HITACHI

KP-M20/M30

B/W CCD Camera
Operation Guide

Hitachi Kokusai Electric Inc.

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1. General

The KP-M20/M30 are compact, lightweight, black and white cameras. The KP-M20 uses the atest high grade 1/2-inch image size CCD and the KP-M30 uses the high grade 1/3-inch image size CCD. The total pixel number of each CCD is 410,000(490,000 for CCIR).

Type: KP-M20N:EIA
KP-M20P:CCIR
KP-M30N:EIA
KP-M30P:CCIR

2. Composition

1) Black and white camera (With IR cut filter) ····· 1
2) Operation manual ····· 1

3. Specifications

(1) Imaging device ····· Interline CCD
No. of total pixels ····· KP-M20N/M30N EIA :811(H)×508(V)
KP-M20P/M30P CCIR:795(H)×596(V)
Pixel size ····· KP-M20N EIA:8.4(H)×9.8(V)μm
KP-M20P CCIR:8.6(H)×8.3(V)μm
KP-M30N EIA:6.35(H)×7.4(V)μm
KP-M30P CCIR:6.5(H)×6.25(V)μm
No. of effective pixels ···· KP-M20N/M30N EIA :768(H)×494(V)
KP-M20P/M30P CCIR:752(H)×582(V)

(2) Sensing area ····· KP-M20N EIA :6.45(H)×4.84mm(1/2 inch size)
KP-M20P CCIR:6.47(H)×4.83mm(1/2 inch size)
KP-M30N EIA :4.88(H)×3.66mm(1/3 inch size)
KP-M30P CCIR:4.89(H)×3.64mm(1/3 inch size)

(3) TV format ····· EIA/CCIR

(4) Lens mount ····· C-mount

(5) Flange focal distance ····· 17.526mm(Not adjustable)

(6) Hor. Scanning freq. ····· EIA:15.734KHz CCIR:15.625KHz

(7) Vert. Scanning freq. ····· EIA:59.94Hz CCIR:50Hz

(8) Sync system ····· Internal/external (automatic switching)

3. Specifications

(9) Internal synchronization scanning system
2:1 interlaced
The horizontal number: 525 lines (CCIR: 625lines)
fV=2fH/525 (CCIR: 625 lines)

(10) External synchronization I/O
External switch selection. Set to Input at the factory.
Input: HD/VD 4～6Vp-p Negative Frequency deviation: ±1%
Impedance: 75 Ω or high impedance. (Switch selection)
Output: HD/VD 4～5Vp-p Negative
Impedance: 100Ω

(11) Video output ····· 1.0Vp-p 75Ω unbalanced
Video component: 0.7Vp-p
Sync component: 0.3Vp-p Negative

(12) Resolution ····· EIA: 570 TV lines (H) /485TV lines (V)
CCIR: 560 TV lines (H) /575TV lines (V)

(13) Sensitivity ····· 200Lx, F4 3200K Min Gain

(14) Min. illumination ····· 0.3Lx,F1.4 AGC, Gamma ON

(15) S/N ····· 60dB Min Gain

(16) Electronic shutter ····· 1/10000s, 1/4000s, 1/2000s, 1/1000s,
1/500s, 1/250s, 1/120s(CCIR),
1/100s(EIA), 1/60s(EIA), 1/50s(CCIR)
OFF: Normal exposure
External switch can be set. The Factory setting is OFF.

(17) Integration mode ····· Field or frame External switch can be set.
The Factory setting is Frame.

(18) Gamma ····· Gamma=1.0 or correction External switch can be set.
The Factory setting is Gamma=1.0.

(19) Gain selection ····· AGC or Manual Gain setting External switch setting
The Factory setting is Manual Gain.

(20) Power requirement ····· DC12V±1V

(21) Power consumption ····· 1.4W approx.

(22) Ambient temperature and humidity Operating: -10～50℃ RH90% or less
Storage: -20～60℃ RH70% or less

Caution : For continued stable operation, the camera should be used under 40℃ or less when it is used continuously for extended period of time.

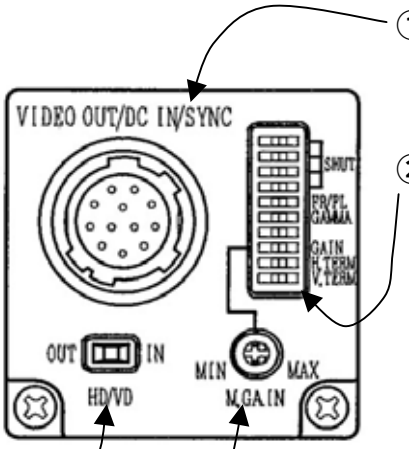
(23) Anti-vibration ····· 98m/s^2 (10 to 60Hz,amplitude: 0.98mm
constant 60 to 200Hz amplitude: variable)
(10 to 150Hz sweep: 1min, XYZ, 30min.)

(24) Resistance to shock ····· 686 m/s^2 (Drop test, once each top, bottom, left and right)

(25) Dimensions ····· 29(W)×29(H)×38.5(D)mm

(26) Mass ····· 55g approx.

4. NAME OF EACH SECTION



① **VIDEO OUT/DC IN/SYNC connector**
This connector is for a 12V DC input, a composite Video signal (VS) output and an external sync signal input.

② **Shutter speed/mode setting DIP switch**

Switch 1to4 : Select the shutter speed
Switch 5 : Select the frame or field integration
Switch 6 : Select γ correction ON/OFF
Switch 7 : NC
Switch 8 : Select the gain
Switch 9 : HD75Ω terminal select switch.
Switch 0 : VD75Ω terminal select switch.

③ **Manual Gain control**
This switch can be changed in the range of switch 0 to 14dB when the GAIN switch is set to "M.GAIN"

④ **HD/VD input-output selector switch**
IN : External HD/VD input
OUT : Internal HD/VD output

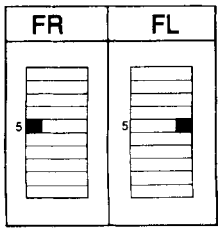
●Shutter speed/mode setting DIP switch

● Setting of shutter speed

Speed (second)	※1	※2	1/250	1/500	1/1000	1/2000	1/4000	1/10000
Setting position								

※1 1/60(EIA)
1/50(CCIR)
※2 1/100(EIA)
1/120(CCIR)

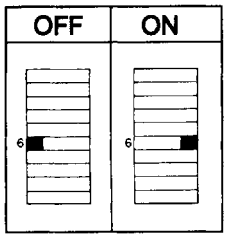
● FRAME/FIELD integration mode select switch



This switch is set to FRAME at factory.

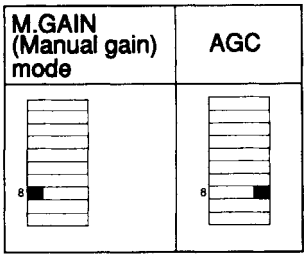
4. NAME OF EACH SECTION

● SELECT SWITCH GAMMA CHARACTERISTIC



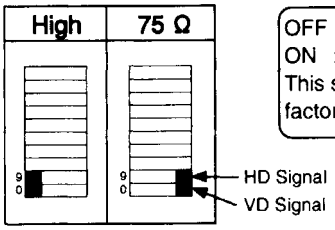
Gamma : OFF(Gamma=1.0)
Gamma : ON(Gamma=0.45)
This switch is set to OFF at factory.

● GAIN SELECTOR SWITCH



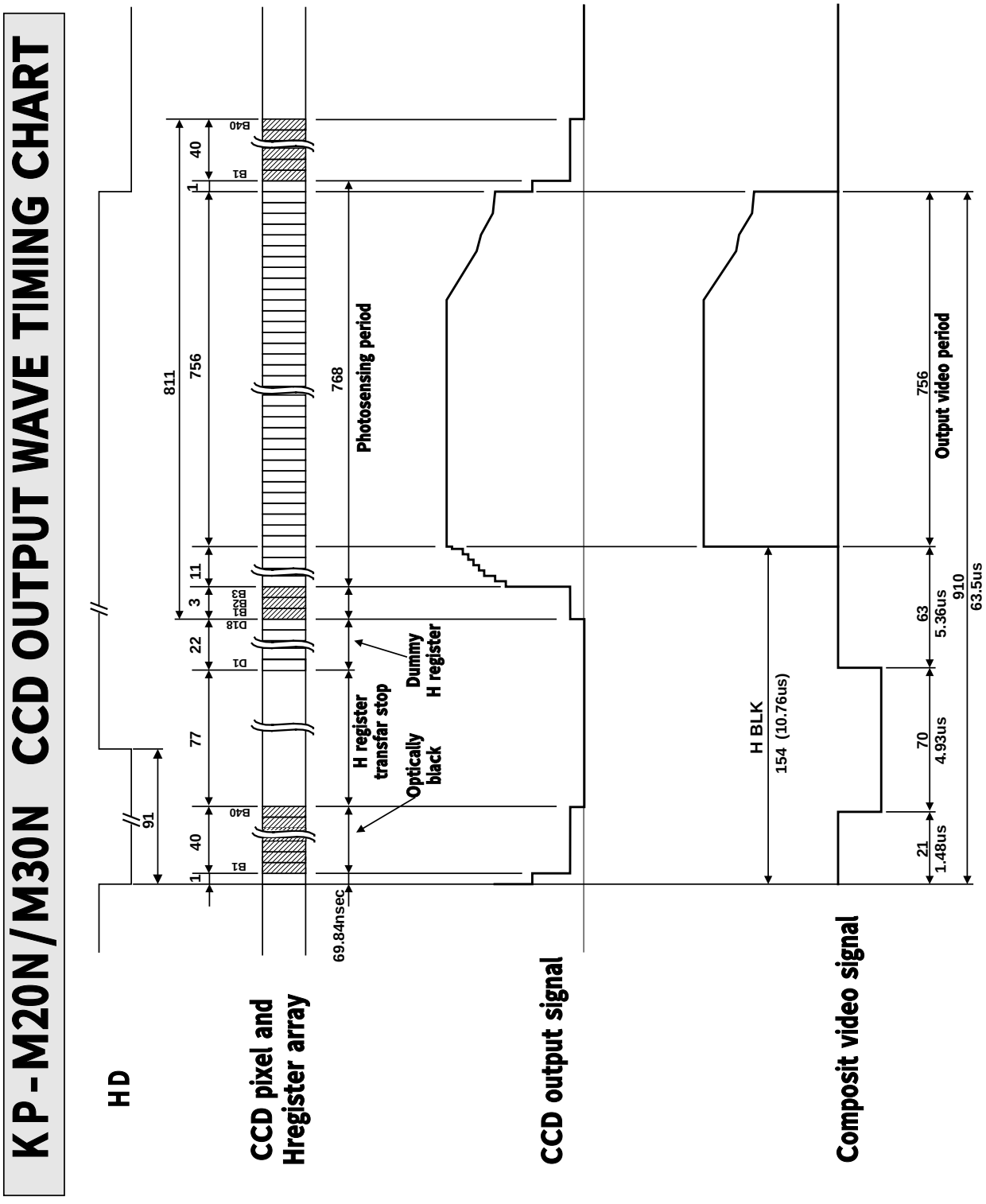
The gain of the camera can be switched between the Manual gain mode and the AGC mode.
This switch is set to the normal gain mode at the factory.

● 75 ohms termination switch (H. TERM/V. TERM)

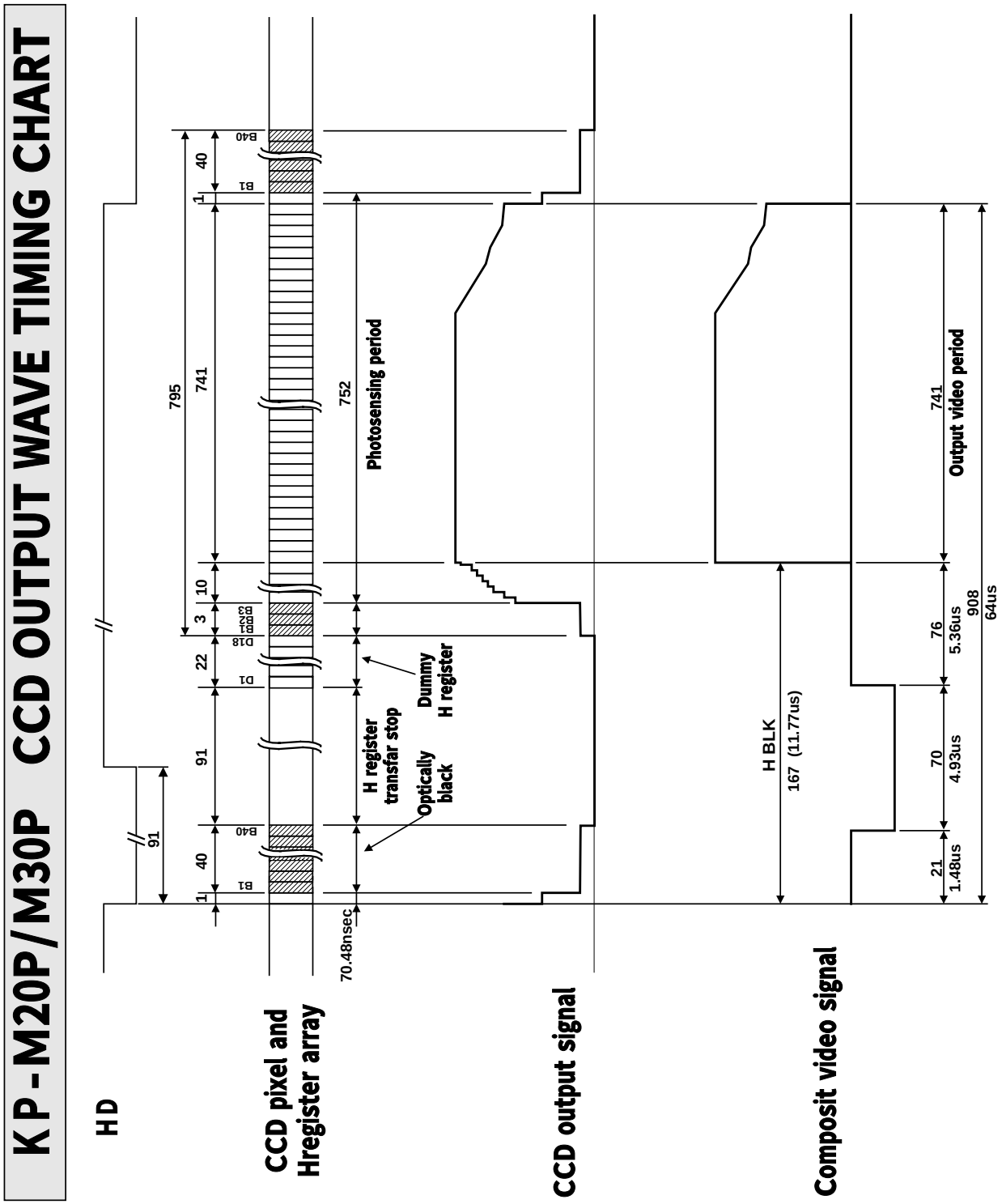


OFF : High impedance
ON : 75 ohms terrmination
This switch is set to High at factory.

5. Timing chart



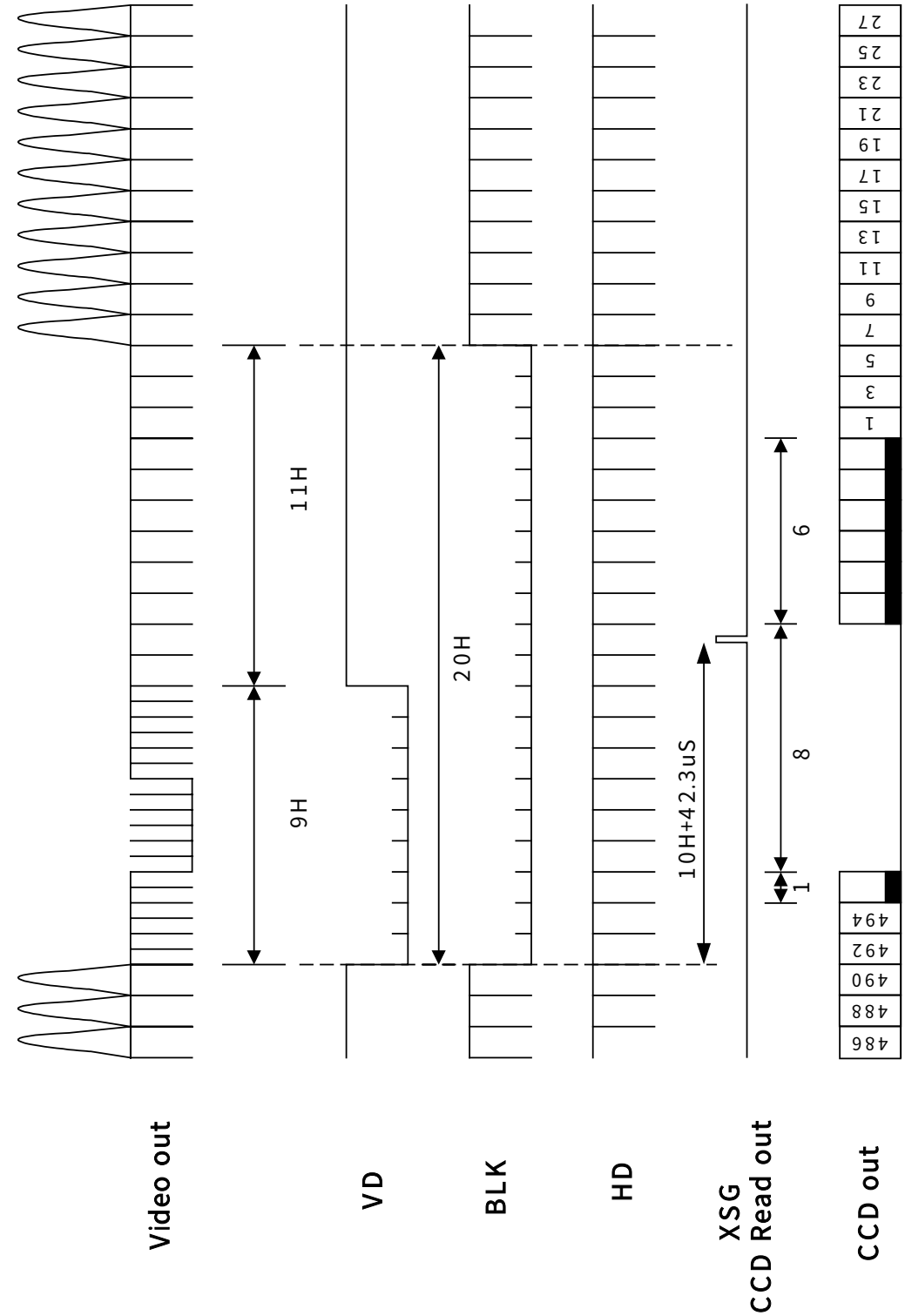
5. Timing chart



5. Timing chart

KP-M20N/M30N Timing Chart

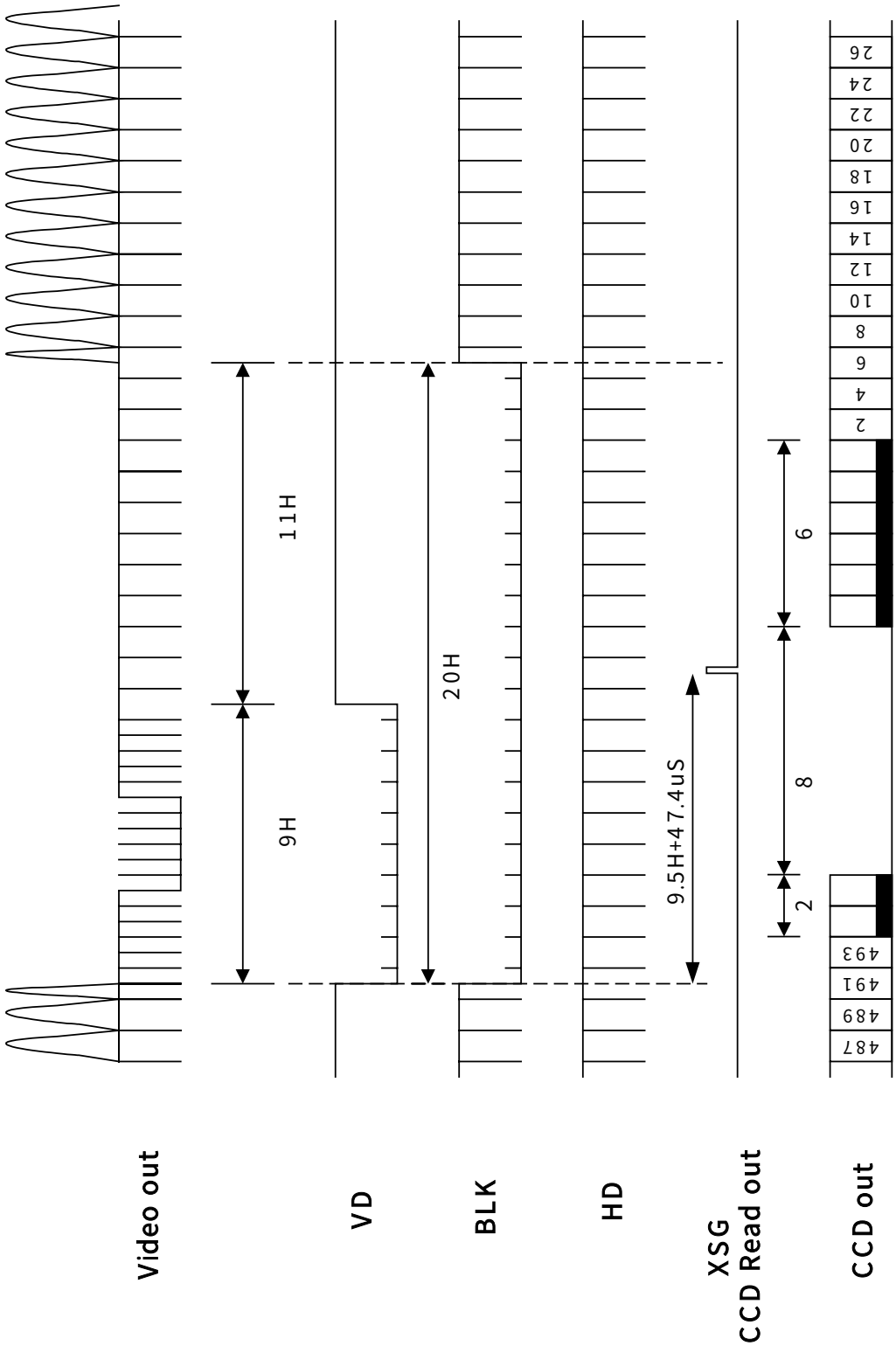
[ODD Field]



5. Timing chart

KP-M20N/M30N Timing Chart

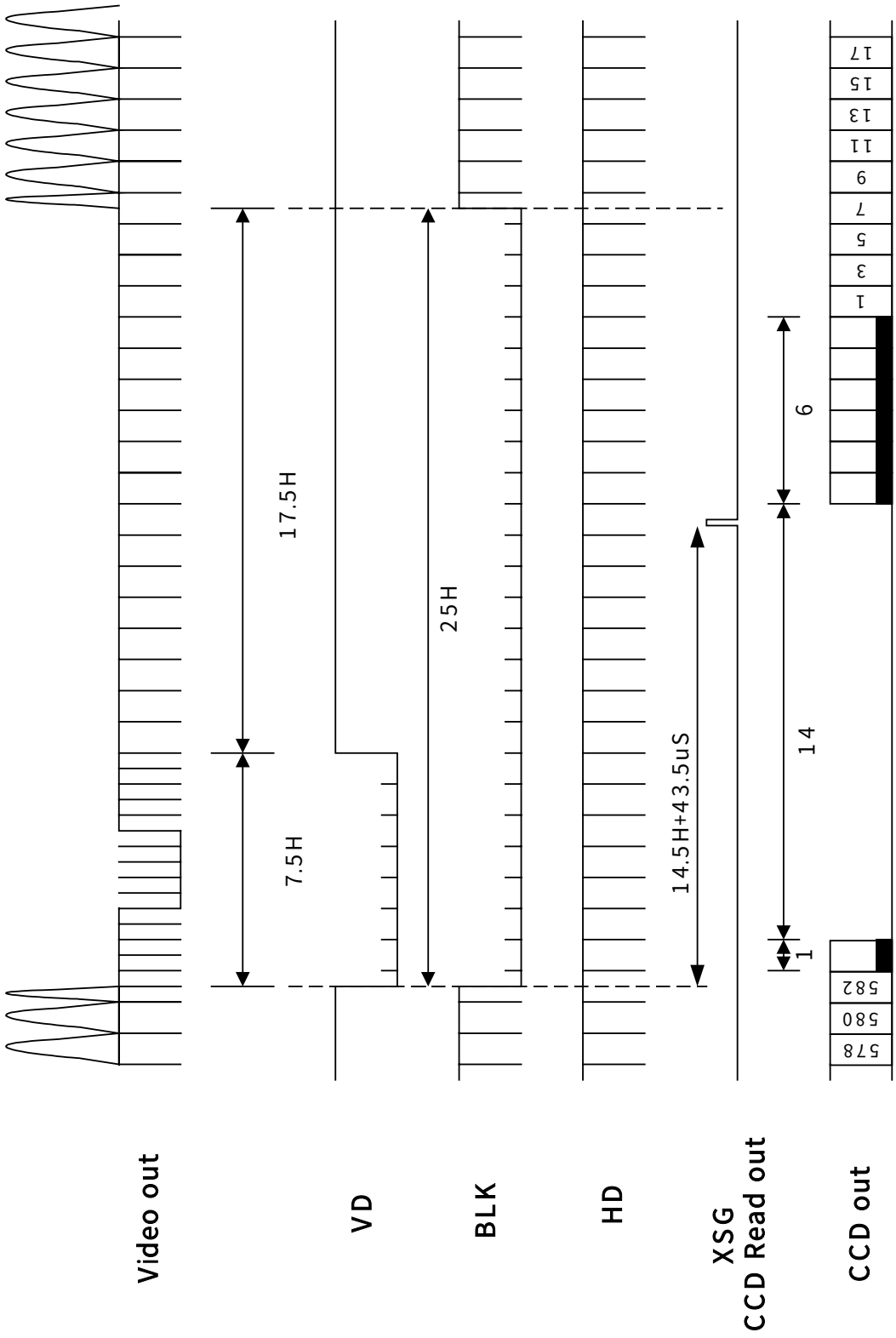
[EVEN Field]



5. Timing chart

KP-M20P/M30P Timing Chart

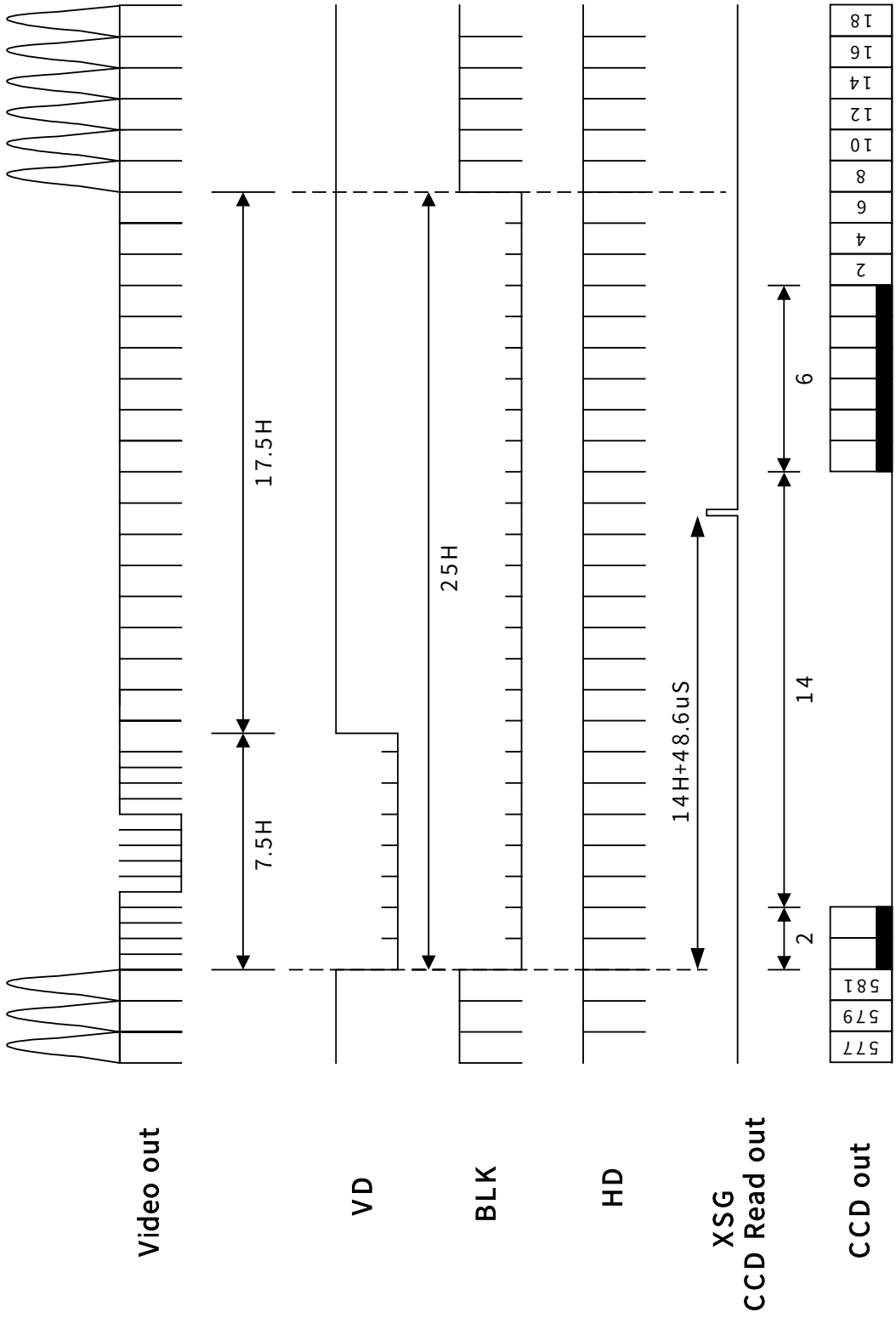
[ODD Field]



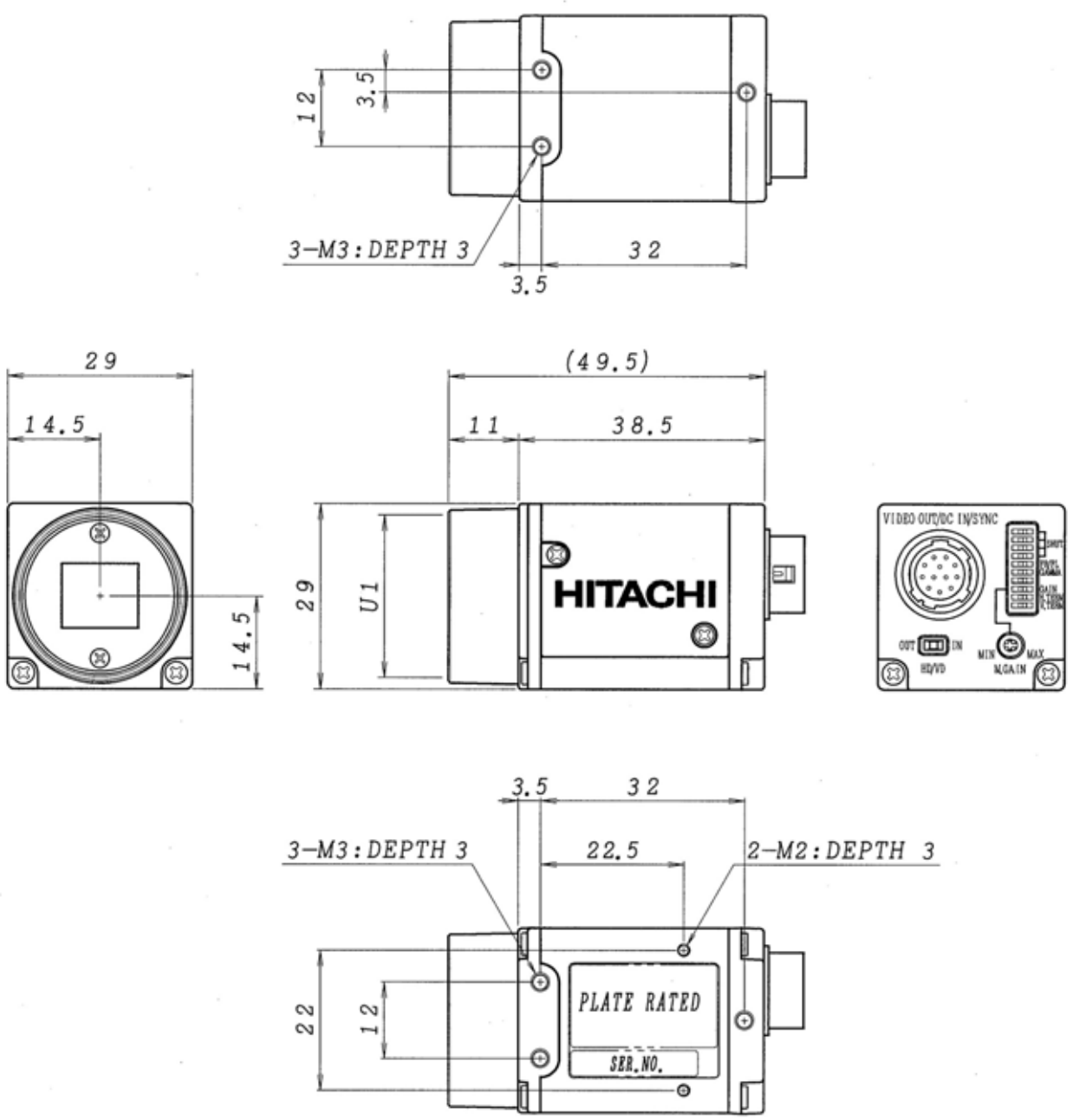
5. Timing chart

KP-M20P/M30P Timing Chart

[EVEN Field]



6. External View



Mass：approx. 55g

Color：BLACK

7. External synchronization (2:1 interlaced)

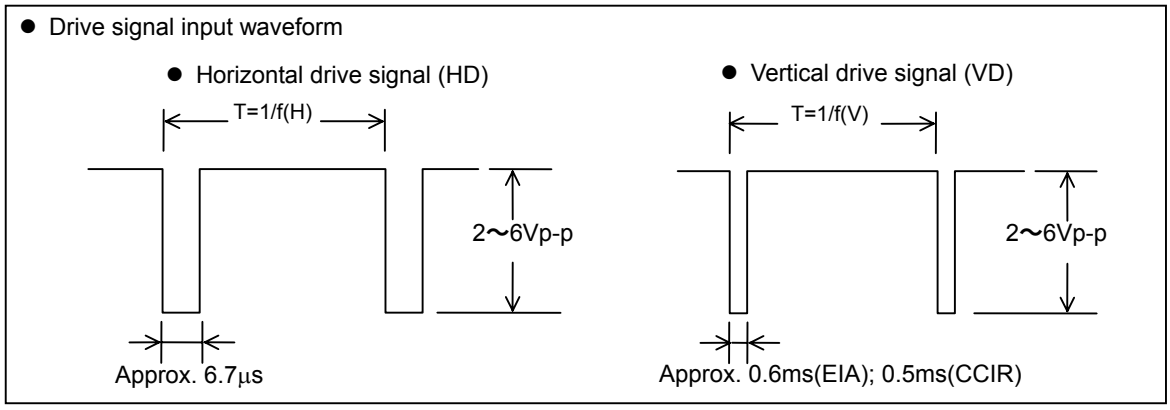
When operating the camera by external drives signals, connect sync drive signals (HD, VD) to the DC IN/SYNC connector, then the mode is automatically switched from the internal sync mode to the external sync mode.

- Horizontal and vertical drive signal inputs
  HD EIA: f(H) = 15.734 kHz ±1 %
  CCIR: f(H) = 15.625 kHz ±1 %
  VD EIA: f(V) = 59.94 Hz (f(V) = f(H) ÷ 262.5)
  CCIR: f(V) = 50 Hz (f(V) = f(H) ÷ 312.5)

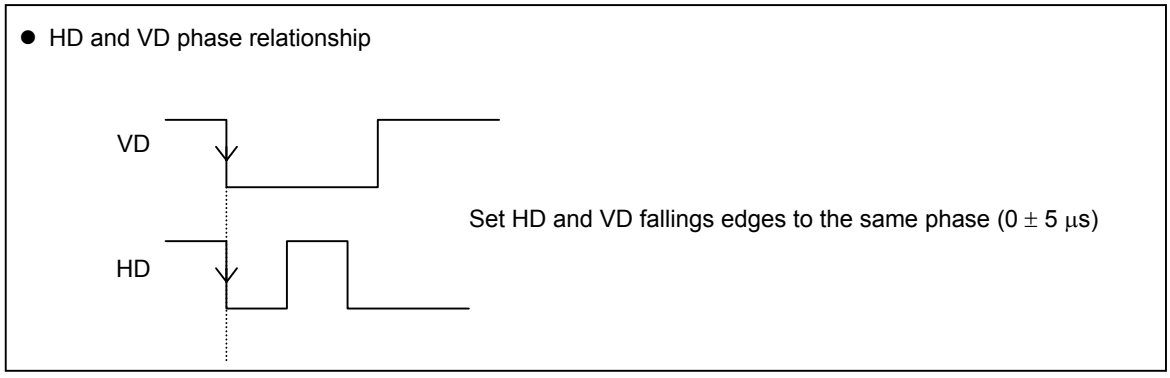
- Input level
  HD 4 to 6 Vp-p negative
  VD 4 to 6 Vp-p negative

- Input impedance 1 kΩ

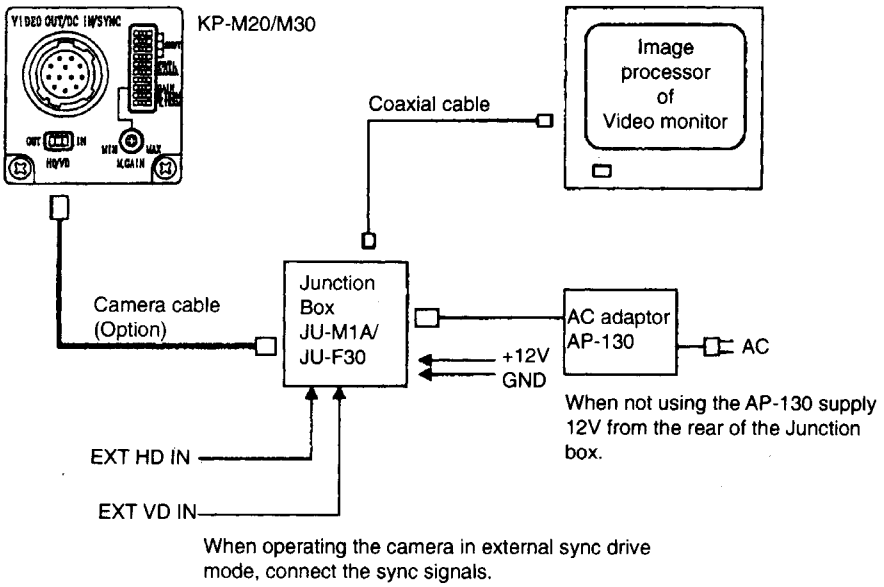
- Drive signal input waveform



- HD and VD phase relationship



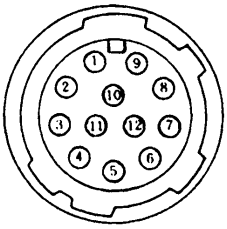
8. CONNECTION OF OPTIONS



● Signal connection to DC IN/SYNC connector.

Signal connection to each pin

PIN NO.	Internal sync mode	External sync mode HD/VD
1	GND	GND
2	+12V	+12V
3	VIDEO (GND)	VIDEO (GND)
4	VIDEO (Signal)	VIDEO (Signal)
5	—	HD (GND)
6	(HD OUT)	HD (Signal)
7	(VD OUT)	VD (Signal)
8	—	GND
9	—	—
10	—	—
11	—	—
12	—	VD (GND)



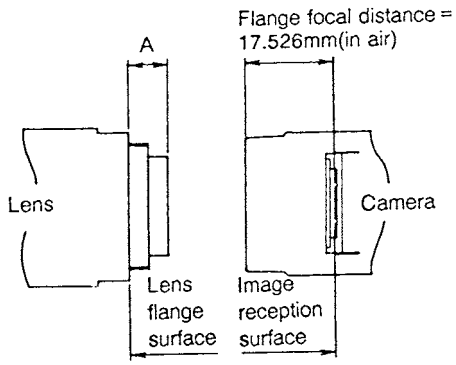
Viewed from this side

Note:
Supply 12V DC in the range between 11 and 13V.

9. Optical system

1)Flange focal

- Image size: 1/3-inch
- The flange focal distance is 17.526mm(in air).
- Flange focal distance cannot be adjusted.

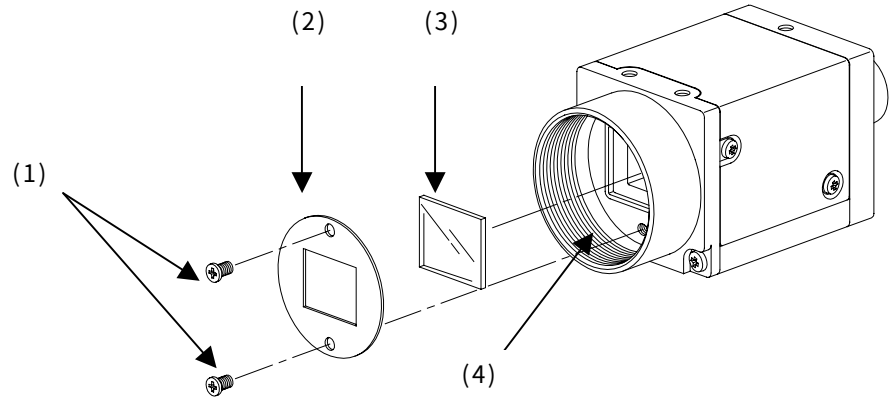


Note:

Select such a lens as the length (A) from the flange surface of the lens to the end of the screw side is 8mm or less.

2) Optical filler

This camera is provided with an IR cut filter.



IR cut filter removal

a) Remove two screws (1) shown in Fig., and filter holder (2) will come off.

b) Remove the IR cut filter (3) from filter frame (4).

c) Reinstall and secure filter holder (2) with two screws (1).

Caution

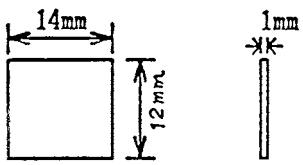
Prior to removing the optical filter, be sure to turn off the power.

IR cut filter IRC650

Dimensions: 14 x 12 x 1.0t

Part code: XMD0006

External view

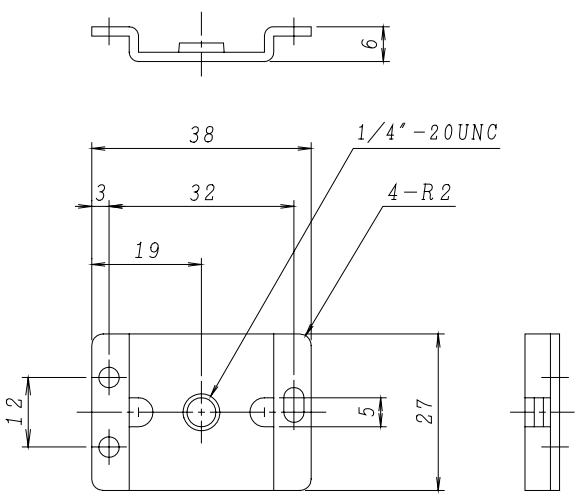


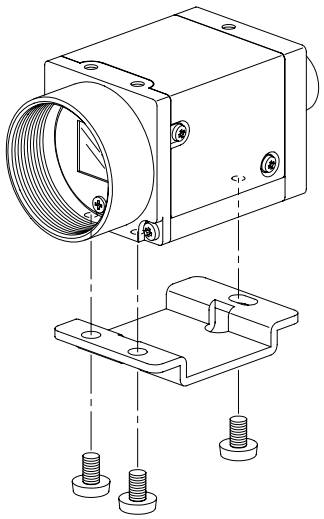
* The flange focal point shortens by about 0.3mm when IR cutting filter is removed.

We will recommend the dummy glass of the optional to be installed.

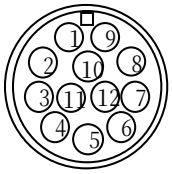
10. Optional

1)Tripod adaptor TA-F30 (23885AX)

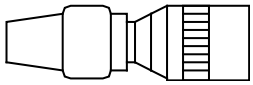




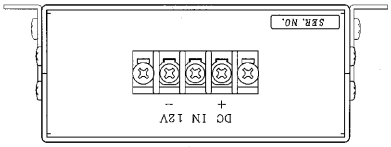
2)12-pin plug HR10A-10P-12S(01) Product code: 23810AX

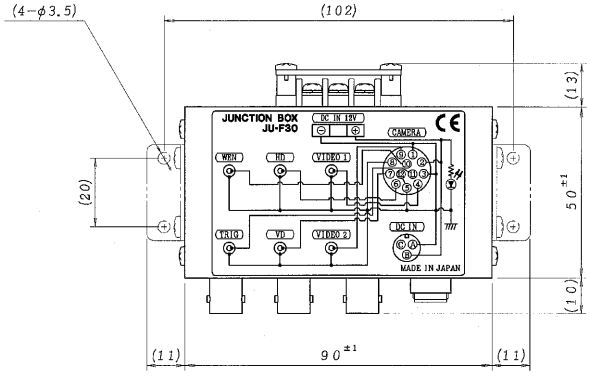


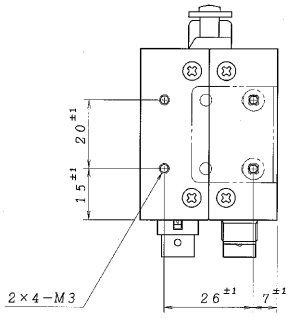
Viewed from this side

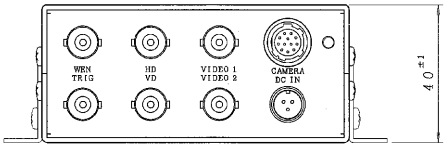


3)Junction box JU-F30 Product code: 23884AX





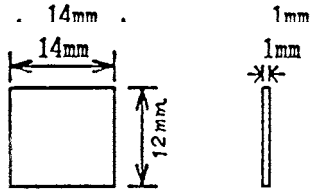




UNIT: mm

4)Dummy glass ARC1214 Parts code: XMD0009

External view

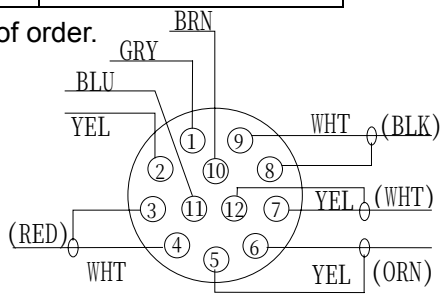


5)Camera cables

	Mould type	Assy type	Shielded type
2m	C-201KSM(23861AX)	C-201KS(23856AX)	C-201KSS(23872AX)
5m	C-501KSM(23862AX)	C-501KS(23857AX)	C-501KSS(23873AX)
10m	C-102KSM(23863AX)	C-102KS(23858AX)	C-102KSS(23874AX)

Specify assembly or shielded type at time of order.

(): Product code



・Voltage drop due to a cable is about 0.01V per meter.

・The H phase delays by about 5ns per meter.

• Attenuation of video signal due to used cable

Attenuation due to optional cables C-501KSM and C-102KSM is shown below.

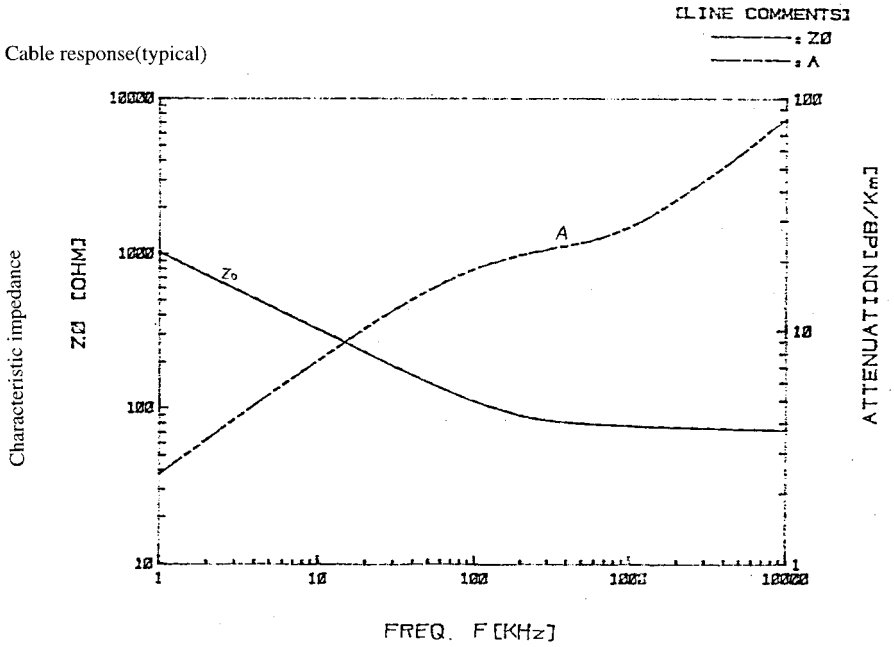
Attenuation is proportionate to the cable length.

Characteristic impedance is kept at constant even at cable length change.

	Cable length	Attenuation at 4MHz 50dB/Km	Attenuation at 7MHz 70dB/Km	Attenuation at 12MHz 90dB/Km
Attenuation due to cable length(dB)	1m	0.05	0.07	0.09
	2m	0.1	0.14	0.18
	5m	0.25	0.35	0.45
	10m	0.5	0.7	0.9

The video bandwidth obtained by the KP-M20/M30is up to approximately 12.5 MHz.

Cable response(typical)



11. Notes to users

◆ Power supply

- Connect a 12V DC voltage (11 to 13V) from an external regulated DC power supply.
- Use a stable power supply without ripple and noise.
- Prior to turning on the power switch , check that the polarities of the power cable are correct , referring to the connection diagram

◆ To protect CCD (sensor)

- Do not touch the glass surface of the CCD sensor to avoid deterioration in picture quality due to dirt and scratches.
- If the glass surface of the sensor should become dusty or dirty , remove dust or dirt carefully with a cotton-tipped applicator. Do not wipe the surface with dry cloth or paper tissue to avoid possible damage to the glass surface by static electricity.

◆ Protection of camera

- Do not use or store the camera under direct sunlight , at a place exposed to rain or snow , or at a place where flammable or corrosive gas is present.
- When housing the camera in a camera case , use the utmost care regarding rise of internal temperature.

When casing the camera , the temperature normally rises by 10 to 20℃ , compared with the outside air temperature. The camera operates in the temperature range from -5 to 45℃. If the camera is used or left in high temperature environment for hours , the life of the camera may be shortened.

- Do not drop the camera. Do not apply strong shock or vibration to the camera.
- Before connecting or disconnecting a connector , turn off the camera and be sure to hold connector body to connect or disconnect the connector.

◆ Camera arrangement

- Mutual interference noise can occur if multiple cameras are arranged in close proximity. Separate the cameras to the extent possible.

When camera units are installed directly into other equipment , external noise can prevent a normal picture. In such cases , shield the camera units.

The camera can be damaged by static electricity. Use ample care when installing and arranging.

◆ Auto electric shutter

- In regions using 50 Hz power line frequency , flicker can appear on the monitor screen from light sources such as fluorescent or mercury. In such cases , release the auto electronic shutter.

11. Notes to users

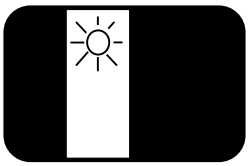
◆ Phenomena inherent to CCD imaging device

Following are phenomena inherent to a CCD imaging device , and not defects.

● Smear and blooming

When strong light (lamp , fluorescent lamp , reflected light , etc.) is shot , pale bands are displayed vertically above and below the light.

In this case , change the angle of the camera so that such strong light does not enter the camera through the lens.



● Fixed pattern noise

When the camera is operated in a high temperature , fixed pattern noise may appear on the entire screen.

The higher the sensitivity of camera , the more this fixed pattern noise appears.

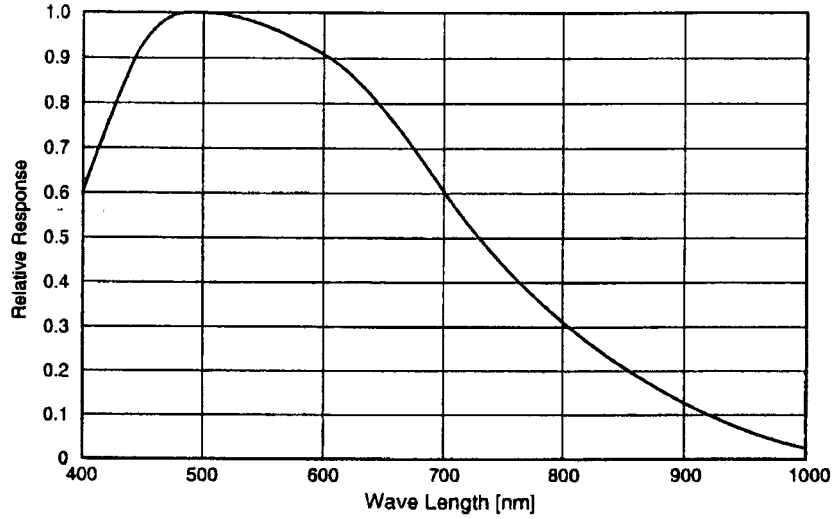
● Moire

When fine patterns are shot , moire may be displayed.

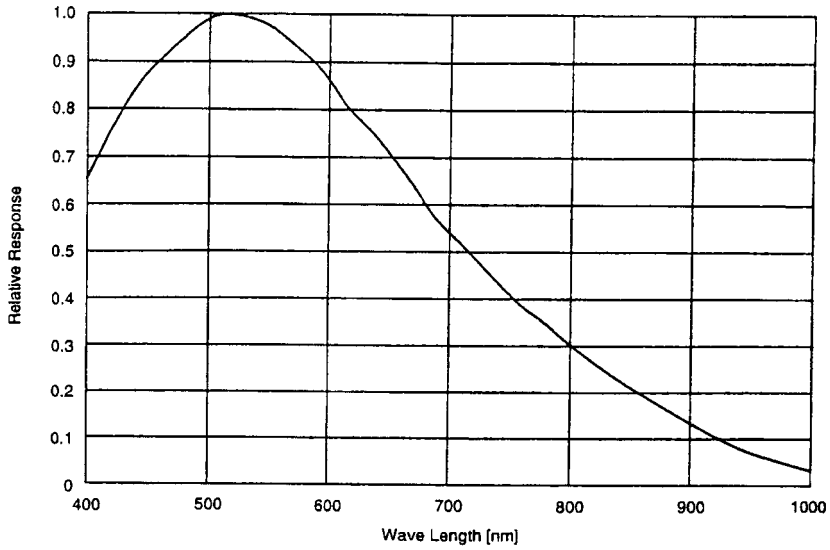
The CE mark is required when exporting to Europe. Obtain the necessary authorization for the customer's system. Enclose the camera in a shielded case and use shielded cable.

Spectral sensitivity (typical example)

KP-M20



KP-M30



Caution

The specifications of this equipment are subject to change without notice for improvement.
Prior to placing your order , be sure to confirm that these specifications are the latest ones.
Hitachi Denshi guarantee that the equipment shipped from our factory conforms to the Hitachi Denshi's standard warranty conditions and perform quality control within the range necessary to Perform the warranty.

Warranty and After-sales Service

1) The guarantee period is one year after the date of purchase. However, the defects due to erroneous use or intentional act are excluded.
2) Defect occurring after expiration of the guarantee period will be repaired at cost to the customer if it is possible to restore the intended function.
3) Our standard Warranty scope pertains only to the camera unit. Secondary losses to a user's system, possibly attributable to malfunction of the camera, are outside the scope of this Warranty. Further, Hitachi bears no liability to reimburse or otherwise compensate for costs incurred in dismantling and reassembling an affected system.
4) Hitachi bears no liability to reimburse or otherwise compensate for loss or damage to business, software, database or other property possibly attributable to malfunction of the camera.
5) Hitachi Kokusai Electric is not liable for the losses caused when the equipment is used in a system used 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 environments of high temperature or high humidity.
   When stable operation is required for a long time, it is recommended to perform periodic maintenance and inspection every one or two years.