

Progressive Scan Type
Black and White Camera

KP-F3

OPERATION MANUAL

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

 **Hitachi Denshi, Ltd.**

CCD カメラ

KP-F3

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。

 **日立電子株式会社**

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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-F3 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

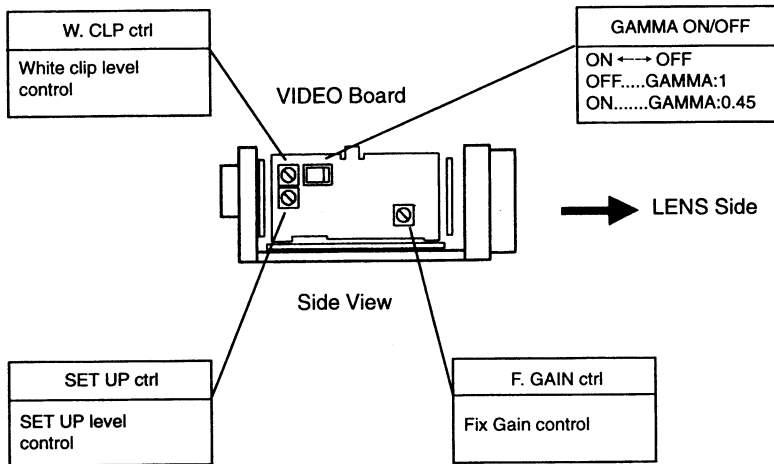
Standard composition

- (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



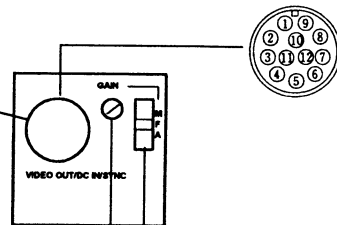
VIDEO OUT/DC IN/SYNC CN

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)



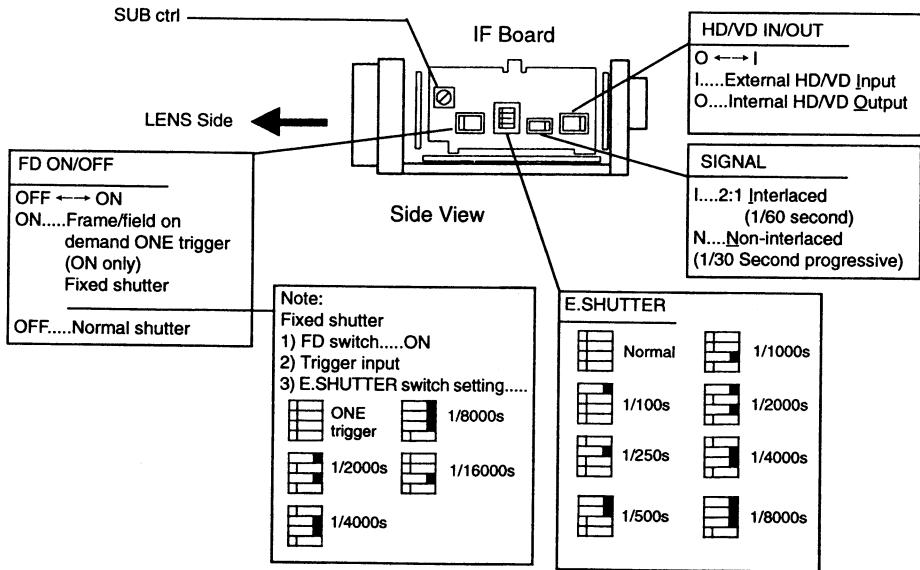
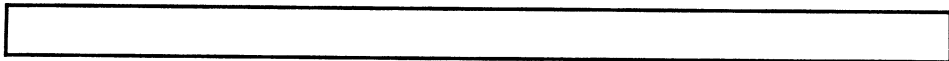
REAR View

GAIN select

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

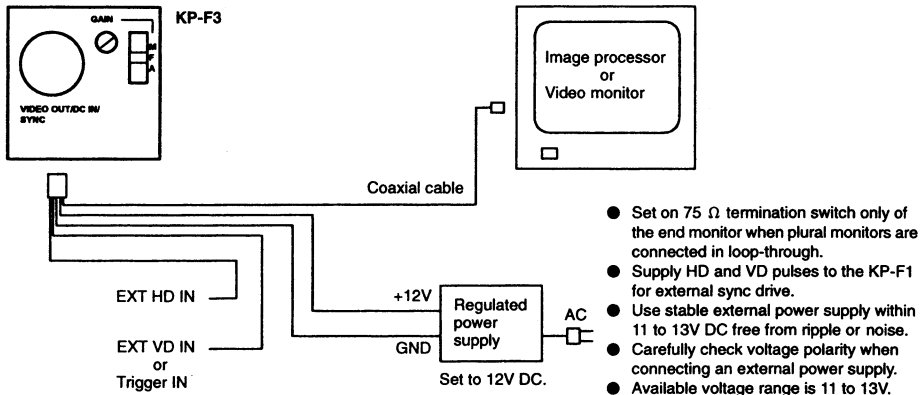
M. GAIN ctrl

Manual GAIN ctrl



5. CONNECT CABLES

5-1 Basic connection



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

- Set on 75 Ω termination switch only of the end monitor when plural monitors are connected in loop-through.
- Supply HD and VD pulses to the KP-F1 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.

Fig. 2

5-2 Connection of options

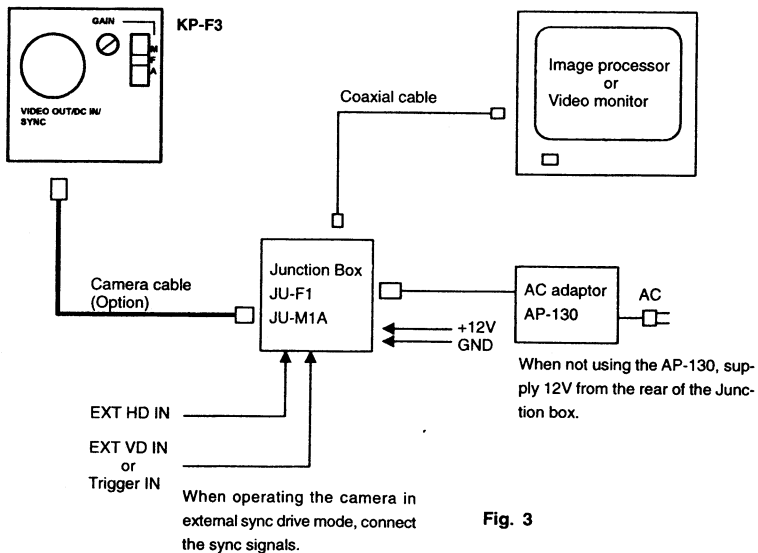


Fig. 3

6. OPTICAL SYSTEM

5-3 Camera cable

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

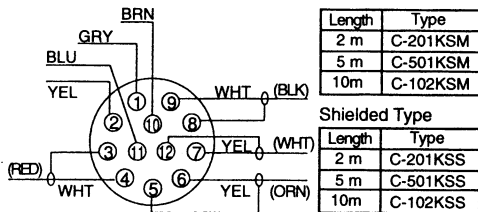
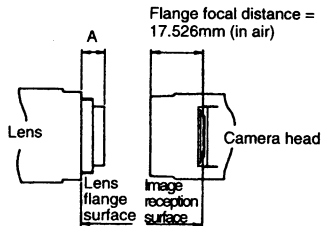


Fig. 4

- Voltage drop due to a cable is about 0.01V per meter.
- The H phase delays by about 5ns per meter.
- When 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-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.

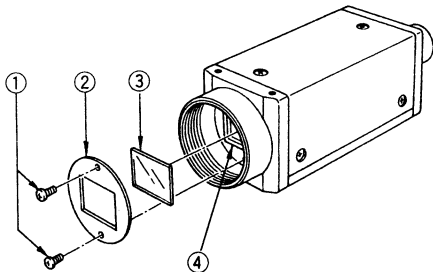


Fig. 6

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.

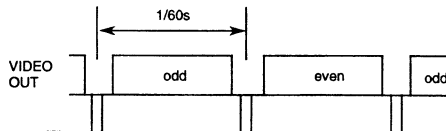
8. VIDEO OUTPUT MODES

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

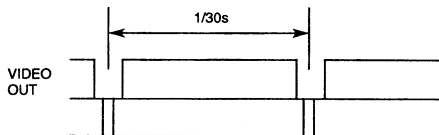
- **Frame output mode**
(N:Non-interlaced)

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

Interlaced (1/60 s)

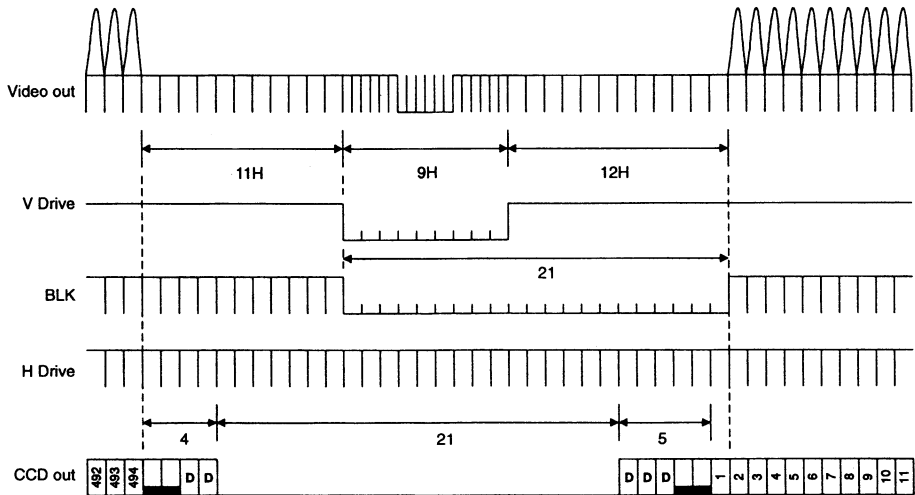


1/30s non-interlaced

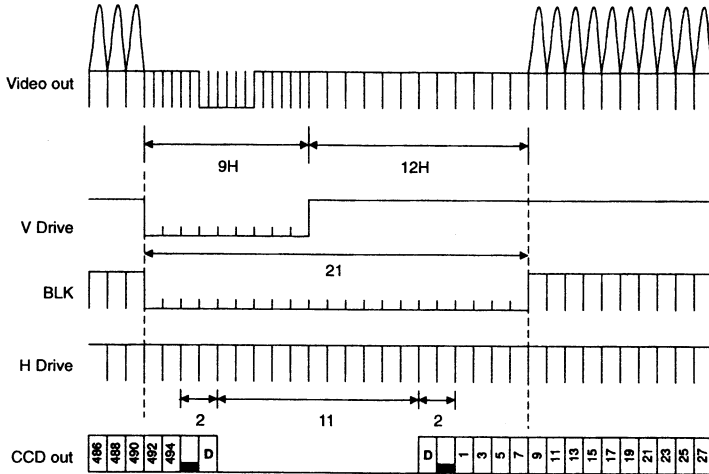


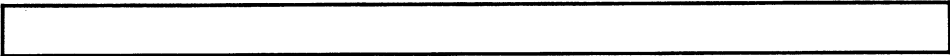


Timing diagrams
1/30sec non-interlace(V)

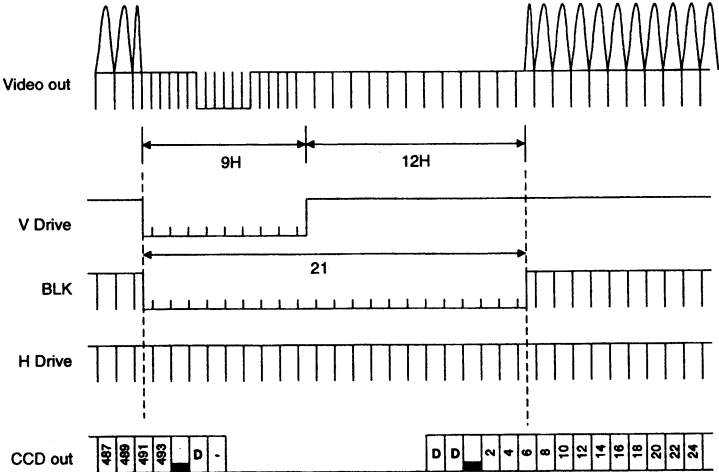


1/60sec interlace(V)





1/60sec 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 : $f(H)=15.734\text{kHz} \pm 1\%$

VD : $f(V)=59.94\text{Hz} [f(V)=f(H) \div 262.5]$

(Non-Interlace)

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

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

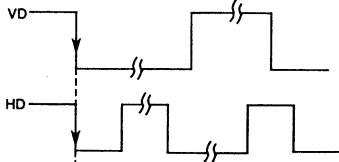
- Input level

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)

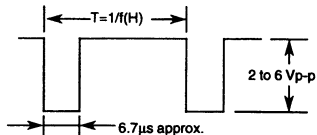


Adjust the phases so that the falling edges of HD and VD are in phase ($0 \pm 5\mu\text{s}$).

Fig. 8

- Input waveforms

- Horizontal drive signal (HD)



- Vertical drive signal (VD)

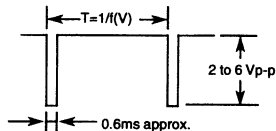


Fig. 9

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-F3 has 2 field on demand modes: However, at 1 trigger input, 1 image output is produced.

• One trigger mode

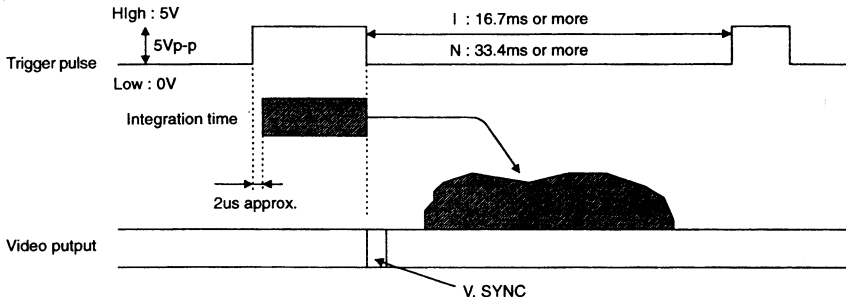
At a single trigger pulse input (Trig), exposure starts at the pulse rising edge and ends at the pulse falling edge. The vertical sync is reset and the video output is obtained immediately.

The pulse width equals the exposure time.

Trigger specifications

- High: $5V \pm 0.5V$
Low: $0V \pm 0.5V$
- High period greater than $8\mu s$, less than 100ms.

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.

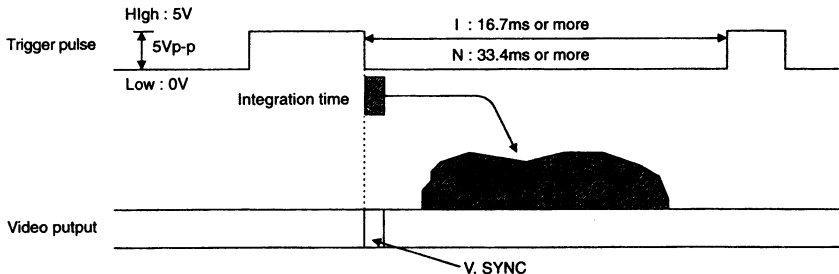
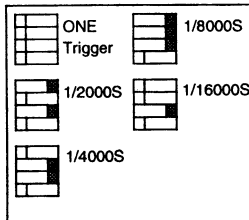
In this mode, the vertical sync signal is absent from the video output.

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 $8\mu s$, less than 100ms.



11. SPECIFICATIONS

(1) Imaging device:	Interline CCD	(12) Resolution	500 TVL(H)/485 TVL(V)
No. of total pixels	699(H)×503(V)	(13) Sensitivity	400 lx, f5.6, 3200K
Pixel size	7.4(H)×7.4(V)μm	(14) Minimum illumination	0.2 lx, f1.4, no IR cut filter
No. of effective pixels	647(H)×485(V)	(15) Signal-to-noise ratio	56dB
(2) Sensing area:	6.52(H)×4.89(V) mm (1/3-inch size)	(16) Electronic shutter	1/8000, 1/4000, 1/2000, 1/1000, 1/500, 1/250, 1/100 (Internal switch selectable)
(3) Signal format	EIA Progressive Scan	(17) Gamma correction	1 (factory setting) or compensation
(4) Lens mount	C-mount	(18) Gain selection	VIDEO 1: Fixed VIDEO 2: Fixed Finely adjustable to 2 channels by knob. (Fixed gain at factory setting)
(5) Flange focal distance	17.526mm (Not adjustable)	(19) Frame/field-on-Demand function	ON/OFF: Internally switchable ONE trigger, and Fixed shutter mode selectable by internal switch. (Factory setting: OFF)
(6) Hor. scanning frequency	15.734kHz		
(7) Vert. scanning frequency	59.94Hz/29.97Hz		
(8) Sync system	Internal/external (automatically switchable)		
(9) Int. sync operation	2:1 interlaced / non- interlaced		
(10) Ext. sync input	HD/VD: 2 to 6Vp-p, negative Input impedance: 1kΩ Frequency deviation: ±1%		
(11) Video output	1.0Vp-p, 75Ω, unbalanced Video: 0.7Vp-p Sync: 0.3Vp-p, negative		

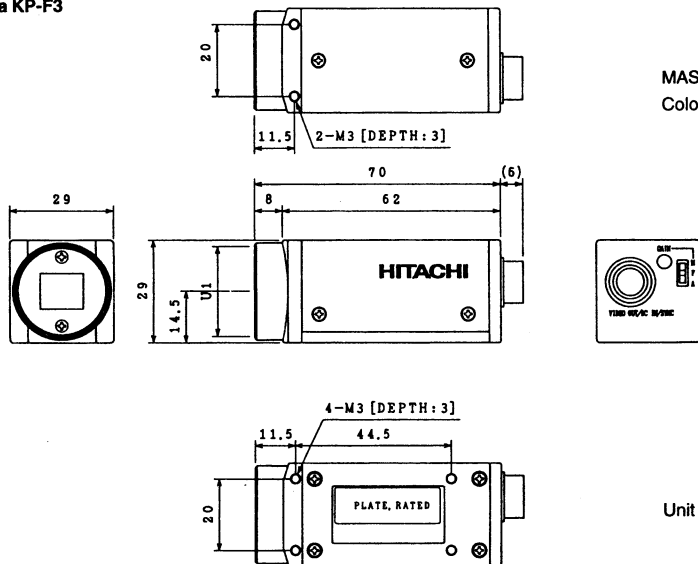


- | | |
|---------------------------------|---|
| (20) Power supply | 12VDC \pm 1V |
| (21) Power consumption | 1.4W approx. |
| (22) Ambient conditions | Operating: -10 to 50°C,
90%RH or less Storage: -
20 to 60 C, 70%RH or less |
| (23) Anti-vibration | 10G (10 to 60Hz,
amplitude: 0.98mm
constant, 60 to 200Hz,
amplitude: variable)
(10 to 150Hz, sweep:1
min., XYZ, 30 min.) |
| (24) Resistance to shock | 70G
(Drop test, once each top,
bottom, left and right) |
| (25) Dimensions | |
| (26) Mass | 29(W) \times 29(H) \times 62(D)mm
100g approx. |

*Specifications are subject to change without notice.

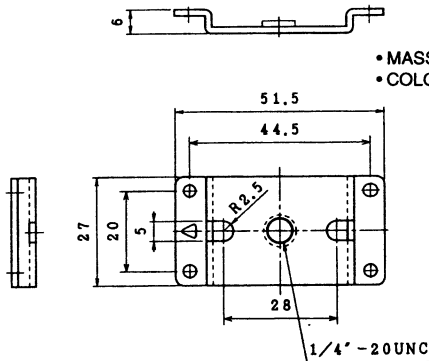
12. EXTERNAL VIEW

Camera KP-F3



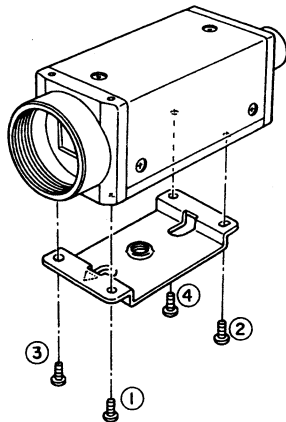
Unit : mm

Tripod adaptor TA-F3 (Option)



- MASS : Approx. 20g
- COLOR : BLACK

• UNIT : mm

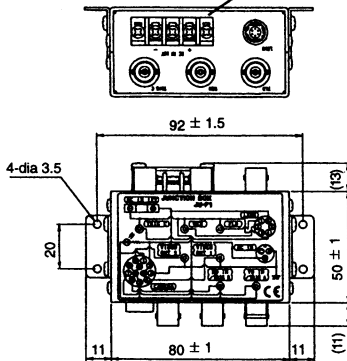


Installation

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.

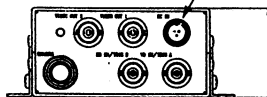
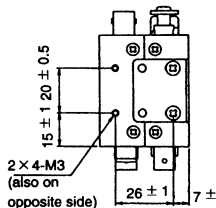
Junction box JU-F1(option)

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

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