HITACHI

1/3-inch, 1/2-inch single CCD type color camera

KP-D20A/B

Very small, high quality images, high sensitivity, Multi purpose color camera
KP-D20A/B is smaller than KP-D20 as volume 1/5 approx. and mass 1/3 approx.

Features

■**Small and light weight**
44 (W) × 44 (H) × 49 (D) mm　130 g approx.

■**High sensitivity**
Minimum illumination (F 1.2, AGC 31 dB)　KP-D20A：1.5 lx　KP-D20B：1.0 lx

■**Y/C outputs and RS-232C Control is provided**

■**Digital zoom**
The screen can be smoothly enlarged up to 4 times.

■**Multi Function**
Picture control parameters can also be adjusted with the aid of on-screen menus, thus enabling optimum adjustments to match the application.

Principal features and Specifications

Item \ model	KP-D20A	KP-D20B
Pickup element	Interline transfer type CCD CCD (with on-chip microlenses)	
Total pixels	NTSC : 811 (H) × 508 (V)	PAL : 795 (H) × 596 (V)
Effective pixels	NTSC : 768 (H) × 494 (V)	PAL : 752 (H) × 582 (V)
Scanning area	equivalent to 1/3-inch pickup tube NTSC : 4.88 (H) × 3.66 (V) mm PAL : 4.89 (H) × 3.64 (V) mm	equivalent to 1/2-inch pickup tube NTSC : 6.45 (H) × 4.84 (V) mm PAL : 6.47 (H) × 4.83 (V) mm
Unit cell size	NTSC : 6.35 (H) × 7.4 (V) µm PAL : 6.5 (H) × 6.25 (V) µm	NTSC : 8.4 (H) × 9.8 (V) µm PAL : 8.6 (H) × 8.3 (V) µm
Sync system	Internal	
Video signal output	Composite video : 1.0 Vp-p/75 Ω unbalanced BNC Y/C Y:1.0 Vp-p C:0.3 Vp-p (Burst) 75 ohms unbalanced 4pin (C7648-01-201)	
Remote control	RS-232C Round multi-connector, 4 pin (HR10A-7R-4SB)	
S/N	More than 50 dB (luminance signal, standard gain, enhancer and gamma off)	
Resolution	Horizontal NTSC More than 480 TV lines PAL More than 470 TV lines Vertical NTSC More than 350 TV lines PAL More than 450 TV lines	
Scene illumination range	1.5 to 100,000 lx (F1.2, Auto-iris lens)	1.0 to 100,000 lx (F1.2, Auto-iris lens)
AGC	selectable : off, 6, 12, 21 and 31 dB (factory setting is 21 dB)	
Electronic shutter speed	1/60 (PAL:1/50), 1/100 (PAL:1/120), 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/20000, 1/30000 second, and Auto	
Backlight Compensation	On/off switchable Sensing areas: selectable from 9 areas	
Auto-iris lens outputs	(a)Video signal input type lens Luminance signal:1.0 Vp-p/high impedance Power supply : 12 V DC 60 mA (b)Iris control voltage input (galvanometer) type lens Coupling coil impedance Damper : 1150 Ω ± 10 % , Drive : 190 Ω ± 10 %	
White balance	Selectable auto-tracking (ATW), preset (AWC), manual (MANUAL) (R/B gain adjustment)	
Digital zoom	Enlarged up to 4 times smoothly	
Text display	One line of up to 24 alphanumeric characters selectable display position	
Power supply	12 V DC ± 10%	
Power consumption	220 mA approx. (including Auto-iris lens Power supply)	
Lens mount	CS mount (C mount adaptor (LA-D20AB) optionally)	
Camera mount	Tripod adaptor (TA-D20AB) optionally	
Ambient temperature	-10 to +50 ℃ (+14 to +122 F), 30 to 80 % RH (Note)	
Storage ambient	-20 to +6 0 ℃ (-4 to +140 F), 20 to 90 % RH	
Vibration endurance	Less than 29 m/s^2, 10 to 55 Hz 30 minutes each on XYZ axes	
External dimensions	44 (W) × 44 (H) × 49 (D) mm (not including lens and protrusions)	
Mass	130 g (4.6 oz) Approx. (not including lens and protrusions)	

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

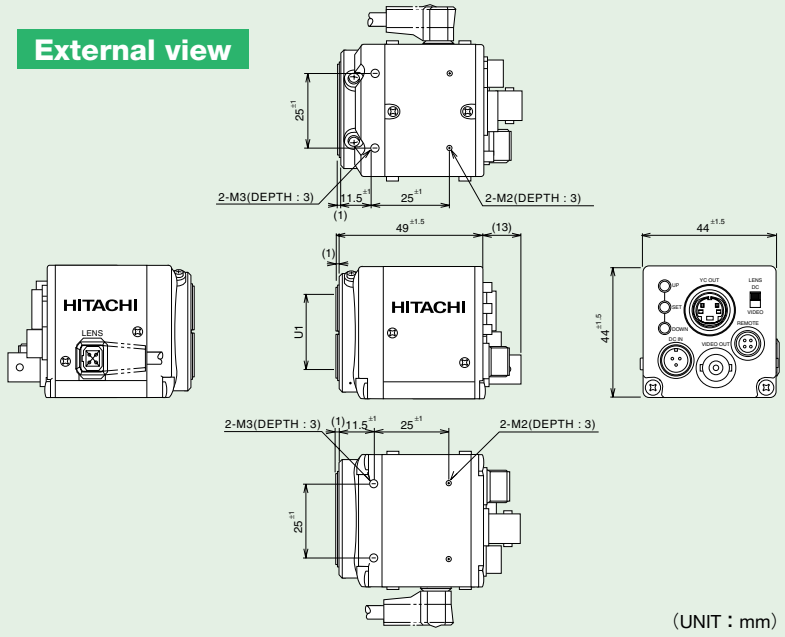
Supplied equipment

- Camera 1
- Operating instructions 1

Optional accessories

- Lens (see operating instructions)
- Lens plug (E4-191J-100)
- Tripod adaptor (TA-D20AB)
- C mount adaptor (LA-D20AB)
- Remote plug (HR10A-7P-4P(01))
- DC IN plug (R03-P3F)
- AC adaptor (AP-130)

External view



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Specification are subject to change without notice.

DV- E392 Printed in Japan (N')'01-06

HITACHI

Digital Signal Process CCD COLOR CAMERA

KP-D20BP-S3.....one cable version...

A. Outline

- ◆ Very small, light weight.
- ◆ Various functions, high picture quality by digital signal processing system.

B. Sales points

- ◆ Flexibility to equipment and system by small and lightweight.
- ◆ Various camera mode set up by on screen display.
- ◆ Y / C output (**Round 12p**/ see Table 1)
- ◆ RS-232C remote control (**Round 12P**/ see Table 1)

C. External view

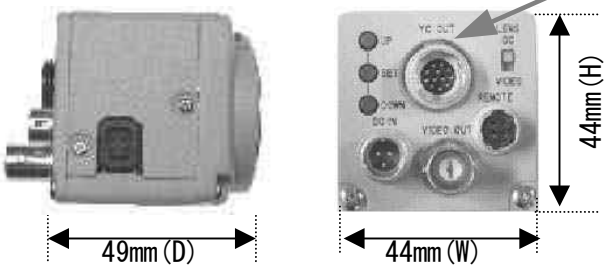


Table 1 **YC output／DC in／Remote**

Round multi-connector pin arrangement	
Pin No.	Signal name
1	GND
2	+12V
3	GND (Y)
4	Y output
5	GND (TX, **RX**)
6	**TX output**
7	**RX input**
8	GND (C)
9	C output
10	GND
11	+12V
12	GND (RX)

D. Major specifications

Color format	PAL
Imager	**1 / 2 " IT - CCD**
Effective pixels	752 (H) x 582 (V)
Sync system	Internal
Horizontal resolution	470 TV lines
Minimum illumination	**0.3 lx** (F1.2 AGC: ON [31dB])
S / N	50 dB
Video output	VBS, Y/C
Electronic shutter speed	OFF, 1/120,1/250,1/500,1/1000,1/2000, 1/4000,1/10000,1/20000,1/30000,AES
AGC	ON selectable: 6,12, 21, 31dB/OFF
Backlight correction	Photometric area selectable from among 9 positions on screen
White balance	Auto tracking white balance/Preset/Manual
Gamma	ON (0.45) or OFF (1.0) Selectable
Remote control	RS-232C
Other functions	Digital zoom (4times), Color saturation, Pedestal, Detail, Polarity, Text display
Power supply	12VDC±10%　220mA
Dimensions	44(W) x 44(H) x 49(D) mm
Mass	130g approx
Auto iris control	VIDEO (Video, DC 12 V) / DC (galvanometer type)
Lens mount	CS mount (Option: C-mount ring)

Option accessories	
AC adaptor	AP-130
DC input plug	R03-P3F
YC/DC in plug	HR10A-10P-12S
C mount adaptor	LA-D20AB
Tripod adaptor	TA-D20AB
Lens plug	E4-191J-100
Remote plug	HR10A-7P-4P (01)

E. Suggested markets: Inspection system, Factory automation, etc.

Hitachi Kokusai Electric

HITACHI

High Resolution, High Sensitivity Day/Night Compact Color camera

KP-D5010(P)

High Performance with Proven Hitachi Reliability for Demanding Surveillance Applications.

Day & Night

High Sensitivity 0.03lx

KP-D5010(P) DC12V model

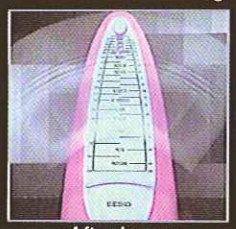
Three new features

1 Adaptive Noise Reduction

ANR utilizes a noise reduction algorithm that enables the camera to choose between current pixel values and former pixel values. The ANR identifies any large pixel change between frames as a motion and smaller changes as noise. By masking small changes, while at the same time preserving larger changes, this recursive action effectively reduces noise and makes an image clearer. The flexibility of ANR enables itself to be taken advantage of in many of the AUTO mode configurations.

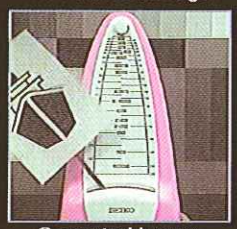
Night → Adaptive Noise Reduction → Clear

Standard camera image



After Image

New camera image

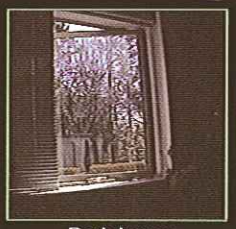


Corrected Image

2 Adaptive Image Enhancer

AIE precisely corrects images in real time. Rapid analysis of input images, division of images into several areas by a unique algorism, extraction of a optimum brightness and color correction parameter, all done quickly in real time. The Clearnesses of bright and dark areas are adjusted proportionally, making the visibility of a image similar to that of the human eye.

Backlighting → Adaptive Image Enhancer → Clear



Dark Image

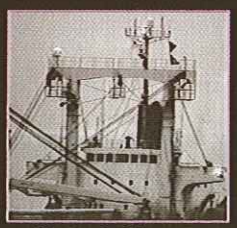
Corrected Image

3 Adaptive Fog Reduction

AFR makes images clearer in real time, enhancing visibility in the dark, in conditions with backlight, or in a fog, while an optimized computational algorithm is putting the frame rate up to 30fps. The technology enables dramatic enhancement of visibility by adjusting the contrast ratio of a white or foggy image and restoring the faded colors in the image.

Fog → Adaptive Fog Reduction → Clear

Hazy Foggy Image



Corrected Image

Day & Night Operation

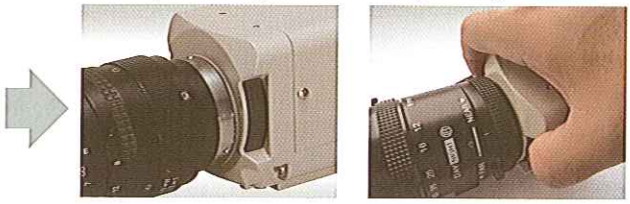
Camera switches from the Color mode to the B &W mode by removing the IR-Cut filter from the front of the CCD and replacing it with the AR glass, compensating for focus position shifts.

Easily Adjustable Back Focus & Remote Control

The adjustable flange back means optimum back focuses of the camera & lens. All of the functions of the camera, such as the scene file storage and call-up, can be controlled from a long distance by RS-232C.

Sensitivity UP

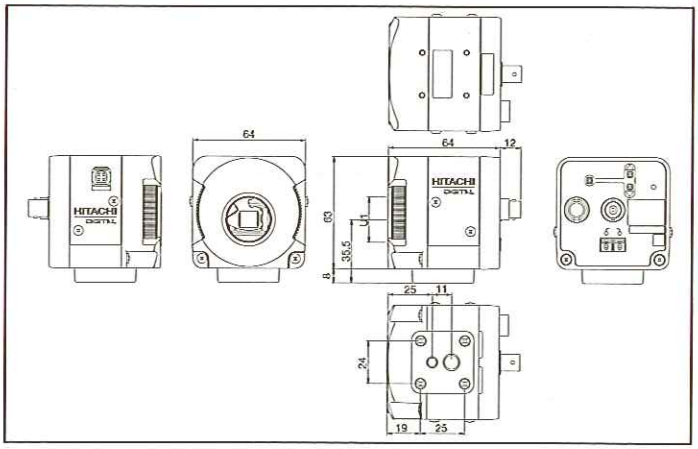
Dual Mode Integration enhances sensitivity by 128 times in the AUTO mode and 512 times in the Manual mode, enabling the camera to capture images in extremely low light conditions.



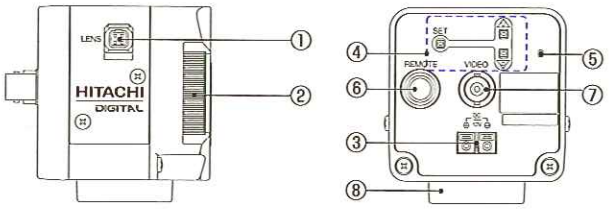
Specifications

MODEL		KP-D5010(P)
Effective pixels		NTSC : 768 (H) × 494 (V), PAL : 752(H) × 582(V)
Image sensor		1/2 Interline transfer CCD
Sync system		Internal / External (HD/VD)
Minimum illumination	Color	0.03 lx (F1.2 AGC : Max, Tungsten lamp)
	B/W	0.004 lx (F1.2 AGC : Max, Tungsten lamp)
	Color sensup	0.0002 lx (F1.2 AGC : Max, Sensup × 128Tungsten lamp)
	B/W sensup	0.00003 lx (F1.2 AGC : Max, Sensup × 128Tungsten lamp)
Resolution (Standard)		Color : 560TV lines / B/W : 580TV lines
S / N ratio		More than 53dB (AGC : OFF)
AGC		ON (Auto) / OFF (Fix) -6~49dB Range
Sensitivity setting		AUTO / MANUAL (Maximum sensitivity up to × 512)
Electronic shutter speed		OFF(1/60(NTSC), 1/50(PAL)), 1/60(NTSC) or 1/50(PAL)~1/100,000, AES
White balance		Auto tracking white balance / Preset AWC / Manual
Power supply		DC12V±10%
Power consumption		Approx. 190mA
Dimensions		64 (W) × 63 (H) × 64 (D) mm
Mass		Approx. 270g
Auto iris control		VIDEO (Iris video, DC 12V) / DC (Galvanometer type)
Remote control		RS-485 / Remote-contact
Lens mount		CS mount /C mount
Back Focus Adjustment		Dial type adjustment
Scene file		5 scenes
Digital Flip		LEFT/RIGHT
Back Light Compensation		ON/OFF (Detection area can be selected from 9 areas)
Character display		22 characters (alphanumeric, symbol and katakana) Selectable display position
B/W mode		ON/OFF/AUTO
Noise Reduction		ON/OFF/HIGH/LOW/FIX
Fog Reduction		ON/OFF/MANUAL
Image Enhancer		LOW/MID/HIGH/OFF

Dimensions



Major operating controls



①Lens connector
②Flange back adjustment
③Power supply connectors (DC12V / GND)
④Setup buttons
⑤Status lamp
⑥Remote control connector
⑦Video output
⑧Adaptor for camera tripod

⚠ CAUTION : To ensure safe operation, please read the instruction manual before using this product.

These Specifications are subject to change without notice.

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HITACHI

FOR MACHINE VISION AND OTHER INDUSTRIAL APPLICATIONS

Hitachi Black and white CCD camera

KP-M1AN/KP-M1AP

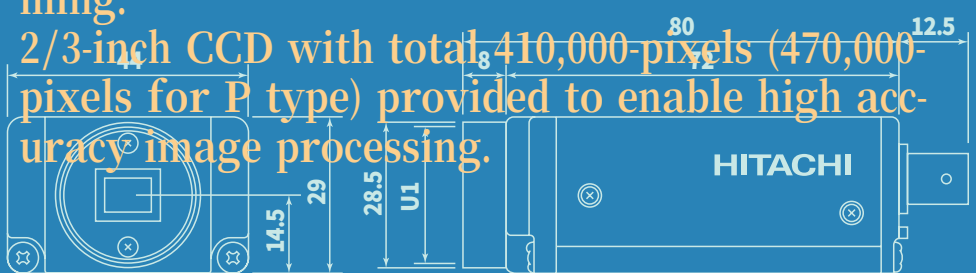
CCD

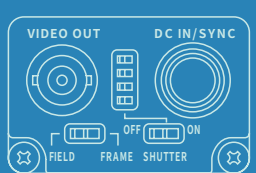
Compact size and lightweight (about 90cm³ in volume and about 120g in weight) achieved by using the hybrid IC and high density mounting technologies.

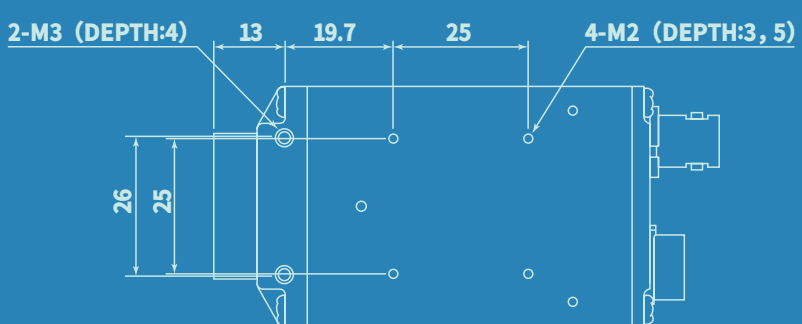
Variable speed electronic shutter of eight steps from 1/100 (1/120 for P type) to 1/10000 seconds provided.

Field-on-demand and function provides a instantaneous picture at desired external trigger timing.

2/3-inch CCD with total 410,000-pixels (470,000-pixels for P type) provided to enable high accuracy image processing.

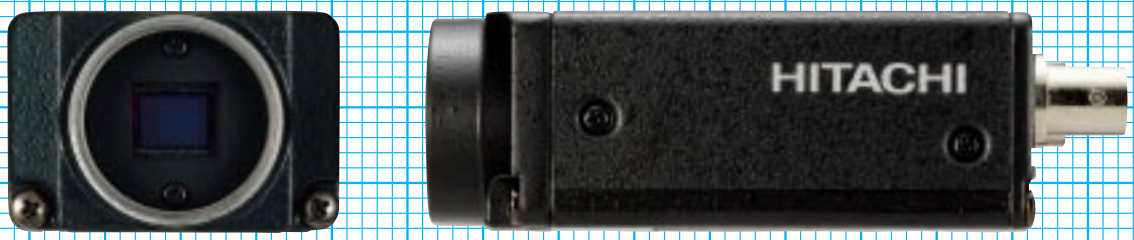






UNIT : mm

Extremely compact and lightweight



Actual Size

The Hitachi KP-M1A is a black and white camera which uses the latest high grade 2/3-inch image size CCD. Though the KP-M1A is a compact and lightweight camera, it features high sensitivity and high resolution. As the KP-M1A is provided with a variety of functions including the multiple step electronic shutter function, the restart and reset function, the selectable integration mode, the HD/VD external sync operation, and the non-interlace scan capability, it is most suitable for use with a microscope or an image processing equipment.

Compact and lightweight

The KP-M1A is small in size and light in weight, while the camera is provided with multiple functions and delivers high performance. The video signal can be obtained only by supplying 12V DC.

High resolution

The KP-M1A uses the latest high grade CCD which has 410,000 pixels and 768(H)×494(V) effective pixels [CCIR: Number of pixels is 470,000 and number of effective pixels is 752(H)×582(V)]. The camera features horizontal resolution of 570 (560 for CCIR) TV lines and vertical resolution of 485 (575 for CCIR) TV lines.

2/3-inch image size

The image size is 2/3 inches, which is most popular among cameras for industrial application. As the standard C type lens mounting is provided, the camera can be installed on a microscope.

Multiple step electronic shutter function

The multiple step electronic shutter function is provided. The eight-step shutter speed can be selected from 1/100 (1/120 for CCIR) to 1/10000.

Internal/external sync. Interlace/non-interlace capabilities

The sync system and the scanning system are automatically selected when an external sync signal is supplied.

Field-on-demand function

The image captured at an optional timing by an external trigger signal can be output instantly. The capture time can be adjuster by an external trigger signal and the shutter.

Frame and field integration modes

An integration mode can be switched between the frame mode and the field mode, an appropriate picture can be obtained by a combination of the scanning system, the electronic shutter and the restart and reset function.

Resistant to vibrations

The camera uses aluminum die castings and the camera is designed by taking consideration of vibration-resistant performance.

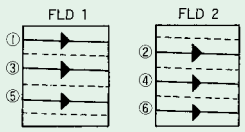
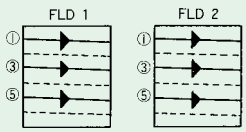
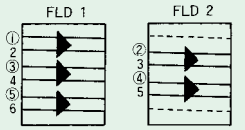
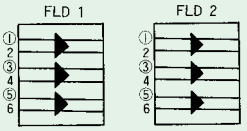
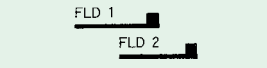
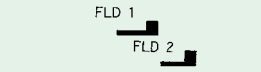
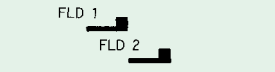
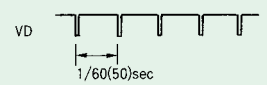
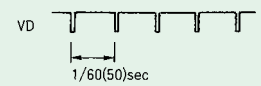
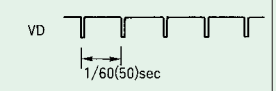
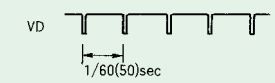
Shutter function

The shutter speed of the KP-M1A can be selected in eight steps from 1/100 (CCIR: 1/120) to 1/10000 seconds with the switch on the rear. To select the speed, set the SHUTTER ON/OFF switch to ON, then set the speed with the shutter speed select switch.

Setting of shutter speed

Position									
Speed (second)	Normal 1/60(CCIR) 1/50(EIA)	1/125	1/250	1/500	1/1000	1/2000	1/4000	1/10000	1/100(EIA) 1/120(CCIR)

Relationship among electronic shutter, scanning system, integration mode and video output

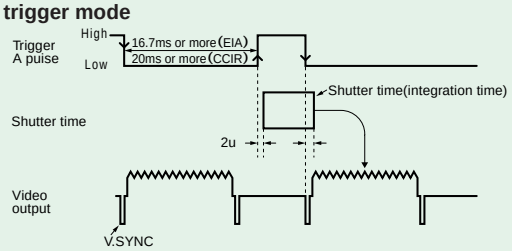
Integration mode		Frame Integration mode		Field Integration mode	
		Interlace	Non-interlace	Interlace	Non-interlace
Scanning system					
Relationship between integration time and VIDEOOUT	Integration time				
	VD				
	VIDEO OUT				
Vertical resolution(TV lines)		485 (575)	242 (287)	350 (415)	242 (287)

Shutter

Integration time (when shutter is OFF)

Field-on-demand function

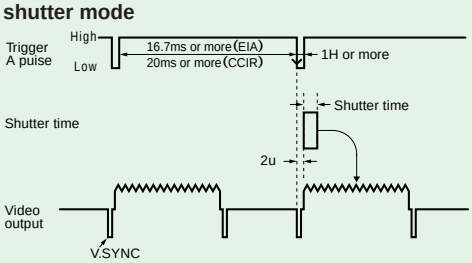
ONE trigger mode



The shutter is started by the rising edge of the trigger A pulse, and V.SYNC is reset by the falling edge of the trigger A pulse. (After reset, the first field is delivered)
A shutter time is controlled by the duration when the trigger pulse is high.
Only one field image is delivered by one trigger pulse, and a sync signal lasts till the next pulse.

Trigger pulse
- 5Vp-p +0.5/-1.0Vp-p
- Low period: EIA :16.7V or more
  CCIR:20V or more
- High period: 8U or more

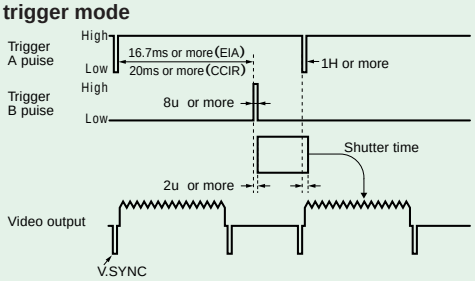
Fixed shutter mode



The shutter is started by the falling edge of the trigger A pulse, and at the same time V.SYNC is reset . (After reset, the first field is delivered)
Only one field is delivered by one trigger pulse, and a sync signal lasts till the next pulse.

Trigger pulse
- 5Vp-p +0.5/-1.0Vp-p
- Low period: EIA :63.5U or more
  CCIR:64U or more
- High period: EIA :16.7V or more
  CCIR:20V or more

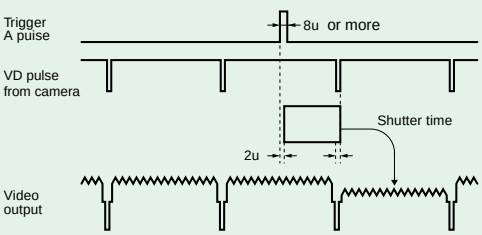
TWO trigger mode



V.SYNC is reset by the falling edge of the trigger A pulse. (After reset, the first field is delivered.)
The shutter is started by the rising edge of the trigger B pulse.

Trigger pulse
- 5Vp-p +0.5/-1.0Vp-p
- Trigger A: Low period: EIA :63.5U or more
  CCIR:64U or more
  High period: EIA :16.7V or more
  CCIR:20V or more
- Trigger B: Low period: Not specified
  High period: 8U or more

External shutter control mode



The shutter is started by the rising edge of the trigger B pulse, the shutter is effective only for the next field of the pulse input. When the trigger B pulse is not supplied, the normal exposure results.
The V.SYNC pulse of the camera is not reset.

Trigger pulse
- 5Vp-p +0.5/-1.0Vp-p
- Low period: Not specified
- High period: 8U or more

● Field/frame integration

Since the scanning line is read one by one in the frame integration mode, the highest vertical resolution can be obtained in the normal shutter mode. Since the scanning line is read two by two in the field integration mode, sensitivity is almost double in shutter operation in comparison with that in the frame storage mode. The mode is set to the frame integration mode at the factory.

● Gamma correction mode

Gamma can be switched between 1.0 and 0.45 with an internal switch. Gamma is set to 1.0 at the factory.

● AGC

Gain can be switched between NORM (normal) and AGC. Gain is set to NORM at the factory.

● Video output signal

The video signal (1Vp-p/75 ohms) is fed from the VIDEO OUT terminal (BNC) and the DC IN/SYNC terminal (12-pin). However, since the video signal is fed to the terminals from one output amplifier, use either of the terminals.

Camera input signal

Internal sync/2:1 interlace

When an external sync signal is not fed in, the camera is automatically operated in the internal sync (2:1 interlace) mode. The mode is automatically switched between the internal sync mode and the external sync mode.

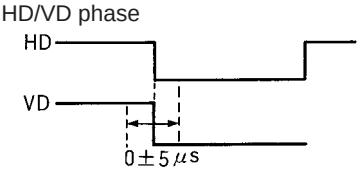
External Sync (VS,VBS or SYNC)

When the external sync signal of the composite video signal (VS) or the composite sync signal (SYNC) is fed in, the camera is operated in the external sync (2:1 interlace) mode.

External sync (HD/VD)

When HD/VD (5.0Vp-p/High) is fed in to the HD/VD input terminal, the camera is operated in the external sync mode.

HD:fH=15,734Hz ± 1% (EIA)
fH=15,625Hz ± 1% (CCIR)
VD:fV=59.94Hz [fV=fH ÷ 262.5](EIA)
fV=50Hz [fV=fH ÷ 312.5](CCIR)
HD/VD phase



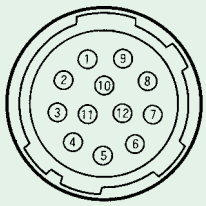
Non-interlace operation

When VD is fed in on the non-interlace condition, the camera is operated in the non-interlace mode.

Connection of DC IN/SYNC (DC input/sync signal) terminal

Use the 12-pin connector for supply of 12VDC, output of a video signal and input of an external sync signal.

Pin locations of 12-pin connector (on camera side)

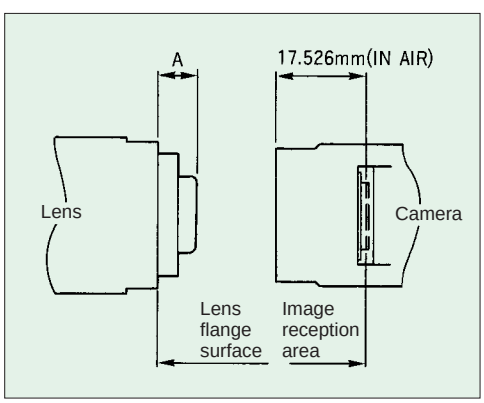


(optional)

Pin No.	Internal sync	External sync				
		HD • VD	Field-on-demand			
			ONE trigger	TWO trigger	Fix trigger	Ext. trigger
1	GND	GND	GND	GND	GND	GND
2	12VDC	12VDC	12VDC	12VDC	12VDC	12VDC
3	Video output (GND)	Video output (GND)	Video output (GND)	Video output (GND)	Video output (GND)	Video output (GND)
4	Video output (Signal)	Video output (Signal)	Video output (Signal)	Video output (Signal)	Video output (Signal)	Video output (Signal)
5	—	HD input (GND)	—	—	—	HD input (GND)
6	—	HD input (Signal)	—	—	—	HD input (Signal)
7	—	VD input (Signal)	Trigger A input (Signal)	Trigger A input (Signal)	Trigger A input (Signal)	VD input (Signal)
8	—	—	—	Trigger B input (GND)	—	Trigger B input (GND)
9	—	—	—	Trigger B input (Signal)	—	Trigger B input (Signal)
10	GND	GND	GND	GND	GND	GND
11	12VDC	12VDC	12VDC	12VDC	12VDC	12VDC
12	—	VD input (GND)	Trigger A input (GND)	Trigger A input (GND)	Trigger A input (GND)	VD input (GND)

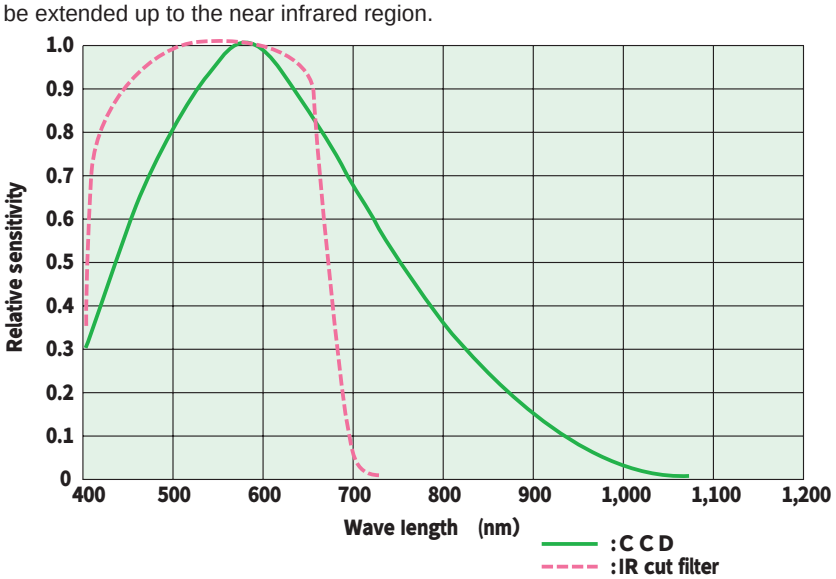
Lens mount

The lens mount is of the C mount system, and the flangeback is 17.526mm. Use a lens or an optical system of which length (A) between the flange face of the lens and the end of the screwed screwed section is 8mm or less.



Spectral response characteristics

The KP-M1A is provided with an IR (infrared) cut filter as standard. Normal spectral response characteristics are shown by the dotted line in the figure. However, by removing the IR cut filter is removed, the spectral response can be extended up to the near infrared region.

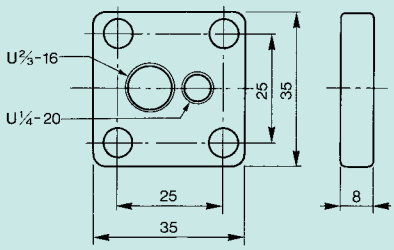


The IR cut filter can be removed by unscrewing the two front screws.

Options

Tripod adaptor **TA-M1**

When using the camera fixed on the tripod, mount this tripod adaptor on the bottom of the camera. Use the four supplied screws M2 × 5.



UNIT:mm

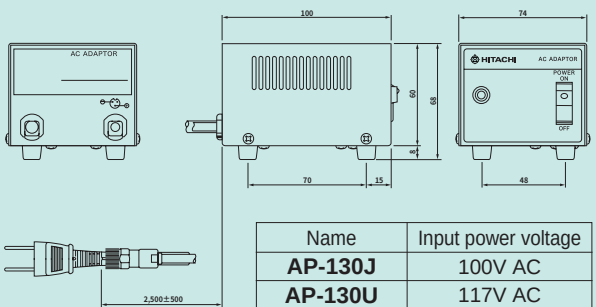
DC IN/SYNC plug

Connect this plug to the DC IN/SYNC of the camera.

HR10A-10P-12S (01)
[Made by Hirose Electric Co.,Ltd.]

AC adaptor **AP-130**

When operating the camera by a commercial AC power source, use this AC adaptor to supply 12V DC to the camera through the junction box JU-M1A (connected to DC IN).



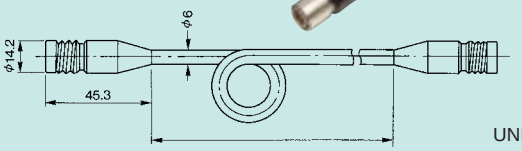
Name	Input power voltage
AP-130J	100V AC
AP-130U	117V AC
AP-130E	220V AC
AP-130K	240V AC

UNIT:mm

Camera cable

Connect this cable to the DC IN/ SYNC Connector of the camera.

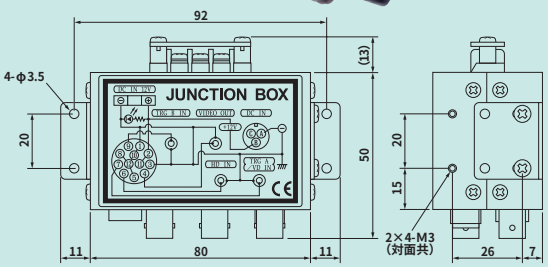
	Molded type	Assembly type	Shielded type
2m	**C-201KSM**	**C-201KS**	**C-201KSS**
5m	**C-501KSM**	**C-501KS**	**C-501KSS**
10m	**C-102KSM**	**C-102KS**	**C-102KSS**

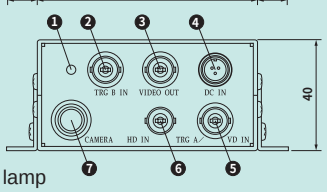


UNIT:mm

Junction box **JU-M1A**

Connect this junction box to the camera using the camera cable.

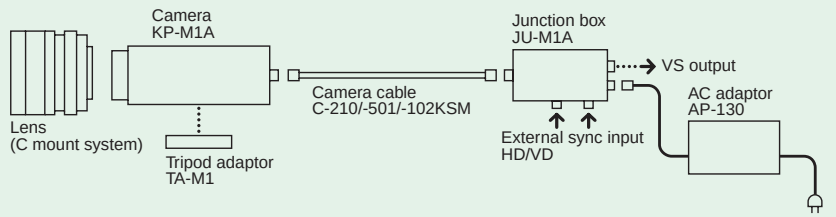




UNIT:mm

1 Pilot lamp
2 Trigger IN
3 VIDEO OUT (video output) [BNC connector]
4 DC IN [3 pin]
Connect the AC adaptor AP-130, and 12V DC is supplied.
5 VD IN [BNC connector]
When operating the camera by external sync, feed in the VD, VS, VBS or SYNC signal.
6 HD IN [BNC connector]
When operating the camera by external sync, feed in the HD signal.
7 CAMERA (12-pin) [Multi connector]

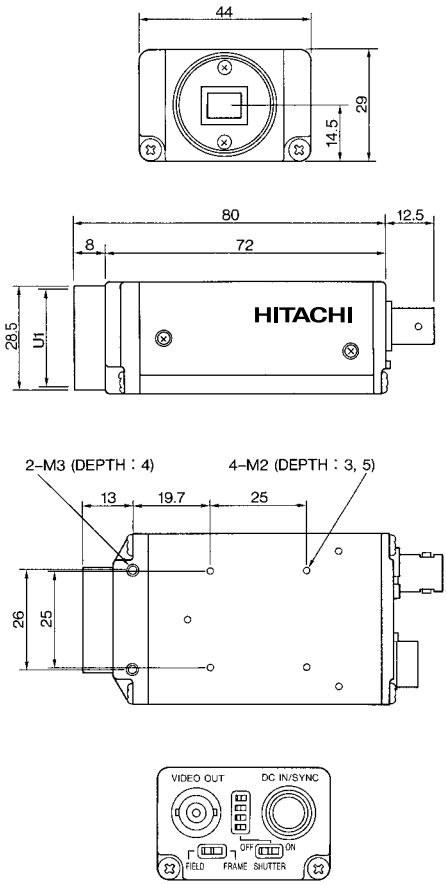
System Configuration



Specifications

		KP-M1AN	KP-M1AP
Signal system		EIA system	CCIR system
Pickup device		Interline transfer CCD	Interline transfer CCD
Number of effective pixels:		68 (H)× 474 (V)	752 (H)× 582 (V)
Sensing area		8.94 × 6.67mm (2/3-inch size)	8.72 (H)× 6.52 (V) (2/3-inch size)
Pixel pitch		11.64 (H)× 13.5 (V)μm	11.6 (H)× 11.2 (V)μm
Lens mount		C mount	
Flange focal distance		17.526mm	
Scanning frequency		15.734kHz (H), 59.94 (V)	15.625kHz (H), 50Hz (V)
Sync system		Internal sync/external sync (automatic switching)	
Scanning System		2:1 interlaced Non-interlaced (Only in external sync mode)	
External sync input		HD/VD : 2 to 6Vp-p or SYNC : 0.3Vp-p (min. 0.25Vp-p) (VS or VBS also possible) Input impedance:1k ohms Frequency deviation:± 1% Polarity : Negative	
Video output		VS:1.0Vp-p/75 ohms (DC cut output)	
Sensitivity	Standard	400 lux, f4 (3200K)	
	Minimum	0.3 lux, f1.4 (AGC:ON, gamma:0.45 without IR cut filter)	
Horizontal/vertical resolution		570/485 TV lines	560/575 TV lines
S/N		56dB	
Shutter speed		1/10000, 1/4000, 1/2000, 1/1000, 1/500, 1/250, 1/125, 1/120 (CCIR), 1/100 (EIA), OFF (normal exposure) Above setting are possible by external switch, Set to OFF at factory.	
AGC		Normal gain/AGC : (selectable by internal switch)	
Gamma		Gamma=1.0/0.45 (selectable by internal switch) (set to 1.0 at factory)	
Integration mode		Field or frame integration : Selectable by external switch (set to frame integration mode at factory)	
Field-on-demand		ON/OFF selectable by internal switch (set to OFF at factory)	
Restart and reset operation		ON/OFF selectable by internal points (optional function) (set to OFF at factory)Input:5Vp-p/1 k ohms	
White clip		Clip level:1.0Vp-p (excluding SYNC)	
Ambient temperature and humidity	Full specifications	0 to 40℃ (32 to 104℉), RH 50 to 70%	
	Operating	–10 to 50℃ (14 to 122℉), RH 90% or less	
	Storage	–20 to 60℃ (–4 to 140℉), RH 70% or less	
Resistance to vibration		98m/s²	
Resistance to shock		686m/s²	
Supply voltage		12V DC ± 1V	
Current consumption		220mA approx.	
Dimensions		44 (W)× 29 (H)× 72 (D)mm (1.7 × 1.1 × 2.8 in)	
Weight		120g (4.2 oz) approx.	
Composition		Camera head(with IR cut filter)·····1 Operation manual ·····1	

Dimensions



UNIT:mm

Note

- The products and their specifications herein described are subject to change without notice. When placing an order of the products, please make sure whether the information of this material is the latest.
- Hitachi Denshi, Ltd. Warrants that these products meet the standard warranty conditions of Hitachi Denshi, Ltd.
- Hitachi Denshi, Ltd. carries out inspection and other quality control of the products within the range required to provide this warranty.
- It is recommended that to maintain your video

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DV-E387 Printed in Japan (B) '00-9

HITACHI

HITACHI CCD CAMERAS
KP-M2A/M3A

Model KP-M2A CCD Camera :
The 1/2-inch CCD sensor, developed using the state-of-the art technology

Model KP-M3A CCD Camera :
The 1/3-inch CCD sensor, developed using the state-of-the art technology

These high-performance CCD cameras are designed to offer excellent sensitivity and superb resolution. Equipped with a diversity of functions such as multiple step electronic shutter, field on demand, integration mode selection, external HD/VD synchronization, non-interlace scanning, etc,. these CCD cameras can be used with Machine vision or IC bonder.

Features

Compact, lightweight
The KP-M2A/M3A are CCD cameras which provide versatile functions and superb perfomance. They can deliver video signals only by supplying 12 V DC voltage.

High resoution
Horizontal resolution···EIA : 570 TV lines
(CCIR : 560 TV lines)
Vertical resolution···EIA : 485 TV lines
(CCIR : 575 TV lines)

Multiple-step electronic shutter function
Provided with the multiple-step electronic shutter function. Eight electronic shutter speeds are selectable in a range of 1/100 sec (CCIR : 1/120 sec) to 1/10,000 sec.

Internal/external synchronization and inter laced/non-interlaced
A syncronization mode and scanning mode are automatically selected in the camera circuit by the kind of supplied sync signal.

Field-on-demand function
A picture acquired at an optional timing using an external trigger signal be displayed. Also, a picture acquisition time adjustable through use of external trigger signal and shutter function.

Frame/field integration mode selectable
The frame or field integration mode can be selected. In combination with scanning system and electronic shutter speed selection, the desired video signal is obtained.

Vibration-proof
The die-cast aluminum is used to ensure vibration-proof performance.

Major specifications

Imaging device	Interline CCD sensor
Total number of pixels	EIA : 811 (H) × 508 (V) CCIR : 795 (H) × 596 (V)
Pixel pitch	KP-M2A EIA : 8.4 (H) × 9.8 (V) µm KP-M3A EIA : 6.35 (H) × 7.4 (V) µm KP-M2A CCIR : 8.6 (H) × 8.3 (V) µm KP-M3A CCIR : 6.5 (H) × 6.25 (V) µm
Number of effective pixels	EIA : 768 (H) × 494 (V) CCIR : 752 (H) × 582 (V)
Imaging area	KP-M2A EIA : 6.45 mm × 4.84 mm (1/2-inch) KP-M2A CCIR : 6.47 mm × 4.83 mm (1/2-inch) KP-M3A EIA : 4.88 mm × 3.66 mm (1/3-inch) KP-M3A CCIR : 4.89 mm × 3.64 mm (1/3-inch)
Signal system	Conforming to EIA/CCIR signal format (at normal operation)
Lens mounting	C mount
Flange forcal distance	17.526 mm (not an adjustable)
Horizontal scanning frequency	EIA : 15.734 kHz CCIR : 15.625 kHz
Vertical scanning frequency	EIA : 59.94 Hz CCIR : 50 Hz
Synchronization	Automatic changeover of internal/exernal synchronization
Internal sync scanning	2:1 interlaced, 525 horizontal lines (CCIR : 625 lines) fv = 2 fH/525 (CCIR : lines)
External sync input	HD/VD, 2 to 6 Vp-p, negative polarity Input impedance : 1 kΩ, Frequency deviation : ±1 %
Number of horizontal lines	2:1 interlaced
Allowable for external synchronization	EIA : 521 to 2047 lines/2FLD, 1FLD : (61 to 15 Hz) CCIR : 621 to 2047 lines/2FLD, 1FLD : (51 to 15 Hz) Non-interlaced EIA : 260 to 1023 lines/1FLD, 1FLD : (61 to 15 Hz) CCIR : 310 to 1023 lines/1FLD, 1FLD : (51 to 15 Hz)
Video outoput	1.0 Vp-p 75 Ω unbalanced Video component : 0.7 Vp-p Sync component : 0.3 Vp-p negative polarity
Horizontal/vertical rezolution	EIA : 570 TV lines (H) /485 TV lines (V) CCIR : 560 TV lines (H) /575 TV lines (V)
Sensitivity	Under illumination of 400 lx, F8, 3200 K
Minimum illumination	0.3 lx, F1.4 AGC:ON, Gamma:ON, without IR filter
SN ratio	56 dB
Electronic shutter	1/10000, 1/4000, 1/2000, 1/1000, 1/500, 1/250, 1/125, 1/120 (CCIR), 1/100 (EIA) sec In OFF state : Normal exposure Selectable external switch mode
Integration mode	Field/frame integration mode, Selectable by external switch setting
Gamma correction	Gamma = 1.0 or correction, Selectable by internal switch
AGC	Pixed gain or AGC, Selectable by internal switch setting
Field-on-demand function	Turned on/off with internal switch
Restart/reset function	Turned on/off with chip component switching
Power requirement	12 V DC ±1 V, 180 mA apporx
Ambient temperature and humidity	Operating: -10 to +60 °C, Less than 90 % RH Storage : -20 to +60 °C, Less than 70 % RH
Vibration resistance	68.6 m/s² max (10 to 60 Hz, amplitude : constant at 0.98 mm) (60 to 200 Hz, amplitude : variable) (10 to 200 Hz, sweeping for one minute, Each of X, Y and Z directions for 30 minutes)
Dimensions and mass	44 (W) × 29 (H) × 72 (D) mm 120 g approx

Standard compotion

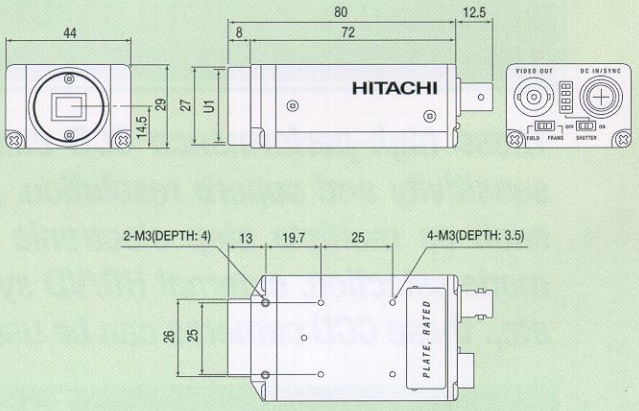
- Camera (with IR cut filter) ·····1
- Operation manual ·····1

Optional accessories

- Tripod adaptor, TA-M1
- 12pin plug , HR10A-10P-12S(01)
- AC adaptor, AP-130
- Junction box, JU-M1A
- Camera cables

	Mold type
2m	C-201KSM
5m	C-501KSM
10m	C-102KSM

External view



unit : mm

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These products are manufactured at a factory which has received quality control system certification in accordance with the ISO international standards.

CERTIFIED JQA MANAGEMENT SYSTEM QUALITY SYSTEM

CERTIFICATE No.
JMI-0062
ISO 9001/BS 5750Pt1
EN 29001/JIS Z9901

Specification are subject to change without notice.

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