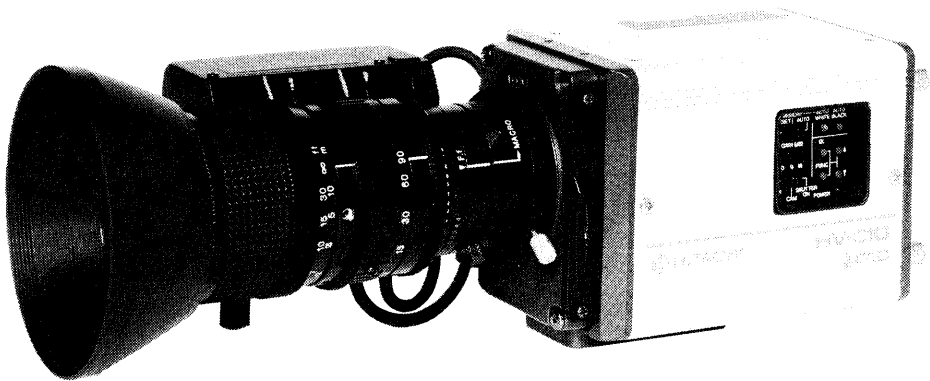


OPERATION MANUAL

HV-C10

3-CCD COLOR CAMERA



Read this operation manual carefully for proper operation before using your color camera.



Hitachi Denshi, Ltd.

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FEATURES

- **High resolution**

Horizontal resolution of 680 TV lines (luminance signal) is achieved by employing the newly developed 1/2-inch 360,000 (420,000 for PAL)-pixel CCD and the high accuracy CCD cladding technology.

- **High sensitivity**

High sensitivity and a high S/N are achieved by employing the CCD with a micro lens.

- **Real-time auto white balance**

The microprocessor detects the change of color temperature in real time and automatically corrects the color temperature, so that the optimum white balance can always be ensured during shooting.

- **Auto gain**

In the real-time auto white balance mode, the auto gain function which automatically selects gain in accordance with light quantity simultaneously operates. The HV-C10 is thus suitable for observation in particular.

- **Electronic shutter**

Since a variable speed electronic shutter is incorporated, the camera is most suitable for shooting a rapidly moving object.

- **Memory backup by E²PROM**

(battery unnecessary)

By using an E²PROM, a battery for memory backup is no longer necessary.

- **Compact camera head and low power consumption**

The size of the camera head is

substantially reduced by using the custom ICs (1/3 of FP-C1H in volume). Low power consumption (7W) is also achieved.

- **Direct connection to AC adaptor without cable**

The camera can be directly connected to the AC adaptor (AP-C10) for exclusive use.

- **Camera cable connection**

By using the optional RA-C10 ROU Adaptor, the camera can be connected to the optional RU-C10 Remote Operation Unit through a single camera cable (up to 100m). The camera is thus most suitable for applications including those for TV conference and weather observation camera.

- **Camera remote control**

By using the optional RC-C10 Remote Control Box, various functions of the camera can be remote-controlled. By using the optional JU-C10 RS-232-C Level Converter, the camera can also be remote-controlled from a personal computer through RS-232-C.

- **A variety of functions**

- Three-memory auto white balance corresponding to optical filter
- Switchable between the field storage mode (normal mode) and frame storage mode (high resolution mode)
- Auto knee function for improving white compression at highlights
- Flare correction circuit providing an even, pure picture
- Masking circuit improving color reproductivity.
- Self diagnosis display function for various functions

NOTES TO USERS

Notes for safety

- Use this camera by 12V DC power supply.
- Use care for flammable things, water or metal not to intrude into the inside of the camera to avoid a possible failure and a possible accident.
- Do not modify the camera or do not use the camera with the side cover removed. It may cause a failure and an accident.
- When rolls of thunder are heard near during shooting outside, stop using the camera. When using the camera in the rain, use care not to get the camera wet.
- If the camera should show any abnormality, be sure to turn off the camera and disconnect the power cord, then contact the shop where you purchased the camera or your nearest Hitachi Denshi service station.

Notes for operation

● Supply voltage

Check that the supply voltage is between 10.5V and 17V DC.

When the voltage drops, color may be changed and noise may be generated. If the voltage exceeds 17V, it may cause a failure.

● Place for use and storage

Avoid using or storing the camera at the following places.

- Extremely hot or cold place

[Ambient temperature of the camera:
– 10 to 45°C (14 to 113°F)]

Note that the temperature inside a car with its windows closed may rise to 50°C (122°F) or more in midsummer in particular.

- Place where strong radio wave is generated (near TV or radio transmitting station, etc.)
- Humid or dusty place
- Place where strong vibrations occur
- Installation of camera

When mounting the camera, use two or three tripod screws (1/4-20UNC).

- Maintenance

Dust off the surface of the lens or the optical filter with a blower. Wipe off stains on the camera head lightly with a dry, soft cloth.

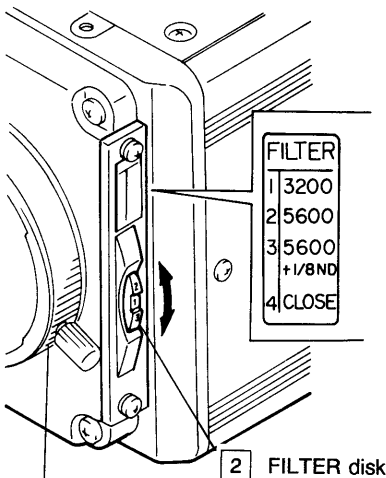
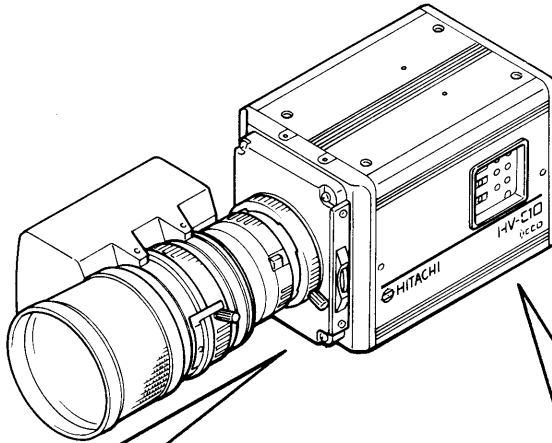
STANDARD COMPOSITION

Camera head HV-C10	1
Standard accessories	1

Contents of standard accessories

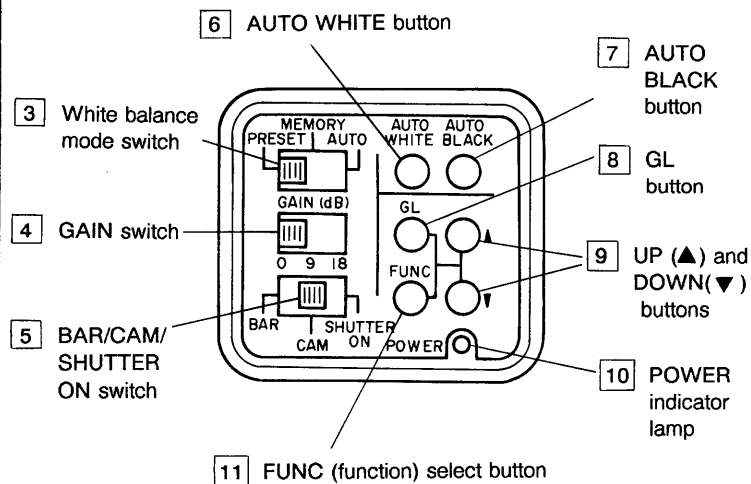
Spare fuses 2A (1.6A for E/K type) .	3
Lens mount cap	1
Plug (RM12BPG-3S HIROSE) . . .	1
Operation manual	1

NAME AND FUNCTION OF EACH SECTION



1 Mount clamp ring

2 FILTER disk



6 AUTO WHITE button

7 AUTO BLACK button

3 White balance mode switch

8 GL button

4 GAIN switch

9 UP (▲) and DOWN (▼) buttons

5 BAR/CAM/SHUTTER ON switch

10 POWER indicator lamp

11 FUNC (function) select button

1 Mount clamp ring

2 FILTER disk (page 18)

Select the filter in accordance with the light source illuminating an object.

3 White balance mode switch

- PRESET: Establishes the same state as that when white balance is obtained at 3200K color temperature.

- **MEMORY:** Establishes the white balance which is automatically adjusted by the AUTO WHITE button **6**.
- **AUTO:** Establishes the state of real-time auto white balance. (At this time the auto gain function operates simultaneously.)

4 GAIN switch

When the illumination is low, increase the sensitivity of the camera by +9dB or +18dB with this switch. Set this switch to 0dB for normal use.

5 BAR/CAM/SHUTTER ON switch

Select a signal fed out from the video output terminals (**12** **14** **16**) on the rear panel with this switch.

BAR: Feeds out the color bar signal.

CAM: Feeds out a video signal from the camera under shooting.

SHUTTER ON:

Turns on the shutter (page 13). Select the shutter speed with the FUNC select button **11** and the UP and DOWN buttons **9**.

Note: If the switch is operated quickly, the shutter speed may not be displayed properly. But it is not a failure. Operate the switch slowly and securely.

6 AUTO WHITE button

Press this switch to perform automatic adjustment of white balance.

Preset the white balance mode switch **3** to MEMORY.

7 AUTO BLACK button

Press this switch to perform automatic adjustment of black balance.

8 GL button (page 22)

Set the following with this button and the UP and DOWN buttons **9**.

- H PHASE (horizontal phase)
- SC COARSE (coarse adjustment of subcarrier phase)
- SC FINE (fine adjustment of subcarrier phase)

9 UP (▲) and DOWN (▼) buttons

Adjust the mode selected with the GL button **8** or the FUNC select button **11**.

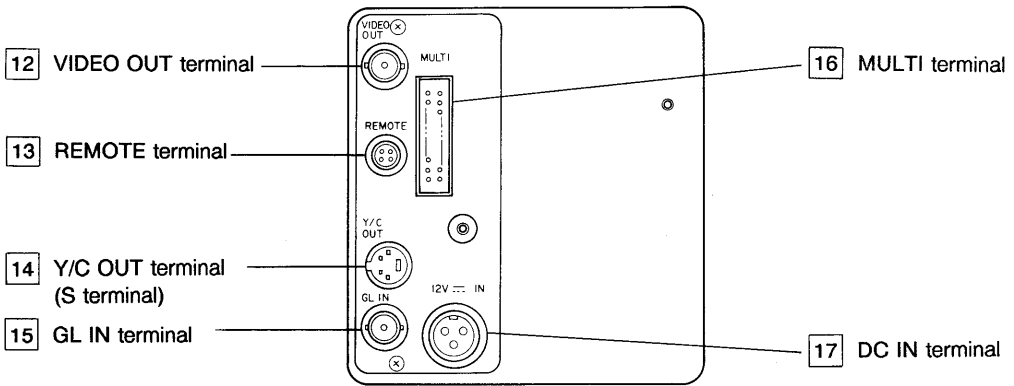
10 POWER indicator lamp

When power is supplied, this lamp lights green.

11 FUNC select button (page 21)

Set the following with this button and the UP and DOWN buttons.

- M.BLK (master black level)
- SHUTTER (shutter speed)
- DTL (DTL quantity)
- IRIS (iris value in auto iris mode)



12 VIDEO OUT (video output) terminal (BNC)

The composite video signal 1Vp-p/75 ohms is fed out.

13 REMOTE (remote control) terminal (4-pin, female)

This terminal is for connecting the remote control box RC-C10 or the RS-232-C Level Converter.

14 Y/C OUT (Y/C output) terminal (4-pin, female)

The separate Y/C signal is fed out.

15 GL-IN (genlock input) terminal (BNC)

When operating the camera by external sync, supply the black burst signal or the composite video signal to this terminal.

16 MULTI terminal (20-pin, male) (page 24)

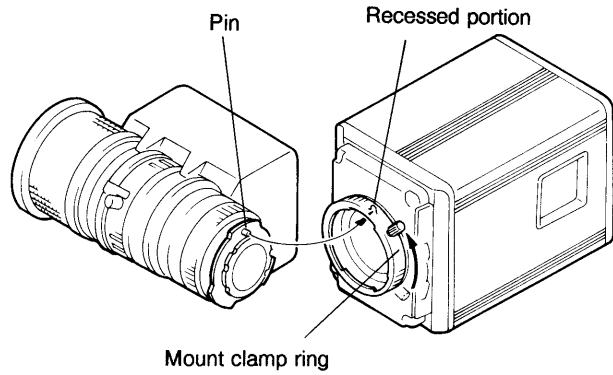
17 DC IN (DC input) terminal (3-pin, male)

Connect the plug from the AC adaptor to this terminal when using the camera with the RGB adaptor VA-C10.

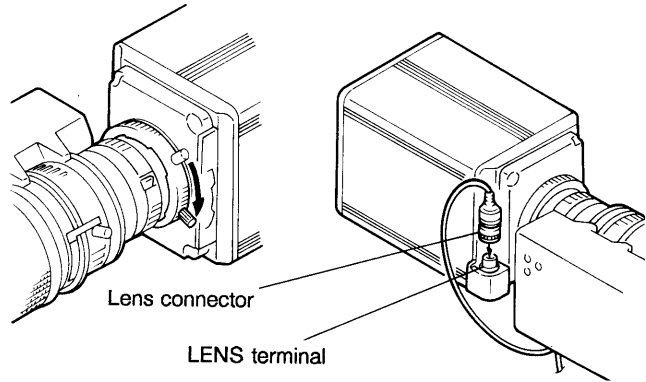
INSTALLATION OF PERIPHERAL EQUIPMENT

Installation of lens

- Turn the mount clamp ring in the direction of arrow, and fit the pin (projected portion) of the lens to the recessed portion of the mount section, then mount the lens.

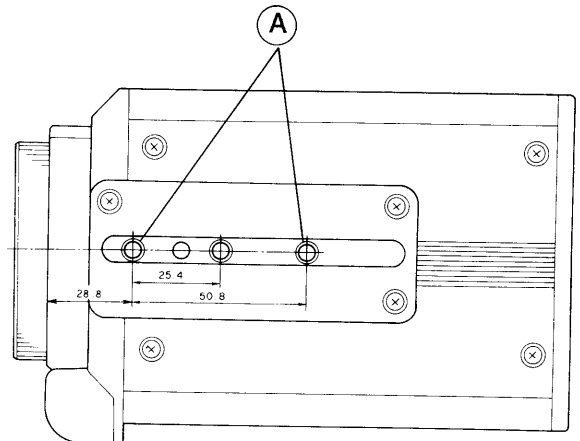


- Turn the mount clamp ring in the direction of arrow, then secure the ring.
- Connect the lens connector to the LENS terminal.

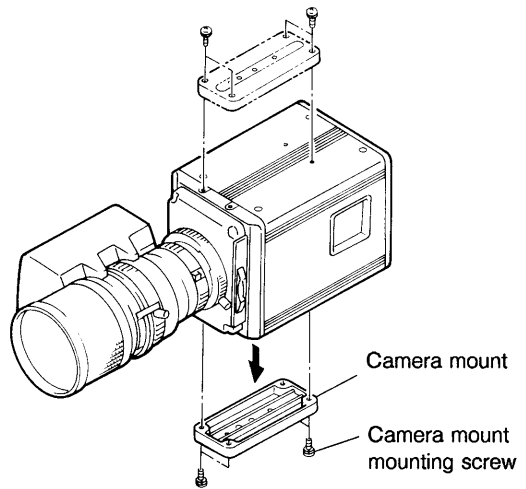


Installation of camera

- When mounting the camera, use two tripod screws (sections A) or three screws.



- ◎ When suspending the camera from the ceiling
- The camera mount mounted on the bottom of the camera can also be mounted on the top of the camera. (In this case, do not use screws other than the camera mount mounting screws.)

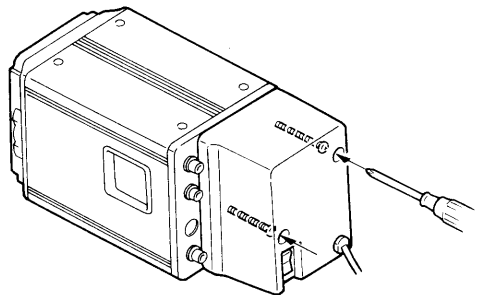
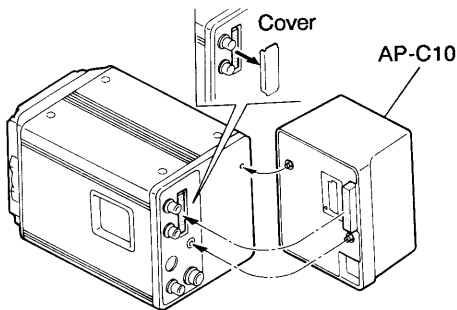


INSTALLATION OF VARIOUS OPTIONAL ADAPTORS

AP-C10

Before installing the AC adaptor AP-C10, remove the cover of the multi connector.

Fix the adaptor with the two built-in screws.

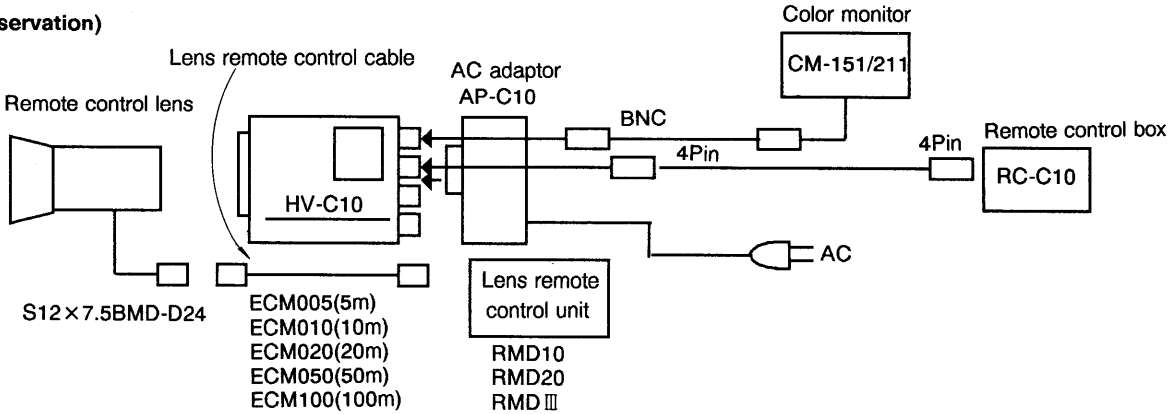


VA-C10 and RA-C10

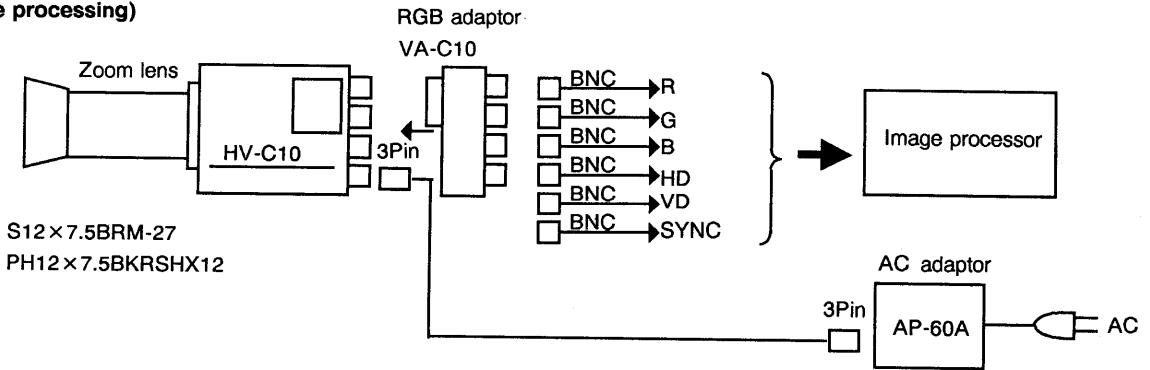
Mount the RGB adaptor VA-C10 and the ROU adaptor RA-C10 in the same manner as the AP-C10.

EXAMPLES OF SYSTEM CONFIGURATIONS

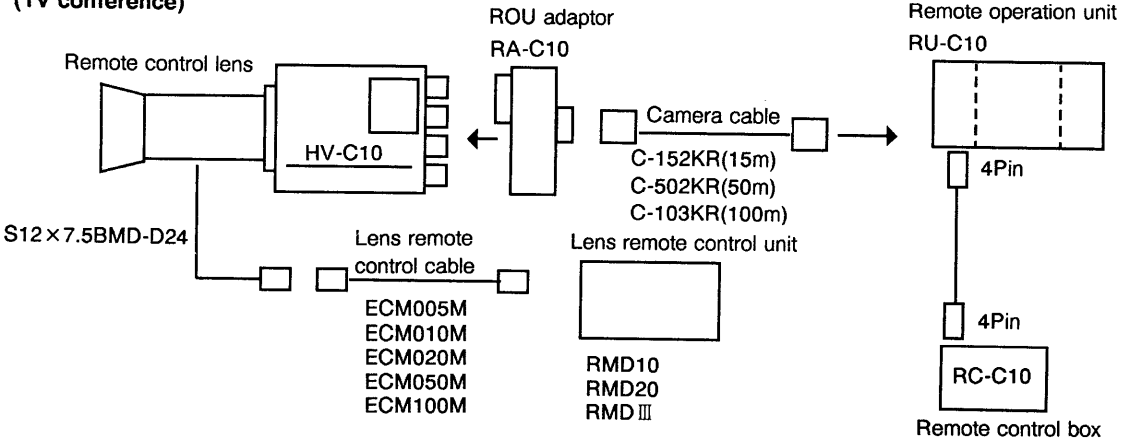
(Observation)



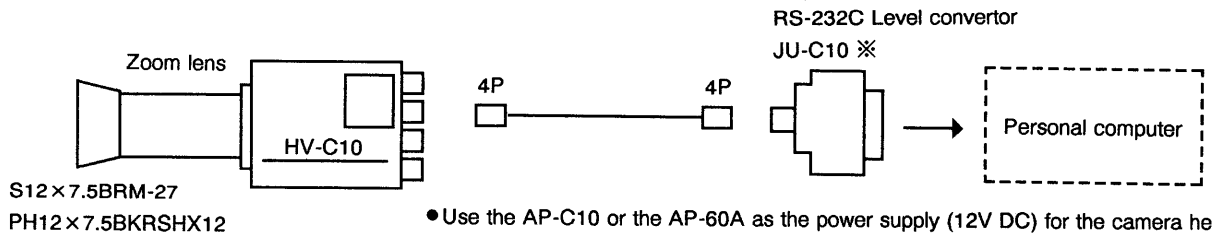
(Image processing)



(TV conference)



(Personal computer control)



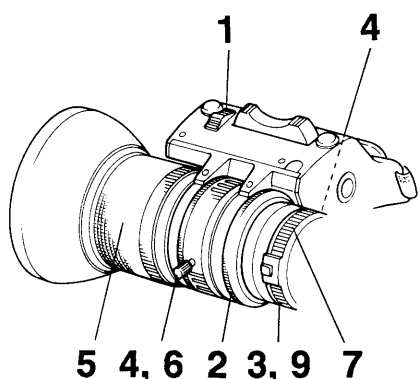
- Use the AP-C10 or the AP-60A as the power supply (12V DC) for the camera head.
- ※ The JU-C10 does not include software.

OPERATION CHECKS AND INITIAL ADJUSTMENT

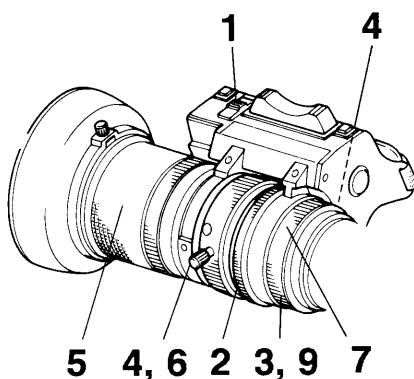
Adjustment of back focus

When a lens is not properly focused in the telephoto or the wide angle mode during zooming, adjust the lens according to the following steps.

1. Set the IRIS switch (A/M) of the lens to M.
2. Open the iris of the lens fully. Illuminate an object so that the proper video output level can be obtained with the iris of the lens fully open.
3. Loosen the screw fixing the back focus ring.
4. Set the zoom select (S/M) knob to M, then turn the manual zoom lever to get the lens telephoto.
5. Shoot an object 3m or more away, then turn the manual zoom lever to focus the lens on the object.
6. Turn the manual zoom lever to get the lens wide angle.
7. Turn the back focus ring, then focus the camera on the same object as that in step 5. At this point, use care not to move the focus ring.
8. Repeat steps 4. to 7. until the lens is properly focused both in the telephoto and the wide angle mode.
9. Secure the screw fixing the back focus ring.



S12×7.5BRM-27



PH12×7.5BKRSRSH × 12

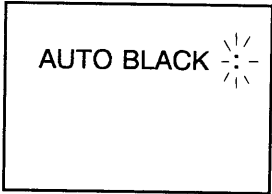
Adjustment of black balance

Adjust black balance to obtain a picture with proper tone.

Adjustment

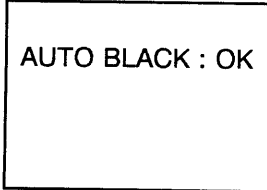
Press the AUTO BLACK button, then the iris of the lens automatically closes and black balance is adjusted.

Under adjustment



Displayed for about two seconds

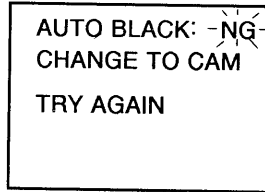
Adjustment completed



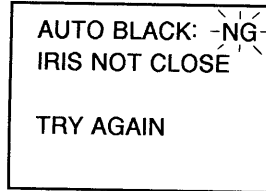
Displayed for about three seconds

When black balance cannot be automatically adjusted

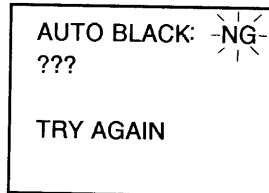
The following messages are displayed on the screen for about six seconds.



When the BAR/CAM/SHUTTER switch is set to BAR



When the iris is not closed

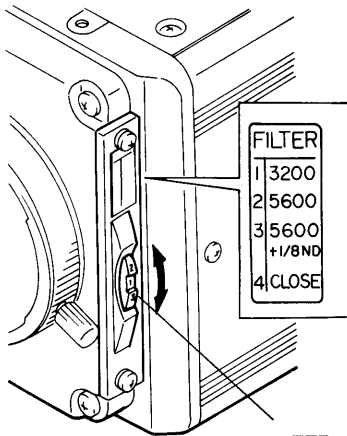


When black balance is not adjusted because black balance is out of the adjustment range

Adjustment of white balance

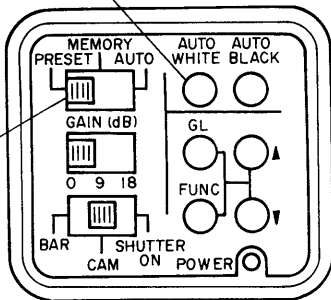
White balance adjustment is to adjust the camera to produce white correctly and a picture with natural shades under the lighting conditions at a shooting place.

Once this state is established, it is not necessary to adjust the camera often for white balance under similar lighting conditions with the same light source. When the major light source illuminating an object is changed, adjust white balance.



FILTER disk

AUTO WHITE button



White balance mode switch

Adjustment

- Set the white balance mode switch to MEMORY.
- Set the FILTER disk in accordance with the lighting condition. (Refer to the table below.)

Display of FILTER disk	Color temperature of light	Type of light source
1	3200K	Lighting by tungsten lamp and halogen lamp
2	5600K	For outdoor use except 3
3	5600K + 1/8ND	For outdoor use and also when ND filter is necessary (when too bright)
4	CLOSE	

- Place a white object (white paper, cloth, etc.) in the scene, and zoom in the object.
- Press the AUTO WHITE button, and the following are displayed, then white balance is adjusted.

Under adjustment

AUTO WHITE



Displayed for about one second


Adjustment completed

AUTO WHITE: OK
FILTER = 3200K


Displayed for about three seconds

When white balance cannot be adjusted automatically


The following is displayed on the screen for about six seconds.

AUTO WHITE : 
CHANGE TO CAM
TRY AGAIN


When the
BAR/CAM/SHU
TTER ON
switch is set to
BAR

AUTO WHITE: 
C.TEMP.HIGH
CHANGE FILTER
TRY AGAIN


When color
temperature is
too high to
adjust

AUTO WHITE: 
CHANGE TO MEMORY
TRY AGAIN

When the white
balance mode
switch to
PRESET or
AUTO

AUTO WHITE: 
C.TEMP.LOW
CHANGE FILTER
TRY AGAIN

When color
temperature is
too low to
adjust

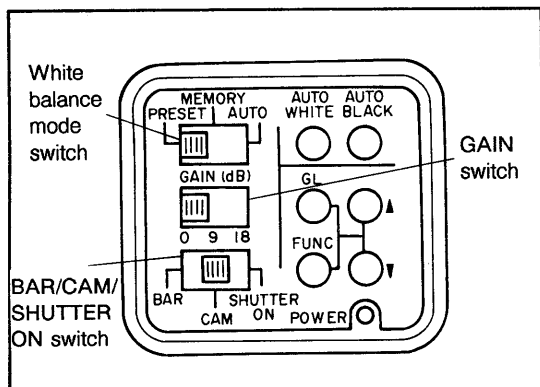
AUTO WHITE: 
LOW LIGHT
TRY AGAIN

When light is
too low to
adjust

OPERATION

Real-time auto white balance

This camera is provided with a newly developed real-time auto white function in addition to the conventional auto white function (three memories). This function detects the signal of a white portion in the scene shot by the camera and the built-in microprocessor corrects white balance continuously in real time. The function automatically corrects white balance when color temperature changes.



- (1) Set the BAR/CAM/SHUTTER ON switch to CAM.
- (2) Setting the auto white balance mode switch to AUTO establishes the real-time auto white balance mode. In the auto white balance mode, the auto gain function operates simultaneously.

AUTO GAIN

In the auto white balance mode, the auto gain function operates simultaneously as shown below.

- (a) When the GAIN switch is set to 0dB
Gain is fixed to 0dB.
- (b) When the GAIN switch is set to 9dB
Gain is automatically switched to 0dB or 9dB.
- (c) When the GAIN switch is set to 18dB
Gain is automatically switched to 0, 9 or 18dB.

Notes for operating real-time auto white balance function

- (1) When there are objects in the same scene which are illuminated by light sources of different color temperatures, white balance is set for an object whose luminance is higher than others.

(Example)

A room illuminated by lighting equipment and shone by the sunlight

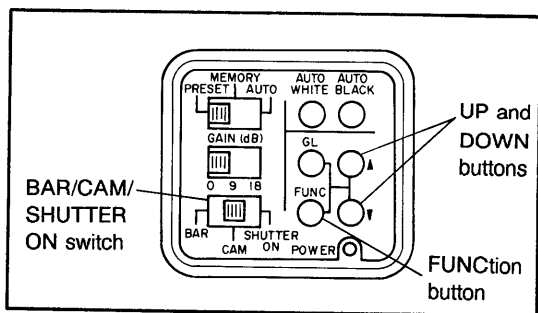
- (2) When there are no white objects in the scene, a bright portion is processed as white.

(Example)

When shooting a man's face in close-up, even subtle change of the flesh tone may cause a sense of incongruity because the flesh tone is a memory color.

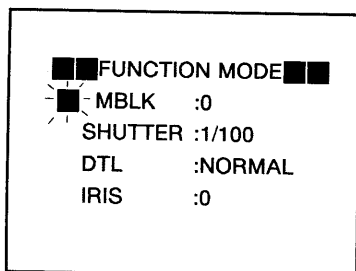
When shooting an object under a single lighting, it is recommended to use the camera in the MEMORY mode.

SHUTTER



Setting the BAR/CAM/SHUTTER ON switch to SHUTTER ON establishes the shutter mode. To select a shutter speed, perform the following steps.

- (1) Press the FUNC button, then the following screen is displayed.



- (2) Press the FUNC button again, then the cursor moves downward.
- (3) Set the cursor to SHUTTER.
- (4) Press the UP and DOWN buttons to select a shutter speed.

The shutter speed is changed in the following order.

→ 1/100 → 1/250 → 1/500 → 1/1000 → 1/2000

MASTER BLACK (M BLK)

- (1) Press the FUNC button, then set the cursor to M BLK.
- (2) Adjust the master black level with the UP and DOWN buttons.

DTL QUANTITY

- (1) Press the FUNC button, then set the cursor to DTL.
- (2) Press the UP and DOWN buttons, and the DTL quantity is changed in the following order.

→ OFF → LOW → NORMAL → HIGH

Fine adjustment of IRIS

Use this function when making fine adjustment of the iris value in the auto iris value.

- (1) Press the FUNC button, then set the cursor to IRIS.
- (2) Press the UP and DOWN buttons, and the iris is changed in the following order.

→ -1.0 → -0.5 → 0 → +0.5 → +1.0

Note 1 When no switch is operated in the function mode, the display will disappear in six seconds and the function mode will end.

Note 2 The functions (M BLK, SHUTTER, DTL, and IRIS) which can be selected with the FUNC button are unavailable when the SHUTTER ON switch is set to BAR.

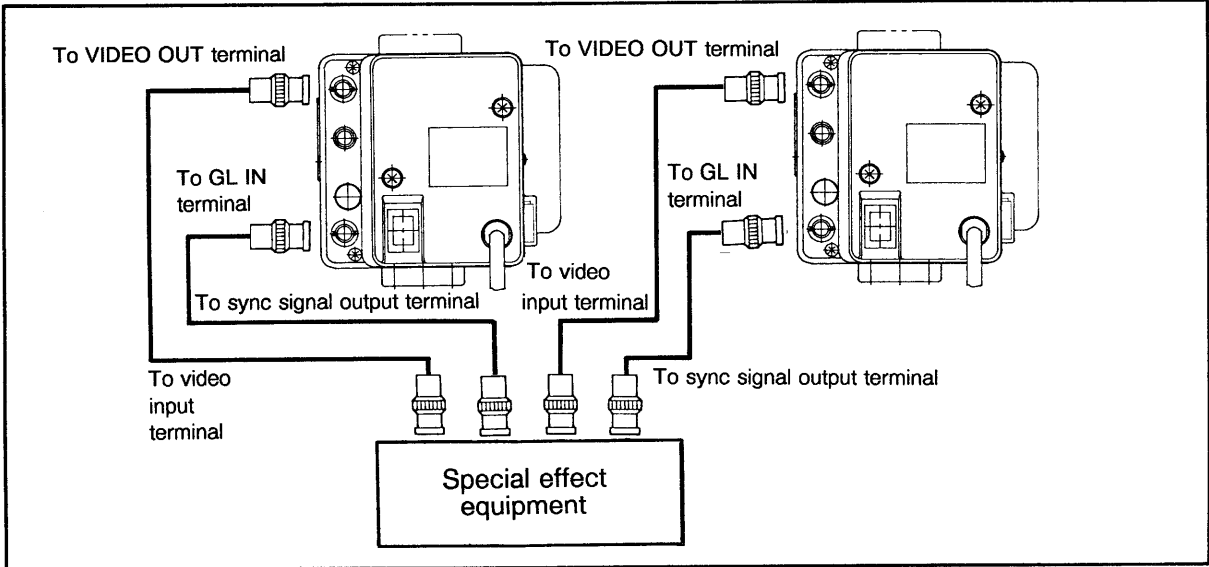
When pressing both the UP and DOWN switches simultaneously, the item shown by the cursor is initialized to display the table shown below.

MBLK	0
SHUTTER	1 / 100
DTL	NORMAL
IRIS	0

GENLOCK

- To perform genlock operation, supply an external sync signal (composite video signal or black burst signal) to the GL IN terminal.

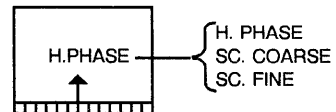
Connection



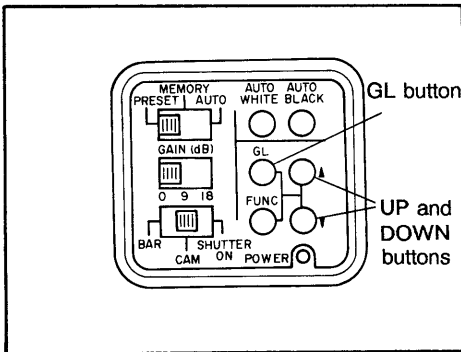
Phase adjustment - Adjustment of SC (subcarrier) phase and H (horizontal) phase

When operating plural cameras simultaneously by using special effect equipment, etc., adjust the SC phase and the H phase so that the picture tone is not changed by switching the cameras.

- When pressing the GL button, the following is displayed.



The display disappears in about six seconds.



●Adjustment

Select a desired item with the GL button, and adjust the phase with the UP/DOWN button.

●Adjustment of SC phase

Make coarse adjustment with the SC COARSE button (the phase is changed by 90° with the UP/DOWN button).

Make fine adjustment with the SC FINE button.

SELECTION OF FUNCTION BY INTERNAL SWITCHES

This switch is used for check and maintenance.
Set the switch to OFF for normal use.

SW271 TEST



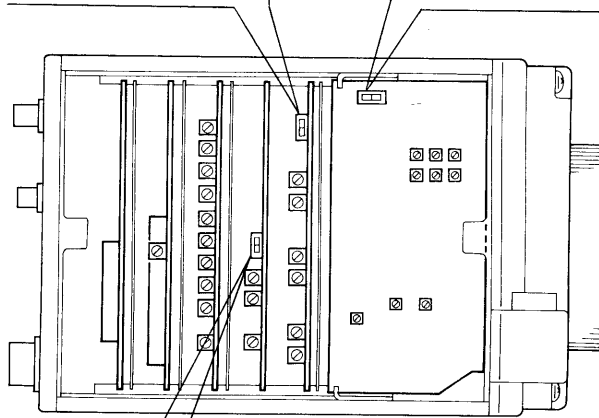
SW11



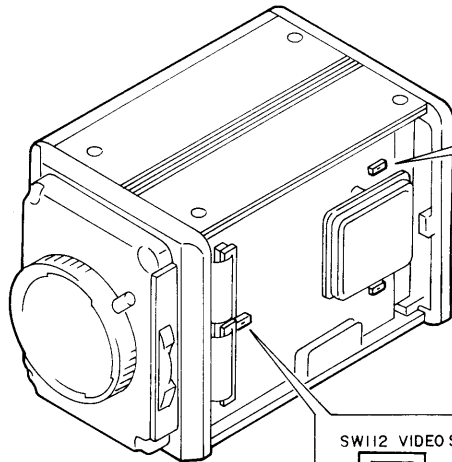
Use this switch to switch between the field storage mode (normal mode) and the frame storage mode (high resolution mode).

(Note)

In the frame storage mode vertical resolution increases, however, lag also increases. Use the camera in the frame storage mode when shooting a still object.



SW401 MASKING



SW104 ADJUST



This switch is used for check and maintenance.
Set the switch to OFF for normal use.

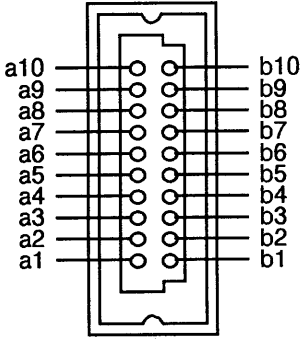
SW112 VIDEO SELECT



Select the type of the output signal supplied to the video output connector with this switch. For the types of the output signals, refer to SPECIFICATIONS (page 26).

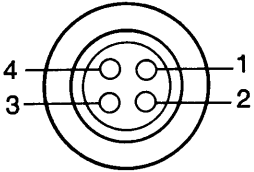
CONNECTORS

MULTI terminal (PCN-10, 20-pin, male)



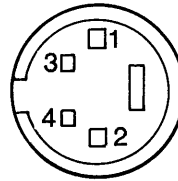
Pin No.	Signal	
	Column a	Column b
10	HD output	+5V output
9	VD output	SYNC output
8	SD GND	SD input
7	GL GND	CHR output
6	-5V output	GL input
5	VBS GND	VBS output
4	RGB GND	R output
3	G output	B output
2	GND	ROU CHECK
1	GND	+12V input

REMOTE terminal (4-pin, female)



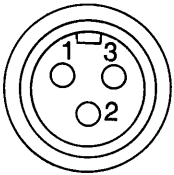
Pin No.	Signal
1	+12V output
2	SD input
3	SENS input
4	SD GND

Y/C OUT terminal (5-pin, female)



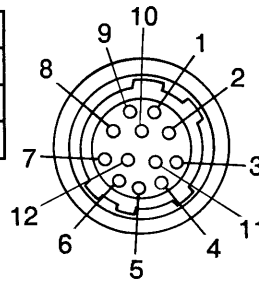
Pin No.	Signal
1	Y GND
2	C GND
3	Y output
4	C output

DC-IN terminal (3-pin, male)



Pin No.	Signal
1	+12V input
2	GND
3	NC

Lens connector (12-pin, female)



Pin No.	Signal
1	NC
2	NC
3	GND
4	ENF AUTO output
5	IRIS CONTROL output
6	+12V input
7	IRIS POSITION input
8	NC
9	SD output
10	NC
11	NC
12	AF VIDEO output

OPTIONAL ACCESSORIES

The following optional accessories are available. For details, contact the shop where you purchased the camera or your nearest Hitachi Denshi sales office.

12X zoom lens (ENG type)	S12X7.5BRM-27 (Fujinon)
12X zoom lens (ENG type)	PH12X7.5BKRSX12 (Canon)
12X zoom lens (remote-control type)	S12X7.5BMD-D24 (Fujinon)
Lens remote-control unit (for S12X7.5BMD-D24)	RMD10
	RMD20
	RMD III
Lens remote-control cable (for S12X7.5BMD-D24)	ECM-005M (5m)
	ECM-010M (10m)
	ECM-020M (20m)
	ECM-050M (50m)
	ECM-100M (100m)
AC adaptor (type directly mountable on the rear)	AP-C10
AC adaptor (cable connection type)	AP-60A
Remote operation unit (simplified type)	RU-C10 *See note.
Remote control box	RC-C10
ROU adaptor	RA-C10
RGB adaptor	VA-C10
RS-232-C level convertor	JU-C10
Camera cable (for RU-C10, 50m)	C-502KR
Camera cable (for RU-C10, 100m)	C-103KR

* Note: The RU-C10 does not include the RC-C10 which is used for remote-controlling the camera. Use the RU-C10 in conjunction with the RC-C10 as necessary (the RC-C10 can be incorporated into the RU-C10).

SPECIFICATIONS

Camera head (HV-C10)

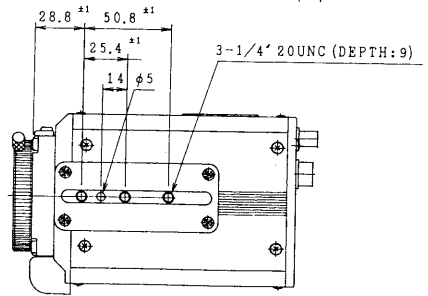
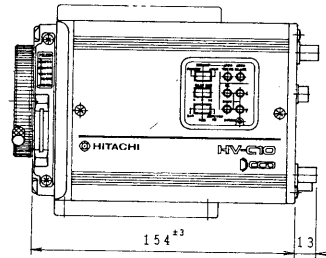
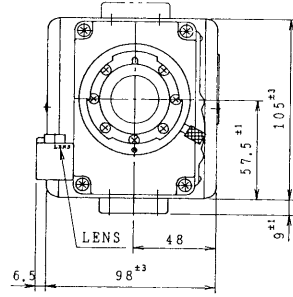
■ Color system	NTSC, PAL	■ Electronic shutter	1/100, 1/250, 1/500, 1/1000, 1/2000 sec.
■ Optical system	1/2 inch, f1.4 prism	NTSC	
■ Pickup system	RGB 3-chip system	PAL	1/60, 1/250, 1/500, 1/1000, 1/2000 sec.
■ Imaging device	1/2-inch interline CCD	■ Color bars	NTSC: SMPTE PAL: EBU
■ Sync system	Internal or genlock (automatic switching)		
■ External sync input	Composite video signal: VBS 1.0Vp-p/75 ohms (or black burst signal), BNC	■ Output signals	
		Video output	VBS 1.0Vp-p/75 ohms, BNC
■ Horizontal resolution	680 TV lines at center (luminance signal) 510 TV lines (each output of RGB)	●Y/C output*	S terminal or VA-C10 (option) BNC (unusable at the same time) Y: 1.0Vp-p/75 ohms C: 0.286Vp-p (burst level)/75 ohms
■ Vertical resolution	350 TV lines (Field storage mode) 480 TV-lines (frame storage mode)	●RGB output*	VA-C10 (option) BNC R: 0.7Vp-p/75 ohms G: 0.7Vp-p/75 ohms B: 0.7Vp-p/75 ohms
■ S/N	NTSC 58dB typical PAL 56dB typical (gamma = 1, DTL OFF, sensitivity 0dB, Y OUT)	●Component output* (Y/R-Y/B-Y)	VA-C10 (option) BNC Y 1.0Vp-p/75 ohms R-Y: 0.7Vp-p/75 ohms B-Y: 0.7Vp-p/75 ohms
■ Sensitivity	2000 lux (f5.6, 3200K)	●Sync output	VA-C10 (option) BNC SYNC: 2Vp-p/75 ohms HD: 2Vp-p/75 ohms VD: 2Vp-p/75 ohms
■ Minimum illumination	15 lux (f1.4 at +18dB)		
■ Gamma correction	0.35 to 1.0		
■ Optical filter	3200K, 5600K, 5600K + 1/8ND, CLOSE		
■ Vertical contour correction	2H		
■ Lens mount	Bayonet mount		
■ Gain switching	0dB, +9dB, +18dB		

* (Note) One of these outputs selectable with the SELECT switch of SW112 VIDEO SELECT inside the camera

- Supply voltage 12V DC
(10.5 - 17V DC)
- Power consumption 7W
(camera head only)
- Operating temperature -10 to 45°C
(14 to 113°F)
- Storage temperature -20 to 60°C
(-4 to 140°F)
- Weight 1.4kg (3.1 lb)

■ Dimensions

Camera head Unit: mm



Dimensions: 98(W) × 105(H) × 154(D)mm
(3.9 × 4.1 × 6.1 in)

The specifications and the external view are subject to change without notice for improvement.



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