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A

Progressive scan monochrome CCD camera

(Frame shutter)

KP-F30SCL

Specifications

B

C

D

E

F

E400002624

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DWN	S. Hatayaka	Apr 26 '06	KP-F30SCL Specifications	Hitachi Kokusai Electric	E400002624	
DSGN	K. Ueno	Apr 26 '06				
CHKD	K. Kanomata	Apr 26 '06			1 / 20	
APPD	H. Suzuki	Apr 26 '06				

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1. Outline

Hitachi's KP-F30SCL is a 1/3-inch size black and white CCD camera designed for versatile functions. Progressive scan with full pixel independent readout and full frame shutter provide images of unparalleled quality at 60 frames per second non-interlaced output.

While the broad array of functions includes digital output, multi-step electronic shutter, and frame on demand etc. The square lattice pixel format also provides excellent suitability for image processing applications.

2. Outstanding features

(1) Small-sized camera

The camera has small SDR connector for digital outputs.

Therefore, the camera has the realization of small-sized shape of 29x29x29mm.

(2) Frame shutter

The frame shutter function improves vertical resolution of moving objects.

(3) Multi-step electronic shutter

The shutter speed can be selected in 8 steps from 1/60th second to 1/50,000th second.

(4) Frame on demand

An external trigger signal input can be used to capture an image at a desired timing for instant view or processing. The capture time can be adjusted by the trigger and shutter.

(5) Various functions can be set by a remote control.

(6) Digital output

Camera Link

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3. Specifications

(1) Imaging device	1/3-inch interline CCD	A
Total pixels	692 (H) x 504(V)	
Effective pixels	659 (H) x 494(V)	
Pixel size	7.4 (H) x 7.4 (V) um (square lattice)	
(2) Sensing area	4.88 (H) x 3.66 (V) mm	
(3) Scanning system	Non-interlaced	
(4) Aspect ratio	4 : 3	
(5) Frame rate	60frames/second (full pixel readout)	B
(6) Horizontal scanning frequency	31.468kHz	
(7) Vertical scanning frequency	59.94 Hz	
(8) Sync system	Internal	
(9) Lens mount	C mount	
(10) Flange focal distance	17.526 mm	
(11) Video output	Digital output Camera Link Data : Base configuration 10bit x 1 Clk = 24.5454MHz	C
(12) VD reset	VD LVDS level, 59.94 Hz or less	
(13) Resolution	Horizontal 500TV lines Vertical 490TV lines	
(14) Sensitivity	400 lx, F4, 3200 K	
(15) Minimum lamination	1.0 lx, F1.4, MAX GAIN, without IR cut filter	
(16) Signal noise to ratio	50 dB	
(17) Electronic shutter speed	1/60, 1/250, 1/500, 1/1000, 1/2000,1/4000,1/10000, 1/50000 second. Factory setting is off (1/60 second) or changeable by variable shutter (Minimum 1/100000 second)	D
(18) Gamma compensation	$\gamma = 1$	
(19) Frame on demand	Remote setting (fixed shutter, one trigger and reset control mode). Factory setting is all off.	E
(20) Partial scan	Selectable start position and width of picture grabbing from 1H to 494H by 1H step.	
(21) Power supply voltage	12 ± 1 VDC	
(22) Current consumption	Approx. 120 mA	F

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(23) Ambient, operating	0 to + 40°C (+32 to ; 104 F), less than 90 % RH	A
Ambient, storage	-10 to + 50°C(+14 to +122 F), less than 70 % RH	
Note: If operated continuously, be sure to use at less than +40°C(104 F) for long term stable performance.		
(24) Vibration endurance	98 m/s ² (Acceleration: constant) (10 to 200Hz,sweep:10 min,XYZ,30 min)	B
(25) Shock endurance	686 m/s ² (Drop test, once each top, bottom, left and right)	
(26) External dimensions	29 (W) x 29 (H) x 29 (D) mm	C
(27) Mass	Approx. 53 g	
(28) Remote control		D
(a) Signal system		
Control system	Start-stop synchronization system	
Transmission rate	9600 bps	
Data length	8 bits	
Start bit	1bit	
Stop bit	1bit	
Parity	None	
Bit transfer	LSB first	
(b) Communications control system		
Full control by remote control software, data send/receive by text data transfer to camera microprocessor (BSC system handshake)		
(c) Control items		E
1. Shutter speed	1/60, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second	
2. Variable shutter	Minimum 1/100000 second	
3. Mode	Fixed shutter, one trigger, reset control mode	
4. Gain	0 to 18.5 dB(Approx. 0.04 dB step)	
5. VD/FVAL	Factory setting: VD	
6. HD/LVAL	Factory setting: HD	
7. 8bit/10bit	Factory setting: 10bit	
8. HD reset/NON reset	Factory setting: HD reset	
9. Partial scan mode		
10. VD reset mode		
11. Trigger pulse polarity	Factory setting: POS	F

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(2) Signal connection to DIGITAL OUT

Pin No.	Signal	Pin No.	Signal
1	GND	14	GND
2	TxOUT0(-)	15	TxOUT0(+)
3	TxOUT1(-)	16	TxOUT1(+)
4	TxOUT2(-)	17	TxOUT2(+)
5	TxCLKOUT0(-)	18	TxCLKOUT0(+)
6	TxOUT3(-)	19	TxOUT3(+)
7	Rx(+)[SERTC(+)]	20	Rx(-)[SERTC(-)]
8	Tx(-)[SERTEFG(-)]	21	Tx(+)[SERTEFG(+)]
9	TRIG-A/VD(-)[CC1(-)]	22	TRIG-A/VD(+)[CC1(+)]
10	TRIG-B(+)[CC2(+)]	23	TRIG-B(-)[CC2(-)]
11	NC[CC3(-)]	24	NC[CC3(+)]
12	NC[CC4(+)]	25	NC[CC4(-)]
13	GND	26	GND

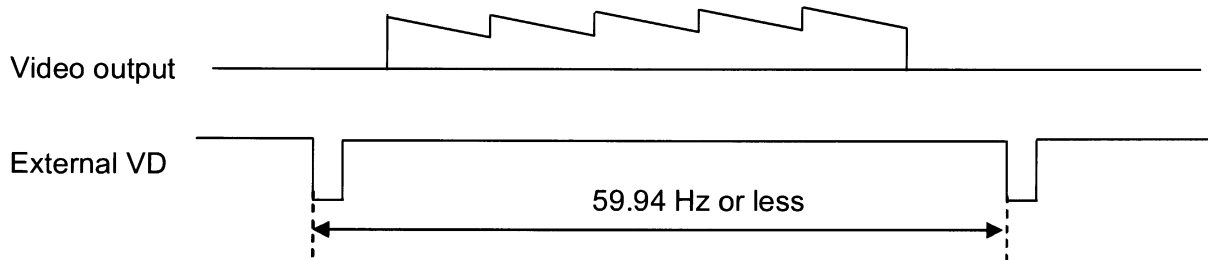
Connector (camera side) Sumitomo 3M 1226-1100-00PL or equivalent

- The digital out cable should be comprised of a twisted pair of wires having 100Ω characteristic impedance and an outer sheath shield type conductor.
 - Connect the shield (ground) of the digital out cable to the ground terminal of the video equipment, frame grabber, etc.
 - Install clamp filter(ZCAT3035-1330:TDK) at both ends(camera and video processor ends) in the CE making region.
 - Tx: Transmit data from camera to PC
 - Rx: Transmit data from PC to camera
- (Note)
Please do not unplug and insert cable(digital out cable) with a power supplied to a camera.

7. VD reset mode

When external VD pulse is inputted, internal HD/VD is reset.

External VD specification: 59.94 Hz or less



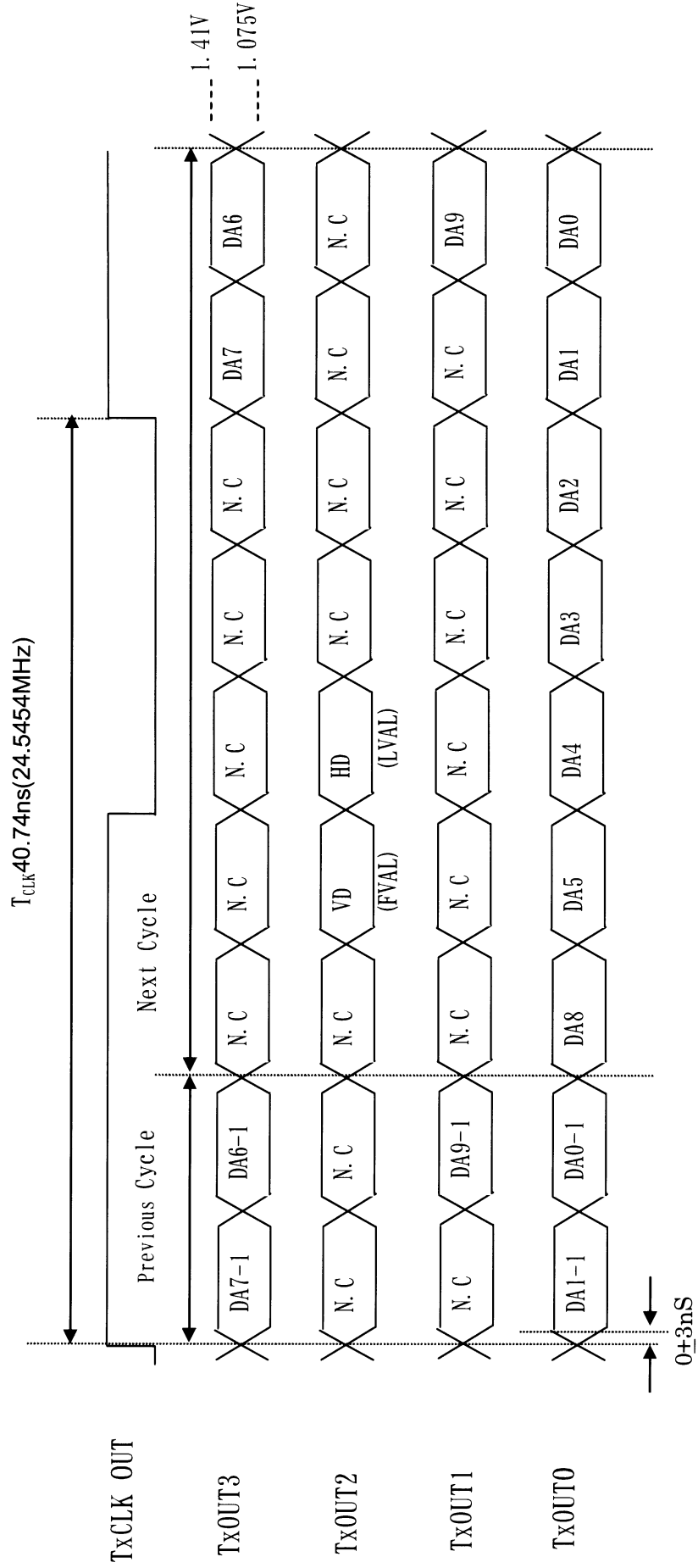
(Note) When external VD of 59.94Hz or more is input, electronic shutter has an equation between external VD and 59.94Hz.

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8. Timing chart

8-1 Transmitter LVDS Output Pulse Position Measurement
(a) 10bit



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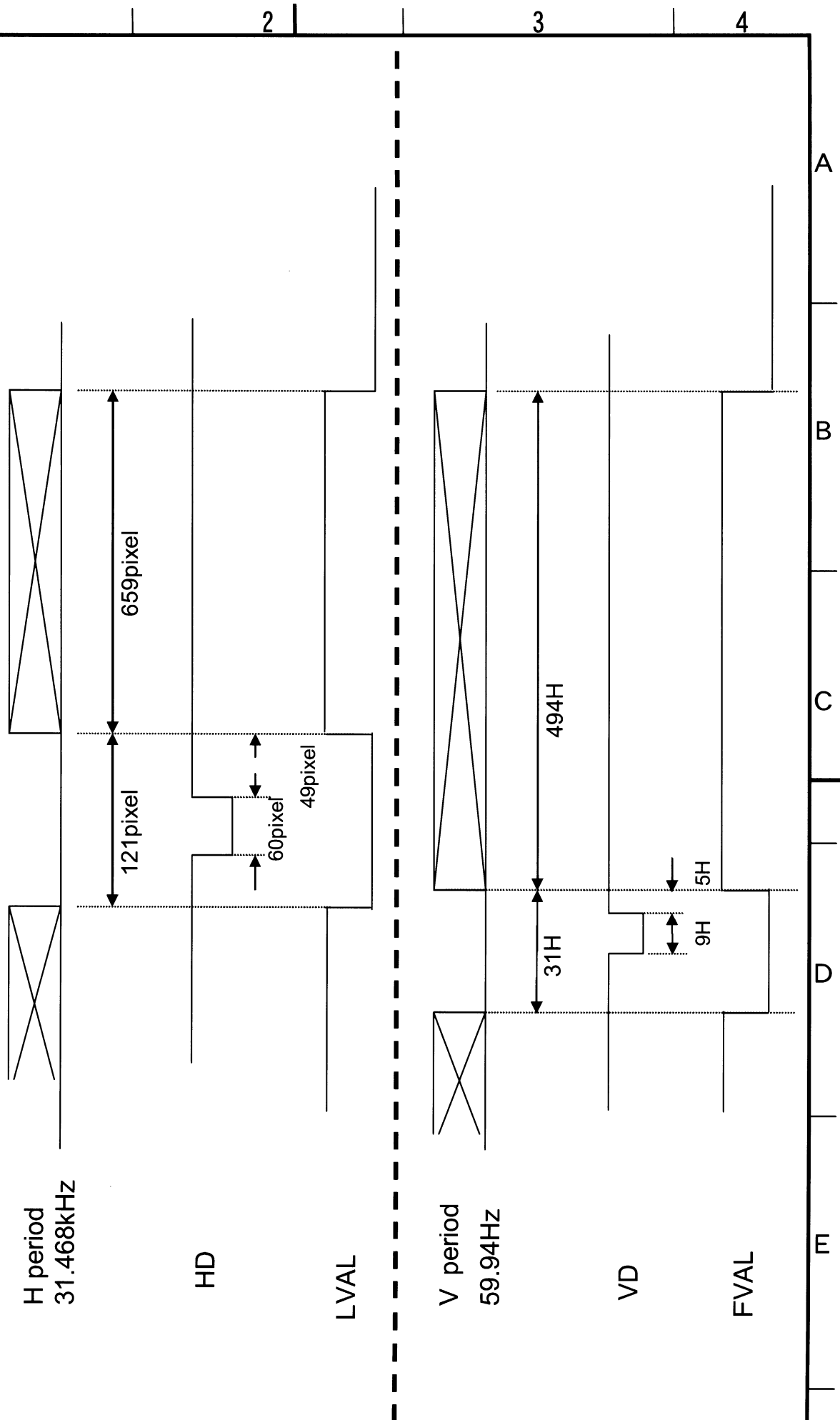
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8-2 Output signal levels and timing

1 pixel = 40.74ns(24.5454MHz)



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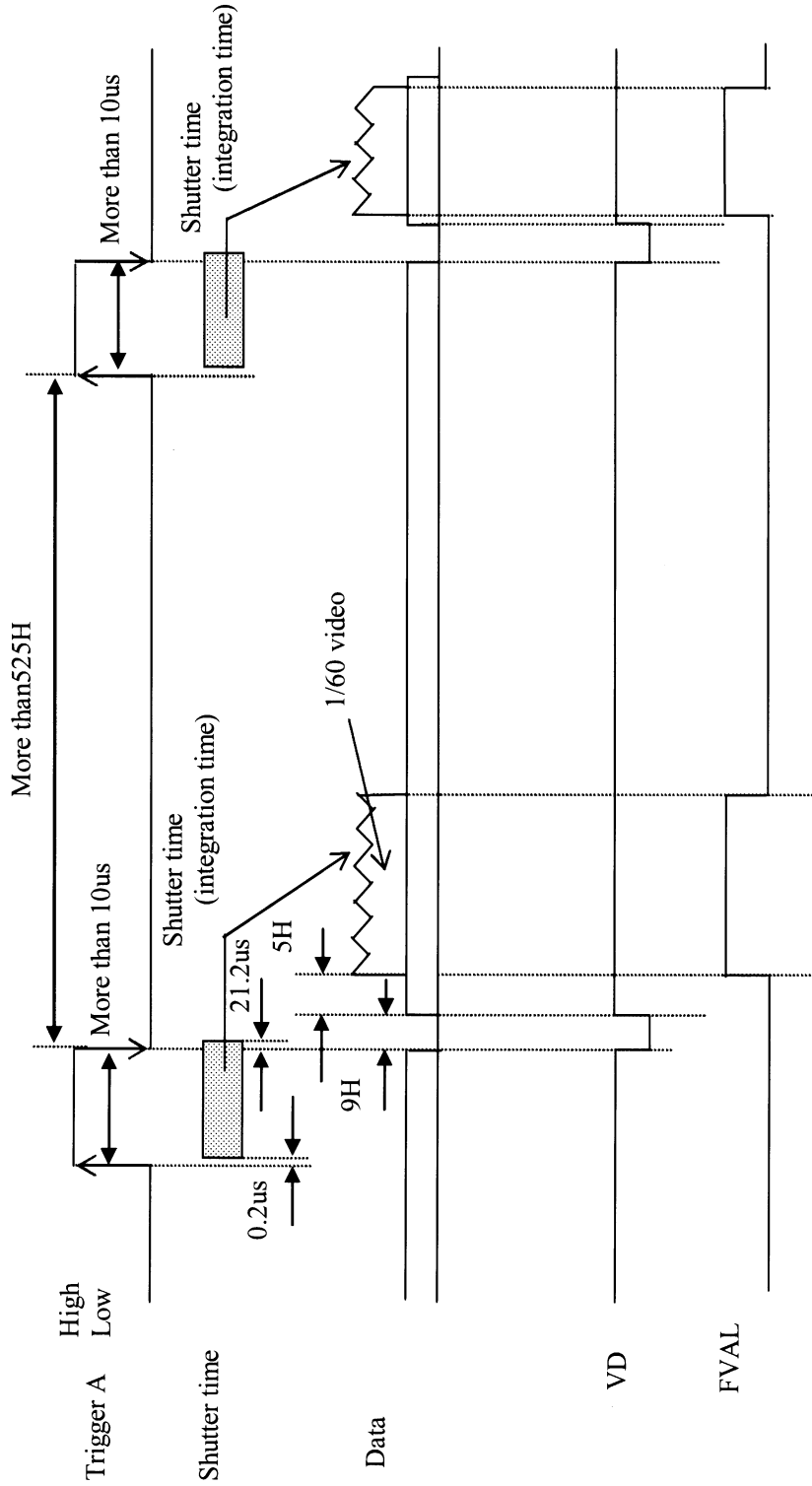
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MODE TIMING CHART

8-3 ONE trigger mode



Trigger polarity are selectable by remote control.
(Factory setting: POS)

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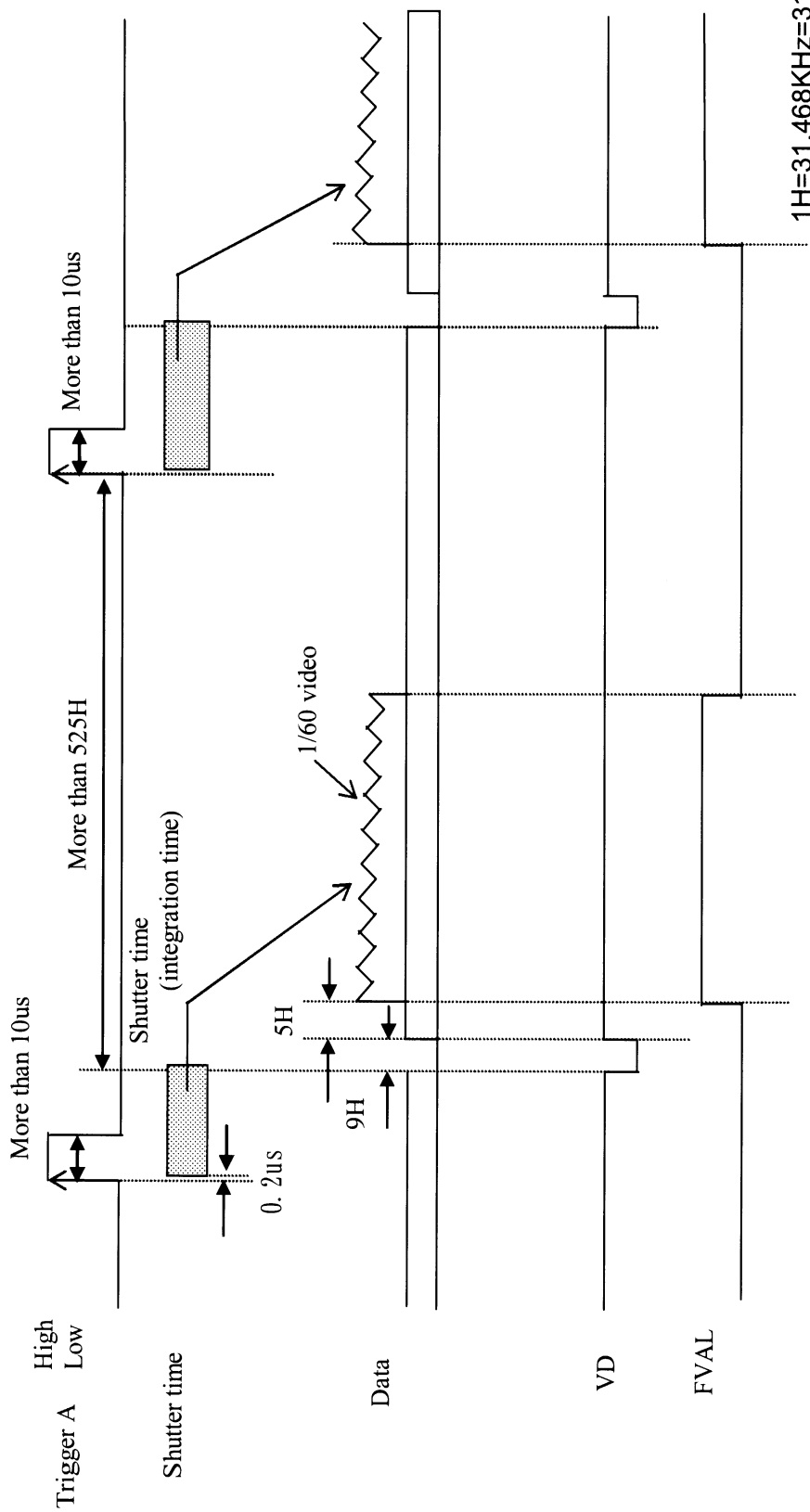
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8-4 Fixed shutter mode



Trigger polarity are selectable by remote control.
(Factory setting: POS)

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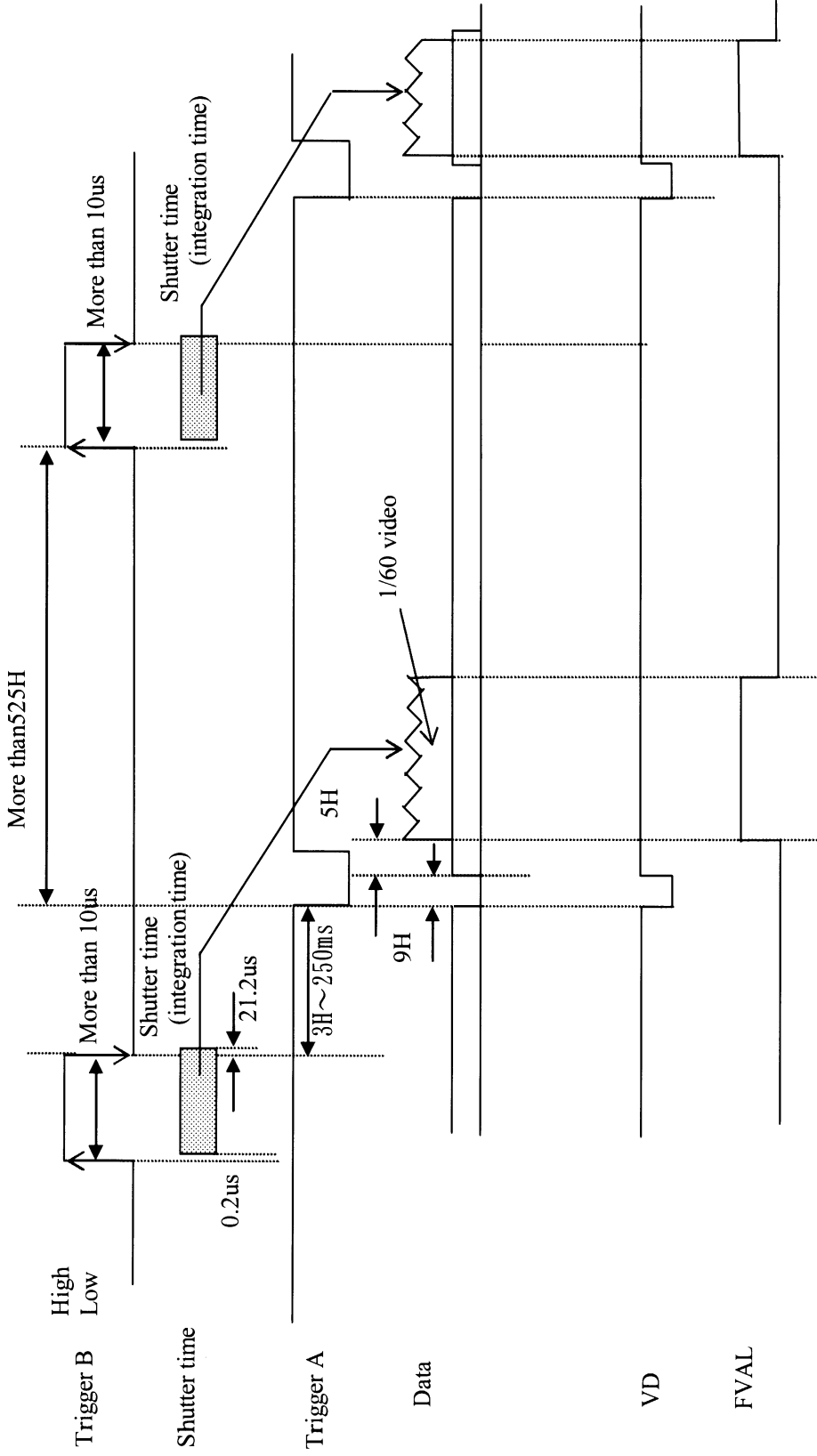
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8-5 Reset control mode



Trigger polarity are selectable by remote control.
(Factory setting: POS)

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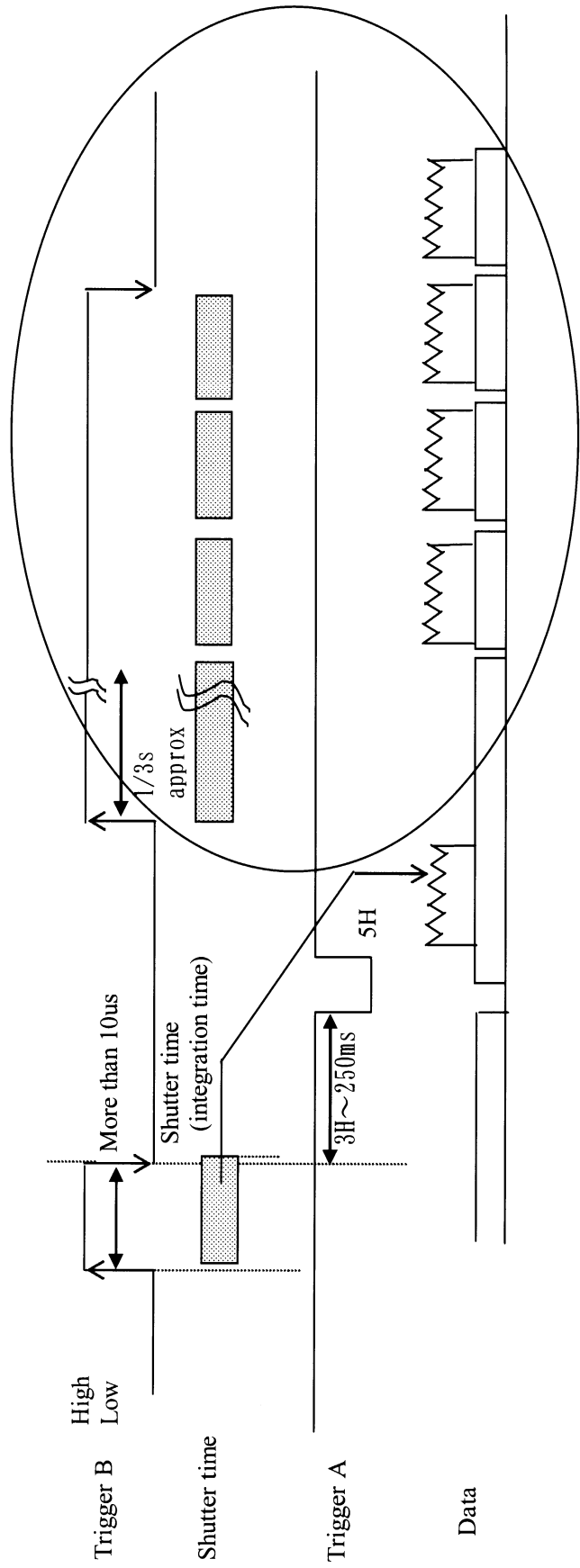
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Special function of reset control mode

The camera shifts to the output of a normal mode (continuous output) when Trigger B signal passes about 1/3 seconds in the state of High. It returns to the Trigger mode if Trigger B signal becomes Low. However, after becoming Low Trigger B, the period of 50ms becomes a Trigger signal input prohibition period.



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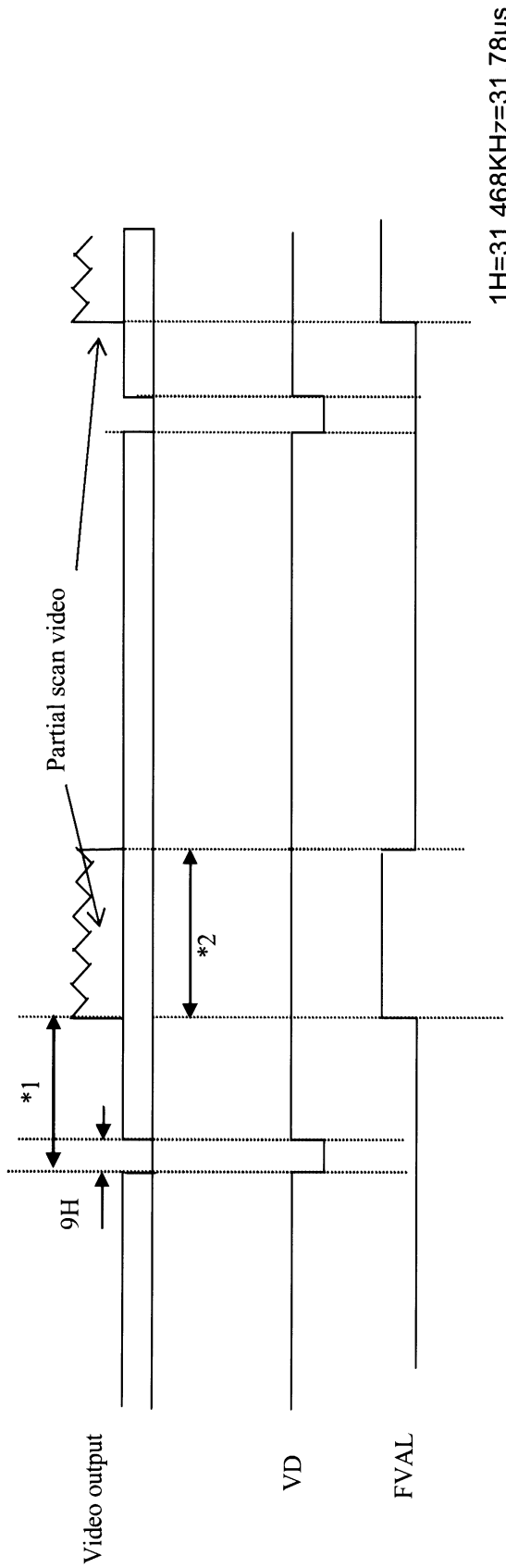
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8-6 Partial Scan NORMAL mode



*1: Variable by start position of picture grabbing

*2: Selectable start position and width of picture grabbing from 1H to 494H by 1H step.
Frame rate will not be changed by difference in start position of picture grabbing.

Note1: Cannot use the partial scan in following condition.

Start position of picture grabbing + Width of picture grabbing \cong 494H

Note2: Please use FVAL in the partial scan.

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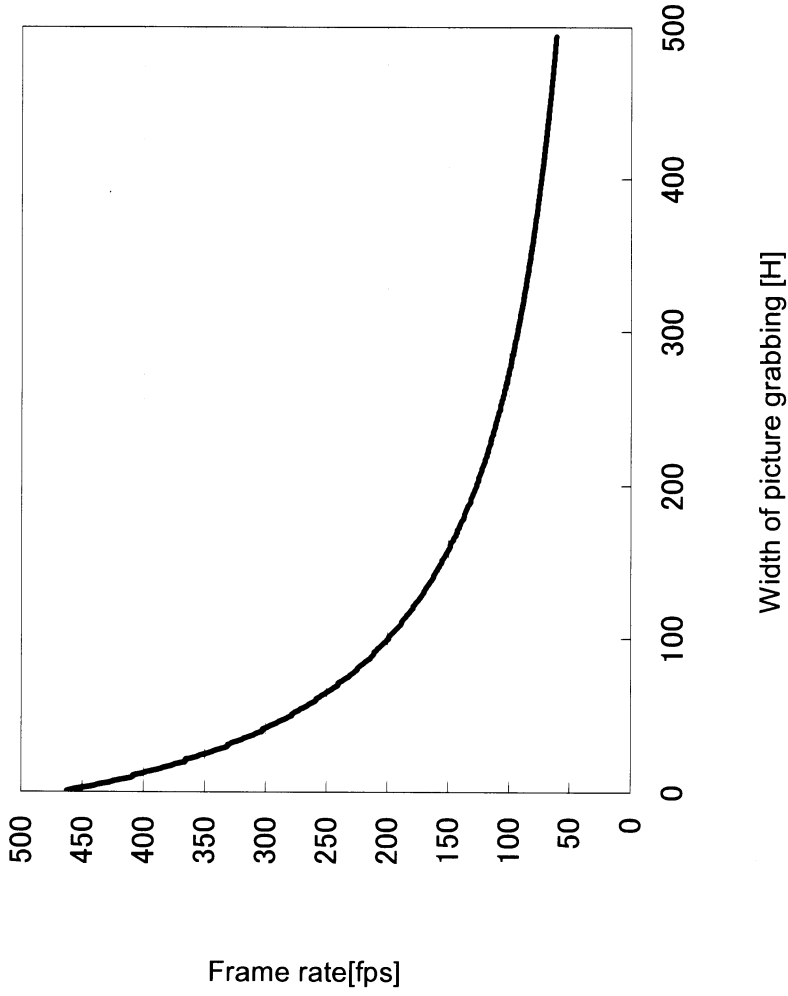
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Graph following shows frame rate in each width of picture grabbing



Note: Please ask your sales representative more detail information about frame rate in each width of picture grabbing

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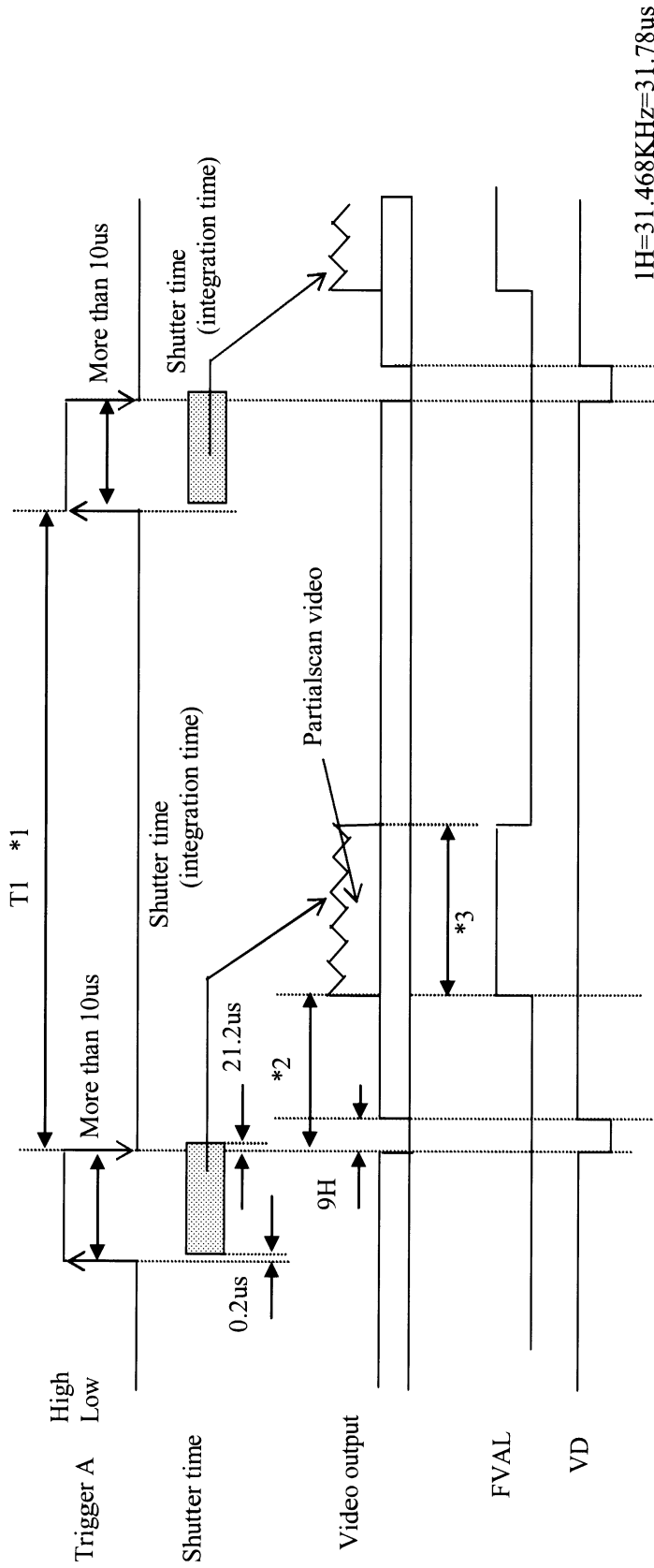
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8-7 Partial Scan ONE Trigger mode



*1: Please set X to be following condition

$X < T1 < 16.7ms$

X: Variable by width of picture grabbing(Refer to chart written in left side)

*2: Variable by start position of picture grabbing

*3: Selectable start position and width of picture grabbing from 1H to 494H by 1H step.

Note1: Cannot use the partial scan in following condition.
Start position of picture grabbing + Width of picture grabbing \geq 494H

Note2: Please use FVAL in the partial scan.
Trigger polarity are selectable by remote control. (Factory setting: POS)

Example

Width of picture grabbing[H]	X(Minimum of T1)[ms]
1H	2.2
100H	5.1
200H	7.9
400H	13.7

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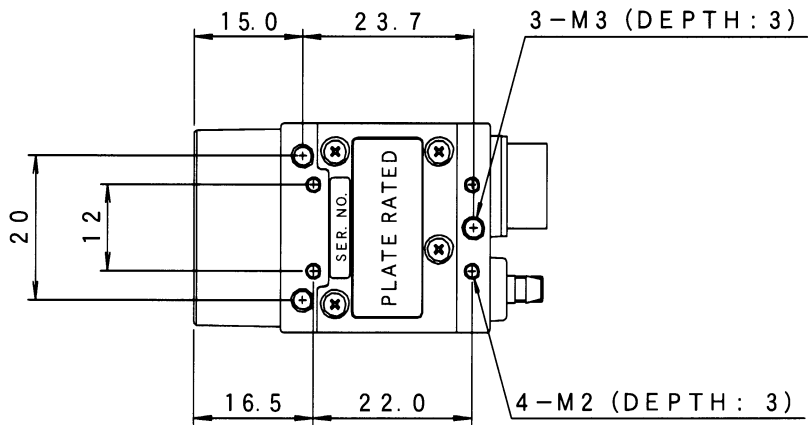
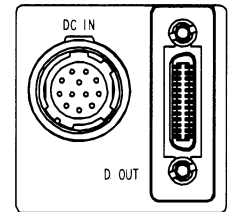
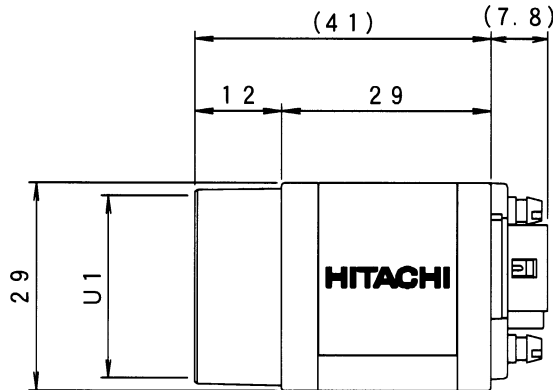
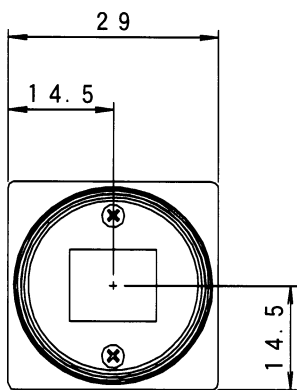
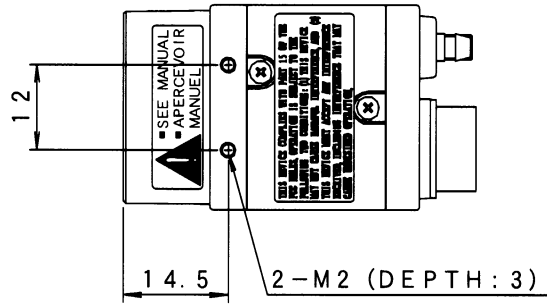
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External view

- MASS : APPROX 53 g
- COLOR : BLACK
- TOLERANCE : ± 0.5



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Notice:
 These specifications are subject to change without prior notice due to product improvement.
 Confirm the most recent specifications at time of order.
 Hitachi Kokusai certifies this product complies with the standard warranty conditions of Hitachi Kokusai, and that quality control is implemented to the extent required to comply with these conditions.

A

Warranty and service:

B

- (1) The guarantee period is one year after the data purchase.
 However, the defects due to erroneous use or intentional act are excluded.
- (2) As the defect after expiration of the guarantee period, where product repair is possible, repair will be performed at charge. .
- (3) The present Warranty pertains only to the camera unit. Secondary malfunctions attributable to camera failure as well as expenses incurred by disassembly and reassembly of the related system, are beyond the scope of this Warranty.
- (4) Compensation for loss of business, loss or damage to software, database and other contingent losses are beyond the scope of this Warranty.
- (5) Hitachi Kokusai Electric Inc. is not liable for the losses caused when the equipment is used in a system, use for business trades, production process, medical fields, crime prevention applications, etc.
- (6) The parts used in the equipment have their respective lives. The lives of such parts will be shortened under the environments of high temperature or high humidity.
 When the stable operation is required for a long time, it is recommended to perform periodical maintenance and inspection every year or every two years.
- (7) In the case of camera trouble by miss wiring of cable, it will be considered as out of warranty.

C

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E

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