

**Progressive Scan Type**  
**Black and White Camera**

**KP-F3W**

**OPERATION MANUAL**

Please read this operation manual carefully for proper operation, and keep it for future reference.

**CCD カメラ**

**KP-F3W**

**取扱説明書**

この取扱説明書には、あなたや他の人々への危害や財産への損害を未然に防ぎ、この機器を安全にお使いいただくために、守っていただきたい事項を示しています。ご使用になる前に、取扱説明書をよくお読みいただき、正しい使い方でご愛用ください。  
お読みになった後も、この機器のそばなどいつも手元に置いてご使用ください。

**Hitachi Kokusai Electric Inc.**

**株式会社 日立国際電気**

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**Note:**The model and serial numbers of your CAMERA are important for you to keep for your convenience and protection. These numbers appear on the nameplate located on the bottom of the products. Please record these numbers in the spaces provided below, and retain this manual for future reference.

**Model No.** \_\_\_\_\_

**Serial No.** \_\_\_\_\_

# 1. GENERAL

The KP-F3W is a progressive scan black and white CCD camera with a 1/3-inch size CCD and a full frame shutter. The full repertoire of functions includes high sensitivity, high resolution, multi-stage electronic shutter, external HD and VD synchronization, frame/field on demand (FD) and non- interlace

scanning. The square format picture elements provide suitability for image processing applications.

# 2. MAJOR FEATURES

- Frame shutter function
- Multiple step electronic shutter
- Selectable internal/external synchronization (interlaced and non-interlaced)
- Frame/field-on-Demand function

# 3. COMPOSITION

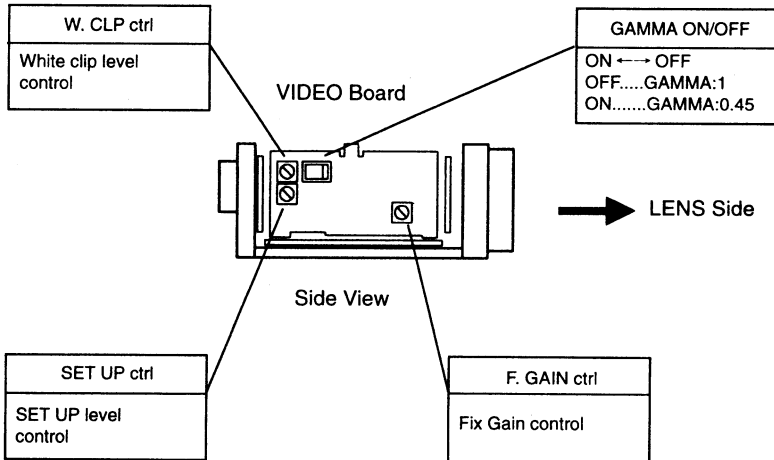
## Standard composition

- (1) Camera (w/IR cut filter)
- (2) Operation manual

## Optional accessories

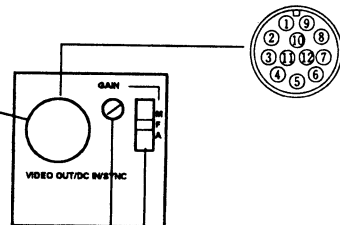
- (1) Lens
- (2) 12-pin plug, HR10A-10P-12S(01)
- (3) AC adaptor, AP-130
- (4) Junction box, JU-F1 or JU-M1A
- (5) Camera cables
  - 2m: C-201KSM
  - 5m: C-501KSM
  - 10m: C-102KSM

## 4. SECTION NAMES AND FUNCTION



VIDEO OUT/DC IN/SYNC CN  
 VIDEO OUTPUT  
 DC IN:DC12V(11 to 13V)  
 EXT. HD, EXT. VD and Trigger input.

Pin No.	Internal sync mode	External sync mode		
		HD/VD	Frame/field -On-Demand	
			ONE Trigger	Field shutter
1	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V
3	VIDEO (GND)	VIDEO (GND)	VIDEO (GND)	VIDEO (GND)
4	VIDEO (Signal)	VIDEO (Signal)	VIDEO (Signal)	VIDEO (Signal)
5	—	HD (GND)	—	—
6	—	HD (Signal)	—	—
7	—	VD (Signal)	TRIG (Signal)	TRIG (Signal)
8	—	—	—	—
9	—	—	—	—
10	GND	GND	GND	GND
11	+12V	+12V	+12V	+12V
12	—	VD (GND)	TRIG (GND)	TRIG (GND)



REAR  
View


GAIN select  
 M ↔ F ↔ A  
 M.....Manual Gain  
 F.....Fix Gain  
 A.....Auto Gain Control

M. GAIN ctrl  
 Manual GAIN ctrl

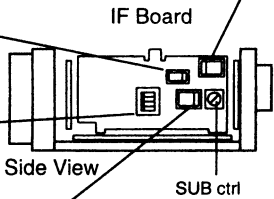


**SIGNAL**  
 N ↔ I  
 I.... 2:1 Interlaced  
 (1/120 second)  
 N.... Non interlaced  
 (1/60 Second progressive)

**FD ON/OFF**  
 OFF ↔ ON  
 ON....Frame/field on demand  
 ONE trigger (ON only)  
 Fixed shutter  
 OFF....Normal shutter



(OFF) (ON)



**E:SHUTTER**

	Normal		1/2000s
	1/200s		1/4000s
	1/500s		1/8000s
	1/1000s		1/16000s

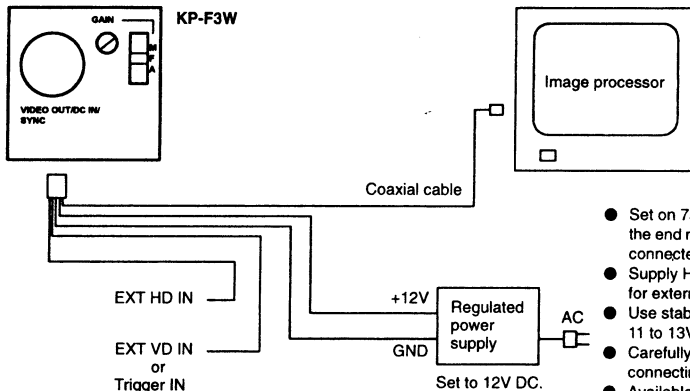
**HD/VD IN/OUT**  
 I ↔ O  
 I.....External HD/VD Input  
 O.....Internal HD/VD Output

**Note:**  
 Fixed shutter  
 1) FD switch....ON  
 2) Trigger input  
 3) E.SHUTTER switch setting...

	ONE trigger		1/16000s
	1/4000s		1/32000s
	1/8000s		

## 5. CONNECT CABLES

### 5-1 Basic connection

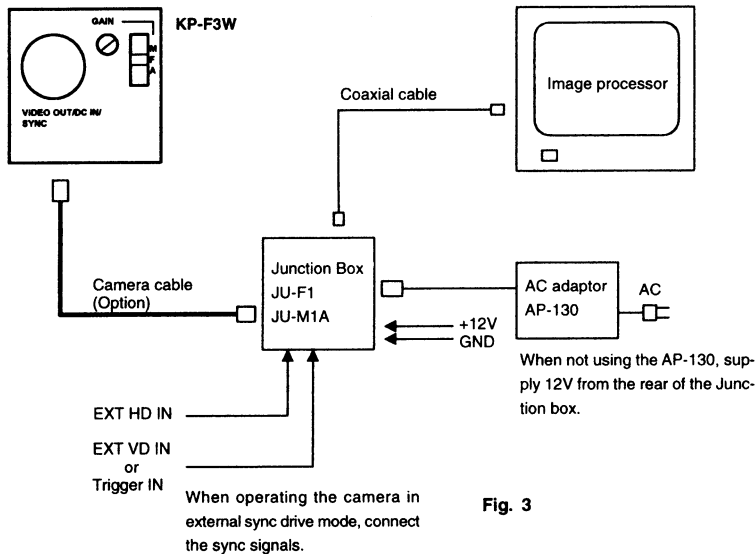


When operating the camera in external sync drive mode, connect the sync signals.

- Set on 75  $\Omega$  termination switch only of the end monitor when plural monitors are connected in loop-through.
- Supply HD and VD pulses to the KP-F3W for external sync drive.
- Use stable external power supply within 11 to 13V DC free from ripple or noise.
- Carefully check voltage polarity when connecting an external power supply.
- Available voltage range is 11 to 13V.
- Before turning on an external power supply unit, be sure to check the polarities of the power supply.

**Note:** The video signal cannot be fed simultaneously from both the VIDEO OUT connector and the DC IN/SYNC connector.

## 5-2 Connection of options



**Fig. 3**



## 6. OPTICAL SYSTEM

### 5-3 Camera cable

Cables dedicated for connecting the camera head and the junction box JU-F1 are available as option.

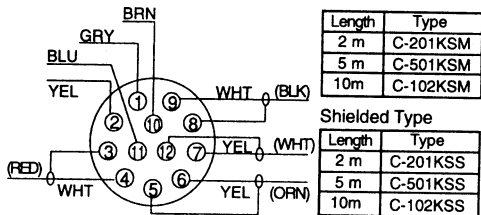
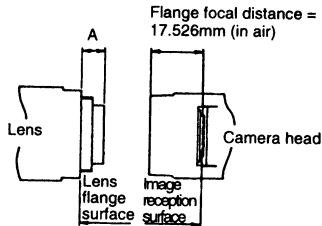


Fig. 4

- Voltage drop due to a cable is about 0.01V per meter.
- The H phase delays by about 5ns per meter.
- When using a cable only to supply power, use the C-201KSM (2m) cable.

- 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.

Fig. 5

## 7. OPTICAL FILTER

This camera is provided with an IR cut filter.

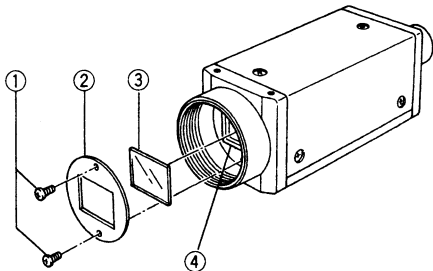


Fig. 6

### IR cut filter removal

- (1) Remove two screws ① shown in Fig. 6, and filter holder ② will come off.
- (2) Remove the IR cut filter ③ from filter frame ④.
- (3) Reinstall and secure filter holder ② with two screws ①.

### Caution

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

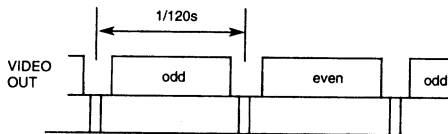
## 8. VIDEO OUTPUT MODES

- **2:1 interlaced**  
(I:Interlace)

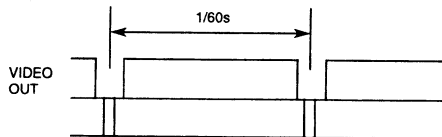
- **Frame output mode**  
(N:Non-interlaced)

The non-interlaced video data of all exposed pixels are output at one frame intervals .

**Interlaced (1/120 s)**

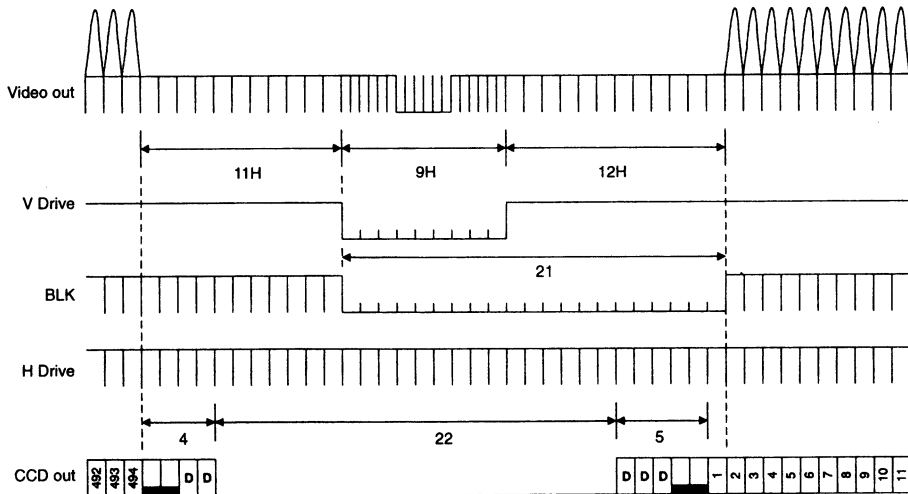


**1/60s non-interlaced**

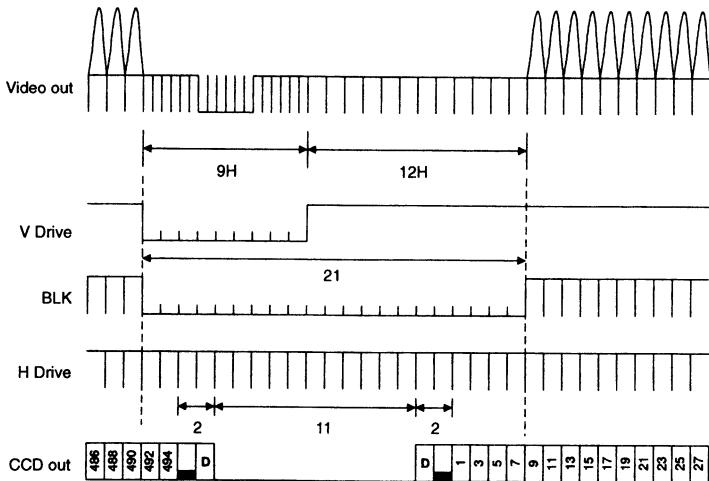


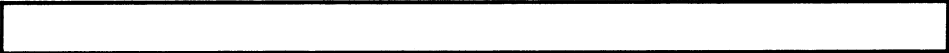


**Timing diagrams**  
**1/60sec non-interlace(V)**

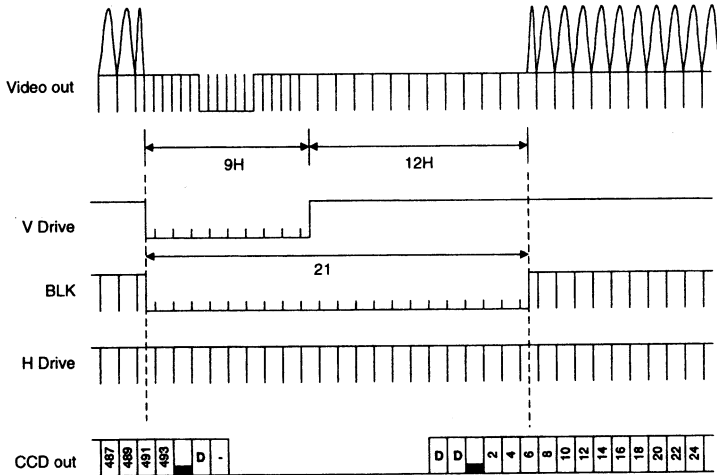


# 1/120sec Interlace(V)





### 1/120sec interlace(V)



## 9. EXTERNAL SYNCHRONIZATION (2:1 INTERLACED)

When operating the camera by external drive 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.

- Input signals

HD and VD signals

(2:1 Interlace)

HD :  $f(H)=31.468\text{kHz} \pm 1\%$

VD :  $f(V)=119.88\text{Hz} [f(V)=f(H) \div 262.5]$

(Non-Interlace)

VD :  $f(V)=f(H) \div (262 \pm 2)$  (Hz)

VD :  $f(V)=f(H) \div (525 \pm 2)$  (Hz)

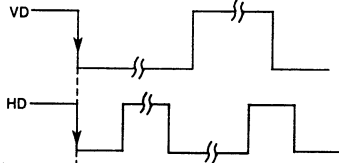
- Input level

HD 2 to 6Vp-p, negative

VD 2 to 6Vp-p, negative

- Input impedance 1k ohms

- Phase relationship between horizontal drive signal (HD) and vertical drive signal (VD)

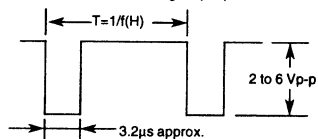


Adjust the phases so that the falling edges of HD and VD are in phase ( $0 \pm 1.7\mu\text{s}$ ).

Fig. 8

- Input waveforms

- Horizontal drive signal (HD)



- Vertical drive signal (VD)

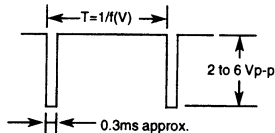


Fig. 9

## 10. FRAME/FIELD-ON-DEMAND FUNCTION

Frame/field-on-demand refers to a function whereby a trigger pulse input is applied at a desired timing to take a high speed object at a desired or fixed exposure time. It is effective for rendering a fast moving object at always the same position of the screen. The KP-F3W has 2 field on demand modes: However, at 1 trigger input, 1 image output is produced.

### • One trigger mode

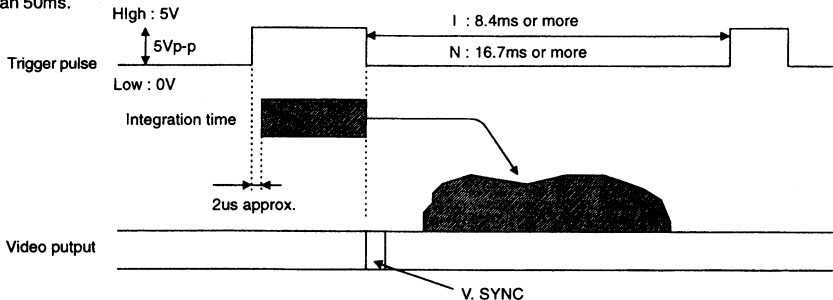
At a single trigger pulse input (Trig), exposure starts at the pulse rising edge and ends at the pulse falling edge. The vertical sync is reset and the video output is obtained immediately.

The pulse width equals the exposure time.

### Trigger specifications

- High:  $5V \pm 0.5V$
- Low:  $0V \pm 0.5V$
- High period greater than  $4\mu s$ , less than 50ms.

**Note:** Use a sync signal free of noise.





### •Fixed shutter mode

At a single trigger pulse input (Trig), exposure starts at the pulse rising edge. The exposure time is set by the camera electronic shutter switch.

The video output is obtained immediately after the end of fixed exposure.

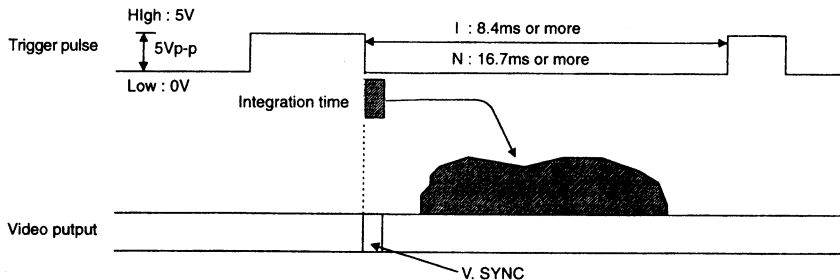
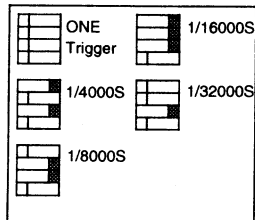
In this mode, the vertical sync signal is absent from the video output.

**Note:** Trigger input cannot be applied to fields of the video output where a picture is produced (a normal picture will not be obtained).

Use a sync signal free of noise.

### Trigger specifications

- High :  $5V \pm 0.5V$   
Low :  $0V \pm 0.5V$
- High period than  $4\mu s$ , less than 50ms.



## 11. SPECIFICATIONS

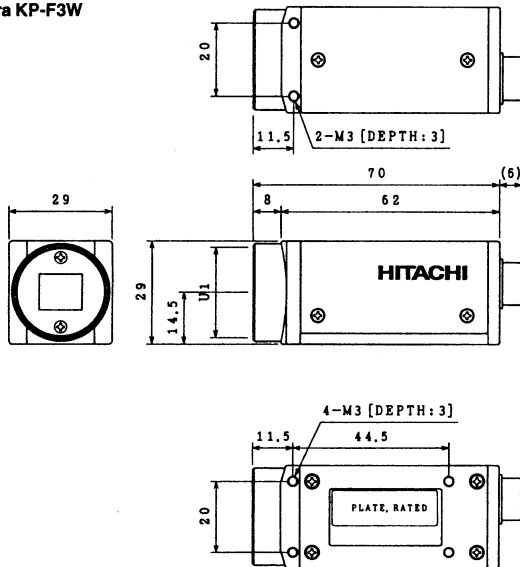
- |                                     |  |  |  |
|-------------------------------------|--|--|--|
| <b>(1) Imaging device:</b>          | Interline CCD  | <b>(15) Signal-to-noise ratio</b>          | 50dB or more   |
| No. of total pixels                 | 699(H)×503(V)  | <b>(16) Electronic shutter</b>             | 1/16000, 1/8000, 1/4000,<br>1/2000, 1/1000, 1/500,<br>1/200  |
| Pixel size                          | 7.4(H)×7.4(V)μm  |  | (Internal switch selectable)   |
| No. of effective pixels             | 647(H)×485(V)  |  | OFF mode: Normal<br>exposure<br>(Factory setting)  |
| <b>(2) Sensing area:</b>            | 6.52(H)×4.89(V) mm<br>(1/3-inch size)  | <b>(17) Gamma correction</b>               | 1 (factory setting) or<br>compensation   |
| <b>(3) Signal format</b>            | Progressive Scan   | <b>(18) Gain selection</b>                 | VIDEO 1: Fixed<br>VIDEO 2: Fixed<br>Finely adjustable to 2<br>channels by knob.<br>(Fixed gain at factory<br>setting)                  |
| <b>(4) Lens mount</b>               | C-mount  | <b>(19) Frame/field-on-Demand function</b> | ON/OFF: Internally<br>switchable ONE trigger,<br>and Fixed shutter mode<br>selectable by internal<br>switch.<br>(Factory setting: OFF) |
| <b>(5) Flange focal distance</b>    | 17.526mm (Not adjustable)  | <b>(20) Power supply</b>                   | 12VDC±1V   |
| <b>(6) Hor. scanning frequency</b>  | 31.468kHz  | <b>(21) Power consumption</b>              | 1.8W approx.   |
| <b>(7) Vert. scanning frequency</b> | 119.88Hz/59.94Hz   |  |  |
| <b>(8) Sync system</b>              | Internal/external<br>(automatically switchable)  |  |  |
| <b>(9) Int. sync operation</b>      | 2:1 interlaced / non-<br>interlaced  |  |  |
| <b>(10) Ext. sync input</b>         | HD/VD: 2 to 6Vp-p,<br>negative<br>Input impedance: 1kΩ<br>Frequency deviation: ±1%             |  |  |
| <b>(11) Video output</b>            | 1.0Vp-p, 75Ω, unbalanced<br>Video: 0.7Vp-p<br>Sync: 0.3Vp-p, negative<br>500 TVL(H)/485 TVL(V) |  |  |
| <b>(12) Resolution</b>              |  |  |  |
| <b>(13) Sensitivity</b>             | 400 lx, f5.6, 3200K  |  |  |
| <b>(14) Minimum illumination</b>    | 0.2 lx, f1.4, no IR cut filter   |  |  |

- |                                 |  |
|---------------------------------|--|
|                                 |  |
| <b>(22) Ambient conditions</b>  | Operating: -10 to 50°C,<br>90%RH or less Storage: -<br>20 to 60 C, 70%RH or less   |
| <b>(23) Anti-vibration</b>      | 98m/s <sup>2</sup> (10 to 60Hz,<br>amplitude: 0.98mm<br>constant, 60 to 200Hz,<br>amplitude: variable)<br>(10 to 150Hz, sweep:1<br>min., XYZ, 30 min.) |
| <b>(24) Resistance to shock</b> | 686m/s <sup>2</sup><br>(Drop test, once each top,<br>bottom, left and right)   |
| <b>(25) Dimensions</b>          |  |
| <b>(26) Mass</b>                | 29(W)×29(H)×62(D)mm<br>100g approx.  |

\*Specifications are subject to change without notice.

# 12. EXTERNAL VIEW

Camera KP-F3W



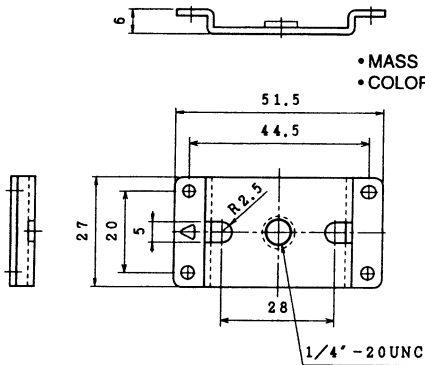
MASS : Approx. 100g

Color : BLACK



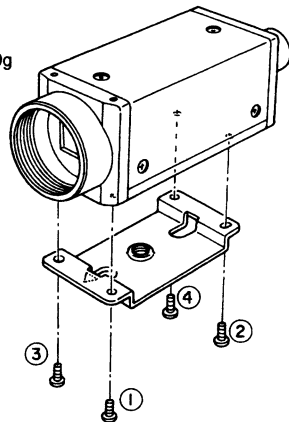
Unit : mm

## Tripod adaptor TA-F3 (Option)



- MASS : Approx. 20g
- COLOR : BLACK

• UNIT : mm

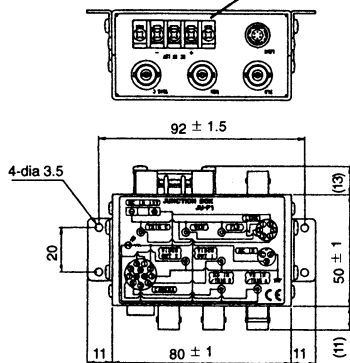


### Installation

1. Attach the TA-F3 tripod adaptor to the camera by using the screws supplied with the adapter.
2. Refer to the figure and insert the screws in the sequence 1-4 as indicated.

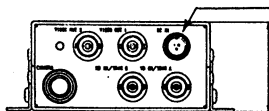
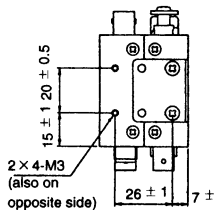
## Junction box JU-F1(option)

Connect power supply to these terminals when the AP-130 is not used.



### Notes:

- Supply voltage ranged 11 to 13V.
- Make sure of the voltage polarity before connecting an external power supply.
- Use an external power supply other than the AP-130 at your own risk.



Connect the AC adaptor AP-130 to this connector.

Mass : Approx. 200g