

RS-232C controlled high resolution progressive scan  
monochrome CCD camera

KP-F102

Specifications (preliminary)

DIEN	<i>N. Fujimura</i>	<i>JAN-26-00</i>
DSGN	<i>N. Fujimura</i>	<i>JAN-26-00</i>
CHKD	<i>N. Fujimura</i>	<i>JAN-26-00</i>
APPD	<i>T. Teramoto</i>	<i>Jan-27-00</i>

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Tokyo Japan

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1. Overview

The KP-F102 is a high resolution full frame shutter black and white CCD camera utilizing a 2/3-inch progressive scan type charge coupled device (CCD) image sensor and equipped with RS-232C control capability.

The output is non-interlaced at 12 frames per second.

High resolution is provided by the 1.3 million picture elements (pixels), while the camera is equipped with a host of versatile functions, including digital output, multistep electronic shutter, HD/VD external sync and frame on demand. RS-232C control allows setting from a personal computer.

The square lattice pixel arrangement also produces images suitable for image processing.

2. Outstanding features

(1) High resolution

The most recent high grade CCD has 1300 (H) × 1030 (V) effective pixels arranged in a square lattice configuration.

(2) Frame shutter

The frame shutter function enables high vertical resolution for moving objects.

(3) Multistep electronic shutter

The shutter speed can be selected in 8 steps from 1/30th to 1/10,000th of a second.

(4) Frame on demand

An external trigger signal can provide instant readout of the stored image at a desired timing. The image storage time can also be adjusted by external trigger and shutter.

(5) The self-contained CPU permits using RS-232C control for setting each function. The functions can also be set from rear panel switches.

(6) Digital output

An EIA-644 digital output is provided.

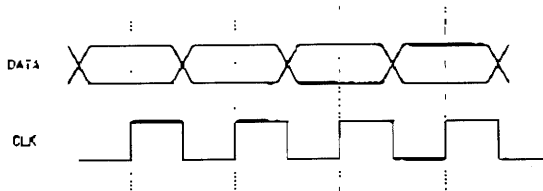
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### 3. Specifications

- (1) Pickup element 2/3-inch interline CCD
- Total pixels 1360 (H) × 1034 (V)
- Effective pixels 1300 (H) × 1030 (V)
- Pixel pitch 6.7 (H) × 6.7 (V) μm (square lattice)
- (2) Imaging area 8.71 (H) × 6.90 (V) mm
- (3) Scanning system Non-interlaced
- (4) Aspect ratio 5 : 4
- (5) Frame rate 12 frames per second (progressive readout)
- 24 frames per second (2 V pixel simultaneous readout)
- Frame on demand does not operate during 24 frame.
- Selected by rear panel switch, factory setting is 12 frames/second.
- (6) Horizontal scanning frequency 12.528 kHz
- (7) Vertical scanning frequency 12 Hz
- (8) Synchronization Internal/external (automatic switching)
- (9) Lens mount C mount.
- (10) Flange focal distance 17.526 mm
- (11) Video output Digital output or analog output for image checking
- Digital output EIA-644
- Note: Maximum digital out cable length is 2 meters.
- Data : single channel 10 bits, 20.2 MHz

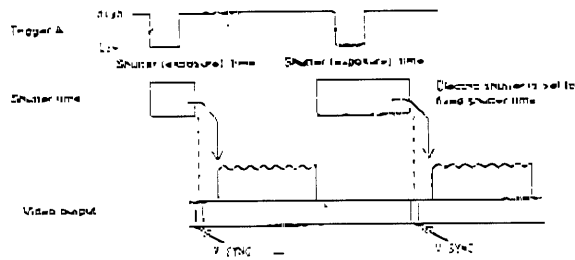
DATA



- (12) External sync input HD/VD 4 to 6 Vp-p negative
- Input impedance: 1 kΩ
- Frequency deviation: ± 1%
- (13) Electronic shutter speed Selectable by external switches: Off (frame rate), 1/30, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/4000, 1/10000 second. Factory setting is off.
- (14) a correction  $\gamma = 1$
- (15) Frame on demand Externally switched on/off
- Externally switched fixed shutter, two trigger and synchon-reset modes. Factory setting is all off.

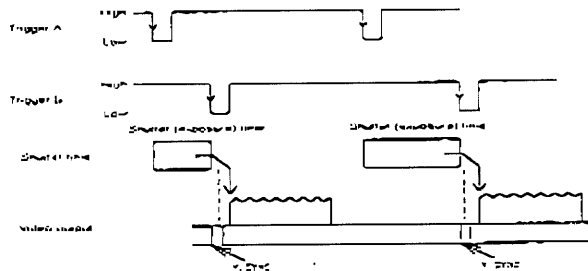
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Fixed shutter mode



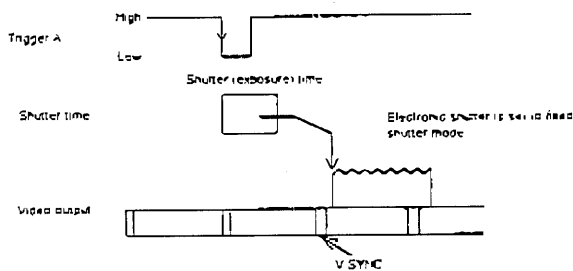
Fixed shutter mode

Two trigger mode



Two trigger mode

Sync non-reset mode



Sync non-reset mode

- (16) Power supply voltage                      12 ± 1 VDC
- (17) Current consumption                      Approx. 400 mA

- (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                      3 G (3 directions, 30 minutes each)
- (20) Shock endurance                            30 G (vertical, horizontal, once each face)
- (21) External dimensions                      44 (W) × 44 (H) × 110 (D) mm
- (22) Mass    Approx. 230 g

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(23) RS-232C control

(a) Signal system

Control system	Start-stop synchronization system
Transmission rate	9600 bps
Data length	8 bits
Start bit	1
Stop bits	2
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, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/4000, 1/10000 second)
  - 2. FD (frame on demand) On/off
  - 3. Mode Fixed shutter, two trigger, sync non-reset
  - 4. V-binning On/off
  - 5. Gain Variable in 50 steps
  - 6. Black level Variable in 50 steps
  - 7. Partial scan On/off
- On: 16H, 32H, 64H, 128H, 256H

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4. Composition

- (1) Camera (with infrared blocking filter)
- (2) Operating instructions

5. 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) Junction box JU-F1\*
- (5) Dummy glass (AR coated) ARC1214
- (6) Camera cable

	Molded type	Assembly type
2 m	C-201-KSM	C-201KS
5 m	C-501KSM	C-501KS
10 m	C-102KSM	C-102KS

Note : Assembly type made to order

\* 12-pin connector output pin differences

Pin	KP-F1	KP-F102
4	VIDEO 1	VIDEO
6	HD/TRIG-B	HD
9	VIDEO 2	TRIG-B

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6. DC input and sync connections

(1) Connections to DC IN and SYNC

Pin No.	Int. sync	Ext. sync			
		Ext. HD/VD	Frame on demand		
			Fixed shutter	Two trigger	Sync non-reset
1	GND	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V	+12V
3	GND	GND	GND	GND	GND
4	VIDEO	VIDEO	VIDEO	VIDEO	———
5	———	EXTHD (GND)	EXTHD (GND)	EXTHD (GND)	EXTHD (GND)
6	———	EXTHD (SIGNAL)	EXTHD (SIGNAL)	EXTHD (SIGNAL)	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)

Connector (camera side) : Hirose HR10A-10R-12PB(01)  
 Plug (matching cable plug) : Hirose HR10A-10P-12S (01)

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## (2) Signal connections to D. OUT (26 pin)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	DATA 0-H	8	DATA 3-L	15	DATA 7-H	22	VD-L
2	DATA 0-L	9	DATA 4-H	16	DATA 7-L	23	HD-H
3	DATA 1-H	10	DATA 4-L	17	DATA 8-H	24	HD-L
4	DATA 1-L	11	DATA 5-H	18	DATA 8-L	25	CLK-H
5	DATA 2-H	12	DATA 5-L	19	DATA 9-H	26	CLK-L
6	DATA 2-L	13	DATA 6-H	20	DATA 9-L		
7	DATA 3-H	14	DATA 6-L	21	VD-H		

Connector (camera side) : Hirose DX10GM-26S or an equivalent  
 Plug(matching cable plug) : Hirose DX30AM-26P or an equivalent  
 Cover : Hirose DX30M-26CV or an equivalent

The digital out cable should be comprised of a twisted pair of wires having 100 Ω characteristic impedance and an outer sheath shield type conductor. Connect the shield (ground) of the digital out cable to the ground terminal of the video equipment, frame grabber, etc.

## (3) Remote (RS-232C control) cable pin connections

(Connect the cable between the camera Remote connector and the personal computer serial interface connector (D-SUB 9 pin).

Pin no.	Signal name
1	-
2	RD
3	TD
4	Manual/remote
5	Ground
6	-

Connector (camera) HR10-7R-6SA (Hirose) or equivalent  
 Plug (cable matching plug) HR10A-7P-6P (Hirose) or equivalent

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).

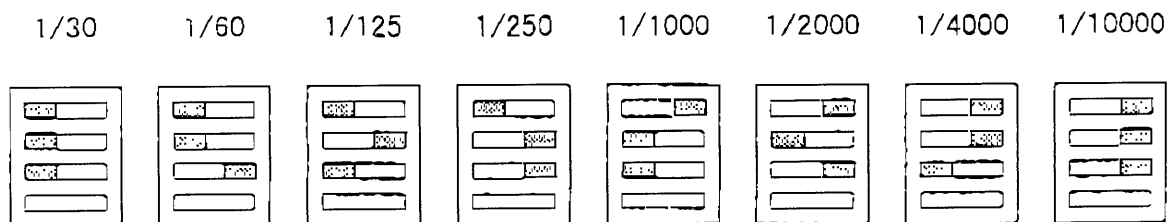
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7. Rear panel switches

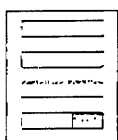
The rear panel includes switches for electronic shutter data, readout rate, and field on demand on/off and mode switches.

(1) Electronic shutter switches



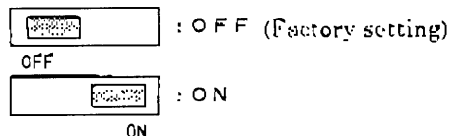
(2) Readout rate switch

All pixels  
(1/125s)

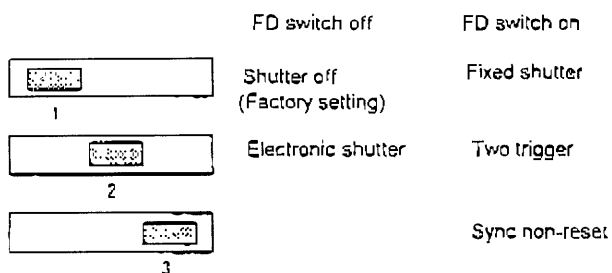


(Factory setting)

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



(4) Frame on demand mode switch

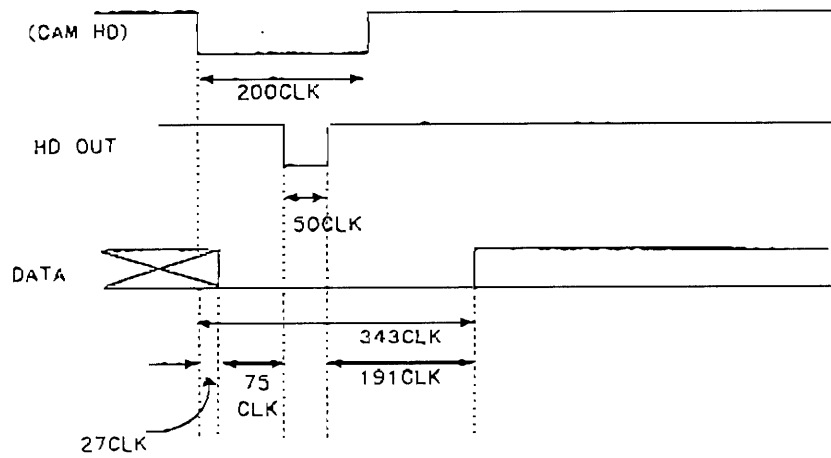


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8. Input/output signal levels and timing

(1) Digital output

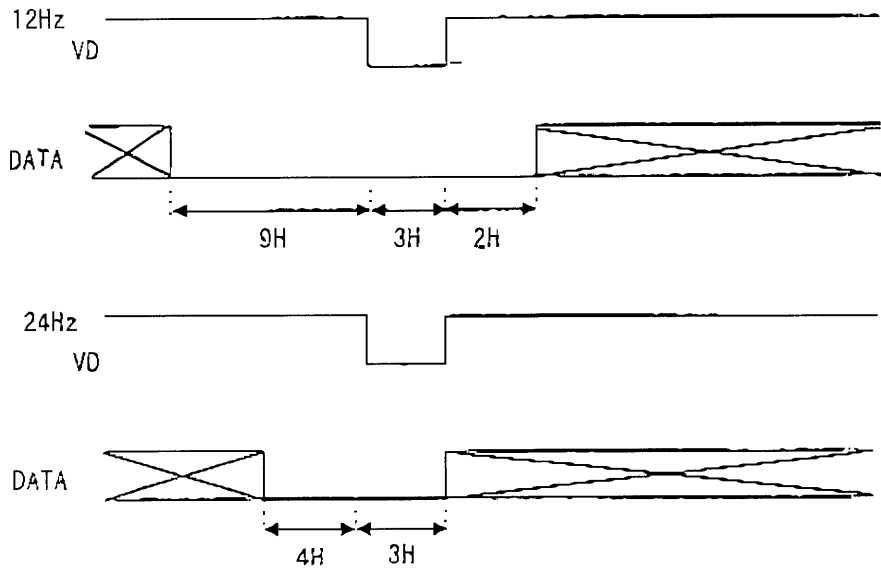
H sync phase relationship



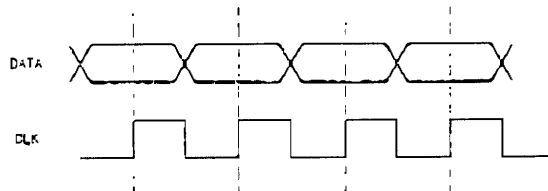
HD OUT is obtained at RS-422A rating from the digital connector pins 23 and 24.  
 $HD = 12.528kHz = 1616CLK$

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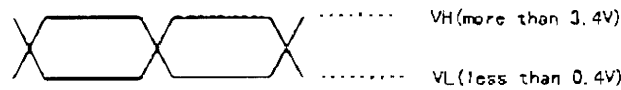
V sync phase relationship



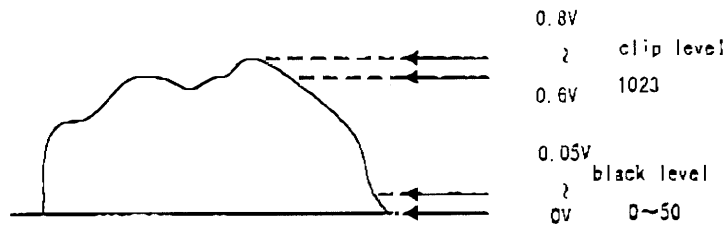
Output phase



Level: RS-172A (Hi: more than 3.4V, Low: less than 0.4V)



A/D converter digitizing level



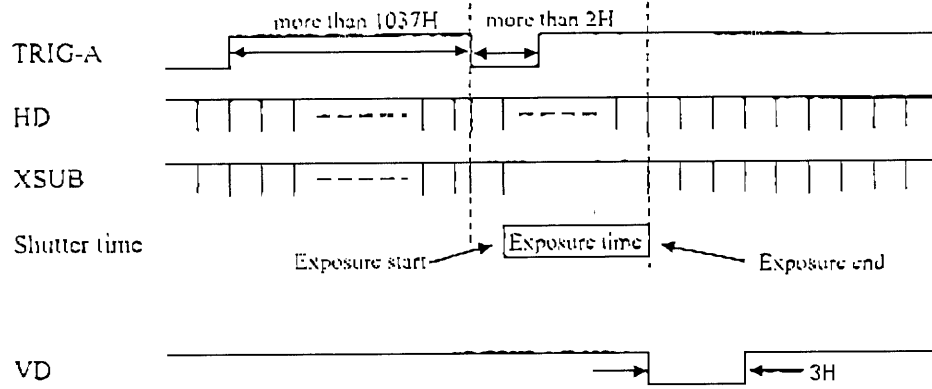
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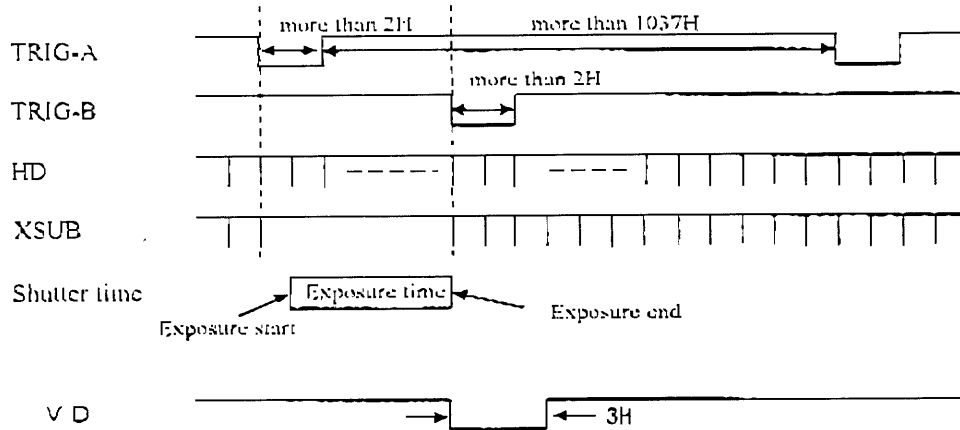
(2)TRIG-A input and HD & VD phase during Fixed shutter mode

Transmit TRIG-A at 5Vp-p level



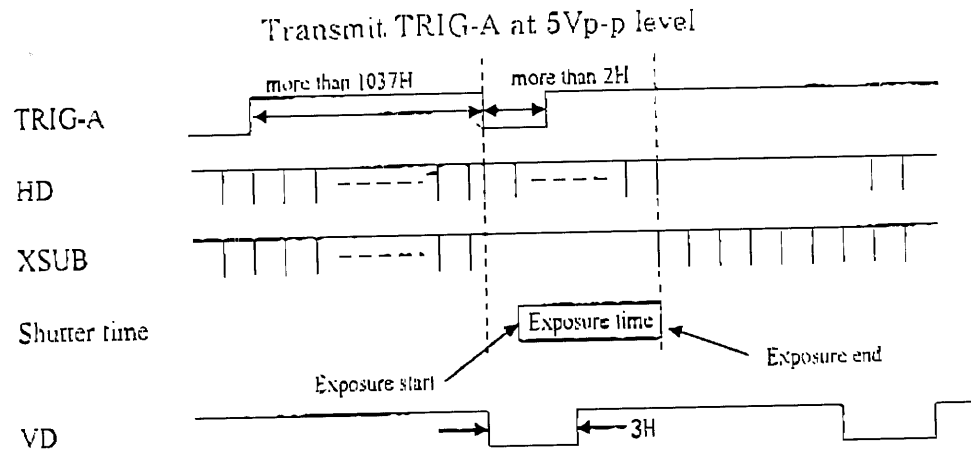
(3)TRIG-A & B input phase and HD & VD phase during Two trigger mode

Transmit TRIG-A & B at 5Vp-p level



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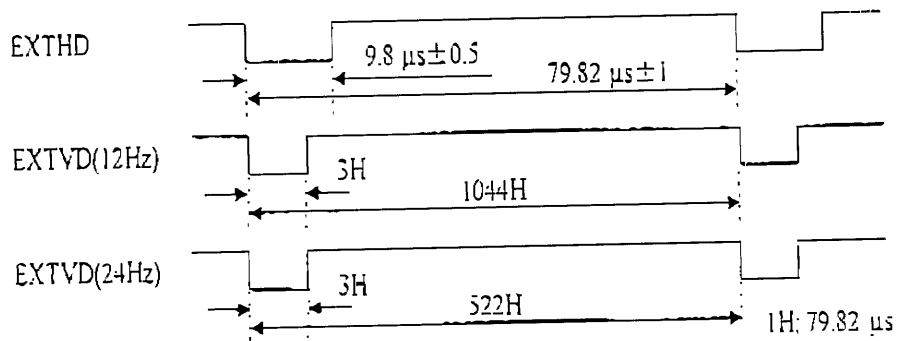
(4) TRIG-A input and HD & VD phase during sync non-reset mode



WEN is not output

(5) External HD & VD input levels and phase

Level: 5 Vp-p



Align falling edges of external HD and VD.  
VD output is delayed 2H compared to EXTVD

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**Notice:**

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Confirm the most recent specifications at time of order.

Hitachi Denshi certifies this product complies with the standard warranty conditions of Hitachi Denshi, and that quality control is implemented to the extent required to comply with these conditions.

**Warranty and service:**

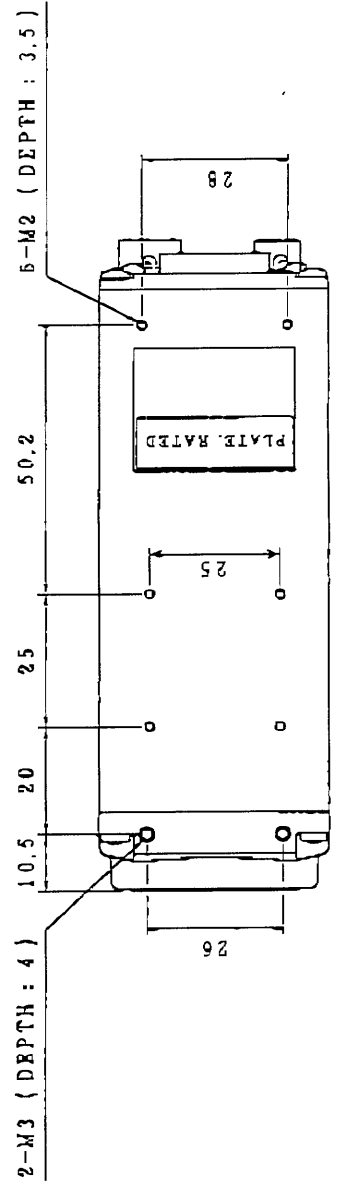
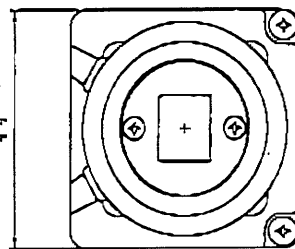
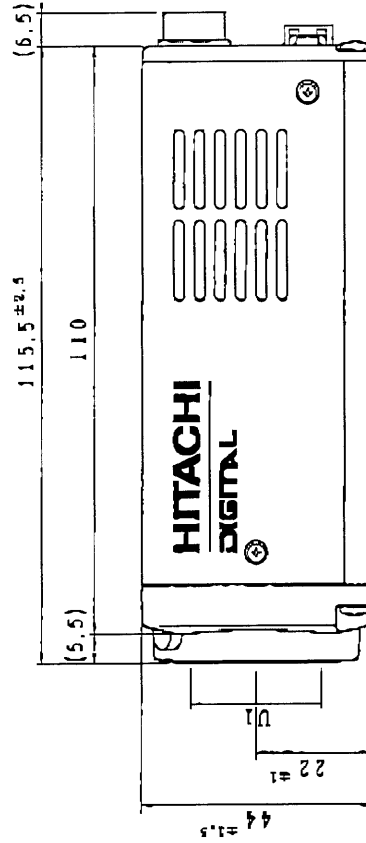
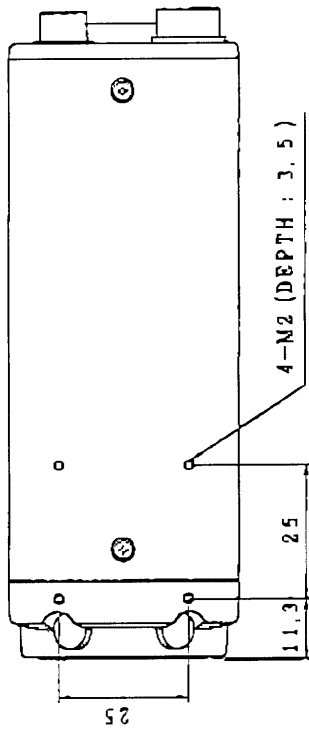
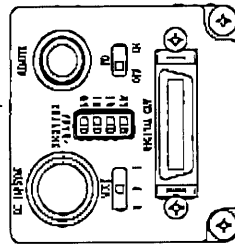
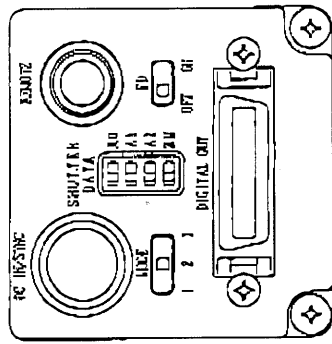
- (1) The warranty (toll-free) service is one year after the date of purchase.
- (2) After elapse of the warranty period, in cases where service can restore product functions, such service will be performed at fee at the request of the customer.
- (3) Hitachi Denshi bears no responsibility for loss or damage resulting from the use of this product, including and not limited to use of this product in systems for commerce, manufacturing, medicine, crime prevention and other applications.
- (4) This product uses components having limited operating life.  
 Use and storage of the product under high temperature and humidity can shorten the operating life.  
 Regular maintenance every one to two years is recommended for preserving long term stable performance.

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MASS : APPROX 230 g

COLOR : BLACK



UNIT : mm  
SCALE : N T S

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