

XC-7500 XC-8500CE CMA-87

Component/OEM



XC-7500
1/2" IT CCD
659(H) X 494(V),EIA

XC-8500CE
1/2" IT CCD
782(H) X 582(V), CCIR

CMA-87

OUTLINE

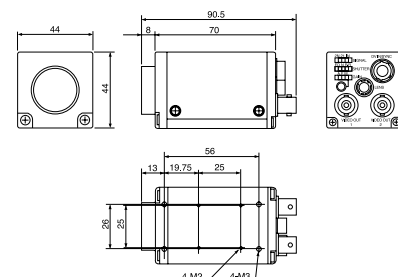
The XC-7500/XC-8500CE is a frame shutter camera that mounts a newly developed CCD. Square grid cells most suitable for a machine vision are used for this CCD that enables all pixels to be read. The resolution is equal in the vertical and horizontal directions. Therefore, it is not required to correct the dimension on the image processing side. The XC-7500 conforms to an EIA system of 659 (H) × 494 (V), and the XC-8500CE conforms to a higher-resolution CCIR system of 782 (H) × 582 (V). The XC-7500 and XC-8500CE enable a trigger frame shutter (E-DONPISHA) control function, signal format conversion function, and high-rate scanning function when they are connected with an optional memory adaptor (CMA-87). Moreover, the still pictures of various high-speed movable objects can be read at a high resolution (in the horizontal and vertical directions).

FEATURES

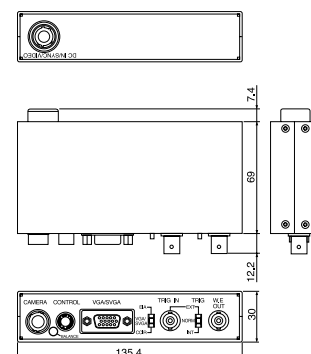
- XC-7500/XC-8500CE
- 1/2" Hyper HAD IT CCD
 - Square Pixels 9.9 × 9.9μm(XC-7500), 8.3 × 8.3μm(XC-8500CE)
 - Frame Shutter
 - Normal : 1/60 to 1/10,000sec., 1/50 to 1/10,000sec., Flickerless
 - E-DONPISHA :
 - Low-Speed : ∞ to approx.1/60sec., ∞ to approx.1/50sec.
 - Normal-Speed : 1/1,000 to 1/11,000sec., 1/1,000 to 1/10,000sec.
 - High-Speed : 1/10,000 to 1/100,000sec.
 - External Control : ∞ to 1/60 to 1/10,000sec., ∞ to 1/50 to 1/10,000sec.
 - Three Mode Outputs
 - Interlace(1/60sec., 1/50sec.)-2I mode
 - Non interlace(1/60sec., 1/50sec.)-2N mode
 - Non interlace(1/30sec., 1/25sec.)-1N mode
 - Restart Reset Function (Trigger Input)
- CMA-87
- E-DONPISHA (Frame Shutter) Control
 - Signal format conversion EIA/CCIR, VGA/SVGA
 - High-Rate scan-Up to 4

DIMENSIONS

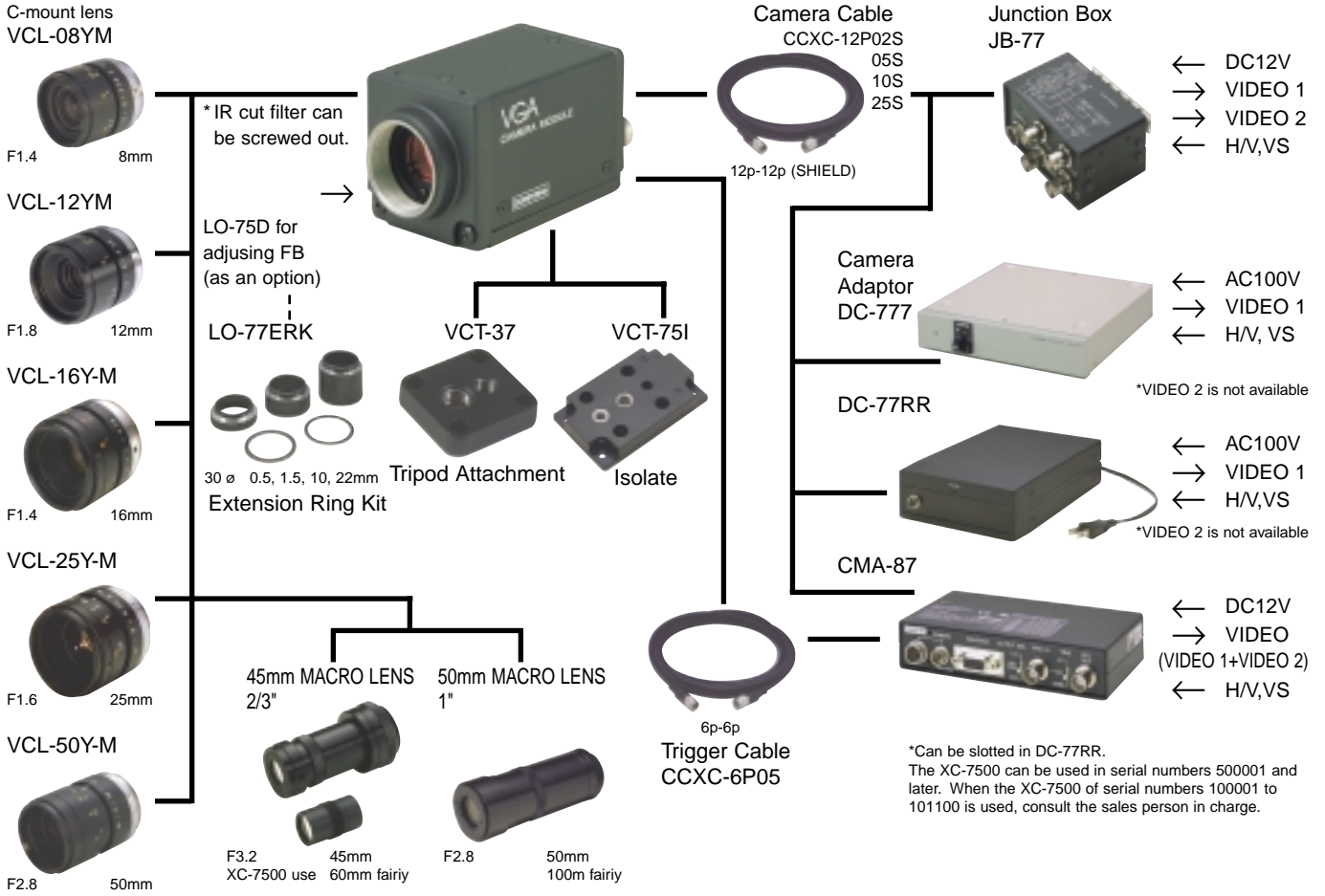
XC-7500/8500CE



CMA-87



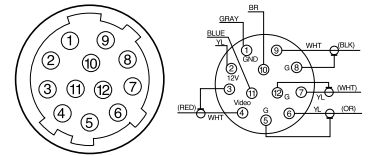
CONNECTIONS



REAR SWITCHES&CONNECTORS

12P MULTI							
Pin No.	EXTERNAL SYNC MODE		INTERNAL SYNC MODE	Pin No.	EXTERNAL SYNC MODE		INTERNAL SYNC MODE
	HD/VD	VS			HD/VD	VS	
1	GND	GND	GND	7	VD IN	VS IN	VD OUT
2	+12V	+12V	+12V	8	VIDEO(G)	VIDEO(G)	VIDEO(G)
3	VIDEO(G)	VIDEO(G)	VIDEO(G)	9	VIDEO OUT2	VIDEO2	VIDEO OUT2
4	VIDEO OUT1	VIDEO1	VIDEO OUT1	10	GND	GND	GND
5	HD(G)		HD(G)	11	+12V	+12V	+12V
6	HD IN		HD OUT	12	VD(G)	VS(G)	CD(G)

12Pin Connector



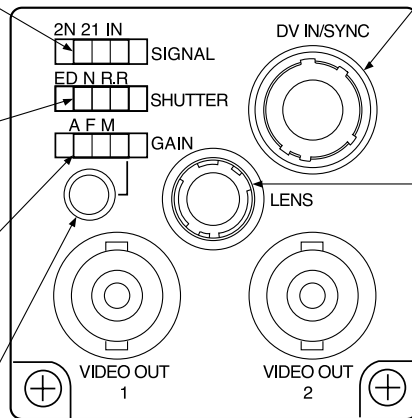
6P MULTI	
Pin No.	SIGNAL
1	CTL IN/ FLD OUT *
2	TRIGGER IN
3	GND
4	WE OUT
5	AI VIDEO OUT
6	+12V OUT

VIDEO OUT MODE	
2N	1/60S NON INTER
2I	1/60S INTERLACE
IN	1/30S NON INTER

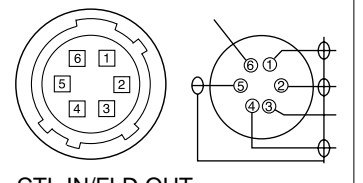
SHUTTER MODE	
ED	E-DONPISHA
N	NORMAL
R.R	RESTART RESET

GAIN MODE	
A	AUTO GAIN
F	FIX GAIN
M	MANUAL GAIN

MANUAL GAIN CONTROL VOLUME



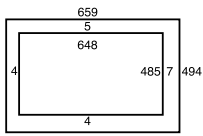
6Pin Connector



CTL IN/FLD OUT

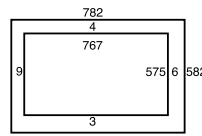
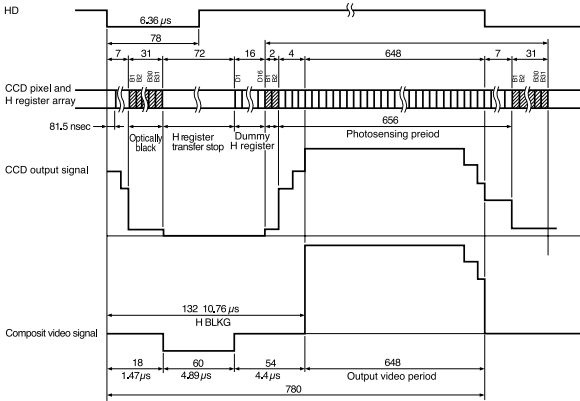
* CTL IN is very useful for monitoring the normal image during E-DONPISHA. Serial numbers 100201 and later are set to CTL IN at the factory. Therefore, a video signal is usually output when pin 1 is connected to ground (GND) during E-DONPISHA setting. In the XC-7500, serial numbers 100001 to 100200 are set to FLD OUT at the factory. To set serial numbers 100201 and later to FLD OUT, the XC-7500 must be changed internally.

CCD OUTPUT WAVE TIMING CHART



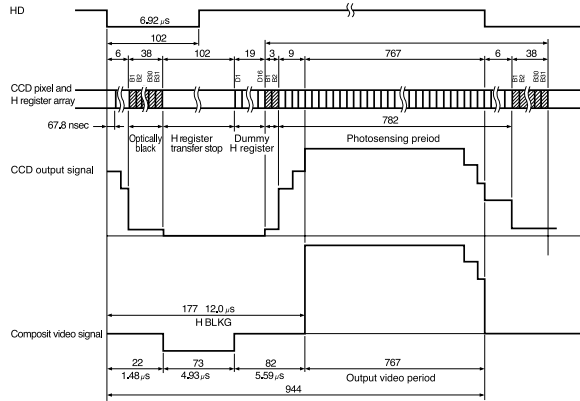
XC-7500

- Optical size: 1/2-inch format
- Total number of pixels: 692 (H) × 504 (V)
- Effective picture elements: 659 (H) × 494 (V)
- Number of video output pixels: 648 (H) × 485 (V)
- Unit cell size: 9.9μm (H) × 9.9μm (V)



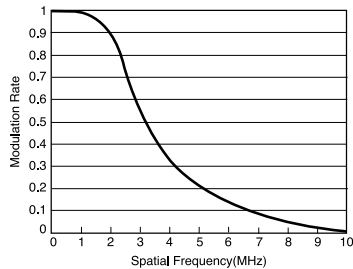
XC-8500CE

- Optical size: 1/2-inch format
- Total number of pixels: 823 (H) × 592 (V)
- Effective picture elements: 782 (H) × 582 (V)
- Number of video output pixels: 767 (H) × 575 (V)
- Unit cell size: 8.3μm (H) × 8.3μm (V)

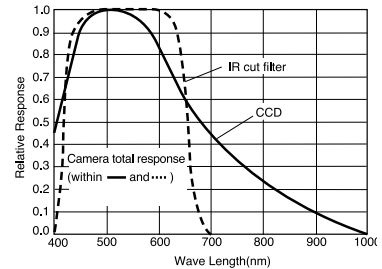


MTF,SPECTRAL RESPONSE

MTF

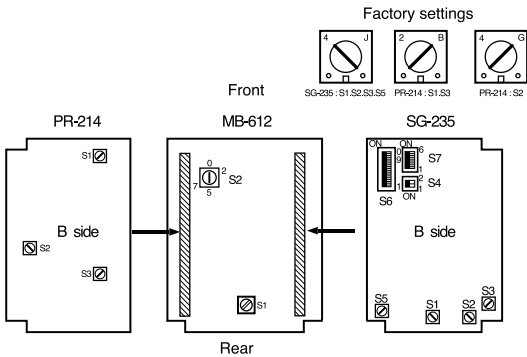


Spectral Response



INTERNAL SWITCH FUNCTIONS

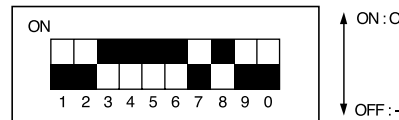
Location



Location	No.	Function	Factory Setting
MB-612	S1	High-Rate ON/OFF	OFF
	S2	Normal Shutter 0:1/60 1:1/125 2:1/250 3:1/500 4:1/1000 5:1/2000 6:1/4000 7:1/10000 8:FL 9:FL	0
SG-235	S1	VD 75Ω termination ON/OFF	ON
	S2	INT H/V OUT / EXT H/V IN	EXT H/V IN
	S3	HD 75Ω termination ON/OFF	ON
	S4	R.Rmode Vdpulse 1 to 4	1:OFF 2:OFF
	S5	Trigger polarity +/-	+
	S6	E-DONPISHA® Shutter Speed	approx 1/1000sec.
	S7	E-DONPISHA® WE(0V/-1V) VIDEO(3V/1V) RESET/NON RST WE +/- HIGH SPEED LOW SPEED	1:OFF (-1v) 2:OFF (1v) 3:OFF (NON) 4:OFF (-) 5:OFF 6:OFF
PR-214	S1	VIDEO 1 r ON/OFF	OFF
	S2	Gain tracking MAN/AUTO	MAN
	S3	VIDEO 2 r ON/OFF	OFF

E-DONPISHA®

Set the E-DONPISHA switch on SG-235 board



XC-7500

Shutter speed (sec.)	SW6	1	2	3	4	5	6	7	8	9	0
1/1000	ON	ON						ON		ON	ON
1/2000	ON	ON					ON	ON		ON	
1/3000		ON								ON	
1/4000		ON				ON	ON	ON			
1/6000		ON									
1/8000	ON	ON	ON				ON				
1/10000	ON			ON	ON						
1/11000			ON	ON							

XC-8500CE

Shutter speed (sec.)	SW6	1	2	3	4	5	6	7	8	9	0
1/1000						ON				ON	ON
1/2000	ON	ON	ON					ON		ON	
1/3000		ON				ON			ON		
1/4000	ON	ON	ON			ON	ON				
1/6000	ON	ON	ON			ON	ON				
1/8000			ON				ON				
1/10000		ON	ON			ON					

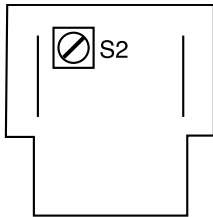
E-DONPISHA®

This function accumulates electric charges with the external input trigger pulse as reference, places them on a continuous sync signal, and outputs a video signal. The objects that move at high speed are recognized using a sensor, and the image can be precisely shot in the fixed place. Normal speed (shown in the figure on the left), low speed, high speed, and external control speed are available as the shutter speed. The shutter operates in the range of ∞ to 1/100,000 sec.

VARIOUS SHUTTER FUNCTIONS

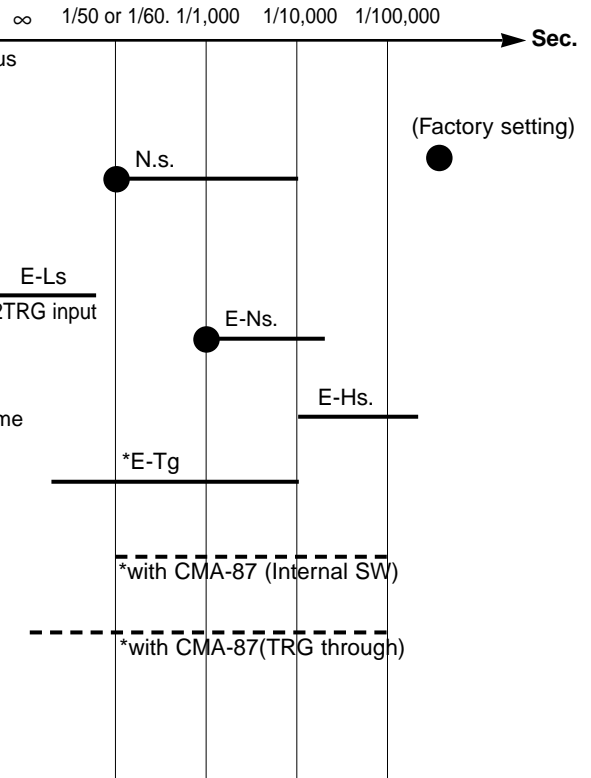
NORMAL SHUTTER (N.s.)

Rotary Switch
MB-612 board



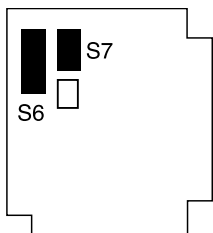
This shutter speed is used when a continuous picture without blurring is required.

Position	Shutter Speed(sec.)	Position	Shutter Speed(sec.)
0	OFF	5	1/2000
1	1/125	6	1/4000
2	1/250	7	1/10000
3	1/500	8	FL (Flickerless)
4	1/1000	9	FL (Flickerless)



E-DONPISHA®

SG-235 board



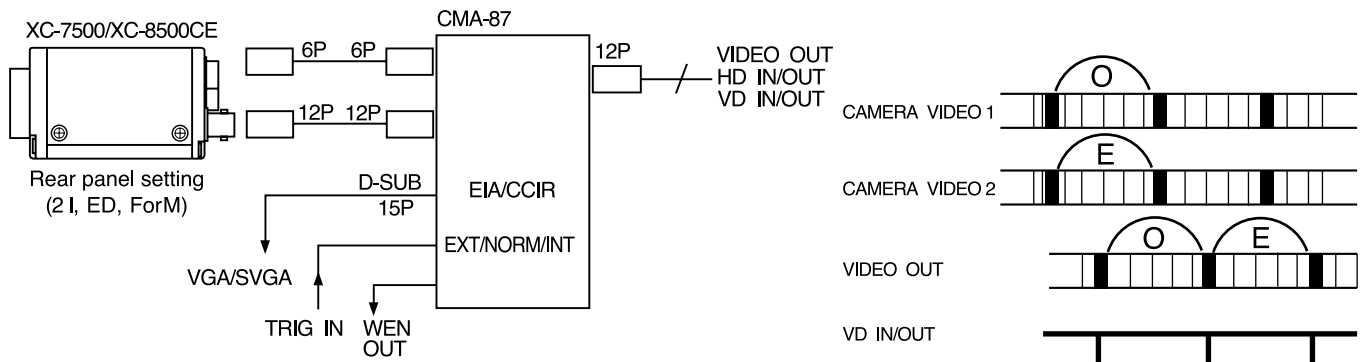
This shutter speed is used to obtain one frame of still picture by inputting any trigger pulse.

- Low-Speed(E-Ls)
(for long exposure)
- Normal-Speed(E-Ns)
- External Control(E-Tg)
(wide range speed by trigger width control)
- High-Speed(E-Hs)
(for capturing high speed object)

S6 : Setting Shutter Speed
S7 : Setting E-DONPISHA®

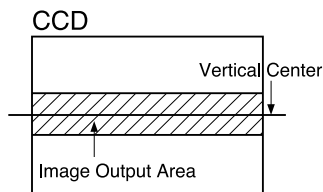
*In case of XC-7500, the connection with CMA-87 and E-Tg mode are available after #500001.

CMA-87



One-Shot Memory of E-DONPISHA®

This function controls the E-DONPISHA frame shutter by inputting a trigger pulse and memorizes the simultaneous timing signal output from the VIDEO OUT 1 and 2 terminals of the camera.



High-Rate Scanning

The image in a CCD can be read partially (in the vertical center portion) at high speed. This function is useful in the field where a shorter trigger cycle than one field is required. (1.5, 2, 3, and 4 times the normal speed)

Example)
XC-8500CE: 220/64 lines at 2/4 times the normal speed
XC-7500: 180/48 lines at 2/4 times the normal speed

Sports Mode

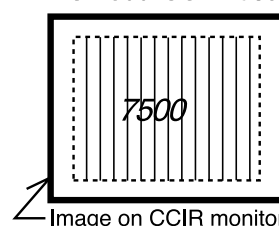
In the sports mode, a continuous picture at two times the normal speed (1/100 sec.) can be read as a 50-field (CCIR/PAL) output by combination with the XC-8500CE. Since 1/100 sec. are precisely required in the sports world, this mode can be used for video recording.

Signal Format Conversion CMA-87 VIDEO OUT

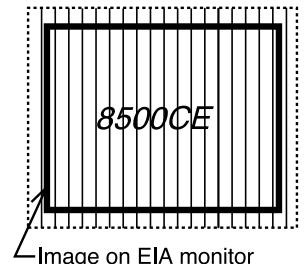
Output	*7500	8500CE	Scan Convert Out
VGA	OK		646 x 485 / 60 Frame
SVGA		OK	767 x 575 / 50 Frame
EIA	OK	OK	646 x 485 / 30 Frame
CCIR	*OK	OK	767 x 575 / 25 Frame

*In case of XC-7500, the above function is available after #500001

XC-7500 CCIR use



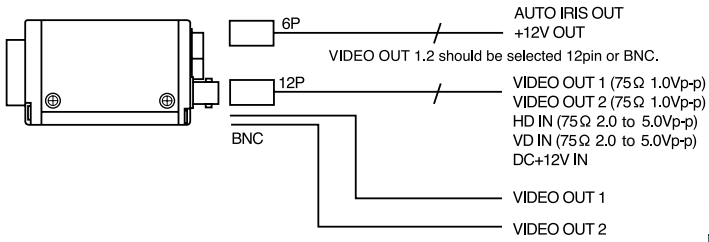
XC-8500CE EIA use



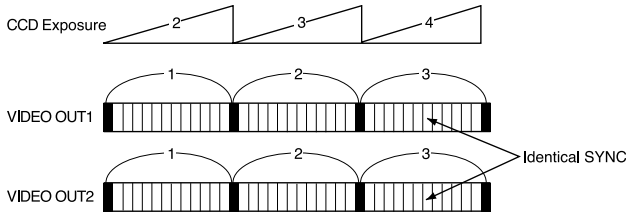
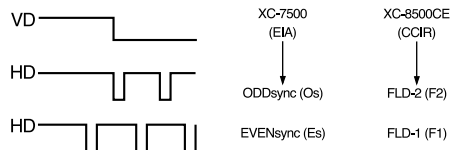
CONDITIONS & TIMING FOR SHUTTER FUNCTION

Normal Mode

The connection for normal operation and normal shutter.



Definition of Sync Signal



Output Image

O = ODD field image
 E = EVEN field image

	XC-7500/XC-8500CE		
Output	Continuance image		
Sync	Internal/External	Internal	
Output mode	2I	1N	2N
VIDEO OUT 1	O1, E2	O1+E1	E1, E2
VIDEO OUT 2	E1, O2	/	O1, O2

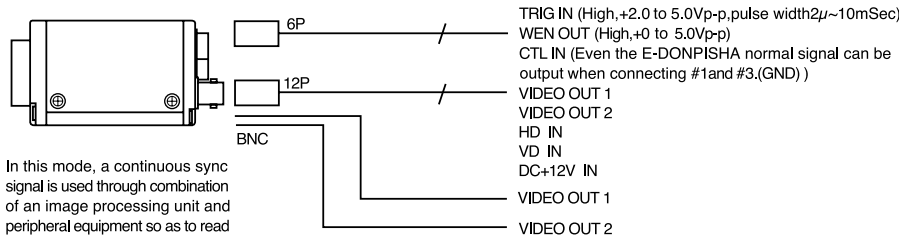
The sync signal at the VIDEO OUT 2 terminal is the same as that at the VIDEO OUT 1 terminal.

In the 2I mode, O1, O2/E1, E2 signals can be continuously output by inputting a non-interlaced external sync signal.

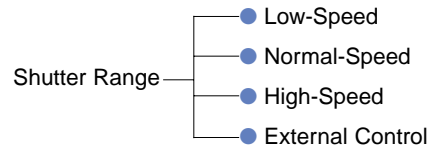
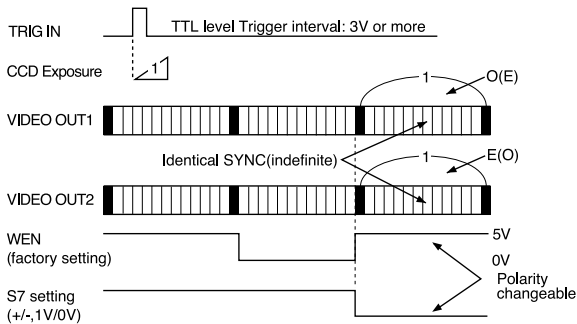
External Trigger Shutter

The E-DONPISHA mode can capture one shot image by external trigger.

● Non Reset Mode (one shot image/standard sync) (S7:Factory setting)



In this mode, a continuous sync signal is used through combination of an image processing unit and peripheral equipment so as to read a stable image.



Output Image

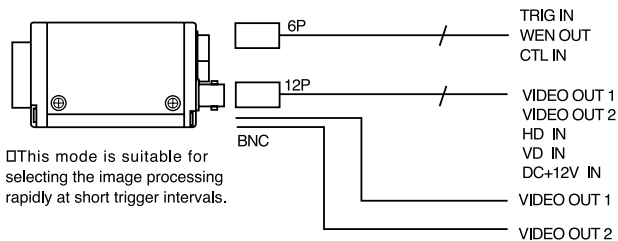
():XC-8500CE

	XC-7500/XC-8500CE		
Output	One shot image		
Sync	Internal/External		
Output mode	2I	1N	2N
VIDEO OUT 1	O (E)	O+E	/
VIDEO OUT 2	E (O)	/	/

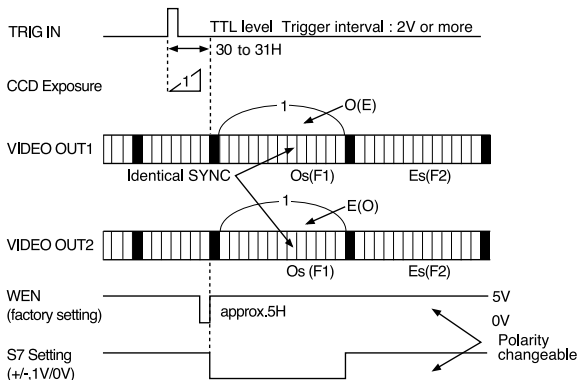
In the 2N mode, the VIDEO OUT 1 and 2 terminals do not operate.

The sync signal at the VIDEO OUT 2 terminal is the same as that at the VIDEO OUT 1 terminal.

● Reset Mode (one shot image/non standard sync)

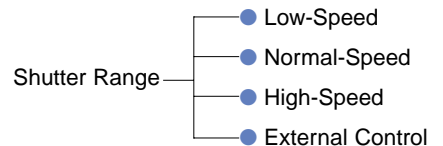


□ This mode is suitable for selecting the image processing rapidly at short trigger intervals.



Write Enable Pulse (WEN)

In a camera, the write enable pulse is output 1V before a video output signal is produced or it is output simultaneously with a video output signal. This pulse is used for combination with peripheral equipment.



Output Image

():XC-8500CE

	XC-7500/XC-8500CE		
Output	One shot image		
Sync	Internal		
Output mode	2I	1N	2N
VIDEO OUT 1	O(E)	/	/
VIDEO OUT 2	E(O)	/	/

In the 1N and 2N modes, the VIDEO OUT 1 and 2 terminals do not operate.

The sync signal at the VIDEO OUT 2 terminal is the same as that at the VIDEO OUT 1 terminal.

SPECIFICATIONS

XC-7500/XC-8500CE

	XC-7500	XC-8500CE
Pick up device	Interline transfer Hyper HAD CCD	
Optical size	1/2-inch format (6.4 x 4.8mm)	
Picture elements	659(H) × 494(V)	782(H) × 582(V)
Video output elements	646(H) × 485(V)	767(H) × 575(V)
Cell size	9.9(H) × 9.9(V)μm	8.3(H) × 8.3(V)μm
Signal systems	EIA/VGA	CCIR/SVGA
Lens mount	C-mount	
Flange back	17.526mm	
Horizontal frequency	15.734kHz	15.625kHz
Vertical frequency	59.94Hz	50Hz
Sync system	Internal/External (auto)	
External sync system	HD/VD (4.0Vp-p). VS or SYNC (0.3Vp-p) Frequency deviation±1%	
Video out	1.0Vp-p sync negative 75 Ω	
Output modes	2 I:Interlace (1/60sec.) 2N:Non Interlace (1/60sec.) 1N:Non Interlace (1/30sec.)	2 I:Interlace (1/50sec.) 2N:Non Interlace (1/50sec.) 1N:Non Interlace (1/25sec.)
Horizontal resolution	500TV lines	580TV lines
Vertical resolution	485TV lines	575TV lines
S/N ratio	60dB (200kHz to 4.2MHz)	58dB (200kHz to 5.0MHz)
Sensitivity	400lx F4	
Minimum sensitivity	3lx F1.4 AGC:ON (with IR cut filter)	
Power requirements/consumption	DC+10.5 to 15V/2.5W	
Normal Shutter (Frame)	off. 1/125.1/250.1/500.1/1,000.1/2,000.1/4,000.1/10,000sec., Flickerless	
E-DONPISHA	1/1,000. 1/2,000. 1/4,000. 1/6,000. 1/8,000. 1/10,000sec., 1/11,000sec. (XC-7500 only)	
Normal-speed (Frame)	Another speed can be selected by internal SW.	
High-speed (Frame)	1/10,000 to 1/100,000sec.	
Low-speed (Frame)	∞ to approx.1/60sec.	∞ to approx.1/50sec.
External control (Frame)	∞ to 1/60~1/10,000sec.	∞ to 1/50~1/10,000sec.
External trigger	Polarity+/-, trigger width (2μ to 10m sec.), input impedance 10kΩ	
Gamma	ON (γ=0.45) / OFF (γ=1) (Internal switch selection)	
Gain	AGC(0 to 18dB). FIX (0dB). Manual (0 to 18dB factory setting:fixed same level)	
Dimensions/Weight	44 × 44 × 70mm/190g	
Temperture on performance	0 to 40°C	
Operating temp./mois.	-5 to 45°C/25 to 80%	
Storage temp./mois.	-25 to 60°C/20 to 90%	
Vibration resistance	7G (11 to 200Hz) 3directions	
Shock resistans	70G	
MTBF/Regulations	83,400 hrs / UL FCC CE marking	

CMA-87

Video input/output signal	12P/IN (VIDEO1,2, 1.0Vp-p, 75Ω), D-sub 15P/OUT (VGA/SVGA), 12P/OUT (1.0Vp-p,75Ω)
External input/output signal	TRIG IN (High,+2.0 to 5.0Vp-p), WEN OUT (High,5.0Vp-p), CTL OUT
Sync input/output signal	HD/VD IN (2.0 to 5.0Vp-p,75Ω) HD/VD OUT (4.0 to 5.0Vp-p,High)
Scanning conversion	XC-7500 (EIA/VGA/CCIR), XC-8500CE (CCIR/SVGA/EIA)
High-Rate scan	x1.5, 2, 3, 4
Sports mode	1/100sec. × 2 (XC-8500CE only)
Shutter control	E-DONPISHA: ∞ to 1/100,000sec. (Low-speed,Middle-speed,Normal-speed,High-speed,Trigger through)
Power requirements/consumption	DC+10.5 to +15V/2.4W
Dimentions/Weight	135.4(W) × 30(H) × 69(D)mm / 295g

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