

Progressive Scan Type  
Black and White Camera

**KP-F100A**

## **OPERATION MANUAL**

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

**Hitachi Kokusai Electric Inc.**

CCD カメラ

**KP-F100A**

フレーム・オン・デマンド

## **取扱説明書**

このたびは日立KP-F100A 白黒 CCD カメラをお買い上げいただきまことにありがとうございます。ご使用前にこの取扱説明書をよくお読みいただき、正しくお使いください。

**株式会社 日立国際電気**

### **KP-F100A for U. S. A.**

These products have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. These equipments generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of these products in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### **WARNING**

Changes or modifications not expressly approved by Hitachi Denshi responsible for compliance could void the user's authority to operate the equipment.

### **KP-F100A for Canada**

These products do not exceed the class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations.

Le présent appareil n'émet pas de bruits radioélectriques dépassant les limites applicable aux appareils numériques de classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada.

# NOTES TO USERS

## **a. Power supply**

Connect 12V  $\pm$  1V DC from an external power supply.

## **b. 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, wipe off dust or dirt carefully with a cotton-tipped applicator. Never use dry cloth or paper. The surface may be scratched and further the sensor may be damaged by static electricity.
- Be sure to mount a lens or the supplied mount cap on the camera to protect the sensor from dust.

## **c. To protect camera**

- Do not use or store the camera under direct sunlight, in environments exposed to rain, or snow, or at a place exposed to flammable or corrosive gas.
- The camera operates in the temperature range between -0 and 40C.

If the camera is used or left at a 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 such a 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.

**Phenomena inherent to CCD imaging device**  
Following are the phenomena inherent to a CCD imaging device, and not defects

### **1) 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.

### **2) Fixed pattern noise**

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

### **3) Moire**

When fine patterns are shot, moire may be displayed.



## **d. Arrangement of camera**

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

## **e. Fixing of camera**

When a heavy lens is used, or when excessive shock or vibration is applied, fix the lens to the equipment, too.

## GENERAL

Hitachi's KP-F100A is a 2/3-inch size black and white CCD camera designed for high resolution and versatile functions.

- High resolution : 1300 (H) × 1030 (V) effective pixels
- RS-232C control

- Digital output is EIA-644
- Frame shutter function and multiple electronic shutter.
- Positive or negative select switch for Input trigger
- Frame-on-Demand function

## COMPOSITION

Standard composition

- (1) Camera (with infrared cut filter)
- (2) Operation manual

### Optional accessories

- (1) Tripod adaptor TA-M1
- (2) 12 pin plug HR10A-10P-12S(01)
- (3) D. OUT connector (26 pins) DX30AM-26P or equivalent
- (4) AC adaptor AP-130
- (5) Dummy glass (AR coated) ARC1214
- (6) Junction box JU-F1\*
- (7) Camera cable

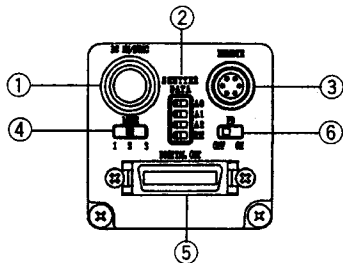
	Model type	Assembly type	Shield type
2m	C-201KSM	C-201KS	C-201KSS
5m	C-501KSM	C-501KS	C-501KSS
10m	C-102KSM	C-102KS	C-102KSS

**Note** : Assembly type made to order  
In Europe, use the Shield type

\*12-pin connector output pin differences

Pin	JU-F1	KP-F100A output
4	VIDEO 1	VIDEO
6	HD/TRIG-B	HD(Input)
9	VIDEO 2	TRIG-B

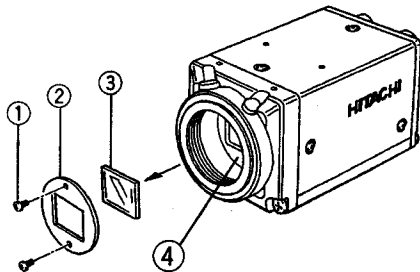
## NAME OF EACH SECTION



- ① DC IN/SYNC connector  
Connector for DC 12V supply, external SYNC input, and Video signal output.
- ② SHUTTER DATA switch  
Use these switches to set a shutter speed.
- ③ REMOTE connector  
Connector for RS-232C control.
- ④ MODE switch  
Set to electric shutter ON/OFF, or fixed shutter, one or two trigger mode.
- ⑤ DIGITAL OUT connector  
RS-644 digital data output.
- ⑥ FD switch  
Set to on to use Frame On Demand function.

## OPTICAL FILTER

This camera is provided with an IR cut filter.



### How to remove the IR cut filter.

- (1) Remove two screws ① 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

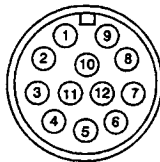
Prior to removal of the optical filter, be sure to turn off the power.

# SIGNAL CONNECTION TO CONNECTOR

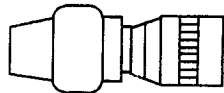
## (1) Signal connections to DC IN and SYNC(DC IN/SYNC)

Pin No.	Internal SYNC mode	External SYNC mode			
		HV/VD	Frame-On-Demand		
			Field shutter	TWO trigger	ONE trigger
1	GND	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V	+12V
3	GND	GND	GND	GND	GND
4	VIDEO	VIDEO	VIDEO	VIDEO	VIDEO
5	—	EXTHD(GND)	—	—	—
6	—	EXTHD(SIGNAL)	—	—	—
7	—	EXTVD(SIGNAL)	TRIG-A(SIGNAL)	TRIG-A(SIGNAL)	TRIG-A(SIGNAL)
8	—	—	—	TRIG-B(GND)	—
9	—	—	—	TRIG-B(SIGNAL)	—
10	GND	GND	GND	GND	GND
11	+12V	+12V	+12V	+12V	+12V
12	—	EXTVD(GND)	TRIG-A(GND)	TRIG-A(GND)	TRIG-A(GND)

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



View from  
this side



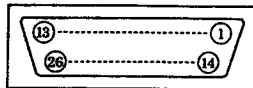
Camera  
side

## (2) Signal connection to DIGITAL OUT(S)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	DATA0-H	8	DATA3-L	15	DATA7-H	22	VD-H
2	DATA0-L	9	DATA4-H	16	DATA7-L	23	HD-H
3	DATA1-H	10	DATA4-L	17	DATA8-H	24	HD-L
4	DATA1-L	11	DATA5-H	18	DATA8-L	25	CLK-H
5	DATA2-H	12	DATA5-L	19	DATA9-H	26	CLK-L
6	DATA2-L	13	DATA6-H	20	DATA9-L	Shield	GND
7	DATA3-H	14	DATA6-L	21	VD-H		

-H: High, -L: Low

The digital out pin is not grounded. Connect the ground terminal of a frame grabber or other equipment to the shield of the digital out cable. The digital out cable should be comprised of a twisted pair of wires having 100  $\Omega$  characteristic impedance and an outer sheath shield type conductor.



DIGITAL OUT  
DX30AM-26P  
Part code : JMD0240



## (3) Signal connection to REMOTE connector

Pin No.	Signal
1	—
2	RD
3	TD
4	MANU/REM
5	GND
6	—



REMOTE  
HR10A-7P-6P(01)  
Part code : JMH0092

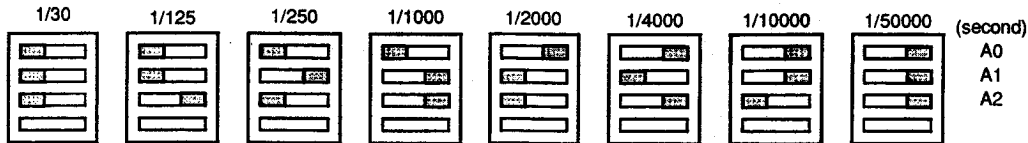


View from this side



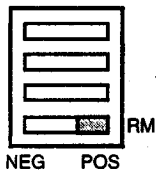
- Connect the cable between the camera Remote connector and the personal computer serial interface connector (D-SUB 9 pin).
- **Notes:** At the camera Remote plug, connect pin 4 Manual/remote and pin 5 ground.  
At the computer serial interface connector (D-SUB), short pins 7 (RTS) and 8 (CTS).

## (1) Setting of shutter speed



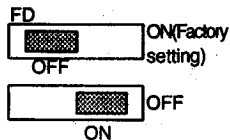
(Factory setting)

## (2) Trigger input pulse invert switch

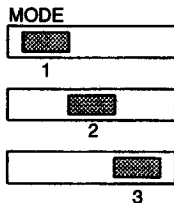


(Factory setting)

## (3) Setting of Frame-On-Demand ON/OFF



## (3) SETTING OF MODE

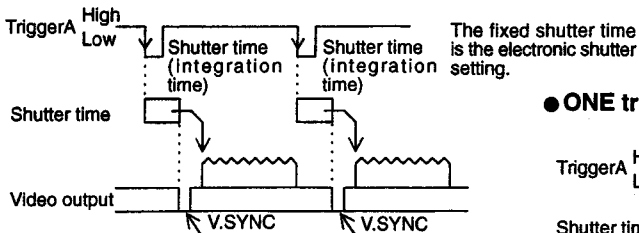


FD switch: OFF	FD switch: ON
1: Electronic shutter OFF	1: Fixed shutter
2: Electronic shutter ON	2: TWO trigger
3: _____	3: ONE trigger

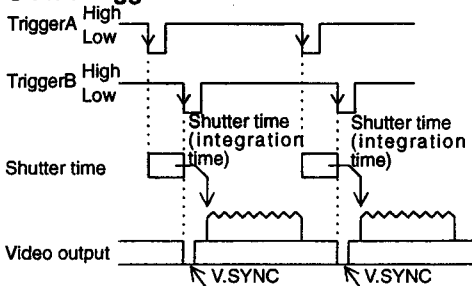


# FRAME-ON-DEMAND-FUNCTION

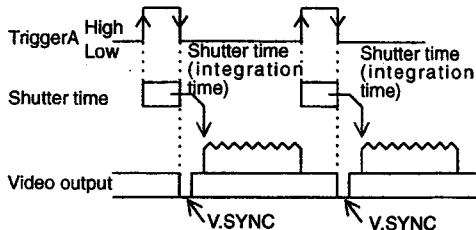
## ● Fixed shutter mode



## ● TWO trigger mode



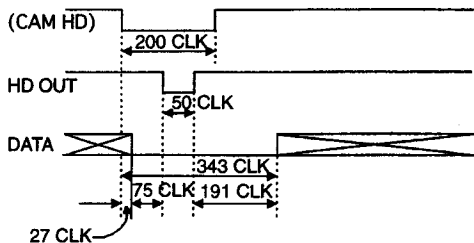
## ● ONE trigger mode



# INPUT/OUTPUT SIGNAL LEVELS AND TIMING

## (1) Digital output

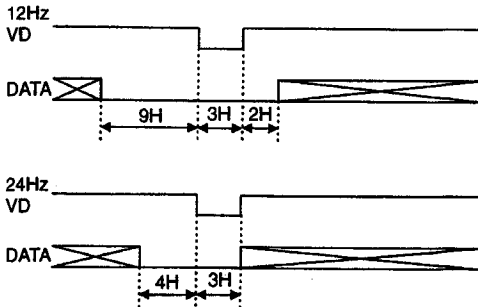
### ● H sync phase relationship



HD OUT is obtained at RS-422A rating from the digital connector pins 23 and 24.

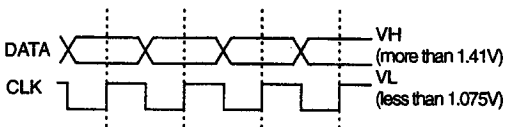
HD = 12.528kHz = 1616CLK

### ● V sync phase relationship



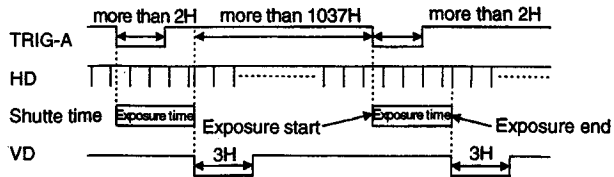
### ● Output phase (Data : 10bit 20.2MHz)

Level : EIA644(h : more than 1.41V L : less than 1.075V)



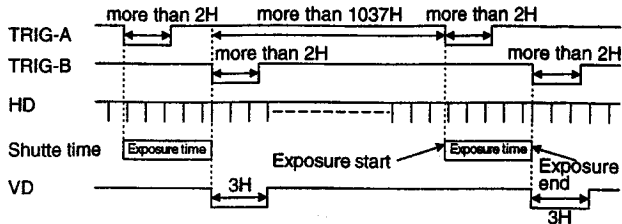
## (2) TRIG-A input and HD & VD phase during Fixed shutter mode

Transmit TRIG-A at TTL level



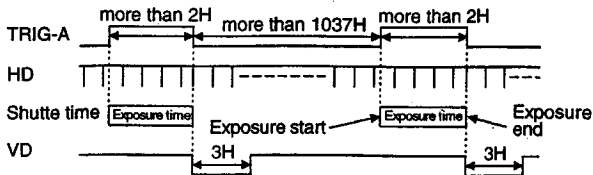
## (3) TRIG-A & B input phase and HD & VD phase during Two trigger mode

Transmit TRIG-A & B at TTL level



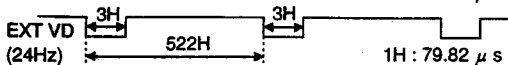
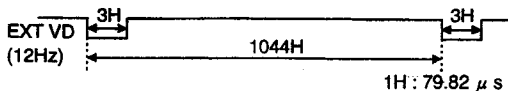
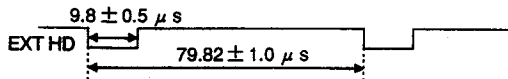
## (4) One trigger mode

Transmit TRIG-A at TTL level

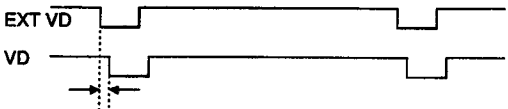
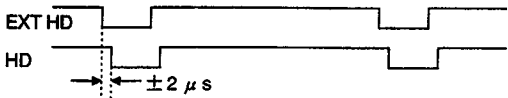


## (5) External HD & VD input levels and phase

Level: TTL level

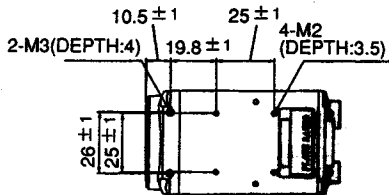
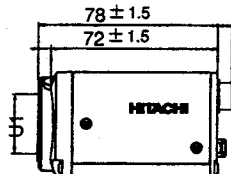
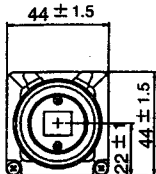


Align falling edges of external HD and VD.



VD output is delayed 2H compared to EXT VD.

## EXTERNAL VIEW



### Caution

When a heavy lens is used, or when excessive shock or vibration is applied, fix the lens to the equipment, too.

# SPECIFICATIONS

- |                                   |   |                               |   |
|-----------------------------------|---|-------------------------------|---|
| (1) Pickup element                | 2/3-inch interline CCD                      | (11) Video output             | Digital output or analog output for image checking                                      |
| Total pixels                      | 1360 (H) × 1034 (V)                         | Digital output                | EIA-644   |
| Effective pixels                  | 1300 (H) × 1030 (V)                         |                               | Note: Maximum digital out cablelength is 2 meters.                                      |
| Pixel pitch                       | 6.7 (H) × 6.7(V) $\mu$ m (square lattice)   |                               | Data: Single channel 10 bits, 20.2 MHz  |
| (2) Imaging area                  | 8.71 (H) × 6.90 (V) mm                      | (12) External sync input      | HD/VD TTL level negative  |
| (3) Scanning system               | Non-interlaced                              |                               | Input impedance: 1 k $\Omega$   |
| (4) Aspect ratio                  | 5 : 4                                       |                               | Frequency deviation: $\pm$ 1%   |
| (5) Frame rate                    | 12 frames/second (full pixel readout)       | (13) Electronic shutter speed | Selectable by external switches:  |
|                                   | 24 fps (2V pixelssimultaneous readout)      |                               | Off (frame rate), 1/30, 1/125, 1/250, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second.  |
|                                   | 24 fps is without frame on demand function. | (14) Gamma compensation       | Set by external switch..  |
| (6) Horizontal scanning frequency | 12.528 kHz                                  | (15) Frame-on-demand          | $\gamma = 1$  |
| (7) Vertical scanning frequency   | 12 Hz                                       |                               | External switch setting on/off and modes (fixed shutter, two trigger, and one trigger). |
| (8) Synchronization               | Internal/external (automatic switching)     | (16) Power supply voltage     | 12 $\pm$ 1 VDC  |
| (9) Lens mount                    | C mount                                     | (17) Current consumption      | Approx. 290 mA  |
| (10) Flange focal distance        | 17.526 mm                                   |                               |   |

- (18) Ambient, operating 0 to + 40 °C (+32 to ; 104 F), less than 90 % RH  
 Ambient, storage -10 to + 50 °C (+14 to +122 F), less than 70 % RH

**Note:** If operated continuously, be sure to use at less than +40 °C (104 F) for long term stable performance.

- (19) Vibration endurance 3G (3 directions, 30 minutes each)  
 (20) Shock endurance 30G (vertical, horizontal, once each face)

(21) External dimensions 44 (W) × 44 (H) × 78 (D) mm

(22) Mass Approx. 180 g

(23) RS-232C control

(a) Signal system

Control system Start-stop synchronization system

Transmission rate 9600 bps

Data length 8 bits

Start bit 1 bit

Stop bits 2 bit

Parity None

Bit transfer LSB first

(b) Communications control system

Full control by remote control software, data send/receive by text data transfer to camera microprocessor (BSC system handshake)

(C) Control items

1. Shutter speed (1/30, 1/125, 1/250, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second)
2. FD (frame-on-demand) On/off
3. Mode Fixed shutter, two trigger, one trigger
4. V-binning On/off
5. Gain Variable in 50 steps
6. Black level Variable in 50 steps
7. Input trigger Negative/Positive

※ Specifications are subject to change without notice.

## ● Operation Guide

For more details, see the operation guide.

Please ask your sales representative about the Operation Guide.

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