

**Progressive Scan CCD Color Camera**

**KP-FD30CL**

**Specifications**

**Hitachi Kokusai Electric Inc.**

January 12, 2005 Revision 1.1

## 1. General

The KP-FD30CL is a single CCD type RGB color camera which utilized the progressive scan CCD image sensor with square pixel for VGA format of 1 / 2-inch which adopted the RGB primary color mosaic filter.

The KP-FD30CL is equipped with the progressive full frame digital (Camera-Link Base Configuration) RGB 24bits output of high frame rate( approx. 60 frame/second ), the external trigger function, external synchronization(HD/VD), the, etc., it is suitable for the image-processing equipment input.

## 2. Principal features

### 1) High resolution and high color fidelity

By adoption of the progressive scan CCD image sensor and RGB primary color mosaic filters, the picture of high vertical resolution and high color fidelity can be acquired.

### 2) A new digital signal processor (DSP)

The clear picture of a high signal to noise ratio (S/N) is obtained by the new digital signal processor (DSP) adoption which has improved luminance signal processings, such as 5H enhancer processing.

### 3) CCD drive functions

- a) Preset electronic shutter ( settable 11 steps from 1/60 second to 1/50,000 second and 27 steps from 1/30 second to 8 second. )
- b) Variable electric shutter ( 1H steps from 1/60 second to Aprox. 1/10,000 second )
- c) Auto electronic shutter[AES] ( from 1/60 second to approx. 1/50,000 second )
- d) Frame on demand ( one trigger and fixed shutter modes )

### 4) White balance

- a) Auto-tracking white balance ( detecting white color in the scene at a color temperature form 2,500K to 6,000K )
- b) Preset white balance [AWC]
- c) Manual white balance. ( R, B gain control )

#### 5) External synchronization

As the external synchronization mode of HD/VD inputs system is available, the KP-FD30 is most suitable for system operation. The horizontal sync phase can be adjusting to the on-screen menu and remote control.

#### 6) Remote control ( Via RS-232C )

### 3. Specifications

1) Imaging device	: 1/2-inch progressive scan interline CCD ( with on-chip microlenses )
Total number of pixels	: 692(H) x 504(V)
No. of effective pixels	: 659(H) x 494(V)
Scanning area	: 6.52(H) x 4.89(V) mm
Unit cell size	: 9.9(H) x 9.9(V) $\mu$ m ( Square pixel )
Color filter	: R, G, B primary color mosaic fillers on chip
2) Scanning system	: Progressive scan ( VGA mode )
3) Frequency	Horizontal : 31.468 kHz
Vertical	: 59.94 Hz
4) Sync system	: Internal / external ( HD/VD auto selection )
Internal sync output	
HD(LVAL)	: 31.468 kHz $\pm$ 0.5Hz, LVDS, Negative
VD(FVAL)	: 59.94 Hz, LVDS, Negative
External sync input	
EXT-HD	: 31.468 kHz $\pm$ 0.5Hz, 2 ~ 5Vp-p, Negative
EXT-VD	: 59.94 Hz, 2 to 5 Vp-p, Negative
Trigger(CC2)	: LVDS, Positive or Negative (Selectable)
5) Video signal output	
Digital output	: Camera-Link Base Configuration RGB 24bits (Maximum cable length is 10 meters.)
Analog output	: NTSC(VBS) <b>(For image checking)</b> : 1.0 Vp-p/75 Subcarrier frequency : 3.579545 MHz
6) Video signal processing	: Digital processing ( input 10 bits )
7) Standard sensitivity	: 2,000 lx ( F5.6, 100% )
8) Minimum illumination	: 10 lx ( F1.4, AGC ON, 50% )
9) Sensitivity selection	: AGC OFF / ON Manual Gain Adjustable at AGC OFF Limit Gain Adjustable at AGC ON
10) Electric shutter speed	
PRESET	: Selectable in 11 steps high speed shutter OFF(1/60), 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000 1/10000, 1/20000, 1/30000, 1/50000 second Selectable in 27 steps low speed shutter OFF(1/60), 1/30, 1/15, 1/10, 1/7.5, 1/6, 1/5, 1/3.75, 1/3, 1/2.5, 1/2, 1/1.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8 second

- AES : From 1/60 second to approx. 1/50,000 second  
( Response : SLOW, NORMAL, FAST )
- VARIABLE : Approx. 1H steps from 1/60 second to 1/10,000 second
- 11) Auto level control[ALC] ( The auto level control system of AES and AGC. )  
: AVERAGE / PEAK&AVERAGE / AREA  
( Scanning area is selectable from 9 area. )
- 12) White balance : Selectable in 3 modes  
Auto-tracking[ATW] / preset[AWC] /  
R/B gain manual control[MANUAL] /
- 13) Remote control : Modes and settings can be selected and adjusted  
from PC.  
RS-232C protocol Level: LVDS or RS-232C level
- 14) Power supply : 12 VDC  $\pm$  10 %
- 15) Power consumption : Approx. 220 mA
- 16) Lens mount : C/CS mount ( Frange-back adjustment )
- 17) Ambient temperature  
Operating : -10 to +50 , 30 to 80 %RH  
Storage : -20 to +60 , 20 to 90 %RH
- Note : If operated continuously, be sure to use at less than +40 (104F)  
for long term stable performance.
- 18) Vibration endurance : 68.65 m/s<sup>2</sup> ( 10 to 200Hz, 30 minutes each on XYZ axes )  
Note : Do not subject to strong vibration for long periods of time.
- 19) Shock endurance : 490.3 m/s<sup>2</sup> ( vertical, horizontal, once each face )
- 20) External dimensions : 58(W) x 58(H) x 48(D)  
( not including lens and protrusions )
- 21) Mass : Approx. 220g ( without lens )
- 22) Supplied equipment : Camera 1  
Operating instructions 1
- 23) Optional accessories : 12 pin plug SNH-10-12(P)  
Junction box JU-M1A  
Camera cable

Cable length	Standard type	* Shield type
2m	C-201KSM	C-201KSS
5m	C-501KSM	C-501KSS
10m	C-102KSM	C-102KSS

\*Note

In the CE marking Legion, use the Shield type.

24) DC input connector pin arrangement ( DC IN )

PinNo.	Signal name
1	GND(+12V)
2	DC +12V
3	GND(VBS)
4	VBS OUT
5	GND(Tx/Rx)
6	Tx <sup>(*Note)</sup> or HD-in
7	Rx <sup>(*Note)</sup> or VD-in
8	GND
9	---
10	GND(+12V)
11	DC +12V
12	GND

**Note: Tx/Rx: RS-232C level**

It is a setup which performs remote control via Camera-Link at the time of factory shipments. When carrying out via 12 pin connectors, it is necessary to switch the inside SW of a camera.

25) Digital output ( Camera-Link ) connector pin arrangement ( D.OUT/REMOTE )

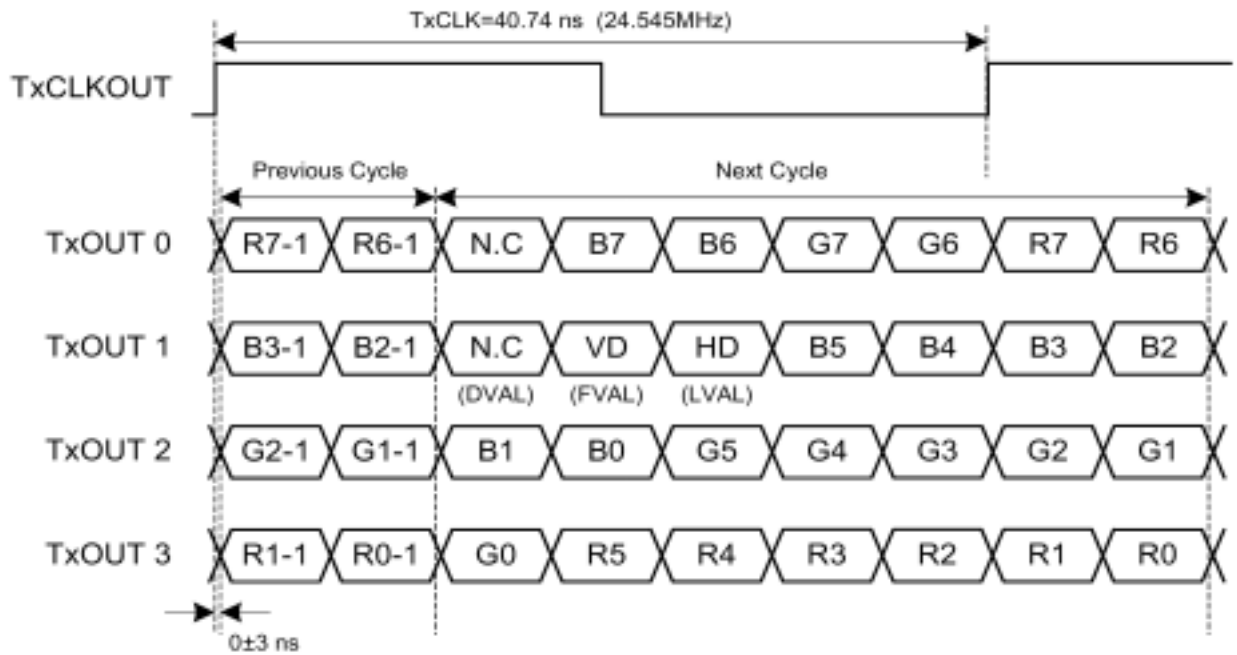
PinNo.	Signal name	PinNo.	Signal name
1	GND	14	GND
2	TxOUT 0(-)	15	TxOUT 0(+)
3	TxOUT 1(-)	16	TxOUT 1(+)
4	TxOUT 2(-)	17	TxOUT 2(+)
5	TxCLKOUT(-)	18	TxCLKOUT(+)
6	TxOUT 3(-)	19	TxOUT 3(+)
7	SerTC (+)	20	SerTC (-)
8	SerTFG (-)	21	SerTFG (+)
9	N.C. [CC1(-)]	22	N.C. [CC1(+)]
10	TRIG(+) [CC2(+)]	23	TRIG(-) [CC2(-)]
11	N.C. [CC3(-)]	24	N.C. [CC3(+)]
12	N.C. [CC4(+)]	25	N.C. [CC4(-)]
13	GND	26	GND

**Note: Digital output (Camera-Link) cable**

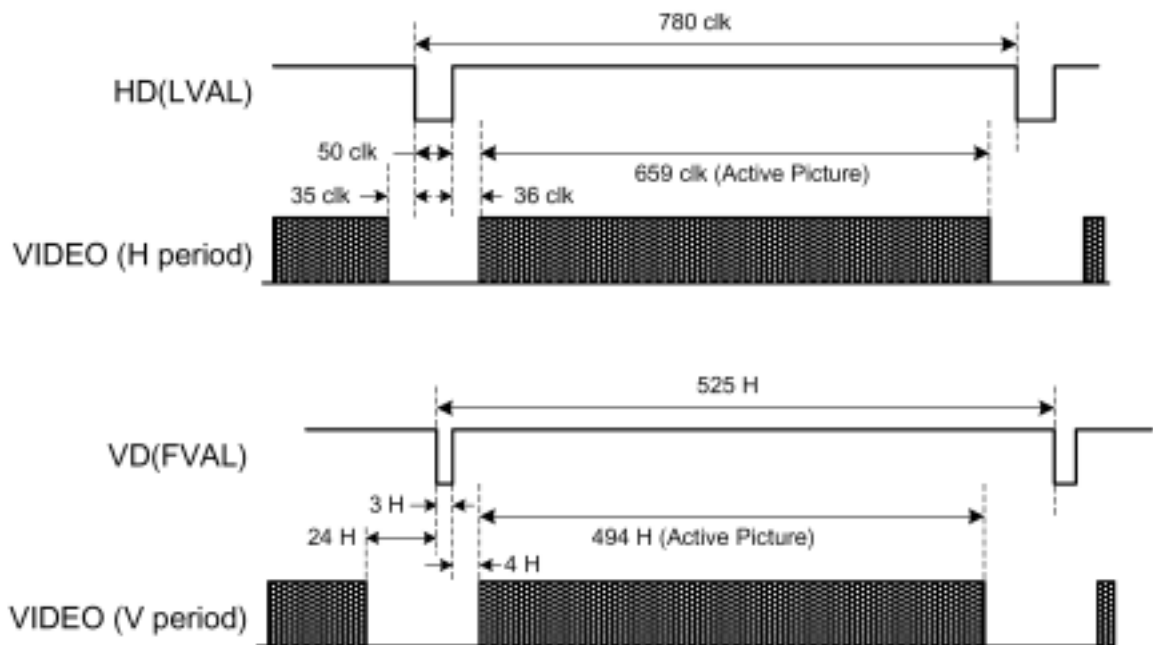
Install clamp filter ( ZCAT3035-1330: TDK ) at both ends(camera and video processor ends) in the CE marking Legion.

26) Camera-Link output timing chart

a) CLK output & Video output data phase relationship



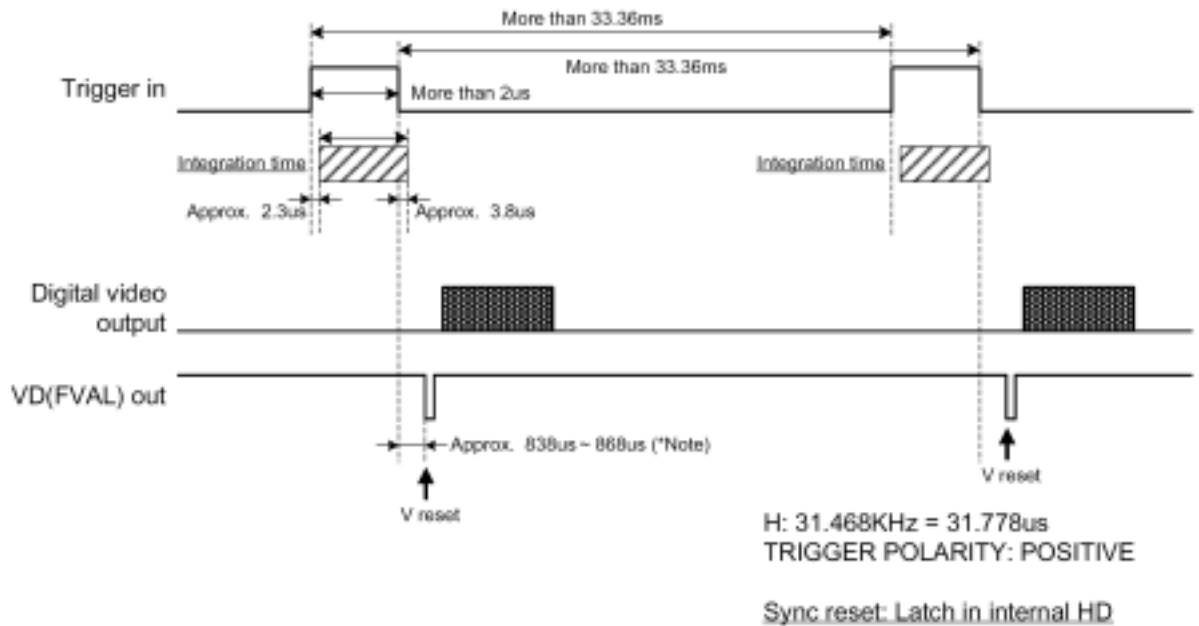
b) HD/VD output & video output data phase relationship



27) Frame On Demand Function ( External trigger timing chart )

a) ONE trigger mode

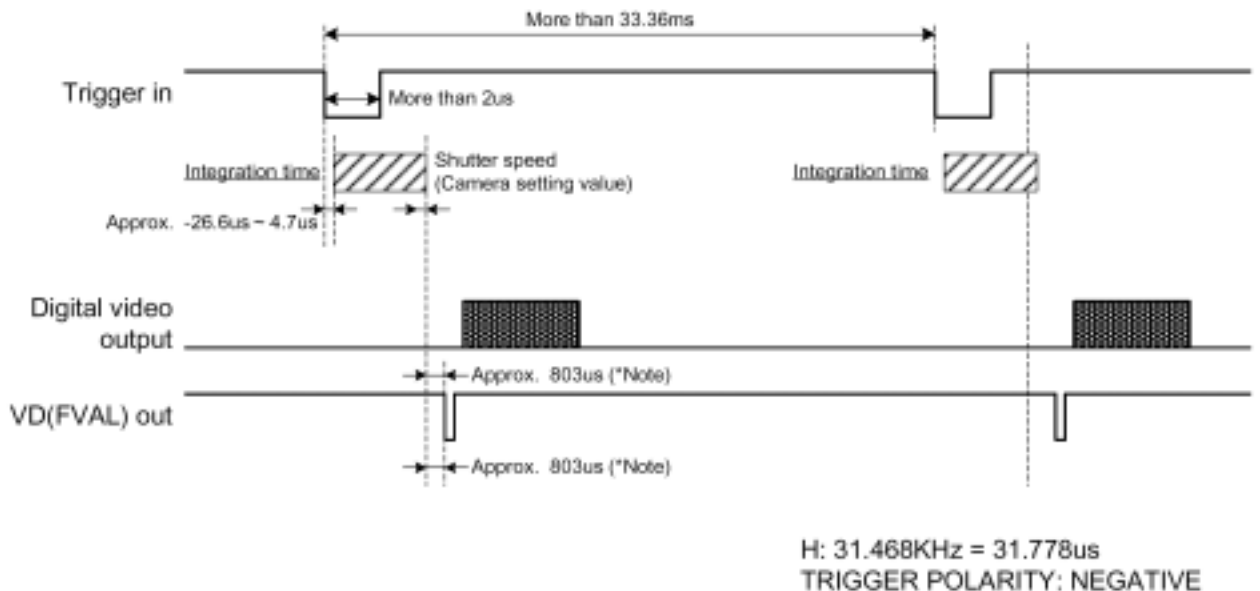
Trigger pulse.....Asynchronous



\* **Note** : When falling(rising) of a trigger pulse is inputted in the period in front of 779.4us – 843.5us of VD, it is 838us~931us.

b) Fixed shutter mode

Trigger pulse.....Latch in internal HD

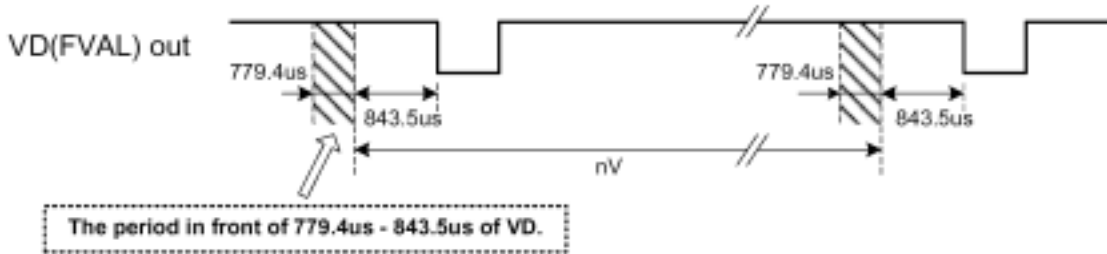


\* **Note** : When falling(rising) of a trigger pulse is inputted in the period in front of 779.4us – 843.5us of VD, it is 803us~866us.

**( Important ) About external trigger timing**

When falling (rising) of a trigger pulse enters during the following figure, V RESET timing differs. A case so that the period from falling (rising) of a front trigger pulse to the following falling (rising) may be set to  $nV-nV+63.5\mu s$ , and when falling (rising) of a trigger pulse enters during the following figure, be careful.

(V :vertical synchronous period, n :integer)

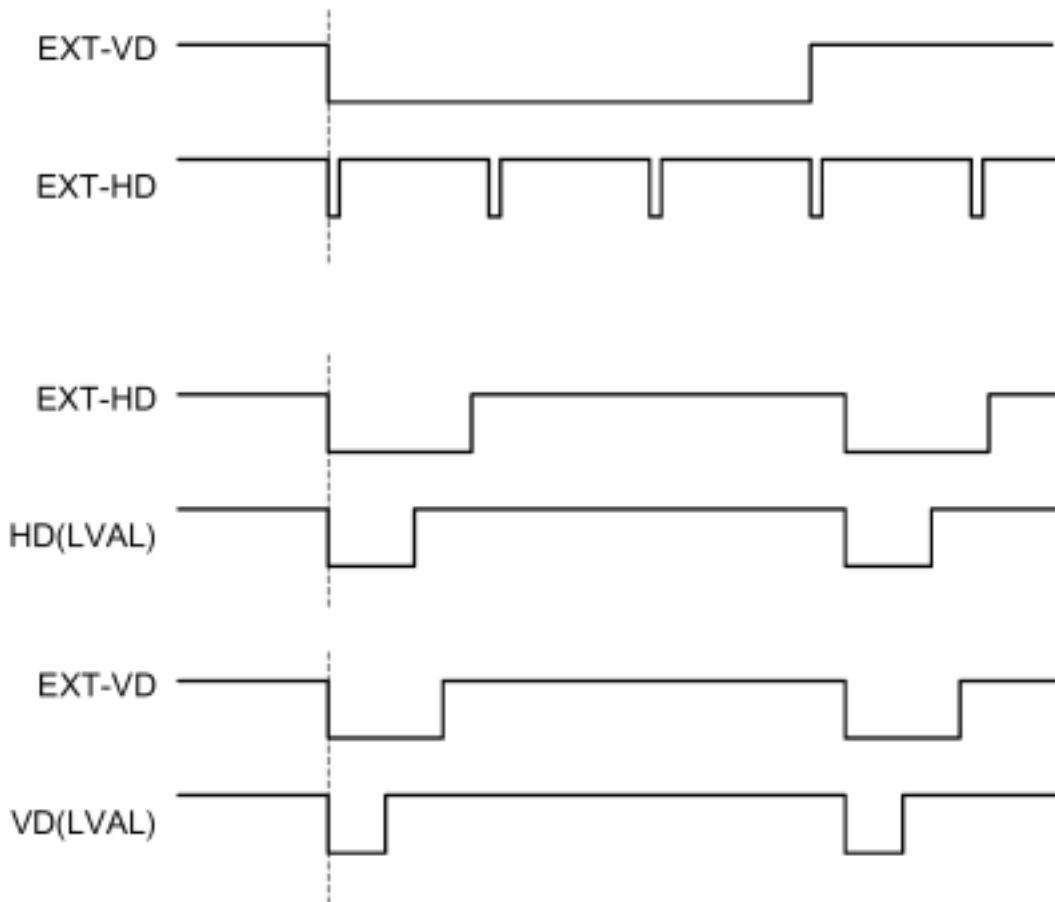


28) HD/VD External timing chart

EXT-HD input: 31.468kHz  $\pm$  0.5Hz, 2 ~ 5Vp-p, Negative

EXT-VD input: 59.94Hz, 2 ~ 5Vp-p, Negative

\* **Caution** : Please unite the falling phase of EXT-HD and EXD-HD.

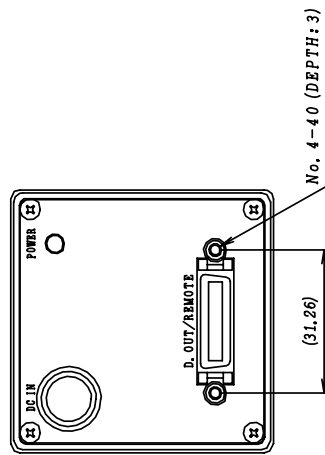
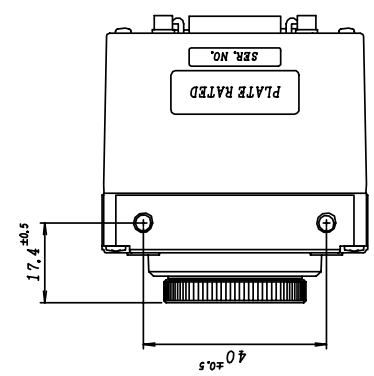
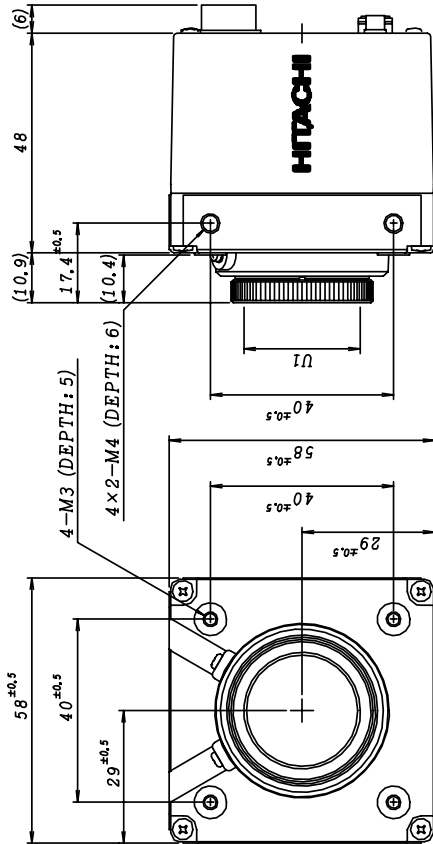
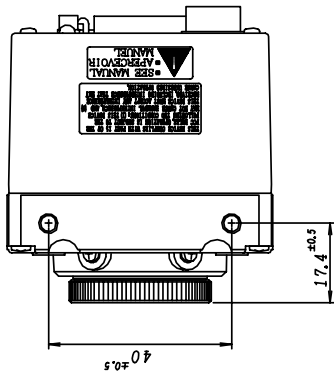


29) External View

KP-FD30CL

MASS: APPROX. 220 g

COLOR: BLACK



TENTATIVE

UNIT: mm

**Notice:**

These specifications are subject to change without prior notice due to product improvement. Confirm the most recent specifications at time of order.

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

**Warranty and service:**

- 1) The guarantee period is one year after the data purchase. However, the defects due to erroneous use or intentional act are excluded.
- 2) As the defect after expiration of the guarantee period, where product repair is possible, repair will be performed at charge.
- 3) The present Warranty pertains only to the camera unit. Secondary malfunctions attributable to camera failure as well as expenses incurred by disassembly and reassembly of the related system, are beyond the scope of this Warranty.
- 4) Compensation for loss of business, loss or damage to software, database and other contingent losses are beyond the scope of this Warranty.
- 5) Hitachi Kokusai Electric Inc. is not liable for the losses caused when the equipment is used in a system, use for business trades, production process, medical fields, crime prevention applications, etc.
- 6) The parts used in the equipment have their respective lives. The lives of such parts will be shortened under the environments of high temperature or high humidity. When the stable operation is required for a long time, it is recommended to perform periodical maintenance and inspection every year or every two years.

**Correction and change career**

Dec 6, 2004 . . . . . Revision 1.0 is issued.

Jan 12, 2005 . . . . . Revision 1.1 is issued.

Reasons: Page 3, 3 1) The error in writing is corrected.

Scanning area ~~7.48(H)x6.15(V)mm~~ >6.52(H)x4.89(V)mm