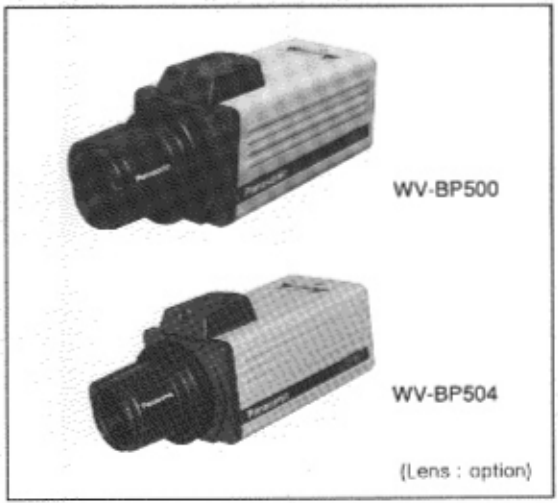
CCTV Cameras

WV-BP500/WV-BP504

Operating Instructions



Panasonic®

Before attempting to connect or operate this product, please read these instructions completely.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

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

SA 1965

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

SA 1966

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.

For U.S.A

Warning:
This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

For CANADA

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

The serial number of this product may be found on the bottom of the unit.
You should note the serial number of this unit in the space provided and retain this book as a permanent record of your purchase to aid identification in the event of theft.

Model No. _____

Serial No. _____

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION:

Before attempting to connect or operate this product, please read the label on the bottom.

CONTENTS

PREFACE

Panasonic's WV-BP500 series cameras introduce a new level of high picture quality through the use of a 1/3 inch interline transfer CCD having 682 horizontal pixels (picture elements). High performance-to-cost ratio is achieved through the use of newly developed Sync IC's and ability to shoot indoor scenes with a fixed iris lens by use of Electronic Light Control (ELC) function.

FEATURES

- Minimum illumination of 0.008 footcandle (0.08 lux) at F1.4 and Signal-to-noise ratio of 46 dB by employing a 1/3 inch interline transfer CCD image sensor with 682 (H) × 492 (V) pixels.
- 500 lines of horizontal resolution.
- Either optional standard C-mount or Special C-mount (CS-mount) auto iris control lens can be used with.
- Selectable auto iris control signal for the lens either a video signal or DC control signal.
- Various Sync functions, including Gen-lock.
- Ability to shoot indoor scenes with fixed iris lens by use of Electronic Light Control (ELC) function.
- Backlight compensation:
  Three selectable positions are available.

PRECAUTIONS

- **Do not attempt to disassemble the camera.**
  To prevent electric shock, do not remove screws or cover. There are no user-serviceable parts inside. Refer servicing to qualified service personnel.

- **Handle the camera with care.**
  Do not abuse the camera. Avoid striking or shaking it. The camera could be damaged by improper handling or storage.

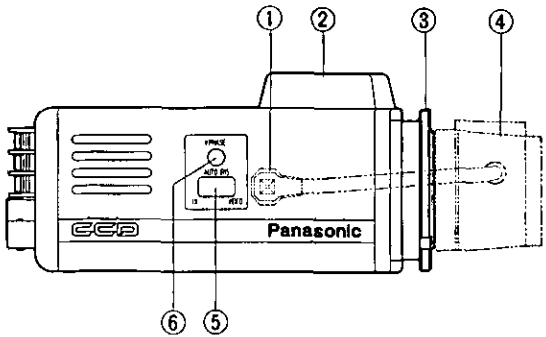
- **Do not expose the camera to rain or moisture, or try to operate it in wet areas.**
  Do take immediate action if ever the camera do becomes wet. Turn power off and refer servicing to qualified service personnel. Moisture can damage the camera and also create the danger of electric shock.

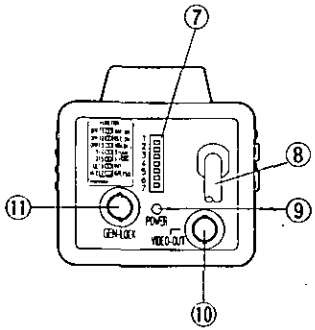
- **Never face the camera toward the sun.**
  Whether the camera is in use or not, never face it toward the sun. Do use caution when operating the camera in the vicinity of spot lights or other bright lights and light reflecting objects.

- **Do not operate the camera beyond its temperature, humidity or power source ratings.**
  Do not use the camera in an extreme environment where high temperature or high humidity exist. Use the camera under conditions where temperatures are within −22°F - 122°F (−30°C - +50°C), and humidity is below 90%. The input power source is 120V AC 60 Hz for WV-BP500 or 24V AC 60 Hz for WV-BP504.

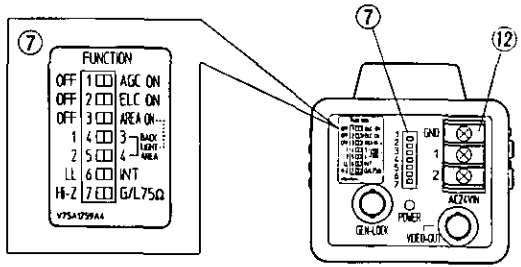
Caution :
To prevent fire or shock hazard, the UL listed wire VW-1, style 1007 should be used for the cable for AC 24V Input Terminal.

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS





WV-BP500



WV-BP504

(1) **Auto Iris Lens Connector**

This 4-pin female connector supplies the power and either video signal or DC control signal to the auto iris lens.

A 4-pin male connector, which can be mated with the camera's female connector, is supplied as a standard accessory (Part No. YFE4191J100).

This male connector can be installed on lenses which have incompatible type connector.

See page 15 for installation details.

(2) **Camera Mounting Screw Hole**

This threaded hole (1/4" - 20) is used to mount the camera onto a mounting bracket or tripod.

(3) **Flange-back Adjusting Ring**

This ring is used to adjust the back focal length or picture focus by rotating this ring to clockwise for C-mount lens or counterclockwise for special C-mount (CS-mount) lens.

Cautions :

1. Always set this ring to fully clockwise before mounting the lens.
2. Do not turn this ring too much to counterclockwise when the C-mount lens is mounted as this could damage the inner glass and CCD image sensor.

(4) **Lens (Option)**

See pages 11, 12, 13 and 14 for details on lens selection.

(5) **Lens Selection Switch (AUTO IRIS, DC/VIDEO)**

This switch is used to select the supplied auto iris control signal to the lens from the Auto iris lens Connector (1).

DC :

Choose this position when the auto iris control lens requiring DC control signal such as WV-LA2.8, WV-LA4R5C3, WV-LA6B2, WV-LA9C3, WV-LA12B2, WV-LA18, WV-LA36, WV-LA4510, WV-LA608, WV-LA1208, WV-LZ81/6A, WV-LZ81/10, WV-LZ83/6, is mounted on the camera.

VIDEO :

Choose this position when the auto iris control lens requiring video signal such as WV-LA8B, WV-LA16B, WV-LA25B, WV-LA50B, is mounted on the camera.

(6) Vertical Phase Control (V. PHASE)

The vertical phase of the camera signal can be adjusted to match the vertical phase of the line power.

(7) Function Switches

Seven switches are located on the rear panel. These switches are used for following modes.

1) AGC ON/OFF Switch (AGC ON/OFF)

This switch is used to select the gain of the video amplifier as follows;

ON :

When the lens iris is fully opened under a low light condition, a clear picture is obtained by automatic increase of the gain.

OFF :

A natural and low-noise picture is obtained under a low light condition.

2) Electronic Light Control ON/OFF Switch (ELC ON/OFF)

OFF :

Choose this position used with an auto iris lens.

ON :

Choose this position used with a fixed or manual iris lens.

3) BLC (Back light Compensation) Area Display Switch (AREA ON/OFF)

Select this switch to ON position, masking area appears on the monitor screen as shown in the Figures below.

Select this switch to OFF position, masking area disappears.

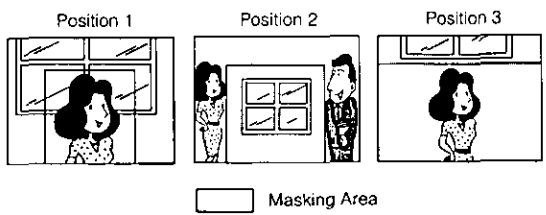
4), 5) Backlight Area Selection Switch (BACK LIGHT AREA 1, 2, 3, 4)

1 & 2 : Choose this position to select "BLC OFF" mode.

3 & 2 : Choose this position to select "Position 1" mode below.

1 & 4 : Choose this position to select "Position 2" mode below.

3 & 4 : Choose this position to select "Position 3" mode below.



6) **Sync Selection Switch (INT/LL)**

This switch is used to select the camera synchronization mode.

INT :

When no signal is supplied to the GEN-LOCK connector, the camera synchronization mode is set to internal 2 : 1 interlace.

Whenever the Gen-lock video signal is supplied to the GEN-LOCK connector, the camera synchronization mode is automatically set to external synchronization.

LL :

The camera synchronization mode is set to Line-lock even if the Gen-lock video signal is supplied to the GEN-LOCK connector.

Note :

Set this switch to INT position for Gen-lock operation.

7) **Gen-lock Termination Switch (G/L 75 ohm / Hi-Z)**

When looping through the Gen-lock video input signal, set this switch to Hi-Z position and in all other cases, set this to 75 ohm position.

(8) **Power Cord**

(9) **Power Indicator**

(10) **Video Output Connector (VIDEO-OUT)**

A 1.0 Vp-p/75 ohms composite video signal is provided at this connector.

Whenever the multiplexed vertical drive (VD2) signal is supplied to this connector, the camera synchronization mode is automatically set to Vertical Drive Lock.

(11) **Gen-lock Video Input Connector (GEN-LOCK)**

A composite B/W or color 1.0Vp-p/75 ohms video signal, or black burst 0.3Vp-p/75 ohms or composite sync 4Vp-p/75 ohms should be supplied to this connector for external synchronization.

(12) **AC 24V In Terminal (AC 24V IN)**

This terminal accepts 24V AC power source (19.5V - 28V). Be sure to connect grounding lead to the GND terminal.

Cautions :

1. Connect this to a 24V AC class 2 power supply only.
2. To prevent fire or shock hazard, the UL listed wire VW-1, style 1007 should be used for the cable for AC 24V Input Terminal.

CONNECTIONS

Power Source

■ WV-BP500

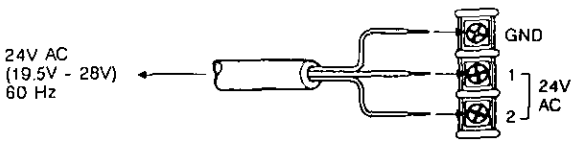
Connect the AC Power Cord (8) to a electrical outlet of 120V AC 60 Hz.

■ WV-BP504

1. A power supply of 24V AC 60 Hz is required.
2. Connect the power cable to the 24V AC In Terminal (12) on the rear panel of the camera.

Recommended wire gauge sizes for 24V AC line.

Copper wire size (AWG)		#24 (0.22mm^2)	#22 (0.33mm^2)	#20 (0.52mm^2)	#18 (0.83mm^2)
Length of Calbe (Approx.)	(ft)	314	495	842	1403
	(m)	95	150	255	425



Caution :

To prevent fire or shock hazard, the UL listed wire VW-1, style 1007 should be used for the cable for AC 24V Input Terminal.

Video Cable

1. It is recommended to use a video monitor whose resolution is at least equal to the camera's.
2. Terminate the camera output with 75-ohm resistor at the furthest end of its cable run.

- It is recommended to use 75-ohm coaxial cable.
- Always set the last monitor's termination switch to 75 ohms, and set the termination switches of intermediate monitors to high impedance (Hi-Z) position.
- The maximum extensible coaxial cable length between the camera and the monitor is shown in the table 1. Since cable quality varies among manufactures, verify video quality before final installation if maximum lengths are to be used.

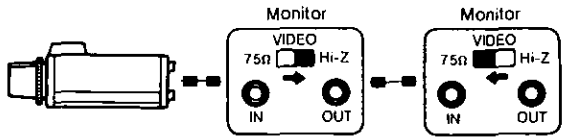
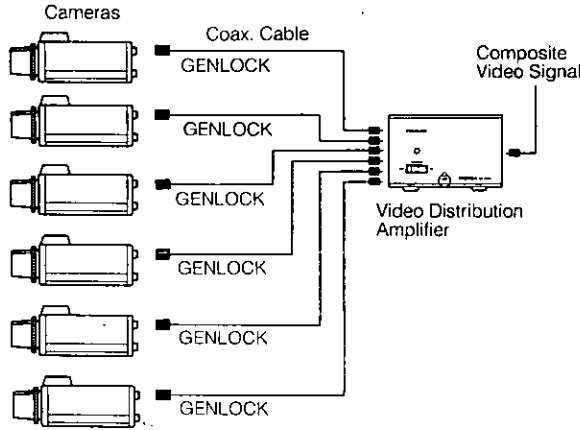


Table 1

Type of coaxial cable		RG-59/U (3C-2V)	RG-6U (5C-2V)	RG-11/U (7C-2V)	RG-15/U (10C-2V)
Recommended maximum cable lenght	(ft)	825	1,650	1,980	2,640
	(m)	250	500	600	800

3. Wiring precautions :

- Do not bend coaxial cable into a curve whose radius is smaller than 10 times the cables diameter.
- Never staple the cable-not even with circular staples. Mismatching will occur.
- Never crush or pinch the cable.
  All of these will change the impedance of the cable and cause poor picture quality.

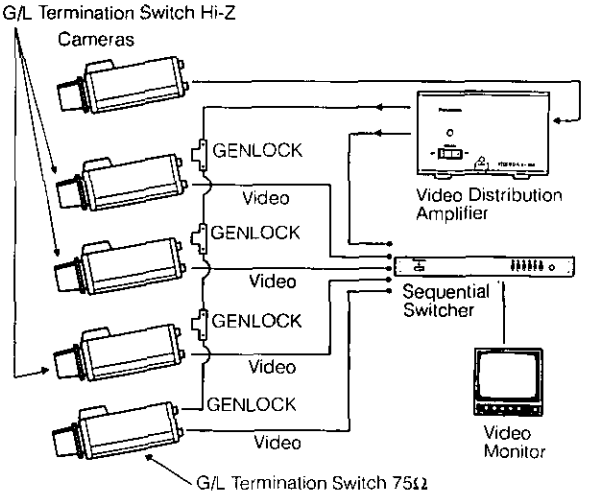


Gen-Lock Video Cable

Connect the coaxial cable for gen-lock video signal between the Gen-lock Video Input Connector (11) and the refference composite video output (B/W or color 1.0Vp-p/75 ohms) or composite sync (4Vp-p/75 ohms) or black burst (0.3Vp-p/75 ohms) of the production system.

* The Gen-lock Termination Switch of all cameras should be set to 75 ohm position.

• **Gen-lock (Looping through)**



* The Gen-lock Termination Switch of the furthest camera should be set to 75 ohm position and that of all other cameras should be set to Hi-Z position.

Note :

The gen-lock input signal should meet with EIA standard and should not contain jitter such as VTR playback signal.

LENSES

1. Selection of Lens

<Auto Iris Lenses>

Models / Specifications		WV-LA2.8 (Wide Angle)	WV-LA6B2 (Wide Angle)	WV-LA12B2 (Standard)	WV-LA18 (Telephoto)	WV-LA36 (Telephoto)
Image Size		1/2" (6.4 (H) × 4.8 (V) mm)				
Focal Lenght		2.8 mm	6 mm	12 mm	18 mm	36 mm
Maximum Aperture Ratio		1 : 1.4	1 : 1.4	1 : 1.4	1 : 1.4	1 : 1.8
Angular Field of View 1/3"	H	87.5°	43.5°	22.8°	15.5°	7.7°
	V	69.2°	33.0°	17.1°	11.5°	5.7°
Focusing Range		Adjusted by Camera			0.89 (ft) - ∞ 0.27 (m) - ∞	3.3 (ft) - ∞ 1 (m) - ∞
Mount		Special C-mount (CS-mount, 1"-32UN)				
Filter Size		None			φ37.5 mm, P = 0.5	φ37.5 mm, P = 0.5
Dimensions		φ1-11/16" × 1-5/16" (φ43 × 34 mm)	φ1-11/16" × 1-7/16" (φ43 × 36 mm)	φ1-11/16" × 1-7/16" (φ43 × 36 mm)	φ1-11/16" × 1-5/8" (φ43 × 41 mm)	φ1-11/16" × 1-5/8" (φ43 × 41 mm)
Weights		0.14 lbs. (65g)	0.11 lbs. (50g)	0.09 lbs. (40g)	0.15 lbs. (70g)	0.18 lbs. (80g)

- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

<Auto Iris Lenses>

Models / Specifications		WV-LZ81/6A (Motorized Zoom)	WV-LZ81/10 (Motorized Zoom)	WV-LA4R5C3 (Wide Angle)	WV-LA9C3 (Standard)
Image Size		1/2" (6.4 (H) × 4.8 (V) mm)		1/3" (4.8 (H) × 3.6 (V) mm)	
Focal Lenght		8.5 - 51 mm (6X)	8 - 80 mm (10X)	4.5 mm	9 mm
Maximum Aperture		1 : 1.2 (Wide) 1 : 1.3 (Tele)	1 : 1.4 (Wide) 1 : 1.7 (Tele)	1 : 1.2	1 : 1.2
Angular Field of View 1/3"	H	Wide : 31.4° Tele : 5.5°	Wide : 33.5° Tele : 3.5°	56.4°	29.6°
	V	Wide : 23.5° Tele : 4.1°	Wide : 25.2° Tele : 2.6°	43.3°	22.2°
Focusing Range		3.3 (ft) - ∞ 1 (m) - ∞	3.6 (ft) - ∞ 1.1 (m) - ∞	Adjusted by Camera	
Mount		Special C-mount (CS-mount, 1"-32UN)			
Filter Size		φ49 mm, P = 0.75	φ55 mm, P = 0.75	None	
Dimensions		3-3/8"(W)×2-7/16"(H)×3-7/8"(D) 86(W)×62(H)×99(D) mm	3-3/16"(W)×2-5/8"(H)×4-1/2"(D) 81(W)×66(H)×114(D) mm	φ1-11/16" × 1-1/2" (φ43 × 38.5 mm)	φ1-11/16" × 1-1/2" (φ43 × 38.5 mm)
Weights		0.93 lbs. (420g)	0.99 lbs. (450g)	0.09 lbs. (42g)	0.09 lbs. (40g)

- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

<Auto Iris Lenses>

Models / Specifications		WV-LA4510 (Wide Angle)	WV-LA608 (Wide Angle)	WV-LA1208 (Standard)	WV-LZ83/6 (Motorized Zoom)
Image Size		1/2" (6.4 (H) × 4.8 (V) mm)			
Focal Lenght		4.5 mm	6 mm	12 mm	8.5 - 51 mm (6X)
Maximum Aperture		1 : 1.0	1 : 0.75	1 : 0.8	1 : 0.8 (Wide) 1 : 1.0 (Tele)
Angular Field of View 1/3"	H	56.9°	43.8°	23.8°	Wide : 31.3° Tele : 5.5°
	V	43.6°	33.1°	17.6°	Wide : 23.4° Tele : 4.1°
Focusing Range		Adjusted by Camera			4.0 (ft) - ∞ 1.2 (m) - ∞
Mount		Special C-mount (CS-mount, 1"-32UN)			
Filter Size		None	ϕ46 mm, P = 0.75	ϕ46 mm, P = 0.75	ϕ67 mm, P = 0.75
Dimensions		1-11/16" × 1-11/16" (ϕ43 × 43 mm)	2-1/16" × 2-3/16" (ϕ52 × 55 mm)	2-5/8" × 2-7/8" (ϕ66 × 72.5 mm)	3-1/2"(W)×3"(H)×4-5/8"(D) 90(W)×77(H)×119(D) mm
Weights		0.19 lbs. (85g)	0.34 lbs. (155g)	0.56 lbs. (255g)	1.63 lbs. (740g)

- **When using the above lenses with the camera, be sure to read instruction manual of lenses.**
- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

<Manual and Fixed Iris Lenses>

Models / Specifications	WV-LM4R5A (Wide Angle)	WV-LM6B2 (Wide Angle)	WV-LM12B2 (Standard)	WV-LF4R5C3 (Wide Angle)	WV-LF9C3 (Standard)
Image Size	1/2" (6.4 (H) × 4.8 (V) mm)			1/3" (4.8 (H) × 3.6 (V) mm)	
Focal Length	4.5 mm	6 mm	12 mm	4.5 mm	9 mm
Maximum Aperture Ratio	1 : 1.4	1 : 1.4	1 : 1.4	1 : 1.2	1 : 1.2
Angular Field of View 1/3" H	56.9°	43.5°	22.8°	56.4°	29.6°
Angular Field of View 1/3" V	43.6°	33.0°	17.1°	43.3°	22.2°
Iris	Manual	Manual	Manual	Fixed	Fixed
Focusing Range	Adjusted by Camera				
Mount	Special C-mount (CS-mount, 1"-32UN)				
Filter Size	ϕ37.5 mm, P = 0.5	None	None	ϕ30.5 mm, P = 0.5	ϕ30.5 mm, P = 0.5
Dimensions	ϕ1-3/4" × 1-5/8" (ϕ44 × 41 mm)	ϕ1-11/16" × 1-9/16" (ϕ43 × 39 mm)	ϕ1-11/16" × 1-9/16" (ϕ43 × 39 mm)	ϕ1-3/8" × 1-7/16" (ϕ34.4 × 36 mm)	ϕ1-3/8" × 1-7/16" (ϕ34.4 × 36 mm)
Weights	0.20 lbs. (93g)	0.10 lbs. (45g)	0.08 lbs. (35g)	0.06 lbs. (29g)	0.05 lbs. (23g)

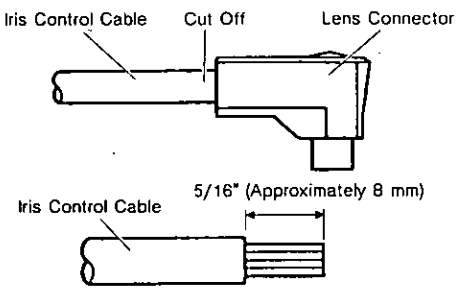
- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

2. Installation of Auto Iris Lens Connector

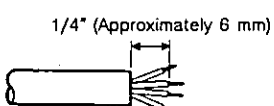
When you use an auto iris lens other than listed on pages 11, 12 and 13, for example a video servo ALC lens, install the lens connector (YFE4191J100) coming with the camera as follows.

The following installation should be made by qualified service personnel or system installers.

(1) Cut off the iris control cable at the edge of lens connector and then cut off the outer cable cover as shown in the diagram.



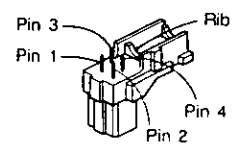
(2) Cut off the inner cable covers of the iris control cable as shown in the diagram.



(3) Put the heat shrinkable tubes or equivalent tubes on the inner cables of the iris control cable.

(4) Solder the inner cable of the iris control cable at the pin-plug block according to the following pin assignment and cover the heat shrinkable tubes or equivalent tubes over the soldered area and heat on the tubes to shrink them.

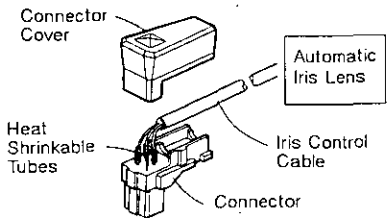
Pin 1 : Power source : +9V DC, 50 mA Max.
Pin 2 : Not used
Pin 3 : Video signal : 0.7Vp-p/40 kohms
Pin 4 : Shield, ground
(Set the Lens Selection Switch (5) to the VIDEO Position)



(5) Both the connector cover and connector should be positioned to interlock.

Note :

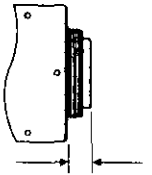
Cut off the rib on the connector, when the iris control cable is too thick and the connector cover and connector can not be interlocked.



3. Mounting the Lens

When you use the lens other than listed on pages 11, 12, 13 and 14, lens mount should be C-mount or special C-mount (CS-mount 1"-32UN) and lens weight should be less than 0.99 lbs. (450g). If not, both the lens and camera should be secured.

The protrusion of the rear of the lens should be as shown below.



C-mount : Less than 7/16" (11.5 mm)
CS-mount : Less than 1/4" (7.2 mm)

Caution :

Always set the Flange-back adjusting ring to fully clockwise (C-mount side) by loosing screws on the ring before mounting the lens, otherwise the inner glass and CCD image sensor could be damaged by the lens.

(1) Mount the lens by turning it clockwise onto the lens mount of the camera.

(2) Connect the lens cable to the Auto Iris Lens Connector (1) on the camera when an auto iris lens is used.

(3) Set the Lens Selection Switch (5) to the proper position as follows.

DC :

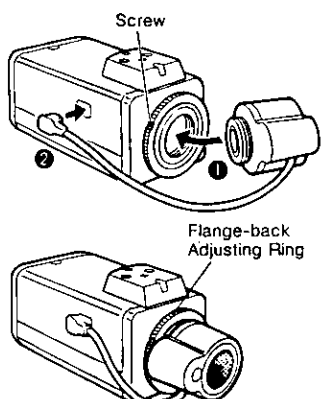
The mounted lens is one of the lenses listed on pages 11, 12 and 13 or one that requires the DC control signal for auto iris control.

VIDEO :

The mounted lens requires video signal for auto iris control.

Note :

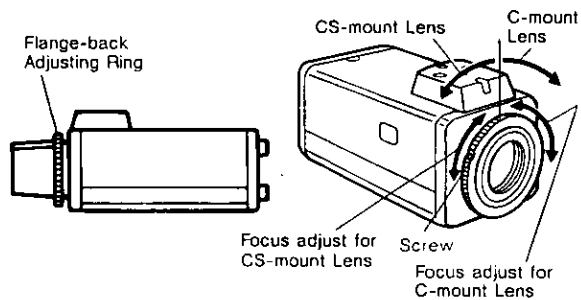
Refer to item (5) on page 5 for the lens selection switch.



FOCUS OR FLANGE-BACK ADJUSTMENT

The following adjustment should be made by qualified service personnel or system installers.

1. Loosen screws on the flange-back adjusting ring.



2. Turn the flange-back adjusting ring to the desired position.

   Caution :

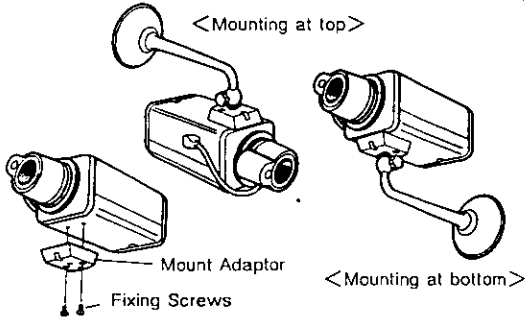
   Do not turn this ring too much to counterclockwise as this could damage the inner glass and CCD image sensor.
3. Tightens the screws on the flange-back adjusting ring.

INSTALLATION OF CAMERA

- **Mounting from the top**
  This camera is originally designed to be mounted from the top, as shown. The hole is the standard photographic pan-head screw size (1/4" - 20).
- **Mounting from the bottom**
  Remove the mount adaptor from the top of the camera by removing two fixing screws. Attach the mount adaptor to the bottom as shown in the diagram, then mount the camera on the mounting bracket.
  Make sure that two original screws are used when mounting the mount adaptor ; longer type screws may damage inner components.

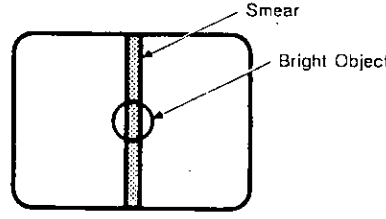
Note :

When installing the camera, use such a camera mounting bracket as to support the load of four times of the total weight.



PREVENTION OF BLOOMING AND SMEAR

When the camera is faced toward spot light or other bright lights and light reflecting objects, smear or blooming may appear. Therefore, the camera should be operated carefully in the vicinity of extremely bright objects to avoid smear or blooming.



LENS MAINTENANCE AND CLEANING

1. Remove the lens connector.
2. Remove the lens, and inspect the camera CCD faceplate through the lens mount opening to assure that the faceplate is free of smudges or particles of dirt.
3. Clean the CCD faceplate, if necessary, using lens tissue or a cotton tipped applicator and ethanol.
4. Install the new lens.

SPECIFICATIONS

Pick-up Device :	682 (H) × 492 (V) pixels. Interline Transfer CCD	
Scanning Area :	4.8 (H) × 3.6 (V) mm (Equivalent to scanning area of 1/3" pick-up tube)	
Synchronization :	Internal, External, Line-locked or Multiplexed vertical drive (VD2) selectable	
Scanning System :	2 : 1 interlace	
Scanning :	525 lines/60 fields/30 frames	
Horizontal :	15.734 kHz	
Vertical :	59.94 Hz	
Horizontal Resolution :	500 lines	
Video Output :	1.0 Vp-p composite, 75 ohms/BNC connector	
Signal-to-Noise Ratio :	46 dB	
Electronic Light Control :	Equivalent to continuous variable shutter speed between 1/60 sec. and 1/10,000 sec.	
Minimum Illumination :	0.008 footcandle (0.08 lux) at F1.4, AGC ON	
Gain Control :	Selectable AGC ON (+24 dB) or OFF	
Lens Mount :	C-mount or Special C-mount (CS-mount) selectable	
Ambient Operating Temperature :	−22°F - 122°F (−30°C - +50°C)	
Ambient Operating Humidity :	Less than 90%	
Power Source :	WV-BP500	120V AC 60 Hz
	WV-BP504	24V AC 60Hz
Power Consumption :	WV-BP500	5.8W
	WV-BP504	6.1W

Dimensions (without lens) :	2-3/4" (W) × 2-3/4" (H) × 5-9/16" (D) 70 (W) × 70.5 (H) × 141 (D) mm	
Weights (without lens) :	WV-BP500	2.0 lbs. (0.9 kg)
	WV-BP504	1.5 lbs. (0.68 kg)

Weights and dimensions indicated are approximate.
Specifications are subject to change without notice.

STANDARD ACCESSORIES

ALC Lens Connector (YFE4191J100) ..... 1 pc.
Body Cap ..... 1 pc.

OPTIONAL ACCESSORIES

Lenses : WV-LA2.8, WV-LA6B2, WV-LA12B2
WV-LA18, WV-LA36, WV-LA4510
WV-LA608, WV-LA1208, WV-LA4R5C3
WV-LA9C3
WV-LZ81/6A, WV-LZ81/10, WV-LZ83/6
WV-LM4R5A, WV-LM6B2, WV-LM12B2
WV-LF4R5C3, WV-LF9C3

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