5M Pixel Color Camera

72MHz Pixel Clock Camera Link

VCC-F32FV19CL

Product Specification
& Operational Manual

CIS Corporation

Table of Contents

1. Scope of Application.....	3
2. Handling Precautions	3
2.1. Performance Guaranteed Conditions.....	3
2.2. Handling Precautions	4
3. Product Outline.....	5
4. Specification.....	6
4.1. General Specification	6
4.2. Camera Output Signal Specification.....	7
4.3. Camera Link Connector Bit Assignment (Base Configuration)	8
4.4. Function Settings.....	9
5. External Connector Pin Assignment	11
5.1. 12pins Circular Connector HR10-10R-12PA (73) (HIROSE)	11
5.2. 26pins Compact Camera Link Compatible Connector (3M).....	11
6. Switch Setting, Adjustment Potentiometer Specifications	12
6.1. Rear Panel Switch Function 10bit DIP-SW.....	12
6.1.1. Shutter Speed Settings (Rear panel: SW1:E0, SW2:E1, SW2:E2).....	12
6.1.2. Operation Mode Settings (Rear panel SW 4: MODE 0, SW 5: MODE 1)	12
6.1.3. Partial Scan Mode Setting Switch (Rear panel SW:6 SCAN)	13
6.1.4. RGB/RAW Selection Switch (Rear SW8: RGB/RAW)	15
6.1.5. 8bit/10bit Selection Switch (Rear SW9:8Bit/10Bit).....	15
6.1.6. (Rear SW10: -).....	15
6.2. 12 turn Rotary Potentiometer For Manual Gain Adjustment	15
6.3. Internal Adjustment Switches and Potentiometer Information	16
6.4. HD/VD Trigger Input/Output Circuit of 12pin Circular Connector.....	17
6.5. Serial Communication Function.....	18
7. Safety/Quality Standards	20
8. Durability	20
9. Timing Chart	21
9.1. Horizontal Synchronous Timing.....	21
9.2. Vertical Synchronous Timing.....	21
9.3. Standard Trigger Timing.....	22
9.4. Pulse Width Trigger Timing.....	22
10. Dimensions.....	23
11. Cases for Indemnity (Limited Warranty).....	24
12. Product Support.....	24

1. Scope of Application

This is to describe VCC-F32FV19CL Camera Link Color CCD Camera.
All specifications contained herein are subject to change without prior notice.
Reproduction in whole or in part is prohibited.

2. Handling Precautions

2.1. Performance Guaranteed Conditions

Please make sure to use the camera under the temperature conditions specified below.

(1) Background

The CCD image sensor utilized for VCC-F32FV19CL is subjected to restraint for performance guarantee temperature conditions by the CCD manufacturer. Long term use under high temperature conditions may cause degradation of image quality in age.

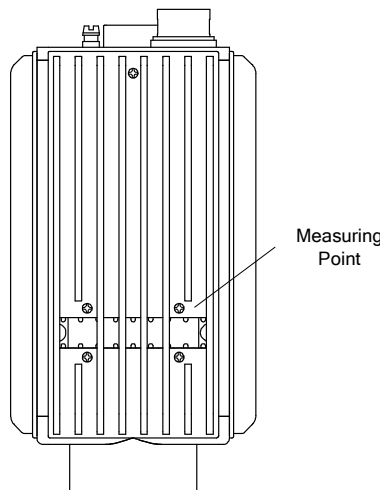
CIS tries to make VCC-F32FV19CL to be good for any longer, using peltiert device to cool CCD image sensor down, design, and verify it to meet the guidelines the CCD manufacturer guarantees.

The cooling effect, however, will be affected by installation conditions and/or use temperature conditions. Therefore, we specify performance guarantee conditions of VCC-F32FV19CL as below.

(2) Measuring Position

There would be wide variety of installation ways of the camera but we would like to specify either right or left side of the void on camera upper side as the measuring position of the camera environmental temperature. Please refer to the drawing below.

The measured temperature at the measuring point shall be under 41°C



Reference: The followings are the examples of installation ways assumed for the condition above

In case of when installing the camera to a large metallic chassis directly.

Camera usage environmental temperature is 34°C.

Temperature of the measuring point is 41°C.

In case of when installing the camera to a metallic chassis through an insulator attached.

Camera usage environmental temperature is 25°C.

Temperature of the measuring point is 41°C.

With those conditions above, operation temperature of CCD image sensor would be 25°C.

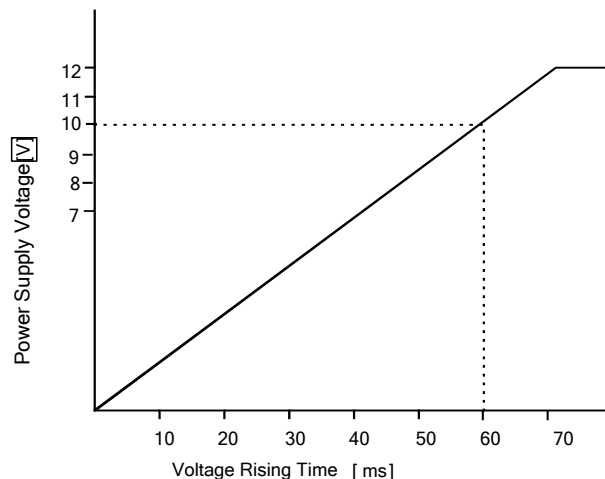
2.2. Handling Precautions

The camera must not be used for any nuclear equipments or aerospace equipments with which mechanical failure or malfunction could result in serious bodily injury or loss of human life. Our warranty does not apply to damages or defects caused by irregular and/or abnormal use of the product.

Please observe all warnings and cautions stated below.

Our warranty does not apply to damages or malfunctions caused by neglecting these precautions.

- Do not use or store the camera in the following extreme conditions:
 - Extremely dusty or humid places.
 - Extremely hot or cold places (operating temperature -5°C to $+40^{\circ}\text{C}$)
 - Close to generators of powerful electromagnetic radiation such as radio or TV transmitters.
 - Places subject to fluorescent light reflections.
 - Places subject to unstable (flickering, etc.) lighting conditions.
 - Places subject to strong vibration.
- Remove dust or dirt on the surface of the lens with a blower.
- Do not apply excessive force or static electricity that could damage the camera.
- Do not shoot direct images that are extremely bright (e.g., light source, sun, etc.), and when camera is not in use, put the lens cap on.
- Follow the instructions in Chapter 5, "External connector pin assignment" for connecting the camera. Improper connection may cause damages not only to the camera but also to the connected devices.
- Confirm the mutual ground potential carefully and then connect the camera to monitors or computers. AC leaks from the connected devices may cause damages or destroy the camera.
- Do not apply excessive voltage. (Use only the specified voltage.) Unstable or improper power supply voltage may cause damages or malfunction of the camera.
- The voltage ripple of camera power DC $+12\text{V}\pm 10\%$ shall be within $\pm 50\text{mV}$. Improper power supply voltage may cause noises on the video signals.
- The rising time of camera power supply voltage shall be less than $+10\text{V}$, Max 60ms.
Please avoid noises like chattering when rising.



3. Product Outline

VCC-F32FV19CL is a high-resolution industrial color digital video camera module utilizing a 2/3 inch PS IT CCD. 5M pixels CCD image sensor (square pixels) with on-chip micro-lenses realizes high sensitivity and high resolution.

Key Features

Electronic shutter

Fixed shutter speed (OFF 1/10s~1/10000s) switchable by rear switch .

Electronic shutter speed switchable by trigger pulse width (1/2s~1/10,000s).

Video frame rates

The followings are for both normal mode and trigger operation mode.

Progressive Scan : 10fps

Partial Scan (19fps is set as initial setting) : 10fps ~ 27fps

Trigger operation

Trigger operation is V-Sync Reset with CLK sync. The delay time between receiving trigger pulse into the camera and starting exposure is approx. 7 μ sec (500CLK).

Input trigger

The input trigger inputted during outputting the images can be accepted, but the one inputted during exposure shall be ignored.

To input trigger during the execution of prior trigger (during outputting the images), the rising edge and/or the down edge of trigger pulse shall be synchronized with the down edge of camera HD output.

4. Specification

4.1. General Specification

Item	Specification	Remarks												
Power consumption	5.0 W													
Power requirements	DC+12V \pm 10% (Max voltage not to exceed 15V)													
Operation environment	(Performance guaranteed) 0°C~+40°C with RH 20~80% (Operation guaranteed) 0°C ~+40°C with RH 20~80%	No condensation												
Storage environment	-25°C~+60°C with RH 20~80%	No condensation												
Mass	215g													
Dimension	Refer to overall dimension drawing (Clause 10) (W: 44mm×H : 29mm×D : 91mm)													
Lens mount	C mount (Flange back : 17.526mm) (fixed) Protruding portion shall be under 10mm.													
Optical axis accuracy	Under \pm 0.1mm from the center of pixel													
Video output signal	Digital RAW 8bit/10bit or Digital 24bit RGB (8bit each)													
Pick up device	2/3" Interline Transfer Color CCD Total Pixel number 2616(H) \times 1960(V) Effective pixels number 2608(H) \times 1950(V) Unit cell size 3.4 μ m(H) \times 3.4 μ m(V) Square pixel	Progressive												
Operation Mode	(1) Normal Mode (2) Standard Trigger Mode (Fixed Shutter) (3) Pulse Width Trigger Mode Can be input via camera link connector or 12pin circular connector.	12pin circular connector												
Scanning system Non Interlace scan	1/10sec Progressive scan (Standard mode) Horizontal frequency 20.57 KHz Vertical frequency 10.01 Hz Pixel clock 72 MHz	3500 CLK 2056 HD												
Partial Scan	<table border="1"> <thead> <tr> <th></th> <th>V Scanning Lines</th> <th>Rate</th> <th>V. Effective lines</th> </tr> </thead> <tbody> <tr> <td>Progressive Scan</td> <td>2056 Lines</td> <td>10 fps</td> <td>1950 Lines</td> </tr> <tr> <td>Partial Scan</td> <td>1076 Lines</td> <td>19 fps</td> <td>480 Lines</td> </tr> </tbody> </table> (Selectable 2056 line: 10fps: 1950 line~766 line: 27 fps: 15 line)		V Scanning Lines	Rate	V. Effective lines	Progressive Scan	2056 Lines	10 fps	1950 Lines	Partial Scan	1076 Lines	19 fps	480 Lines	(Initial Setting) Refer to 6.1.3.
	V Scanning Lines	Rate	V. Effective lines											
Progressive Scan	2056 Lines	10 fps	1950 Lines											
Partial Scan	1076 Lines	19 fps	480 Lines											
Sensitivity	More than F8 at 400 lx (at 1/10sec exposure, Gain 0dB)													
Min. illumination	F1.4 12 lx (at 1/10sec exposure, Gain 12dB, VS 50IRE)													

4.2. Camera Output Signal Specification

Item	Specification		Remarks
Horizontal resolution	1000 TV lines (at RGB output) 1900 TV lines (at RAW output)		
Sync. Signal Output	(1) LVAL output: Negative polarity (2) FVAL output: Negative polarity (3) DVAL output: BLK output Positive polarity		Camera Link connector
	(1) HD/VD output: Negative polarity (2) WEN output: DVAL Positive polarity		12pin circular connector
Trigger input	Input signal: Polarity Selectable		
	Input signal level	Input signal level : 2~5Vp-p under condition that the camera is connected.	12pin circular connector
		CC1 input	Camera Link Connector
Video Output Signal	Setup level 4 ± 2 (Hex) to 8bit video output (00 – FF Hex)		
Shutter	(1) Standard mode OFF (1/10), 1/30, 1/90, 1/500, 1/1000, 1/2000, 1/5000, 1/10000 sec Manual (Shutter value can be set per 1 line step.)		
	(2) Standard trigger mode 1/10, 1/30, 1/90, 1/500, 1/1000, 1/2000, 1/5000, 1/10000 sec		
	(3) Trigger pulse width mode Approx.1/2s ~ 1/10000s		
Gain	0dB, +6dB, MANUAL (min 0dB ~ max+12dB) Performance guaranteed range : 0 ~ +6dB		
White Balance	2600K, 3200K, 5600K, 9000K, Manual		
γ Gamma correction	OFF ($\gamma = 1.0$), ON ($\gamma = 0.45$) : selectable (as an factory option)		
Serial Communication	With camera link connector input or 12 pin circular connector (option) input, the camera can be controlled by serial communication.		

4.3. Camera Link Connector Bit Assignment (Base Configuration)

RGB output (Rear panel switch: 8-ON)

Port/bit	24bit RGB	Port/bit	24bit RGB	Port/bit	24bit RGB
Port A0	R0	Port B0	G0	Port C0	B0
Port A1	R1	Port B1	G1	Port C1	B1
Port A2	R2	Port B2	G2	Port C2	B2
Port A3	R3	Port B3	G3	Port C3	B3
Port A4	R4	Port B4	G4	Port C4	B4
Port A5	R5	Port B5	G5	Port C5	B5
Port A6	R6	Port B6	G6	Port C6	B6
Port A7	R7	Port B7	G7	Port C7	B7

RAW output, 8bit output mode (Rear panel switch : 8-OFF 9-OFF)

Port/bit	8bit×1	Port/bit	8bit×1	Port/bit	8bit×1
Port A0	D0	Port B0	(-)	Port C0	(-)
Port A1	D1	Port B1	(-)	Port C1	(-)
Port A2	D2	Port B2	(-)	Port C2	(-)
Port A3	D3	Port B3	(-)	Port C3	(-)
Port A4	D4	Port B4	(-)	Port C4	(-)
Port A5	D5	Port B5	(-)	Port C5	(-)
Port A6	D6	Port B6	(-)	Port C6	(-)
Port A7	D7	Port B7	(-)	Port C7	(-)

RAW output, 10bit output mode (Rear panel switch : 8-OFF 9-ON)

Port/bit	10bit×1	Port/bit	10bit×1	Port/bit	10bit×1
Port A0	D0	Port B0	D8	Port C0	(-)
Port A1	D1	Port B1	D9	Port C1	(-)
Port A2	D2	Port B2	(-)	Port C2	(-)
Port A3	D3	Port B3	(-)	Port C3	(-)
Port A4	D4	Port B4	(-)	Port C4	(-)
Port A5	D5	Port B5	(-)	Port C5	(-)
Port A6	D6	Port B6	(-)	Port C6	(-)
Port A7	D7	Port B7	(-)	Port C7	(-)

4.4. Function Settings

Camera functions can be set with serial data communication.

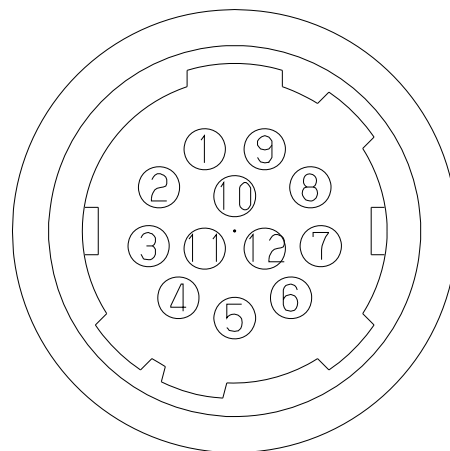
Function	Address	Data	Remarks
LOC/REM	000	0: Local (Camera SW) Control 1: Serial Communication Control	Initial Setting (0)
Gain	001	0: 0dB 1: 0dB 2: +6dB 3: +12dB 4: Manual Gain (Refer to address 008)	Initial Setting (1)
E-Shutter Position	002	0 ~ 7: Please refer to the shutter settings, 6.1.1. 8~15: N/A 16: Manual Shutter (Refer to address 009 & 010)	Initial Setting (0)
White Balance	003	0: 2600K 1: 3200K 2: 5600K 3: 9000K 4: Manual White Balance (Refer to address 006 & 007)	Initial Setting (1)
Trigger Mode	004	0: Normal Mode 1: Standard Trigger Mode 2: Pulse Width Trigger Mode 3: Normal Mode	Initial Setting (0)
Scan Mode	005	0: Normal Scan Mode 1: Partial Scan Mode	Initial Setting (0)
Manual Gain R	006	R Gain 0~255 ※Valid when address 003 data is 4 (manual). ※ 64: x 1	
Manual Gain B	007	B Gain 0~255 ※Valid when address 003 data is 4 (manual). ※ 64: x 1	
MANUAL Gain	008	0 ~ 255: -1dB ~ +12dB ※Valid when address 001 data is 4 (manual).	
Manual Shutter	009&010	0 ~ max 2055 (max address 009: 8, address 010:7) Shutter Speed = $2055 - \text{DATA} * 48.61\mu\text{s} + 24.31\mu\text{s}$ Shutter Speed = $1 / ((2055 - \text{DATA}) * 48.61\mu\text{s} + 24.31\mu\text{s})$ Address 009 MSB and address 010 LSB make 12 bits in total.	

Function	Address	Data	Remarks
Trigger Neg/Pos	011	0: Trigger positive 1: Trigger negative	Initial Setting (0)
Trigger Input	012	0: Camera Link 1: 12Pin	Initial Setting (1)
8bit/10bit	013	0: 8bit, 1: 10bit ※Valid when address 018 data is 0(RAW).	Initial Setting (0)
Gamma correction	014	0: $\gamma = 1.0$ (OFF) 1: $\gamma = 0.45$ (ON) (option)	Initial Setting (0)
No Function	015-017	Not assigned.	
RAW/RGB	018	0: RAW 1: RGB 2: N/A 3: N/A	Initial Setting (1)
Partial Scan Starting Position	019	0 ~ 129 (max) ※ 15 lines step	
Partial Scan Effective Lines	020	0 ~ 129 (max) ※ 15 lines step	
Partial Scan Total Lines	021-022	Read Only (Address 021&022) + 1: Partial Scan Total Lines	
No Function	023-062	Not assigned.	
Data Save	063	To save data to EEPROM, Input "083". (Note) Camera inner SW104-2 shall be ON to save the data to EEPROM.	

5. External Connector Pin Assignment

5.1. 12pins Circular Connector HR10-10R-12PA (73) (HIROSE)

Pin No.	
1	GND
2	POWER IN DC +12V
3	GND
4	N/A
5	GND
6	HD OUT (RS 232C RXD)
7	VD OUT (RS 232C TXD)
8	GND
9	N/A
10	WEN OUT
11	TRG IN
12	GND



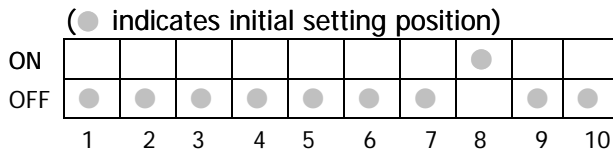
※HD/VD in and out pin can be used as a port for serial communication (As an option).

5.2. 26pins Compact Camera Link Compatible Connector (3M)

Signals	Specifications	
LVAL	HD	
FVAL	VD	
DVAL	Composite Blanking (Effective pixels area)	
SP	—	
Signals	Channel Link Pin No.	Specifications
XCLK-	5	CLK OUT
XCLK+	18	
SerTC+	7	RS232C RXD (Serial to camera)
SerTC-	20	
SerTFG+	8	RS232C TXD (Serial to frame grabber)
SerTFG-	21	
CC1-	9	TRG IN
CC1+	22	
CC2+	10	No Function
CC2-	23	
CC3-	11	No Function
CC3+	24	
CC4+	12	No Function
CC4-	25	

6. Switch Setting, Adjustment Potentiometer Specifications

6.1. Rear Panel Switch Function 10bit DIP-SW



- 1 E0
 - 2 E1
 - 3 E2
 - 4 MODE0
 - 5 MODE1
 - 6 SCAN
 - 7 N/A
 - 8 RGB/RAW
 - 9 10bit/8bit
 - 10 N/A
- ◇ Electronic shutter speed (3bit)
 - ◇ Trigger mode (2bit)
 - Normal Mode, Standard Trigger Moe, Pulse Width Trigger Mode
 - ◇ Partial Scan Mode Selection (1bit) OFF:10fps ON: 19fps
 - ◇ Not assigned. (Fixed to OFF)
 - ◇ RAW/RGB Selection (1bit) OFF: RAW ON: RGB
 - ◇ 8bit/10bit Selection (at RAW setting) (1bit) OFF:8bit ON:10bit
 - ◇ Not assigned. (Fixed to OFF)

6.1.1. Shutter Speed Settings (Rear panel: SW1:E0, SW2:E1, SW2:E2)

(1) Normal Scan Mode				(2) Standard Trigger Mode			
E0	E1	E2	Shutter Value	E0	E1	E2	Shutter Value
1	2	3		1	2	3	
OFF	OFF	OFF	OFF (1/10) sec	OFF	OFF	OFF	1/10 sec
ON	OFF	OFF	1/30 sec	ON	OFF	OFF	1/ 30 sec
OFF	ON	OFF	1/90 sec	OFF	ON	OFF	1/ 90 sec
ON	ON	OFF	1/500 sec	ON	ON	OFF	1/500 sec
OFF	OFF	ON	1/1000 sec	OFF	OFF	ON	1/1000 sec
ON	OFF	ON	1/2000 sec	ON	OFF	ON	1/2000 sec
OFF	ON	ON	1/5000 sec	OFF	ON	ON	1/5000 sec
ON	ON	ON	1/10000 sec	ON	ON	ON	1/10000 sec

6.1.2. Operation Mode Settings (Rear panel SW 4: MODE 0, SW 5: MODE 1)

MODE0	MODE1	Setting Mode
OFF	OFF	Normal Mode
ON	OFF	Standard Trigger Mode
OFF	ON	Pulse Width Trigger Mode
ON	ON	Normal Mode

(1) Normal Mode

Standard mode means progressive scan, 10fps, and invalid trigger shutter.

(2) Standard Trigger Mode

Standard trigger mode is a trigger mode to set shutter value via serial communication or fixed switch at rear. Trigger pulse width shall be over 1HD.

(3) Pulse Width Trigger Mode

Pulse width trigger mode is a trigger mode to set shutter value by trigger pulse width. Trigger pulse width shall be within the range from over 1HD to less than 1/2 sec.

Approximate exposure time will be as follows.

$$\text{Exposure time} = \text{Trigger width (nHD)} + 24.31 \mu\text{S} \quad (\text{HD} = 48.61 \mu\text{s})$$

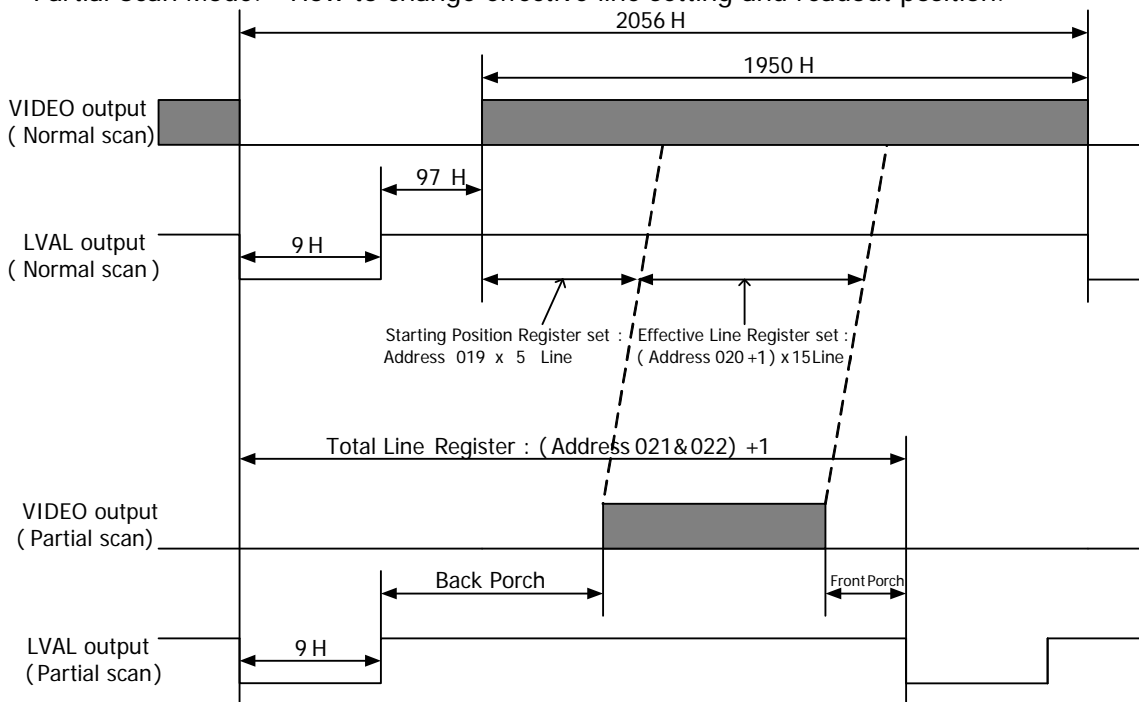
- Trigger operation is V-Sync Reset with CLK sync. The delay time between receiving trigger pulse into the camera and starting exposure is approx. 7 μ sec (500CLK).
- The input trigger inputted during the execution of prior trigger can be accepted. However, the input trigger inputted during the execution of exposure shall be ignored.
- To input trigger during the execution of prior trigger, the trigger pulse shall be synchronized with the down edge of camera HD output.

6.1.3. Partial Scan Mode Setting Switch (Rear panel SW:6 SCAN)

SCAN	Scanning Mode	V Scanning Lines	Rate	V Effective Lines
OFF	Progressive Scan	2056 Lines	10 fps	1950 Lines
ON	Partial Scan Mode	1076 Lines	19 fps	480 Lines

※ The above values are the value when partial scan mode is ON as initial setting.

(1) Partial Scan Mode. How to change effective line setting and readout position.



Any kind of settings can be set by serial communication function, setting readout position (Starting Position Register:019) and effective line numbers (Effective Line Register).

Readout Position (Starting Position Register: 019): 0~129 (max)

Starts reading out from the setting value x 15th line.

Effective Line (Effective Line Register: 020): 0~129 (max)

Outputs (setting value+1) x 15 lines

(Example) How to set up total line numbers

- By Remote communication function: (Total Line Register: 021&022)+1
- Formula

9	: LVAL
$97 + (\text{Address } 019) \times 5$: Back Porch
$(\text{Address } 020 + 1) \times 15$: Effective Line
$(129 - (\text{Address } 019 + \text{Address } 020)) \times 5$: Front Porch

(Note) Starting position register: 019 and Effective line register: 020 shall be under the conditions;
 $(\text{Address } 019) + (\text{Address } 020) = < 129$

When the above condition is not met, the value of 129-(Address 019) will be set to (Address 020).

<Setting Example 1> Conditions: Starting Position Register: 019 = 000

Effective Line Register (Address 020)	Effective Line	Total Line	Frame Rate
0	15	766	27 fps
1	30	776	27 fps
•	•	•	•
•	•	•	•
•	•	•	•
128	1935	2046	10 fps
129	1950	2056	10 fps

<Setting Example 2>

Q. How to read out 120 lines from the 600th line?

- A.
- (1) Address 000: 001 . . . Serial communication control
 - (2) Address 005: 001 . . . Partial Scan mode
 - (3) Address 019: 040 . . . Starting position set 600/15
 - (4) Address 020: 007 . . . Effective line (120/15) – 1
 - (5) Address 063: 083 . . . Data saving as needed base
 (Camera internal SW104-2 shall be ON to save data.)

6.1.4. RGB/RAW Selection Switch (Rear SW8: RGB/RAW)

RGB/RAW	RGB/RAW Switch
OFF	RAW
ON	RGB (interpolating averaged value)

6.1.5. 8bit/10bit Selection Switch (Rear SW9:8Bit/10Bit)

8bit/10bit	8bit/10bit output Switch
OFF	8bit output
ON	10bit output

※ Valid only when RAW output

6.1.6. (Rear SW10: -)

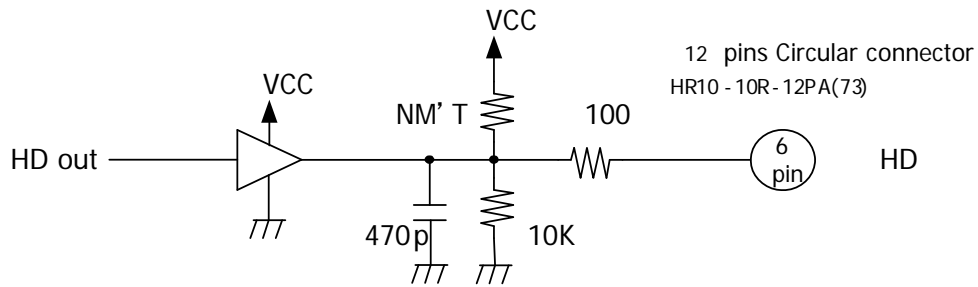
	N/A
OFF	Fixed

6.2. 12 turn Rotary Potentiometer For Manual Gain Adjustment

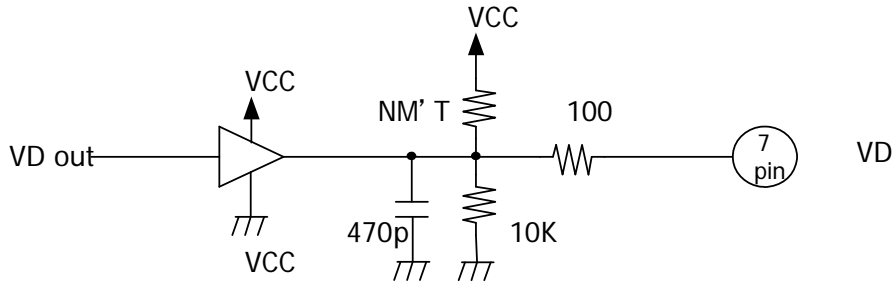
Adjustment range: min. 0dB ~ max. +12dB

(The performance guarantee range: 0 ~ +6dB.)

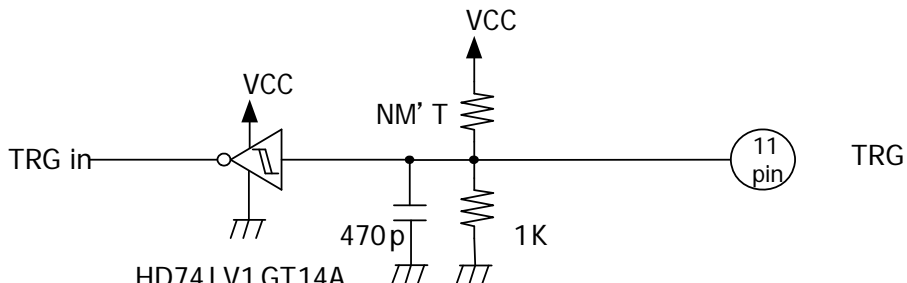
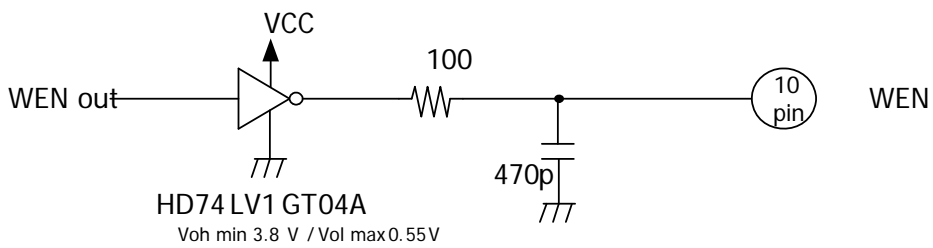
6.4. HD/VD Trigger Input/Output Circuit of 12pin Circular Connector



HD74 LV1 GT126A
 Vih min 2.0 V / Vil max 0.8 V
 Voh min 3.8 V / Vol max 0.55 V



HD74 LV1 GT126A
 Vih min 2.0 V / Vil max 0.8 V
 Voh min 3.8 V / Vol max 0.55 V



※ VCC : 5 V NM T : No mount

※ Please refer to the manufacturer's data sheets for the characteristics of component parts.

6.5. Serial Communication Function

Through RS-232C interface, the camera can be controlled by external PC.

(1) The settings for RS-232C are as follows.

- Baud rate: 9600 bps
- Data: 8 bit
- Stop bit: 1 bit
- Parity: None
- XON / XOFF: not controlled

(2) Control code

- The total control code is 14 bits, which conforms to ASCII code.
- The control code consists of camera No., process code, remote controller address, remote controller data, and CR. Execute Read/Write through PC, and the camera will reply the data.

1	2	3	4	5	6	7 th Byte	8	9	10	11	12	13	14
Camera NO.						Process code	Remote controller address			Remote controller data			CR
000000 : Common to the all cameras. 000001 ~ZZZZZZ : Camera No. of individual camera						"R" Read mode "W" Write mode "C" Camera mode	Please refer to the address table of 4.4 function setting.			000~255			0 Dh

Camera No. shall consist of 6 bytes of characters/numeric strings.

Send the individual camera number code or common number code, "000000".

The reply data from the camera shall contain the registered number for that camera.

Process code

Input any one of R, W, or C to the process code.

R (read mode) is to read the data of remote controller address. Please be noted to set any dummy data (000~255) to 11th ~ 13th, since a command shall consists of 14 bytes.

W (write mode) is to write the data to the remote controller address. Please be noted that the data cannot be saved into EEPROM of the camera. (Reboot the camera, and the data is reset to the initial setting.) To save the data into EEPROM, set camera internal switch, SW104-2, ON, and send the data, "83" into the address 064.

Note: Once the data was saved into EEPROM, it may not be reset to the initial settings.

C is the code to send the data back from the camera.

Note: Do not set code C when sending the data from PC side.

Remote controller address

Note: Do not write the data into the address other than specified, since it may cause the damages or malfunction of the camera.

Remote controller data

Set the decimal number (000~255) for the remote controller data. Please be noted to set any dummy data at read control mode.

CR Be sure to input "CR" to confirm the end of the command.

(3) Setting example

Set gain to +6dB with remote control function.

- Step 1. Set the camera to "000000" (assign the common camera number).
Write "1" into address "000" to set the camera into remote control mode.
Please be noted that the camera control switch becomes invalid in remote control mode.

Code from the PC: "000000W000001CR"

- Step 2. Set gain to +6dB.

Code from the PC: "000000W001002CR"

7. Safety/Quality Standards

UL Standard Conform to UL Standard including materials and others.

CE Marking (to be acquired) Conform to EN55022:2006 (Class B) for Emission
Conform to EN61000-6-2:2005 for Immunity

RoHS Conform to RoHS.

FCC Conform to FCC Class A Digital Device

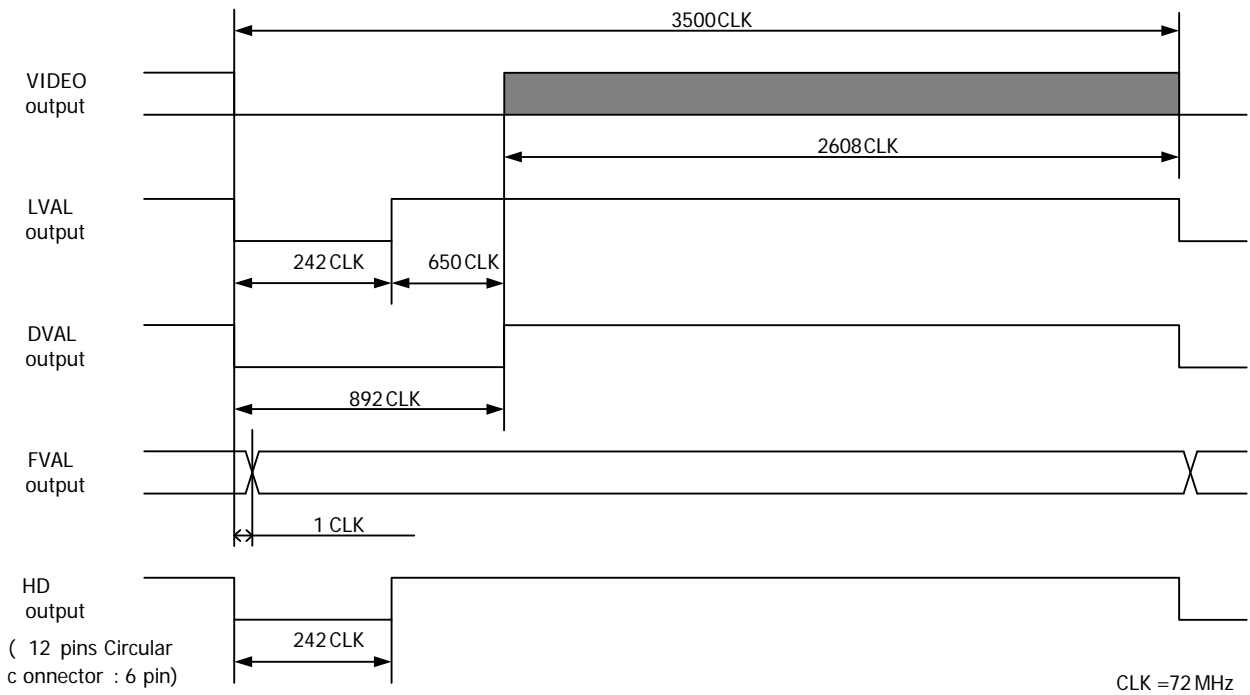
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

8. Durability

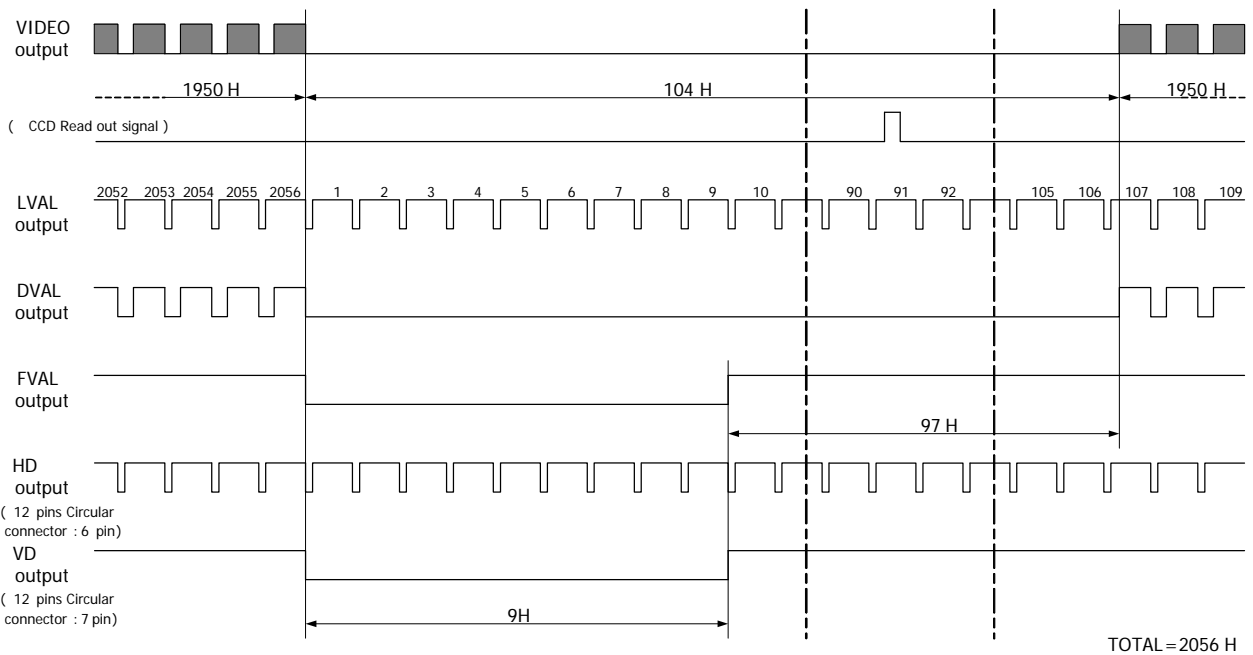
Item	Specification	Remarks
Vibration resistance	Acceleration 98 m/s ² (10.0G) Vibration frequency 20~200Hz Sweep interval 300 sec Direction XYZ 3 directions Testing time 120 min for each direction No malfunction shall occur after testing the above.	
Shock resistance	Acceleration 490m/s ² (50G) Direction 6 directions	Without package
Operation temperature	0°C~+40°C with RH 20~80% (No condensation) a) Leave the camera for 1 hour at the highest operation temperature, turn on the power, and then the camera shall operate and meet the specifications. b) Leave the camera for 1 hour at the lowest operation temperature, turn on the power, and then the camera shall operate and meet the specifications.	No condensation

9. Timing Chart

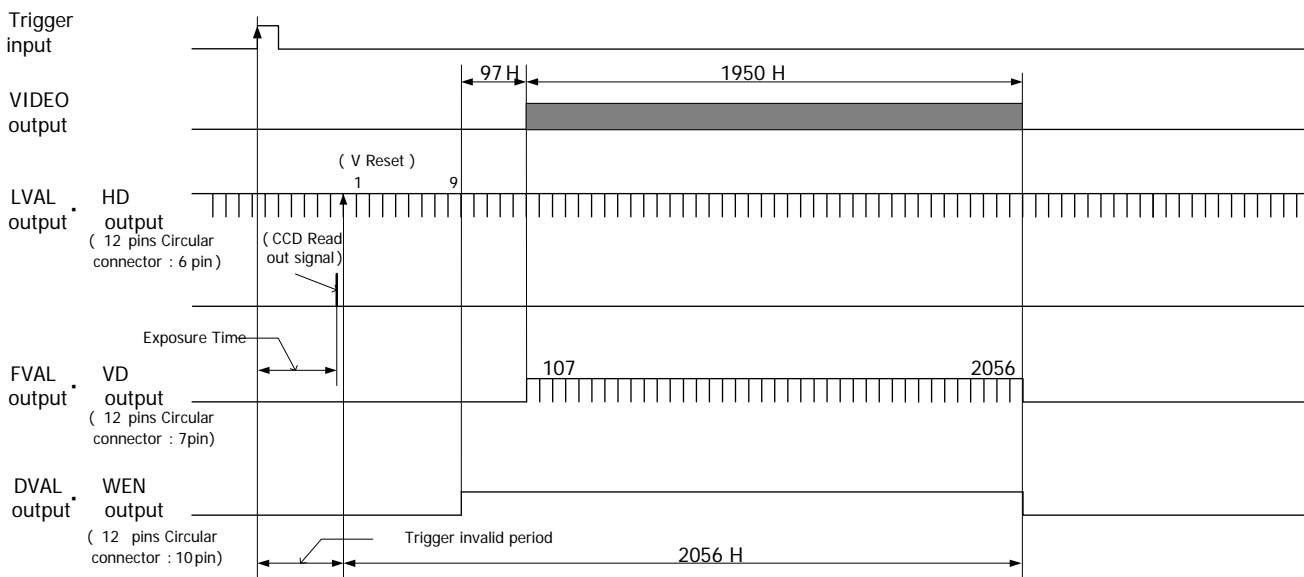
9.1. Horizontal Synchronous Timing



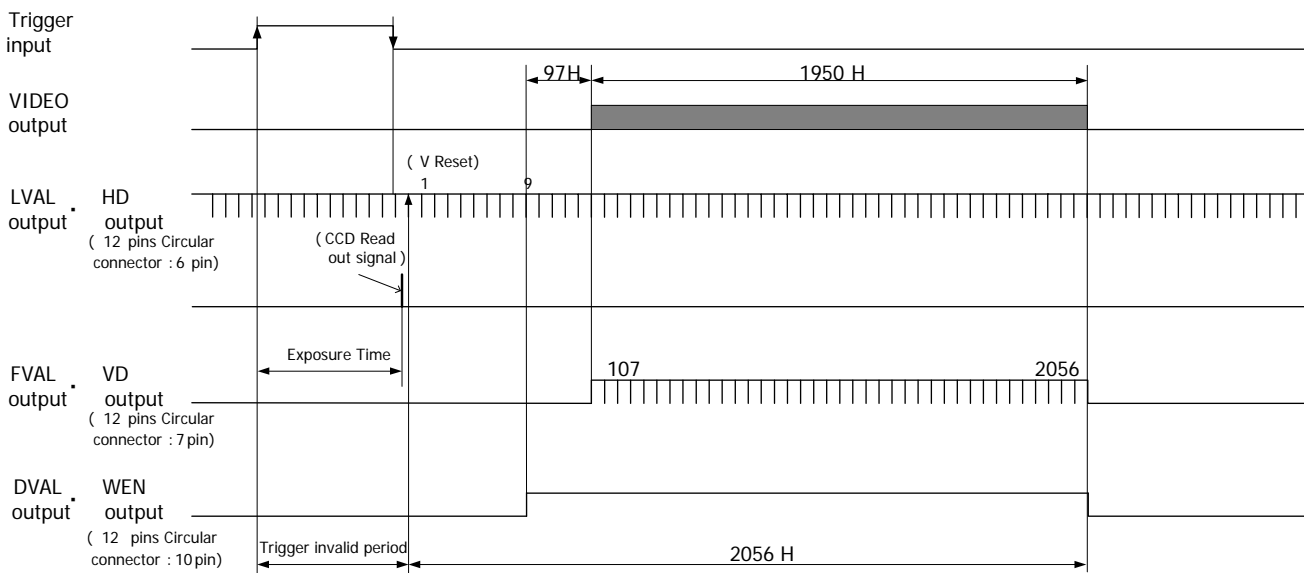
9.2. Vertical Synchronous Timing



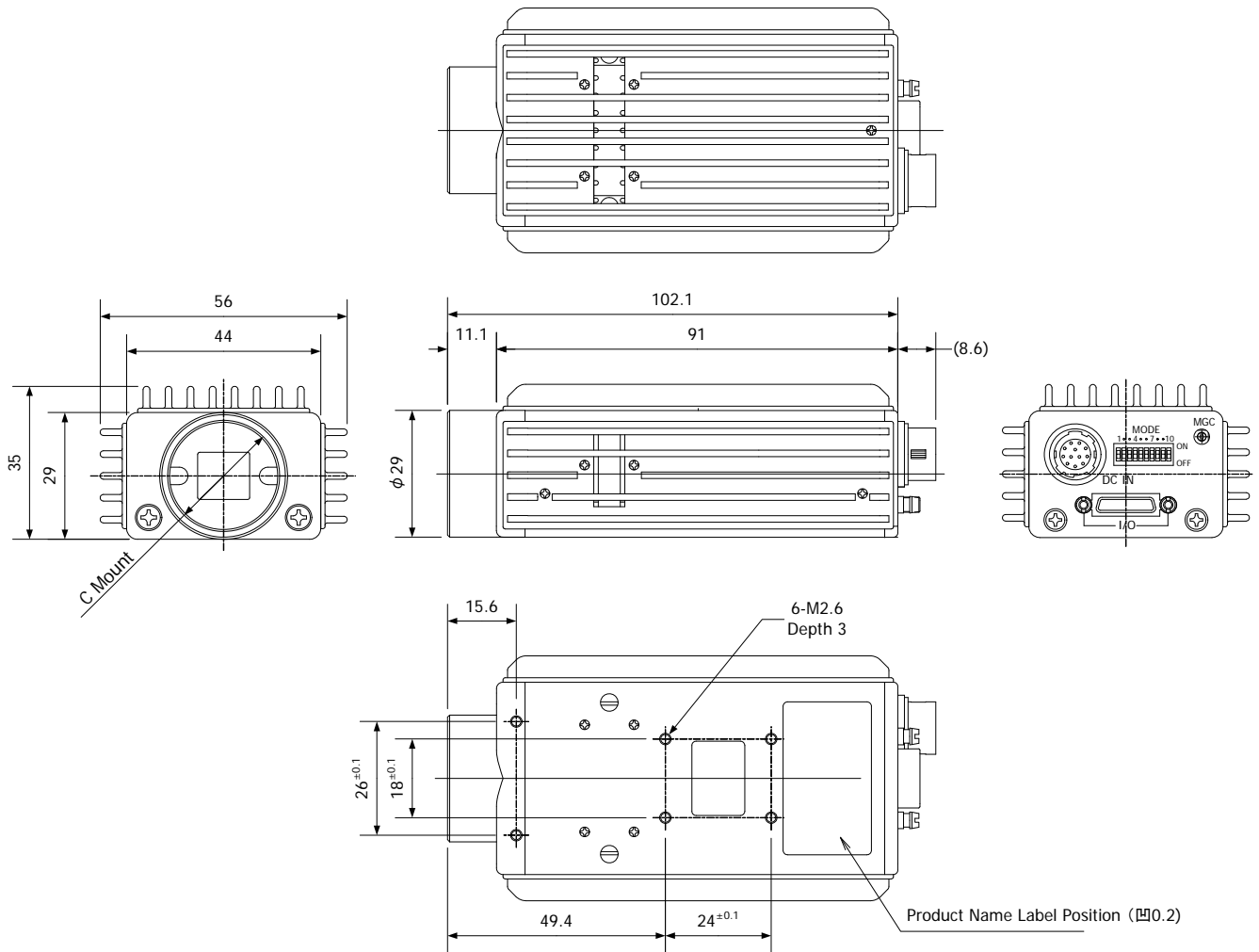
9.3. Standard Trigger Timing



9.4. Pulse Width Trigger Timing



10. Dimensions



1) C Mount screws comply with ANSI/ASME B1.1, 132UN(2B).

2) Screw length from C mount lens surface shall be under 6mm. And protruding portion shall be less than 10mm.

999-463-00-00

11. Cases for Indemnity (Limited Warranty)

We shall be exempted from taking responsibility and held harmless for damage or losses incurred by the user in the following cases.

- In case damage or losses are caused by fire, earthquake, or other acts of God, acts by third party, deliberate or accidental misuse by the user, or use under extreme operating conditions.
- In case indirect, additional, consequential damages (loss of business interests, suspension of business activities) are incurred as result of malfunction or non-function of the equipment, we shall be exempted from responsibility for such damages.
- In case damage or losses are caused by failure to observe the information contained in the instructions in this product specification & operation manual.
- In case damage or losses are caused by use contrary to the instructions in this product specification & operation manual.
- In case damage or losses are caused by malfunction or other problems resulting from use of equipment or software that is not specified.
- In case of damage or losses are caused by repair or modification conducted by the customer or any unauthorized third party (such as unauthorized service representative).
- Expenses we bear on this product shall be limited to the individual price of the product.

12. Product Support

When defects or malfunction of our products occur, and if you would like us to investigate on the cause and repair, please contact your distributors you purchased from to consult and coordinate.