

Black and White Camera

KP-M2A/M3A

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-M2A/M3A

取扱説明書

この取扱説明書には、あなたや他の人々への危害や財産への損害を未然に防ぎ、この機器を安全にお使いいただくために、守っていただきたい事項を示しています。ご使用になる前に、取扱説明書をよくお読みいただき、正しい使い方でご愛用ください。

お読みになった後も、この機器のそばなどいつも手元に置いてご使用ください。

株式会社 日立国際電気

KP-M2A/M3A N 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 KOKUSAI ELECTRIC responsible for compliance could void the user's authority to operate the equipment.

KP-M2A/M3A N 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 applicables aux appareils numériques de classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada.

KP-M2A/M3A P

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß CCD-Kamera KP-M2AP/M3AP in Übereinstimmung mit den Bestimmungen der Amtsblattverfügung Nr. 1046/1984 funktentstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Hitachi Denshi(Europa) GmbH
Weiskircher Straße 88, D-6054 Rodgau 1 (Jügesheim)
F. R. Germany

Note: The model and serial numbers of your CAMERA are important for you to keep for your convenience and protection. These numbers appear on the nameplate located on the bottom of the products. Please record these numbers in the spaces provided below, and retain this manual for future reference.

Model No. _____

Serial No. _____

Declaration of Conformity

Manufacturer's Name: Hitachi Kokusai Electric, Inc
Manufacturer's Address: 3-14-20,Higashinakano, Nakano-ku,
 Tokyo 164 8511, Japan
Representative(a) Address in the EU: Hitachi Denshi (Europe) GmbH
 Weiskircher Straße 88,
 Jugesheim D 63110 Rodgau, Germany
 Hitachi Denshi (U.K.) Ltd.
 14 Garrick Industrial Centre,
 Irving Way, Hendon, London,
 NW9 6AQ, United Kingdom

declares, that the product:

Product Name: CCD Camera
Model Number(s): KP-M2AP, KP-M2AN
 KP-M3AP, KP-M3AN

conforms to the following Standards:

EMC: EN 50081 1:1992
 EN 50082-1:1997

Supplementary Information:
 "The product complies with the requirements of the Low Voltage
 Directive 73/23/EEC and the EMC Directive 89/336/EEC."

Signature:



T. Urakawa
 Dept. Manager, Quality Assurance
 Broadcast & Telecommunication
 Systems Group
 Hitachi Kokusai Electric Inc.



K. Otsuka
 Managing Director
 Hitachi Denshi (Europe) GmbH
 Hitachi Denshi (U.K.) Ltd.

Date: 04th September 2002

V3T 0041

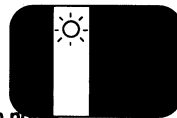
Phenomena inherent to CCD imaging device

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.

NOTES TO USERS

a. Power supply

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

b. Optical system attachment (sensor)

- Use a clean site when installing the lens or other attachment.
- Use care not to tilt the camera when attaching the lens. Also observe absence of foreign matter and scratches on the lens mount.
- Use a manual type blower or lens brush to clear debris from the lens and glass. Carefully wipe the glass with a cotton swab to avoid scratches.
- Even when not using the camera, attach the lens or seal to protect the glass from soiling or damage.

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 -10 and 50C.

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.

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

The KP-M2A/M3A are compact, lightweight, black and white cameras. The KP-M2A uses the latest high grade 1/2-inch image size CCD and the KP-M3A uses the high grade 1/3

-inch image size CCD. The total pixel number of each CCD is 410,000 (490,000 for CCIR).

KP-M2AN : EIA, KP-M2AP : CCIR
KP-M3AN : EIA, KP-M3AP : CCIR

MAJOR FEATURES

- Compact: 44(W) × 29(H) × 72(D)mm
Lightweight: 120g approx.
- Variable speed electronic shutter function
- Internal/external synchronization, interlaced/non-interlaced operation
- Field-on-Demand function
- Frame and field integration modes switchable

COMPOSITION

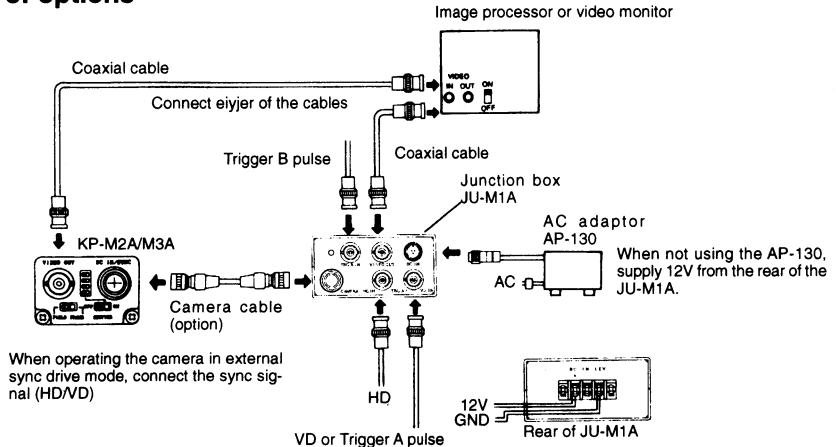
Standard composition

- (1) Camera body (with IR cut filter)
- (2) Operation manual

Optional accessories

- (1) Tripod adaptor TA-M1
- (2) 12-pin plug HR10A-10P-12S (01)
- (3) AC adaptor AP-130
- (4) Junction box JU-M1A
- (5) Camera cable 2m : C-201KSM
5m : C-501KSM
10m : C-102KSM

Connection of options



SIGNAL CONNECTION TO DC IN/SYNC CONNECTOR

Signal connection to each pin

Pin No.	Internal sync mode	External sync mode				
		HD-VD	Field · on · demand			
			ONE trigger	TWO trigger	Fixed shutter	Ext. shutter
1	GND	GND	GND	GND	GND	GND
2	+ 12V	+ 12V	+ 12V	+ 12V	+ 12V	+ 12V
3	Video output (GND)	Video output (GND)	Video output (GND)	Video output (GND)	Video output (Signal)	Video output (GND)
4	Video output (Signal)	Video output (Signal)	Video output (Signal)	Video output (Signal)	Video output (GND)	Video output (Signal)
5	—	HD input (GND)	—	—	—	HD input (Signal)
6	—	HD input (Signal)	—	—	—	HD input (Signal)
7	—	VD input (Signal)	TriggerA input (Signal)	TriggerA input (Signal)	TriggerA input (Signal)	VD input (Signal)
8	—	—	—	TriggerB input (GND)	—	TriggerB input (GND)
9	—	—	—	TriggerB input (Signal)	—	TriggerB input (Signal)
10	GND	GND	GND	GND	GND	GND
11	+ 12V	+ 12V	+ 12V	+ 12V	+ 12V	+ 12V
12	—	VD input (GND)	TriggerA input (GND)	TriggerA input (GND)	TriggerA input (GND)	VD input (GND)

Optional 12-pin plug: HR10A-10P-12S (01)



Viewed from this side →

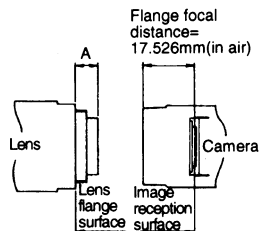


Note:

- 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.

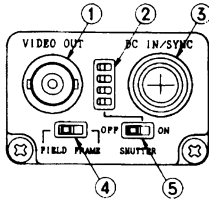
OPTICAL SYSTEM

- Image size.
KP-M2A : 1/2-inch
KP-M3A : 1/3-inch
- The flange focal distance is 17.526mm (in air).
- 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.



Note Flange focal distance cannot be adjusted.

NAME OF EACH SECTION



(1) VIDEO OUT (BNC) connector

A composite video signal (VS) is fed from this connector. Connect a 75-ohm coaxial cable between the connector and a video monitor or other video equipment.

(2) Shutter speed select switches

Use these switches to set a shutter speed.

(3) DC IN/SYNC connector

This connector is for a 12V DC input, a composite video signal (VS) output and an external sync signal input.

(4) FIELD/FRAME integration mode select switch

Use this switch to select an integration mode. This switch is set to FRAME at factory.

(5) SHUTTER ON/OFF switch

Set the SHUTTER ON/OFF switch to ON to establish the shutter mode.

Setting of shutter speed

Speed (second)	※ 1	※ 2	1/125	1/250
Setting position				

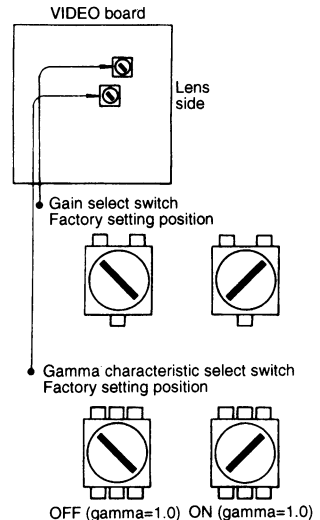
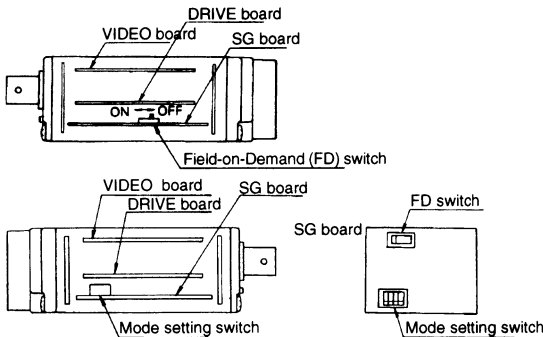
1/500	1/1000	1/2000	1/4000	1/10000

※ 11/60(EIA), 1/50(CCIR)

※ 21/100(EIA), 1/120(CCIR)

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.

ARRANGEMENT OF INTERNAL SWITCHES



	Normal mode	ONE trigger mode	TOW-trigger mode	Fixed shutter mode	Ext. shutter control mode
Mode setting switch					
FD switch	OFF (Sitting at factory)	ON	ON	ON	OFF

SELECT SWITCH GAMMA CHARACTERISTIC

The camera is provided with the gamma characteristic select switch. This switch is set to OFF at the factory.

(1) Gamma: OFF (Gamma=1.0)

In this mode, a linear output signal in accordance with the brightness of an object can be obtained.

(2) Gamma: ON (Gamma=0.45)

This mode is suitable for viewing a picture on a monitor screen.

GAIN SELECT SWITCH

The gain of the camera can be switched between the normal gain mode and the AGC mode. This switch is set to the normal gain mode at the factory.

(1) Normal gain mode

In this mode, the video gain is fixed. (The noise amount is also fixed.)

(2) AGC mode

When the illumination on an object becomes lower than the rated level, gain is automatically increased. As gain increases, noise also increases.

EXTERNAL SYNCHRONIZATION (2:1 INTERLACED)

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 EIA : $f(H)=15.734\text{kHz} \pm 1\%$

CCIR : $f(H)=15.625\text{kHz} \pm 1\%$

VDEIA : $f(V)=59.94\text{Hz} [f(V)=f(H) \div 262.5]$

CCIR : $f(V)=50\text{Hz} [f(V)=f(H) \div 312.5]$

● Input level

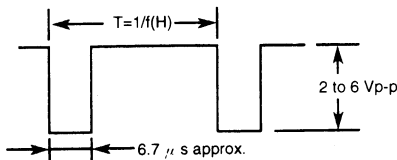
HD 2 to 6Vp-p, negative

VD 2 to 6Vp-p, negative

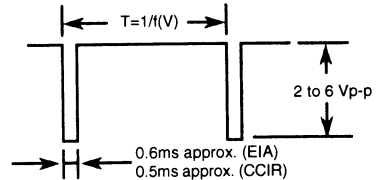
● Input impedance 1k ohms

● Input waveform

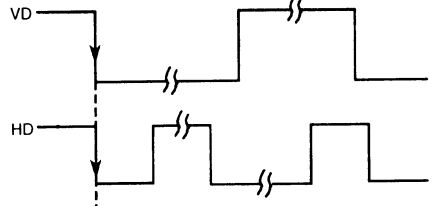
● Horizontal drive signal (HD)



● Vertical drive signal (VD)



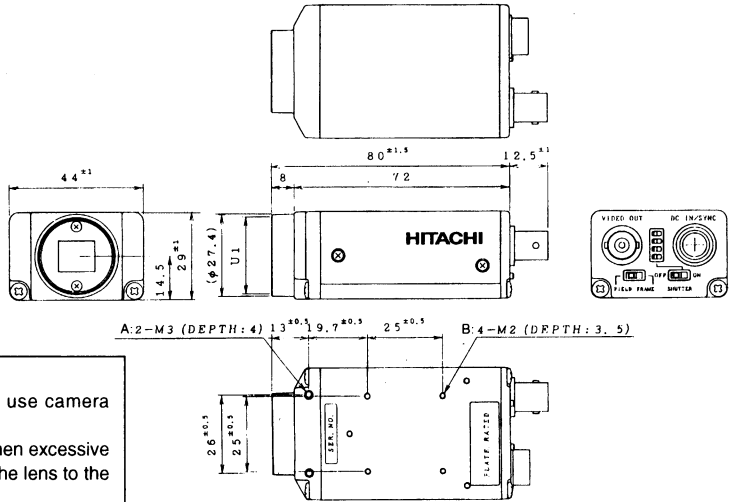
● Phase relationship between horizontal drive signal (HD) and vertical drive signal (VD)



Adjust the phase so that the falling edges of HD and VD are in phase ($0 \pm 5 \mu$ s)

EXTERNAL VIEW

● Camera KP-M2A/M3A



Caution

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

SPECIFICATIONS

(1) Imaging device:

Total number of pixels
Pixel pitch
Number of effective pixels

Interline transfer CCD
EIA: 811(H) × 508(V)
CCIR: 795(H) × 596(V)
KP-M2A
EIA: 8.4 μm(H), 9.8 μm(V)
CCIR: 8.6 μm(H), 8.3 μm(V)
KP-M3A
EIA: 6.35 μm(H), 7.4 μm(V)
CCIR: 6.5 μm(H), 6.25 μm(V)

(2) Imaging area:

KP-M2A
EIA: 6.45mm × 4.84mm
CCIR: 6.47mm × 4.83mm
(1/2-inch size)
KP-M3A
EIA: 4.88mm × 3.09mm
CCIR: 4.89mm × 3.64mm
(1/3-inch size)

(3) Signal system:

Based on EIA or CCIR system
(at normal operation)

(4) Lens mount:

C mount

(5) Flange focal distance:

17.526mm

(6) Horizontal scanning

frequency: EIA: 15.734kHz
CCIR: 15.625kHz

(7) Vertical scanning

frequency: EIA: 59.94Hz
CCIR: 50Hz

(8) Sync system:

Automatic switching between
internal sync and external sync
modes

(9) Internal sync

scanning system: 2:1 interlaced
Number of horizontal
lines

EIA: 525 TV lines
CCIR: 625 TV lines
 $f(v) = 2f(H) / 525 (625 \text{ for CCIR})$

(10) External sync input

HD/VD: 2 to 6Vp-p
Input impedance: 1k ohms
Frequency deviation: ± 1%

(11) Number of horizontal lines within range where external synchronization is possible

2:1 interlaced EIA: 521 to 2047 TV lines/2 fields
(1 field: 61 to 15Hz)
CCIR: 621 to 2047 TV lines/2
fields (1 field: 51 to 15Hz)
Non-interlaced EIA: 260 to 1023 TV lines/fields
(1 field: 61 to 15Hz)
CCIR: 310 to 1023 TV lines/field
(1 field: 51 to 15Hz)

- (12)Video output:** 1.0Vp-p, 75 ohms, unbalanced
Video: 0.7Vp-p
Sync: 0.3Vp-p, negative
- (13)Horizontal resolution**
EIA: 570 TV lines
CCIR: 560 TV lines
EIA: 485 TV lines
CCIR: 575 TV lines
- Vertical resolution
400 lx, F8, 3200K
- (14)Sensitivity:** 0.3 lx, f1.4, AGC and GAMMA:
(15)Minimum illumination: ON, without IR cut filter
56dB
- (16)S/N:** 1/10000, 1/4000, 1/2000,
(17)Electronic shutter: 1/1000, 1/500, 1/250, 1/125,
1/ 120(CCIR), 1/100(EIA)
OFF(normal exposure)
Set to OFF at the factory.
- (18)Integration mode:** Field or frame integration mode
Set to frame integration mode
at the factory.
- (19)Gamma correction:** Gamma=1.0 or correction
Set to 1.0 at the factory.
- (20)AGC:** Fixed gain or AGC
Set to fixed gain at the factory.
- (21)Field-on-Demand function**
- ON/OFF switchable by internal switch
 - Switchable modes: ONE trigger TWO-trigger, 1/1600s (EIA)/1/1000s (CCIR) fixed shutter,

external shutter control, OFF
(normal exposure)
* Set to OFF at the factory

- (22)Power requirement:** 12V DC \pm 1V
(23)Power consumption: 180mA approx.
- (24)Ambient temperature and humidity**
- | | |
|--------------------|------------------------------|
| Operating | - 10 to 50°C, 90% RH or less |
| Full specification | 0 to 40°C, 50 to 70% RH |
| Storage: | - 20 to 60°C, 70% RH or less |
- (25)Anti-vibration:** 88.2m/s² max. (Cycle:10 to 60Hz, amplitude:0.98mm constant)
68.6m/s² constant
(Cycle: 60 to 150Hz, amplitude-variable) (Cycle: 10 to 150Hz per minute, 30 min in each direction of X, Y and Z)
- (26)Resistance to shock:** 686/s²
(Drop test, once each top, bottom, left and right)
- (27)Dimensions:** 44(W) \times 29(H) \times 72(D)mm
(28)Mass: 120g approx.

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