

# HD-SDeye

## Full HD HD-SDI Camera

### KP-HD20A

## Operation manual

Thank you for procuring this fine Hitachi Kokusai Electric color camera. Before using the camera, please read this operation manual carefully and keep this manual on file for ready reference in the future.



### CAUTION FOR SAFE OPERATION

	<b>CAUTION</b> RISK OF ELECTRIC SHOCK DO NOT OPEN	
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.		
	This symbol is intended to alert the user to the presence of unisolated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.	
	This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.	

<b>WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS COLOR CAMERA TO RAIN OR MOISTURE.</b>
<b>AVERTISSEMENT</b> Afin d'éviter tout risque d'incendie ou d'électrocution, ne pas exposer l'appareil à la pluie ou à l'humidité. Afin d'écartier tout risque d'électrocution, garder le coffret fermé. Ne confier l'entretien de l'appareil qu'à un personnel qualifié.
<b>VORSICHT</b> Um Feuergefahr und die Gefahr eines elektrischen Schiages zu vermeiden, darf das Gerät weder Regen noch Feuchtigkeit ausgesetzt werden. Um einen elektrischen Schiag zu vermeiden, darf das Gehäuse nicht geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur einem Fachmann.

<b>Note:</b> The model and serial numbers of your product are important for you to keep for your convenience and protection. These numbers appear on the nameplate located on the bottom of the product. Please record these numbers in the spaces provided below, and retain this manual for future reference.	
<b>Model No.</b> _____	<b>Serial No.</b> _____

# IMPORTANT SAFETY INSTRUCTIONS

## 1. Read Instructions

All the safety and operating instructions should be read before the product is operated.

## 2. Retain Instructions

The safety and operating instructions should be retained for future reference.

## 3. Heed Warnings

All warnings on the product and the operating instructions should be adhered to.

## 4. Follow Instructions

All operating and use instructions should be followed.

## 5. Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

## 6. Attachments

Do not use attachments not recommended by the product manufacturer as they may cause hazards.

## 7. Water and Moisture

Do not use this product near water — for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool; and the like.

## 8. Accessories

Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may

fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

## 9. Moving

A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.



## 10. Ventilation

Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

## 11. Power Sources

This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.

## 12. Grounding or Polarization

This product is equipped with a three-wire grounding-type plug a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

## 13. Power-Cord Protection

Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

## 14. Lightning

For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the

wall outlet. This will prevent damage to the product due to lightning and power-line surges.

## 15. Overloading

Do not overload wall outlets, extension cords or integral convenience receptacles as this can result in a risk of fire or electric shock.

## 16. Object and Liquid Entry

Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

## 17. Inflammable and Explosive Substance

Avoid using this product where there are gases, and also where there are inflammable and explosive substances in the immediate vicinity.

## 18. Heavy Shock or Vibration

When carrying this product around, do not subject the product to heavy shock or vibration.

## 19. Servicing

Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

## **20. Damage Requiring Service**

Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- a. When the power-supply cord or plug is damaged.
- b. if liquid has been spilled, or objects have fallen into the product.
- c. If the product has been exposed to rain or water.
- d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
- e. If the product has been dropped or damaged in any way.
- f. When the product exhibits a distinct change in performance—this indicates a need for service.

## **21. Replacement Parts**

When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

## **22. Safety Check**

Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

## **23. Wall or Ceiling Mounting**

The product should be mounted to a wall or ceiling only as recommended by the manufacturer.

## **24. Heat**

The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

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## Introduction

Hitachi's camera KP-HD20A is HD-SDI interface one which support Full HD.

## Features

### High definition

- They are high definition and wide viewing angle because it is full HD.
- Low delay HD video signal and long-distance transmission (at the time of multiunit connection)

### High sensitivity

- 1/3 type high sensitivity MOS sensor has made 0.2lux high sensitivity.

### High functioning

- Full HD and double shutter WDR function
- 1080/30fps double shutter WDS function.

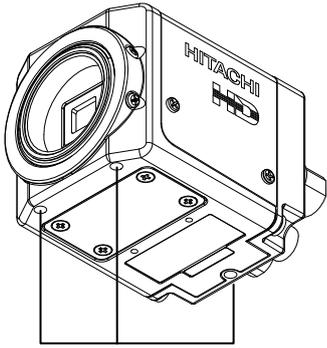
### Coaxial superposition

- A simple system configuration is possible by one cable connection.

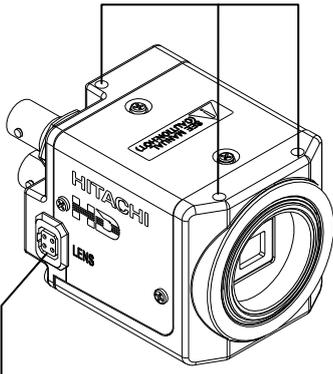
## Standard composition

- 1) Camera
- 2) Operation manual
- 3) Tripod adapter
- 4) Attchement screw x 3

# Name and function



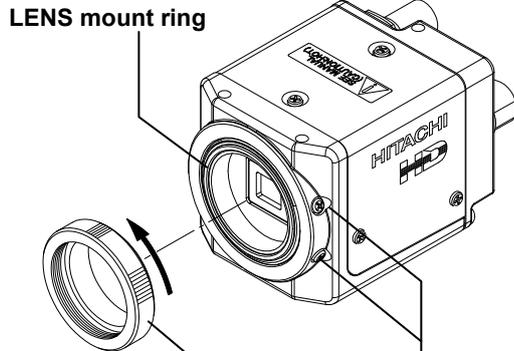
**Tripod adaptor installation screw hole**



**LENS connector [LENS]**

Connect the lens cable, when using automatic iris lens. Refer to page 4 (Lens connectors).

**Attachment of C mount adapter**

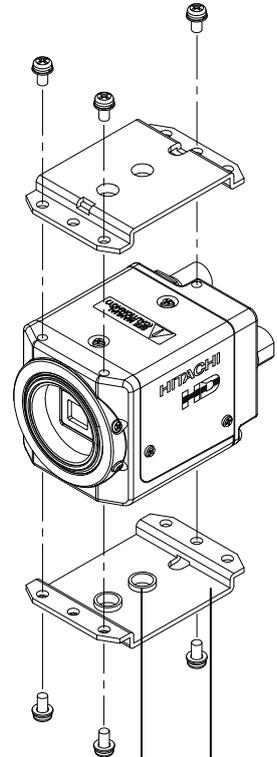


**LENS mount ring**

**C mount adapter (optional accessories)**

**Lens mount fixing screw**  
Adjust the flange back  
Refer to page 4 (Flange back adjustment)

**Attachment of tripod adapter**



**Camera attachment screw hole**

**Tripod adapter**

**Back**

**Status lamp [STATUS]**

Camera state is indicated  
 · HD-SDI output mode : Turn green light  
 · VIDEO output mode : Flicked green light

**Power supply input connector**

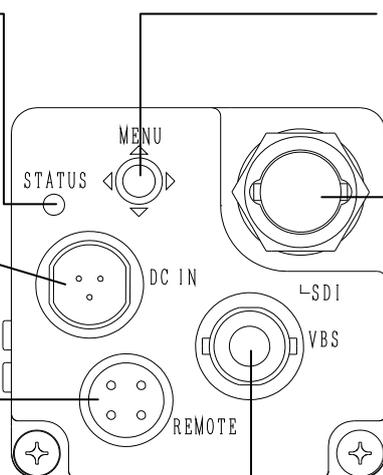
Refer to page 3 (Video output connection).

**REMOTE connector [REMOTE]**

Refer to page 10 (Remote-contact).

**Video output connector [VIDEO]**

Refer to page 3 (Video output connection).



**Camera menu setting operation switch [MENU]**

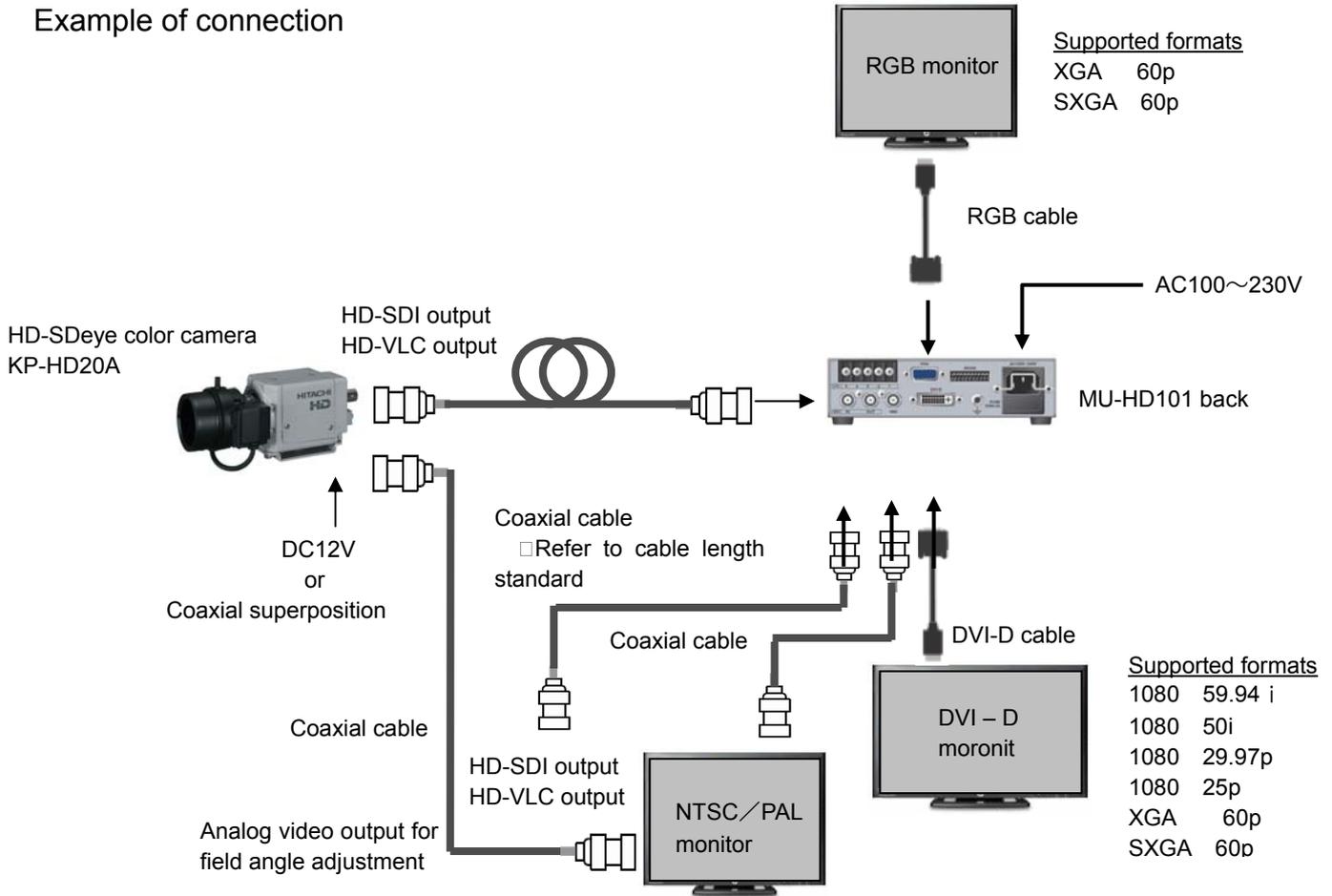
Various setting and adjustment values are confirmed and changed with these 3 switches. Refer to page 6 to 10 (Setting menu operations).

**HD-SDI output connector [SDI]**

Refer to page 3 (Video output connection).

# Connections

## Example of connection



## Cable length standard

	HD-SDI mode(1.5Gbps)	HD-VLC mode (270Mbps)
5C-FB (No power supply superposition)	100m	300m

\* Actual distance changes with cable, connector, temperature, etc, because transmission distance is actual measurement by sample cables.

\* We recommend using cable of 7C-FB or 5C-FB at the time of using HD-SDI mode, because 7C-2V, 5C-2V and 3C-2V are not guaranteed to support high-frequency signal transmission of HD-SDI mode.

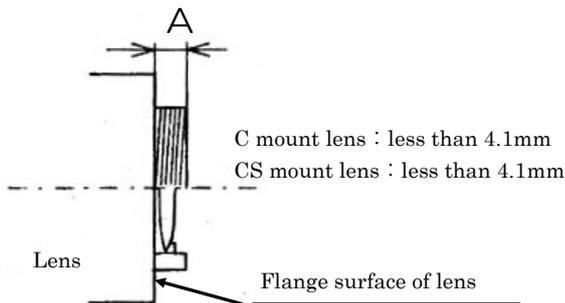
# Lens

## Lens selection

- 1) Dimension A) of lens installation part should be according to the figure below. When the lens with dimension more than the following size is installed, the internal damage of camera may occur.
- 2) Please do not install a lens which is heavier than the camera body. In case of using such lens, please fix the lens to the installation stand.

### Caution

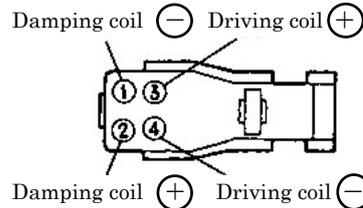
Use of heavy lens may damage the camera because of unbalance.



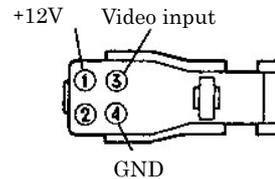
## Lens connectors

When a lens-connector-free automatic iris lens is used, the optional lens plug is installed in the lens cable as follows. Please refer the manual for signal and color combination of camera cable.

DC (Direct current) control voltage input type lens



Video signal input type lens



Install the head of lens cable to plug and then insert the plug in the lens connector [LENS] of camera.

## Flange back adjustment

Flange back adjustment is needed after installation of lens or in cases where focus cannot be obtained by normal lens focus operation and focus is lost at the wide angle settings of a zoom lens.

In such cases, open the lens iris (refer to page 9) and adjust as follows.

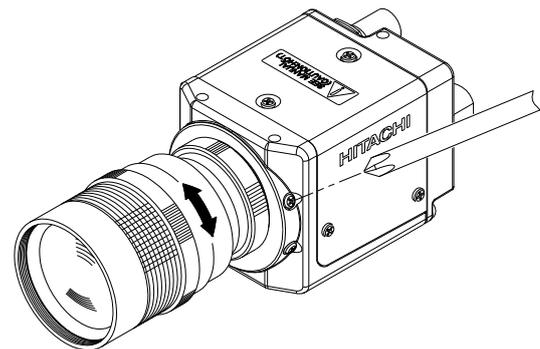
### 1) Fixed focus lens

Set the lens focus ring to infinity and pickup a camera subject at least 20 meters distant. Loosen the lens mount setscrews (2 screws) and turn the lens and lens mount ring to adjust the focus. After adjusting, tighten the lens mount setscrews.

### 2) Varifocal and Zoom lens

- 1) Set the lens to maximum telephoto and pickup a camera subject at least 20 meters distant. Loosen the lens mount setscrews (2 screws) and turn the focus ring to adjust the focus while using care not to turn the lens and lens mount ring.
- 2) Set the lens to maximum wide angle and pickup the same camera subject. While using care not to turn the lens focus ring, turn the lens and lens mount ring to adjust the focus. Repeat these steps until focus is obtained at both telephoto and wide angle settings. After adjusting, tighten the lens mount setscrews.

- ※ The flange back adjustment can adjust C~CS mount range.
- ※ The angle of view is adjusted by turning the lens zoom ring.



### Note

KP-HD20A camera has structure that user can change lenses. Therefore dust may adhere to the CCD or the optical filter unit depending on environmental conditions where lens are attached to this camera. If you use this camera under the bright outdoor conditions, dust may be seen depending on the aperture of lens. In such cases we recommend that you use AES & LENS mode.

**Note**

If an auto iris lens is used and the object distance is less than few meters, due to focus length of lens, slight blurring can occur at certain iris positions.

In such case, please refer to page 9[Lens open setting] and set the lens to full open. At this time, AES is operated.

**Auto Electric Shutter (AES)**

AES is a function to automatically adjust the electronic shutter speed according to the amount of incident light and keeps the image level constant.



## MAIN MENU

- 1) Press the Set button for at least 2 seconds to display the Main menu on the monitor screen.

■MAIN MENU [FILE1]	.....Setting scene files setting
SHUTTER :1/30	.....Shutter speed setting
LIGHT CONT. :->	.....Light control menu
GAIN :->	.....AGC setting menu
WHITE BAL. :->	.....White balance setting menu
SUB :->	.....Sub menu
TITLE :->	.....Camera title setting menu
LENS :->	.....Lens setting menu
SYSTEM :->	.....Camera tilte setting menu

Main menu

- 2) Check the current settings at the main menu.
- 3) Shift the cursor vertically by pushing the Up and Down buttons, then press the Set button to change the setting of the selected item.
- 4) To return to the normal screen, press the Set button.
- 5) Changed settings are stored in the camera memory (flash memory) and restore them when the power is switched on.
- 6) When button operation is not performed for 1 minute during displaying menu, changed items are saved and menu display disappears.

## Scene file setting

Scene file is a function to record various mode settings and the adjusted values of the camera at the file.

- 1) Press the Set button for at least 2 seconds to display the main menu on the monitor screen.
- 2) Use UP and Down buttons to move the cursor to MAIN MENU. push the Right and Left button to change the scene file.

**FILE1<->FILE2<-> FILE3<->FILE4<->FILE5<->FILE1**

Factory setting is FILE1.

## SHUTTER SPEED

- 1) Shutter speed can be switched at MAIN MENU. Select "SHUTTER" by Up (Down) button. Then shutter speed can be changed by Right/Left button.

### [Preset]

**1/30(1/25) → 1/50 → 1/100 → 1/250 → 1/500 → 1/1000  
→ 1/2000 → 1/5000 → 1/10000 → 1/20000 → 1/50000  
→ AES → AES&LENS(1/1000) → AES&LENS(1/2000)  
→ AES&LENS(1/5000)**

Factory setting is "1/30".

\* AES&LENS is AES priority mode.

## LIGHT CONT MENU

■LIGHT CONT. MENU	
PEAK/AVE. :0/100	.....Exposure control mode
LEVEL : 0	.....Video level adjustment
ALC GATE :OFF	.....Automatic level control gate setting
WDR MODE :AUTO	.....WDR function setting
*WDR BLEND :128	.....WDR blend ratio setting
*WDR SHUTTER:1/2000	.....WDR short exposure shutter setting
*WDR LEVEL : 0	.....WDR short exposure convergence level setting

Light control menu

### Light control menu setting

- 1) Press the Set button for longer than 2 seconds to display the Main menu.  
Select "LIGHT CONTROL" by Up (Down) button. Then LIGHT CONTROL MENU can be displayed by Rght,  
(1) PEAK/AVE : (PEAK/AVERAGE)  
Set the rate of automatic iris PEAK/AVERAGE.  
0/100, 15/85, 30/70, 50/50, 75/25, 100/0.  
(2)LEVEL : (LEVEL)  
Standard level of Automatic exposure control( AUTO IRIS, AGC, AES ) (dark)-128 to 0 to127 (bright)  
(3)ALC GATE : (PEAK/AVERAGE)  
Set PEAK/AVERAGE Automatic level control gate.  
OFF:Full screen, Select 1 to 9.  
(4) WDR MODE : (Wide dynamic range mode)  
Set WDR.  
OFF/ON (manual) /AUTO  
(5) WDR BLEND : (WDR short/long exposure ratio)  
Set WDR short/long exposure ratio.  
128 (50%) to 255 (100%)  
Effective only at the time of WDR ON  
(6) WDR SHUTTTER : (WDR short exposure shutter speed)  
Set the shutter speed of short exposure at the time of WDR manual mode. Long exposure is set by SHUTTER command.  
(7) WDR LEVEL : (Short exposure shutter desired value of AUTO)  
Short exposure convergence level setting of short exposure shutter automatic control  
0 (95%) to 255 (110%)  
Effective only at the time of WDR Auto mode

# GAIN MENU

<b>■GAIN MENU</b>	
GAIN MODE :AGC	.....Gain mode setting
*PRESET GAIN: 0dB	..... Fixed amplification setting
AGC LIMIT : 31dB	..... Maximum amplification setting

## Gain setting

- Press the Set button for at least 2 seconds to display the main menu on the monitor screen.
- Select GAIN by Up (Down) button, and display GAIN MENU by Right button.
  - MODE : Set gain mode.
    - PRESET : Preset gain mode
    - AGC : Automatic gain mode
  - PRESET GAIN : Set gain value of manual.
    - 0dB to 48dB
  - AGC LIMIT : Set maximum of the automatic gain.
    - 0dB to 48dB B

# WHITE BALANCE MENU

<b>WHITE BAL. MENU</b>	
MODE :ATW	.....Mode setting
ATW RANGE :NORMAL	.....Range of Following color temperature setting
*AWB :PUSH R	.....One push setting
*R GAIN : 0	.....Manual setting(R gain)
*B GAIN : 0	.....Manual setting (B gain)
WHITE GATE :OFF	.....Auto level control gate setting

White balance setting menu

- MODE : Set white balance mode
  - ATW : Automatic white balance.
  - Manual : Set white balance.
- ATW RANGE : Set Range of Following color temperature
  - NORMAL : 2500K to 8000K.
  - SPECIAL : 2500K to 8000K+special light (Sodium lamp, mercury lamp)
- AWB : One push automatic white balance
 

A white balance is adjusted with auto after pressing the right button. The value of R and G GAIN is updated and it fixes to MANUAL.
- R GAIN : White balance hand regulation of R gain
  - 128 to 0 to 127

This operates, only when a white balance is a manual.
- B GAIN : White balance hand regulation of B gain
  - 128 to 0 to 127

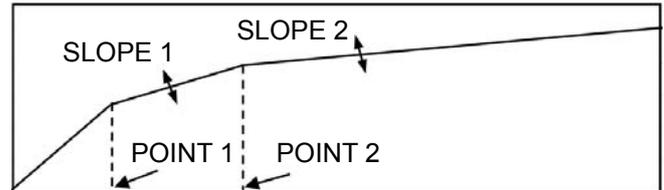
This operates, only when a white balance is a manual.
- WHITE GATE : Set auto level control of white balance.
  - OFF/ NO.1 to NO.9

# SUB MENU

<b>■SUB MENU</b>	
CHROMA : 0	.....Chroma level setting
DETAIL : 0	.....Detail correction setting
PEDESTAL : 0	.....Black level setting
GAMMA :ON	.....Gamma correction setting
KNEE :ON	.....KNEE mode setting
KNEE S/P :->	.....KNEE function setting
MASKING :PREST	.....Masking mode setting
*HUE/SAT :->	.....Masking function setting
INITIALIZE :PUSH R	

- CHROMA : Chroma level setting
  - 128 to 0 to 50

Chroma level is fixed to the value of "-128", and cannot be adjusted, at time of B/W MODE.
- DETAIL : The optimum detail level setting
  - 128 to 0 to 127
- PEDESTAL : Set black level.
  - 28 to 0 to 100
- GAMMA : Gamma correction setting
  - ON : Gamma ON
  - HIGH : Gamma ON (High)
  - OFF : Gamma OFF
- KNEE MODE: Mode select
  - OFF : Not use KNEE function
  - ON : Use Knee function
- KNEE: KNEE function setting when KNEE MODE is "ON".
  - SLOPE 1 : KNEE slope 1 0 to 255
  - SLOPE 2 : KNEE slope 2 0 to 255
  - POINT 1 : KNEE point 1 0 to 255 (64 = 100%)
  - POINT 2 : KNEE point 2 0 to 255 (64 = 100%)



- MASKING MODE: Mode select
  - PRESET : Use a standard preset
  - VARIABLE : Use a user setting mode
- MASKING: Masking function setting when MASKING MODE is "VARIABLE".
  - (SAT): Degree of saturation of the color
    - R : Red mask setting 1 to 255
    - Y : Yellow mask setting 1 to 255
    - G : Green mask setting 1 to 255
    - C : Cyan mask setting 1 to 255
    - B : Blue mask setting 1 to 255
    - M : Magenta mask setting 1 to 255
  - (HUE): Color phase
    - R : Red mask setting 0 to 255
    - Y : Yellow mask setting 0 to 255
    - G : Green mask setting 0 to 255
    - C : Cyan mask setting 0 to 255
    - B : Blue mask setting 0 to 255
    - M : Magenta mask setting 0 to 255



## TV FORMAT MENU

Operation : Select TV FORMAT by Up (Down) button, and press Right button.

### ■TV FORMAT

- 080i,59.94Hz .....1080i 59.94Hz
- \*  080i,50 Hz .....1080i 50Hz
- 080p,29.97Hz .....1080p 29.97Hz
- \*  080p,25 Hz .....1080p 25Hz

- (1) 1080i 59.94Hz (NTSC MODE ONLY)
- (2) 1080i 50Hz (PAL MODE ONLY)
- (3) 1080p 29.97Hz (NTSC MODE ONLY)
- (4) 1080p 25Hz (PAL MODE ONLY)

## NTSC/PAL mode change

### PAL mode change

Operation : The following processings are performed at the time of NTSC mode .

- ① Push left button. (5 times)
- ② Push Down button. LED lights up red.  
When it pushes except Down button, the change to NTSC mode is canceled.  
A change in PAL mode is canceled at the time of PAL mode (LED lights up green).  
When it is canceled, LED blinks green.
- ③ LED is turned on orange after putting out lights of LED. → LED lights up green. (a camera reboots)
- ④ A PAL picture is displayed in about ten seconds.

### NTSC mode change

Operation : The following processings are performed at the time of PAL mode.

- ① Push Right button. (5 times)
- ② Push Down button. LED lights up red.  
When it pushes except Down button, the change to NTSC display mode is canceled.  
A change in PAL mode is canceled at the time of NTSC mode (LED lights up green).  
When it is canceled, LED green.
- ③ LED is turned on orange after putting out lights of LED. → LED lights up green. (a camera reboots)
- ④ A NTSC picture is displayed in about ten seconds

### Caution!

**Please do not turn off the power by any means during the change of output mode.**

## HD-SDI/HD-VLC mode change

### Button operation at a camera start-up

#### (1) Starting in HD-SDI mode

A power supply is started pushing an Up button.

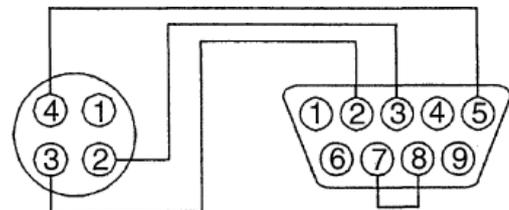
#### (2) Starting in HD-VLC mode

A power supply is started pushing a Right button.

※Exclusive multiunit MU-HD101 is required for HD-VLC mode.

## Remote-contact operation

An optional remote plug is available to enable remote controlling of the B/W MODE and scene file. The plug is wired as shown in the figure and connected to the remote connector of the camera rear panel.



Remote plug (option)

D-sub 9 pin (female)

### Scene file setting

Pin No.	Signal name
1	N.C.
2	Serial data camera input
3	Serial data camera output
4	GND

### Note

- 1) Nothing should connect with NC pin.
- 2) Please perform extraction and insertion of a remote plug after turning off a camera power supply.

## Specifications

1)	Imaging device	1/3" Progressive Scan MOS
	Total pixels	2010(H)x1108(V) 2.2M pixels
	Effective pixels	1944(H)x1092(V) 2.1M pixels
2)	Sync system	Internal
3)	Video output	HD-SDI / Analog CVBS
4)	Video format	HD-SDI: 1080i 59.94/ 50, 1080P 29.97/ 25 CVBS: NTSC/ PAL
5)	Transmission distance	HD-SDI Std mode: max100m (5C-FB 75ohm) HD-VLC mode: max 300m (5C-2V 75ohm/ Exclusive multiunit MU-HD101 use) *mode selectable
6)	Minimum illumination	Color: 0.2lx(F1.2/AGC48dB)
7)	S/N ratio	50dB (AGC: OFF/Weight: ON)
8)	Resolution	800TV line
9)	Lens mount	C/ CS *C: C mount Adaptor (optional accessory) use
10)	Power consumption	DC12V or Coaxial superposition from MU-HD101 5.8W
11)	Operating temperature	-10 to +45 C
12)	External dimensions	44(W)x44(H)x59(D)mm
13)	Mass	Approx.130g
14)	Accessory (optional accessory)	Lens/Lens plug/Tripod adapter/Power plug/Remote plug/Multiunit (MU-HD101)
15)	AGC	OFF/ Auto (Max Gain 48dB)/ Manual (0dB to +48dB) *1dB step setting
16)	Electronic shutter	OFF/ AES/ Manual (1/30(1/25) to 1/50000 sec)
17)	BLC	OFF/ ON (photometry aria can be set)
18)	White Balance	Auto: ATW/ AWC Manual: Manual (2500K to 10000K)
19)	Wide dynamic range	OFF/ON/AUTO *WDR: Double shutter sampling
20)	Picture adjust menu	Video level/Gamma correction/Chroma level/Black level/Enhance level
21)	Lens control	DC/VIDEO
22)	Remote control	RS-232C