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## 1. GENERAL .....

The KP-M1 is a compact, lightweight, black and white CCD camera of the integrated type which uses the latest high grade 2/3-inch image size CCD with total 410,000 (490,000 for CCIR) pixels in combination with high density mounting.

## 2. MAJOR FEATURES .....

- Compact: 44(W) × 29(H) × 72(D)mm  
Lightweight: 120g approx.
- Variable speed electronic shutter function
- Internal/external synchronization, interlace/non-interlace operation
- Restart and reset function
- Frame and field integration modes switchable

## 3. COMPOSITION .....

- (1) Camera body (with IR cut filter)
- (2) C mount cap
- (3) Operation manual

### Optional accessories

- |                    |                    |
|--------------------|--------------------|
| (1) Tripod adaptor | TA-M1              |
| (2) 12-pin plug    | HR10A-10P-12S (01) |
| (3) AC adaptor     | AP-130             |
| (4) Junction box   | JU-M1              |
| (5) Camera cable   | 2m: C-201KS        |
|                    | 5m: C-501KS        |
|                    | 10m: C-102KS       |

## **4. NOTES TO USERS** .....

### **4-1 Power supply**

Connect 12V DC source in the range between 11 and 13V from an external power supply. Prior to turning on power switch make sure of the proper polarities of the electrodes by referring to the connection table on page6.

### **4-2 To protect CCD (sensor)**

- Do not touch the glass surface of the sensor to avoid dirt and scratches.
- If the glass surface of the sensor should become dusty or dirty, never wipe the surface with dry cloth or paper. The surface may be scratched and further the sensor may be damaged by static electricity.
- When the glass surface become dusty or dirty, wipe off dust or dirt carefully with a cotton-tip applicator.
- Be sure to mount a lens or the supplied mount cap on the camera to protect the sensor from dust.

### **4-3 To protect camera**

- Do not use or store the camera under direct sunlight, exposed to rain, snow, or at a place exposed to flammable or corrosive gas.
- The camera operates in the temperature range between -10 to 50°C. If the camera is used or left at high temperature (40°C or more) for hours, the life of the camera may be shortened. When using the camera continuously for hours, avoid using the camera in high temperature or high humidity.
- 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. Be sure to hold the connector body to connect or disconnect the connector.

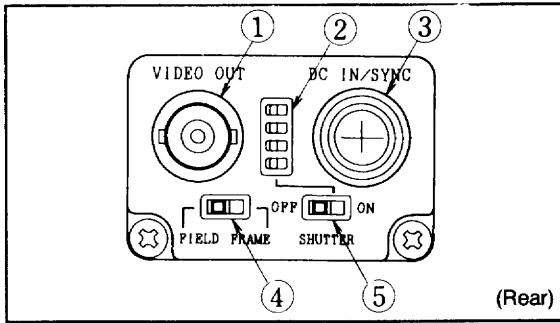
#### **4-4 Arrangement of camera**

When several cameras are installed very close with one another, the cameras may interfere with one another to cause noise. Install the cameras as far as possible each other or operate the cameras by external sync.

#### **4-5 Objects**

If extremely intense light is reflected on a part of an object, vertical white stripes (called vertical smear or blooming) may occur on the screen. In this case, adjust the position and the angle of lights. If intense light is inevitable, adjust the lens iris according to the reflected light and the brightness of the object in accordance with the shooting purpose.

## 5. NAME OF EACH SECTION .....



**Fig. 1**

### **(1) VIDEO OUT (BNC)**

A composite video signal (VS) is fed from this connector. Connect the connector to a video monitor, etc. with a 75-ohm coaxial cable.

### **(2) Shutter speed select switch**

Use this switch to set the shutter speed.

### **(3) DC IN/SYNC connector**

This connector is for 12V DC input, a composite video signal (VS) output and an external sync signal input.

### **(4) FIELD/FRAME integration select switch**

Use this switch to select an integration mode. This switch is set to FRAME at factory.

### **(5) SHUTTER ON/OFF switch**

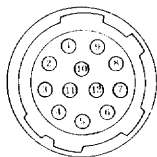
Set the SHUTTER ON/OFF switch to ON to establish the shutter mode.

## 6. CONNECTION OF DC IN/SYNC (DC INPUT/SYNC SIGNAL) CONNECTOR

### Connection of 12-pin plug

Pin NO.	Internal sync	External sync		
		HD-VD	VBS/VS/SYNC	Reset trigger input
1	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V
3	Video output (GND)	Video output (GND)	Video output (GND)	Video output (GND)
4	Video output (Signal)	Video output (Signal)	Video output (Signal)	Video output (Signal)
5	-	HD input (GND)	-	HD input (GND)
6	-	HD input (Signal)	-	HD input (Signal)
7	-	VD input (Signal)	VBS/VS/SYNC (Signal)	Reset trigger input (Signal)
8	-	-	-	-
9	-	-	-	-
10	GND	GND	GND	GND
11	+12V	+12V	+12V	+12V
12	-	VD input (GND)	VBS/VS/SYNC (GND)	Reset trigger input (GND)

12-pin plug



HR10A-10P-12S(01)  
(optional)

Viewed from  
this side



#### Note:

- The video signal cannot be fed simultaneously from both the VIDEO OUT connector and the DC IN/SYNC connector. If both the outputs are connected simultaneously, a proper picture will not be obtained.
- Supply 12V DC in the range between 11 and 13V.

# 7. HOW TO CONNECT CABLES

## 7-1 Basic connection

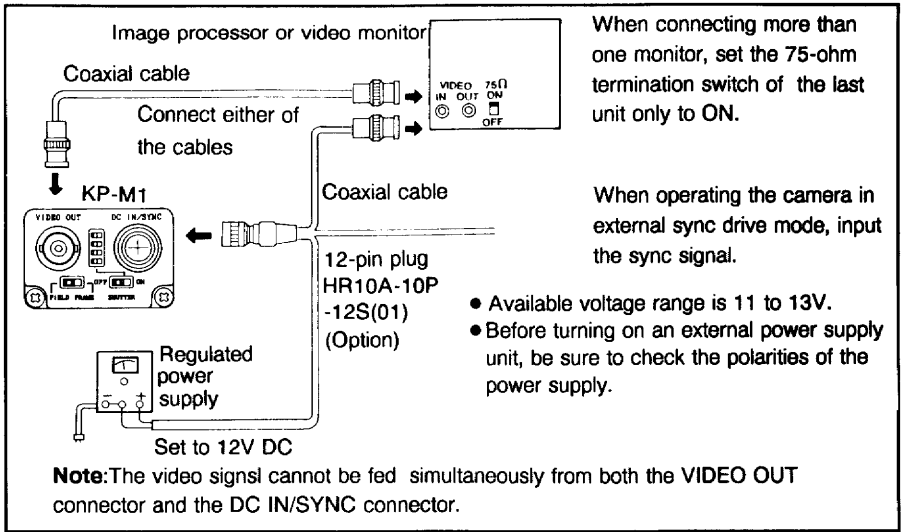


Fig. 2

## 7-2 Connection to options

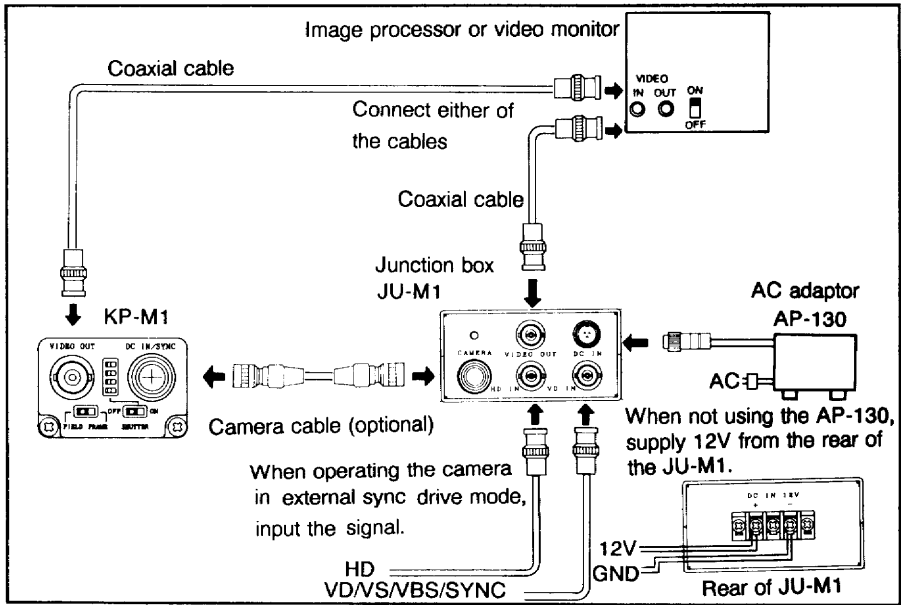
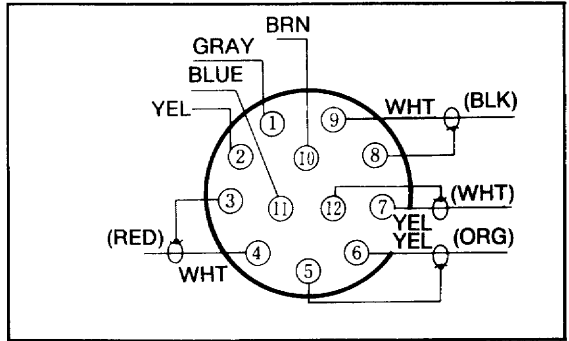


Fig. 3

### 7-3 Optional cables

Cables dedicated for connecting the camera head and the junction box JU-M1 are available as option.

Length	Type
2m	C-201KS
5m	C-501KS
10m	C-102KS

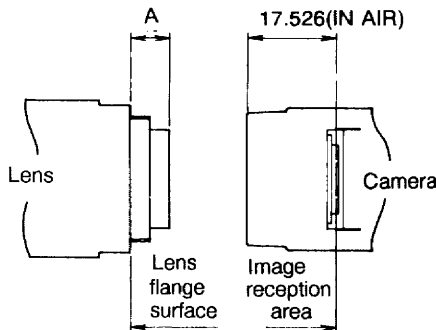


**Fig. 4**

- Voltage drop is about 0.01V per meter.
- The H phase delays by about 5ns per meter.
- When an optional cable is used, the video signal cannot be fed from the VIDEO OUT connector.
- When using a cable only to supply power, use the C-201KS (2m).

### 8. OPTICAL SYSTEM

- The image size is 2/3 inches.
- The flange focal distance is 17.526mm (in air).
- Select a lens of which length (A) from the flange surface of the lens to the end of the screw side is 8mm or less.



**Note**  
Frang focal distance cannot be adjusted.

**Fig. 5**



## 9. IR (INFRARED RAY) CUT FILTER

This camera is provided with an IR cut filter.

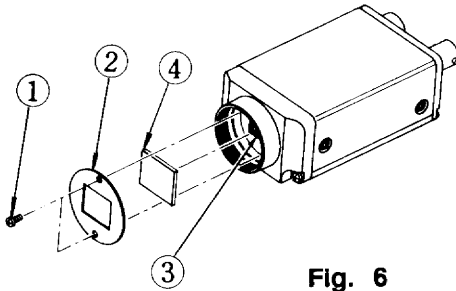


Fig. 6

### How to remove the IR cut filter.

- (1) Remove two screws shown in the figure, and filter plate ② will come off.
- (2) Remove the IR cut filter ④ from filter frame ③.
- (3) Then, reinstall and secure filter plate ② with two screws ①.

## 10. ARRANGEMENT OF INTERNAL SWITCHES

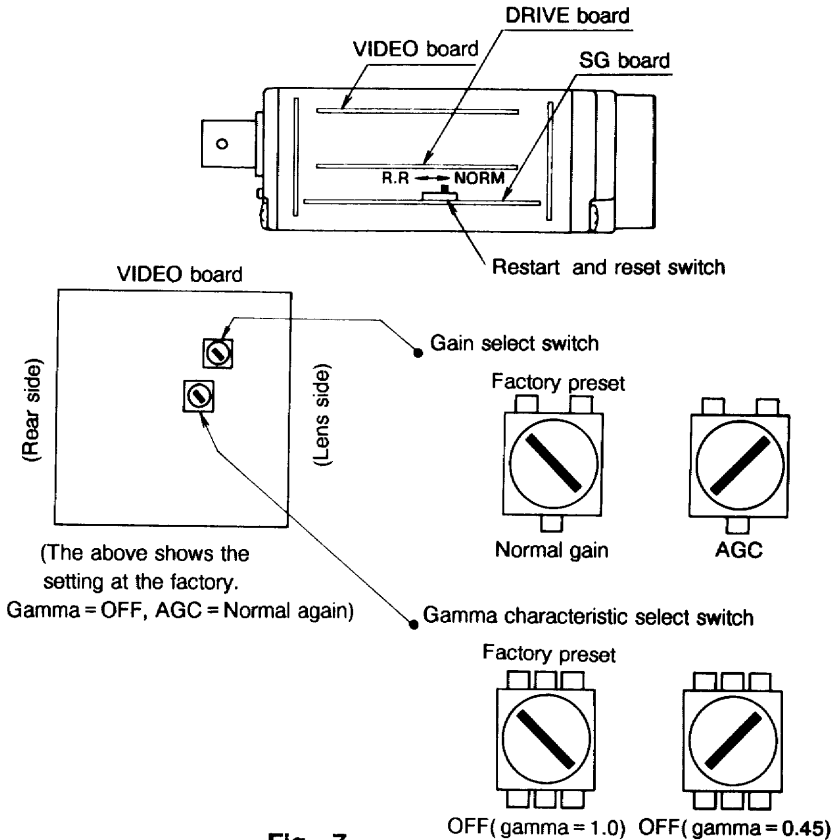


Fig. 7

## **11. GAMMA CHARACTERISTIC SELECT SWITCH** .....

The camera is provided with the gamma characteristic select switch. The switch is set to OFF at the factory. (For the location of the switch, refer to figure 7 on page 9.)

### **(1) Gamma: OFF (Gamma = 1.0)**

In this mode, a linear output signal in accordance with the brightness of an object can be obtained.

### **(2) Gamma: ON (Gamma = 0.45)**

This mode is suitable to view a picture on a monitor screen.

## **12. GAIN SELECT SWITCH** .....

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

(For the location of the switch, refer to figure 7 on page 9.)

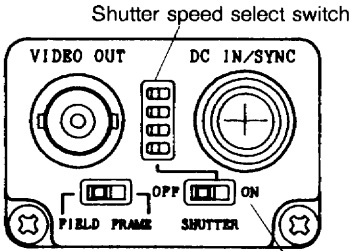
### **(1) Normal gain mode**

In this mode, the video gain is always fixed. (The noise amount is also fixed.)

### **(2) AGC mode**

When the illumination on an object becomes lower than the rated level, gain is automatically increased. As gain increases, noise also increases.

### 13. HOW TO USE ELECTRONIC SHUTTER



Set the SHUTTER ON/OFF switch to ON, then set the speed with the shutter speed select switch.

SHUTTER ON/OFF switch

#### Setting of shutter speed ( ) :CCIR

Setting position	Speed (second)	Relative sensitivity	Setting position	Speed (second)	Relative sensitivity
 (Or set the shutter ON/OFF switch to OFF.)	Normal 1/60 (1/50)	1		1/500	1/8 (1/10)
				1/1000	1/16 (1/20)
	1/100 (1/120)	1/1.5		1/2000	1/32 (1/40)
	1/125	1/2		1/4000	1/64 (1/80)
	1/250	1/4 (1/5)		1/10000	1/160 (1/200)

The higher the shutter speed, the greater the effect. However, since sensitivity lowers, adjust the lens iris or increase illumination. And when the shutter is used, the flicker of an object may be emphasized. Use a light which causes no flicker, such as a DC lighting lamp.

## 14. EXTERNAL SYNCHRONIZATION (2:1 INTERLACE) .....

When operating the camera by external drive signals, connect sync drive signals (HD,VD) or SYNC (VS,VBS) to the DC IN/SYNC connector.

When supplying the sync signal from an external unit, the mode is automatically switched from internal sync to external sync.

[When synchronization is made by SYNC (VS,VBS), it is unnecessary to connect the HD signal.]

- Input signals
 

HD	EIA: $f(H) = 15,734\text{kHz} \pm 1\%$
	CCIR: $f(H) = 15,625\text{kHz} \pm 1\%$
VD	EIA: $f(V) = 59.94\text{Hz}$ [ $f(V) = f(H) \div 262.5$ ]
	CCIR: $f(V) = 50\text{Hz}$ [ $f(V) = f(H) \div 312.5$ ]
  
- Input level
 

HD	2 to 6Vp-p, negative
VD	2 to 6Vp-p, negative
SYNC	2 to 6Vp-p, negative
VS,VBS	1.0Vp-p (SYNC 0.3 min. 0.25Vp-p)
  
- Input impedance
 

	1k ohms
--	---------

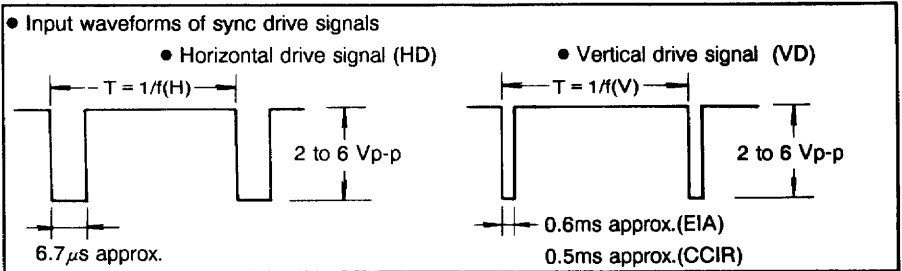


Fig. 8

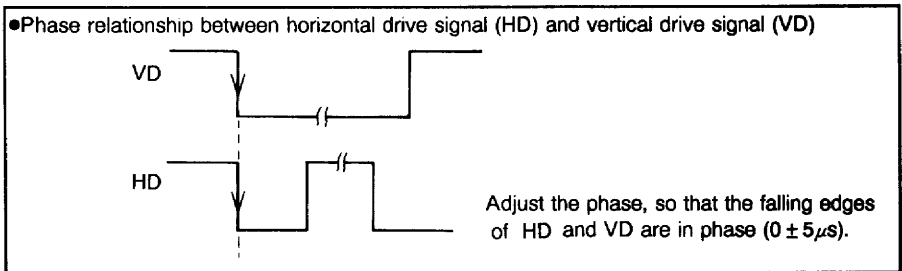


Fig. 9

**Caution** When connecting the VS OR VBS signal as an external sync signal, use the composite video signal whose level does not change.



## 16. RESTART AND RESET FUNCTION .....

The camera is provided with the restart and reset function (called also random reset or asynchronous function) to store only the pictures at desired timing in a picture memory, etc.

To operate the restart and reset function, set the restart and reset switch to R.R.

Please note that when the switch is set to R.R., the camera does not operate in internal sync mode.

- Input signal

(1) HD

EIA:  $f(H) = 15,734\text{kHz} \pm 1\%$

CCIR:  $f(H) = 15,625\text{kHz} \pm 1\%$

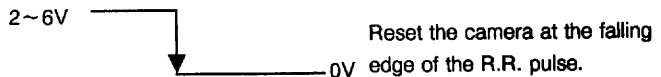
Input level: 2 to 6Vp-p, negative

Input impedance: 1k ohms

The input waveforms of sync drive signals are the same as those of 2:1 interlaced external sync signals.

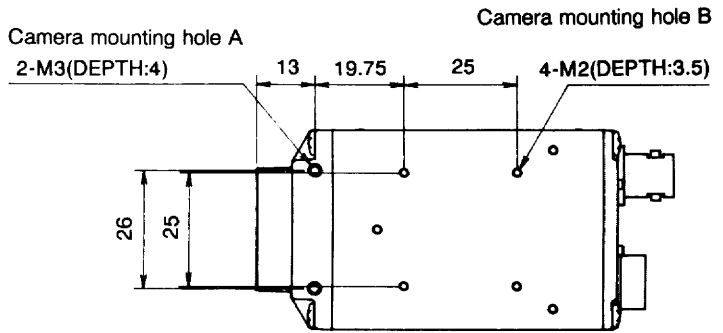
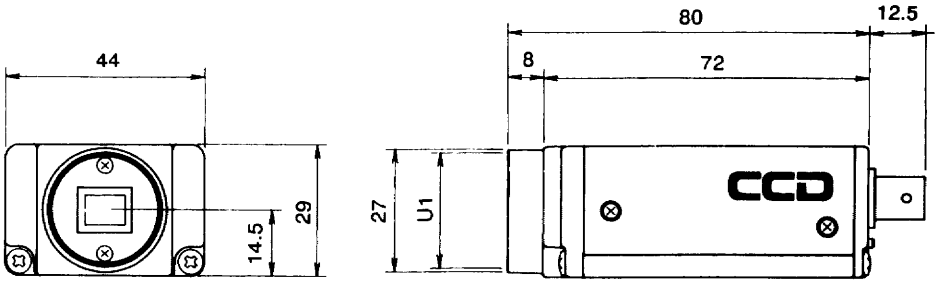
(2) R.R Input level: 2 to 6Vp-p, negative

(Restart pulse) Input impedance: 1k ohms



# 17. EXTERNAL VIEW DRAWING

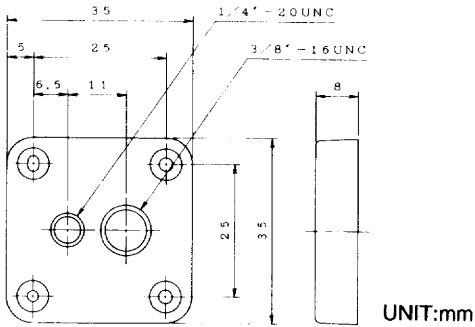
## ● Camera KP-M1



UNIT:mm

**For mounting the camera, use camera mounting holes A and B.**

## ● Tripod adaptor TA-M1



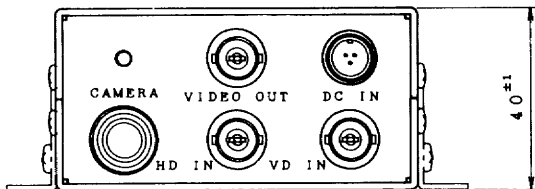
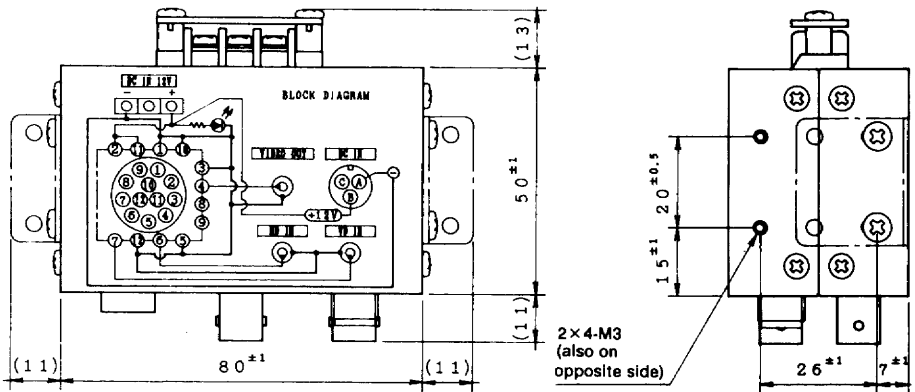
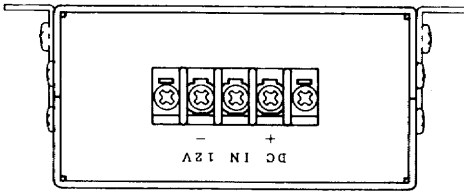
Secure the adaptor to camera mounting holes B using four supplied screws (M2 × 5).

### Note:

If the screws are too long, they will cause trouble of the camera.

Be sure to check the length before use.

## ● Junction box JU-M1



UNIT:mm



## 18. SPECIFICATIONS

- |                                   |  |
|-----------------------------------|--|
| (1) Imaging device:               | Interline transefer CCD  |
| Total number of pixels            | EIA: 818(H) × 513(V)<br>CCIR: 816:(H) × 606(H)   |
| Pixel pitch                       | EIA: 11.0(H) × 13.0(V)um<br>CCIR: 11.0(H) × 11.0(V)um  |
| Number of effective<br>Pixels     | EIA: 768(H) × 493(V)<br>CCIR: 756(H) × 581(V)  |
| (2) Imaging area:                 | 8.8 × 6.6mm (2/3-inch size)  |
| (3) Signal system:                | Subject to EIA or CCIR system<br>(at normal operation)   |
| (4) Lens mount:                   | C mount  |
| (5) Flangeback:                   | 17.526mm   |
| (6) Horizontal scan<br>frequency  | EIA: 15.734kHz<br>CCIR: 15.625kHz  |
| (7) Vertical scan<br>frequency    | EIA: 59.94Hz<br>CCIR: 50Hz   |
| (8) Sync system:                  | Automatic switching between internal<br>sync and external sync   |
| (9) Internal sync scan<br>system: | 2:1 interlace  |
| Number of horizontal<br>Lines     | EIA: 525 TV lines<br>CCIR: 625 TV lines<br>Equation for relationship between $f(v)$ and<br>$f(H)$ : $f(v) = 2f(H)/525(625 \text{ for CCIR})$ |

- (10) External sync input  
 HD + /VD: 2 to 6Vp-p  
 or SYNC (VS and  
 VBS also acceptable): 0.3(min. 0.25)Vp-p, negative  
 Input impedance: 1k ohms  
 Frequency deviation:  $\pm 1\%$
- (11) Number of horizontal lines within range where external sync is possible
- 2:1 interlace  
 EIA: 521 to 2047 TV lines/2 fields  
 (1 field: 61 to 15Hz)  
 CCIR: 621 TO 2047 TV lines/field  
 (1 field: 51 to 15Hz)
- Non- interlace  
 EIA: 260 to 1023 TV lines/field  
 (1 field: 61 to 15Hz)  
 CCIR: 310: to 1023 TV lines/field  
 (1 field: 51 to 15Hz)
- (12) Video output: 1.0Vp-p, 75 ohms, unbalanced  
 Video: 0.7Vp-p  
 Sync: 0.3Vp-p, negative
- (13) Horizontal resolution EIA: 570 TV lines  
 CCIR: 560 TV lines  
 Vertical resolution EIA: 485 TV lines  
 CCIR: 575 TV lines
- (14) Sensitivity: 400 lux, f4, under 3200K lighting
- (15) Minimum object illumination: 0.5 lux, f1.4 AGC and GAMMA ON, without IR cut filter
- (16) S/N: 56dB
- (17) Electronic shutter: 1/10000, 1/4000, 1/2000, 1/1000, 1/500, 1/250, 1/125, 1/120, (CCIR), 1/100 (EIA), OFF(normal exposure)  
 Setting to OFF at the factory.
- (18) Storage mode: Field/frame storage  
 Setting to frame storage at the factory.

- (19) Gamma correction:           Gamma = 1.0 or correction  
Gamma = 1.0 is set at the factory.
- (20) AGC:                           Fixed gain or AGC  
Setting to fixed gain at the factory.
- (21) Restart and reset  
function:                           ON/OFF  
Setting to OFF at the factory.
- (22) Power requirement:           12V DC  $\pm$  1V
- (23) Current consumption:         210mA approx.
- (24) Storage temperature  
and humidity:                     -20 to 60°C, RH 70% or less
- (25) Operating temperature  
and humidity:                     -10 to 50°C, RH 90% or less
- (26) Full specification temperature  
and humidity:                     0 to 40°C, RH 50 to 70%
- (27) Resistance to vibration:     9G MAXIMUM(10 to 60Hz,  
amplitude:0.98 constant)  
7G constant(60 to 150Hz, amplitude  
varriable)  
(Sweep of 10 to 150Hz in each direction  
of XYZ for 30 minutes)
- (28) Dimensions:                   44(W)  $\times$  29(H)  $\times$  72(D)mm
- (29) Weight:                        120g approx.

※ Specifications ore subject to change without notice .