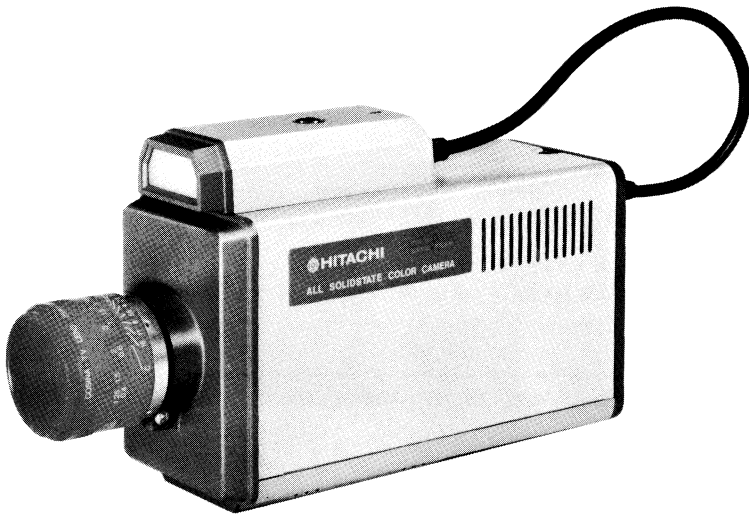


MODEL KP-C100A

**ALL SOLID-STATE COLOR CAMERA
OPERATION MANUAL**



MODEL KP-C100A

 **Hitachi Denshi, Ltd.**



CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER.
NO USER – SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Explanation of Graphical Symbols



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure; that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.


NOTE FOR USERS IN THE UNITED KINGDOM:

IMPORTANT:

The wires of the mains lead are coloured in accordance with the following code:

Green and Yellow: EARTH
Blue: NEUTRAL
Brown: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

- The wire which is coloured Green and Yellow must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol  or coloured green and yellow.
- The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured black.
- The wire which is coloured Brown must be connected to the terminal which is marked with the letter L or coloured red.

WARNING: This apparatus must be earthed.

**MODEL KP-C100A
ALL SOLID-STATE COLOR CAMERA
OPERATION MANUAL**

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Note: The model and serial numbers of your COLOR CAMERA are important for you to keep for your convenience and protection. These numbers appear on the name-plate 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.** _____

1. GENERAL

Hitachi KP-C100A all solid-state color camera employs high resolution imaging device of 510 (horizontal) x 492* (vertical) picture elements, and reproduces sharp and clear picture of least false signal. *: 500 (H) x 582 (V) for PAL system.

White balance is performed automatically. Manual white balance, however, can be selected by switching when desired.

Output for automatic iris control lens and automatic sensitivity control realizes wide CCTV system applications.

Before operating the camera, please read carefully through this manual.

2. FEATURES

● Wide ranging applications

The KP-C100A can be operated by supply of AC power source; no additional units like power adaptor or camera control unit are required.

Metal camera case prevents interference noise.

White balance can be controlled automatically or manually.

Automatic iris control connector is provided for use of automatic iris control lens.

● Real-time automatic white balance

Real-time and full automatic white balance operation by Hitachi Denshi's originally developed Full Automatic White Balance Unit ensures optimum picture even outdoor where light conditions vary frequently.

● Superb color reproduction

Superb color reproduction is continued by even under low light condition.

● 2H vertical contour corrector

Built-in 2H contour corrector assures a clear-cut picture.

● No geometric distortion

The KP-C100A is ideal for measuring and image processing systems.

● Long life and high reliability

Every circuitry including imaging device is solid-state to ensure long service life and maintenance free.

● Genlock operation

Multiple cameras with genlock units (options) can be operated looping each other by external sync.

- **Excellent color separation**

Color separation filter brings excellent color reproduction.

- **Reduced lag, blooming and no sticking.**

- **Excellent immunity to vibration and shock.**

3. COMPOSITIONS

(1) Camera KP-C100A, with auto white balance unit	1
(2) EE/ES lens plug, DIN-6P (TCP1265-01-5101)	1
(3) Fuse 125V/0.5A (Part No. EFG0660)	1
(4) Operating manual	1

OPTIONAL ACCESSORIES

- (1) Remote control plug, DIN-8P (TCP1285-01-5101)
- (2) External sync unit, GL-KP-C100N for NTSC
GL-KP-C100P for PAL

(This provides external sync under the genlock system.)

NOTE:

A lens is not supplied with this camera as a standard accessory.

Consult with your Hitachi Denshi dealer or service center in order to ascertain which lens is best suited to the conditions under which you intend to use your camera.

4. OPERATING PRECAUTIONS

The KP-C100A color camera employs a solid-state imaging device to convert the optical images passing through the lens into electrical signals, and these signals are sent to a VTR or TV monitor. Care should be taken in the handling of the camera in order to protect the delicate pickup section.

4.1 For protecting the camera

- Avoid using or storing the camera in locations which are exposed directly to sunlight, rain or snow, or to combustible gases and to corrosive gases.
- Although this unit is designed to operate across a temperature range from -10 to +50°C, its service life will be reduced when it is used or left for long periods of time at high temperatures (40°C or above). If you intend to use the unit continuously, avoid locations with high temperatures. Also avoid locations

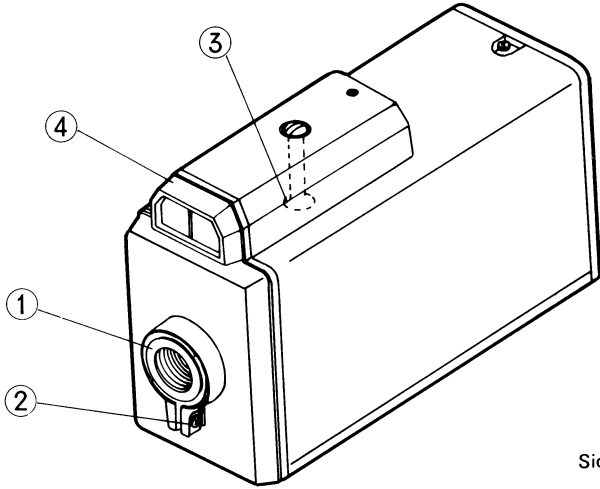
exposed to high levels of moisture or humidity since this may make the camera susceptible to breakdowns or failures.

- Do not drop the camera or subject it to violent shocks or vibrations.

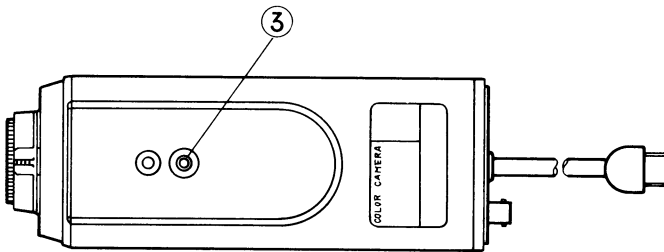
4.2 Connection and others

- Make sure that the power switch is set to the "off" position before proceeding to connect or disconnect any of the connectors.
- The imaging device is the heart of the camera and so when, for instance, the lens has been removed, under no circumstances should the front glass of the device be touched.
- If dust or dirt has accumulated on the front glass of the imaging device or lens, disconnect the power cord from the wall outlet and clean with a puff or lens brush.
- Vertical white stripes will appear when shooting light which is bright in places (lamps, fluorescent lights, the sun, bright reflected light). This, too, does not mean that something is wrong with the camera. Where possible, proceed with the shooting at an angle where this kind of light will not enter the scene.
- When a multiple number of cameras have been positioned in proximity to one another, there may be some interference between them and noise may also be generated. In cases like this, either distance the cameras as far away as possible or use the optional External Sync Unit and operate the cameras in the external sync mode.

5. NAME OF PARTS, AND THEIR FUNCTIONS



Side view



Bottom view

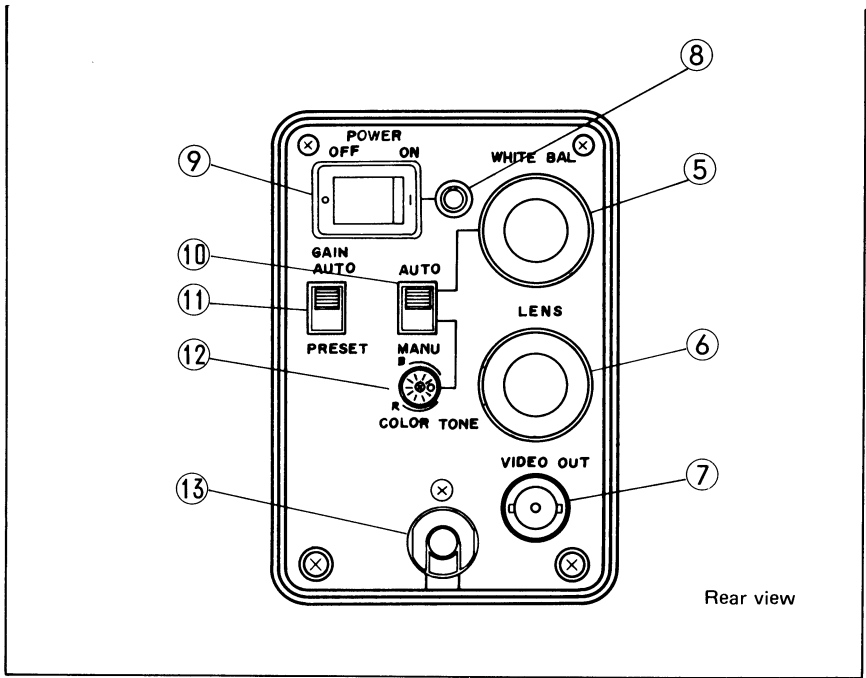


Fig. 1

① **Lens mount ring:**

Screw the lens into this mount ring. A C-mount type of lens may be mounted.

② **Lens mount screw:**

This screw serves to secure the lens mount ring. It is loosened when adjusting the flange-focal distance. When loosened, the lens mount ring rotates and the flange-focal distance can be changed.

③ **Camera mounting screw hole (1/4-20 UNC):**

This is used when securing the camera using the tripod screw. The screw holes are located both on the top and bottom of the camera. Attach the white balance control unit to the screw hole which is not being used for the camera mounting. The screw hole has a depth of 7 mm.

④ **White balance control unit:**

This unit senses the color temperature of the object and adjusts the white balance automatically. It may be mounted on the top or bottom of the camera.

5 WHITE BAL connector for white balance control unit:

This is for connecting the cable of the white balance control unit. When the white balance is attained by remote control, the circuit on Page 17 is connected using the optional remote control plug.

6 LENS connector:

When the EE/ES lens is used, the lens cable is connected here, as described on Page 10.

7 VIDEO OUT BNC connector:

The composite video signal (VBS) is fed out here. The connector itself is connected to a video monitor or other unit using a coaxial cable with a characteristic impedance of 75 ohms.

8 Power indicator:

This lights when the POWER ON/OFF switch is set to ON.

9 POWER ON/OFF switch:

10 AUTO/MANU white balance selector switch:

This selector switch is for adjusting the white balance.

When set to the AUTO position, the color temperature of the object is sensed by the white balance control unit and the balance is automatically adjusted. When set to the MANU position, the color balance can be adjusted manually by rotating the COLOR TONE control **12**.

11 GAIN AUTO/PRESET switch:

This switches between AGC and normal gain control. If the object is poorly illuminated, the sensitivity will be increased automatically once the illumination falls below 250 lux (with f1.4) when the switch is set to the AUTO position. Picture with minimal noise will be obtained at normal gain when the switch is set to the PRESET position. The maximum gain for this camera's AGC operation is approximately 12 dB.

12 COLOR TONE white balance control:

This is used when adjusting the white balance manually. When the AUTO/MANU white balance selector switch **10** is set to the MANU position and when this control is rotated counterclockwise to the B position, a bluish picture is produced; conversely, when the control is rotated clockwise to the R position, a reddish picture is produced. For details, refer to Page 14.

13 Power cord:

This is connected to the mains supply wall outlet.

6. CONNECTIONS

6.1 Connection with color video monitor

When there is only one color video monitor, connect the camera's VIDEO OUT connector and the monitor's VIDEO IN connector with the coaxial cable. Set the 75-ohm ON/OFF switch on the monitor to the ON position.

Connect the power cords of both the camera and monitor to the main supply outlets.

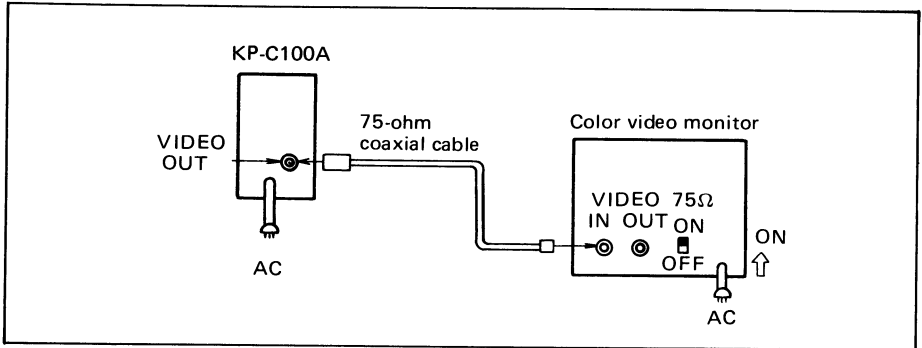


Fig. 2 Camera and monitor (single unit) connections

When there are two or more color video monitors, the camera's VIDEO OUT connector is connected to the VIDEO IN connector on the first monitor using a coaxial cable, and the VIDEO OUT connector on the first monitor is connected to the VIDEO IN connector on the second monitor, and so on. In this case, the 75-ohm ON/OFF switches on all the monitors except the last one are set to the OFF position and the same switch on the last monitor only is set to the ON position. Coaxial cables are used for all the connections.

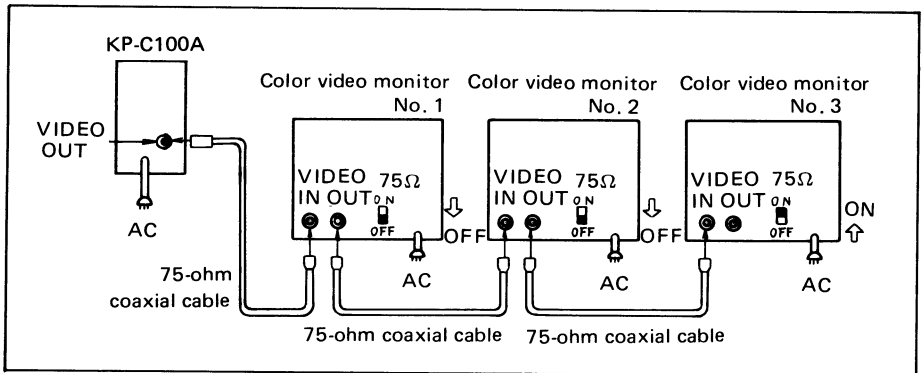


Fig. 3 Camera and monitor (2 or more) feed-through connections

6.2 Connection with VTR

Use a coaxial cable to connect the camera's VIDEO OUT connector to the VTR's VIDEO IN connector.

The camera's internal sync signal is 2:1 interlaced and so high-quality slow-motion pictures and still pictures are produced with VTR playback.

Refer also to the Operating Instructions of the VTR when connecting the camera to the VTR.

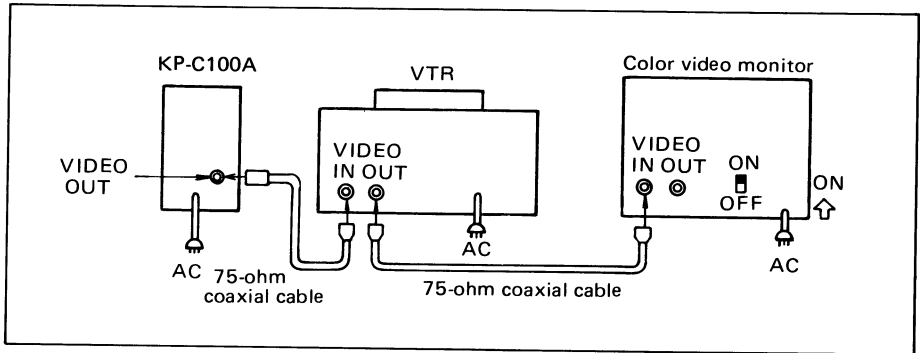


Fig. 4 Camera and VTR connection

USABLE COAXIAL CABLE LENGTH

75-ohm coaxial cable between camera and a color video monitor can be extended up to length below. (Attenuation: -3 dB at subcarrier)

RG-59 B/U	Up to 660 ft (200 m)
RG-11 U	Up to 1,000 ft (300 m)
RG-34 B/U	Up to 1,600 ft (500 m)

When extending a cable more than above length or connecting with contacts (between camera in an elevator and outside monitor), consult your local Hitachi Denshi sales office.

7. CONNECTION OF EE/ES LENS

When the camera shoots an object with slight illumination change, troubles may not be caused, with the lens iris fixed.

However, when the illumination changes, the lens iris is required to be adjusted against the illumination.

To automatically adjust the lens iris, the EE or ES lens can be used.

Attach the cable connector of the EE/ES lens to LENS connector on the rear side of the camera.

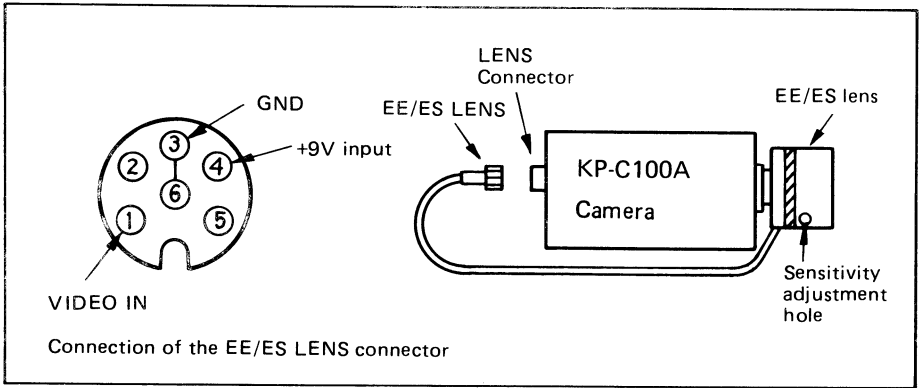


Fig. 5

Notes:

- (1) The required power supply for the EE/ES lens is 9V and 40 mA max. Use the applicable EE/ES lens.
EE/ES lens of voltage other than 9V can be used only by supplying the required power from an external power supply unit.
- (2) Since most ES lenses have a sensitivity adjustment hole, adjust the control at the hole to optimum position by a screw-driver.
- (3) Refer also to the operating instructions for the lens when connecting the EE/ES lens.

8. ILLUMINANCE OF OBJECT AND LENS

(1) About 2000 lux is necessary in the case of the lens stop of f4. Refer to Table 1, which shows the relation between the illuminance of object and the lens stop. If the illuminance is poor than table 1, set the GAIN AUTO/PRESET switch to AUTO, and sensitivity will increase. For instance the AGC circuit built in the camera responses up to 62 lux at f1.4 iris.

(2) If there is a strong reflection light on the object causing halation or extremely strong reflectance light causing blooming (white vertical stripe noise), adjust the illuminating conditions (position, angle, etc.) because the relation in Table 1 may not be applicable. If the reflection is not extinguished by no means, set the lens stop corresponding to the purpose of shooting and the brightness of the reflected light and the object illuminance.

(3) When shooting the object which emits intense light such as sparks and arcs, the screen looks white due to the video signal saturation because the iris of ordinary lenses (f1.4 to f22) cannot control such excessive light. In cases like this, a lens with a high f-number is recommended.

(Reference) Cosmimar C1616AES, 16 mm
f1.6 to 360 or equivalent.

Table 1
Standard relation of
illuminance of object
and lens stop

Illuminance of object (lux)	Lens stop
32,000	f 16
16,000	f 11
8,000	f 8
4,000	f5.6
2,000	f 4
1,000	f2.8
500	f2.0
250	f1.4

Note:

Illuminance of object produces output signal of 100% white level when the GAIN AUTO/PRESET switch is set to PRESET and the gray-scale chart of 90% white reflectance is shot.

ILLUMINANCE APPROXIMATIONS

The object illuminance must be appropriate for eye-pleasing color pictures. The table 2 gives the approximate illuminance values. Refer to it when ensuring that the object is bright enough.

When the illuminance is less than 500 lux, additional illumination is recommended.

Table 2**Unit: lux**

10	<ul style="list-style-type: none"> ○ Candle at 20 cm (10-15 lux) ○ Cigarette lighter at 30 cm (15 lux) ○ During intermission at movie theater (15-35 lux)
100	<ul style="list-style-type: none"> ○ Workshop in machinery factory (150-200 lux) ○ Arcade at night (150-200 lux) ○ Flashlight at 1 meter (250 lux) ○ Study desk with fluorescent lighting (400 lux) ○ Office with fluorescent lighting (400-500 lux) ○ Library reading room (400-500 lux) ○ Bowling alley (500 lux) ○ Sales floor of department store (500-700 lux)
1,000	<ul style="list-style-type: none"> ○ Clear day one hour before sunset (1,000 lux) ○ Cloudy day one hour after sunrise (2,000 lux)
10,000	<ul style="list-style-type: none"> ○ Cloudy day at 10 AM (25,000 lux) ○ Cloudy day at noon (32,000 lux) ○ Clear day at 3 PM (35,000 lux) ○ Clear day at 10 AM (65,000 lux)
100,000	<ul style="list-style-type: none"> ○ Clear day at noon (100,000 lux)

* The above table gives approximations only, Use the figures as a guideline.

Recommended lenses

C-mount lens of 2/3 inch and 1-inch may be used on this camera. However, some lenses of them can not be mounted, or can not reproduce the optimum pictures. So the following lenses are recommended.

Table 3 Recommended Lenses

Category	Type No.	Focal length (mm)	Zoom ratio	F-number	Minimum object distance (m)	Weight (g)
Fixed	C814	8	—	1:1.4	0.2	150
	C815-3	8.5	—	1:1.5	0.2	110
	C1614	16	—	1:1.4	0.5	90
Manual zoom	C6Z1218	12.5 to 75	6	1:1.8	1.0	320

When using the other lenses, it must conform to the following conditions. For further details, consult your local Hitachi Denshi sales office.

- (1) The length "A" between lens flange surface to the end of the projecting part should be less than 6.6 mm.

Bear in mind that, depending on the lens in question, the distance from the flange surface to the screw end may differ when the lens zoom or focus is operated.

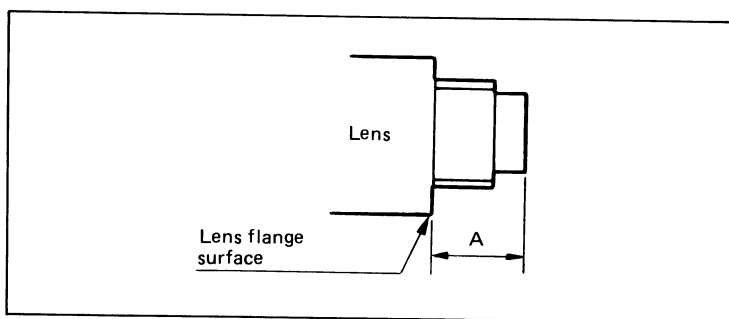


Fig. 6

- (2) Select a lens which is lighter than the camera itself.

Using a heavier lens will upset the balance and may result in a breakdown or damage. If it is absolutely necessary to use a lens weighing more than 1.5 kg, secure even the lens to a tripod.

- (3) When using a large lens which hides the light sensor of the white balance control unit, place the unit at a distance from the camera itself and mount it at a position where the light from the object will not be blocked.

9. ADJUSTMENT OF THE FLANGE BACK (at replacing lens)=====

Depending on the lens used, optimum focusing may not be obtained even if the lens focus itself has been adjusted. In cases like this, perform the flange back adjustment.

- (1) Loosen the screw (2) at the top of the lens mount ring (1) (See the aforesaid NAME OF PARTS, AND THEIR FUNCTIONS), and then rotate the lens mount ring (1).
- (2) Set the focal length scale of the lens to infinity and then rotate the lens and lens mount ring together so that the object at least 20 meters (66 feet) away (far away as possible) is brought into focus.
- (3) Stop rotating when the optimum focus is obtained, tighten up the screw at the top of the lens mount fixing screw (2), to secure the lens mount ring (1).

10. ADJUSTING THE WHITE BALANCE=====

The eye has the ability to adapt or adjust itself to light, and a white object will appear white when seen under indoor lighting or when seen outdoors. In contrast, the camera does not have this ability and so, depending on the color temperature of the light source, objects may appear at times reddish or bluish. The KP-C100A comes with a fully automatic white balance function: the white balance is automatically attained and proper pictures are produced simply by setting its AUTO/MANU white balance selector switch to the AUTO position.

Nevertheless, proper pictures will not be obtained under the conditions described below:

- When the color temperatures of the object's light source and of the incident light of the white balance control unit differ.
- When the object is illuminated by a multiple number of different light sources.
- When sodium lamps, mercury lamps or special effect lamps are being used.
- When the background is red or blue.

In cases like this, set the white balance selector switch to the MANU position. Then, observe the pictures on a properly adjusted color video monitor and, at the same time, adjust as described below to produce the most suitable colors.

Adjustment procedure

- Set the AUTO/MANU white balance selector switch to MANU.
- Shoot a white object and bring it into focus.
- Adjust the COLOR TONE white balance control so that the picture on the monitor becomes white.

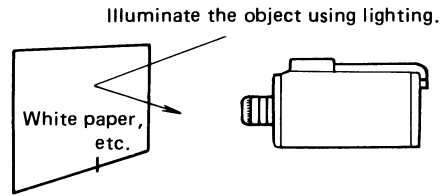


Fig. 7

11. EXTERNAL SYNC (OPTIONAL GENLOCK UNIT)

When using two or more cameras in combination with a video switcher or video special effects amplifier, etc., operation must be conducted in the genlock mode. Genlock* operation can be performed by mounting the optional external sync unit to the camera.

(*: Genlock is a system under which the black burst or composite video signal is added.)

CONTROLS AND CONNECTORS

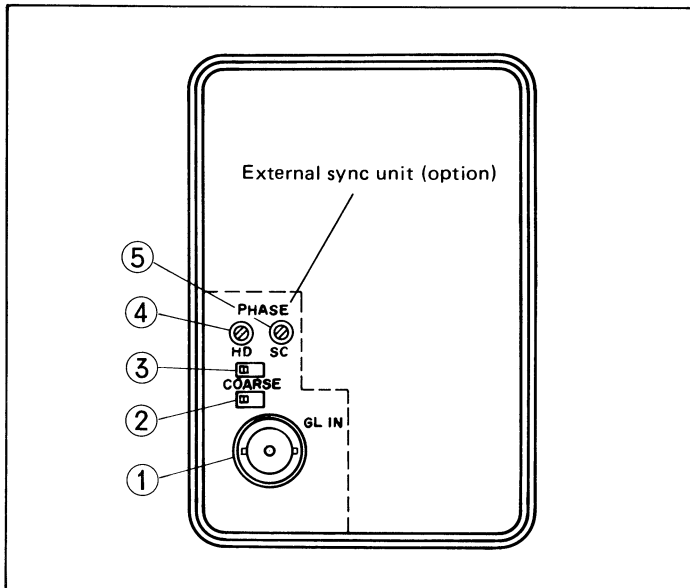


Fig.8 Rear view

① **GL IN external sync signal input BNC connector:**

The black burst signal (BBS) or composite video signal (VBS) is connected here.

② ③ **COARSE subcarrier phase selector switches:**

The coarse adjustment of the subcarrier phase in steps of approximately 90 degrees is conducted by using these two switches in combination.

④ **HD horizontal sync phase control:**

This is used to adjust the timing of the horizontal sync signal.

⑤ **SC subcarrier phase control:**

The subcarrier phase, which is coarsely adjusted using switches ② and ③, is further finely adjusted using this control.

Note:

The frequency of the subcarrier of the signal supplied from the external source is 3.579545 MHz +/- 100 Hz. (4.433618 MHz ± 80 Hz for PAL)

The external sync unit is available from Hitachi Denshi sales offices and dealers..

12. REMOTE CONTROL

When the optional remote control plug, DIN-8P (TCP1285-01-5101), is used and the circuit in Fig. 10 is connected to the WHITE BAL connector, the gain selection and white balance adjustments can be performed at a distance from the camera. Set the camera's AUTO/MANU white balance selector switch to AUTO and the GAIN AUTO/PRESET switch to AUTO. Connect the circuit in the figure below to the remote control plug.

Remote control cable can be extend up to 100 m.

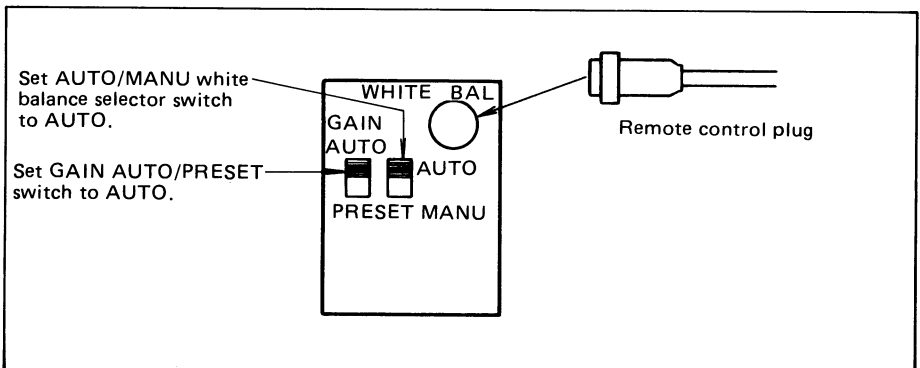


Fig. 9 Connection with camera

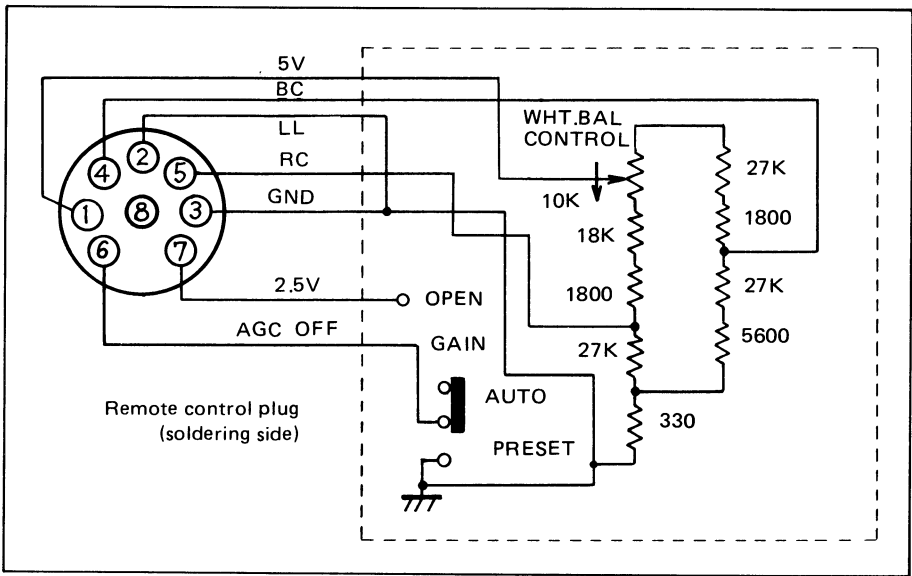


Fig. 10 Remote control circuit

13. SPECIFICATIONS

Color standard:	Conforms to NTSC or PAL standard
Imaging device:	Solid state
Picture elements:	510 (H) x 492 (V) for NTSC 500 (H) x 582 (V) for PAL
Image size:	8.8 (H) x 6.6 (V) square mm (equivalent to 2/3-inch vidicon tube)
Scanning system:	2:1 interlace
Scanning frequency	
Horizontal:	15.734 kHz for NTSC 15.625 kHz for PAL
Vertical:	59.94 Hz for NTSC 50 Hz for PAL
Clock:	9.54 MHz for NTSC 9.46 MHz for PAL
Color subcarrier:	3.579545 MHz for NTSC 4.433618 MHz for PAL

Sync system:	Internal or External by Genlock unit (option)
Video output:	1.0 Vp-p color composite signal
Video:	0.7 Vp-p positive
Sync:	0.3 Vp-p negative
Burst:	0.3 Vp-p 8 cycles or more
Impedance:	75-ohm unbalanced
Connector:	BNC
External sync input from an optional unit:	Black burst or composite color signal
Sync:	0.3 Vp-p
Burst:	0.3 Vp-p
Impedance:	75-ohm unbalanced
Connector:	BNC
Signal-to-noise ratio:	45 dB at luminance channel without AGC, contour correction, and gamma correction 40 dB at luminance channel (GAIN: PRESET)
Resolution:	
Horizontal:	330 TV lines (NTSC), 320 TV lines (PAL)
Vertical:	350 TV lines
Object illumination:	14 to 100,000 lux (when using automatic iris control lens.)
Minimum illumination:	14 lux (f1.4, 3,200 K)
Recommended object illumination:	500 lux or more
Standard object illumination:	2,000 lux (f4, 3,200 K)
White balance:	Automatic / Manual selectable
Color temp. range:	Tungsten lamp to cloudy day (2,800 K to 8,000 K approx.)
Outputs for lens:	
Luminance signal:	0.7 Vp-p / High impedance
Power supply:	+9V VDC, 40 mA max.
Connector:	DIN 6-pin
Sensitivity setting:	AGC on/off selectable
Mounts:	
Lens:	C-Mount

Camera:	1/4-inch 20 UNC One each on the top and the bottom
Ambient conditions:	
Operation:	-10 to 50°C (14 to 122°F), 95% RH
Power requirements:	U, C - types: 117V AC±10%, 60 Hz E-type: 220V AC±10%, 50 Hz K-type: 240V AC±10%, 50 Hz
Power consumption:	7.9 W Approx.
Dimensions:	70 (W) x 105 (H) x 180 (D) mm (2.8 x 4.1 x 7.1 inch)
Weight:	1.7 kg (3.7 lb) approx. (excluding lens and power cord)

***Specifications are subject to change without notice.**



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