COLOUR VIDEO CAMERA

VK-C220E

HITACHI

FEATURES

This surveillance video camera uses a 1/3-inch CCD image sensor and a digital signal processor (DSP) circuit.

- **High sensitivity**
  A on-chip micro-lens realizes high sensitivity with a minimum required subject illumination of 3 lux (F1.3).

- **High resolution**
  A CCD with approx. 440,000 (752 horizontal x 582 vertical) effective pixels realizes a horizontal resolution of 460 lines.

- **High picture quality**
  A digital signal processor performs digital edge enhancement and provides high picture quality.

- **Digital zoom function**
  This built-in feature zooms up on a subject for a magnification of up to 2 times.

- **Electronic shutter**
  Allows the shutter speed to be switched in seven steps from 1/50 to 1/10,000 seconds.

- **CCD iris**
  The CCD electronic shutter adjusts the amount of light automatically.

- **Auto-iris lens terminal**
  You can use an auto-iris lens (without an amplifier only) that adjusts the iris automatically according to the brightness of the place where recording is to be done.

- **External sync**
  Sync connection is possible by inputting a composite sync signal, composite video signal or black burst signal.

CONTENTS

CAUTIONS WHEN HANDLING THE CAMERA

Take great care when handling the camera to protect the image sensor which is easily damaged.

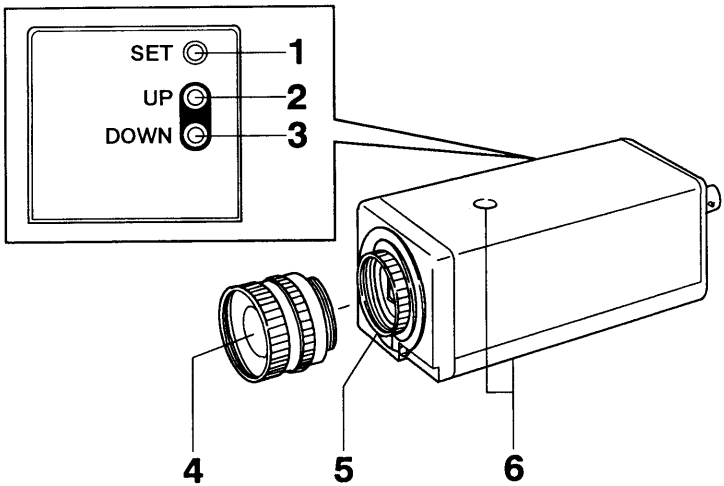
Cautions when installing

- **Avoid places where there is danger of a fire or sparks.**
  Be sure not to use the camera in a place filled with gas or in a place where there is a danger of fire or sparks.
  This could result in a malfunction or accident.
- **Be careful of temperatures and humidity**
  Do not use the camera in hot or cold places where the temperature is over 50℃ or under - 10℃ or in a place where the humidity is too high. It could result in degradation of picture quality, a malfunction or accident.
- **Avoid water and dust**
  If water or dust enters the camera, it could cause a malfunction or accident. Avoid installing the camera where it could be exposed to rain or snow.
  * When using the camera in a place where there is a high level of dust, you need a suitable camera case. Consult the dealer from whom you purchased the camera.

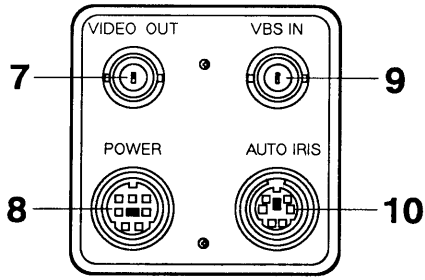
Cautions on use

- **Do not touch the front glass of the image sensor.**
  The image sensor is the heart of the camera. Be sure not to touch the front glass of the image sensor.
- **Do not insert an inflammable or metal object into the camera.**
  This could result in a malfunction or accident.
- **Attach the lens securely.**
  When replacing the lens, tighten the new lens securely. Insufficient tightening could cause the lens to drop off.
- **Do not point the camera at the sun or a bright light.**
  The image sensor could be burned which could make recording impossible.
- **Handle the camera with care.**
  Do not drop the camera or apply any impact or vibrations to it.
- **When dust adheres to the lens or front glass of the image sensor, turn the power off and use an air brush to lightly wipe it off.**

CONTROLS AND FUNCTIONS



1. **SET button**
2. **UP button**
3. **DOWN button**
4. **Lens (optional)**
   Use a C or CS mount lens.
   (See pages 10 - 13)
5. **Conversion ring**
   Change the direction of this ring to match the type of the lens to be used.
   (See pages 10 and 11)
6. **Screw holes for fixing brackets**
   Use two holes at the top and bottom to fix the camera to a camera fixing bracket (optional).



7. VIDEO OUT jack

A composite video signal (VBS) is output from this jack.
(See pages 16 , 17)

8. POWER input connector

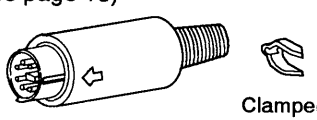
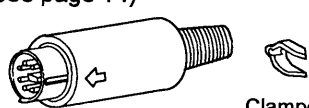
Use the provided 7-pin plug (for power supply) to supply 12V DC to the camera. (See page 14)

9. External sync input jack (VBS IN)

Accepts a composite sync signal (C.SYNC), composite video signal (VBS) or black burst signal (BBS). (See page 17)

10. AUTO IRIS lens output jack

Use this when attaching an optional auto-iris lens without an amplifier. (See page 12)

Provided accessories (Check the accessories)	
One 6-pin plug (for auto-iris) (Hosiden Corp. TCP8060-21-530) (See page 13)  Clamper	One 7-pin plug (for power supply) (Hosiden Corp. TCP8070-21-530) (See page 14)  Clamper

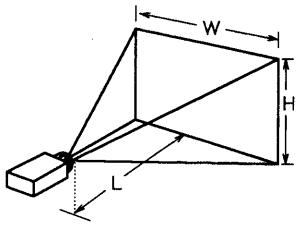
PROCEDURE FROM CONNECTION TO ADJUSTMENT

Perform the following procedure to attach a lens, connect the camera and adjust.

LENS FOCAL LENGTH AND RANGE OF VIEW

Different lenses should be used depending on various conditions such as the size of the subject and the distance between the subject and camera. Select the optimum lens.

- The lens range of view is obtained from the graphs shown on the next page or the following formula.



[Formula]

$$W = \frac{4.8}{f} \times L$$

$$H = \frac{3.6}{f} \times L$$

W : Width of subject (m)	f : Lens focal length (mm)
H : Height of subject (m)	4.8 and 3.6 : Horizontal and vertical lengths of image sensor (mm)
L : Distance to subject (m)	

[Example 1] To calculate the focal length

What lens focal length is necessary when a subject approx. 15m wide is shot at a distance of 25 m?

$$W = \frac{4.8}{f} \times L$$

$$f = \frac{4.8}{W} \times L$$

$$= \frac{4.8}{15} \times 25$$

$$= \frac{120}{15}$$

$$= 8.0(\text{mm})$$

The focal length is 8mm

◎ In only a few cases will the value obtained by the calculation match the focal length of the lens that is actually used. Select a lens with the focal length that is nearest to the calculated value.

[Example 2] To calculate the range of view

How high an object can be shot 20 m away using a f = 4.0mm lens?

$$H = \frac{3.6}{f} \times L$$

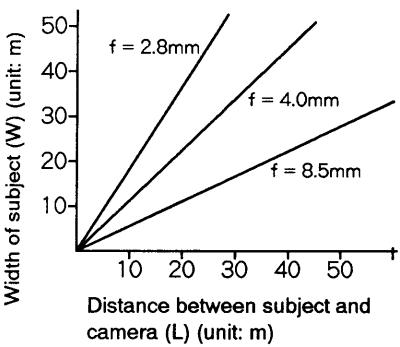
$$= \frac{72}{4.0}$$

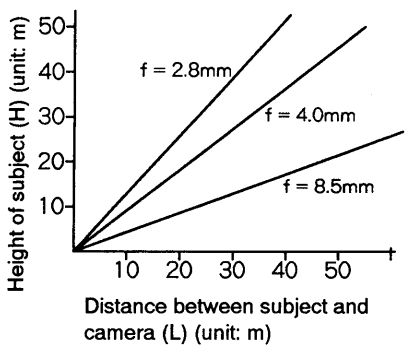
$$= 18.0(m)$$

18m high

◎ The height of a subject to be shot can be calculated when the lens focal length and the distance to the subject are known. Therefore, if two items of the subject height (or width), distance to the subject and lens focal length are known, the remaining one can be calculated easily.

Relationship between lens focal length and subject





LENS USED

This camera can use both the C and CS mount lenses. The lens is optional.

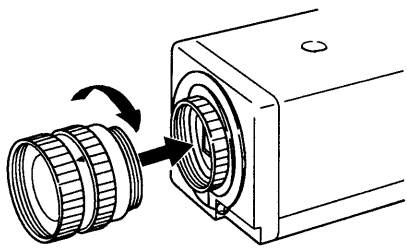
How to attach a C/CS lens

A C mount lens can be attached to the conversion ring as it is shipped from the factory. Check the mount type of the lens to be used carefully.

When using a C mount lens

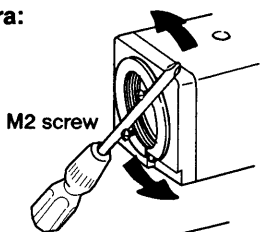
1. Turn the lens in the direction of the arrow to attach it to the camera.

- Adjust the focus after attaching the lens.



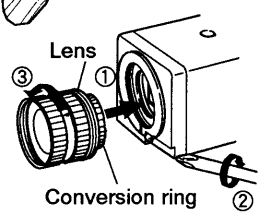
If this happens when replacing the lens

If the conversion ring is left on the camera:
Insert two M2 screws into the holes in the conversion ring and use a screwdriver, etc. to turn the ring as shown in the figure.



If the conversion ring cannot be removed from the lens:

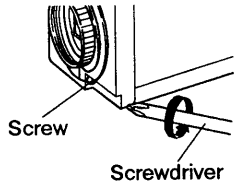
① Attach the lens to the camera again.
② Tighten the screw so the ring is fixed to the camera.
③ Remove only the lens.



When using a CS mount lens

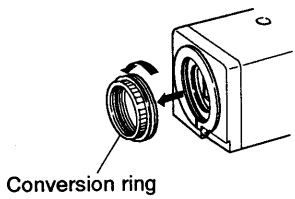
1. Loosen the screw.

- Use a Philips screwdriver.

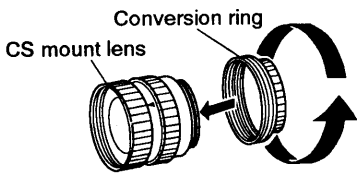


2. Remove the conversion ring.

- Turn the ring in the direction of the arrow to remove it.

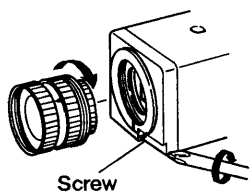


3. Reverse the direction of the conversion ring and attach it to the CS mount lens.



4. Attach the lens to the camera and tighten the screw.

- Adjust the focus after attaching the lens.



LENS USED (in case of an auto-iris lens)

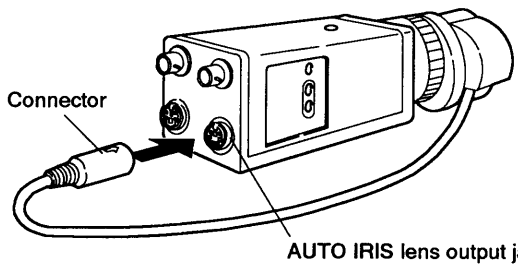
When using an auto-iris lens

This camera can use an auto-iris lens that does not incorporate an amplifier.

- It is recommended to use an auto-iris lens in a place where the brightness of the subject varies.
- It is recommended to use an ordinary C or CS mount manual lens in a place where the brightness does not change.

Connecting to the camera

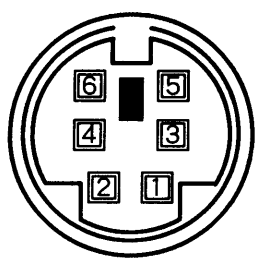
- Attach the lens and connect the connector to the AUTO IRIS lens output jack.
- Also read the instruction manual of the lens to be used.



Pin allocations of AUTO IRIS lens output jack

* The shape and pin names of the AUTO IRIS lens output jack of this camera are as follows. Replace the plug of your auto-iris lens cable with the 6-pin plug provided. Dismantle, connect and reassemble the 6-pin plug by the following procedure.

AUTO IRIS



(Camera Side)

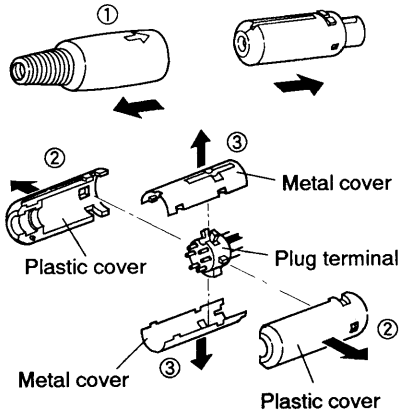
Pin No.	Description
①	DAMP ⊖
②	VIDEO
③	DRIVE ⊖
④	DAMP ⊕
⑤	DC 9V OUT (DRIVE ⊕)
⑥	GND

Disassembling the 6-pin plug

Dismantle the 6-pin plug by the following procedure to remove the plug terminal.

① Remove the plug cover.

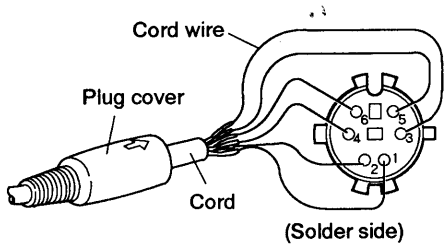
② Remove the plastic covers of the plug in the directions of the arrows.
③ Remove the metal covers of the plug in the directions of the arrows.



Connecting the 6-pin plug

Connect the plug to the plug terminal by the following procedure.

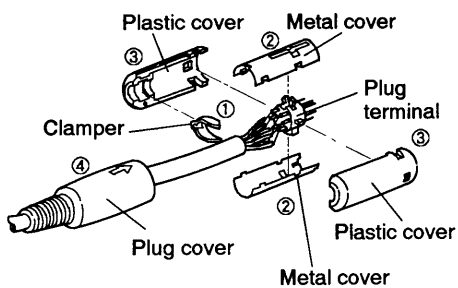
① Put the plug cover over the cord.
② Solder the cord wires to the plug terminal as shown in the figure on the right.



Reassembling the 6-pin plug

Reassemble the 6-pin plug by the following procedure.

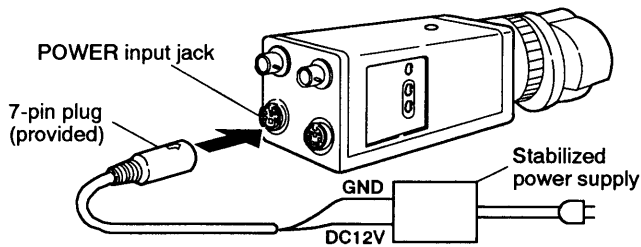
① Attach the clamper to the cord and crimp it.
② Attach the metal covers over the plug terminal.
③ Attach the plastic covers over the metal covers.
④ Cover with the plug cover.



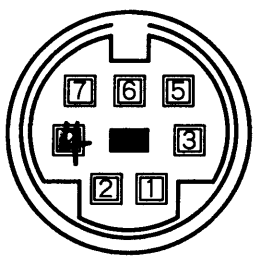
CONNECTION

1. Power Input

- Use the 7-pin plug (for power supply) provided to connect the power supply to the POWER input jack as shown in the figure below.



Pin allocations of POWER input jack



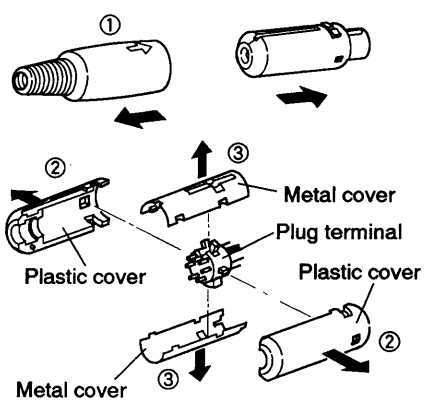
(Camera Side)

Pin No.	Description
①	Not connected
②	CTL
③	Not connected
④	DC12V IN
⑤	GND
⑥	GND
⑦	Not connected

Disassembling the 7-pin plug

Dismantle the 7-pin plug by the following procedure.

① Remove the plug cover.
② Remove the plastic covers of the plug in the directions of the arrows.
③ Remove the metal covers of the plug in the directions of the arrows.

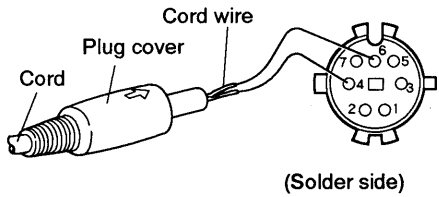


Connecting the 7-pin plug

Connect the plug to the plug terminal by the following procedure.

① Put the plug cover over the cord.

② Solder the cord wires to the plug terminal as shown in the figure on the right.



(Solder side)

Reassembling the 7-pin plug

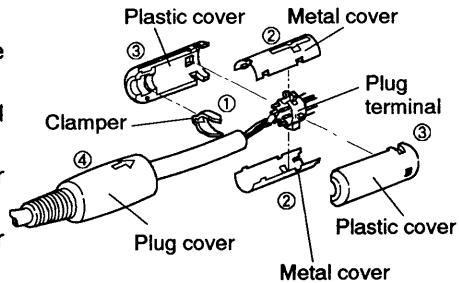
Reassemble the 7-pin plug by the following procedure.

① Attach the clamper to the cord and crimp it.

② Attach the metal covers over the plug terminal.

③ Attach the plastic covers over the metal covers.

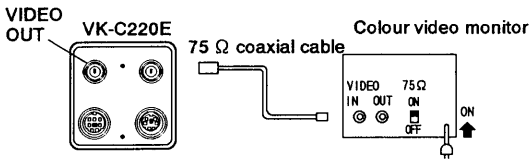
④ Cover with the plug cover.



Note : Also read page 47 when connecting an external switch to the camera.

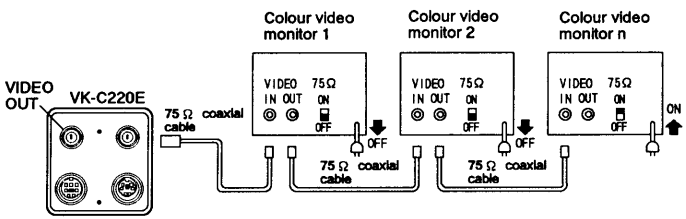
2. Connecting to Colour Video Monitor (s)

If you use one colour video monitor, connect the camera's VIDEO OUT jack to the monitor's VIDEO IN jack using a coaxial cable. Set the 75 Ω ON-OFF switch on the monitor to ON.



Connecting the camera to one monitor

If you use two or more colour video monitors, connect the camera's VIDEO OUT jack of the first monitor's VIDEO IN jack using a coaxial cable, connect the first monitor's VIDEO OUT jack to the 2nd monitor's VIDEO IN jack, then connect in this way to the last monitor. Set the 75 Ω ON-OFF switches on each monitor to OFF apart from the last monitor which must be set to ON. Use coaxial cables for all connections.



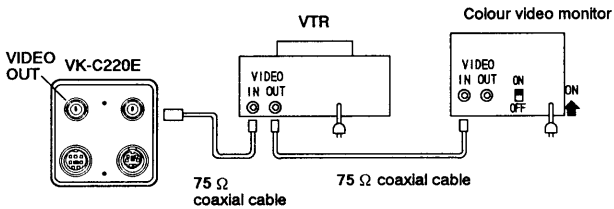
Connecting the camera to monitors (two or more)

3. Connecting to a VTR

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

Since the camera's internal sync signal is 2:1 interlaced, a good slow-motion picture or still picture can be played by the VTR.

Also read the VTR's instruction manual for connecting to a VTR.



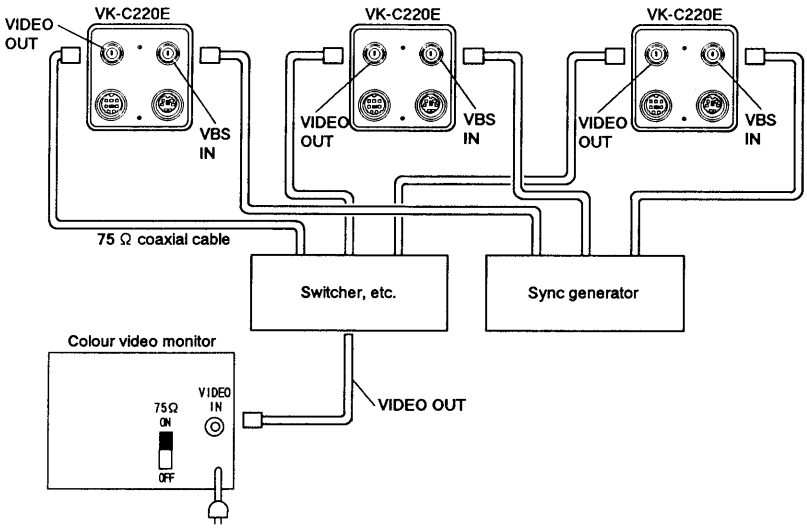
4. Sync Connection

When you use a switcher, etc. to switch between several cameras for monitoring, the cameras can use the same sync signal so the picture is not distorted when the camera is switched.

Sync signals that can be input

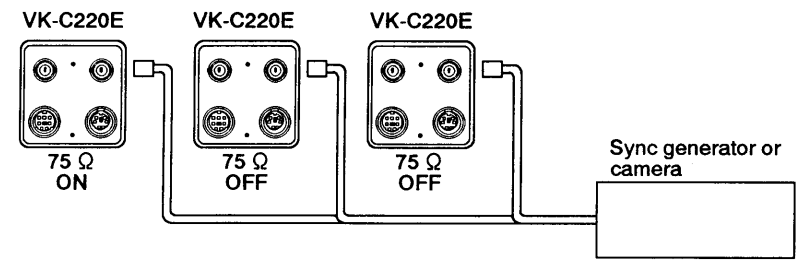
Type of sync signal	Level
Composite sync signal	0.3 - 1 Vp-p, 75 Ω
Composite video signal	1Vp-p, 75 Ω
Black burst signal	0.429Vp-p, 75 Ω

Sync connection 1



- Use 75 Ω coaxial cables to connect the sync signal outputs of the sync generator or switcher to the VBS IN jacks of each camera.
- Read the instruction manual of the switcher or sync generator to use it correctly.

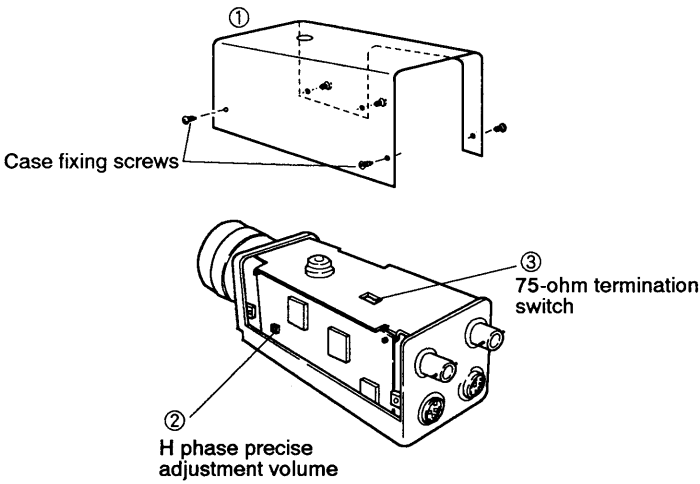
Sync connection 2



- When the sync signal is supplied externally and two or more cameras are to be connected, set the 75-ohm termination switches of all cameras except the last camera to "OFF" and set the 75-ohm termination switch of the last camera to "ON".

Adjustment during sync connection
Adjustment when Genlocked

When several cameras are switched for monitoring, perform the following procedure to adjust the tint and horizontal sync phase of the cameras.



① Remove the five screws holding the top case and lift up the top case.

- **H phase matching**

② Use the H phase matching control to adjust the H phase.

- **EXternal sync input 75-ohm termination switch**

③ This switch is set to "ON" when the camera is shipped from the factory.

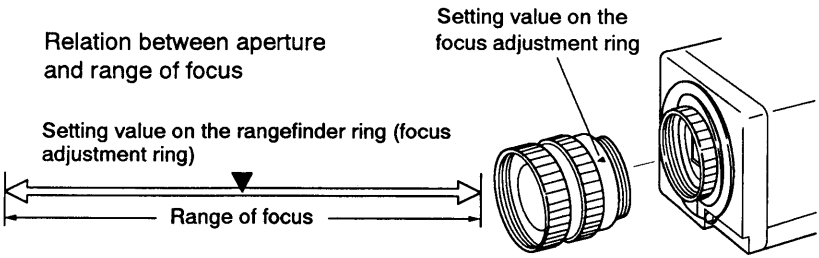
Note : If a composite sync signal is input, SC phase adjustment cannot be done.

ADJUSTING THE FOCUS

Adjust the focus while observing the monitor.
You can also use the values on the rangefinder ring (focus adjustment ring) indicating the distance to the subject to bring the subject into approximate focus.

- The lens has a characteristic (depth of field) with which the range of focus varies depending on the aperture (F value), focal length and distance to the subject. Use this depth of field for easier focusing.
- When the lens is stopped down in a bright place, a focused picture can be obtained even if the distance to the subject changes slightly.

Relation between aperture and range of focus



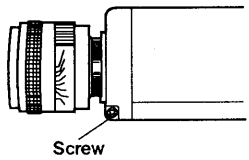
Lens focal length	Aperture	Range of focal distance (m) [▼: setting value on focus adjustment ring] 1 2 3 4 5 6 7 8 9 10
f=8.5mm	F1.5	
	F2.8	
f=12.5mm	F1.4	
	F2.8	
	F5.6	
f=25mm	F1.4	
	F2.8	
	F5.6	

BACKFOCUS ADJUSTMENT

Depending on the type of lens used, there may be cases in which the actual distance to the subject and the distance index of the lens do not match.
In this case, adjust the backfocus to bring the subject into focus.

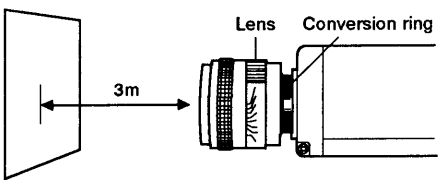
- Observe the monitor when adjusting the backfocus.

1. Loosen the screw.



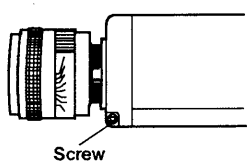
2. Adjust the backfocus.

① Set the lens aperture to minimum.
② Set the index of the lens focal length to 3 m.
③ Turn the lens and conversion ring at the same time to adjust the focus so a subject 3 m away is brought into focus.



3. Tighten the screw.

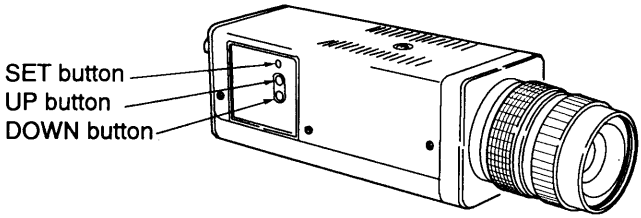
- Tighten the screw securely.



ADJUSTING THE DIGITAL ZOOM

The digital zooming magnification can be adjusted up to 2 times.

- The picture becomes coarse when the magnification is set to 2 times.
- The magnification is set to 1 at the factory.



1. Display the menu.

- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.

```
MENU
1. NEG/POS     :POS
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

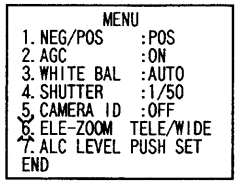
2. Select the ELE – ZOOM mode.

- Press the DOWN (or UP) button until number 6 flashes.

```
MENU
1. NEG/POS     :POS
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

3. Set to the magnification adjustment mode.

- Press the SET button once to switch the option from "PUSH SET" to "TELE/WIDE".

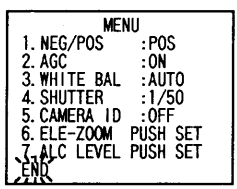


4. Specify the magnification.

- Press the UP or DOWN button to adjust the size of the subject (magnification).
- After adjusting the magnification, press the SET button once to switch the option from "TELE/WIDE" to "PUSH SET".

5. End the setting.

- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.

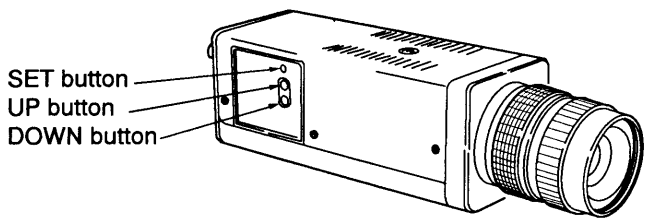


CONTROLLING THE SHUTTER SPEED

The shutter speed can be switched in seven steps.

- Observing the monitor screen, adjust the shutter speed referring to the table below.
- The shutter speed is set to 1/50 at the factory.

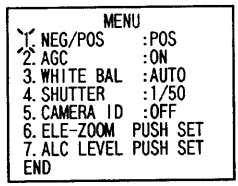
Shutter speed (s)	Suitable for shooting the following
1/50	When recording an object moving slowly. ↕
1/100	
1/250	
1/500	
1/1000	
1/2000	
1/10000	When recording an object moving rapidly
AE	When using the electronic shutter to adjust the amount of light automatically. (See page 33)



1. Display the menu.

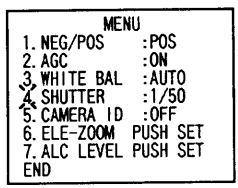
- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.



2. Select the SHUTTER mode.

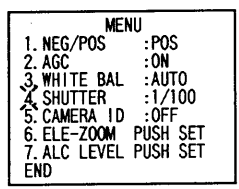
- Press the DOWN (or UP) button until number 4 flashes.



3. Specify the shutter speed.

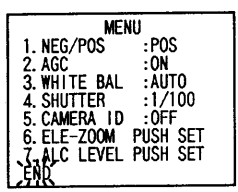
- Press the SET button to switch the shutter speed.
  The speed changes as follows each time the button is pressed.

1/50 → 1/100 → 1/250 → 1/500 → 1/1000 → 1/2000 → 1/10000 → AE → 1/50



4. End the setting.

- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.



CONTROLLING THE SHUTTER SPEED (Cont'd)

Shutter Speed

- If a rapidly moving object is recorded at a higher shutter speed, a little shaking is likely to occur in the picture played back by a time-lapse VTR in the still or slow play mode. The higher the shutter speed, the more light is necessary, so use the camera in as bright a place as possible at higher shutter speeds.
- If the shutter speed is increased with fluorescent lighting, etc., flickering becomes conspicuous. Also smear (a phenomenon with vertical lines above and below bright objects) are likely to be obvious.

Brightness of Subject and Lighting

The subject has to be properly lighted to obtain a good picture. The table below gives approximate brightness values. Refer to this table and use a light with sufficient brightness for the subject.

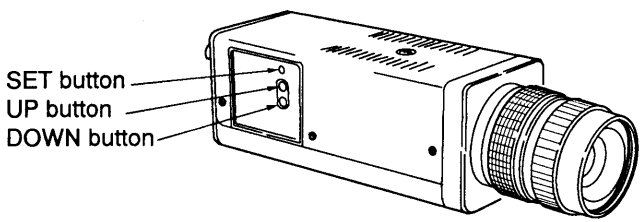
Lux		
10		• Brightness of candle (20 cm away) (10~15)
100	• Indoor driving range (200~300) • Room illuminated by 2 30W fluorescent lamps (300) • Study desk illuminated by fluorescent lamp (400) • Office illuminated by fluorescent lamps (400~500) • Bowling alley (500) • Department store (500~700)	• Direct light of flashlight (1m away) (250) • Subway platform (300) • Clothes shop (400~500) • Reading room of library (400~500) • Inside subway car (500) • Station (650)
1,000	• Outdoors 1 hour before sunset in fine weather (1,000) • Outdoors 1 hour after sunset in cloudy weather (2,000)	• Office near window with fluorescent lighting (1,000)
10,000	• Sunlight at 10 a.m. in cloudy weather (250×10^2) • Sunlight at noon in cloudy weather (320×10^2) • Sunlight at 3 p.m. in fine weather (350×10^2) • Sunlight at 10 a.m. in fine weather (650×10^2)	
100,000	• Sunlight at noon in fine weather ($1{,}000 \times 10^2$)	

ADJUSTING THE WHITE BALANCE

This camera is equipped with an auto white balance function that automatically adjusts the tone according to the colour temperature of the light source illuminating the subject. The auto white balance function may not function correctly in the following cases.

- If the subject is illuminated by several different light sources.
- If a sodium lamp, mercury vapour lamp or special-effects lamp is used.
- If the subject has a single colour (red, blue, etc.)

- In the above cases, point the camera at a white object in the actual lighting condition and adjust the white balance manually.



1. Display the menu.

- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.

```
MENU
1. NEG/POS      :POS
2. AGC          :ON
3. WHITE BAL    :AUTO
4. SHUTTER      :1/50
5. CAMERA ID    :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

ADJUSTING THE WHITE BALANCE(Cont'd)

2. Select the WHITE BAL mode.

- Press the DOWN (or UP) button until number 3 flashes.

```
MENU
1. NEG/POS     :POS
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM    PUSH SET
7. ALC LEVEL   PUSH SET
END
```

3. Specify the manual white balance mode.

- Press the SET button once to switch the option from "AUTO" to "MANU".
- If the SET button is pressed twice within one second when "AUTO" is displayed, the option is switched to "OUTDOOR".
  Note : "OUTDOOR" is used for auto white balance outdoors.
- When "OUTDOOR" is displayed, press the SET button once to switch to "MANU" or twice within one second to return to "AUTO".

```
MENU
1. NEG/POS     :POS
2. AGC         :ON
3. WHITE BAL   :MANU
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM    PUSH SET
7. ALC LEVEL   PUSH SET
END
```

4. Display the MANUAL WHITE BALANCE setting menu.

- Press the SET button twice within one second.
- Number 1 flashes.

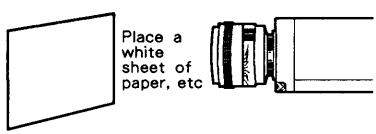
```
MANUAL WHITE BALANCE

1. R-GAIN      PUSH SET
2. G-GAIN      PUSH SET
3. B-GAIN      PUSH SET
4. SET         PUSH SET

RETURN
```

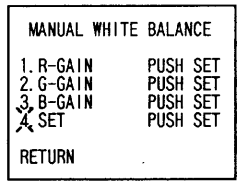
5. Point the camera at a white object and bring it into focus.

- Point at the subject to fill the TV screen.
- Use a light to illuminate the subject.



6. Select the SET mode.

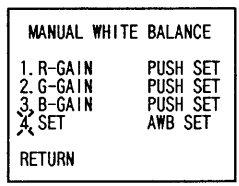
- Press the DOWN (or UP) button until number 4 flashes.



7. The white balance is optimized.

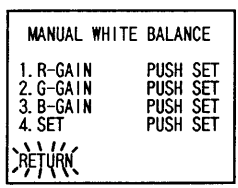
- Press the SET button once to switch the option from "PUSH SET" to "AWB SET". This adjusts the colour to a natural tone automatically.

* After adjustment is completed, the option switches from "AWB SET" to "PUSH SET" automatically.



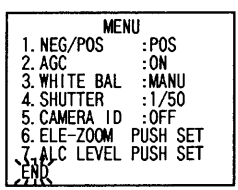
8. Return to the initial menu.

- Press the DOWN (or UP) button until RETURN flashes.
- Press the SET button once to restore the initial menu.



9. End the setting.

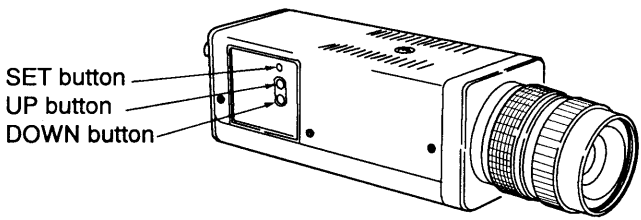
- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.



ADJUSTING THE TONE

The auto white balance function adjusts the tone automatically. You can also adjust the tone as required by displaying the MANUAL WHITE BALANCE menu.

- You can adjust the tones in the red (R), green (G) and blue (B) directions independently.
- Each tone is set to "AUTO" at the factory.
- It is recommended that you use the camera set to "AUTO".



1. Display the menu.

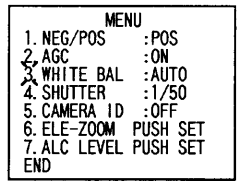
- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.

```
MENU
1. NEG/POS      :POS
2. AGC          :ON
3. WHITE BAL    :AUTO
4. SHUTTER      :1/50
5. CAMERA ID    :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

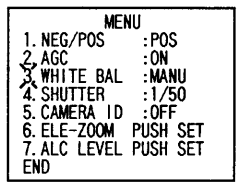
2. Select the WHITE BAL mode.

- Press the DOWN (or UP) button until number 3 flashes.



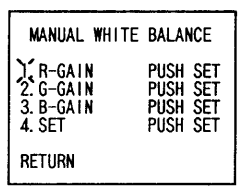
3. Specify the manual white balance mode.

- Press the SET button once to switch the option from "AUTO" to "MANU".



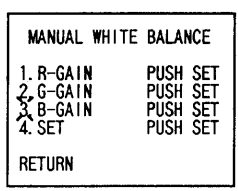
4. Display the MANUAL WHITE BALANCE setting menu.

- Press the SET button twice within one second.
- Number 1 flashes.

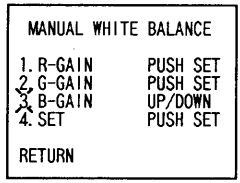


5. Specify the tone to be adjusted.

Example : To adjust 3. B – GAIN.
Press the DOWN (or UP) button until number 3 flashes.



6. Set to the required tone.



- Press the SET button once to switch the option from "PUSH SET" to "UP/DOWN".
- Press the UP and DOWN buttons to adjust the tone. (Refer to the table below.)
- After adjustment is complete, press the SET button once to switch the option from "UP/DOWN" to "PUSH SET".

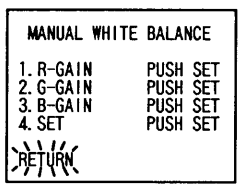
* To reset the adjusted tone, press the DOWN (or UP) button until number 4 flashes and then press the SET button once.

The tone changes as follows as the UP or DOWN button is pressed.

R/G/B mode	Press UP	Press DOWN
R-GAIN	Red is emphasized	Red is deemphasized
G-GAIN	Green is emphasized	Green is deemphasized
B-GAIN	Blue is emphasized	Blue is deemphasized

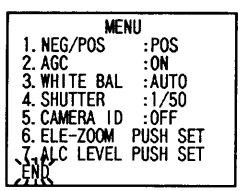
7. Return to the initial menu.

- Press the DOWN (or UP) button until RETURN flashes.
- Press the SET button once to restore the initial menu.



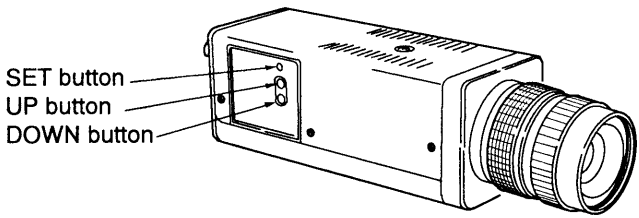
8. End the setting.

- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.



ADJUSTING THE AUTO LIGHT CONTROL (ALC) LEVEL

When an auto-iris lens is used (see page 12) or the shutter speed is set to "AE" (see page 24), you can change the brightness of the picture as required.



1. Display the menu.

- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.

```
MENU
1. NEG/POS      :POS
2. AGC          :ON
3. WHITE BAL    :AUTO
4. SHUTTER      :1/50
5. CAMERA ID    :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

2. Select the ALC LEVEL mode.

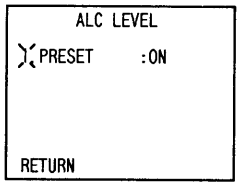
- Press the DOWN (or UP) button until number 7 flashes.

```
MENU
1. NEG/POS      :POS
2. AGC          :ON
3. WHITE BAL    :AUTO
4. SHUTTER      :1/50
5. CAMERA ID    :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

ADJUSTING THE AUTO LIGHT CONTROL (ALC) LEVEL (Cont'd)

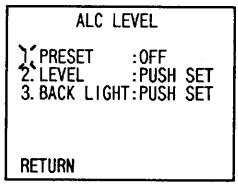
3. Display the ALC LEVEL setting menu.

- Press the SET button once.
- Number 1 flashes.



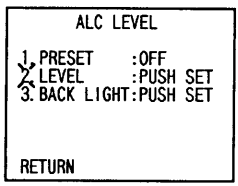
4. Specify the PRESET option to "OFF".

- Press the SET button once to switch the option from "ON" to "OFF".
- Pressing the SET button alternates between "ON" and "OFF".



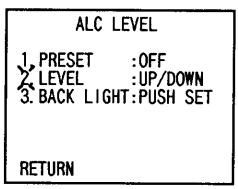
5. Select the LEVEL mode.

- Press the DOWN (or UP) button until number 2 flashes.



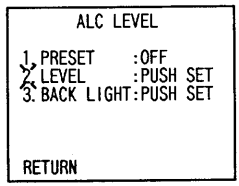
6. Set to the signal level setting mode.

- Press the SET button once to switch the option from "PUSH SET" to "UP/DOWN".
- You can set the signal level when an auto-iris lens is used (see page 12) or the shutter speed is set to "AE" (see page 24).



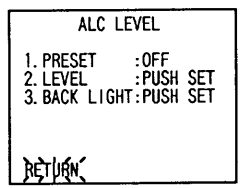
7. Adjust the signal level.

- Press the UP and DOWN buttons to adjust the level.
- After adjustment is completed, press the SET button once to switch the option from "UP/DOWN" to "PUSH SET".



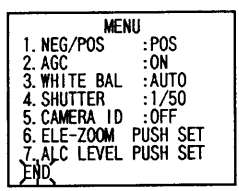
8. Return to the initial menu.

- Press the DOWN (or UP) button until RETURN flashes.
- Press the SET button once to restore the initial menu.



9. End the setting.

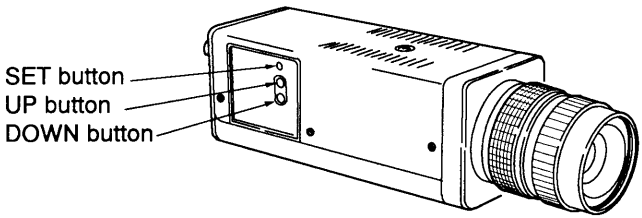
- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.



CORRECTING FOR BACKLIGHTING

If the subject is strongly illuminated from the back by a spot light, etc., you can correct the brightness (backlight correction) so the subject does not become dark.

- You can correct the brightness for backlighting in up to six areas.



1. Display the menu.

- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.

```
MENU
1. NEG/POS     :POS
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

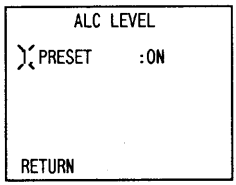
2. Select the ALC LEVEL mode.

- Press the DOWN (or UP) button until number 7 flashes.

```
MENU
1. NEG/POS     :POS
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

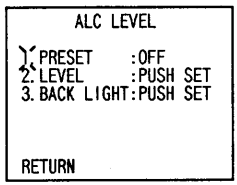
3. Display the ALC LEVEL setting menu.

- Press the SET button once.
- Number 1 flashes.



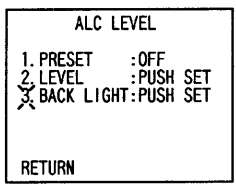
4. Specify the PRESET option to "OFF".

- Press the SET button once to switch the option from "ON" to "OFF".
- Pressing the SET button alternates between "ON" and "OFF".



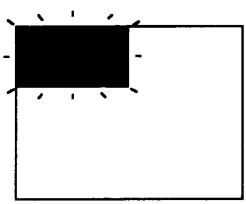
5. Select the BACK LIGHT mode.

- Press the DOWN (or UP) button until number 3 flashes.



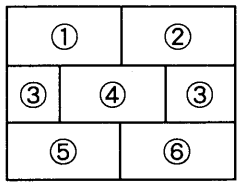
6. Display the backlight correction area setting screen

- Press the SET button once.
- The area at the top left of the screen flashes.



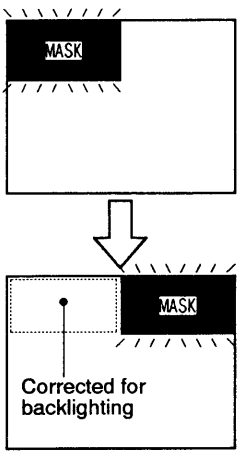
7. Select the areas to be corrected for backlighting and store them in memory.

- You can select up to six areas to be corrected for backlighting as shown on the right.
- Press the UP and DOWN buttons so the area to be selected flashes.
- Press the SET button to store the area in memory. When it is stored in memory, "MASK" appears.



Example : To store areas ① and ② in memory:

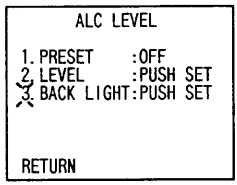
- Press the UP and DOWN buttons to make the area to be stored first flash.
- Press the SET button to cause the letters "MASK" to appear in that area.
- Perform the same procedure to cause the letters "MASK" to appear in the other area.
- To erase the area from memory, press the UP and DOWN buttons to cause the letters "MASK" in the area to go out and then press the SET button once.



Note : When the flashing area is moved, letters "MASK" will disappear, but the area will be corrected for backlighting.

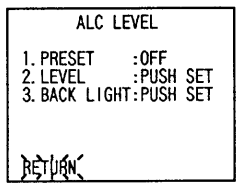
8. Return to the ALC LEVEL setting menu.

- Press the SET button twice within one second.



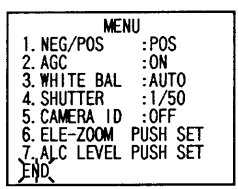
9. Return to the initial menu.

- Press the DOWN (or UP) button until RETURN flashes.
- Press the SET button once to restore the initial menu.



10. End the setting.

- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.



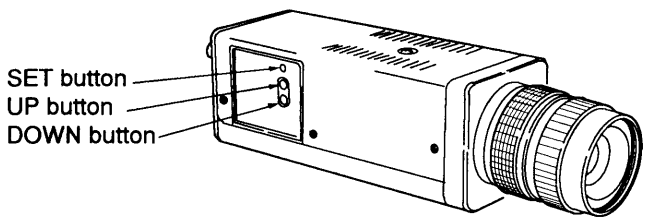
SUPPRESSING VARIATIONS IN CONTRAST (AGC)

AGC (automatic gain control) adjusts the camera's gain automatically according to the brightness of the subject to reduce variations in contrast.

- AGC is set to ON at the factory.
- Usually, AGC is set to ON.

How to use AGC:

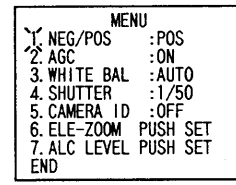
	ON	OFF
When the camera is used	Outdoors where the brightness varies	Indoors where the brightness is fixed
AGC	Reduces variations in contrast according to the brightness.	Does not operate and a fixed picture quality is obtained.



1. Display the menu.

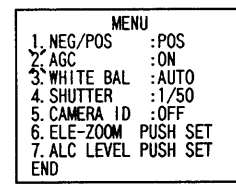
- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.



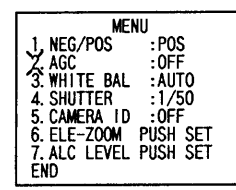
2. Select the AGC mode.

- Press the DOWN (or UP) button until number 2 flashes.



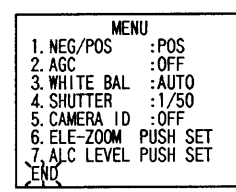
3. Set the AGC option to "OFF".

- Press the SET button once to switch the option from "ON" to "OFF".
- Pressing the SET button alternates between "ON" and "OFF".



4. End the setting.

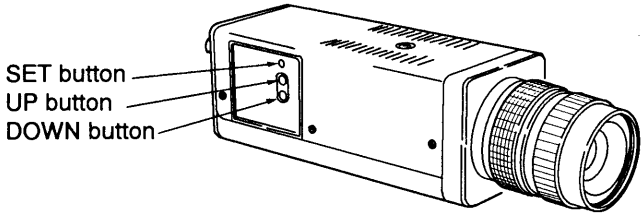
- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.



INVERTING THE VIDEO BETWEEN NEGATIVE AND POSITIVE

You can invert a picture from a negative film to record it as positive.

- The camera is set to "POS" at the factory.
- Switch to "NEG" to invert the picture.



1. Display the menu.

- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.

```
MENU
1. NEG/POS     :POS
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

2. Set the picture to the negative state.

- Press the SET button once to switch the option from "POS" to "NEG".
- Pressing the SET button alternates between "POS" and "NEG".

```
MENU
1. NEG/POS     :NEG
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

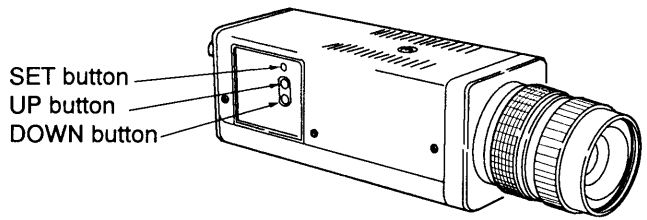
3. End the setting.

- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.

```
MENU
1. NEG/POS     :NEG
2. AGC         :ON
3. WHITE BAL   :AUTO
4. SHUTTER     :1/50
5. CAMERA ID   :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

ADDING A TITLE TO THE PICTURE

You can superimpose a title (up to eight characters) on a picture being recorded. For example, when several cameras are used, you can easily see which camera is recording by checking the title.



1. Display the menu.

- Press the SET button twice within one second.
- Number 1 flashes.

Note : Press the SET button twice quickly without an interval.

```
MENU
1. NEG/POS      :POS
2. AGC          :ON
3. WHITE BAL    :AUTO
4. SHUTTER      :1/50
5. CAMERA ID    :OFF
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

2. Select the CAMERA ID mode.

- Press the DOWN (or UP) button until number 5 flashes.
- Press the SET button once to switch the option from "OFF" to "ON".

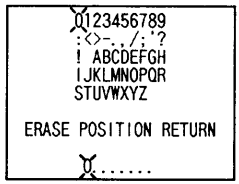
Note : "ON" displays the title and "OFF" erases it.

```
MENU
1. NEG/POS      :POS
2. AGC          :ON
3. WHITE BAL    :AUTO
4. SHUTTER      :1/50
5. CAMERA ID    :ON
6. ELE-ZOOM  PUSH SET
7. ALC LEVEL PUSH SET
END
```

ADDING A TITLE TO THE PICTURE (Cont'd)

3. Display the character setting screen.

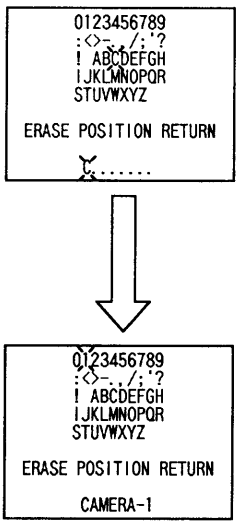
- Press the SET button twice within one second.
- Numeral "0" flashes. "0" also flashes in the location where a character is entered.



4. Input characters to be entered.

Example : To enter CAMERA-1:

- Press the UP (or DOWN) button until "C" flashes.
- Check that "C" also flashes in the location where the character is entered.
- Press the SET button once to enter "C".
- Press the DOWN button so "A" flashes.
- Press the SET button once to enter "A".
- Press the UP (or DOWN) and SET buttons alternately to enter the remaining characters.
- Up to eight characters can be entered.

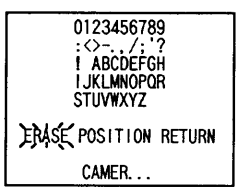


5. If you have entered incorrectly.

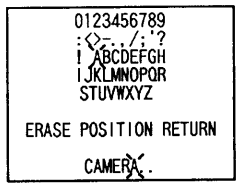
Example : If you have entered CAMERR-1:

- Press the DOWN (or UP) button until "ERASE" flashes.
- Press the SET button to erase the characters back to the incorrect position.

* The characters will be erased from the last character entered.

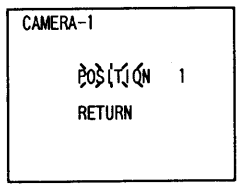


5. If you have entered incorrectly. (Cont'd)



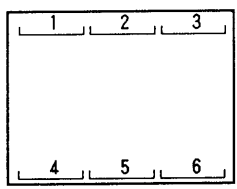
- Press the DOWN (or UP) button until "A" flashes.
- Press the SET button once to enter "A".
- Press the UP/DOWN and SET buttons to enter the remaining characters " – " and "1".

6. Display the title location setting screen.



- Press the DOWN (or UP) button until "POSITION" flashes.
- Press the SET button once to display the title location setting screen.
- The "POSITION 1" display appears.

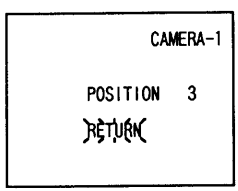
7. Determine the title location.



- There are six locations where the title can be entered as shown on the right.
- Each time the SET button is pressed, the "CAMERA-1" display position moves.

Example : To enter CAMERA-1 in POSITION 3:

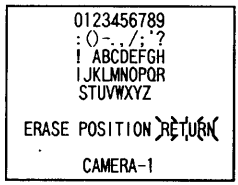
- Press the SET button to select "POSITION 3".
- Press the UP (or DOWN) button to cause "RETURN" to flash.
- Press the SET button once to display the character setting screen.



ADDING A TITLE TO THE PICTURE (Cont'd)

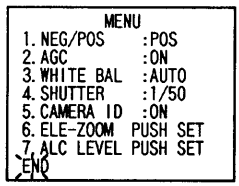
8. Return to the initial menu.

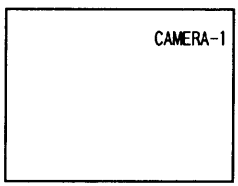
- Press the DOWN (or UP) button until RETURN flashes.
- Press the SET button once to restore the initial menu.



9. End the setting.

- Press the DOWN (or UP) button until END flashes.
- Press the SET button once so the menu disappears.

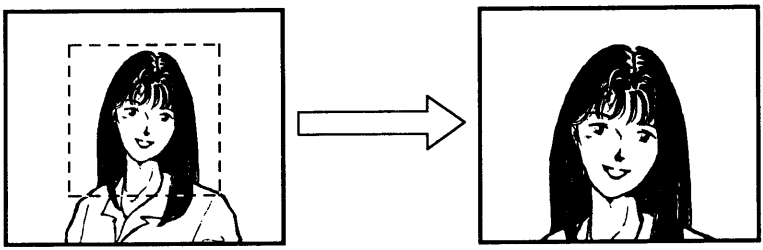




CONNECTING TO AN EXTERNAL SWITCH

If the POWER input jack is connected to an external switch, you can switch the magnification of the digital zoom between 1 and 2 times.

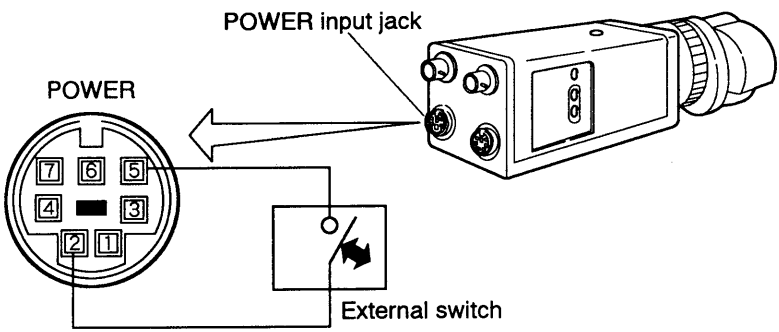
- For example, you can install a open/close switch to the door and record a visitor's face by enlarging it instantaneously.



How to wire :

Connect pins 2 and 5 of the POWER input jack to an external switch as shown in the figure.

- Opening pins 2 and 5 sets the magnification to 1.
- Shorting pins 2 and 5 set the magnification to 2 times.



SPECIFICATIONS

Signal	:	PAL standard 625 TV lines, 50 fields
Image sensor	:	1/3" CCD image sensor Number of effective pixels : 752(H) × 582(V)
Total number of pixels	:	795(H) × 596(V)
Effective imaging area	:	4.8 (H) × 3.6 (V)mm^2 (equivalent to a 1/3" picture tube)
Scanning system	:	2:1 interlaced
Scanning frequency	:	Horizontal : 15.625kHz Vertical : 50Hz
Sync format	:	Internal/external (auto switching)
External sync input	:	VBS signal (1Vp-p, 75 Ω) BS signal (0.429Vp-p, 75 Ω) C.SYNC (0.3Vp-p, 75 Ω) Connector : BNC type
Video signal output	:	VBS : 1.0Vp-p Video : approx. 0.7Vp-p positive Sync : approx. 0.3Vp-p negative Burst : approx. 0.3Vp-p 8 cycles or more Impedance : 75 Ω unbalanced Connector : BNC type
S/N ratio	:	50dB or more
Horizontal resolution	:	460 TV lines or more
Minimum required illumination	:	3 lux or less, F1.3
White balance adjustment	:	Automatic or manual (switchable) Adjustment range : 2,700~8,000K
Auto iris	:	Recommended impedance of lens without built-in amp Drive : 190 Ω ± 10% Damp : 1,150 Ω ± 10%
Lens mount	:	C/CS mount
Permissible operating temperature/humidity:		
		Range in which operation is possible: –10~+50℃ ,10~85%RH Range in which performance is assured: +5~30℃ , 45~75%RH
Power input	:	DC 12V (usable voltage range: 11~14V)
Power consumption	:	320mA
Dimensions	:	52(W) × 50(H) × 125(D)mm (excluding lens protrusions)
Weight	:	370g

* The specifications are subject to change for improvement without notice.