OMRON

GigE Vision

Monochrome / Color CMOS PoE Camera

STC-MBS500POE   (5M / Monochrome)
STC-MCS500POE   (5M / Color)

Product Specifications and User's Guide

OMRON SENTECH CO., LTD.

OMRON

Table of Contents

OMRON

OMRON

Precautions for safe use

Please read carefully this "Precautions for safe use" before use the camera. Then the camera uses correctly with agreeing with below notes.

In this "Precautions for safe use", notes divides into "Warning" and "Caution" to use the camera safety and prevent to harm and damage.

⚠ Warning	This shows, assumption for possibility of serious accident leading death or serious injury if ignore this note and camera uses incorrectly.
⚠ Caution	This shows, assumption for possibility of bear the damage or physical damage if ignore this note and camera uses incorrectly.

About Graphic
symbols
🚫 This symbol shows general prohibition.

❗ This symbol shows completion or instruction.

[Environment / condition]

⚠ Warning	
🚫 Do not use flammable or explosiveness atmospheres. This will cause of personal injury or fire.	🚫 Do not use for "safety for human body" related usage. This camera is designed for use "do not harm human body immediately" if by any chance the camera has malfunction.

⚠ Caution	
❗ Use and store under specified environmental conditions (Vibration, shock, temperature, humidity) in the specifications for this camera. This will cause of fire or damage the camera.	

[Installation and cable wiring]

⚠ Warning	
🚫 Do not use with out of power voltage range that is specified in the specifications for this camera. This will cause of fire, electrification or malfunction.	🚫 Do not wrong wiring. This will cause of fire or malfunction.

⚠ Caution

🛈	The camera housing and 0 V line of camera inside circuit are isolated. There is a risk of short circuit between camera inside ciurcuit and frame ground through other devices. This will cause of malfunction.	🛈	It is necessary to wiring and mounting that is specified in the specifications for this camera. This will cause of fire or malfunction.
🔌	It is necessary to wiring with turn off the camera. This will cause of electrification or malfunction.	🛈	It is necessary to mounting the camera without stress for the cable. This will case of electrification or fire.

[Usage instruction]

⚠ Warning

🚫	Do not touch the terminal and PCB board While turn on the camera. This will cause of electrification or accident caused by malfunction.	🚫	Do not put combustibles near the camera. This will cause of fire.
🚫	Do not use without usage that is specified in the specifications for this camera. This will cause of personal injury or malfunction.	🚫	Do not push metals including screw driver into radiation holes. This will cause of electrification or malfunction.

⚠ Caution

🚫	Do not push contamination into opening of the camera. This will cause of electrification or malfunction.	🚫	Do not block the radiation holes. This will cause of fire due to increase the camera inside temperature.

[Maintenance]

⚠ Caution

🚫	Do not disassemble or repair the camera. This will cause of fire, electrification or malfunction.	🔌	It is turn off the camera when maintaining or inspecting the camera. This will cause of electrification.

[Disposal]

⚠ Caution

🛈	It is necessary to dispose as industrial waste.		

OMRON

1   Product Precautions

- ➢   Do not give shock to the camera.
- ➢   Do not haul or damage the camera cable.
- ➢   Do not wrap the camera with any material while using the camera. This will cause the internal camera temperature to increase.
- ➢   When the camera moving or using the place that temperature difference is   extreme, countermeasure for dew condensation (heat removal / cold removal) is necessary.
- ➢   While the camera is not using, keep the lens cap on the camera to prevent dust or contamination from getting in the sensor or filter and scratching or damaging it.
  Do not keep the camera under the following conditions.
  - ・ In wet, moist, high humidity or dusty place
  - ・ Under direct sunlight
  - ・ In extreme high or low temperature place
  - ・ Near an object that releases a strong magnetic or electric filed
  - ・ Place with strong vibrations
- ➢   Apply the power that satisfies the specified in specifications for the camera.
- ➢   The defective pixels may appear due to the sensor characteristics.
- ➢   Use below recommend materials (or equivalent materials) to clean the surface of glass.
  - ・ Air dust: Non Freon air duster (NAKABAYASHI Co., LTD.)
  - ・ Alcohol: Propan-2-ol (SAN'EI KAKO Co., LTD.)
  - ・ Non-woven: nikowipe clean room (NKB)
- ➢   Use a soft cloth to clean the camera.

2   Warranty

■Warranty period
One year after delivery (However, the camera had malfunction with camera uses correctly)
In below case for a fee even within warranty period.
- ・The malfunction caused by incorrect usage, incorrect modify or repair.
- ・The malfunction caused by external shock including the camera dropping after delivery the camera.
- ・The malfunction caused by fire, earthquake, flood disaster, thunderbolt struck, other natural disaster or wrong voltage.

■Warranty coverage
Exchange or repair the malfunction camera if the malfunction is occurred by our responsibility.
"Warranty" mean is warranty for the delivered camera itself. Please accept the induction damage by the camera malfunction is not included.

3 Introduction

This document describes the specification of the following cameras:

STC-MBS500POE / STC-MCS500POE

3.1 Features

- GigE Interface
- Support PoE (Power over Ethernet)
- Small robust camera housing
- Maximum frame rate (Full resolution): 21.95 fps @ 5M 8bits
- CMOS (Global Shutter)
- Up to 2,048 Defective Pixel Correction (Default: ON)
- 8bits, 10bits, 12bits output

3.2 Naming Method

STC-MxS500POE

POE: PoE (Power over Ethernet (Gigabit Ethernet))

500: 2/3", 5M Sensor

Sensor Manufacture
S: SONY

B: Monochrome
C: Color

OMRON
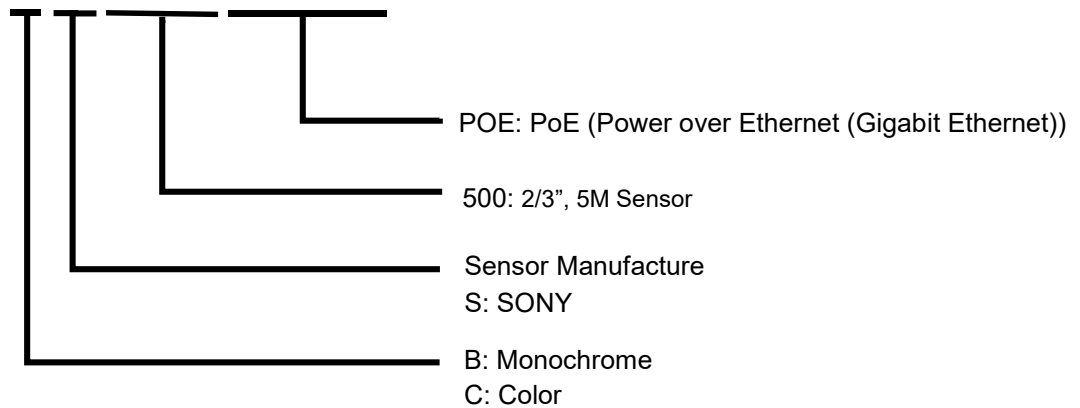
4 Specifications

4.1 Electronic Specifications

Product		STC-MBS500POE	STC-MCS500POE
Image Sensor		2/3" 5M Progressive Monochrome CMOS (SONY: IMX264)	2/3" 5M Progressive Color CMOS (SONY: IMX264)
Shutter Type		Global Shutter	
Active Picture Elements		2,448 (H) x 2,048 (V)	
Cell Size		3.45 (H) x 3.45 (V) μm	
Sync System		External trigger (Hardware / Software) / Free run	
Scanning Mode		**Full scanning (Full resolution)** / ROI	
Frame rate (at full scanning)		**8bits: 21.9 fps** / 10bits: 10.9 fps / 10bits Packed: 14.6 fps / 12bits: 10.9 fps / 12bits Packed: 14.6 fps Maximum frame rate: 1,314.25 fps @ 4 lines (8bits)	
ADC bit depth		12bits	
Video Output Format		**Mono8** / Mono10 / Mono10Packed / Mono12 / Mono12Packed	Mono8 / Mono10 / Mono10Packed / Mono12 / Mono12Packed / **BayerRG8** / BayerRG10 / BayerRG10Packed / BayerRG12 / BayerRG12Packed / RGB8
Noise Level	8bits output	Less than 2.8 digits (Gain 0 dB)	
	10bits / 10bits Packed output	Less than 11.2 digits (Gain 0 dB)	
	12bits / 12bits Packed output	Less than 44.8 digits (Gain 0 dB)	
Sensitivity (*1)		230 Lux	420 Lux
Exposure Time		1 μseconds to 16.777 seconds **(Default: 45,345 μseconds)**	
Gain	Analog Gain	0 to 20.8 dB **(Default: 0 dB)**	
	Digital Gain	X1 to x33 **(Default: x1)**	
ROI		Horizontal: 260 to 2,448 pixels, Vertical: 4 to 2,048 lines **(Default: 2,448 x 2,048)** Adjustable steps for size: 4 pixels in horizontal direction and 4 lines in vertical direction Adjustable steps for offset: 4 pixels in horizontal direction and 4 lines in vertical direction	
Gamma		Gamma 0.1 to 4.0 **(Default: 1.0)**	
Binning		Horizontal and Vertical decimation (2x2) / **Off**	
Decimation		N/A	
Image Flip		Horizontal / Vertical / Horizontal and Vertical / **Off**	
Defective Pixel Correction		Up to 2,048 points **(Default: On)**	
Auto Image Control	Auto Exposure	Support **(Default: OFF)**	
	Auto Gain	Support **(Default: OFF)**	
	Auto White Balance	N/A	Auto / **Manual** / Push to Set
Operational Mode		Edge preset trigger / Pulse width trigger / **Free run**	
Interface		PoE: IEEE802.3af CLASS2 (1000BASE-T)	
Protocol		GigE Vision 2.1 and GenICam SFNC 2.4, IEEE1588 (PTP)	
I/O		One opto-isolated input, one opto-isolated output and one open collector GPIO (Input or output)	
Power	Input Voltage (*2)	+10.8 to +26.4 Vdc External power (via 6 pin connector) / Power Over Ethernet (IEEE802.3af)	
	Consumption	+12 V / +24 V: 3.3 W, PoE: 3.5 W	

Default: **Bold**

OMRON

Precautions

(*1) The sensitivity is measuring the luminance when white level achieved 100 % in below conditions.

Camera Setting		Environment	
Parameter	Setting	Parameter	Setting
Gain Up	0 dB	Light Source	Light Box (White)
AGC	Off	Color temperature	5,100K
White Balance	Optimum	Lens	
Electrical Shutter	1/30 seconds	F on Lens	F5.6
Black Level	Optimum	Target Luminance	IM-600 (Topcon)
Gamma	Factory Setting		

(*2) The camera operates with external power when power suppling by external power supply and PoE to camera at same time.

STC-MBS500POE / STC-MCS500POE
Product Specifications and User's Guide

OMRON

4.2 Spectral Sensitivity Characteristics

4.2.1 STC-MBS500POE
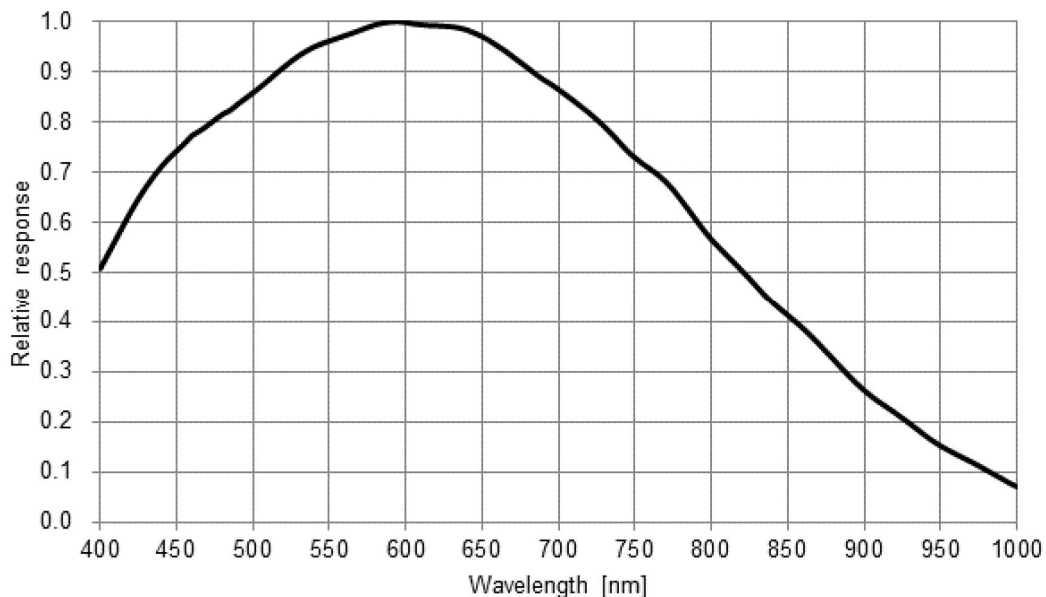
4.2.2 STC-MCS500POE (without IR Cut Filter)

OMRON
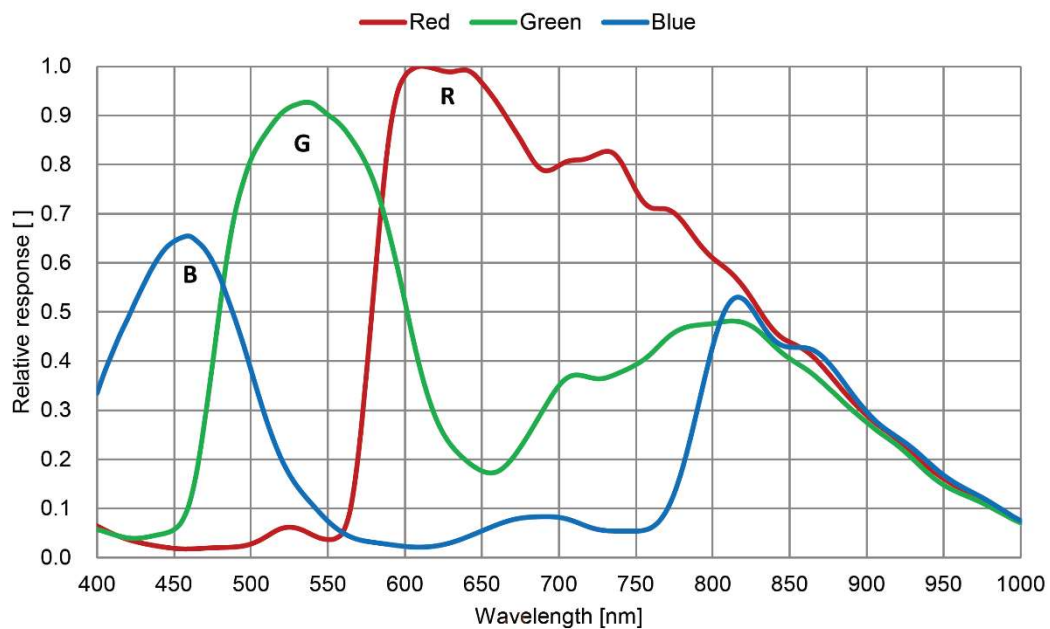
4.2.3 IR Cut Filter (STC-MCS500POE)
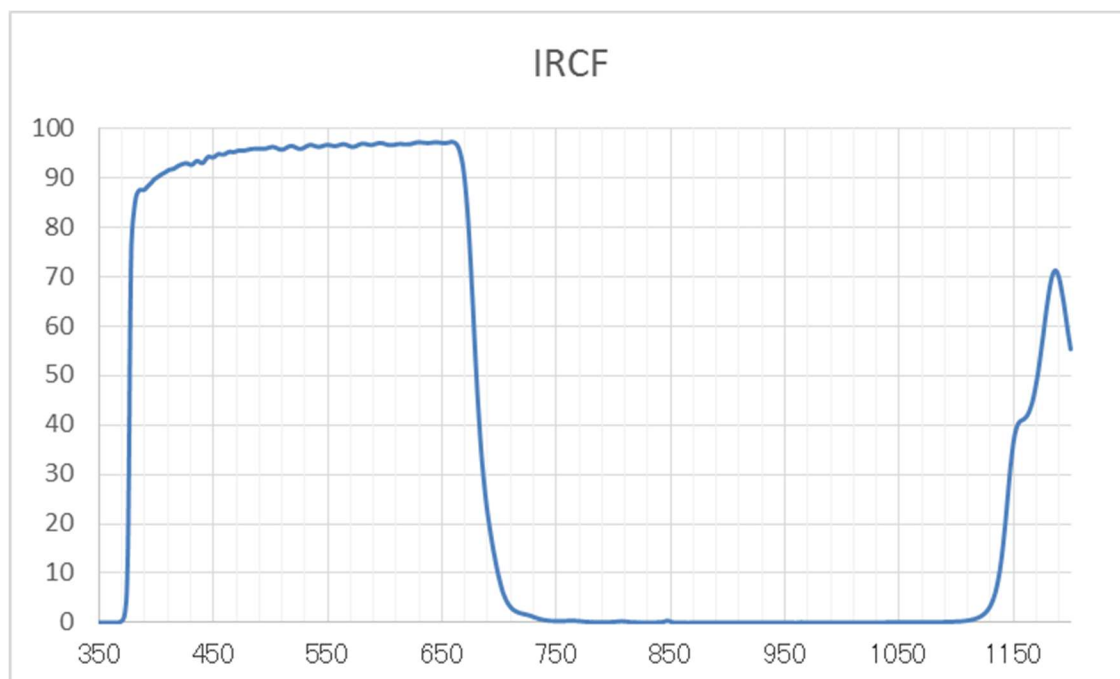
4.3　　Mechanical Specifications

Model Number	STC-MBS500POE	STC-MCS500POE
Dimensions	29 (W) x 29 (H) x 53 (D) mm (*1)	
Optical Filter	No Optical Filter	IR Cut Filter
Optical Center Accuracy	Positional accuracy in Horizontal and Vertical directions: +/- 0.3 mm Rotational accuracy of Horizontal and Vertical: +/- 1.5 deg.	
Material	Aluminum Alloy (AC)	
Lens Mount	C mount	
Interface Connectors	Ethernet connector: RJ45 connector Power- I/O connector: HR10A-7R-6PB (Hirose) or equivalent	
Camera Mounting	Six M3 screw holes (Two on top, four on bottom plate)	
Weight	Approximately 65 g	

(*1) Excluding the connectors

OMRON

4.4 Environmental Specifications

Model Number		STC-MBS500POE	STC-MCS500POE
Operational Temperature / Humidity	Minimum	Environmental Temperature: 0 deg. C, Environmental Humidity: 0 to 85 %RH (No condensation)	
	Maximum	Environmental Temperature: +40 deg. C or Camera housing temperature (top plate) shall not exceed +64 deg. C (*1) Environmental Humidity: 0 to 85 %RH (No condensation)	
Storage Temperature / Humidity		Environmental Temperature: -20 to +70 deg. C, Environmental Humidity: 0 to 85 %RH (No condensation)	
Vibration		20 Hz to 200 Hz to 20 Hz (5 min. / cycle), acceleration 10 G, XYZ 3 directions, 30 min. each	
Shock		Acceleration 38 G, half amplitude 6 ms, XYZ 3 directions, 3 times each	
Standard Compliancy		EMS: EN61000-6-2, EMI: EN55011	
RoHS		RoHS Compliance	

(*1) Please insure the camera is installed with the appropriate heat dissipation. If camera has a mounted lens and a tripod with an aluminum plate, this could decrease the camera housing temperature for heat dissipation. When the internal temperature sensor on the camera shows less than 73 deg. C, the camera housing temperature (top plate) will be less than 64 deg. C.

Taking these steps will maintain the heat rating of the electronic components of the camera.

Upper side of camera

Measuring point

OMRON
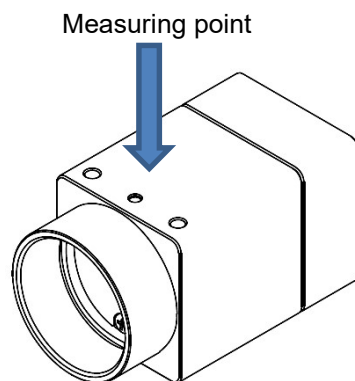
5 Connector Specifications

Power-I/O Connector →
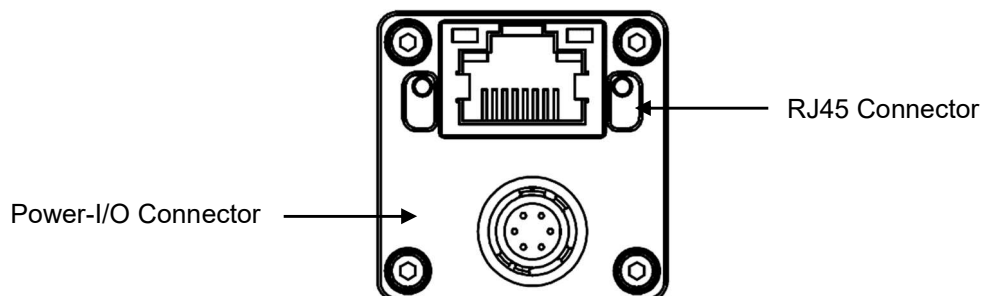
← RJ45 Connector

5.1 RJ45 Connector

This product is PoE compliant.
Please supply power (+10.8 to +26.4 Vdc) through the power-I/O connector when using non-PoE-compliant NIC.

Pin Assignment

Pin No.	Signal Name
1	TA+
2	TA-
3	TB+
4	TC+
5	TC-
6	TB-
7	TD+
8	TD-

LED

Green LED	Yellow LED	Status
Green Light ON	Yellow Light OFF	Power ON (1GB NIC)
Green Light OFF	Yellow Light OFF	Power ON (100MB NIC)
Green Light ON	Yellow Light Blinking	1 GB Transferring
Green Light OFF	Yellow Light Blinking	100 MB Transferring

Yellow LED   Green LED
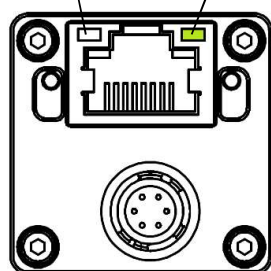
Camera is powered-on
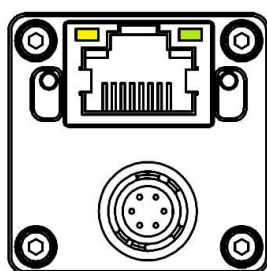
Green light: ON
Yellow light: Blinking
1 GB Transferring
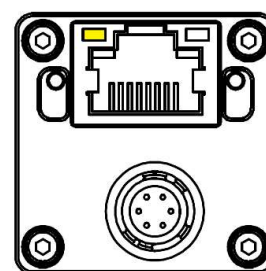
Green light: OFF
Yellow light: Blinking
100 MB Transferring

Please use a 1GB supported NIC, Network Switcher and Ethernet cable.
Check the setting of NIC and Network Switcher being used is "1GB transferring".

OMRON

5.2 Power and Control Signal Connector

HR10A-7R-6PB (Hirose) or equivalent
This connector is for the power supply and input / output signals.
The power from this connector is priority power for camera when power supplies through this connector and PoE at same time.
Please use HR10A-7P-6S (Hirose) or equivalent for cable.

Pin assignment

Pin No.	Signal Name	IN / OUT	Voltage
1	POWER IN	IN	+10.8 to +26.4 Vdc
2	Opto-isolated in (Line0)	IN	Low: Smaller than +1.0 V High: +3.0 to +26.4 V * Potential difference between TRG_in and Opt. Isolated Common
3	Open Collector GPIO (Line2)	IN / OUT	+3.0 to +26.4 V / Open Collector
4	Opto-isolated out (Line1)	OUT	Open Collector
5	Opto-isolated Common	IN	
6	GND	IN	0 V
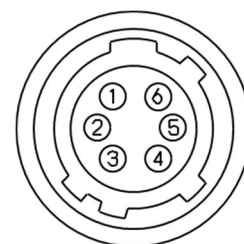
Configuration of Line2 (Pin No.3) and Line1 (Pin No.4)
Output signal can be assign by GenICam command.

.

GenICam
1) Frame Trigger Wait (Default for all output)
2) Frame Trigger Internal
3) Exposure Active
4) Acquisition Trigger Wait
5) Acquisition Trigger Internal
6) Sensor Read Out
7) Debounced Line 0
8) Debounced Line 2
9) User Output 1
10) User Output 2
11) Timer 0 Active
12) Software Signal 0
13) Software Signal 1
14) Logic Block 0
15) Pulse Per Second

OMRON

1) Frame Trigger Wait

The condition of camera operation with trigger signal can be check.

"LOW" state of signal is out between "start exposing" to "image out".

2) Frame Trigger Internal

The input trigger signal with the trigger delay (camera internal process delay).

3) Exposure Active

While camera exposing, "HIGH" state of signal is out. The signal state will be "LOW" after finish exposing.

4) Acquisition Trigger Wait

While image transferring from camera to PC, "Low" state of signal is out. The signal state will be "High" after finish image transferring.

5) Acquisition Trigger Internal

The image transferring starts signal is out.

6) Sensor Read Out

FVAL (Frame valid, HIGH state) signal is out.

7) Debounced Line0

Debounced Line0 signal is out.

8) Debounced Line2

Debounced Line2 signal is out.

9) User Output 1 (User Output signal through Line 1)

Selected "HIGH" or "LOW" state of signal is out.

10) User Output 2 (User Output signal through Line 2)

Selected "HIGH" or "LOW" state of signal is out.

11) Timer 0 Active

Selected signal at "Timer Counter" is out.

When signal synchronizing with "Exposure Active" signal, signal can use for strobe control.

12) Software Signal 0

Selected signal for "Software Signal 0" at "Software Signal Control" is out.

13) Software Signal 1

Selected signal for "Software Signal 1" at "Software Signal Control" is out.

14) Logic Block 0

"Logic Block 0" signal is out.

15) Pulse Per Second

"Pulse / second" signal (50% Duty, 1 Hz interval) is out.

OMRON

5.2.1 Opto-isolated input

The camera has current limiting circuit on camera. The current limiting resistor does not necessary.
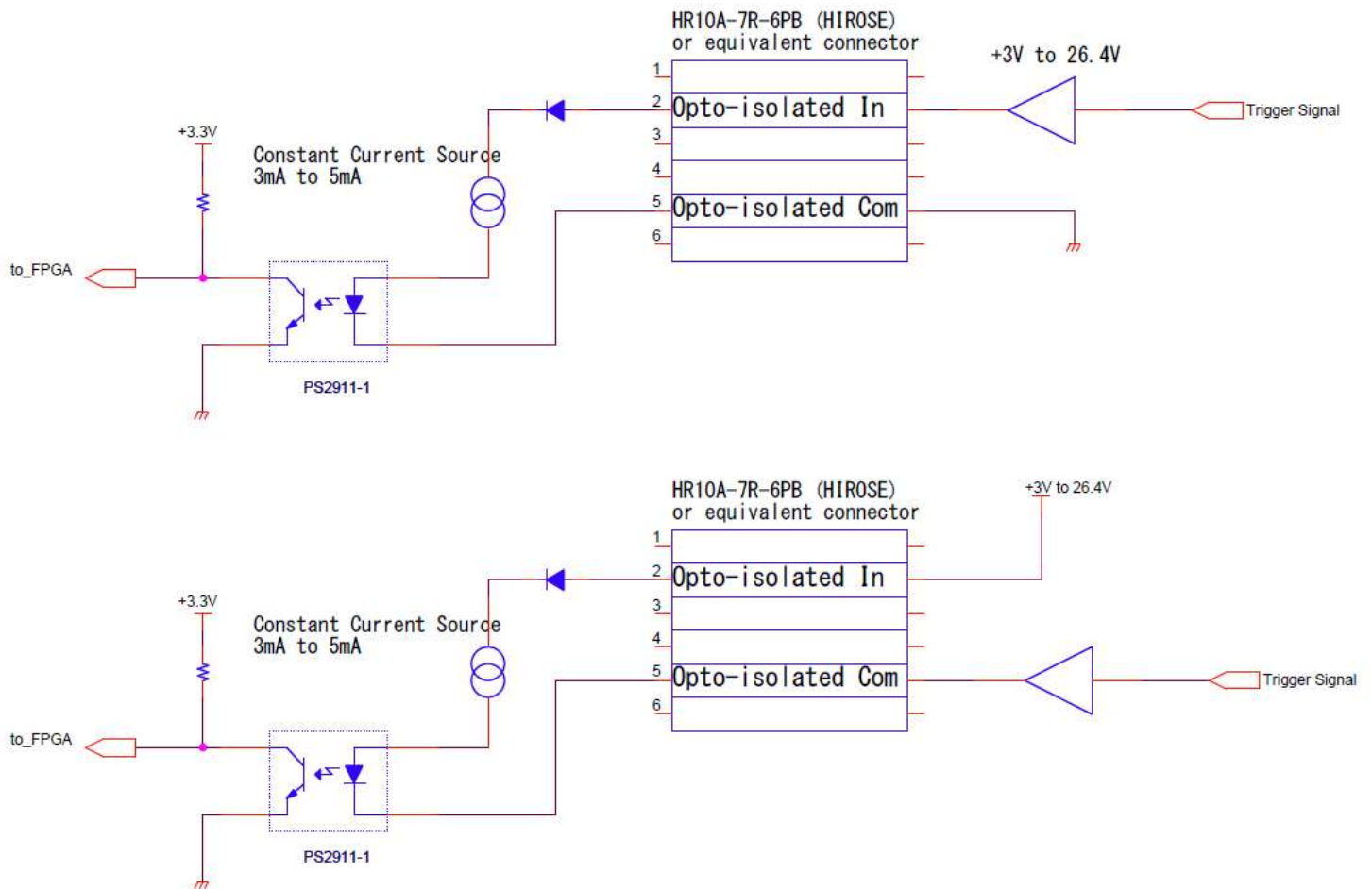
5.2.2 Opto-isolated output

It is necessary to have current limiting resistor at outside of camera, to keep less than 50 mA.

2SC5876:
Vceo=60V
Ic(Max.)=500mA
Pd=200mW

OMRON
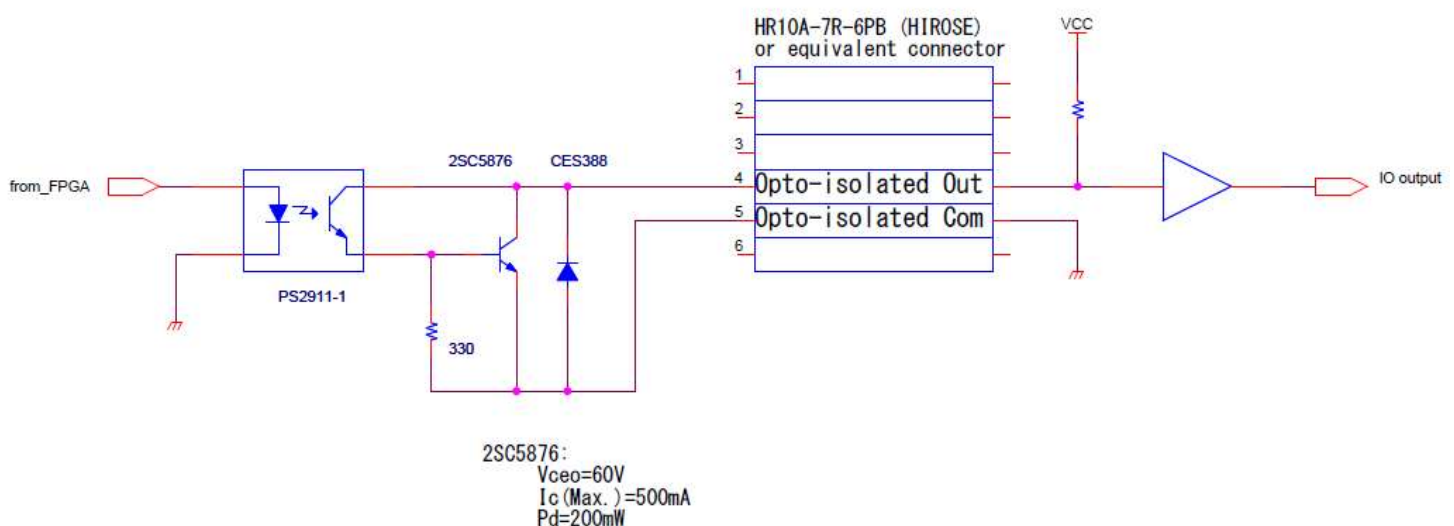
5.2.3   Open Collector GPIO

This GPIO can be used for input or output.

When using as output, it is necessary to have current limiting resistor at outside of camera, to keep current less than 50 mA.

When using as input, current limiting resistor does not necessary. However, camera does not have current limiting circuit on camera. The camera inside circuit may get damage if accidentally uses as output without current limiting resistor. For safety, please add current limiting resistor even use as input.

a)   Open Collector GPIO uses as output

b)   Open Collector GIPO uses as input

OMRON
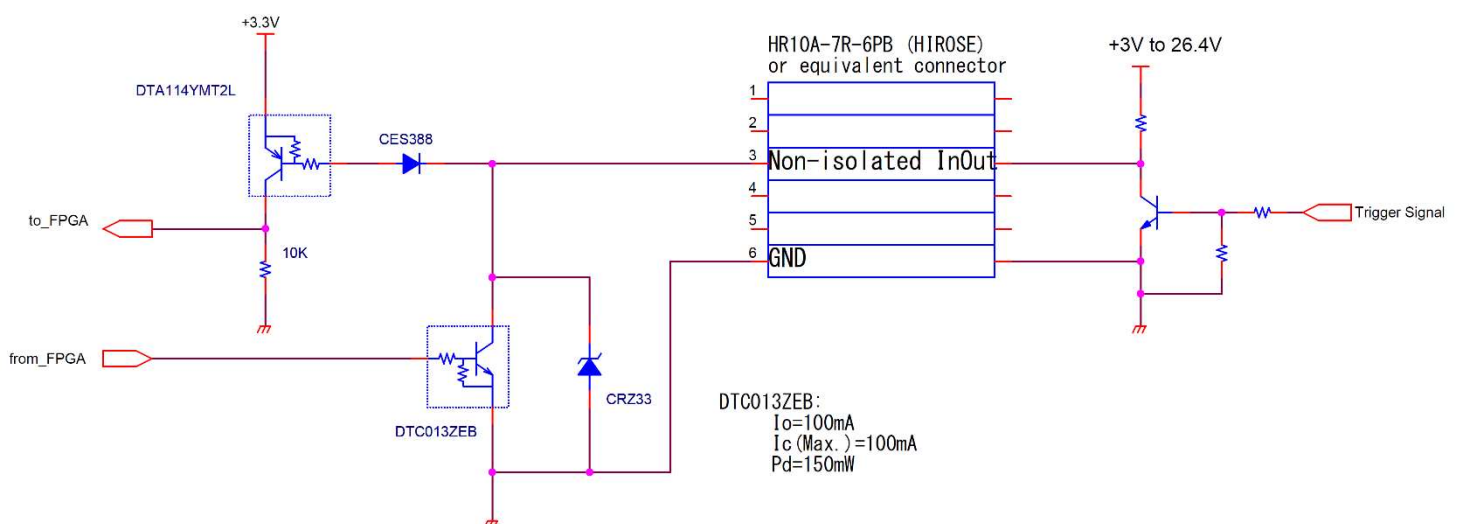
5.2.4 Input and Output Signal Timing (Hardware Trigger)
Case of "External Hardware Trigger", "Timed Exposure Mode" and "Positive Edge Trigger"
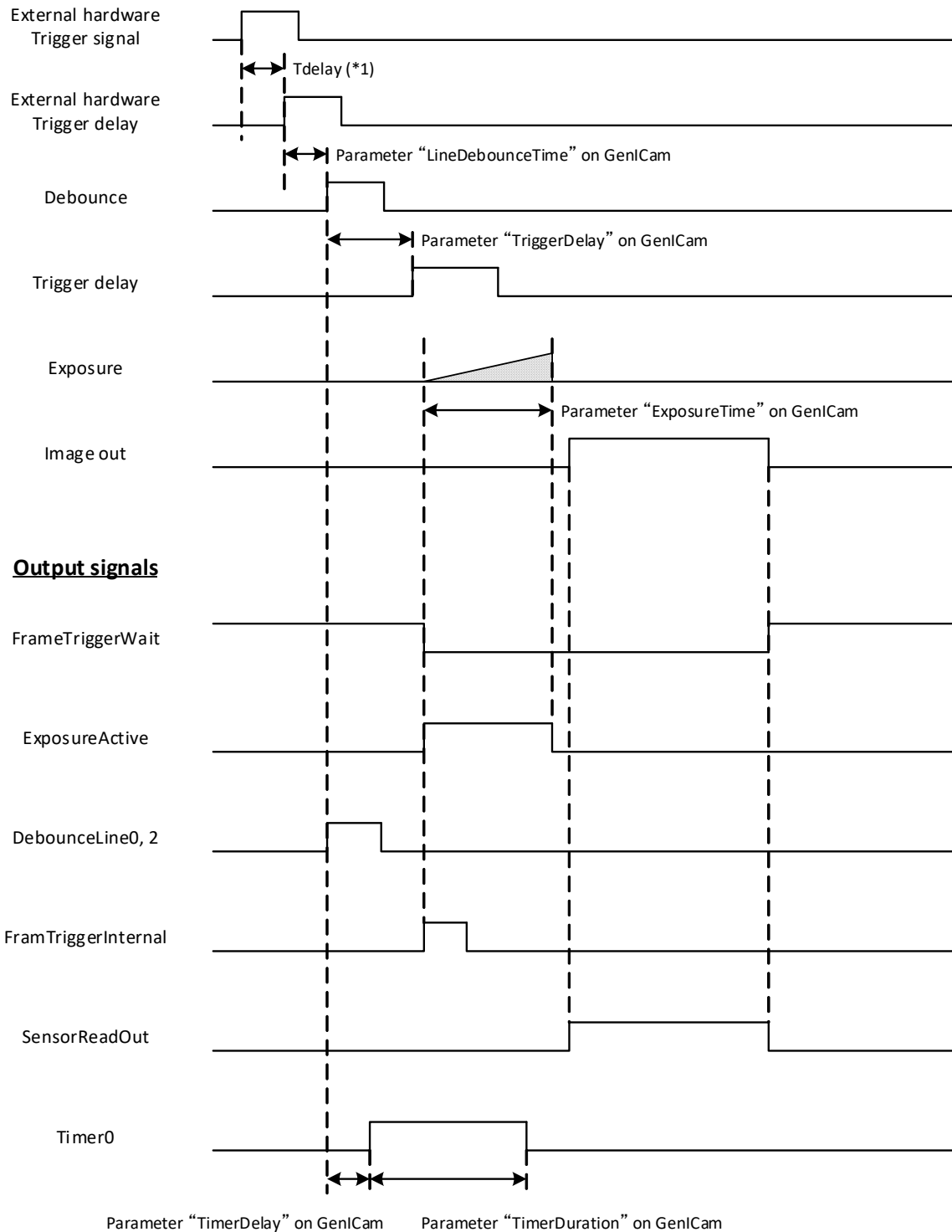
Camera internal processing

Output signals

Parameter "TimerDelay" on GenICam   Parameter "TimerDuration" on GenICam

(*1) Please refers "5.2.6 External Hardware Trigger Input Delay" for more details about "External hardware trigger delay"

OMRON

5.2.5 Input and Output Signal Timing (Software Trigger)
Case of "Software Trigger", "Timed Exposure Mode" and "Positive Edge Trigger"

Camera internal processing

| Software trigger |
| Trigger delay | Parameter "TriggerDelay" on GenICam |
| Exposure |
| Image out | Parameter "ExposureTime" on GenICam |

Output signals

| FrameTriggerWait |
| ExposureActive |
| FramTriggerInternal |
| SensorReadOut |
| Timer0 |

Parameter "TimerDelay" on GenICam   Parameter "TimerDuration" on GenICam

OMRON

5.2.6   External Hardware Trigger Input Delay
The input trigger signal has some delay inside camera by photo coupler or transistor.
Please refers example measurement of delay in below.

5.2.6.1 External Trigger Signal Delay (Positive polarity trigger signal)

External Trigger Signal

External Trigger Signal
with camera internal delay
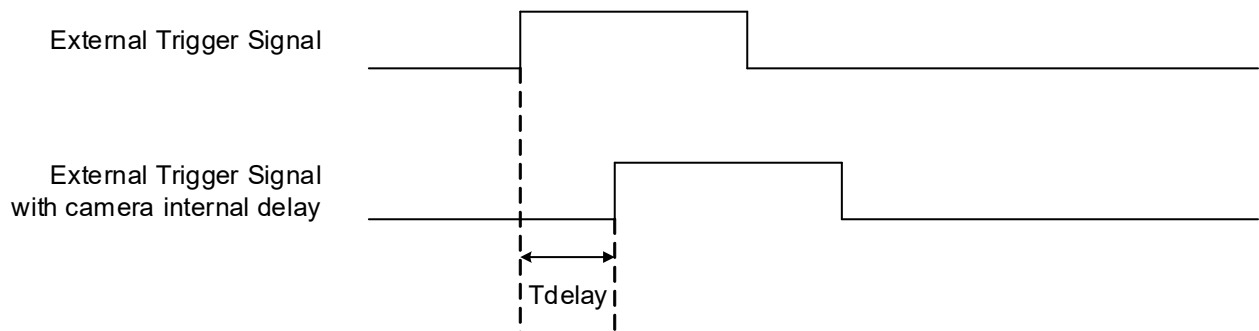
Tdelay

5.2.6.2 External Trigger Signal Delay (Negative polarity trigger signal)

External Trigger Signal

External Trigger Signal
with camera internal delay

Tdelay

OMRON
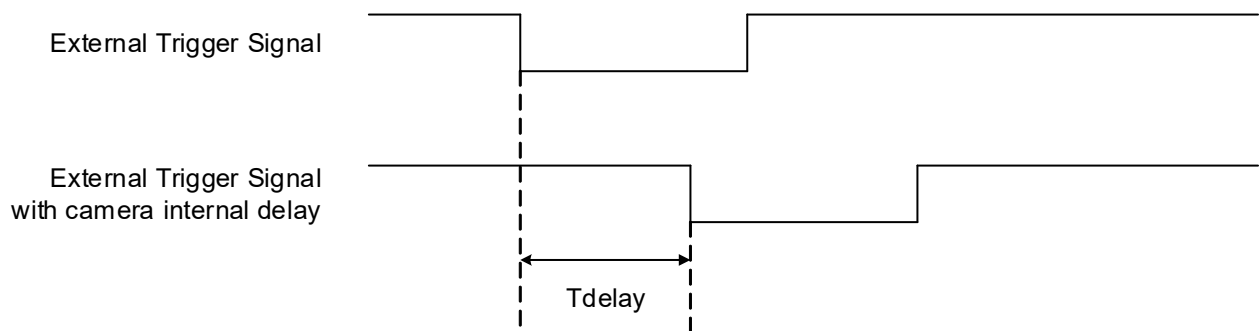
5.2.6.3 Measured External Trigger Signal Delay through Opt-Isolated Port (Line 0)

Measurement circuit

Positive polarity trigger signal

Pull-up voltage	Tdelay	Minimum active pulse duration
+3.3 V	8.2 µseconds	6 µseconds
+12 V	4.6 µseconds	3 µseconds
+24 V	4.4 µseconds	2 µseconds

Negative polarity trigger signal

Pull-up voltage	Tdelay	Minimum active pulse duration
+3.3 V	47 µseconds	6 µseconds
+12 V	53.2 µseconds	3 µseconds
+24 V	53.2 µseconds	2 µseconds

Note. Please use this measured delay as reference. The delay time may fluctuate depending on photo coupler variation, pull-up voltage and pull-up resister.

OMRON

5.2.6.4 Measured External Trigger Signal Delay through Open Collector GPIO Port (Line 2)

Measurement circuit

Positive polarity trigger signal

Pull-up voltage	Tdelay	Minimum active pulse duration
+3.3 V	3.9 µseconds	6 µseconds
+12 V	3.8 µseconds	3 µseconds
+24 V	2.2 µseconds	2 µseconds

Negative polarity trigger signal

Pull-up voltage	Tdelay	Minimum active pulse duration
+3.3 V	0.6 µseconds	6 µseconds
+12 V	0.8 µseconds	3 µseconds
+24 V	0.8 µseconds	2 µseconds

Note. Please use this measured delay as reference. The delay time may fluctuate depending on transistor variation, pull-up voltage and pull-up resister.

6 Dimensions

6.1 STC-MBS500POE

Unit: mm

OMRON

6.2   STC-MCS500POE

1"-32UNF (C mount)

2-M3 Depth3.5

2-M2 Depth4

4-M3 Depth3.5

Unit: mm

OMRON
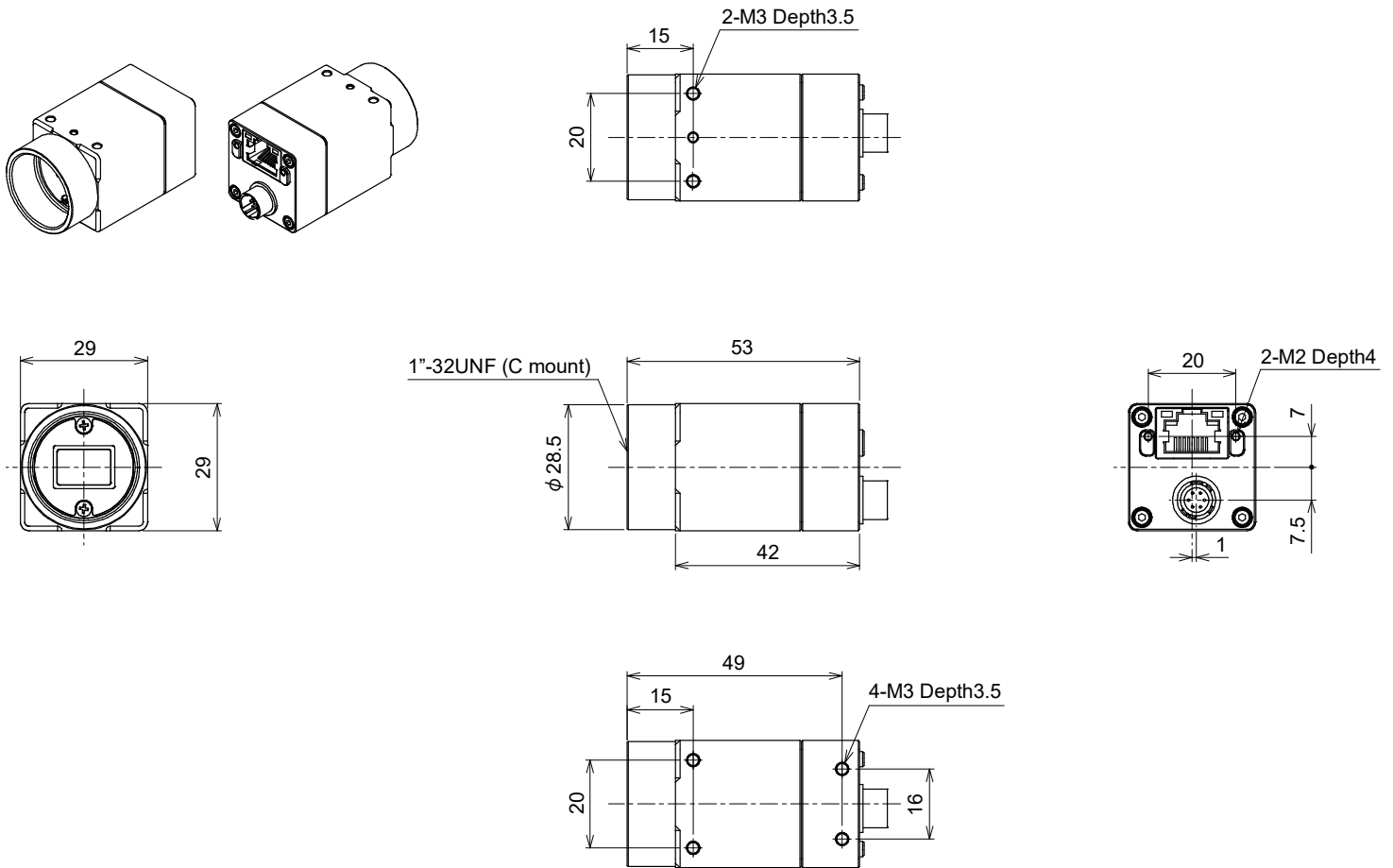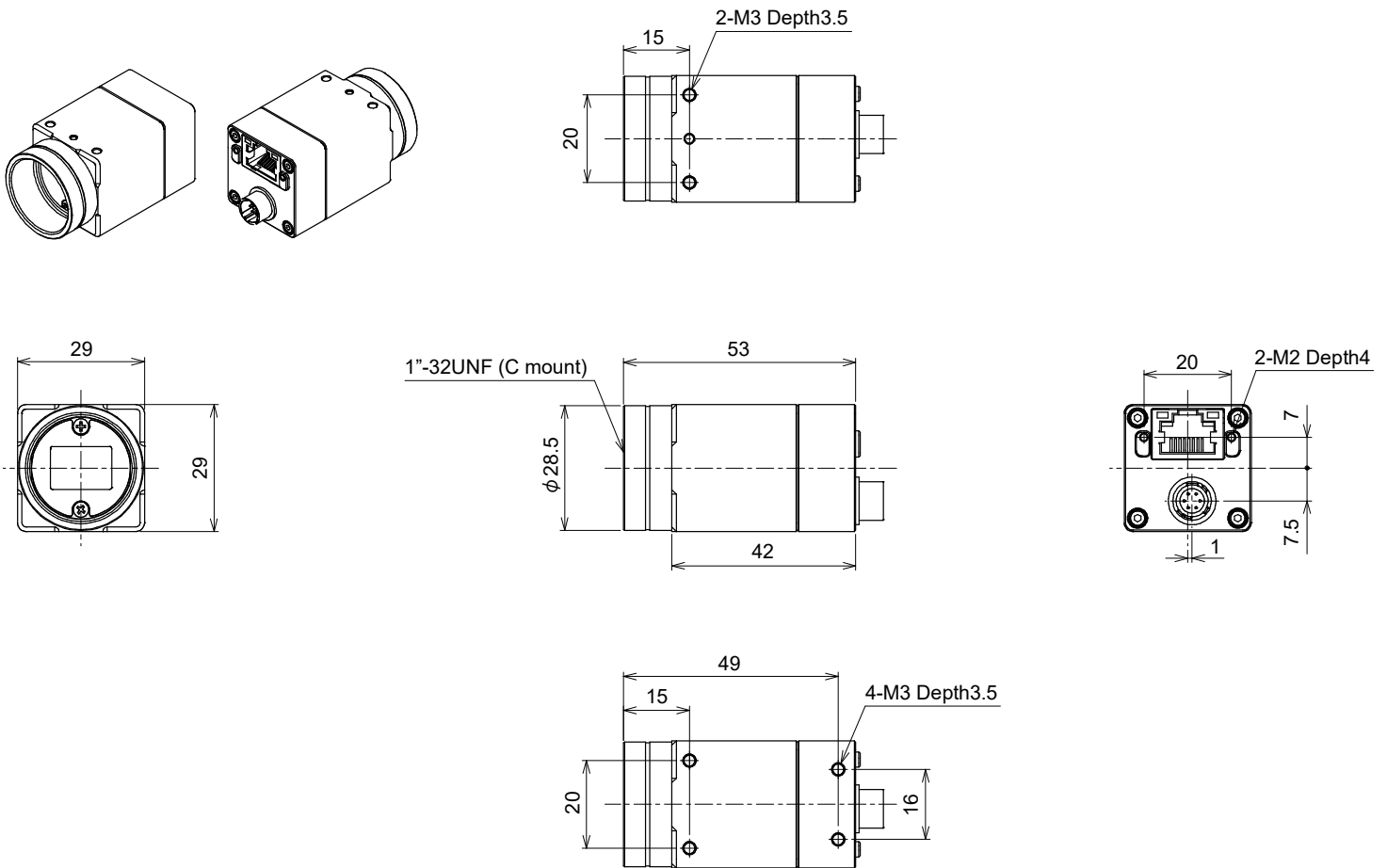
7 Sensor Information

7.1 Pixel Transferring Image

STC-MBS500POE (Monochrome)
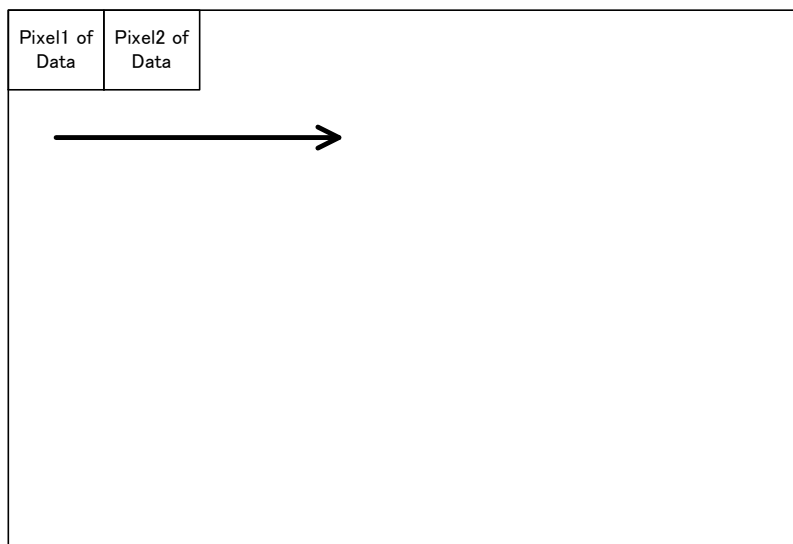
Pixel (m) of Data: mth pixel being transferred

STC-MCS500POE (Color)
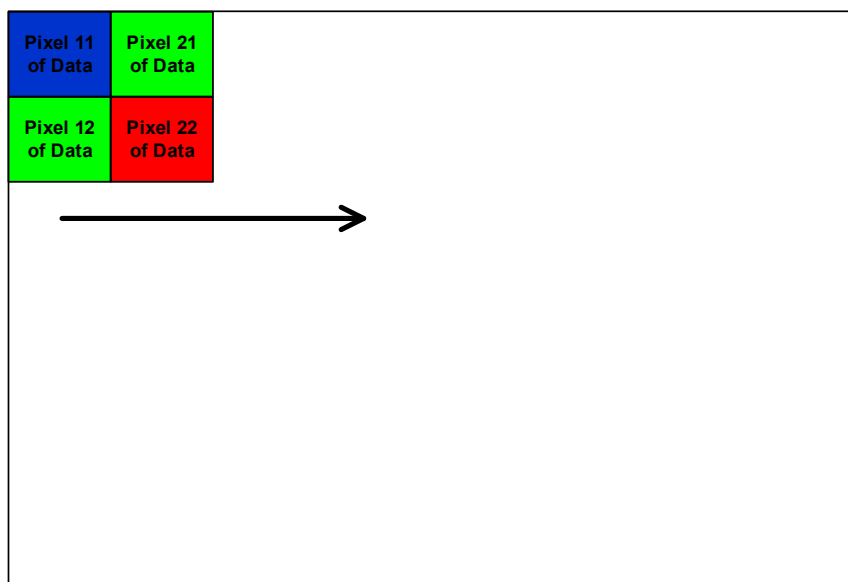
Pixel (m, n) of Data: mth pixel of nth line being transferred

OMRON

8   Camera Operational Modes

8.1   Normal Mode (Rolling shutter)

Expose

Exposure Time

Image out
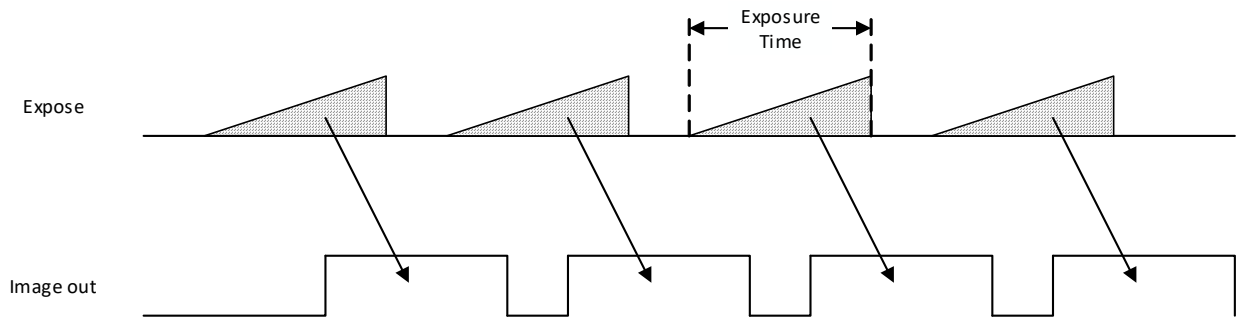
* The exposure time for each line is same.

OMRON

8.2 Pulse width trigger mode

In this trigger mode with positive polarity, the expose starts at rising edge of trigger signal and stops at falling edge of trigger signal. The expose period is high states of trigger signal.
In this trigger mode with negative polarity, the expose starts at falling edge of trigger signal and stops at rising edge of trigger signal. The expose period is low states of trigger signal.

8.2.1 Timing
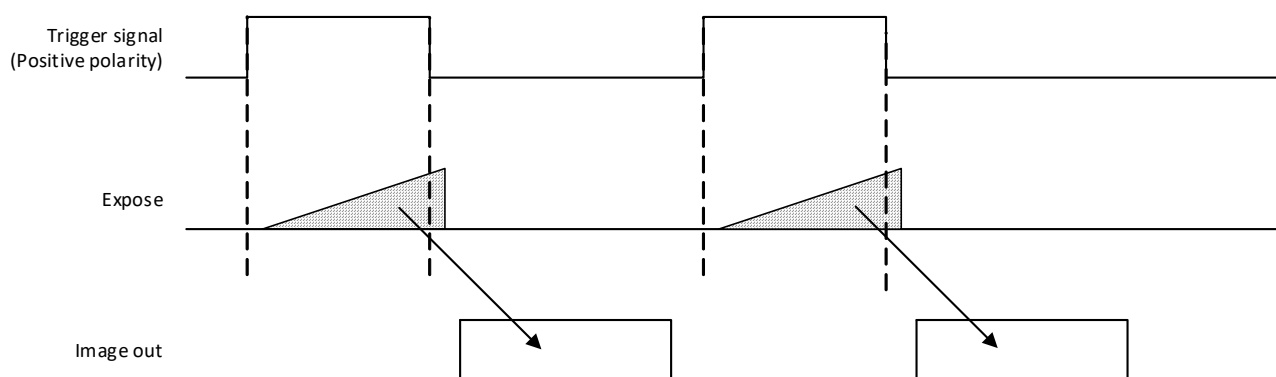
Note: The exposure time is active pulse duration of trigger signal.
        Please refers "Exposure Timing" for more details.

OMRON

8.2.2 Exposure Timing with Positive Polarity Trigger Signal
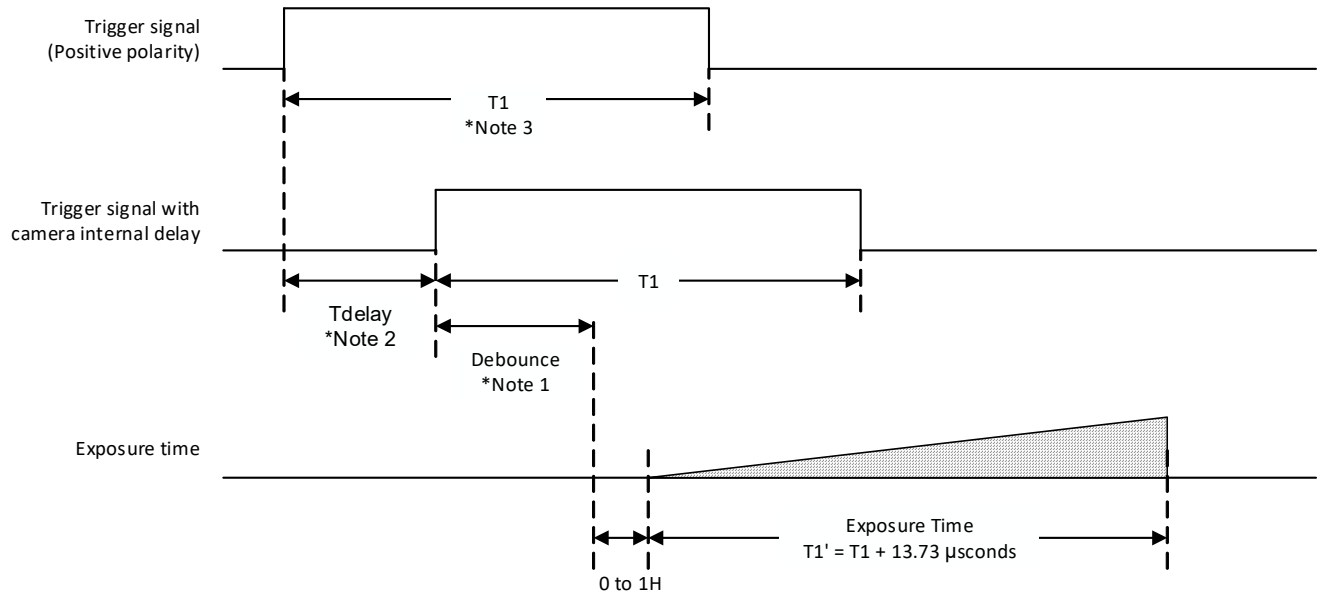
Note 1: The trigger signal will be removed by filtering if active pulse width of input trigger signal is less than "Line Debounce Time" setting time. Please input trigger signal has more than "Line Debounce Time" time active pulse width trigger signal.

Note 2: Please refers "5.2.6 External Hardware Trigger Input Delay" for more details about "External hardware trigger delay".

Note 3: Please refers "5.2.6 External Hardware Trigger Input Delay" for shortest active pulse duration of trigger signal.

OMRON

8.2.3 Exposure Timing with Negative Polarity Trigger Signal
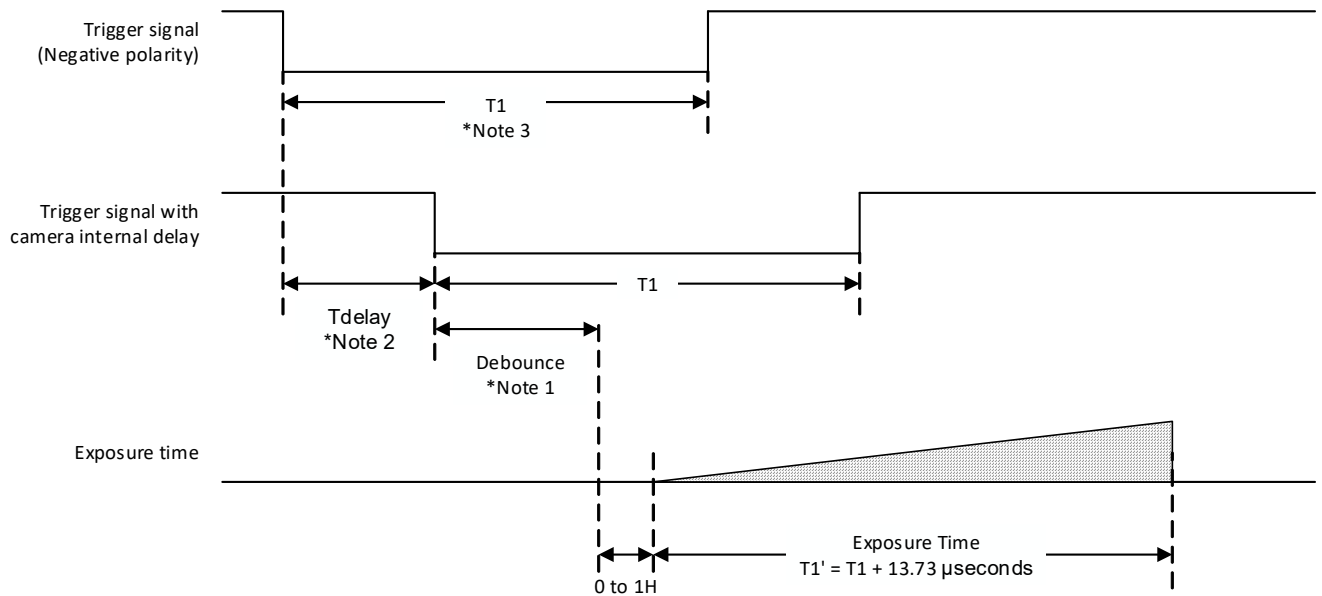
Note 1: The trigger signal will be removed by filtering if active pulse width of input trigger signal is less than "Line Debounce Time" setting time. Please input trigger signal has more than "Line Debounce Time" time active pulse width trigger signal.

Note 2: Please refers "5.2.6 External Hardware Trigger Input Delay" for more details about "External hardware trigger delay".
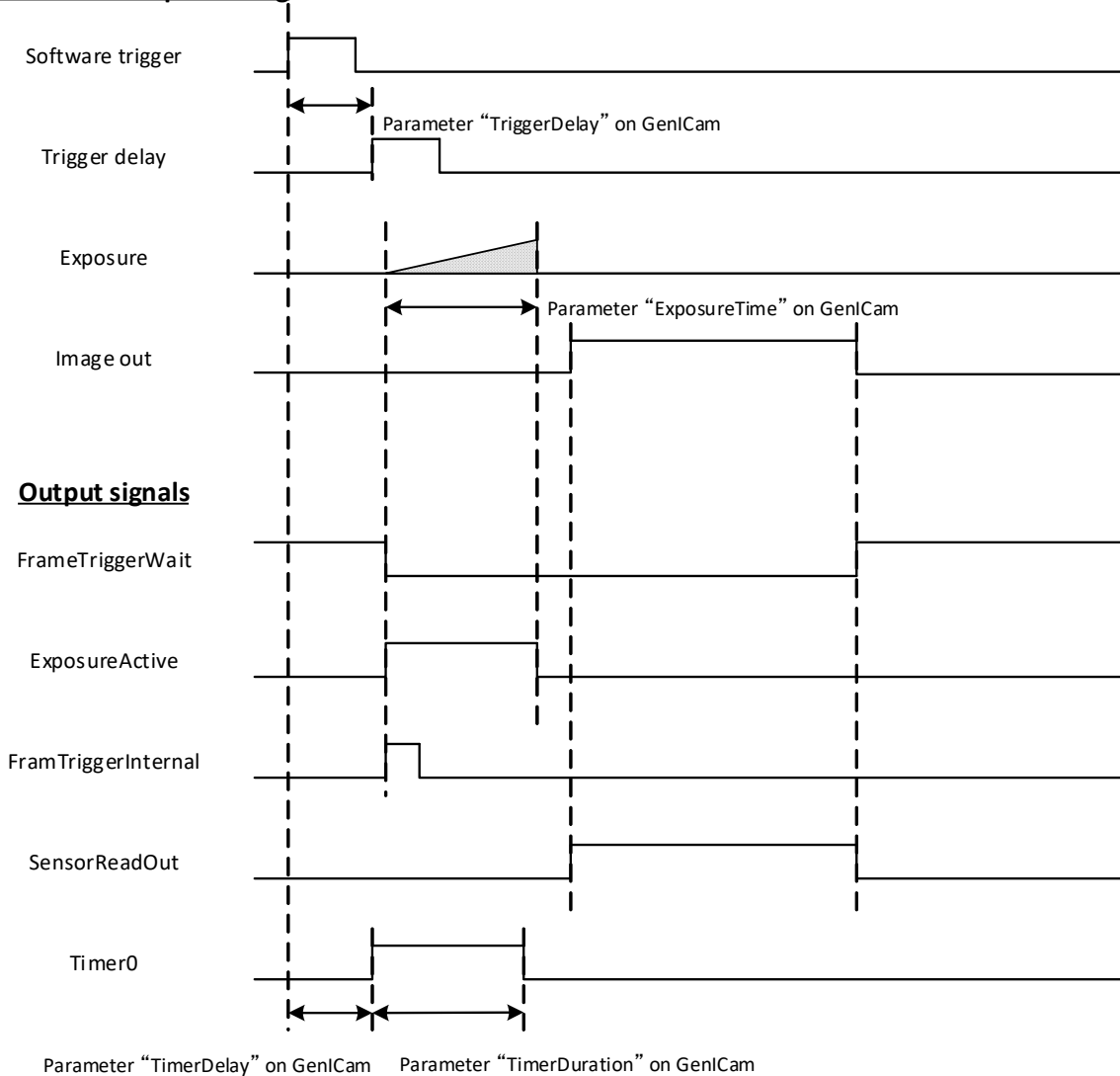
Note 3: Please refers "5.2.6 External Hardware Trigger Input Delay" for shortest active pulse duration of trigger signal.

OMRON

8.3 Edge Preset Trigger Mode

In this trigger mode with positive polarity, the expose starts at rising edge of trigger signal. The exposure duration time is based on preset exposure setting stored by camera setting communication.

In this trigger mode with negative polarity, the expose starts at falling edge of trigger signal. The exposure duration time is based on preset exposure setting stored by camera setting communication.

8.3.1 Timing

Note: The exposure time is "Exposure Time" on GenICam setting.

OMRON
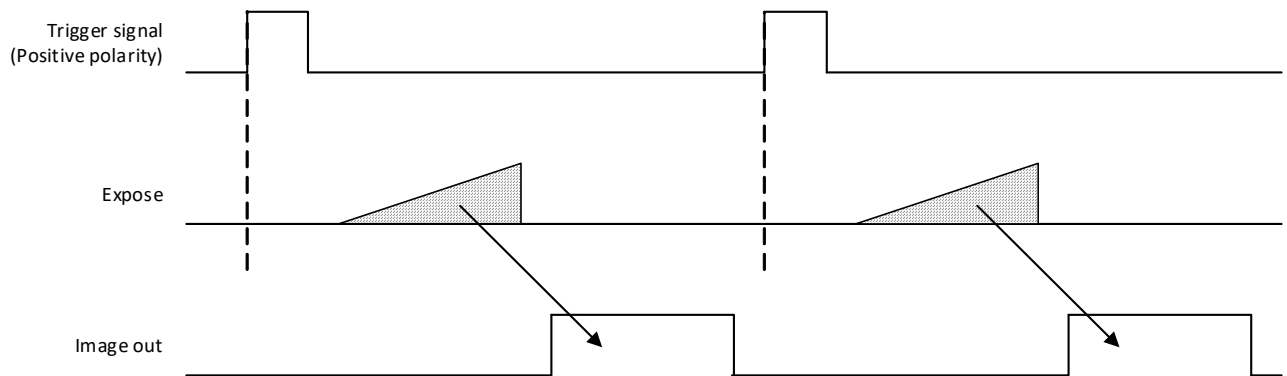
8.3.2 Exposure Timing with Positive Polarity Trigger Signal
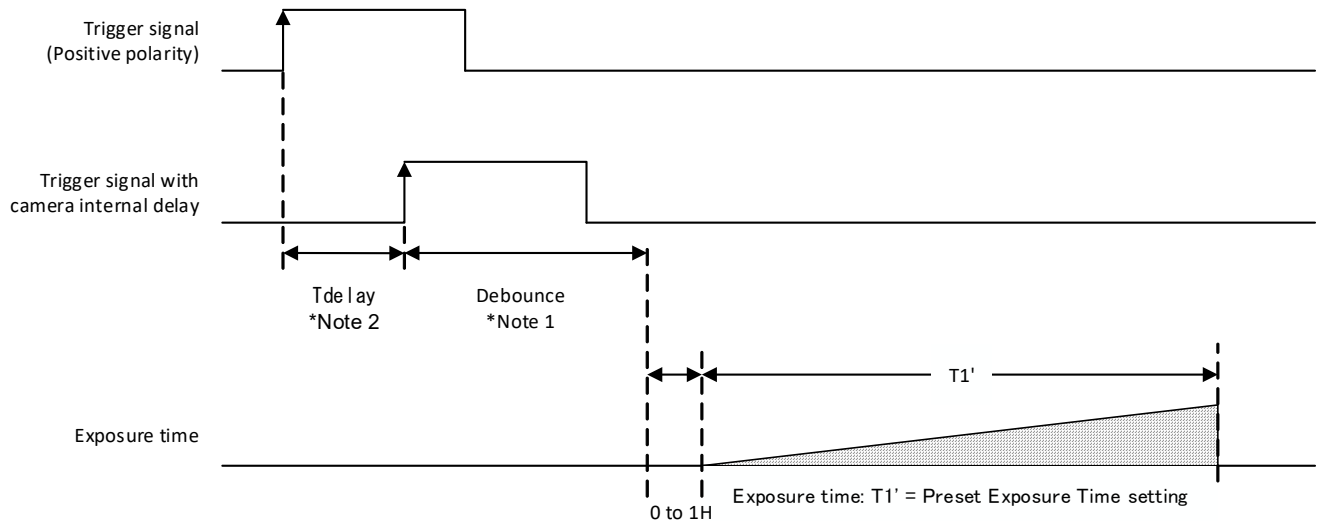
Note 1: The trigger signal will be removed by filtering if active pulse width of input trigger signal is less than "Line Debounce Time" setting time. Please input trigger signal has more than "Line Debounce Time" time active pulse width trigger signal.

Note 2: Please refers "5.2.6 External Hardware Trigger Input Delay" for more details about "External hardware trigger delay".

8.3.3 Exposure Timing with the Negative Polarity Trigger signal
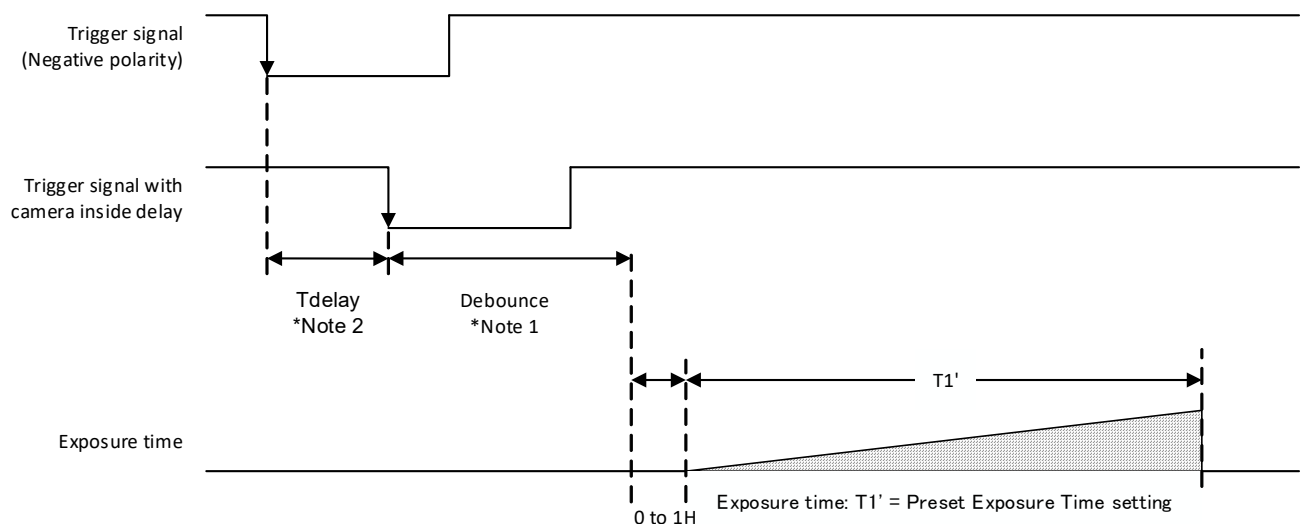
Note 1: The trigger signal will be removed by filtering if active pulse width of input trigger signal is less than "Line Debounce Time" setting time. Please input trigger signal has more than "Line Debounce Time" time active pulse width trigger signal.

Note 2: Please refers "5.2.6 External Hardware Trigger Input Delay" for more details about "External hardware trigger delay".

OMRON

8.4　Edge Preset Trigger Mode (Trigger input while image is out)

In this trigger mode with positive polarity, the expose starts at rising edge of trigger signal. The exposure duration time is based on the preset exposure setting stored by camera setting communication.

In this trigger mode with negative polarity, the expose starts at falling edge of trigger signal. The exposure duration time is based on the preset exposure setting stored by camera setting communication.

However, if the trigger signal input while exposing with previous trigger signal or output image, trigger signal is disregard.

8.4.1　Timing

Trigger signal
(Positive polarity)

Expose

Image out

Note: The exposure time is "Exposure Time" on GenICam setting.

OMRON
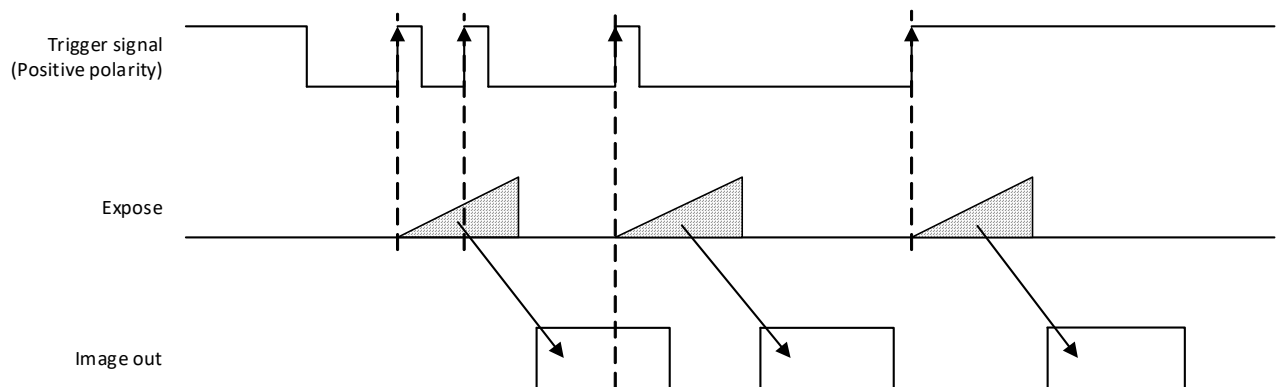
9 Camera Functions

9.1 Save and load the camera settings

The camera has the camera setting save function, and camera setting including factory default loads function.
The camera has below two type of camera settings.

Default: The factory default settings (This setting cannot change)
User Set X: Over writeable camera settings (X: 0 to 7)

These camera settings load from ROM to register in RAM on camera, and camera settings at register in RAM on camera save to ROM.
The camera settings saving and loading are controllable with Parameters ("User Set Selector", "User Set Default Selector"), and commands ("User Set Load", "User Set Save") in "User Set Control" category of GenICam.

The details of the parameters and the functions are in the table below:

GenICam Parameters

UserSetSelector	IEnumeration Type	Select "Default" or "User Set X" "User Set Load" or "User Set Save" process for selected settings.
UserSetLoad	ICommand Type	The camera settings load from ROM to register in RAM.
UserSetSave	ICommand Type	The camera settings at register in RAM save to ROM.
UserSetDefaultSelector	IEnumeration Type	Select which settings ("Default" or "User Set X") load automatically when camera power is on. This selection saves automatically.

9.1.1 Saving Camera Settings
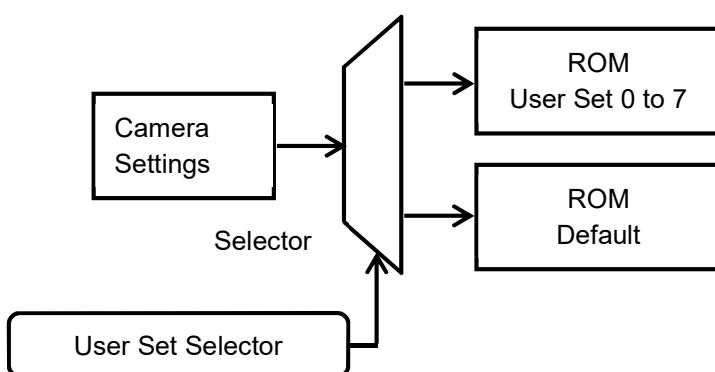
When executing "User Set Save",
camera settings at the register in RAM are
saved to the ROM that is selected at
"User Set Selector".
Caution:
"User Set Save" CANNOT execute when
"Default" was selected at "User Set Selector"

Setting Procedure
1. Selects "User Set X" at "User Set Selector"
2. Execute "User Set Save"

OMRON

9.1.2 Loading Camera Settings

```
┌─────────────────┐
│      ROM        │──┐
│ User Set 0 to 7 │  │    ╲        ┌──────────┐
└─────────────────┘   ─→  ╲────────→│  Camera  │
                          ╱         │ Settings │
┌─────────────────┐   ─→  ╱         └──────────┘
│      ROM        │──┘   ╱ Selector
│    Default      │     ╱
└─────────────────┘    ╱
                      ╱
┌─────────────────────┐
│  User Set Selector  │
└─────────────────────┘
```
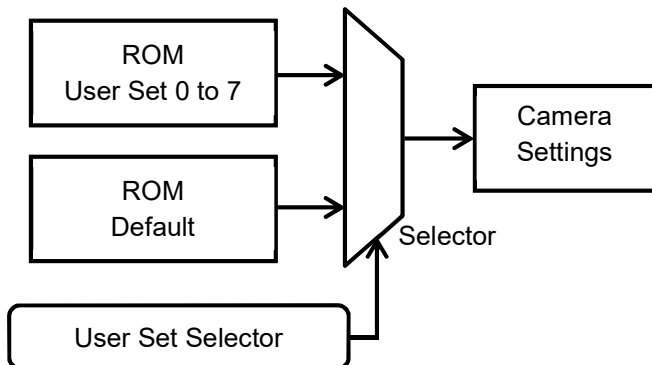
When executing "User Set Load",
camera settings load from selected ROM
that was selected at "User Set Selector" to
register at RAM.

Setting Procedure
1. Select "User Set X" (or Default) at "User Set Selector"
2. Execute "User Set Load"

9.1.3 Loading Camera Settings when Camera Power is on

```
┌─────────────────┐
│      ROM        │──┐
│ User Set 0 to 7 │  │    ╲        ┌──────────┐
└─────────────────┘   ─→  ╲────────→│  Camera  │
                          ╱         │ Settings │
┌─────────────────┐   ─→  ╱         └──────────┘
│      ROM        │──┘   ╱ Selector
│    Default      │     ╱
└─────────────────┘    ╱
                      ╱
┌─────────────────────┐
│  User Set Selector  │
└─────────────────────┘
```
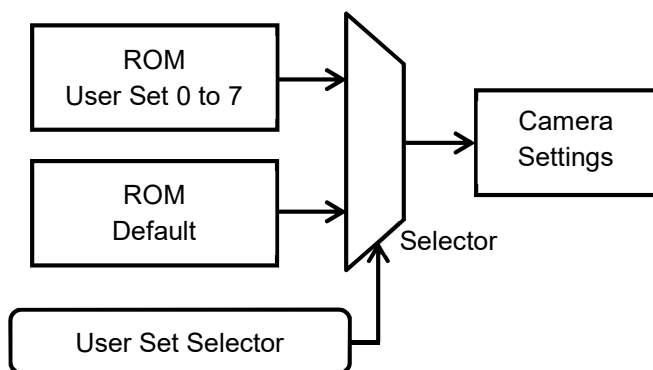
When the camera power is on,
camera settings load from selected ROM
that was selected at "User Set Default" to
register at RAM.

Setting Procedure
1. Set "User Set X" or "Default" at "User Set Default"

9.1.4 Camera Settings Initialization
Please follow the procedure in below for camera settings put back to factory default settings.

Setting Procedure
1. Selects "Default" at "User Set Selector".
2. Executes "User Set Load".
3. Select "User Set X" at "User Set Selector".
4. Executes "User Set Save".

OMRON

9.2　Frame rate

This parameter sets the frame rare (fps) of output image from camera.

GenICam Parameters

AcquisitionFrameRate	IFloat Type	Sets frame rate in Hz unit (*1) Range is changed with exposure time setting Default: 21.9541

(*1) The approximate value of set value, sets to camera and display it.

9.3　Gain

The gain has Analog Gain, Digital Gain.

9.3.1　Analog Gain
This parameter sets analog gain.
Selects "Analog ALL" at "Gain Selector", sets gain at "Gain".

GenICam Parameters

GainSelector	IEnumeration Type	Selects control gain Analog All: Analog Gain
Gain	IFloat Type	Analog Gain Range: 0 to 208 Default: 0

Analog Gain Formula
Gain (dB) = "Gain" / 10

9.3.2　Digital Gain
This parameter sets digital gain.
Selects "Digital ALL" at "Gain Selector", sets gain at "Gain".

GenICam Parameters

GainSelector	IEnumeration Type	Selects control gain Digital All: Digital Gain
DigitalGain	IFloat Type	Digital Gain Range: 0 to 4,095 Default: 0

Digital Gain Formula
Gain (x times) = 1 + ("Digital Gain" / 128)

OMRON

9.4 Exposure Time

This parameter sets variable exposure time.
The control method is selectable from
Manual exposure control, which uses preset exposure time.
Auto exposure control, which is maintain exposure time with brightness of target.

GenICam Parameters

ExposureMode	IEnumeration Type	Exposure control selection
		Selection: "Off" and "Timed"
		Off: Exposure time is "1 / Frame rate"
		Timed: Exposure time is "Exposure Time"
ExposureTime [ExposureTime Selector]	IFloat Type	Exposure time (in µsecond) (*1) Range: 1.000000 to 16,777,215.000000 Default: 45,345.000000
ExposureAuto	IEnumeration Type	Auto exposure ON / OFF selection (*2)

(*1) The approximate value of set value, sets to camera and display it.
(*2) Please sets range of auto exposure control with "Exposure Auto Limit Min" and "Exposure Auto Limit Max" when using auto exposure control.

9.5 Black Level

This parameter sets the black level (clamp level for black signal).
Sets the black level at "Black Level".
The lower limit of signal is clamped at this setting level. The signal does not lower than this.

GenICam Parameters

BlackLevel	IFloat Type	Black Level
		Range:
		12bits output: 0 to 240
		10bits output: 0 to 60
		8bits output: 0 to 15
		Default: 0

OMRON

9.6 ALC (Auto Light Control)

ALC function has two control methods, which is AGC (Auto Gain Control) and auto shutter. The AGC and auto shutter can be set individually.

The camera parameters are adjusted to brightness of image is maintained with target brightness automatically with ALC function.

AGC or auto shutter have to set "On" to activate ALC function.

GenICam Parameters (for AGC and auto shutter)

AutoLuminanceTarget	IInteger Type	Target brightness Range: 0 to 255 Default: 128
AutoLuminanceRegion Selector	IEnumeration Type	ALC weight region to set area, position and weight Selection: Region 0 to Region 8
AutoLuminanceWidth	IInteger Type	Width for selected ALC weight region Range: 4 to 2,448 Default: 794 for all regions
AutoLuminanceHeight	IInteger Type	Height for selected ALC weight region Range: 2 to 2,048 Default: 658 for all regions
AutoLuminance OffsetX	IInteger Type	Horizontal offset for selected ALC weight region Range: 0 to 2,444 Default: 32 (Region 0, 3 and 6), 826 (Region 1, 4 and 7), 1,621 (Region 2, 5 and 8)
AutoLuminance OffsetY	IInteger Type	Vertical offset for selected ALC weight region Range: 0 to 2,046 Default: 36 (Region 0 to 2), 694 (Region 3 to 5), 1,353 (Region 6 to 8)
AutoLuminanceWeight	IInteger Type	Weight Range: 0 to 15 Default: 1 * Sets 10 on Region 4 only Sets the weight for each weight area.
AutoLuminancePeak	IInteger Type	Importance ratio for the brightness peak at ALC control. Range: 0 to 255 Default: 0

OMRON

Target Brightness Formula (Auto Luminance Target)
12bits output: Target Brightness (Gradient) = "Auto Luminance Target" × 16
10bits output: Target Brightness (Gradient) = "Auto Luminance Target" × 4
 8bits output: Target Brightness (Gradient) = "Auto Luminance Target"

About the importance ratio for brightness peak at ALC control (Auto Luminance Peak)
When setting 0, Average: 100 %, Peak: 0 %. The ALC control with brightness average.
When setting 255, Average: 0 %, Peak: 100 %. The ALC control with brightness peak.
When setting 128, Average: 50 %, Peak: 50 %.

9.6.1   ALC control method
          The ALC control with weight region 0 to 8.
          The weight area setting parameters are in below:
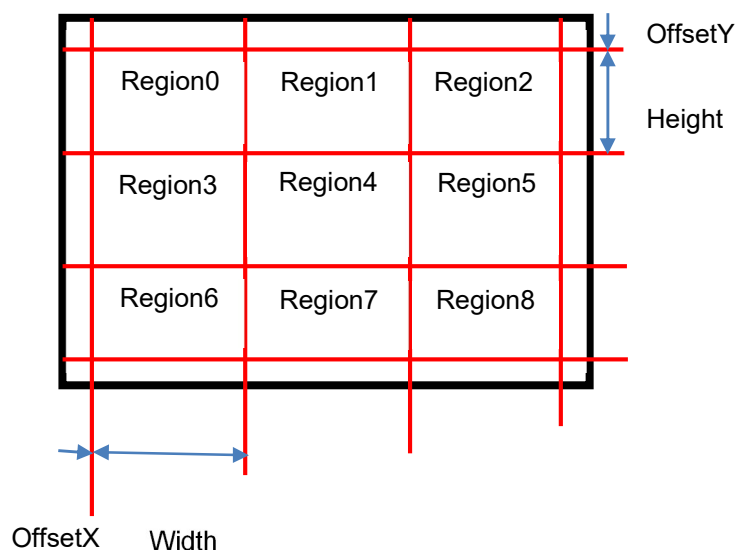
The brightness average and peak calculate for each weight area.
The target brightness comparison value calculates with "Auto Luminance Peak", the brightness average and peak then compare with target brightness to define necessary brightness control (to dark or to bright). The brightness of image maintains to "Auto Luminance Target" with AGC and auto shutter functions.

If AGC and auto shutter are ON for ALC control, auto shutter function maintains brightness first. The AGC function maintains brightness if brightness cannot maintain to "Auto Luminance Target" with auto shutter.

OMRON

9.6.2   AGC (Auto Gain Contorl)

The brightness of image maintains to keep target brightness with gain automatically.

If the brightness of image is darker than target brightness, gain increases up to "Gain Auto Limit Max".

If the brightness of image is brighter than target brightness, gain decreases.

GenICam Parameters

GainSelector	IEnumeration Type	Adjustable gain selection
		Selected gain can be adjusting by Gain[GainSelector].
		Please select "Analog All" when AGC is turned on.
		Selection: "Analog All" (analog gain) and "Digital All" (digital gain)
		Default: "Analog All"
Gain[GainSelector]	IFloat Type	Gain
		Selected gain at "Gain Selector" is adjusting
		Analog gain:
		Range: 0 to 208
		Default: 0
		Digital gain:
		Range: 0 to 4,095
		Default: 0
		Analog gain cannot adjustable when AGC is turned on.
GainAuto [GainSelector]	IEnumeration Type	AGC ON / OFF selection
		Selection: "ON" (Continuous) and "OFF" (Off)
		Default: OFF
GainAutoLimitMin [GainSelector]	IFloat Type	Minimum gain for AGC
		Range: 0 to 208
		Default: 0
		This cannot be set greater than "Gain Auto Limit Max"
GainAutoLimitMax [GainSelector]	IFloat Type	Maximum gain for AGC
		Range: 0 to 208
		Default: 208
		This cannot be set smaller than "Gain Auto Limit Min"

9.6.3　Auto shutter

The brightness of image maintains to keep target brightness with shutter automatically.

If the brightness of image is darker than target brightness, exposure time extends up to "Exposure Auto Limit Max".

If the brightness of image is brighter than target brightness, exposure time becomes shorter up to "Exposure Auto Limit Min".

GenICam Parameters

ExposureAuto	IEnumeration Type	Auto shutter ON / OFF selection Selection: "ON" (Continuous), "OFF" (Off) Default: "OFF"
ExposureAutoLimitMin	IFloat Type	Minimum exposure time (in µsecond) for auto shutter Range: 1 to 16,777,215 Default: 14
ExposureAutoLimitMax	IFloat Type	Maximum exposure time (in µsecond) for auto shutter Range: 1 to 16,777,215 Default: 45,345

9.6.4　ALC settings procedure

ALC Settings Procedure
1. Sets "Auto Luminance Width", "Auto Luminance Height", "Auto Luminance Offset X", "Auto Luminance Offset Y" and "Auto Luminance Weight" for "Auto Luminance Region 0 to 8".
2. Sets "Continuous" for "Gain Auto" when using AGC function.
3. Sets "Gain Auto Limit Min" and "Gain Auto Limit Max" when using AGC function.
4. Sets "Continuous" for "Exposure Auto" when using auto shutter function.
5. Sets "Exposure Auto Limit Min" and "Exposure Auto Limit Max" when using auto shutter function.
6. Sets "Auto Luminance Target".

OMRON

9.7 White balance (Only available for color camera)

The color compensates with gain adjustment each color.
The gain for each color has to adjust each color has same brightness when taking flat white target.
The white balance control methods are listed in below:
OFF
Auto white balance
Push to set white balance
Preset 0 to 2

9.7.1 White balance control methods

GenICam Parameters

BalanceRatioSelector	IEnumeration Type	White balance control target color selection Selection: "Red", "Green" and "Blue"
BalanceRatio	IFloat Type	Color gain setting for color selects at "Balance Ratio Selector" Range: 0 to 255
BalanceWhiteAuto	IEnumeration Type	White balance control method selection. Selection: "Off", "Once", "Continuous", "Preset 0", "Preset 1" and "Preset 2" Default: "Off"

9.7.2 White balance control method selection

OFF
The white balance with "Balance Ratio" setting for Red, Green and Blue.
If the white balance process is not necessary, please sets 0 for "Balance Ratio" for all colors.

White balance "OFF" setting procedure
1. Sets "Off" at "Balance White Auto".

Auto white balance
The optimized white balance gain calculates each frame for auto white balance.

Auto white balance setting procedure
1. Sets "Continuous" at "Balance White Auto".

Push to set white balance
The white balance gain adjusts once after select this white balance then set to "Balance Ratio" for all colors.
Sets "OFF" at "Balance White Auto" automatically after sets "Balance Ratio" for all colors.

Push to set white balance setting procedure
1. Sets the flat white target then acquires image.
2. Sets "Once" at "Balance White Auto".

OMRON

Preset white balance 0 to 2

The camera has three preset manual white balances.

Preset white balance setting procedure
1. Selects "Preset 0" to "Preset 2" at "Balance White Auto".
2. Selects adjusting color from Red, Green or Blue at "Balance Ratio Selector".
3. Sets gain for selected adjusting color at "Balance Ratio".

The settings can be save into camera with "User Set Control" function.

9.7.3 White balance calculate region setting

The size and position for white balance gain calculation region are changeable.

GenICam Parameters

BalanceWhiteAuto RegionSelector	IInteger Type	White balance gain calculation region selection Selection: Region 0
BalanceWhiteAuto Width	IInteger Type	Width (horizontal size, in pixel) for white balance gain calculation region Range: 1 to 2,448 Default: 2,448
BalanceWhiteAuto Height	IInteger Type	Height (vertical size, in line) for white balance gain calculation region Range: 1 to 2,048 Default: 2,048
BalanceWhiteAuto XOffset	IInteger Type	Horizontal offset (in pixel) for region 0 Range: 0 to 2,447 Default: 0
BalanceWhiteAuto YOffset	IInteger Type	Vertical offset (in line) for region 0 Range: 0 to 2,047 Default: 0

The white balance calculation region settings are like below:

OMRON
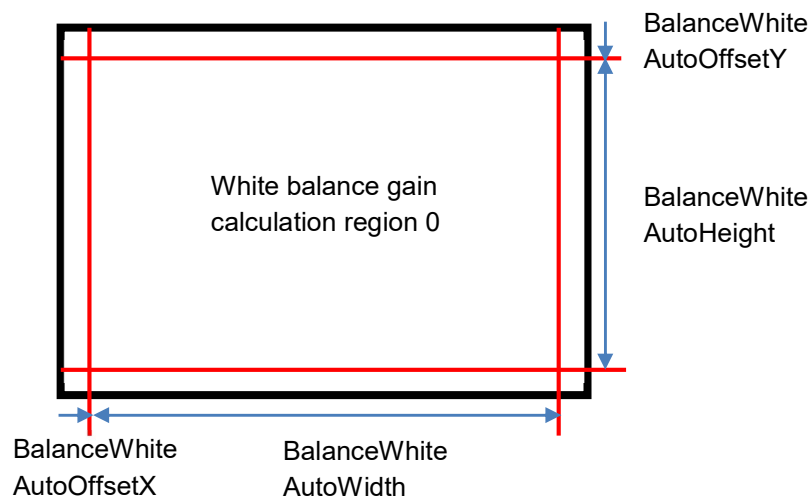
9.8 Gamma correction

The gamma correction is changeable.

GenICam Parameters

Gamma	IInteger Type	Gamma correction Range: 0 to 4.0 Default: 1.0

9.9 ROI (Region of Interest)

The specified region of image can be output from camera with ROI function.

GenICam Paramters

Width	IInteger Type	Width (horizontal size) of output image (in pixel) Range: 260 to 2,448 Default: 2,448 Adjustable steps: 4 ("Width" + "Offset X") should not exceeded maximum width.
Height	IInteger Type	Height (vertical size) of output image (in line) Range: 2 to 2,048 Default: 2,048 Adjustable steps: 4 ("Height" + "Offset Y") should not exceeded maximum height.
OffsetX	IInteger Type	Horizontal offset for output image (in pixel) Range: 0 to 2,188 Default: 0 Adjustable steps: 4
OffsetY	IInteger Type	Vertical offset for output image (in line) Range: 0 to 2,044 Default: 0 Adjustable steps: 4

The ROI region settings are below:

STC-MBS500POE / STC-MCS500POE
Product Specifications and User's Guide

OMRON
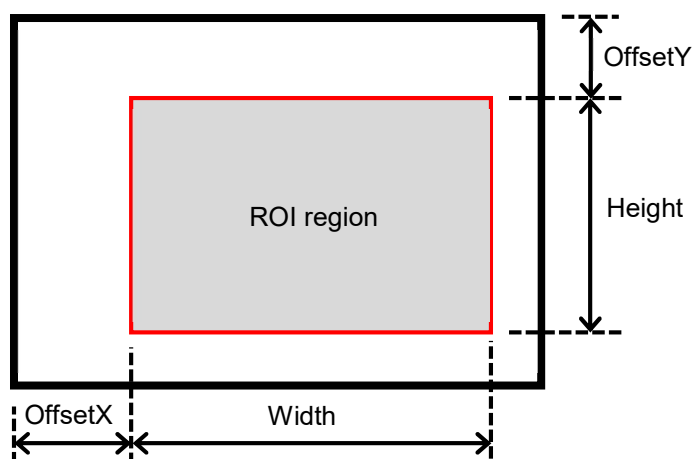
9.10 Pixel Format

The image format from camera can be set on Pixel Format.

GenICam Parameters

PixelFormat	IEnumeration Type	Pixel Format

The following chart shows the available Pixel Formats on camera:

Output Bits	Pixel Format		
	Monochrome Camera STC-MBS500POE	Color Camera STC-MCS500POE	
8bits	Mono8	Mono8	BayerRG8
10bits	Mono10	Mono10	BayerRG10
10bits Packed	Mono10Packed	Mono10Packed	BayerRG10Packed
12bits	Mono12	Mono12	BayerRG12
12bits Packed	Mono12Packed	Mono12Packed	BayerRG12Packed
8bits x 3	N/A	RGB8	

Each format specified on GenICam PFNC (Pixel Format Naming Convention).

9.11 Decimation

When using Decimation mode, the decimated image can be output.
The images below show decimated pixels (red squares) where they are output.

＜STC-MBS500POE＞

＜STC-MCS500POE＞
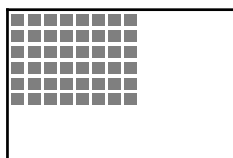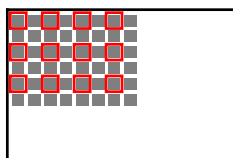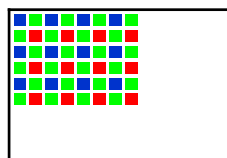
Decimation X（OFF）, Y（OFF）　　Decimation X（ON）, Y（ON）　　Decimation X（OFF）, Y（OFF）　　Decimation X（ON）, Y（ON）
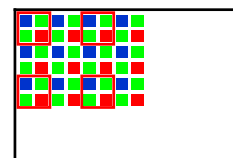
GenICam Parameter

DecimationHorizontal	IInteger Type	Sets decimation on horizontal direction
		Selection: 1: Disable Decimation, 2: Decimate one of two pixels
		Default: Disable Decimation
DecimationVertical	IInteger Type	Sets decimation on vertical direction
		Selection: 1: Disable Decimation, 2: Decimate one of two pixels
		Default: Disable Decimation

(*1) Decimation cannot change horizontal only or vertical only. Selection applies for horizontal and vertical.

(*2) It is necessary to change exposure time (to shorten exposure time), to increase frame rate when using Decimation.

OMRON

9.12   Trigger

The trigger type (trigger source) is selectable at "Trigger Source" under "Acquisition Control".
The trigger type (trigger source) is listed in below table.

Software	Software trigger generates by "Trigger Software"
Software Signal 0	Software trigger generates by "Software Signal Control"
Software Signal 1	Software trigger generates by "Software Signal Control"
Action 0	Action command trigger
Line 0	Hardware trigger through "Line 0"
Line 2	Hardware trigger through "Line 2"
Logic Block 0	Trigger generates by "Logic Block Control"
	Please refers "Trigger signal processing procedure" for more details

9.12.1   Trigger signal processing procedure
The camera internal process for external hardware trigger signal or software trigger signal input is below:
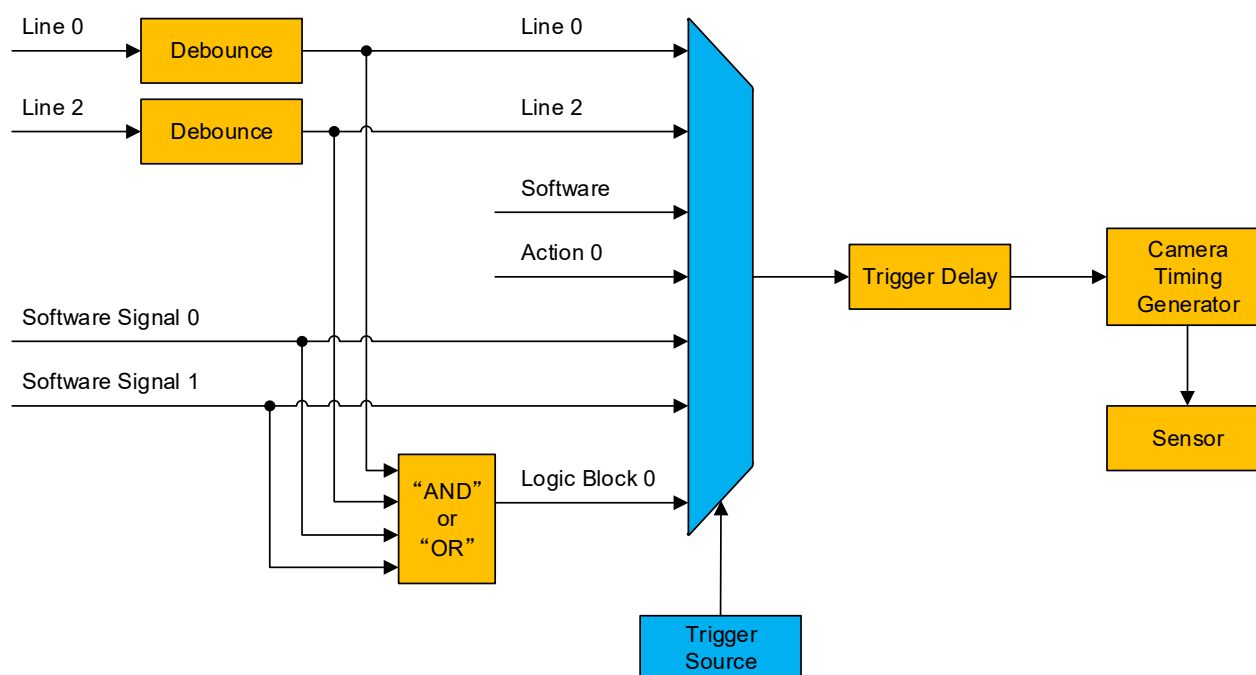
The trigger signal is selectable by GenICam commands.

Trigger Source: select trigger type

OMRON

9.13   Image Flip

The horizontal flip image can be selected by "Reverse X".
The vertical flip image can be selected by "Reverse Y".

GenICam Parameters

ReverseX	IBoolean 型	Horizontal flip image ON / OFF selection
		Selection: "False" (Horizontal flip is Off), "True" (Horizontal flip is On)
		Default: "False" (Horizontal flip is Off)
ReverseY	IBoolean Type	Vertical flip image ON / OFF selection
		Selection: "False" (Vertical flip is Off), "True" (Vertical flip is On)
		Default: "False" (Vertical flip is Off)

9.14   LUT Control

The output signal assigned table for input signal.

GenICam Parameters

LUT Selector	IEnumeration Type	Control LUT selection (Luminance is only selectable)
		Default: Luminance
LUT Index	IInteger Type	Index for LUT
		Range: 0 to 4,095
LUT Enabled	IBoolean Type	LUT ON / OFF selection
LUT Value	IInteger Type	The output value for input value that specifies by index
		Range: 0 to 4,095
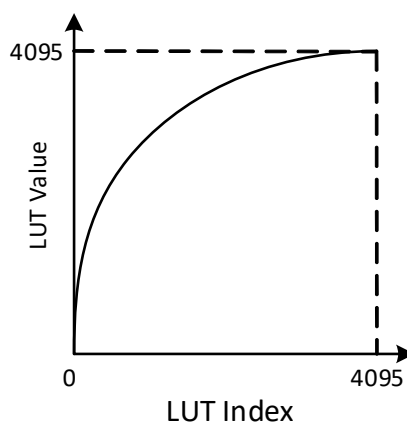
e.g. LUT usage (low brightness level enhancement)

OMRON

9.15   Defective pixel correction

The selected position of defective pixel is correcting with adjacent pixel information.
The selected position of defective pixel of color camera is correcting with adjacent same color of pixel information.

GenICam Parameters

PixelCorrectionAll	IBoolean Type	Defective pixel correction ON / OFF selection Selection: "True" (On), "False" (Off) Default: "True"
PixelCorrection Index	IInteger Type	Index for process defective pixel correction Range: 0 to 2,047 Default: 0
PixelCorrection Enabled	IBoolean Type	Defective pixel correction ON / OFF selection for selected index Selection: "True" (On), "False" (Off) Default: "False" (Off)
PixelCorrectionX	IInteger Type	Horizontal position for selected index for process defective pixel correction Range: 0 to 2,447 Default: 0
PixelCorrectionY	IInteger Type	Vertical position for selected index for process defective pixel correction Range: 0 to 2,047 Default: 0

OMRON

9.16   Counter And Timer Control

Controls "Timer" and "Counter".

A)   Timer Control

GenICam Parameters

TimerSelector	IEnumeration Type	Fixed as "Timer 0"
TimerDelay	IInteger Type	Delay for "Timer 0 active" signal (in μsecond) Range: 0 to 16,777,215 Default: 0
TimerDuration	IInteger Type	Duration of "Timer 0 active" signal (in μsecond) Range: 1 to 16,777,215 Default: 1
TimerTrigger Source	IEnumeration Type	Reference signal selection to generate "Timer 0 active" signal Default: "Off"
TimerTrigger Activation	IEnumeration Type	Polarity of reference signal to generate "Timer 0 active" signal Default: "Rising Edge"
TimerValue	IInteger Type	Returns value for "Timer 0 active" signal

When the timing of "Timer 0 active" signal is adjusting to active signal of Exposure, "Timer 0" can be used as strobe control signal.

B)   Counter Control

GenICam Parameters

CounterSelector	IEnumeration Type	Counter selection Default: "Counter 0"
CounterEvent Source	IEnumeration Type	Counter event source selection
CounterReset Source	IEnumeration Type	Reference signal selection to reset counter
CounterReset Activation	IEnumeration Type	Polarity of reference signal to reset counter
CounterReset	ICommand Type	Rest switch "Activate as switch when selecting "Software" at "Counter Reset Source"
CounterValue	IInteger Type	Returns number of counter

OMRON

9.17 Event Control

The camera internal signal can be output as specified event information, like "exposure end", to PC used by GVCP (GigE Vision Control Protocol).

e.g. Event control
Notified "Exposure End"
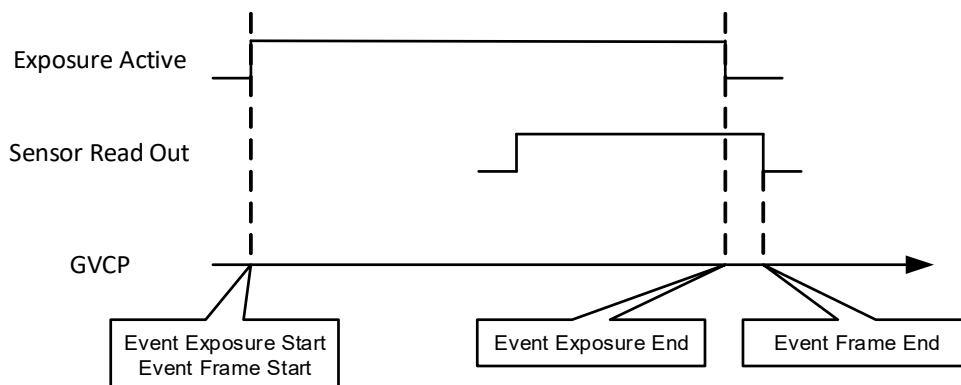
GenICam Parameters

Event Selector	IEnumeration Type	Event notification selection
		Selection: "Action Late", "Frame Trigger", "Exposure Start", "Exposure End",
		"Frame Start", "Frame End", "Block Discard",
		"Line 0 Input Rising Edge", "Line 0 Input Falling Edge",
		"Line 2 Input Rising Edge" and "Line 2 Input Falling Edge"
Event Notification	IEnumeration Type	Event notification ON / OFF selection
		On: Enable event notification
		Off: Disable event notification

9.18 Chunk Control

This function is attached additional image information to image data.

For example, the exposure time and gain information do not include in image data itself. However, Chunk data transfers these parameters when image was acquiring.

GenICam Parameters

ChunkModeActive	IBoolean Type	Chunk control ON / OFF selection Default: "False" (Off)

ChunkSelector	IEnumeration Type	Transfer Chunk data selection
		Selection: "Image", "Offset X", "Offset Y", "Width", "Height", "Pixel Format",
		        "Gain", "Exposure Time", "Black Level", "Line Status All",
		        "Device Temperature", "Timer Value" and "Counter Value"

ChunkEnable	IInteger Type	Enable Chunk data that was selected at "Chunk Selector" Selection: "True" (Enable Chunk data) and "False" (Disable Chunk data)

9.19 Action Control

The multiple cameras control by one action signal.

GenICam Parameters

ActionQueueSize	IInteger Type	Size of scheduled action command queue
ActionDeviceKey	IInteger Type	Control identifier of camera
ActionSelector	IInteger Type	Action command application selection Fixed as "0"
ActionGroupKey	IInteger Type	Action command applies camera * The camera executes action command when group key of action command and group key of camera is matched.
ActionGroupMask	IInteger Type	Select camera to apply action command Logical AND of Group Mask of camera and Group Mask of action command is 1 for any bit of 32bits, camera executes action command.

OMRON

9.20   IEEE1588

Precision Time Protocol (PTP) is implemented on camera, is synchronized to "Master Clock" in same network automatically.
The camera supports IEEE 1588-2008 of PTP Version 2. The accuracy of time (Timestamp) synchronized is different based on network system configuration.

1) BMC (Best Master Clock) function
    BMC function is implemented on camera. The most accurate clock in same network is defined as "Master Clock" then time (Timestamp) synchronizes. If there are more than two devices has most accurate clock in same network, clock of smallest MAC address device is defined as "Master Clock".

2) E2E (End-to-End) Transparent Clock
    The camera supports E2E method. Time difference is correcting by blow algorithm
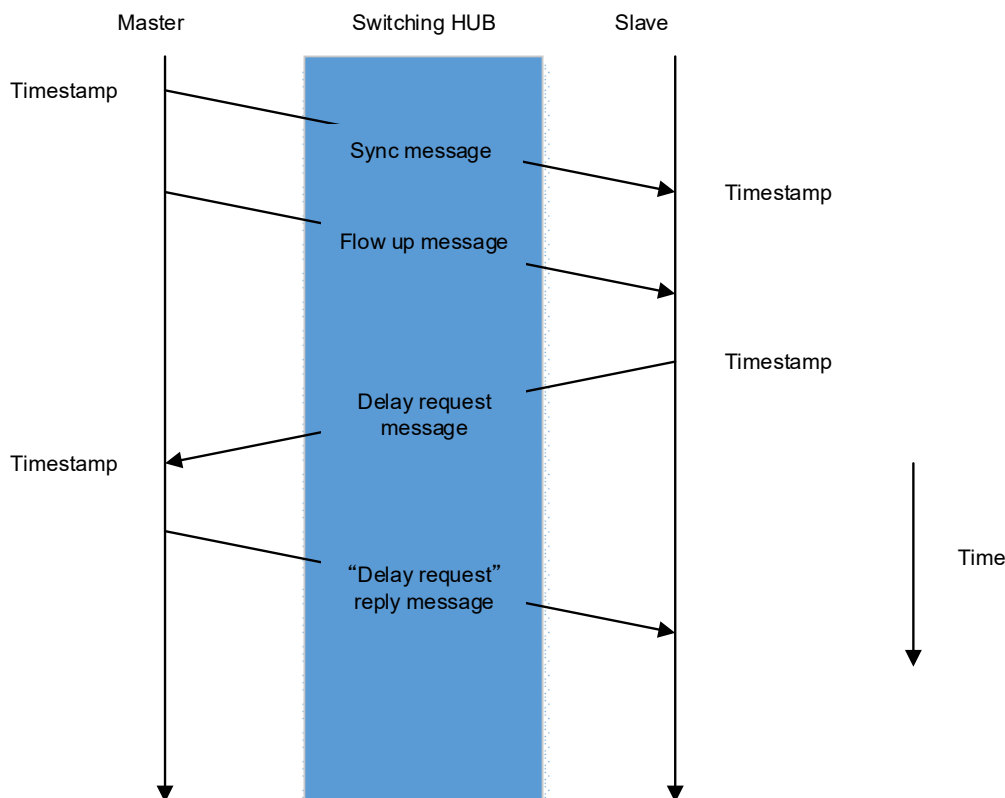
The master device and slave device exchange message included Timestamp.
Defined delay between master device and slave device by comparing these messages.
If time difference between master device and slave device is occurred, adjust internal clock of slave device to synchronize to master device.
Synchronize clock regularly to correcting time drift.

3) How to use PTP

Selects "True" at GevIEEE1588 then synchronize camera time to "Master Clock" (synchronize time is different depending on system). The camera is ready for action command after synchronize to "Master Clock".

4) Synchronized exposure for trigger mode

When action command generating, action command is broadcasting to each camera and camera starts exposing.

Synchronized exposure does not secure if action command does NOT include Timestamp. If action command includes Timestamp, action command will be scheduled automatically and each camera start exposing at same time.

Action Control setting is required when action command generating.
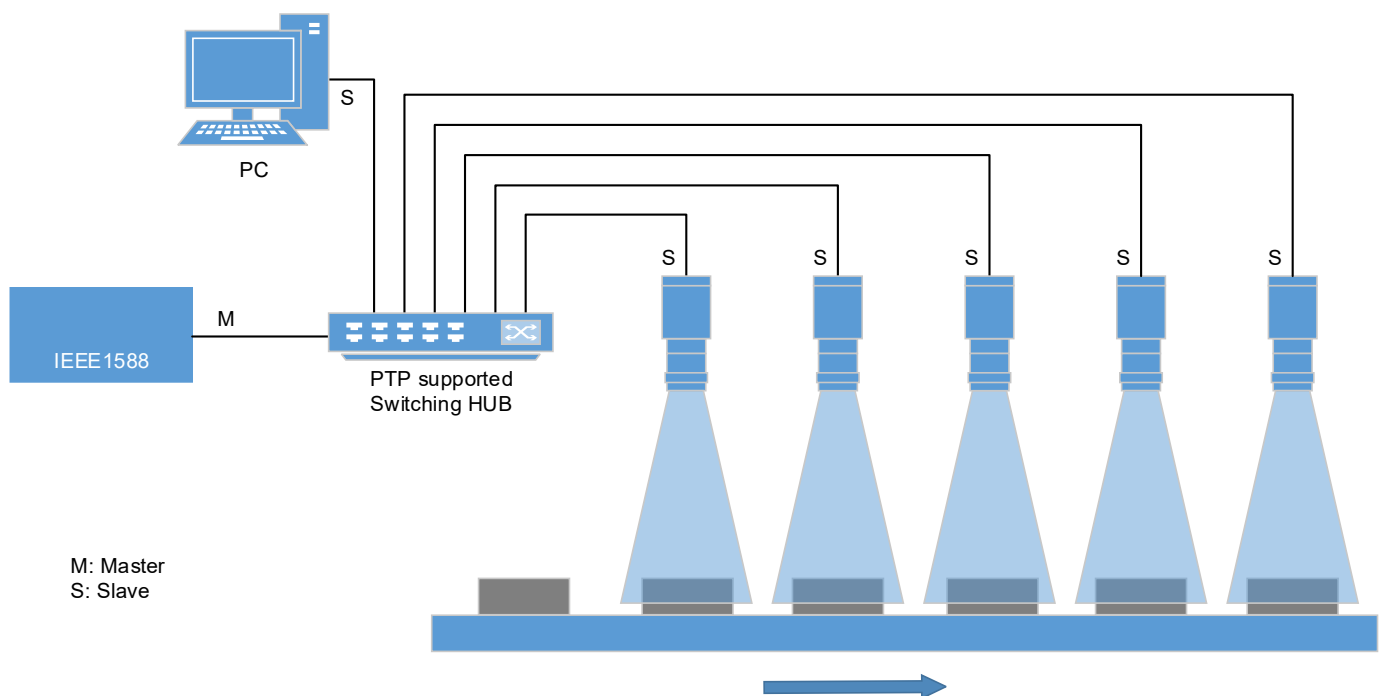
e.g. PTP configuration

10 GenICam command

10.1 Device Control

Name	Description
Device Type	Returns the device type.
Device Scan Type	Scan type of the sensor of the device.
Device Vendor Name	Name of the manufacturer of the device.
Device Model Name	Model of the device.
Device Manufacturer Info	Manufacturer information about the device.
Device Family Name	Identifier of the product family of the device.
Device Version	Version of the device.
Device Hardware Version	Version of the hardware in the device.
Device Firmware Version	Version of the firmware in the device.
Device Serial Number	Device's serial number.
Device User ID	User-programmable device identifier.
Device SFNC Version Major	Major version of the Standard Features Naming Convention that was used to create the device's GenICam XML.
Device SFNC Version Minor	Minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.
Device SFNC Version Sub Minor	Sub minor version of Standard Features Naming Convention that was used to create the device's GenICam XML.
Device TL Type	Transport Layer type of the device.
Device TL Version Major	Major version of the Transport Layer of the device.
Device TL Version Minor	Minor version of the Transport Layer of the device.
Device TL Version Sub Minor	Sub minor version of the Transport Layer of the device.
Device Link Selector	Selects which Link of the device to control.
Device Link Speed [Device Link Selector]	Indicates the speed of transmission negotiated on the specified Link.
Device Max Throughput [Device Link Selector]	Maximum bandwidth of the data that can be streamed out of the device.
Device Link Heartbeat Timeout [Device Link Selector]	Controls the current heartbeat timeout of the specific Link.
Device Link Command Timeout [Device Link Selector]	Indicates the command timeout of the specified Link.
Device Stream Channel Count	Indicates the number of streaming channels supported by the device.
Device Stream Channel Selector	Selects the stream channel to control.
Device Stream Channel Type [Device Stream Channel Selector]	Reports the type of the stream channel.

Name	Description
Device Stream Channel Endianness [Device Stream Channel Selector]	Endianness of multi-byte pixel data for this stream.
Device Event Channel Count	Indicates the number of event channels supported by the device.
Device Character Set	Character set used by the strings of the device's bootstrap registers.
Device Reset	Resets the device to its power up state.
Device Registers Streaming Start	Prepare the device for registers streaming without checking for consistency.
Device Registers Streaming End	Announce the end of registers streaming.
Device Registers Endianness	Endianness of the registers of the device.
Device Temperature Selector	Selects the location within the device, where the temperature will be measured.
Device Temperature [Device Temperature Selector]	Device temperature in degrees Celsius (C).
Timestamp Reset	Resets the current value of the device timestamp counter.
Timestamp Latch	Latches the current timestamp counter into Timestamp Latch Value.
Timestamp Latch Value	Returns the latched value of the timestamp counter.
Device User Memory	Read / Write the user data from / to the non-volatile memory.

OMRON

10.2   Image Format Control

Name	Description
Sensor Width	Effective width of the sensor in pixels.
Sensor Height	Effective height of the sensor in pixels.
Sensor Shutter Mode	Sets the shutter mode of the device.
Width Max	Maximum width of the image (in pixels).
Height Max	Maximum height of the image (in pixels).
Sensor Height Limitation	Sets the vertical size limit od sensor. Full Max Height = 3000, Half Max Height = 1500, Quarter Max Height = 750, Two Lines Max Height = 2.
Region Selector	Selects the Region of interest to control.
Region Mode[Region Selector]	Controls if the selected Region of interest is active and streaming.
Width [Region Selector]	Width of the image provided by the device (in pixels).
Height [Region Selector]	Height of the image provided by the device (in pixels).
Offset X [Region Selector]	Horizontal offset from the origin to the region of interest (in pixels).
Offset Y [Region Selector]	Vertical offset from the origin to the region of interest (in pixels).
Pixel Format	Format of the pixels provided by the device.
Pixel Size	Total size in bits of a pixel of the image.
Pixel Color Filter	Type of color filter that is applied to the image.
Reverse X	Flip horizontally the image sent by the device.
Reverse Y	Flip vertically the image sent by the device.
Test Pattern Generator Selector	Selects which test pattern generator is controlled by the Test Pattern feature.
Test Pattern [Test Pattern Generator Selector]	Selects the type of test pattern that is generated by the device as image source.
Test Pattern Input Value [Test Pattern Generator Selector]	Test Pattern Input Value

OMRON

10.3 Acquisition Control

Name	Description
Acquisition Mode	Sets the acquisition mode of the device.
Acquisition Start	Starts the Acquisition of the device.
Acquisition Stop	Stops the Acquisition of the device at the end of the current Frame.
Acquisition Frame Count	Number of frames to acquire in Multi Frame Acquisition mode.
Acquisition Frame Rate	Controls the acquisition rate (in Hertz) at which the frames are captured.
Trigger Selector	Selects the type of trigger to configure.
Trigger Mode [Trigger Selector]	Controls if the selected trigger is active.
Trigger Software [Trigger Selector]	Generates an internal trigger.
Trigger Source [Trigger Selector]	Specifies the internal signal or physical input Line to use as the trigger source.
Trigger Activation [Trigger Selector]	Specifies the activation mode of the trigger.
Trigger Delay [Trigger Selector]	Specifies the delay in microseconds (us) to apply after the trigger reception before activating it.
Exposure Mode	Sets the operation mode of the Exposure.
Exposure Time Selector	Selects which exposure time is controlled by the Exposure Time feature.
Exposure Time [Exposure Time Selector]	Sets the Exposure time when Exposure Mode is Timed and Exposure Auto is Off.
Exposure Auto	Sets the automatic exposure mode when Exposure Mode is Timed.
Exposure Auto Limit Min	Determine the lower limit of exposure time when Exposure Auto is set to Continuous.
Exposure Auto Limit Max	Determine the upper limit of exposure time when Exposure Auto is set to Continuous.

OMRON

10.4　Analog Control

Name	Description
Gain Selector	Selects which Gain is controlled by the various Gain features.
Gain [Gain Selector]	Controls the selected gain as an absolute physical value.
Gain Auto [Gain Selector]	Sets the automatic gain control (AGC) mode.
Gain Auto Limit Min [Gain Selector]	Determine the lower limit of gain when Gain Auto is set to Continuous.
Gain Auto Limit Max [Gain Selector]	Determine the upper limit of gain when Gain Auto is set to Continuous.
Digital Gain Offset Mode	Digital Gain Offset Mode is enabled.
Auto Luminance Target [Gain Selector]	Target brightness for auto luminance control.
Auto Luminance Region Selector	Select the area for auto luminance control.
Auto Luminance Width [Auto Luminance Region Selector]	Determine width of targeted region for auto luminance control.
Auto Luminance Height [Auto Luminance Region Selector]	Determine height of targeted region for auto luminance control.
Auto Luminance Offset X [Auto Luminance Region Selector]	Determine X offset of targeted region for auto luminance control.
Auto Luminance Offset Y [Auto Luminance Region Selector]	Determine Y offset of targeted region for auto luminance control.
Auto Luminance Weight [Auto Luminance Region Selector]	Weight of the area determined by Auto Luminance Region Selector for auto luminance control.
Auto Luminance Peak	Ratio of peak and average for auto luminance control.
Black Level Selector	Selects which Black Level is controlled by the various Black Level features.
Black Level [Black Level Selector]	Controls the analog black level as an absolute physical value.
Balance Ratio Selector	Selects which Balance ratio to control. (STC-MCS500POE)
Balance Ratio [Balance Ratio Selector]	Controls ratio of the selected color component to a reference color component. (STC-MCS500POE)
Balance White Auto	Controls the mode for automatic white balancing between the color channels. (STC-MCS500POE)
Balance White Auto Region Selector	Select the area for auto white balance. (STC-MCS500POE)
Balance White Auto Width [Balance White Auto Region Selector]	Determine width of targeted region for auto white balance. (STC-MCS500POE)
Balance White Auto Height [Balance White Auto Region Selector]	Determine height of targeted region for auto white balance. (STC-MCS500POE)
Balance White Auto X Offset [Balance White Auto Region Selector]	Determine X offset of targeted region for auto white balance. (STC-MCS500POE)
Balance White Auto Y Offset [Balance White Auto Region Selector]	Determine Y offset of targeted region for auto white balance. (STC-MCS500POE)
Gamma	Controls the gamma correction of pixel intensity.

10.5   LUT Control

Name	Description
LUT Selector	Selects which LUT to control.
LUT Index [LUT Selector]	Control the index (offset) of the coefficient to access in the selected LUT.
LUT Enabled [LUT Selector]	Activates the selected LUT.
LUT Value [LUT Selector]	Returns the Value at entry LUT Index of the LUT selected by LUT Selector.
LUT Value All [LUT Selector]	Accesses all the LUT coefficients in a single access without using individual LUT Index.
Pixel Correction All Enabled	Enable pixel correction for all pixels.
Pixel Correction Index	Determine index of targeted pixel for pixel correction.
Pixel Correction Enabled [Pixel Correction Index]	Determine if targeted pixel is enabled for pixel correction.
Pixel Correction X [Pixel Correction Index]	Determine x-coordinate of targeted pixel for pixel correction.
Pixel Correction Y [Pixel Correction Index]	Determine y-coordinate of targeted pixel for pixel correction.

OMRON

10.6 Digital IO Control

Name	Description
Line Selector	Selects the physical line (or pin) of the external device connector or the virtual line of the Transport Layer to configure.
Line Mode [Line Selector]	Controls if the physical Line is used to Input or Output a signal.
Line Format [Line Selector]	Controls the current electrical format of the selected physical input or output Line.
Line Source [Line Selector]	Selects which internal acquisition or I/O source signal to output on the selected Line.
Line Inverter [Line Selector]	Controls the inversion of the signal of the selected input or output Line.
Line Debounce Time [Line Selector]	Sets the value of the input line debouncer time.
Line Status [Line Selector]	Returns the current status of the selected input or output Line.
Line Status All	Returns the current status of all available Line signals at time of polling in a single bitfield.
Use Output Selector	Selects which bit of the User Output register will be set by User Output Value.
Use Output Value [Use Output Selector]	Sets the value of the bit selected by User Output Selector.

10.7 Logic Block Control

Name	Description
Logic Block Selector	Specifies the Logic Block to configure.
Logic Block Function [Logic Block Selector]	Selects the combinational logic Function of the Logic Block to configure.
Logic Block Input Number [Logic Block Selector]	Specifies the number of active signal inputs of the Logic Block.
Logic Block Input Selector [Logic Block Selector]	Selects the Logic Block's input to configure.
Logic Block Input Source [Logic Block Input Selector] [Logic Block Selector]	Selects the source signal for the input into the Logic Block.
Logic Block Input Inverter [Logic Block Input Selector] [Logic Block Selector]	Selects if the selected Logic Block Input source signal is inverted.

10.8 Software Signal Control

Name	Description
Software Signal Selector	Selects which Software Signal features to control.
Software Signal Pulse [Software Signal Selector]	Generates a pulse signal that can be used as a software trigger.

10.9 Counter And Timer Control

Name	Description
Counter Selector	Selects which Counter to configure.
Counter Event Source [Counter Selector]	Select the events that will be the source to increment the Counter.
Counter Reset Source [Counter Selector]	Selects the signals that will be the source to reset the Counter.
Counter Reset Activation [Counter Selector]	Selects the Activation mode of the Counter Reset Source signal.
Counter Reset [Counter Selector]	Does a software reset of the selected Counter and starts it.
Counter Value [Counter Selector]	Reads or writes the current value of the selected Counter.
Timer Selector	Selects which Timer to configure.
Timer Delay [Timer Selector]	Sets the duration (in microseconds) of the delay to apply at the reception of a trigger before starting the Timer.
Timer Duration [Timer Selector]	Sets the duration (in microseconds) of the Timer pulse.
Timer Trigger Source [Timer Selector]	Selects the source of the trigger to start the Timer.
Timer Trigger Activation [Timer Selector]	Selects the activation mode of the trigger to start the Timer.
Timer Value [Timer Selector]	Reads or writes the current value (in microseconds) of the selected Timer.

OMRON

10.10 Event Control

Name	Description
Event Selector	Selects which Event to signal to the host application.
Event Notification [Event Selector]	Activate or deactivate the notification to the host application of the occurrence of the selected Event.
Event Test Data	Category that contains all the data features related to the Event Test generated using the Test Event Generate command.
Event Action Late Data	Category that contains all the data features related to the Action Late Event.
Event Frame Trigger Data	Category that contains all the data features related to the Frame Trigger Event.
Event Exposure Start Data	Category that contains all the data features related to the Exposure Start Event.
Event Exposure End Data	Category that contains all the data features related to the Exposure End Event.
Event Frame Start Data	Category that contains all the data features related to the Frame Start Event.
Event Frame End Data	Category that contains all the data features related to the Frame End Event.
Event Block Discard Data	Category that contains all the data features related to the Block Discard Event.
Event Line 0 Rising Edge Data	Category that contains all the data features related to the Line0 Rising Edge Event.
Event Line 0 Falling Edge Data	Category that contains all the data features related to the Line0 Falling Edge Event.
Event Line 2 Rising Edge Data	Category that contains all the data features related to the Line2 Rising Edge Event.
Event Line 2 Falling Edge Data	Category that contains all the data features related to the Line2 Falling Edge Event.

10.11 User Set Control

Name	Description
User Set Selector	Selects the feature User Set to load, save or configure.
User Set Load [User Set Selector]	Loads the User Set specified by User Set Selector to the device and makes it active.
Use Set Save [User Set Selector]	Save the User Set specified by User Set Selector to the non-volatile memory of the device.
User Set Default	Selects the feature User Set to load and make active by default when the device is reset.

OMRON

10.12 Chunk Data Control

Name	Description
Chunk Mode Active	Activates the inclusion of Chunk data in the payload of the image.
Chunk Selector	Selects which Chunk to enable or control.
Chunk Enable [Chunk Selector]	Enables the inclusion of the selected Chunk data in the payload of the image.
Chunk Gain Selector	Selects which Gain to return.
Chunk Gain [Chunk Gain Selector]	Returns the gain used to capture the image.
Chunk Exposure Time Selector	Selects which Exposure Time to return.
Chunk Exposure Time [Chunk Exposure Time Selector]	Returns the exposure time used to capture the image.
Chunk Black Level Selector	Selects which Black Level to return.
Chunk Black Level [Chunk Black Level Selector]	Returns the black level used to capture the image included in the payload.
Chunk Line Status All	Returns the status of all the I/O lines at the time of the Frame Start internal event.
Chunk Device Temperature	Indicates the value of the temperature when the image was acquired.

10.13 Action Control

Name	Description
Action Queue Size	Indicates the size of the scheduled action commands queue.
Action Device Key	Provides the device key that allows the device to check the validity of action commands.
Action Selector	Selects to which Action Signal further Action settings apply.
Action Group Key [Action Selector]	Provides the mask that the device will use to validate the action on reception of the action protocol message.
Action Group Mask [Action Selector]	Provides the key that the device will use to validate the action on reception of the action protocol message.

10.14 File Access Control

Name	Description
File Selector	Selects the target file in the device.
File Operation Selector [File Selector]	Selects the target operation for the selected file in the device.
File Operation Execute [File Operation Selector][File Selector]	Executes the operation selected by File Operation Selector on the selected file.
File Open Mode [File Selector]	Selects the access mode in which a file is opened in the device.
File Access Buffer	Defines the intermediate access buffer that allows the exchange of data between the device file storage and the application.
File Access Offset [File Operation Selector] [File Selector]	Controls the Offset of the mapping between the device file storage and the File Access Buffer.
File Access Length [File Operation Selector] [File Selector]	Controls the Length of the mapping between the device file storage and the File Access Buffer
File Operation Status [File Operation Selector] [File Selector]	Represents the file operation execution status.
File Operation Result [File Operation Selector] [File Selector]	Represents the file operation result.
File Size [File Selector]	Represents the size of the selected file in bytes.

10.15 Test Control

Name	Description
Test Pending Ack	Tests the device's pending acknowledge feature.
Test Event Generate	Generates a Test Event.

OMRON

10.16　Transport Layer Control

Name	Description
Payload Size	Provides the number of bytes transferred for each image or chunk on the stream channel.
Ptp Enable	Enable the Precision Time Protocol (PTP).
Ptp Clock Accuracy	Indicate the expected accuracy of the device PTP clock when it is the grandmaster, or in the event it becomes the grandmaster.
Ptp Data Set Latch	Latches the current values from the device's PTP clock data set.
Ptp Status	Returns the latched state of the PTP clock.
Ptp Offset From Master	The latched offset from the PTP master clock in nanoseconds.
Ptp Clock ID	The latched clock ID of the PTP device. PTP Parent Clock ID.
Ptp Parent Clock ID	The latched parent clock ID of the PTP device. The parent clock ID is the clock ID of the current master clock.
Ptp Grandmaster Clock ID	The latched grandmaster clock ID of the PTP device. The grandmaster clock ID is the clock ID of the current grandmaster clock.
Gev Supported Option Selector	Selects the GEV option to interrogate for existing support.
Gev Supported Option [Gev Supported Option Selector]	Returns if the selected GEV option is supported.
Gev Interface Selector	Selects which logical link to control.
Gev MAC Address [Gev Interface Selector]	MAC address of the logical link.
Gev Current IP Configuration LLA [Gev Interface Selector]	Controls whether the Link Local Address IP configuration scheme is activated on the given logical link.
Gev Current IP Configuration DHCP [Gev Interface Selector]	Controls whether the DHCP IP configuration scheme is activated on the given logical link.
Gev Current IP Configuration Persistent IP [Gev Interface Selector]	Controls whether the Persistent IP configuration scheme is activated on the given logical link.
Gev Current IP Address [Gev Interface Selector]	Reports the IP address for the given logical link.
Gev Current Subnet Mask [Gev Interface Selector]	Reports the subnet mask of the given logical link.
Gev Current Default Gateway [Gev Interface Selector]	Reports the default gateway IP address to be used on the given logical link.
Gev IP Configuration Status [Gev Interface Selector]	Reports the current IP configuration status.
Gev Persistent IP Address [Gev Interface Selector]	Controls the Persistent IP address for this logical link.
Gev Persistent Subnet Mask [Gev Interface Selector]	Controls the Persistent subnet mask associated with the Persistent IP address on this logical link.
Gev Persistent Default Gateway [Gev Interface Selector]	Controls the persistent default gateway for this logical link.
Gev GVCP Extended Status Codes Selector	Selects the GigE Vision version to control extended status codes for.
Gev GVCP Extended Status Codes [Gev GVCP Extended Status Codes Selector]	Enables the generation of extended status codes.

OMRON

Name	Description
Gev GVCP Pending Ack	Enables the generation of PENDING_ACK.
Gev Primary Application Switchover Key	Controls the key to use to authenticate primary application switchover requests.
Gev GVCP Expended ID Mode	Enables the extended IDs mode.
Gev CCP	Controls the device access privilege of an application.
Gev Primary Application Socket	Returns the UDP source port of the primary application.
Gev Primary Application IP Address	Returns the address of the primary application.
Gev MCP Host Port	Controls the port to which the device must send messages.
Gev MCDA	Controls the destination IP address for the message channel.
Gev MCTT	Provides the transmission timeout value in milliseconds.
Gev MCRC	Controls the number of retransmissions allowed when a message channel message times out.
Gev MCSP	This feature indicates the source port for the message channel.
Gev Stream Channel Selector	Selects the stream channel to control.
Gev SCP Interface Index [Gev Stream Channel Selector]	Index of the logical link to use.
Gev SCP Host Port [Gev Stream Channel Selector]	Controls the port of the selected channel to which a GVSP transmitter must send data stream or the port from which a GVSP receiver may receive data stream.
Gev SCPS Fire Test Packet [Gev Stream Channel Selector]	Sends a test packet.
Gev SCPS Do Not Fragment [Gev Stream Channel Selector]	The state of this feature is copied into the "do not fragment" bit of IP header of each stream packet.
Gev SCPS Packet Size [Gev Stream Channel Selector]	This GigE Vision specific feature corresponds to DeviceStreamChannelPacketSize and should be kept in sync with it.
Gev SCFTD [Gev Stream Channel Selector]	Controls the delay (in GEV timestamp counter unit) to insert between each packet for this stream channel.
Gev SCPD [Gev Stream Channel Selector]	Controls the delay (in GEV timestamp counter unit) to insert between each frame for this stream channel.
Gev SCDA [Gev Stream Channel Selector]	Controls the destination IP address of the selected stream channel to which a GVSP transmitter must send data stream or the destination IP address from which a GVSP receiver may receive data stream.
Gev SCSP [Gev Stream Channel Selector]	Indicates the source port of the stream channel.

OMRON

11 Revision History

Rev	Date	Changes	Note
ES00	2018/12/12	● New Document	

OMRON

OMRON SENTECH CO., LTD.

9F, Ebina Prime Tower
9-50, Chuo 2 chome
Ebina-city, Kanagawa
243-0432 Japan
TEL 81-46-236-6660 FAX 81-46-236-6661
URL http://www.sentech.co.jp/