

B/W CCD Camera

Model MC-P60

Operation Manual

BEFORE USE - GENERAL SAFETY INSTRUCTIONS

This instruction manual contains important information for the operator (user) and/or people around him/her to avoid personal injury, or property damage to him/her or people around him/her by using this product correctly. Prior to use, read this operation manual carefully to fully understand its instructions for correct use.

OWNER'S RECORD

Please fill in the blank below the model name and product serial number, which is found on bottom chassis of your device. Keep this number for your record.



Model Name _____

Serial No. _____

WARNINGS & CAUTIONS





[Definition of markings]

The meaning of each mark used in this instruction manual is given below.








 DANGER	This mark warns the user that improper use, indicated with this mark, may cause death or severe personal injuries against the user or people around him/her.
 CAUTION	This mark warns the user that improper use, indicated with this mark, may cause personal injuries (*1) or material damages (*2) against the user or people around him/her.

Notes










- *1 : Personal injuries mean wounds, burns, electric shocks, and others for which the person injured need not to be hospitalized nor to be cared for the long term.
- *2 : Material damages mean any direct or consequential damages related to property or material loss.

	This mark indicates what the user SHOULD NOT DO . The details of things which the user should not do are described next to this mark.
	This mark indicates what the user MUST DO . The details of things which the user must do are described next to this mark.
	This mark indicates that the user must be alert against a possible DANGER . The details of the danger which the user must be aware of are described next to this mark.
	This mark indicates that the user are given a CAUTION against possible hazards. The details of the caution which the user must be aware of are described next to this mark.

● Handling Precautions

 DANGER	
 MUST	<p><u>If any overheating sign is observed, discontinue use immediately.</u></p> <p>In the event that smoke, smell, or any other overheating sign is observed, turn its power switch OFF immediately, and remove its camera cable from camera connector. Do NOT try to continue to use your camera. To do so in spite of a clear sign of a malfunction invites a fire, an electric shock hazard, or any other serious damage. In such case, after confirming that there is no risk of a fire accident, contact us or our dealer/distributor through which you purchased this device for repair service. To avoid hazard, do NEVER attempt to repair it yourself.</p>
 MUST	<p><u>If any malfunctioning sign is observed, discontinue use immediately.</u></p> <p>Do NOT try to use this device when it is obviously malfunctioning. (Example: No images on the monitor) In the event of a malfunction, turn its power switch OFF immediately, and remove its camera cable from camera connector. In such case, contact us or our dealer/distributor through which you purchased this device for repair service.</p>
 MUST	<p><u>If any liquid gets into the device, discontinue use immediately.</u></p> <p>In the event that water, or any other type of liquid gets into the body, do NOT try to continue to use the device. To do so invites a fire or an electric shock hazard. In such case, turn its power switch OFF immediately, and then remove its camera cable from camera connector. After that, contact us or our dealer/distributor through which you purchased this device for repair service/technical advice.</p>
 NEVER pull apart	<p><u>Do NOT disassemble this device.</u></p> <p>Do NOT attempt to pull apart, repair, or modify your camera yourself. To do so might lead to a fire or an electric shock accident. Contact us or the dealer/distributor from which you purchased the device for repair/modification.</p>
 DON'T	<p><u>Do NOT supply any power other than specified.</u></p> <p>This device is designed to work only under specified voltage. Do NOT attempt to supply the device with power other than specified. Supplying the device with any unspecified power invites a fire or an electric shock hazard. (MC-P60 --- DC+12V)</p>
 DON'T	<p><u>Do NOT use the camera in a high-humidity environment.</u></p> <p>Do NOT place your camera near a humidifier, or in other high-humidity environment. To do so might cause a fire or an electric shock accident.</p>

● Handling Precautions

 CAUTION	
 CAUTION	<p>If the camera is operated in the electromagnetic field, there may be cases where beat noises (vertical, horizontal, or oblique stripes) appear in the video output. In that case, take preventive measures on the electromagnetic-wave generating source so that your camera do not receive the interference by the electromagnetic-wave. Take extra precautions against electromagnetic-wave-interference if your camera is used with a servomotor, inverter, or other electromagnetic-wave-generating equipment.</p>
 CAUTION	<p>Avoid giving a strong shock against the camera body. It might cause a breakdown or damage. If your camera is used in a system where its camera head is subjected to strong repetitive shocks, its camera head is possible to break down. If you intend to use your camera in such a situation, make sure to use an optional camera-connector-fixing-hardware to connect the connector-plug to the camera body.</p>
 CAUTION	<p>When the camera is not in use, put a lens or a lens-cap onto the camera head so that the image pickup plane of CCD is protected from dust, foreign object, or any other flaw-causing object. If the glass plane (image pickup plane) gets dirty, clean it with a cotton swab. When it needs to be cleaned with a cleaner, be sure NOT to use any organic solvent other than ethyl alcohol. As a countermeasure against condensation, when the camera is moved from a warm condition/environment to a cold one, take appropriate precautions to prevent condensation from forming on the camera.</p>
 CAUTION	<p>Do not pull strongly the camera cable/camera-head nor swing it. The stress from pulling or swinging may cause damage in the coating of the cable, or breaks in the inside wires.</p>
 CAUTION	<p>Avoid short-circuiting signal output. Otherwise, it may cause a malfunction.</p>
 CAUTION	<p>If too much amount of light, (= the incoming light amount of 100 times or greater in comparison with standard light) enters CCD image pickup plane, video output might not be obtained. In such a case, take measures to reduce the amount of incoming light.</p>
 CAUTION	<p>Do NEVER expose its camera head to any intensive light (such as direct sunlight). Otherwise, its inner image pickup device might get damaged.</p>
 CAUTION	<p>When mounting a lens, take extra caution so that the lens is not tilted, nor does flaw exist at the lens-mount-screw part. Also check to confirm that no dirt nor other foreign object is put inside. Improper mounting might cause the parts to become locked.</p>



DANGER



DON'T

Do NOT use any optional unit other than manufacturer-supplied one. [We disclaim any responsibility for damages or losses incurred by user due to the use of unauthorized / unofficial option units supplied by a third-party]

RESTRICTION FOR USE

In the case where a malfunction of this camera (e.g. video output cut-off) can be expected to lead to a significant accident, avoid using this device for such system build-in use.

DISCLAIMER (LIMITED WARRANTY)

We assume no responsibility and shall be held harmless for damage or loss incurred by the user in the following cases.

1. In the case where damage or loss is caused by fire, earthquake, or other acts of Gods, acts by a third party, misuse by the user deliberately or erroneously, or use under extreme operating conditions.
2. In the case where any indirect, additional, consequential damages (e.g. loss of expected interest, suspension of business activities) are incurred as results of a malfunction or non-functioning of this device, we shall be exempted from assuming responsibility for such damages.
3. In the case where damage or loss is caused by incorrect use which is not in line with the instructions given in this operation manual.
4. In the case where damage or loss is caused by a malfunction resulting from bad connection with other equipment.
5. In the case where damage or loss is caused by repair or modification done by the user.

IMPORTANT SAFETY INSTRUCTIONS

This device is designed and guaranteed to work under the temperature range of 0 through 40 degree C. Avoid using the equipment beyond that limits.

Do NOT expose the camera's image-pickup-plane to sunlight or other intense light directly. Its inner CCD (charge-coupled device) might be damaged.

In the event that any abnormal condition is observed, turn the power switch OFF immediately. Do NOT try to continue to use the camera. To do so in spite of clear signs of malfunction invites a fire, an electric shock hazard, or any other serious damage to the camera. In such case, contact us or our dealer/distributor from which you purchased the camera for repair service.

To clean the body of this equipment, make sure to turn the power switch OFF first.

To remove stubborn stains, use a soft cloth soaked in diluted acid-free detergent.

After that, clean with a dry cloth.

In case the image-pickup-plane should be settled with fine dust, dirt, or scratched, ask our distributor for technical advice.

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1. PRODUCT DESCRIPTION

Model MC-P60 is a one-body type B/W CCD camera with a VGA format all-pixel-data readout CCD. This model has twice greater driving frequency of conventional cameras to achieve fast-speed data-processing. The model is suited for high-speed, high-resolution image processing use. Its compact, light-weight body is ideal for system integration.

2. FEATURES

(1) Double-speed scan

This model reads out image-data twice as fast as conventional cameras do.

(2) All pixel's data readout

With its built-in all-pixel-data-readout CCD, this model can read out image-data just in approximately 1/60 sec. A frame-shutter reads out all data even under RTS mode.

(3) High vertical resolution

As all pixel's data are read out even under RTS mode (in 1/60 sec.), images with no deterioration in vertical resolution are obtained.

(4) Square grid pattern CCD

Pixel's in CCD are aligned in square grid pattern. This makes it easier to perform computation correctly for image processing use.

(5) External Sync.

The camera is switched over to external synchronization operation automatically when external HD/VD signal is input.

(6) Random trigger shutter function

With a built-in RTS (Random Trigger Shutter), the camera's CCD starts light-exposure in synchronization with external trigger signals. This function enables the camera to capture fast-moving subjects at constant position for precise image processing.

(7) Restart / Reset

Under the restart / reset mode, this model can capture images at an arbitrary timing cued by external VD signal.

(8) Multiple shutter

With this shutter, this model capture images at an arbitrary timing cued by external trigger signal, and then outputs video at an arbitrary timing cued by external VD signal.

(9) Partial-scan

Under the partial scan mode, only 1/2 or 1/4 screen center portion of image information is read out, resulting in a faster operation.

(10) Ultra-compact & light-weight camera head

The model features its ultra-compact and light-weight camera head, freeing you from your integration-space-problem. In addition, it has an excellent shock and vibration resistance.

3. CONFIGURATION

(1) Camera body 1

4. OPERATION MODE

(1)GAIN selection (Camera rear-panel SW)

Switches sensitivity setting

FIX: Factory-prefixed gain

MANU: Gain is adjustable via the manual gain potentiometer (M.GAIN)

(2)Video output mode selection (Camera rear-panel DIP SW)

Switches video format

1/60: 1/60s ----- Non-interlace mode

(As all pixels are read out in 1/60s, you will get images with the higher V resolution)

1/120: 1/120s ----- 2:1 interlace MIX mode

(As vertical pixels are added in readout, the sensitivity is same as that of 1/60s non-interlace mode during E-shutter OFF. Twice greater sensitivity is obtained under shutter-speed range of 1/200 – 1/20000.)

(3)TRIG selection

Switches TRIG input signal polarity used under RTS mode

POSI Positive polarity (rising edge detection)

NEGA Negative polarity (falling edge detection)

(4)RTS (Random Trigger Shutter) exposure selection

Switches light exposure mode under RTS mode

FIX mode Rear DIP SW

Exposure-time control via rear-panel DIP switch

PULSE W mode TRIG signal pulse width control

Exposure-time control via TRIG signal pulse width

(5)Shutter mode selection (Camera rear-panel DIP SW or TRIG signal IN [Automatic])

Switches shutter mode

(5-1) NOR mode Normal electronic shutter

Exposure control via internal sync signal

----- High-speed shutter: From 1/20,000s through OFF (8 position)

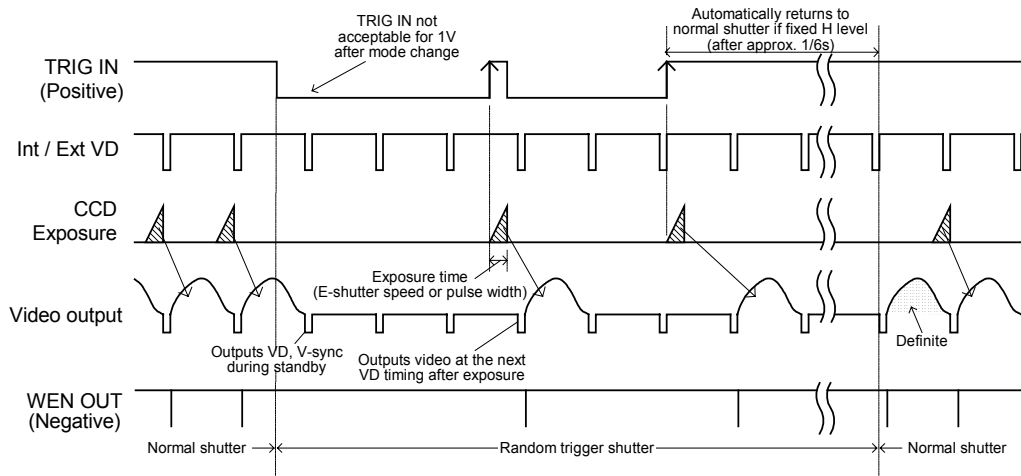
(5-2) RDM mode Random trigger shutter

Exposure control via ex-trigger or ex sync input

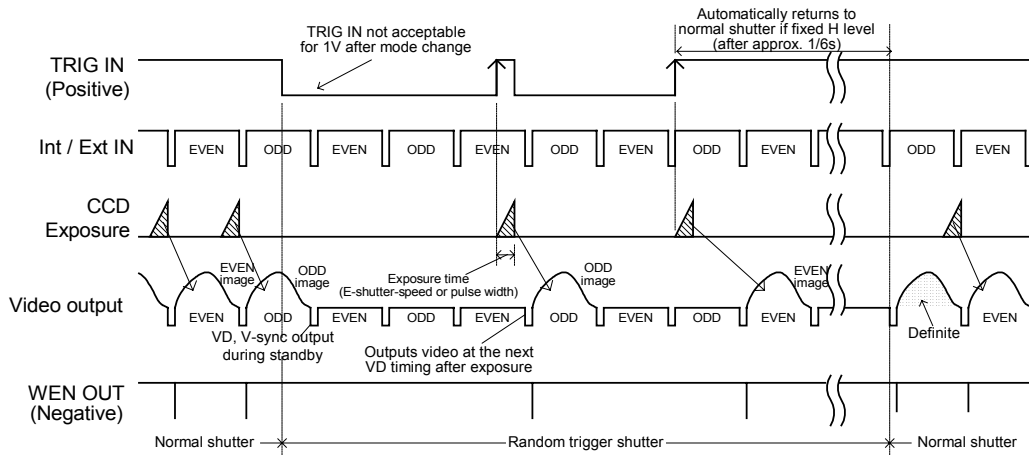
Timing charts are shown below. (TRIG timing: Positive)
 Notes: * RDM selection is automatic with TRIG status
 ** Neither under FIX nor PULSE W mode, RTS doesn't work
 if E-shutter speed SW is set in OFF position.

(a) Non-reset mode (Under internal-sync / external-sync --- Consecutive VD IN)
 Exposure starts at the timing of TRIG signal IN. After each exposure is completed, the camera outputs video at each next VD IN timing.

(1/60s Non-interlace)

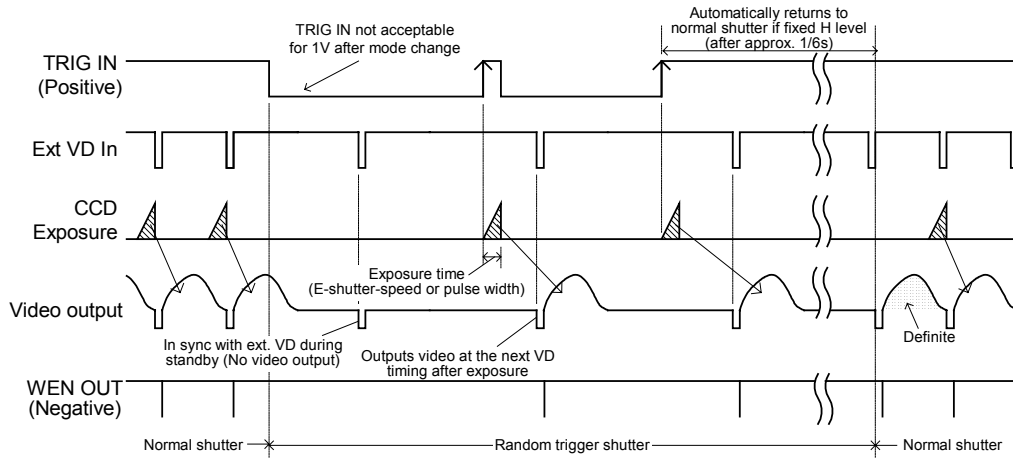


(1/120s 2:1 Interlace)



(b) Non-reset mode (Under external sync --- Single VD IN)
 After TRIG IN and exposure, the camera goes into standby until next external VD IN.

(1/60s Non-interlace)

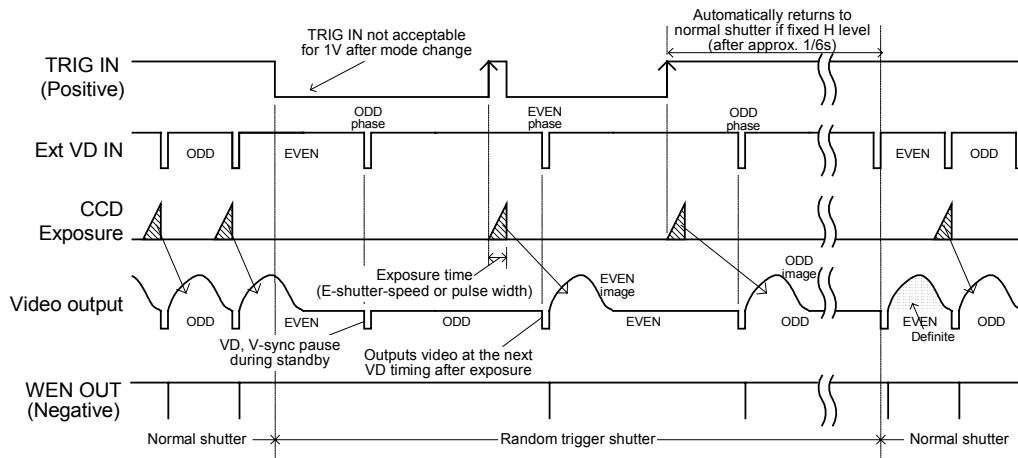


*Don't provide external VD IN during exposure.

** After automatic return, fix ex-VD IN at Hi.

(1/120s 2:1 Interlace)

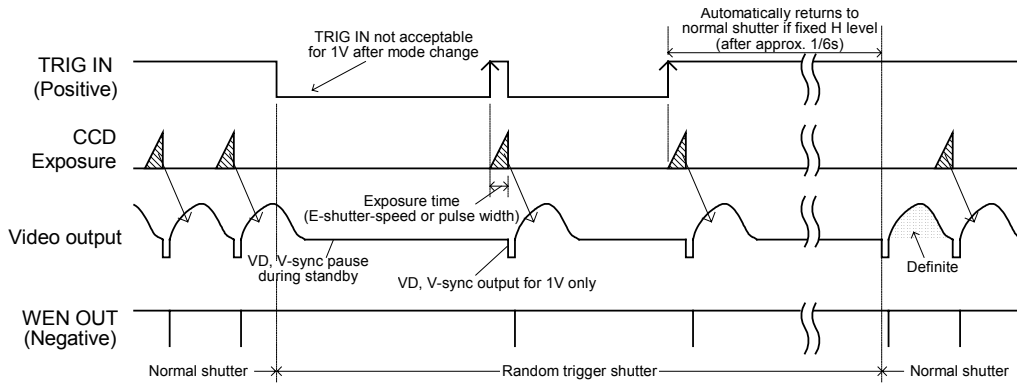
Video output field (ODD/EVEN) is determined by ex-VD falling edge and ex-HD phase.



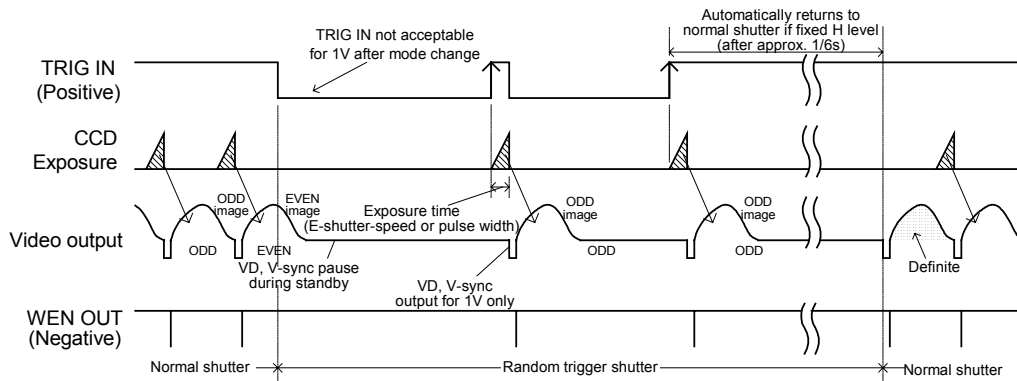
*Don't provide external VD IN during exposure.

** After automatic return, fix ex-VD IN at Hi.

(c)V-reset mode (Under internal-sync / external-sync --- No VD IN)
 Exposure starts at the timing of TRIG signal IN. After each exposure is completed, the camera outputs video immediately by resetting VD. (HD is not reset)
 (1/60s Non-interlace)



(1/120s 2:1 Interlace)
 Irrespective of TRIG IN phase, the camera always outputs ODD field image.

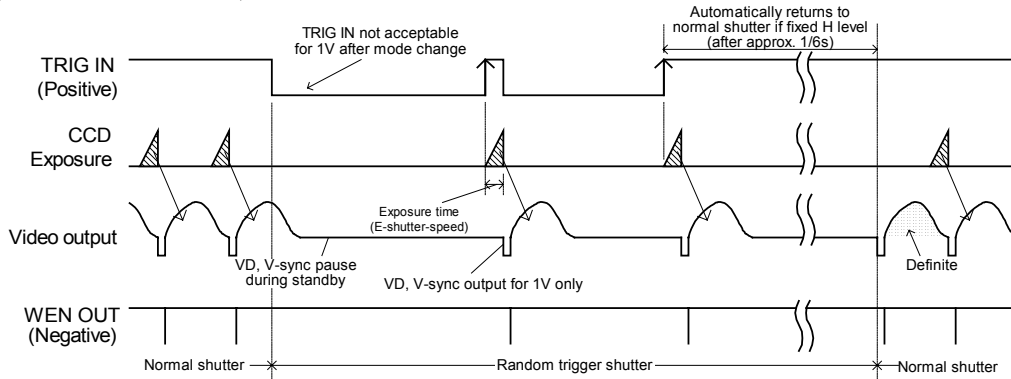


(d) SYNC reset mode (Under internal sync)

Exposure starts at TRIG signal input timing, resets HD, and outputs video immediately after exposure by resetting VD.

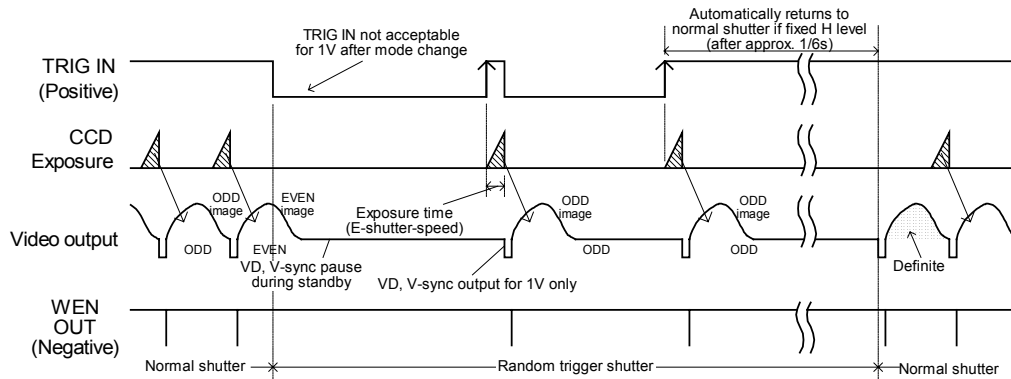
* Available under FIX mode only.

(1/60s Non-interlace)



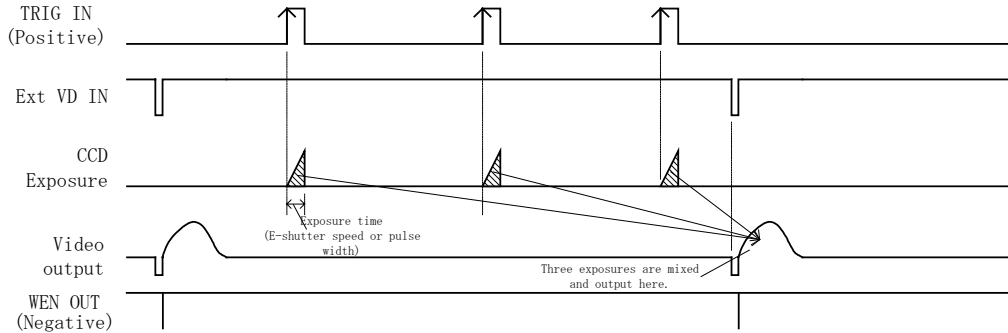
(1/120s 2:1 Interlace)

Irrespective of TRIG IN phase, the camera always outputs ODD field image.



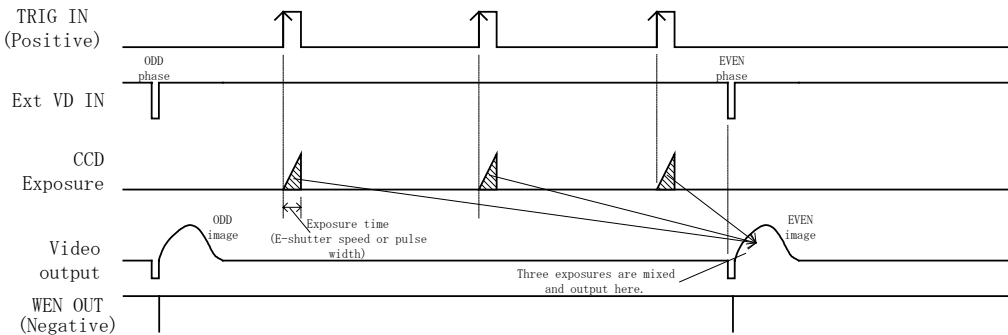
(5-3) MULTIPLE mode Multiple shutter operation is available by providing TRIG IN more than one time before external VD IN. (Non-reset mode, single VD, consecutive VD IN)

(1/60s Non-interlace)



(1/120s 2:1 Interlace)

Video output field (ODD/EVEN) is determined by ex-VD falling edge and ex-HD phase.

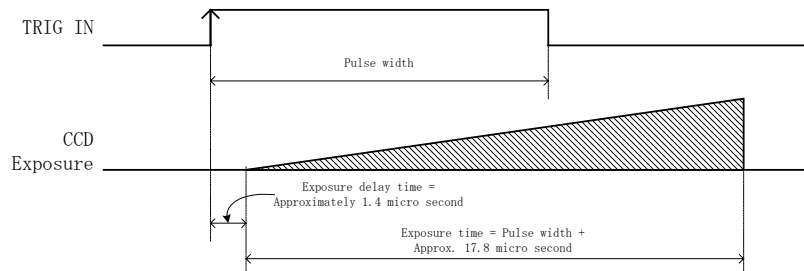


■ Exposure time delay under RTS

When the RTS is active, both in FIX mode and PULSE W mode, there is a time delay of approximately 1.4 micro second until the start of exposure after the rising edge of TRIG IN signal (positive).

■ Exposure time under pulse width mode

Under RTS pulse mode, the exposure time is determined by the pulse width. More exactly, the actual time is the pulse width plus approximately 17.8 micro second.



(5-4) Restart / Reset

The restart / reset function is available with the external VD signal. You can get an arbitrary slower shutter speed than normal shutter and random trigger shutter.

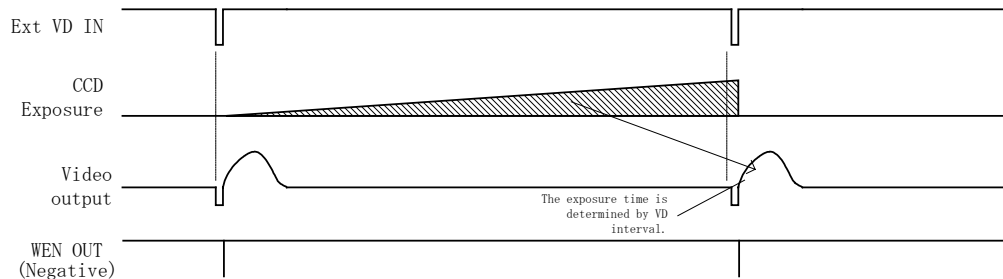
Here are some notes;

* The shutter speed (exposure time) is determined by external VD signal interval.

** This function is enabled when the rear-panel shutter speed DIP SW is OFF.

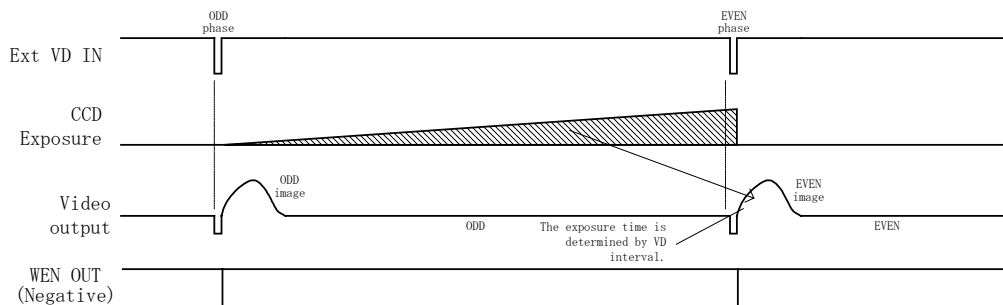
*** Supply consecutive VD.

(1/60s Non-interlace)



(1/120s 2:1 Interlace)

Video output field (ODD/EVEN) is determined by ex-VD falling edge and ex-HD phase.



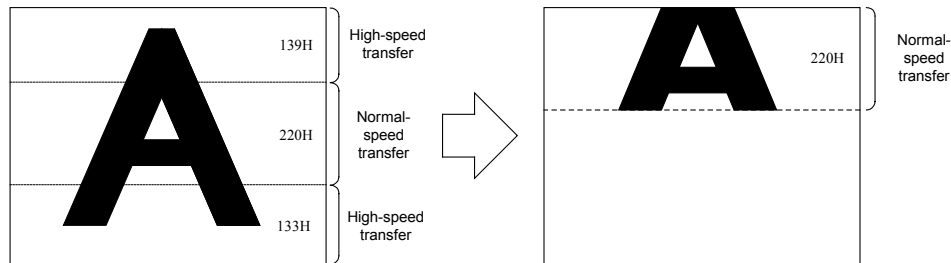
(6) Partial-scan mode selection (Camera rear-panel DIP SW)

Switches partial-scan mode

Note: Sometimes phenomenon called as “whiteout” occurs at the top of the screen when there is strong incident light entering in the wide area of a CCD, however, this is not a malfunction. If this occurs, reduce the amount of incoming rays.

(6-1) 1/2 Partial-scan (Rear-panel SW: 7-OFF, 8-ON) --- Screen center 1/2 readout (1/60s Non-interlace)

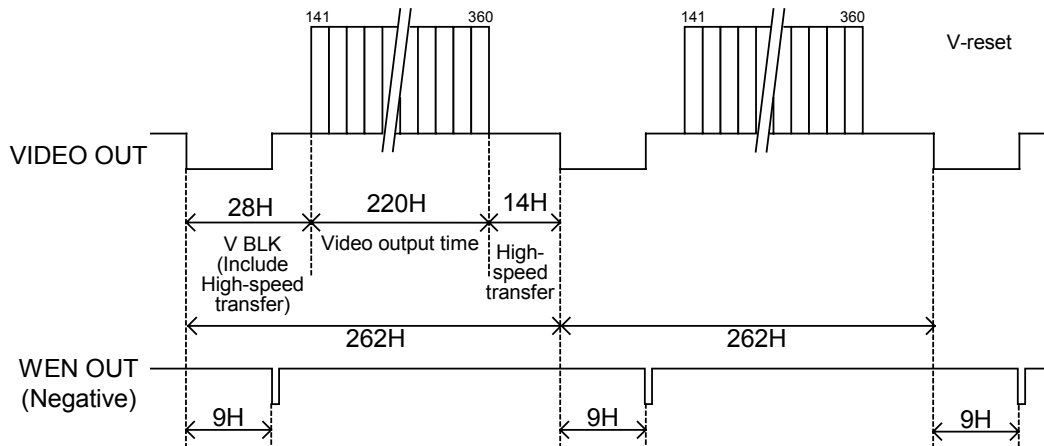
Under 1/60s non-interlace mode, only the center portion of 220H out of the total effective lines 492H (excluding BLK time) is read out. Available both under external / internal mode.



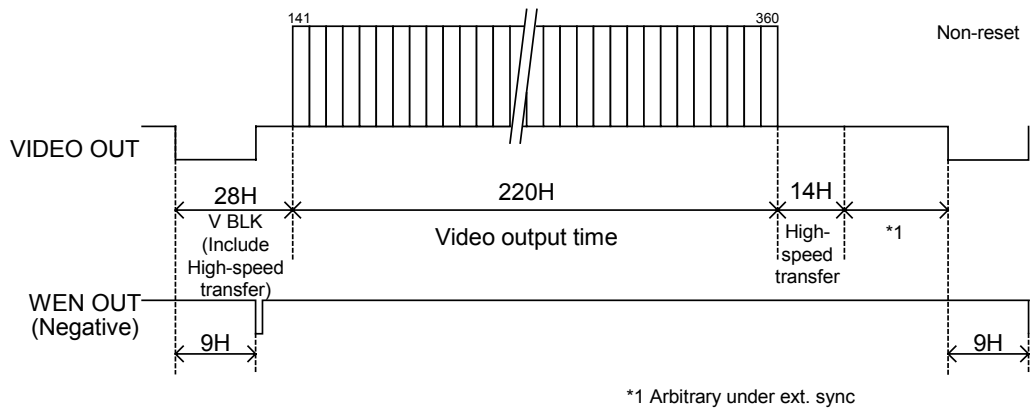
Under normal shutter (Electronic shutter OFF)

Notes: * Under ex-sync, the external VD should be 1V = 262H.

** Under normal shutter, set the rear-panel DIP SW #5, #6 in OFF.



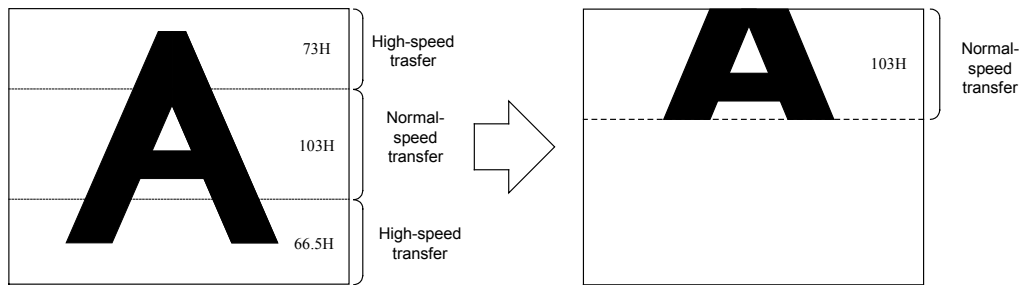
Under other shutter modes



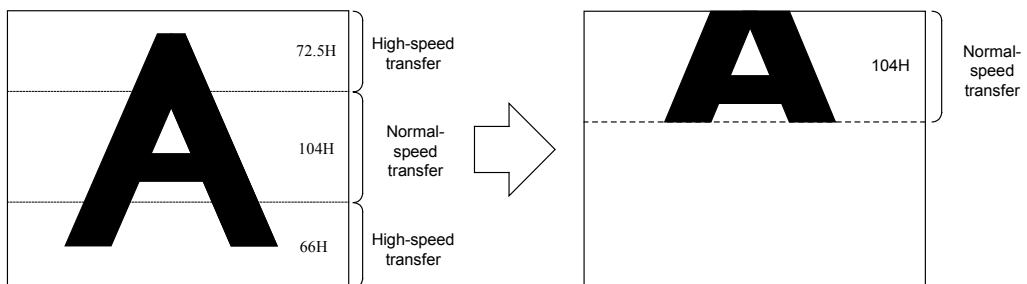
(1/120s 2:1 Interlace)

Under 1/120s interlace mode, only the center portion of 207H out of the total effective lines 485H (excluding BLK time) is read out. Available both under external / internal mode.

ODD Field



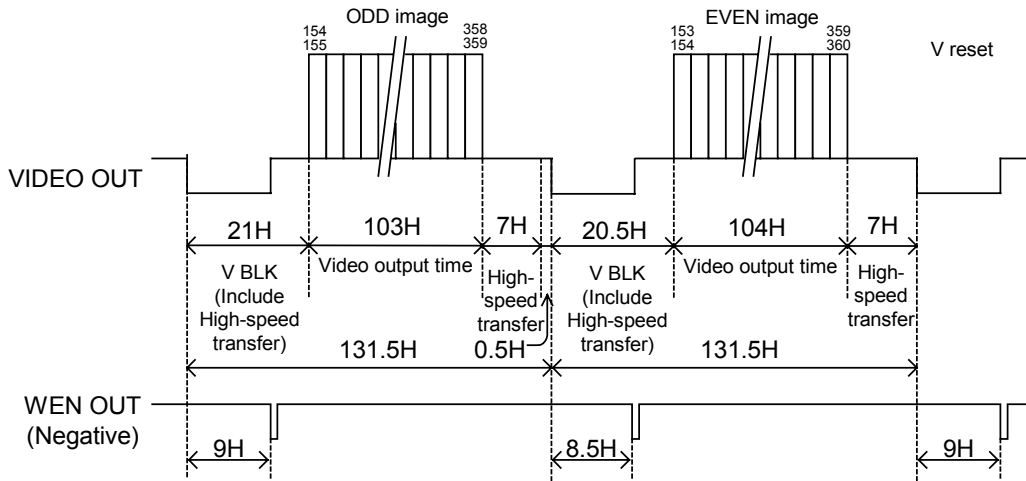
EVEN Field



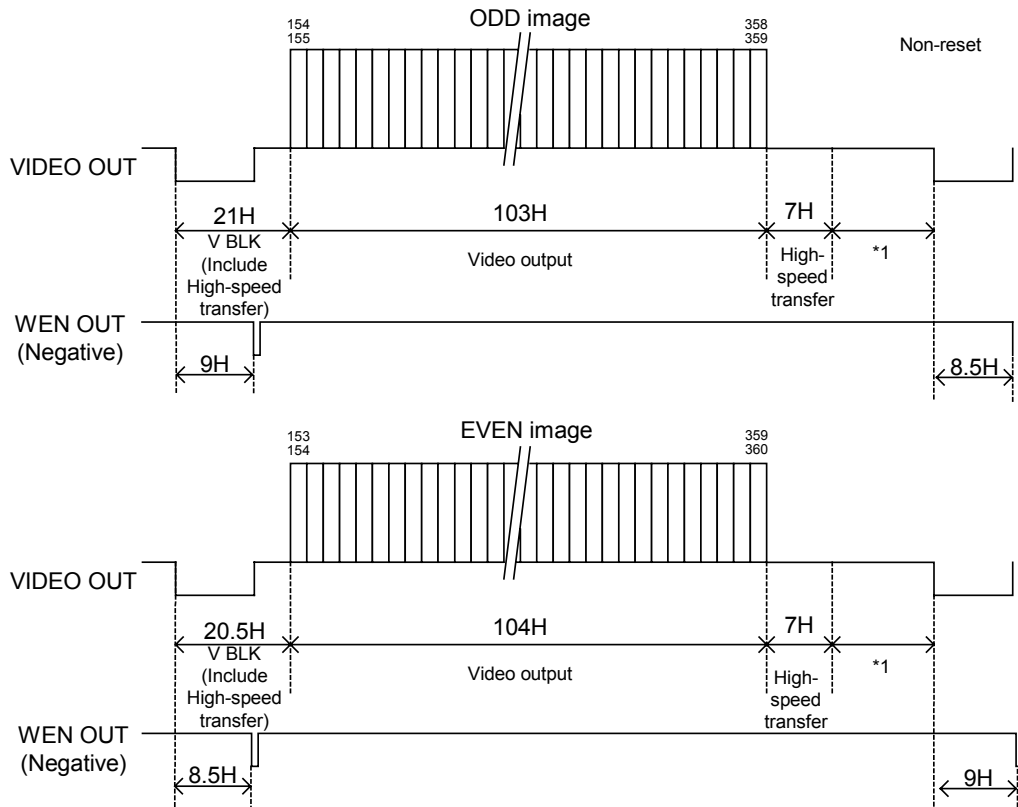
Under normal shutter (Electronic shutter OFF)

Notes: * Under ex-sync, the external VD should be $1V = 131.5H$.

** Under normal shutter, set the rear-panel DIP SW #5, #6 in OFF.



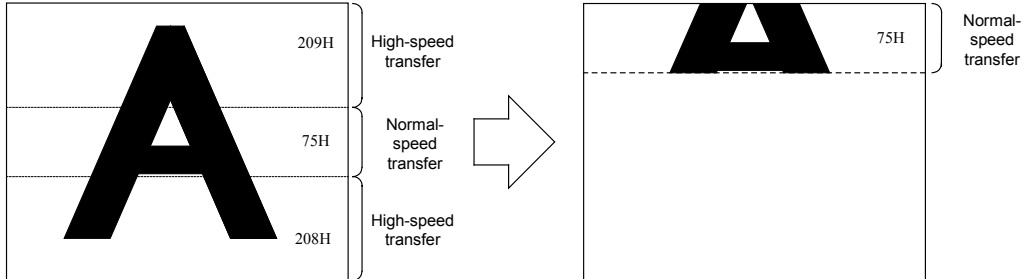
Under other shutter modes



*1 Arbitrary under ext. sync

(6-2)1/4 Partial-scan (Rear-panel SW: 7-ON, 8-ON) --- Screen center 1/4 readout
(1/60s Non-interlace)

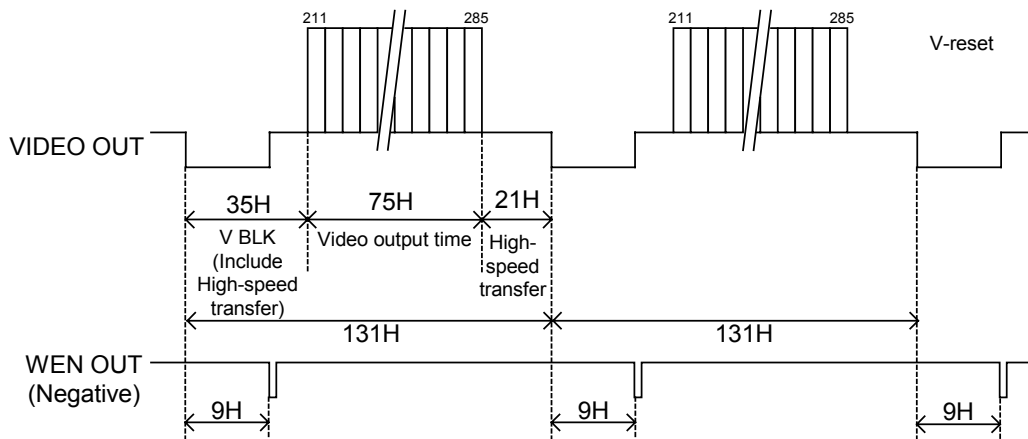
Under 1/60s non-interlace mode, only the center portion of 75H out of the total effective lines 492H (excluding BLK time) is read out. Available both under external / internal mode.



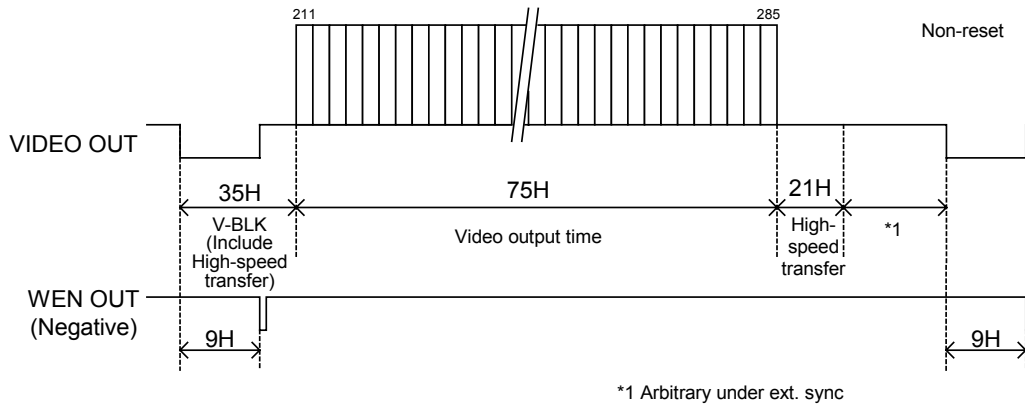
Under normal shutter (Electronic shutter OFF)

Notes: * Under ex-sync, the external VD should be $1V = 131H$.

** Under normal shutter, set the rear-panel DIP SW #5, #6 in OFF.



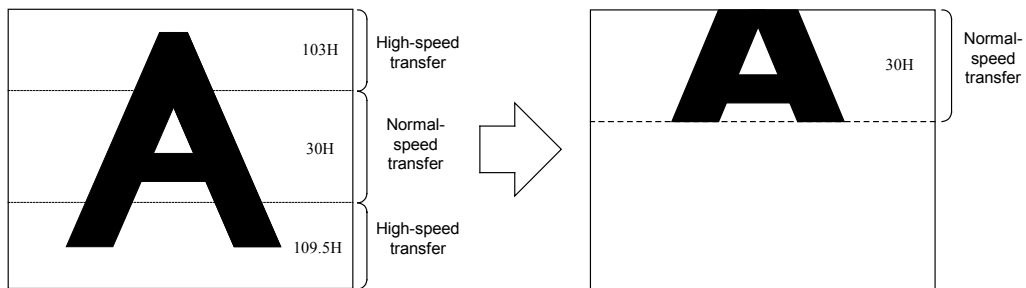
Under other shutter modes



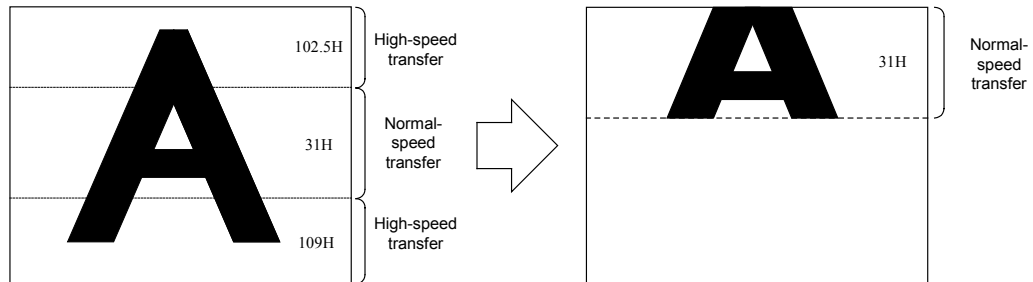
(1/120s 2:1 Interlace)

Under 1/120s interlace mode, only the center portion of 61H out of the total effective lines 485H (excluding BLK time) is read out. Available both under external / internal mode.

ODD Field



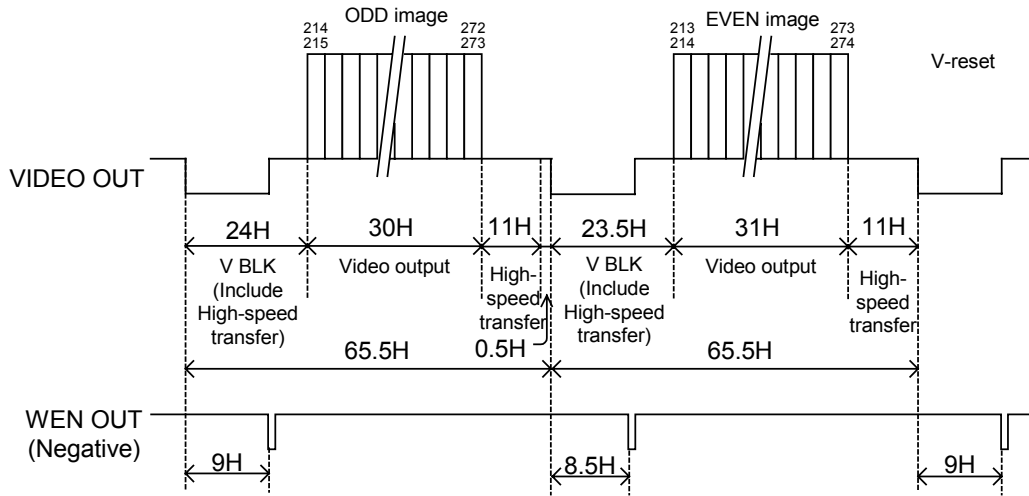
EVEN Field



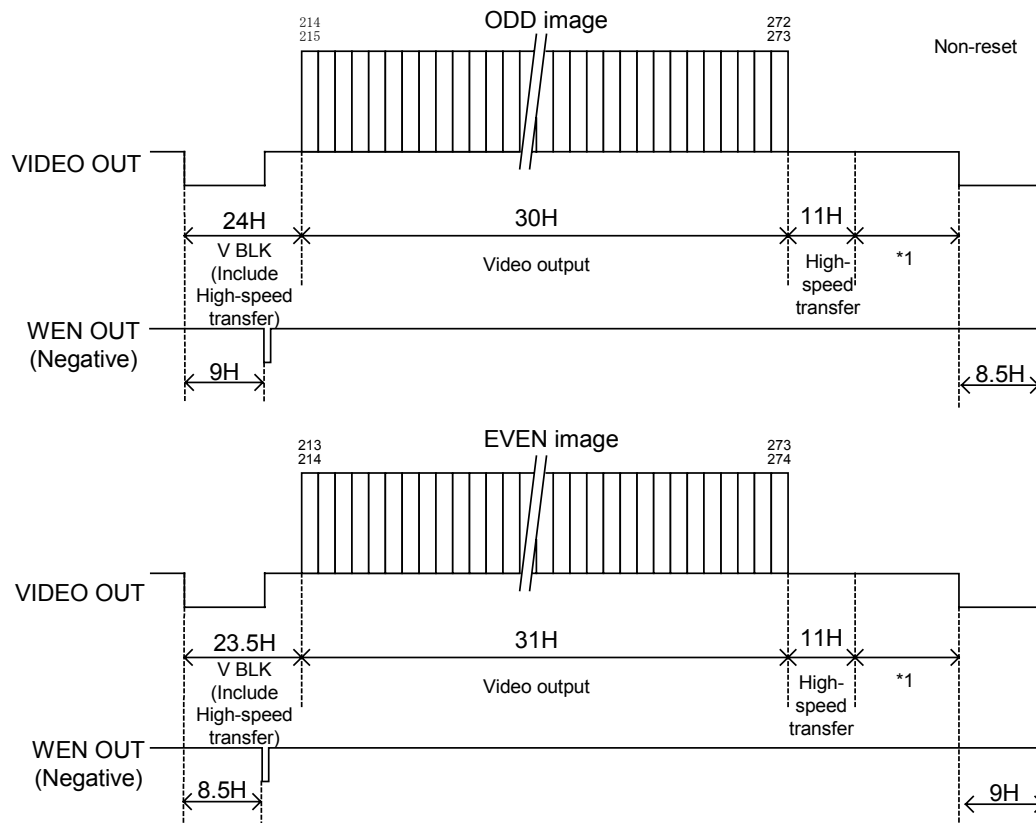
Under normal shutter (Electronic shutter OFF)

Notes: * Under ex-sync, the external VD should be $1V = 65.5H$.

** Under normal shutter, set the rear-panel DIP SW #5, #6 in OFF.



Under other shutter modes



*1 Arbitrary under ext. sync

5. SPECIFICATIONS

Model	MC-P60
[Basic spec]	
Image sensor	All Pixel's Data Read-out Interline CCD
Optical size	1/3 Type (= Equivalent to 1/3" image pickup tube)
Total pixels	692(H) x 504(V)
Active pixel	659(H) x 494(V)
Video output pixels	648(H) x 492(V) (Under non-interlace)
Scanning area	4.88(H) x 3.66(V) mm (= Equivalent to 1/3" image pickup tube)
Unit cell size	7.4(H) x 7.4(V) micro m (Square-grid array)
Scanning lines	525 lines
Interlace	1/120s 2:1 Interlace mode
	1/60s Non-interlace mode
	Switching via rear-panel DIP SW
Sync system	Internal/External automatic switch-over
Aspect ratio	4:3
Video output	VS 1.0V(p-p) / 75-ohm, DC coupled, 1 line
Resolution	485 TV lines(H) 485 lines (350 TV lines)(V)
S/N	Standard: 50dB(p-p)/rms (Initial factory setting)
Illumination	Standard 400 lx (F5.6) Minimum 4 lx (F1.4) (GAIN MAX, Approx. 50% video output)
Gain	FIX (Fixed) gain: Factory-shipped preset level MANU (Manual) gain: Setting through GAIN VR FIX / MANU switching via rear-panel DIP SW
Gamma correction	Gamma = 1 (Fixed)
White-clip level	Approx. 840mV(p-p) (Excluding SYNC)
Power source	DC12V plus/minus 10 percent Ripple voltage: 50mV(p-p) or less
Power consumption	Approx. 1.7W
[Internal sync spec]	
Base clock frequency	24.545MHz (1CLK) plus/minus 200ppm
H sync frequency	31.468kHz (1H = 780CLK)
V sync frequency	59.94Hz (Under non-interlace) 119.88Hz (Under 2:1 interlace)
[External sync spec]	
Ex-sync. input signal	HD/VD
Input level	2~4V (p-p)/10k-ohm
Input impedance	75-ohm / High impedance (switching via rear-panel SW) (Initial factory setting: High)
Interlace	1/60s non-interlace or 1/120s 2:1 interlace
Polarity	Negative

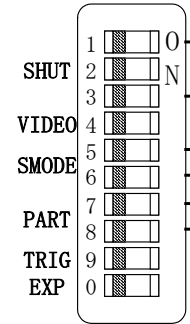
Pulse width	HD: 3.2 plus/minus 1 micro s (LOW) VD: From 125 through 400 micro s (LOW)																																		
Repeating frequency	fH = 31.468kHz plus/minus 1 percent fV = fH/262.5 or fH/525																																		
Phase difference	HD/VD: 0 plus/minus 5.0 micro s, 1/FH/2 plus/minus 5.0 micro s																																		
[Shutter trigger spec]	Exposure-starting-cue signal in random trigger shutter mode																																		
Input level	LOW level: 0~0.5V(p-p) HIGH level: 4~5V(p-p)																																		
Input impedance	High impedance (10k-ohm)																																		
Capture timing	Rising edge detection (Positive) / Falling edge detection (Negative) (Switching via rear-panel DIP SW) (Initial factory setting: Rising edge)																																		
Pulse width	Minimum 2 micro s Maximum 1/8s																																		
[Sync signal spec]	WEN readout timing pulse																																		
Polarity	Negative																																		
Pulse width	1H output																																		
[E-shutter spec]																																			
(1)Normal shutter	Shutter-speed setting via rear-panel SW (Initial: OFF) Selection among 3 scales (= OFF, 1/200s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/8000s, 1/20000s)																																		
(2)RTS																																			
(a)Operation mode																																			
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	*RTS shutter mode automatically switches over through TRIG IN **RTS disabled under E-shutter OFF																																		

(b)Multiple shutter	Multiple shutter via external trigger signal and external VD signal *Operation like No.3, 6 above																										
(3)Restart / Reset	Restart / reset available via external VD signal (Switching via rear panel DIP SW, Initial OFF) Notes: *The exposure-time (shutter-speed) is determined by external VD interval. **Enabled when rear-panel DIP SW OFF. ***Provide Consecutive HD.																										
[Mechanical spec]																											
External dimension	29 x 29 x 39.5(D)mm (Not including protrusion) Refer to the attached ex-view drawing																										
Weight	Approximately 50g																										
Lens mount	C mount																										
GND / insulation	Circuit GND ~ Chassis electrically conducted																										
[Ambient condition]																											
	Performance guaranteed: Temperature: From 0 through 40 degree C Humidity: From 30 through 90 percent (No condensing) Operation guaranteed: Temperature: From -5 through 50 degree C Humidity: From 10 through 90 percent (No condensing) Storage: Temperature: From -20 through 60 degree C Humidity: From 10 through 90 percent (No condensing)																										
EMI	Conforms to EN50081-2																										
[Connector pin assignment]																											
Compatible connector	HR10A-10P-12S (Supplied by HIROSE ELEC.)																										
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[Switch setting]

(1)CCU rear-panel DIP SW

No.	Function	OFF	ON
1	E-shutter-speed (SHUT)	See shutter-speed table (Table 1)	
2			
3			
4	Video output mode (VIDEO)	1/60s non-interlace	1/120s interlace
5	Shutter mode	See shutter-mode table (Table 3)	
6			
7	Partial scan (PART)	See partial-scan table (Table 2)	
8			
9	TRIG polarity (TRIG)	Positive (Rising edge)	Negative (Falling edge)
10	RTS Exposure (EXP)	FIX mode	PULSE mode



*Initial factory setting: All OFF

**Set No.9 OFF when TRIG IN OPEN.

(Table 1) E-shutter-speed

Shutter-	No.1	No.2	No.3
OFF	OFF	OFF	OFF
1/200s	ON	OFF	OFF
1/500s	OFF	ON	OFF
1/1000s	ON	ON	OFF
1/2000s	OFF	OFF	ON
1/4000s	ON	OFF	ON
1/8000s	OFF	ON	ON
1/20000s	ON	ON	ON

*Don't set E-shutter-speed in OFF under RTS mode.

(Table 2) Partial-scan

Partial scan	No.7	No.8
OFF	OFF	OFF
Not acceptable	ON	OFF
1/2 partial	OFF	ON
1/4 partial	ON	ON

(Table 3) Shutter-mode

Shutter mode		No.5	No.6	SYNC		
Random trigger	V reset	OFF	OFF	Internal sync		
	SYNC reset	ON	OFF			
	Non-reset	OFF	ON			
Not acceptable		ON	ON	Ex-sync HD IN		
Random trigger	Non-reset (Multiple shutter)	OFF	OFF			Single VD
	Non-reset	ON	OFF			Consecutive VD
	V-reset	OFF	ON			No VD
Restart / Reset		ON	ON	Single VD		

*Under normal shutter mode partial-scan, set No.5, 6 in OFF.

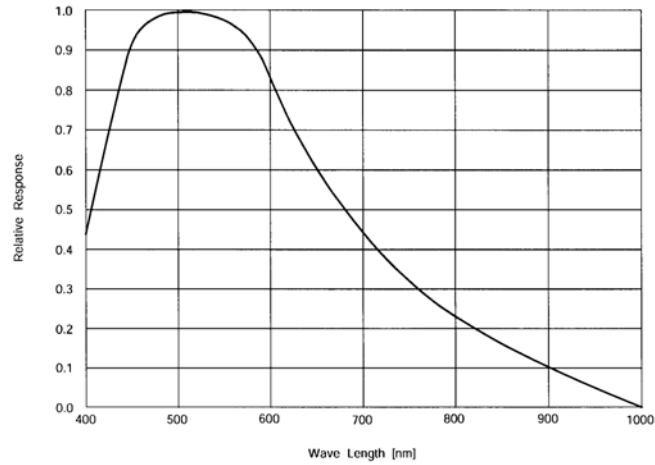
**Under PULSE W mode, SYNC reset is disabled.

(2)CCU rear-panel SW

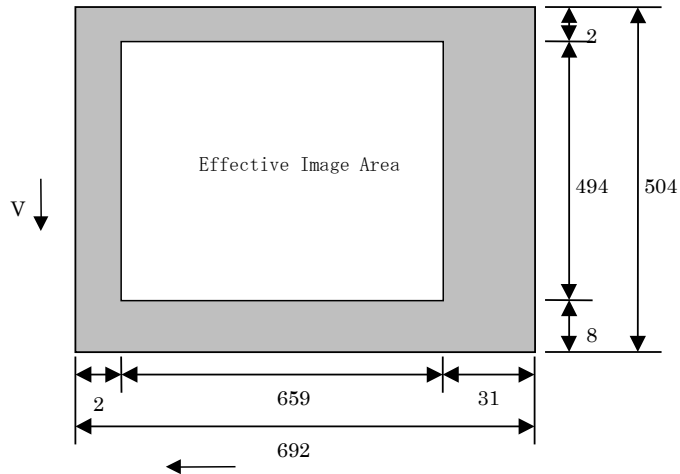
Function	SW	Selected Function
Ex-SYNC IN impedance (HD / VD)	HIGH	High impedance (Initial factory setting)
	75-ohm	75-ohm
GAIN selection (GAIN)	F	Factory-set GAIN Manual GAIN
	M	adjustable via GAIN

[Relative Spectrum Response]

*Including lens characteristics, Excluding light source characteristics



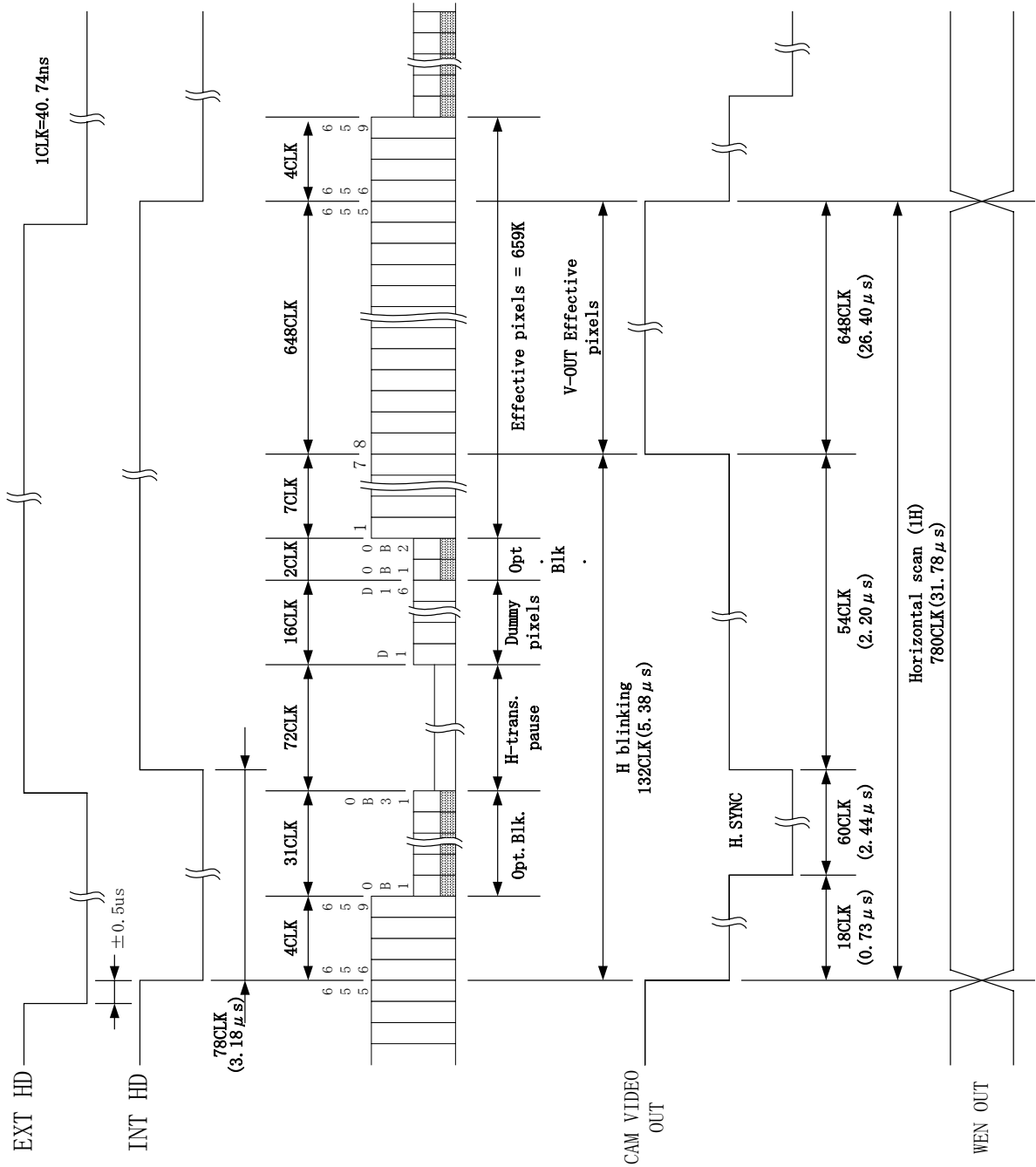
[Optical black characteristics]



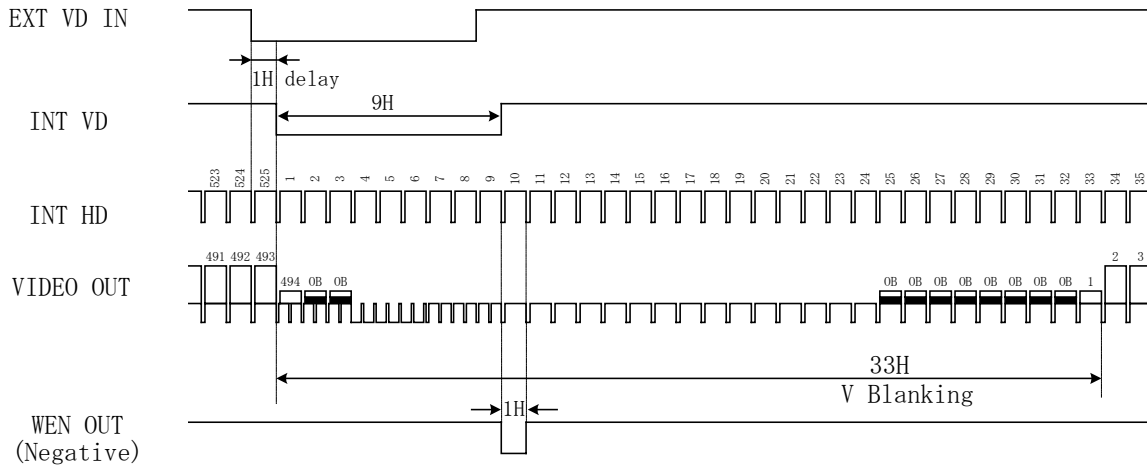
Total pixels: 692(H) x 504(V)
 Effective pixels: 659(H) x 494(V)
 Optical black
 Horizontal: 2 pixels --- 31 pixels
 Vertical: 8 pixels --- 2 pixels

6. TIMING CHART

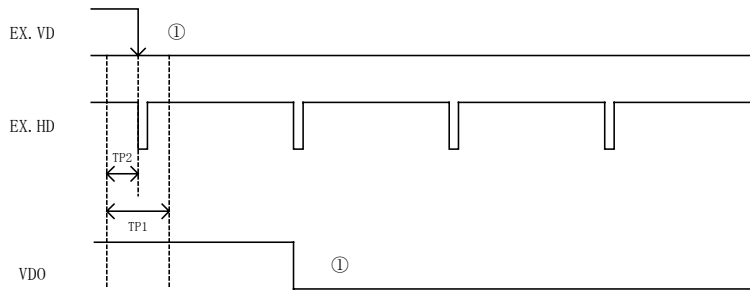
(1)H rate timing



(1/60s Non-interlace mode)



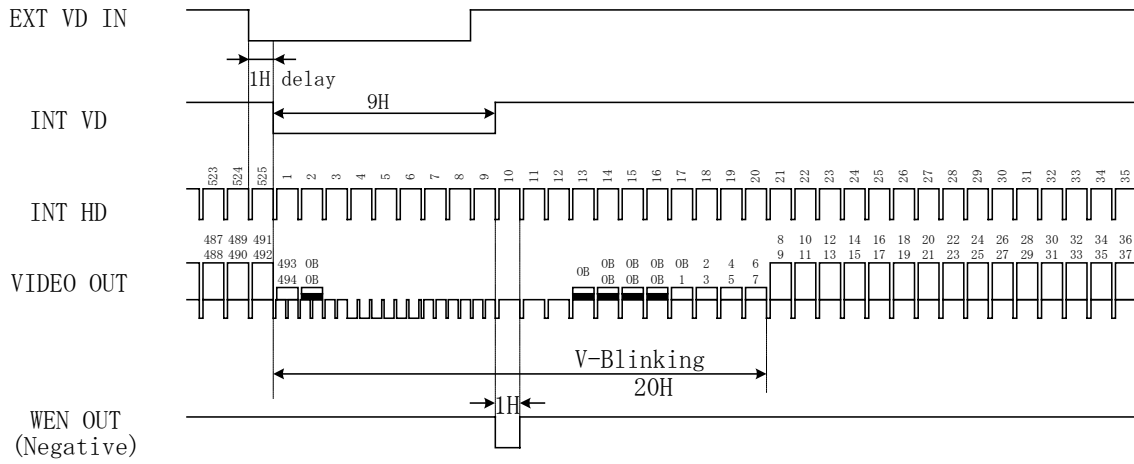
EXVD - EXHD phase difference



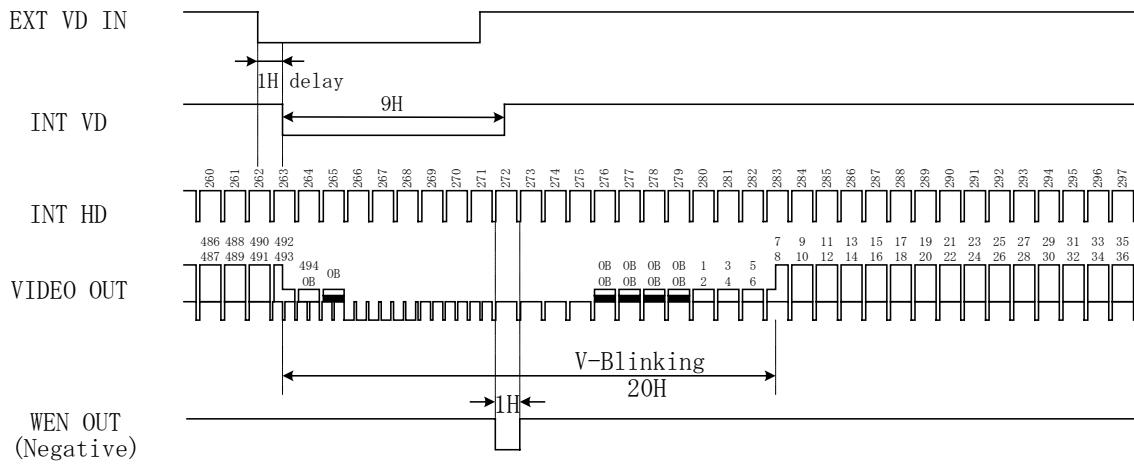
TP1 : 10.0 us
 TP2 : 5.0 us

(1/120s 2:1 Interlace mode)

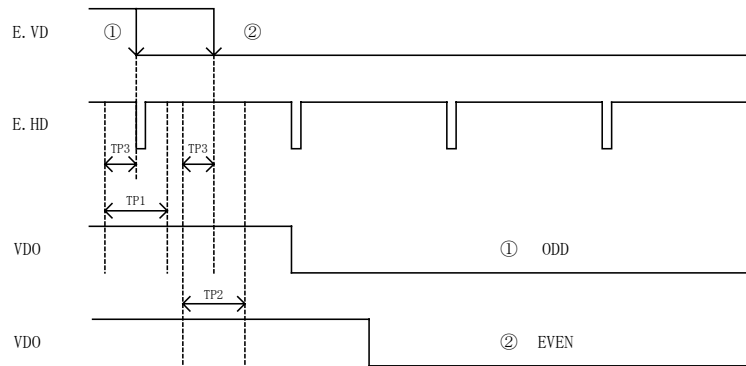
ODD (1st field)



EVEN (2nd field)



EXVD - EXHD phase difference

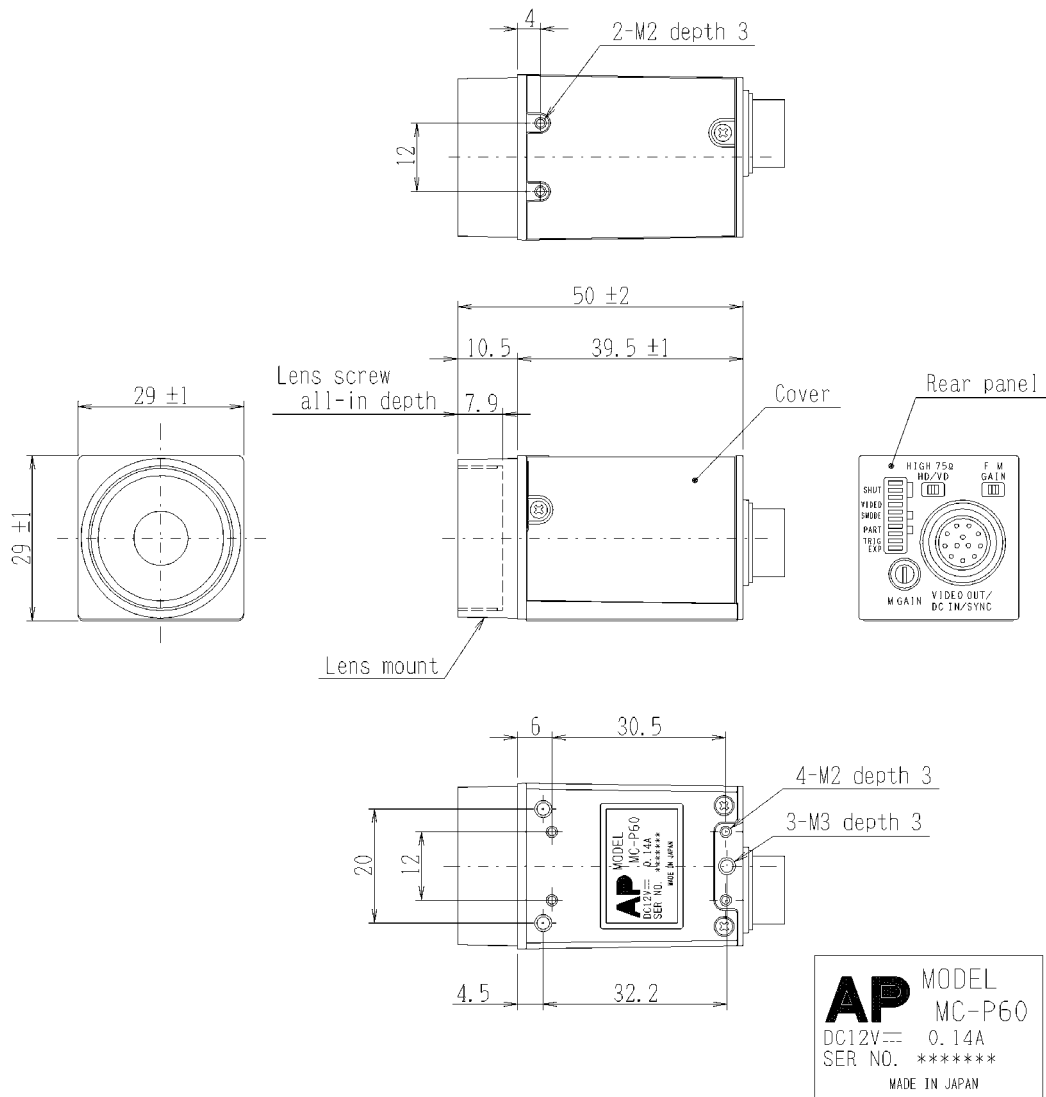


TP1 : ODD reset range 10.0 us

TP2 : EVEN reset range 10.0 us

TP3 : 5.0 ns

7. EXTERNAL-VIEW DRAWING



Specification

Material	Lens-mount, Rear panel	: Aluminum die-cast
	Cover	: Anticorrosion aluminum alloy
Processing	Lens-mount, Rear panel	: Cation coating
	Cover	: Leather satin coating

Name plate detail