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Find the *Hitachi KP-M2U* at our website: ***Click HERE***

Black and White Camera

# KP-M2A/M3A

## OPERATION MANUAL

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

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。

**Hitachi Kokusai Electric Inc.**

**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 limités applicable aux appareils numériques de classe A prescrites dans le règlement sur le brouillage radioélectrique édicter par le ministère des communications du canada.

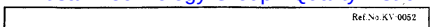
**KP-M2A/M3A P**

**Bescheinigung des Herstellers/Importeurs**
Hiermit wird bescheinigt, daß CCD-Kamera KP-M2AP/M3AP in Übereinstimmung mit den Bestimmungen der Amtsblattverfügung Nr. 1046/1984 funkentstört ist. Der Deutschen Bundespost wurde das inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung de 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. _____

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Ref.No.KV-0052

## Declaration of Conformity

| | |
|---|---|
| Manufacturer's Name: | Hitachi Kokusai Electric, Inc |
| Manufacturer's Address: | 3-14-20,Higashinakano, Nakano-ku, Tokyo 164-8511, Japan |
| Representative(s) Address in the EU: | Hitachi Denshi (Europa) GmbH Weisskircher 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 Cameras |
| 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. Urushima
Dept. Manager, Quality Assurance
Broadcast&Telecommunication Systems Group
Hitachi Kokusai Electric Inc.

K. Osada
Managing Director
Hitachi Denshi (Europa) GmbH
Hitachi Denshi (U.K.) Ltd.

Date: 04th September 2002

V1T 0044

# 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 ± 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℃ 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.

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# GENERAL

The KP-M2A/M3A are compact, lightweight, black and white cameras. The KP-M2A uses the latest hight 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

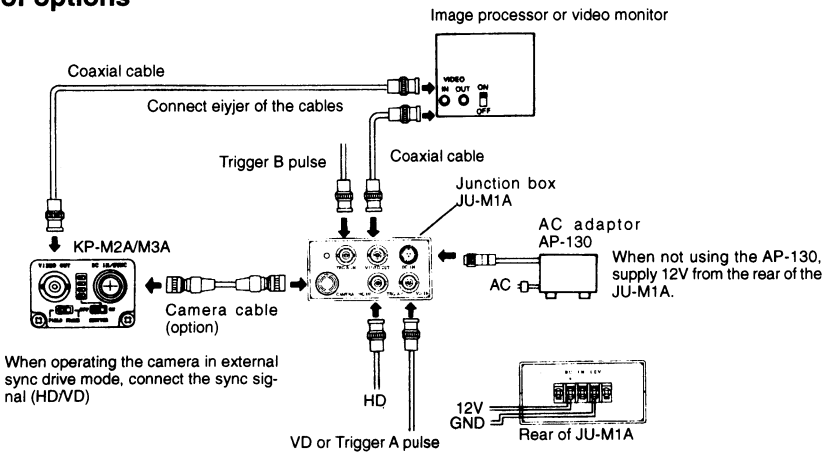
## Standard composition

(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



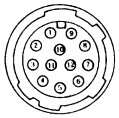

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# SIGNAL CONNECTION TO DC IN/SYNC CONNECTOR

**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)



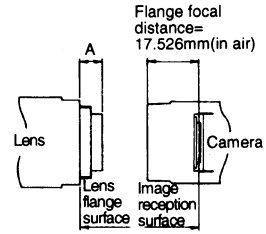



**Note:**

- 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

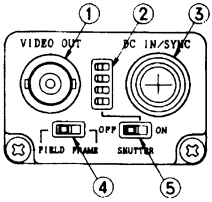
- Image size.
  KP-M2A : 1/2-inch
  KP-M3A : 1/3-inch
- The flange focal distance is 17.526mm (in air).
- Select such a lens as the length (A) from the flange surface of the lens to the end of the screw side is 8mm or less.




**Note** Flange focal distance cannot be adjusted.

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# 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.

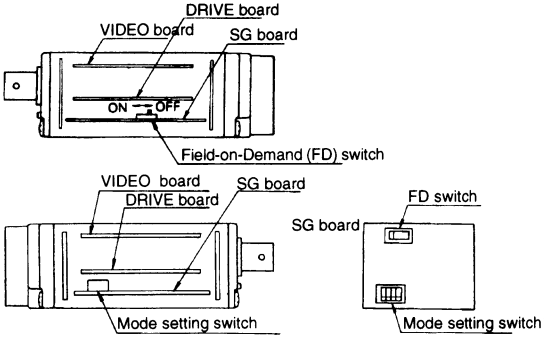
**Setting of shutter speed**

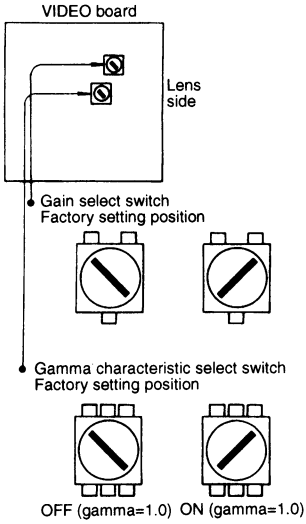
| Speed (second) | ※ 1 | ※ 2 | 1/125 | 1/250 |
|---|---|---|---|---|
| Setting position |  |  |  |  |

| 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 (Stting at factory) | ON | ON | ON | OFF |

# SELECT SWITCH GAMMA CHARACTERISTIC

The camera is provided with the gamma characteristic select

# GAIN SELECT SWITCH

The gain of the camera can be switched between the normal

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## 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 : $f_{(H)}$=15.734kHz ± 1%
CCIR : $f_{(H)}$=15.625kHz ± 1%
VD EIA : $f_{(V)}$=59.94Hz [$f_{(V)}=f_{(H)} \div 262.5$]
CCIR : $f_{(V)}$=50Hz [$f_{(V)}=f_{(H)} \div 312.5$]

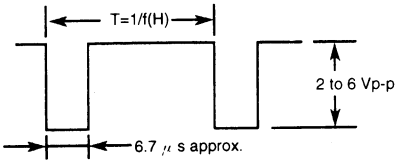
● Input level

HD 2 to 6Vp-p, negative
VD 2 to 6Vp-p, negative

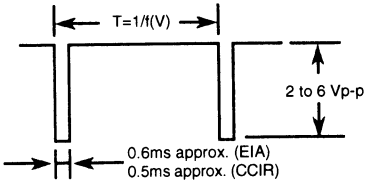
● Input impedance 1k ohms

● Input waveform

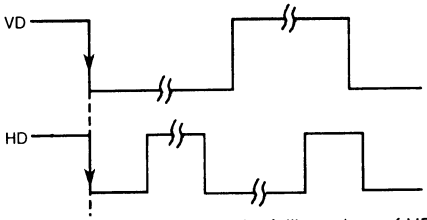
● Hrizontal drive signal (HD)




● Vertical drive signal (VD)




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

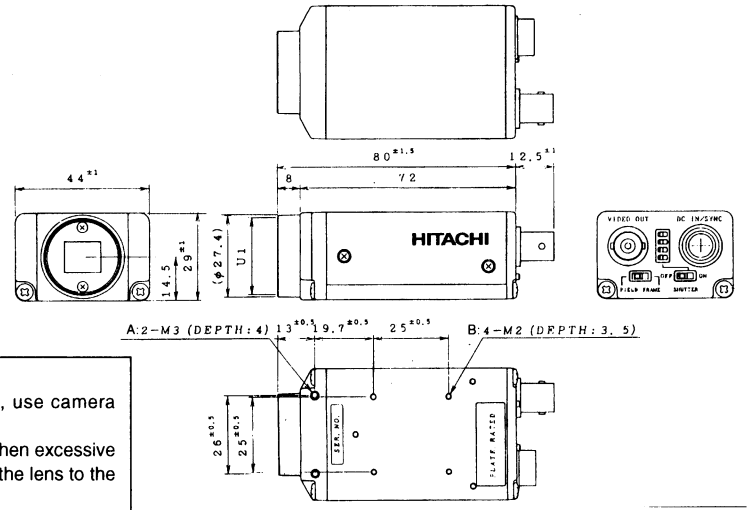



Adjust the phase so that the falling edges of HD and VD are in phase (0 ± 5 μs)

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# 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:** Interline transfer CCD

Total number of pixels
EIA: 811(H)×508(V)
CCIR: 795(H)×596(V)

Pixel pitch
**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)

Number of effective pixels
EIA: 768(H)×494(V)
CCIR: 752(H)×582(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 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 fiels: 61 to 15Hz)
CCIR: 621 to 2047TV 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

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

**(22)Power requirement:** 12V DC ± 1V

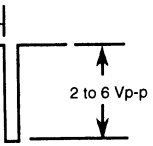
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ITCH

tched between the normal
This switch is set to the

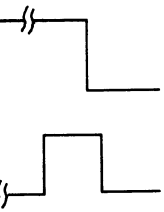
xed. (The noise amount is

ject becomes lower than
tically increased. As gain
.




x. (EIA)
x. (CCIR)

horizontal drive signal (HD)
)



e falling edges of HD and

| | |
|---|---|
| **(12)Video output:** | 1.0Vp-p, 75 ohms, unbalanced<br>Video: 0.7Vp-p<br>Sync: 0.3Vp-p, negative |
| **(13)Horizontal resolution** | EIA: 570 TV lines<br>CCIR: 560 TV lines |
| Vertical resolution | EIA: 485 TV lines<br>CCIR: 575 TV lines |
| **(14)Sensitivity:** | 400 lx, F8, 3200K |
| **(15)Minimum illumination:** | 0.3 lx, f1.4, AGC and GAMMA: ON, without IR cut filter |
| **(16)S/N:** | 56dB |
| **(17)Electronic shutter:** | 1/10000, 1/4000, 1/2000, 1/1000, 1/500, 1/250, 1/125, 1/ 120(CCIR), 1/100(EIA)<br>OFF(normal exposure)<br>Set to OFF at the factory. |
| **(18)Integration mode:** | Field or frame integration mode<br>Set to frame integration mode at the factory. |
| **(19)Gamma correction:** | Gamma=1.0 or correction<br>Set to 1.0 at the factory. |
| **(20)AGC:** | Fixed gain or AGC<br>Set to fixed gain at the factory. |
| **(21)Field-on-Demand function** | ●ON/OFF switchable by internal switch<br>● Switchable modes:ONE trigger TWO-trigger, 1/1600s (EIA)/1/1000s (CCIR) fixed shutter, external shutter control, OFF (normal exposure)<br>* Set to OFF at the factory |
| **(22)Power requirement:** | 12V DC ± 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)<br>68.6m/s² constant<br>(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<br>(Drop test, once each top, bottom, left and right) |
| **(27)Dimensions:** | 44(W) × 29(H) × 72(D)mm |
| **(28)Mass:** | 120g approx. |


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