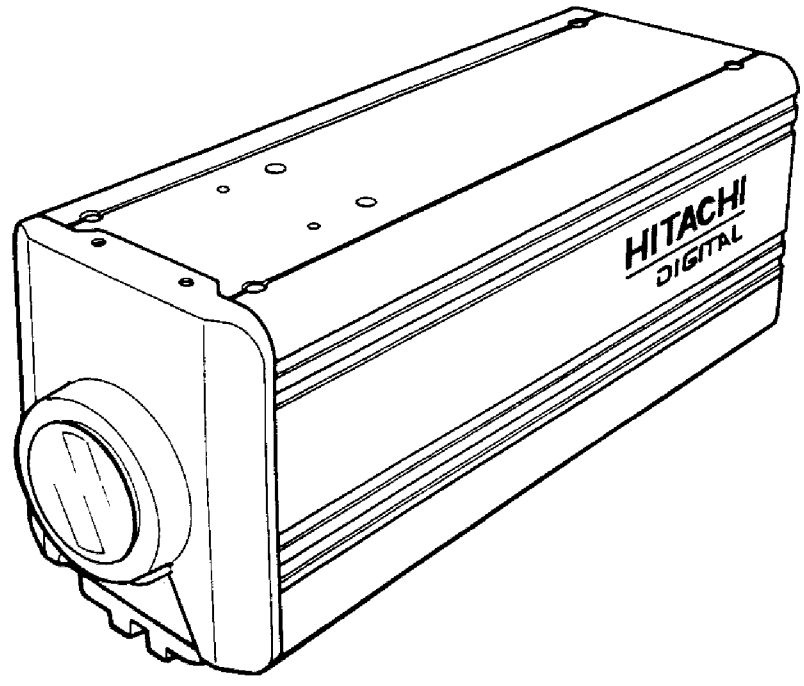
Progressive Scan Type

Black and White Camera

KP-F110

READ AND SAVE THIS BOOK



OPERATION MANUAL

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

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CONTENTS

1. GENERAL

The KP-F110 is a high resolution full frame shutter monochrome CCD camera utilizing a progressive scan type CCD.
Output non-interlace at 30 frames per second.
High resolution is obtained from 1 million picture elements, while the camera is equipped with numerous functions, including digital output, multi-step electronic shutter, HD/VD external sync and frame on demand.
In addition, the CCD comprising square lattice unit pixels results in an image suitable for applications such as image processing.

2. MAJOR FEATURES

(1) High resolution
The most recent high grade CCD having 1024 (H) by 1024 (V) effective square lattice picture elements is utilized.

(2) Frame shutter
The frame shutter function provides high resolution of shifting objects.

(3) Multi-step electronic shutter
The shutter speed is selectable in 8 steps from 1/30 to 1/10,000 second.

(4) Frame on demand
Images captured at a desired timing by an external trigger signal can be obtained instantly as video. The capture time can also be adjusted by the external trigger and shutter.

(5) An RS-422A Digital output is provided.

3. COMPOSITION

(1) Camera (with infrared blocking filter)
(2) Operation instructions

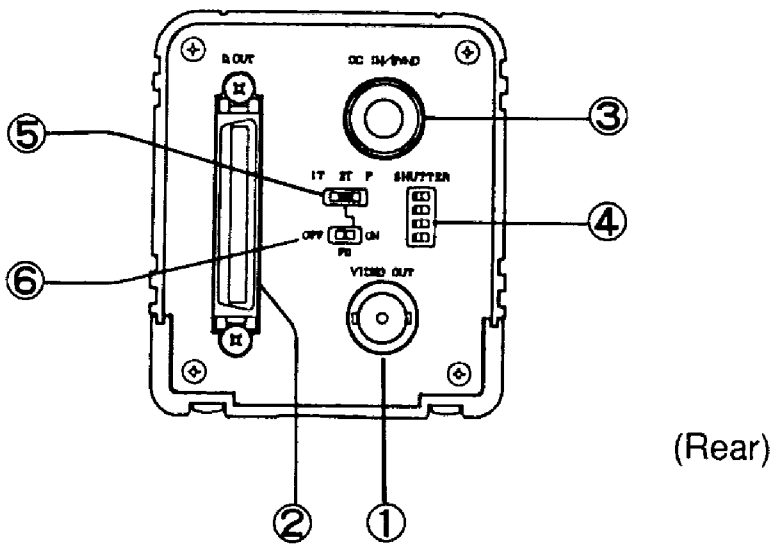
Options

(1) 12-pin plug	HR10A-10P-12S(01)
(2) Junction box	JU-MA1※
(3) Camera cable	2m: C-201KSM (or KS)
	5m: C-501KSM (or KS)
	10m: C-102KSM (or KS)
(4) Dummy glass (AR coated)	ARC1214

※ Notes

- Supply the TRIG-B pulse to the HD IN connector.
- The TRG B IN connector is not connected to the camera.
- During frame on demand operation, the WEN signal output is obtained from the HD IN connector (but not obtained in the 2 trigger mode).

4. NAME OF EACH SECTION



(Rear)

Fig. 1

(1) Video Out (BNC)
Analog composite video (VS) signal output.

(2) D Out
Digital video, sync and clock output connector.

(3) DC In/Sync connector
12 VDC power supply, composite video (VS) signal output and external sync signal input connector.

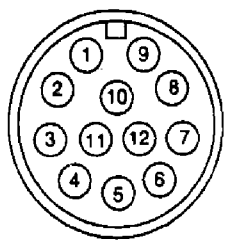
(4) Shutter speed switches
Set shutter speed.

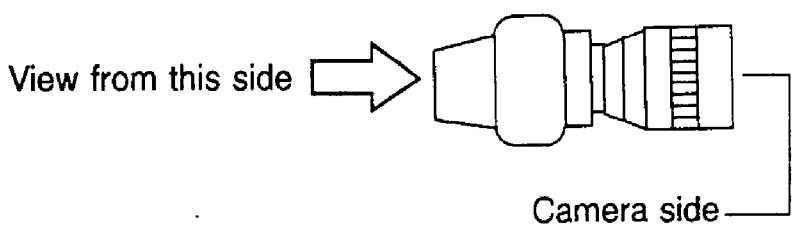
(5) Frame on demand switch
Frame on demand mode setting.

(6) Frame on demand on/off switch
Set to on for frame on demand operation.

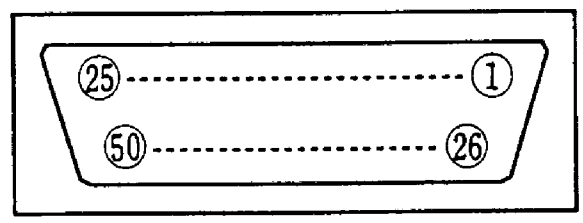
5. SIGNAL CONNECTION TO CONNECTOR

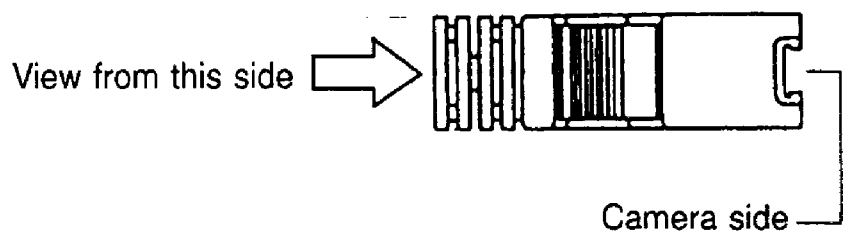
DC IN/SYNC
HR10A-10P-12S(01)
Product code : 23810AX





DIGITAL OUT
DX30AM-50P





(1)Connections to DC IN and SYNC (12 pin connector)

Pin No.	Int. sync	Ext. sync			
		EXT HD/VD	Frame On Demand		
			One trigger	Two trigger	Fixed shutter
1	GND	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V	+12V
3	VIDEO (GND)	VIDEO (GND)	VIDEO (GND)	VIDEO (GND)	VIDEO (GND)
4	VIDEO (signal)	VIDEO (signal)	VIDEO (signal)	VIDEO (signal)	VIDEO (signal)
5	—	EXT HD (GND)	WEN (GND)	TRIG-B (GND)	WEN (GND)
6	—	EXT HD (signal)	WEN (signal)	TRIG-B (signal)	WEN (signal)
7	—	EXT VD (signal)	TRIG-A (signal)	TRIG-B (signal)	TRIG-A (signal)
8	—	—	—	—	—
9	—	—	—	—	—
10	GND	GND	GND	GND	GND
11	+12V	+12V	+12V	+12V	+12V
12	—	EXT VD (GND)	TRIG-A (GND)	TRIG-A (GND)	TRIG-A (GND)

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 cannot be obtained.
- Supply 12V DC in the range between 11 and 13V.

(2) Signal connections to D. OUT (50pin)

Connector : Hirose DX10G1M-50S

Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	DATA DB-D0(+)	14	DATA DB-D6(−)	27	DATA DA-D0(−)	40	DATA DA-D7(+)
2	DATA DB-D0(−)	15	DATA DB-D7(+)	28	DATA DA-D1(+)	41	DATA DA-D7(−)
3	DATA DB-D1(+)	16	DATA DB-D7(−)	29	DATA DA-D1(−)	42	DATA DA-D8(+)
4	DATA DB-D1(−)	17	DATA DB-D8(+)	30	DATA DA-D2(+)	43	DATA DA-D8(−)
5	DATA DB-D2(+)	18	DATA DB-D8(−)	31	DATA DA-D2(−)	44	DATA DA-D9(+)
6	DATA DB-D2(−)	19	DATA DB-D9(+)	32	DATA DA-D3(+)	45	DATA DA-D9(−)
7	DATA DB-D3(+)	20	DATA DB-D9(−)	33	DATA DA-D3(−)	46	CLK(+)
8	DATA DB-D3(−)	21		34	DATA DA-D4(+)	47	CLK(−)
9	DATA DB-D4(+)	22		35	DATA DA-D4(−)	48	VD(+)
10	DATA DB-D4(−)	23	GND	36	DATA DA-D5(+)	49	VD(−)
11	DATA DB-D5(+)	24	GND	37	DATA DA-D5(−)	50	HD(−)
12	DATA DB-D5(−)	25	HD(+)	38	DATA DA-D6(+)		
13	DATA DB-D6(+)	26	DATA DA-D0(+)	39	DATA DA-D6(−)		

Cable side Connecting plug : DX30AM-50M
Hirose or equivalent

Connector cover : DX30M-50CV (10)
Hirose or equivalent

Note: Digital out cable length is maximum 2 meters.

6. HOW TO CONNECT CABLES

6-1 Basic connection (analog out)

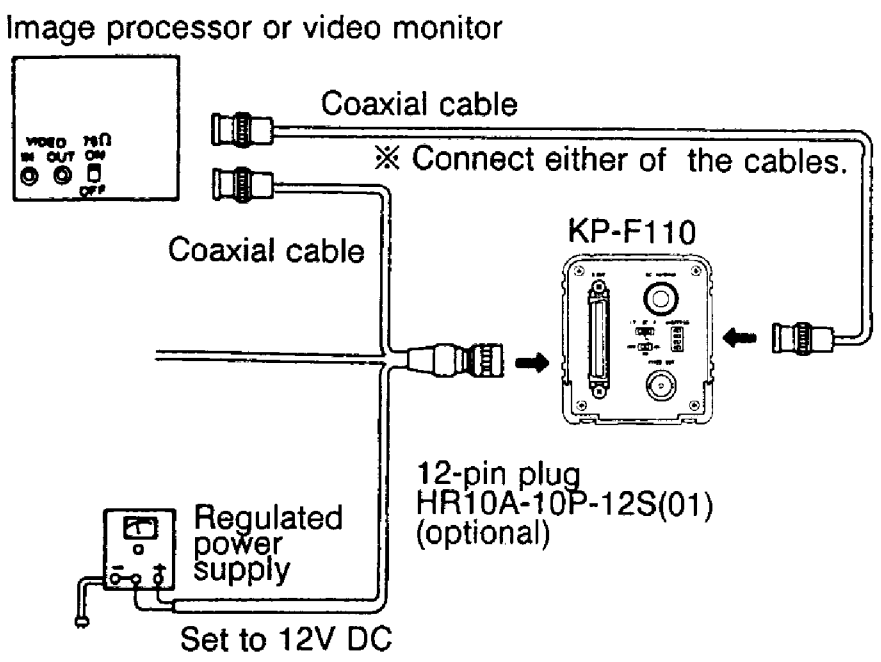


Fig. 2

- Set on 75Ω termination switch only of the end monitor when plural monitors are connected in loop-through.
- Supply HD and VD pulses to the KP-F110 for external sync drive.
- Use stable external power supply within 11 to 13V DC free from ripples or noises.
- Make sure voltage polarity before connecting 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.

6-2 Basic connection (digital out)

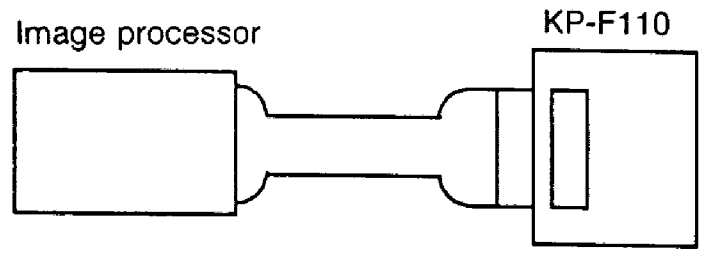
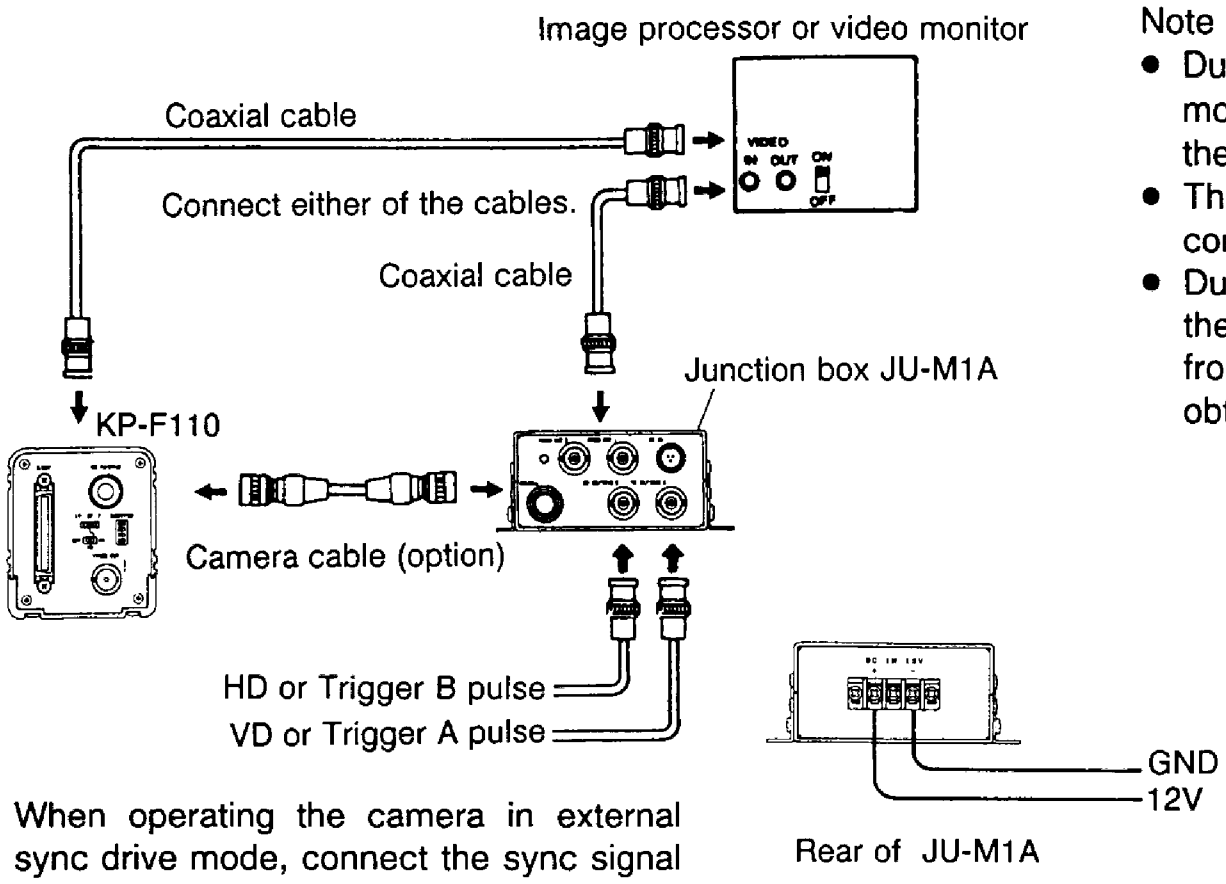


Fig. 3

Note: Digital out cable length is maximum 2 meters.

6-3 Connection of options



When operating the camera in external sync drive mode, connect the sync signal (HD/VD).

Fig. 4

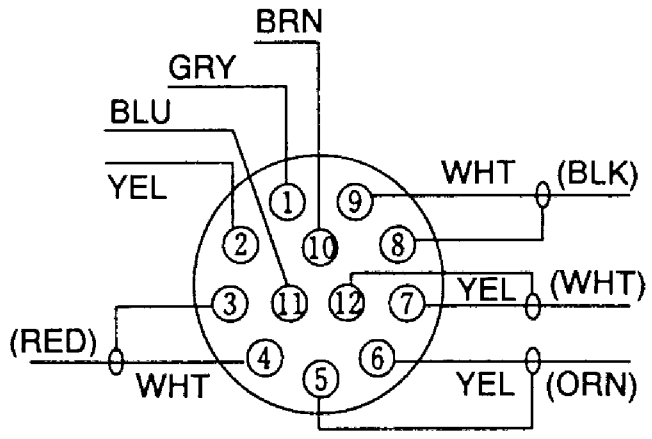
Note when using JU-M1A

- During frame on demand 2 trigger mode, supply the TRIG-B pulse via the HD IN connector.
- The TRG B IN connector is not connected to the camera.
- During frame on demand operation, the WEN signal output is obtained from the HD IN connector (but not obtained in the 2 trigger mode).

6-4 Optional cables

(1) Camera cable

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



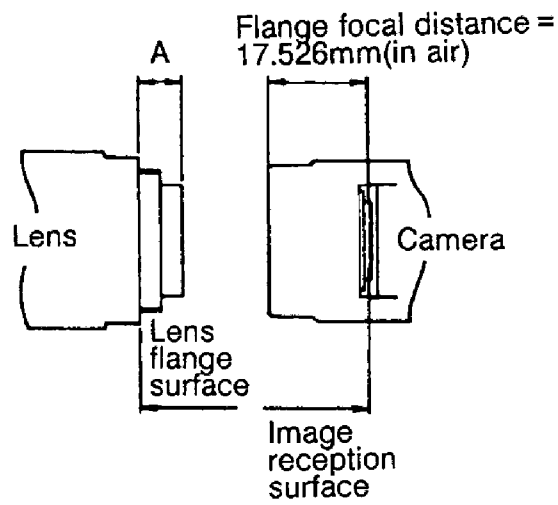
Length	Type
2m	C-201KSM
5m	C-501KSM
10m	C-102KSM

Fig. 5

- 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 cable C-201KSM (2m).

7. OPTICAL SYSTEM

- Image size: 2/3-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. 6

8. OPTICAL FILTER

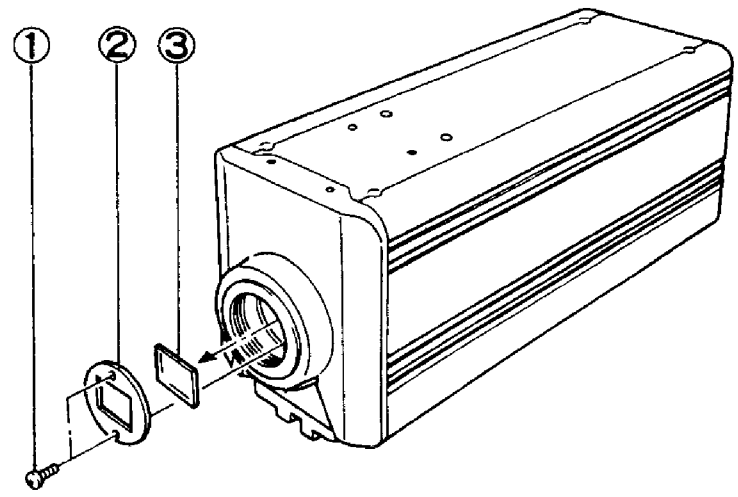


Fig. 7

How to remove the IR cut filter.

(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) Then, reinstall and secure filter holder ② with two screws ①.

Caution

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

9. INTERNAL CONTROL LOCATIONS

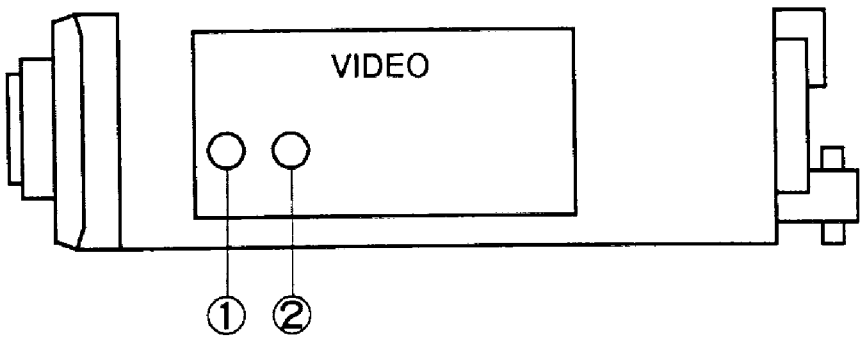


Fig. 8

Controls 1 and 2 can fine adjust the level reference voltage at the A/D converter terminals.

1 : Low level reference voltage setting (VRB = RV203)

2 : High level reference voltage setting (VRT = RV202)

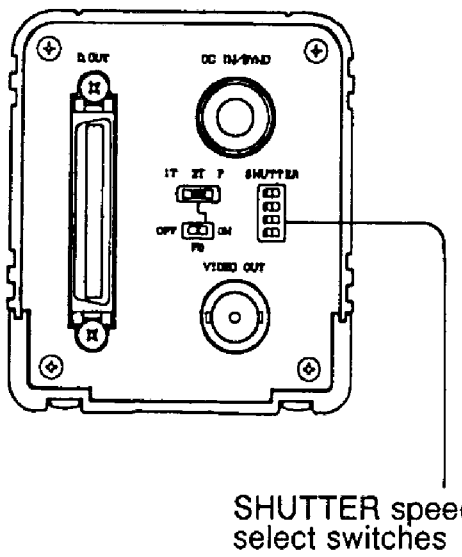
CAUTION

1) Be sure to switch off the power supply connected to the camera before removing the cover for adjusting the controls. Also switch off the power supply before reinstalling the cover.

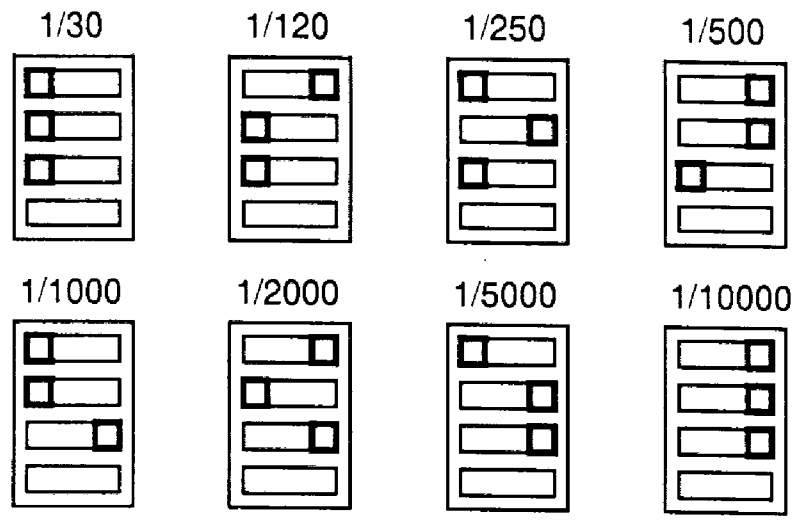
2) Use care to avoid disturbing other controls.

10. HOW TO USE ELECTRONIC SHUTTER

Set the shutter speed with the shutter speed select switches.



Electronic shutter switch



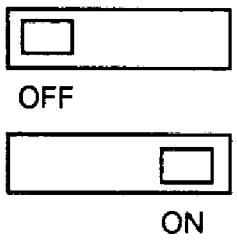
Note: The bottom switch is spare and does not affect selection.

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

11. SETTING OF FRAME-ON-DEMAND FUNCTION

The frame-on-demand function is set as follows.

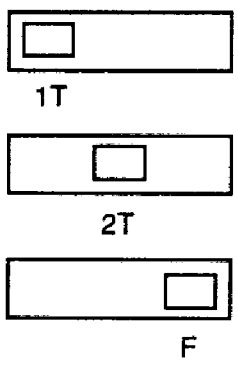
(1) Frame on demand (FD) on/off switch



: OFF

: ON

(2) Frame on demand mode selector switches



: ONE trigger mode

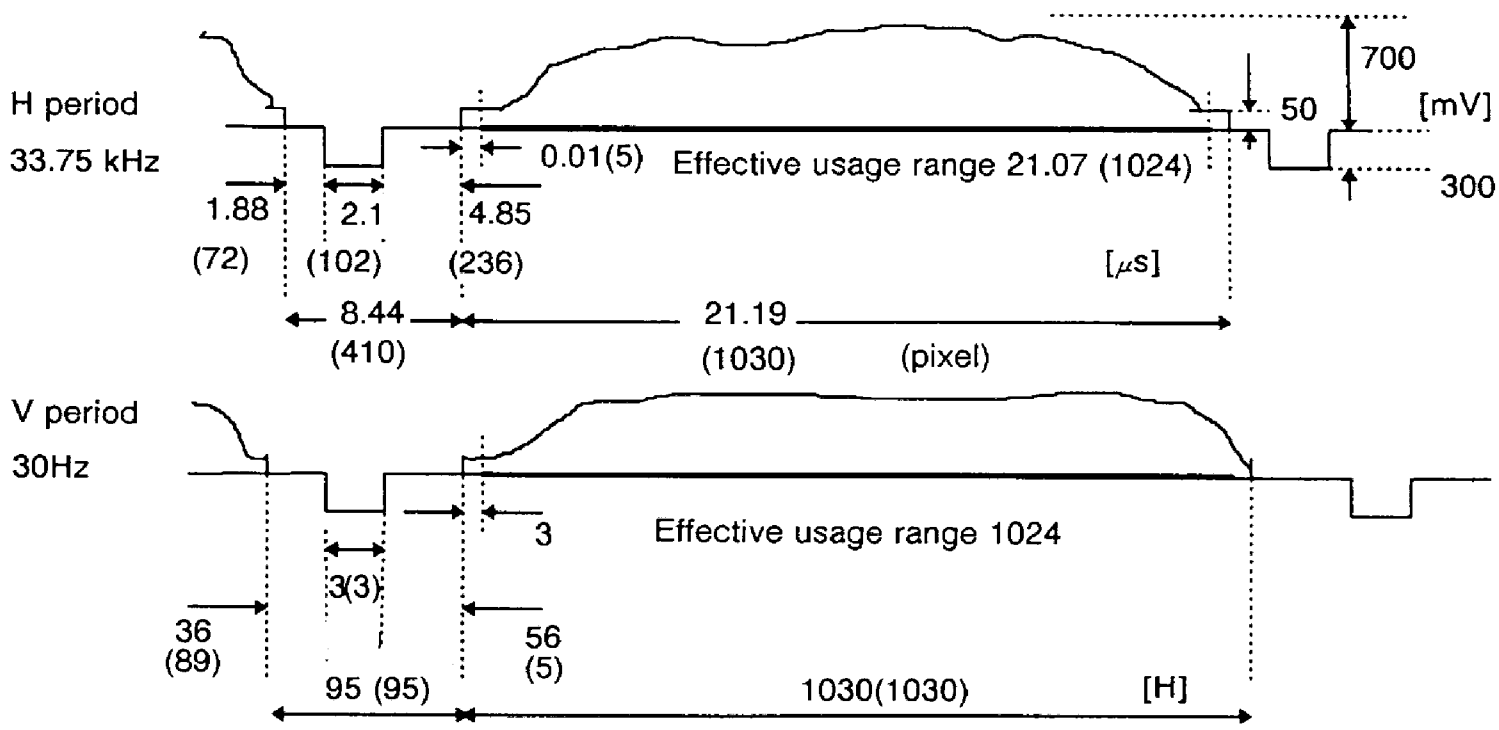
: TWO trigger mode

: Fixed shutter mode

Effective only when the on/off switch is on.

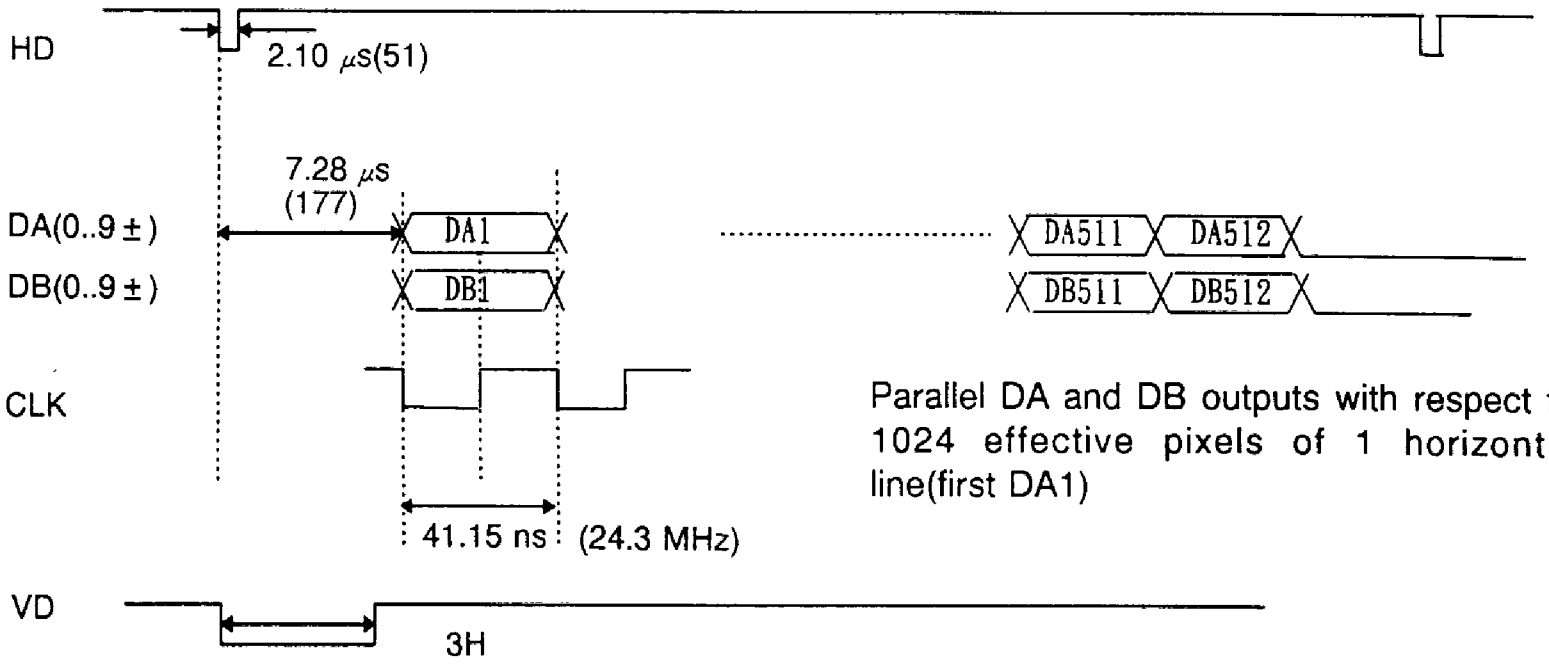
12. VIDEO OUTPUT

(1) Analog (VS) output signal



Note) V period differs with frame on demand on/off. On mode in parentheses.

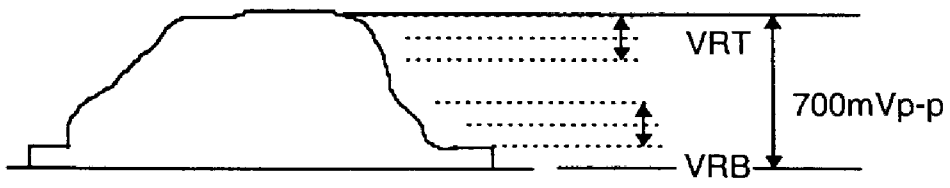
(2) Digital output (V period phase same as analog output)



Parallel DA and DB outputs with respect to 1024 effective pixels of 1 horizontal line(first DA1)

Level: RS-422A rating (High: more than 3.4V, Low: less than 0.4V)

A/D converter digitizing level

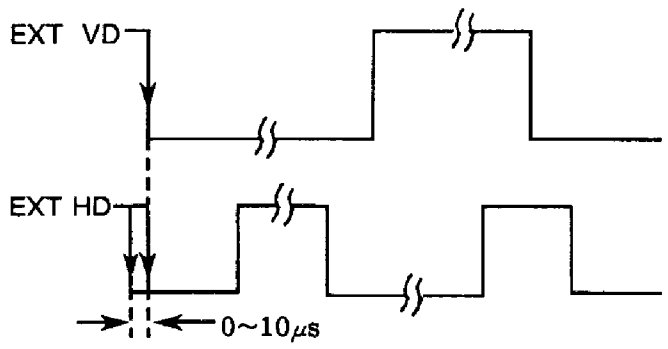


At factory: 70mV to 680mV digitized at 10 bits(TYP)
Low level reference voltage (VRB) fine adjustment
High level reference voltage(VRT) fine adjustment

13. EXTERNAL SYNCHRONIZATION

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
  HD : 33.75kHz ±0.005%
  VD : 30Hz
- Input level
  HD CMOS level, negative
  VD CMOS level, negative
- 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 to 10 μs).

Fig. 9

- External and internal HD/VD relationship

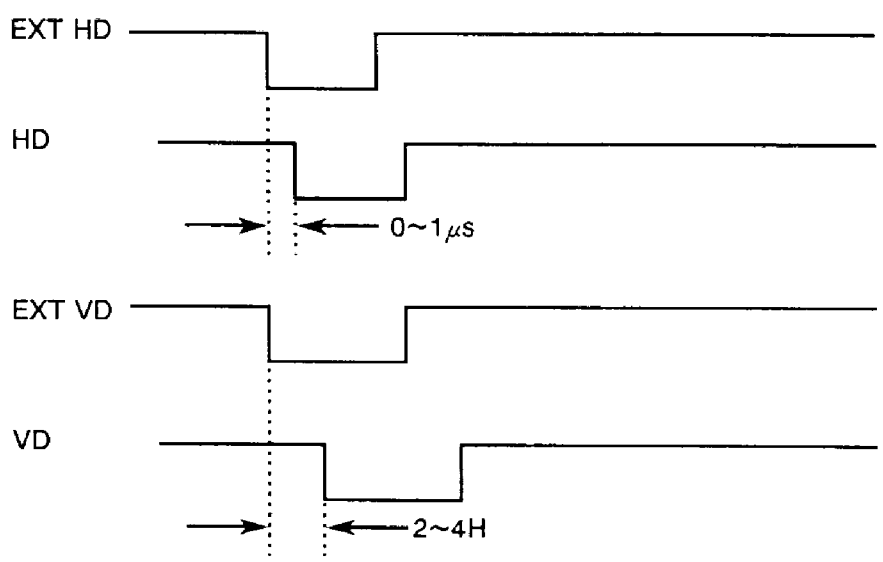
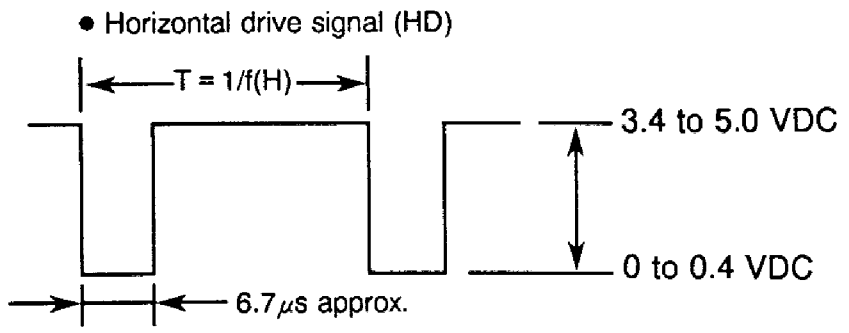


Fig. 10

• Input waveforms



• Vertical drive signal (VD)

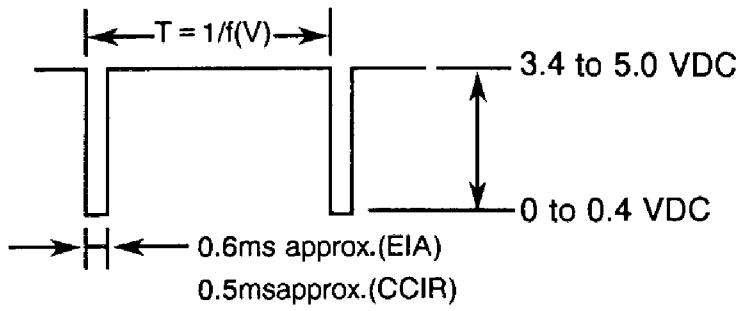
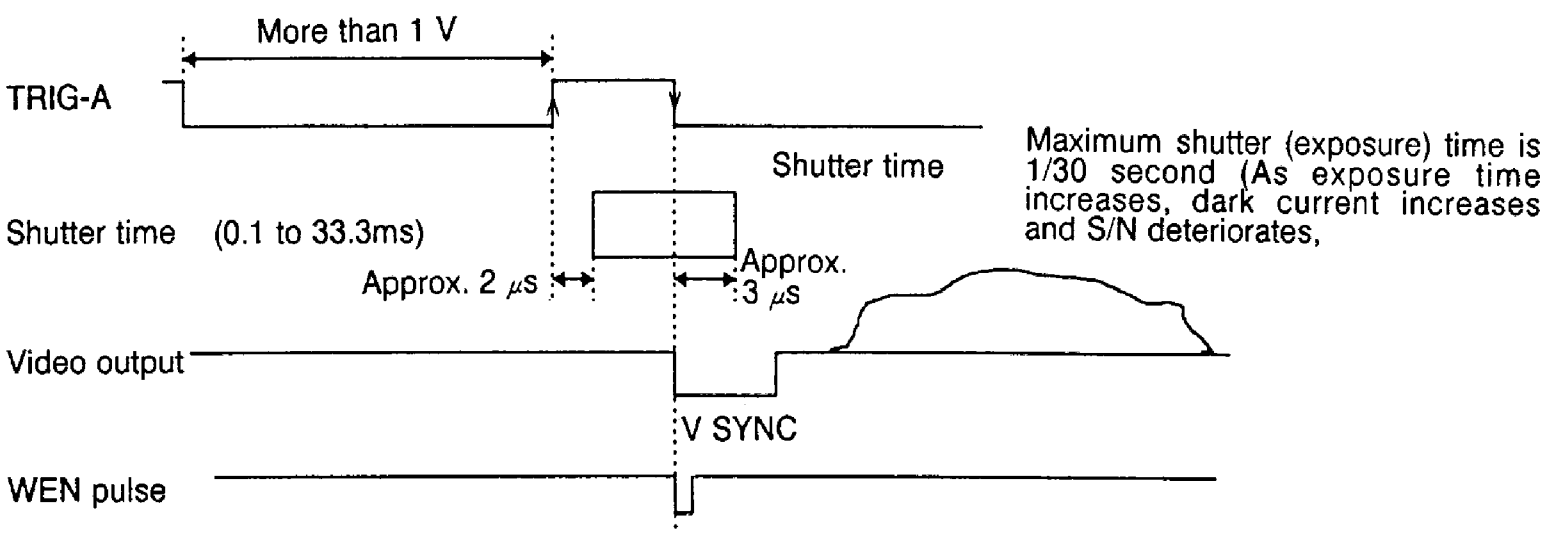


Fig. 11

14. FRAME-ON-DEMAND FUNCTION

Frame-on-demand refers to a function for picking up rapidly moving objects by applying a trigger pulse input at a desired timing to provide a desired or a fixed exposure time. The function is effective since the object is always
taken at the same position in the picture.
The camera is provided with four modes.
Operates when the rear panel FD switch is set to on.
Use the selector switch to select among 3 modes.
In the on setting, the video output is not produced in absence of a trigger pulse input.
At 1 trigger pulse, 1 image output is produced.

One trigger mode
When a single trigger pulse (TRIG-A) is applied, exposure starts at the pulse rising edge and ends at the falling edge. The video output is obtained immediately after vertical sync reset. The pulse width equals the exposure time.

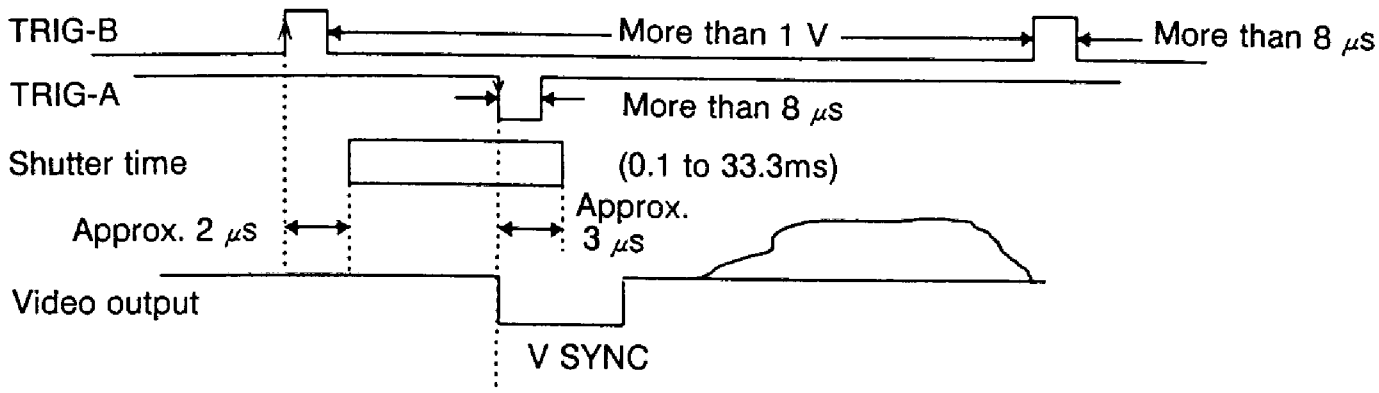


• TRIG-A level :CMOS(H:3.4 to 5.0 VDC, L:0 to 0.4 VDC)

Two trigger mode

Two trigger pulses are applied. Exposure starts at the TRIG-B rising edge and ends at the TRIG-A falling edge.

The video output is obtained immediately after vertical sync reset. The interval between start and end equals the exposure time. Maximum exposure time is 1/30 second.

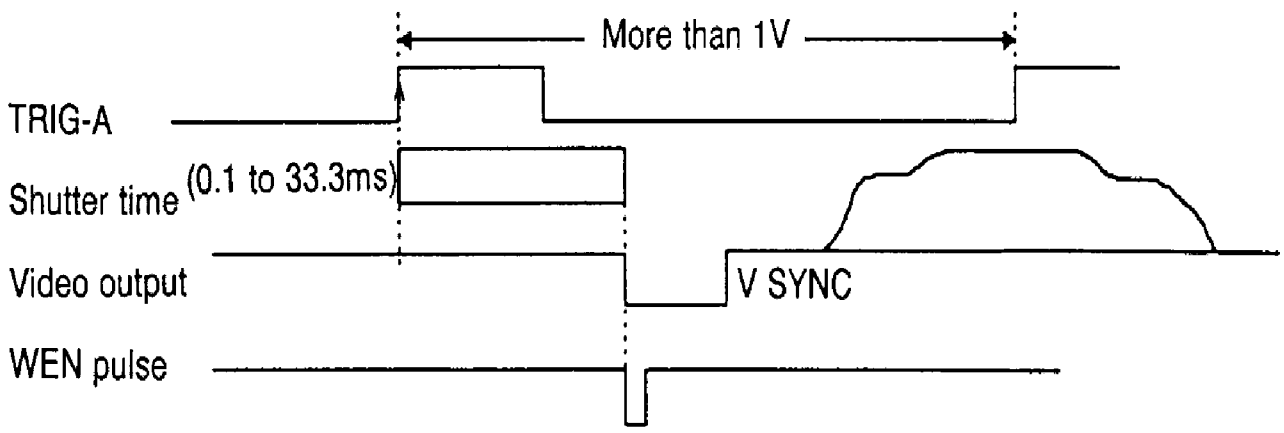


- TRIG-A, TRIG-B level:CMOS(H:3.4 to 5.0 VDC, L:0 to 0.4 VDC)

Fixed shutter mode

When a single trigger pulse (TRIG-A) is applied, exposure starts at the pulse rising edge. The exposure time is fixed and set by the camera electronic shutter switch.

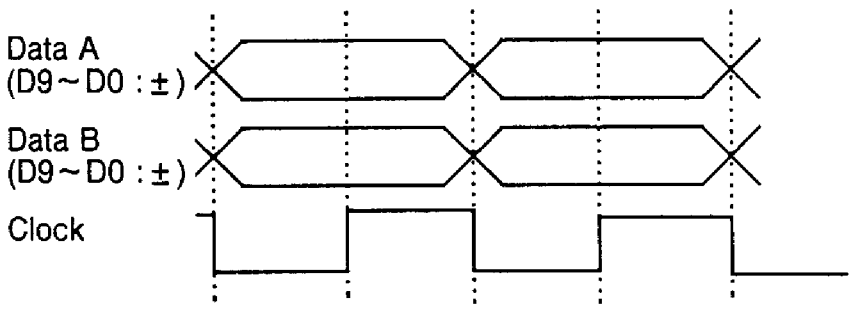
The video output is obtained immediately after exposure ends.



- TRIG-A level :CMOS(H:3.4 to 5.0 VDC, L:0 to 0.4 VDC)

15. SPECIFICATIONS

(1) Pickup element	2/3-inch Interline CCD
Effective pixels	1024(H) × 1024(V)
(2) Scanning system	Non-interlaced
(3) Aspect ratio	1:1
(4) Frame rate	30 frames/second
(5) Hor. scanning frequency	33.75kHz
(6) Vert. scanning frequency	30Hz (1125 lines)
(7) Synchronization	Internal/external (automatic switching)
(8) Lens mount	C mount
(9) Flange focal distance	17.526mm
(10) Video output	
Analog output	1.0Vp-p 75Ω unbalanced Video: 0.7Vp-p Sync: 0.3Vp-p
Digital output	RS-422A Data: dual channel 10 bits, 24.3 MHz/channel Clock: 1 bit × 2



Clock frequency:	24.3 MHz

(**Note**: Max. digital output cable length is 2 meters.)

(11) Ext. sync input	HD/VD: CMOS level negative Frequency deviation: ± 0.005%
(12) Sensitivity	400 lux, F4, 3200K
(13) S/N	50 dB (analog output, internal sync, 1/30 s shutter speed)
(14) Electronic shutter speed	Selectable 1/30, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000 second by external switch. Factory setting is 1/30 second.
(15) Frame on Demand	Externally switched on/off, factory setting is off Externally switched one trigger, two trigger and fixed shutter modes, factory setting is one trigger External trigger:CMOS level

When the frame on demand (FD) switch is on, a video output is not produced unless a trigger pulse input is supplied.

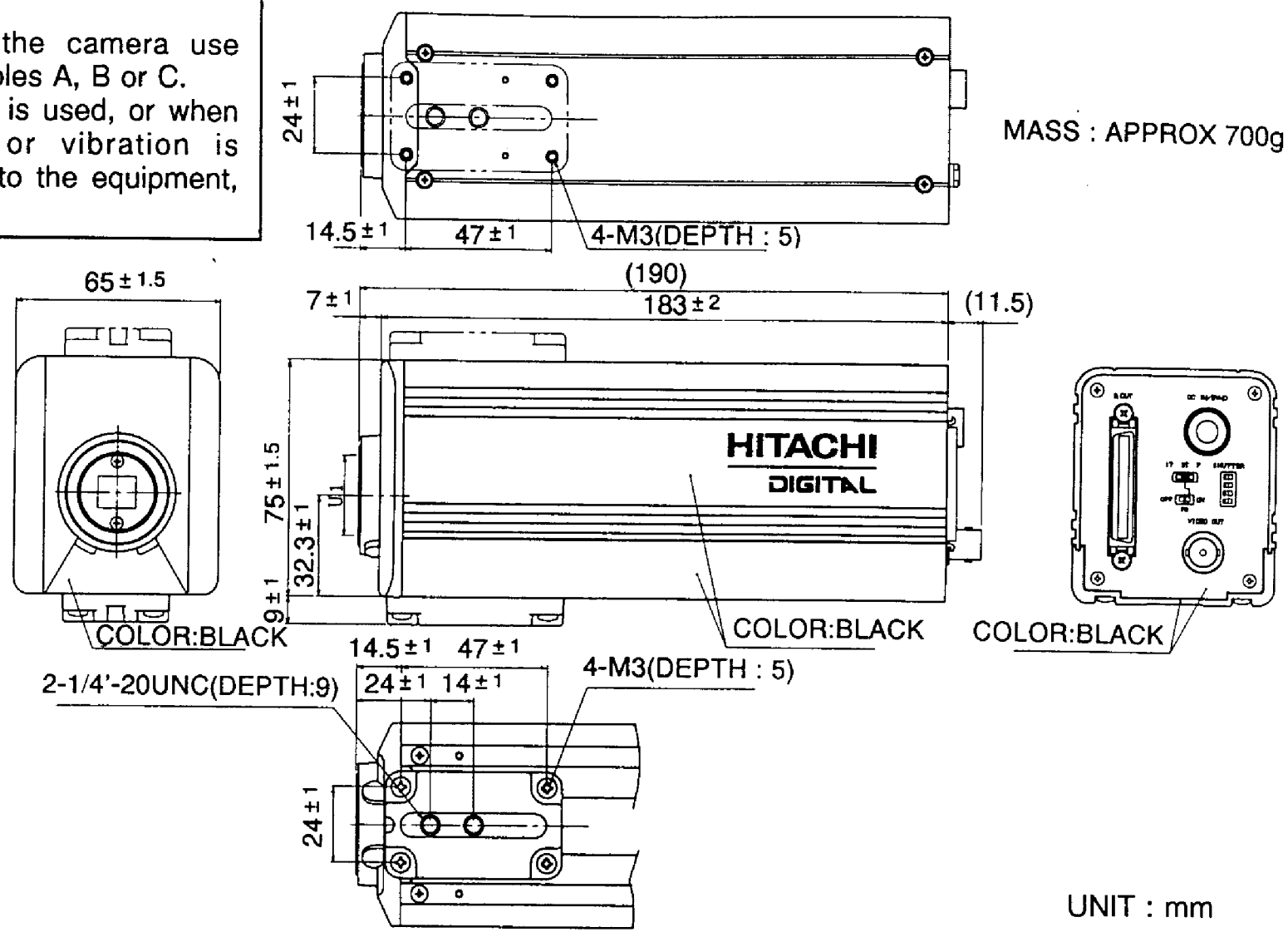
(16) Power supply voltage	12 ± 1 VDC less than 100mVp-p lipple
(17) Power consumption	Approx. 900mA (when digital output receiver side load resistance is 100Ω)
(18) Ambient, operating	0 to + 40°C, less than 90% RH
(19) Vibration endurance	3G
(20) Shock endurance	30G
(21) External dimensions	65(W) × 75(H) × 190(D) mm
(22) Mass	Approx. 700g

*Specifications are subject to change without notice.

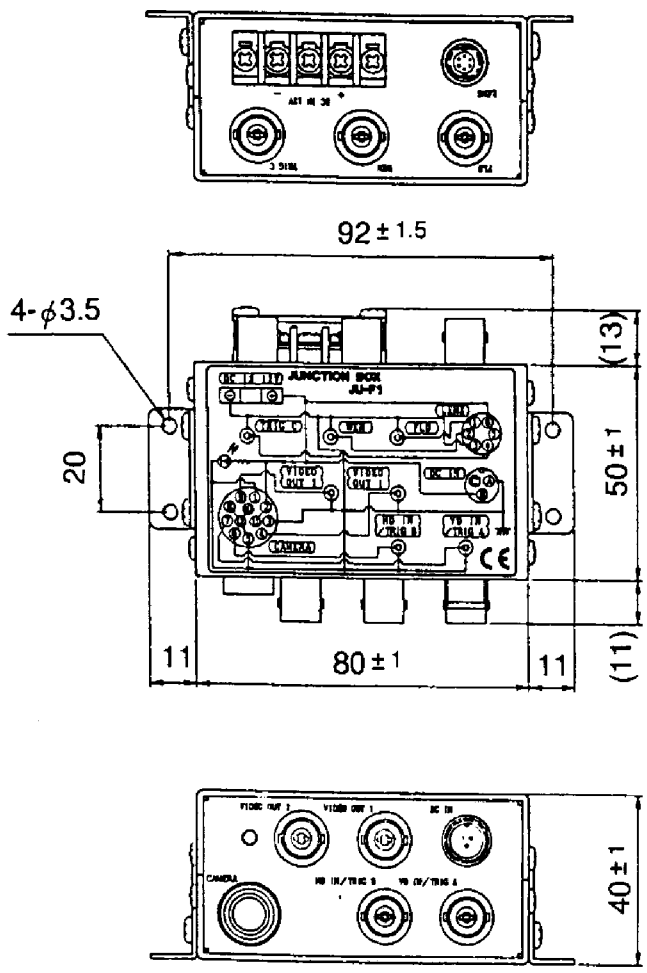
16. EXTERNAL VIEW

Camera KP-F110

Caution
For installation of the camera use camera mounting holes A, B or C.
When a heavy lens is used, or when excessive shock or vibration is applied,fix the lens to the equipment, too.

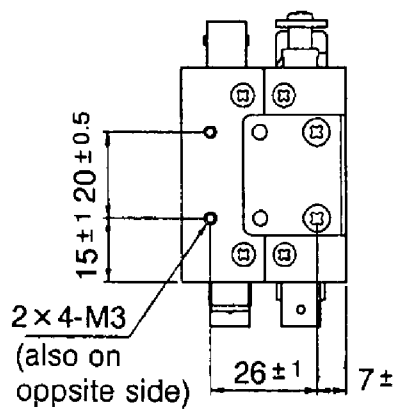


Junction box JU-M1A(option)



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

Notes:
* Supply voltage ranged 11 to 13 V.
* Make sure voltage polarity before connection of an external power supply.
* Use an external power supply other then the AP-130 at your own rish.



※ See signal connections on pages 4 and 7.
MASS : APPROX. 200g
UNIT:mm