

**Ikegami**



# **INSTRUCTION MANUAL**

**MODEL ICD-4220/4224**

**B/W CCD CAMERA**

**OUTDOOR USE WARNING**

**WARNING—TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

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



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.



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.

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**CAUTION;**  
ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PART RESPONSIBLE FOR COMPLIANCE COULD VOID THE USERS AUTHORITY TO OPERATE THE EQUIPMENT.

# IMPORTANT SAFEGUARDS

- **Read Instructions** — All the safety and operating instructions should be read before the appliance is operated.
- **Retain Instructions** — The safety and operating instructions should be retained for future reference.
- **Heed Warnings** — All warnings on the appliance and in the operating instructions should be adhered to.
- **Follow Instructions** — All operating and use instructions should be followed.
- **Cleaning** — Unplug this video product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- **Attachments** — Do not use attachments not recommended by the video product manufacturer as they may cause hazards.
- **Water and Moisture** — Do not use this video product near water — for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.
- **Accessories** — Do not place this video product on an unstable cart, stand, tripod, bracket, or table. The video product may fall, causing serious injury to person, and serious damage to the appliance. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the video product. Any mounting of the appliance should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
- **Power Sources** — This video product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your appliance dealer or local power company. For video products intended to operate from battery power, or other sources, refer to the operating instructions.
- **Grounding or Polarization** — This video product is equipped with a polarized alternating current line-plug (a plug having one blade wider than the other) or a 3-wire grounding-type plug (a plug having a third grounding pin). This is a safety feature. The plug having one blade wider than the other will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, try reversing the plug. The plug having a third grounding pin will only fit into a grounding-type power outlet. If the plug should fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug or the grounding-type plug.
- **Power-Cord Protection** — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
- **Lightning** — For added protection for this video product receiver during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the video product due to lightning and power-line surges.
- **Power Lines** — An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.
- **Overloading** — Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
- **Object and Liquid Entry** — Never push objects of any kind into this video product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the video product.
- **Servicing** — Do not attempt to service this video product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
- **Damage Requiring Service** — Unplug this video product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
  - a. When the power-supply cord or plug is damaged.
  - b. If liquid has been spilled, or objects have fallen into the video product.

- c. If the video product has been exposed to rain or water.
  - d. If the video product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video product to its normal operation.
  - e. If the video product has been dropped or the cabinet has been damaged.
  - f. When the video product exhibits a distinct change in performance — this indicates a need for service.
- **Replacement Parts** — When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.
  - **Safety Check** — Upon completion of any service or repairs to this video product, ask the service technician to perform safety checks to determine that the video product is in proper operating condition.

## 1. GENERAL

This video camera is a B/W CCD camera containing an FT-CCD with approx. 380,000 picture elements and offers high resolution and high sensitivity. It features no geometric distortion, no sticking, no longer life, and it also incorporates LSI and SMT technology for resistance to vibration and shock.

With the line lock function adopted for synchronization, the ICD-4220/4224 are suitable for surveillance system which includes two or more cameras. Also the External Sync. Unit, GL-42 is prepared as option.

## 2. FEATURES

- (1) Incorporates LSI and SMT technologies for compactness.
- (2) Sticking-free design gives longer life.
- (3) Unaffected by electrical or magnetic field.
- (4) Superior resistance to vibration and shock.
- (5) High horizontal resolution with 560 TV lines.
- (6) Sensitivity is about 20 times as high as the IT-CCD camera (compared with our products).
- (7) High sensitivity to near infrared rays (approx. 800 nm).
- (8) The genlock unit (external sync.: GL-42) is optionally available.
- (9) Flange back adjustment mechanism provided.

## 3. CONFIGURATION

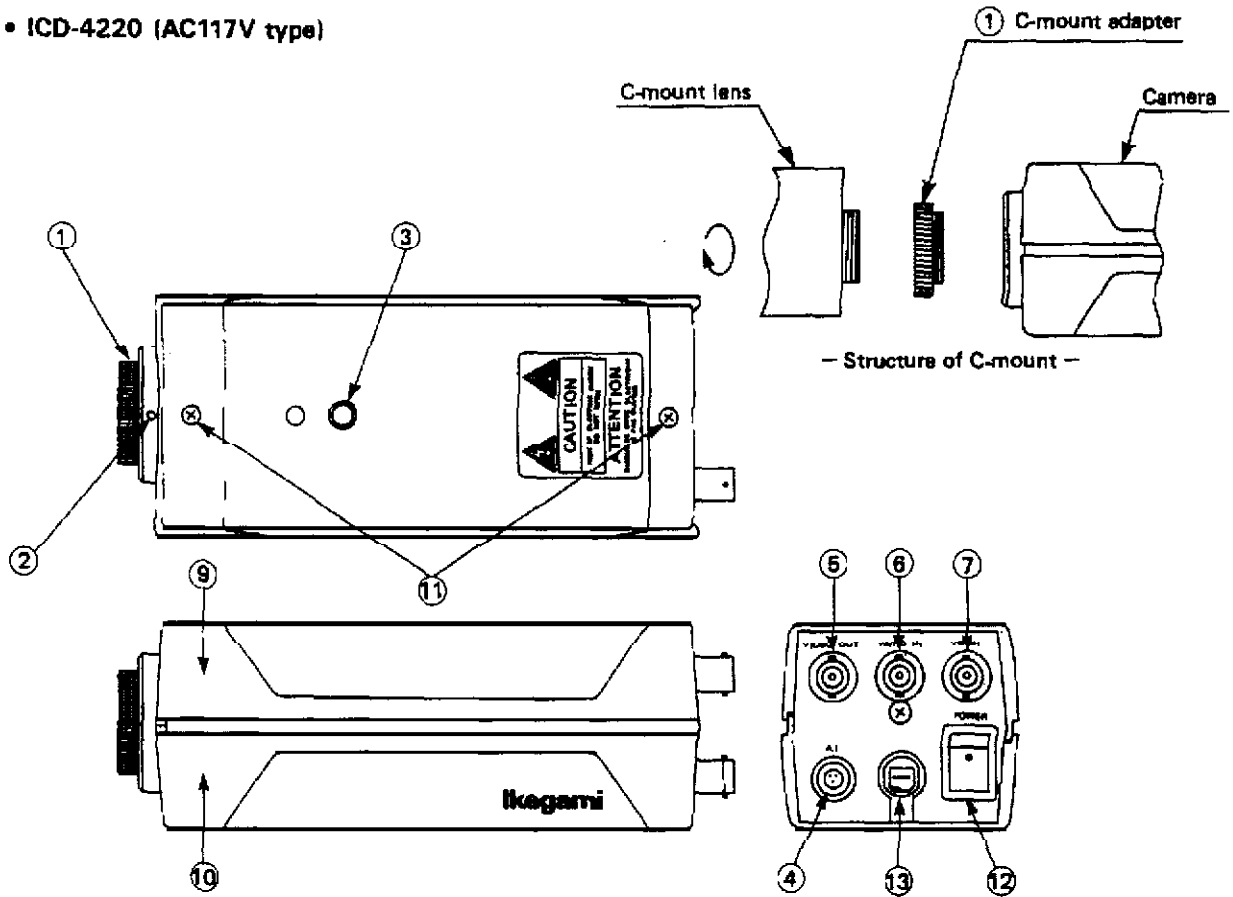
- (1) Video camera [ICD-4220 (AC117V type) or ICD-4224 (AC24V type)] .....1 unit
- (2) Accessories
  - Connector plug for Auto Iris Lens (R05-PB3M) .....1 pce.
- (3) Instruction Manual .....1 vol.
- (4) Option
  - GL-42 (Genlock Unit) .....1 unit

## 4. PRECAUTION TO BE TAKEN WHEN HANDLING THE ICD-4220/4224.

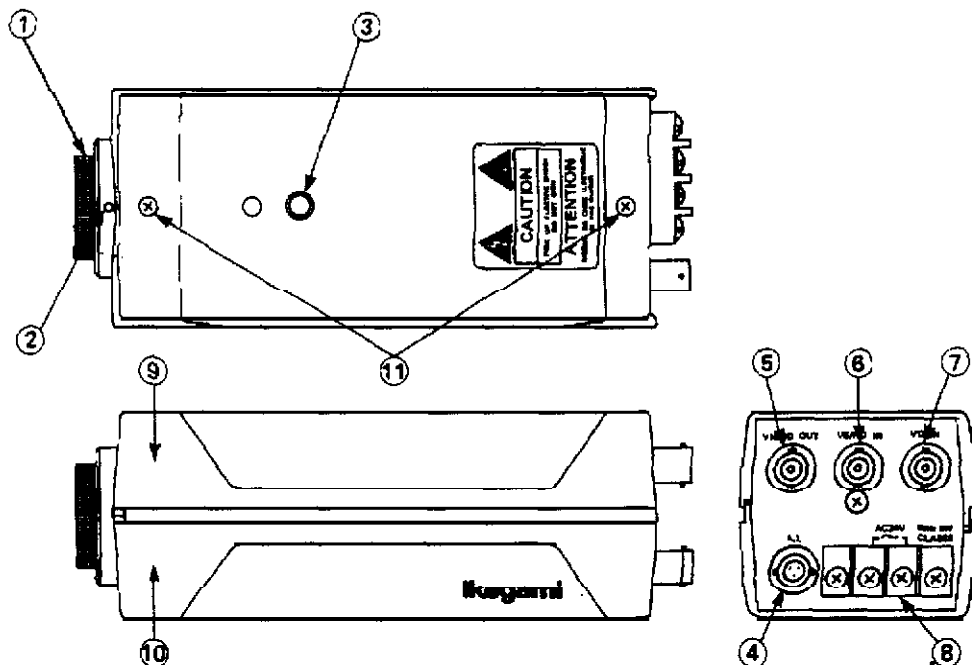
- (1) Do not open the camera case unless necessarily. It may cause a trouble to the internal precision components.  
The internal components adjustment, consult qualified service personnel.
- (2) Do not install this camera where it may get splashed with water or in the damp environment. The ambient temperature should be within the range from  $-5^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ .
- (3) The power source voltage should be within the specified range.
  - AC117V type:  
117-volts AC rating: 117 volts  $\pm 10\%$  AC
  - AC24V type:  
24-volts AC rating: 24 volts  $\pm 10\%$  AC
- (4) Make sure the power source is turned off before trying to install the camera or connect wiring. Use caution not to drop the camera or give strong shock to it.
- (5) Do not touch the CCD face plate.
- (6) The camera has sensitivity to infrared rays, but the image under the visible rays is not in the same focus as under the infrared rays. Set the camera focus according to your purpose.

## 5. NAMES AND FUNCTIONS OF EACH PART

• ICD-4220 (AC117V type)



• ICD-4224 (AC24V type)



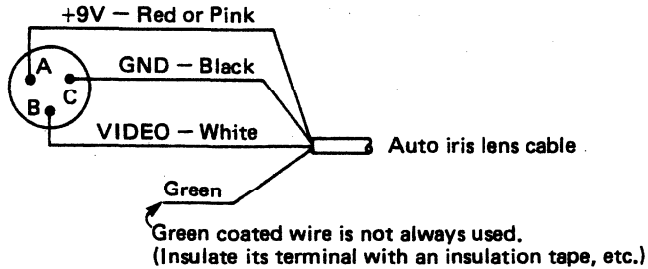
- ① Lens mount (C-mount)  
The part to install a lens. C-mount lens is applicable.
  - ② Optical focus fixing screws.  
The optical focus mechanism of this camera employs a system to adjust flange back by moving C-mount back and forward while rotating it. These are screws to fix C-mount when adjusted. Two screws are provided one on the upper side and one on the left side viewed from the front.
  - ③ Camera mount  
Screw holes to mount the camera body to a tripod, holder, bracket, and the like.  
The hocks are on the top and at the bottom of the camera.
  - ④ Auto iris lens connector  
This connector is for the +9 volts and video-signal output necessary to operate the auto-iris lens. Connect the auto iris lens using the attached special connector.
  - ⑤ VIDEO output connector  
From this connector the video-signal is provided.
  - ⑥ VS/HD input connector  
When the camera is genlocked, the signal is received from this connector. In case genlock with a composite signal, the VS or Composite sync. is received from this connector only. To genlock the camera with separate HD/VD signal, input the HD signal to this connector.
  - ⑦ VD Input connector (Option: Used with GL-42)  
In case genlock with separate HD/VD signals, the VD signal is received from this connector.
  - ⑧ AC24V Power Source Input connector (2P terminal board)  
It is AC24-volts power source input connector. Input 24 volts  $\pm 10\%$  AC.
  - ⑨ Upper case
  - ⑩ Lower case
  - ⑪ Case fixing screws (Two pcs. each on the top and at the bottom)
  - ⑫ Power switch  
On/Off switch for 117-volts AC power source
  - ⑬ Power cord  
Power input cord for 117-volts AC. Input 117 volts  $\pm 10\%$  AC.
- \* When using the CS mount lens, be sure to remove the C mount adapter.

## 6. CONNECTION

### 6-1 Connection of Auto Iris Lens

Use the auto iris lens control connector plug enclosed with the camera for this purpose.

#### — Wiring of connector cables —



\* The connector is R05-PB3M. The above sketch is viewed from the connection side.

After installing the lens to the camera's C mount securely, connect the connector to the AI connector at the rear of the camera.

### 6-3 VIDEO OUT

Connect the VIDEO OUT to monitor's VIDEO IN. Use a commercial BNC coaxial connector for this purpose.

### 6-4 Inputting of External Sync. Signal

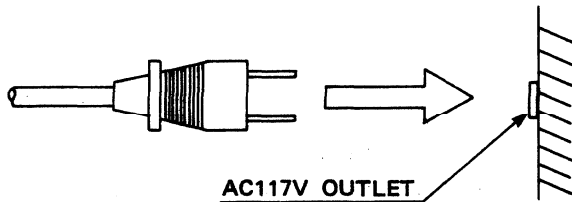
(Option: used with GL-42)

- (1) To genlock the camera with the composite signal, connect the line to the camera's VS/HD IN.
- (2) To genlock the camera with the separate signal HD/VD signals, connect the HD line to the VS/HD IN and the VD line to the VD IN. As connectors, use the BNC connectors in either case.

### 6-2 Connection of Power Source

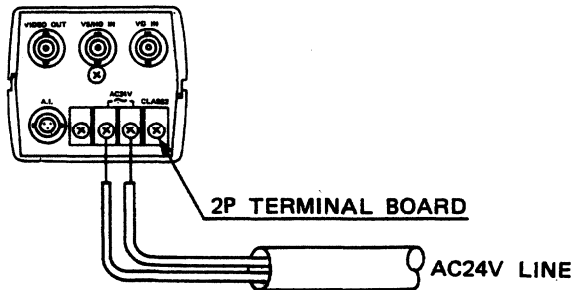
- (1) Connection of 117-volts AC input cord (ICD-4220)

Insert the power cord plug to a 117-volts AC outlet.



- (2) Connection of 24-volts AC input connector (ICD-4224)

Connect the 24-volts AC line to the 2P-terminal board at the rear of the camera.

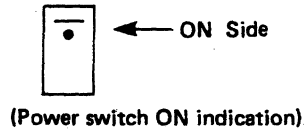


This installation should be made by a qualified service person and should conform to all local codes.

## 7. OPERATION

### 7-1 Power ON

- (1) This AC24V type does not have a power switch. This model is put in operation by supplying 24 volts AC, respectively.
- (2) The AC117V type is put in operation by first inserting the power cord to the outlet and turning on the power switch.



### 7-2 Video Level Adjustment

The video level can be adjusted by changing the iris of lens.

The auto iris lens has two adjusters, LEVEL and ALC. Adjust the iris in the following manner:

- (1) Turn the ALC adjuster to the 'average' side to the full.
- (2) Bring up a scene whose ratio of brightness to darkness (white to black) is even on the screen. Adjust the video level for 0.7 Vp-p with the level adjuster of the lens.
- (3) Bring up a real scene on the screen and adjust the brightness of the scene properly with the ALC adjuster.

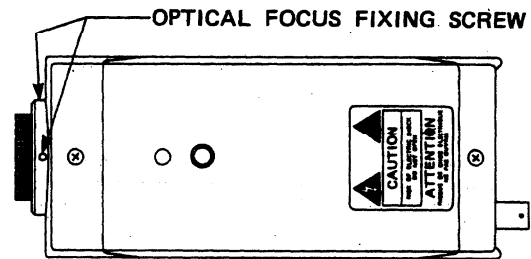
Remember that too dark a scene is not appropriate for this adjustment.

When the bright portion of the scene is greater, the screen does not almost change even if the ALC adjuster is turned.

### 7-3 FOCUS adjustment

When the focus cannot be focused with the focus ring of the lens, adjust the optical focus of the camera. However, if the camera is to be focused on an object at a distance shorter than the MOD of the lens, use a separate close-up ring, etc.

— Adjustment of Optical Focus —



- (1) Loosen the two optical focus fixing screws.
- (2) Turn the focus ring of the lens fully to the direction of infinity ( $\infty$ ) and then turn the c-mount of the camera together with the lens until an object at a distance of 20m or more is brought into focus. In case of a zoom lens, set the zoom ring on the lens to the WIDE-position and then adjust the focus. Make sure that, when the ring is set to the TELE-side, the object is also in focus. Once the infinity adjustment is perfect, the camera can be focused with the only focus ring of the lens.
- (3) Fasten the two optical focus fixing screws after adjustment.

\* For qualified service personnel only \*

## 8. INTERNAL UNIT ADJUSTMENTS

Do not move internal adjusters unless necessary. Use insulated screw drivers such as ceramic ones for volume adjustment. Do not use conductive screw drivers which may cause danger of shorting the circuit.

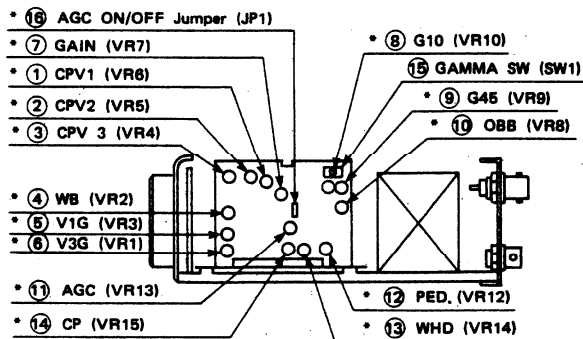
### 8-1 Moving away the case

Remove each two screws on top and bottom side to take out the case.

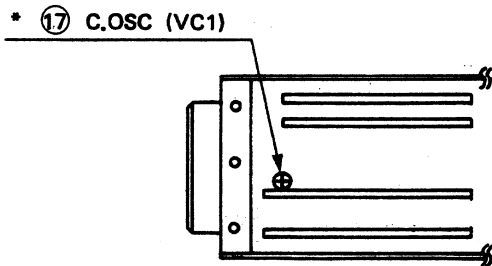
### 8-2 Adjuster Position

(Do not move adjusters marked\*.)

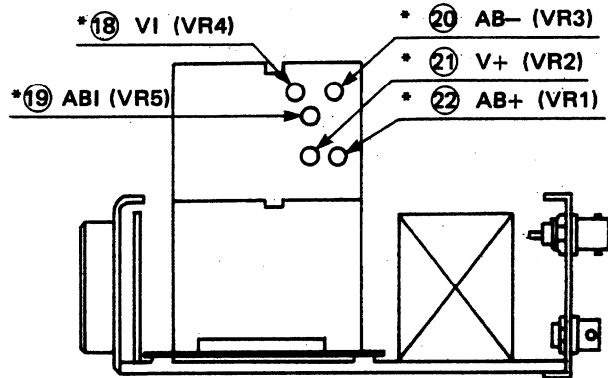
#### (1) VIDEO Board



#### (2) SG/Timing Board (top view)

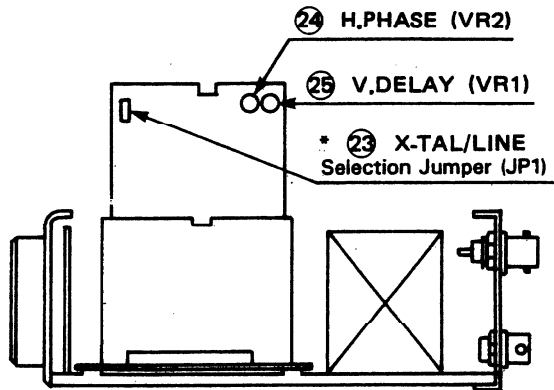


#### (3) SG/Timing Board (with extension board)

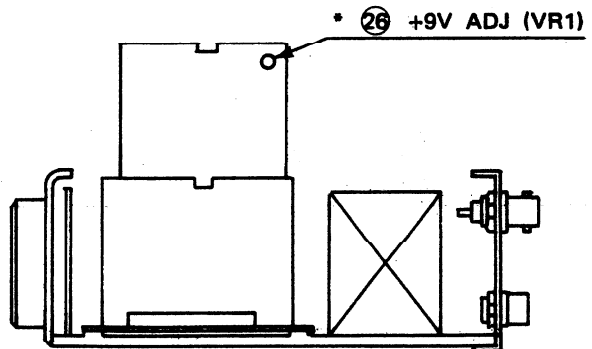


#### (4) GENLOCK Board (with extension board)

\* Option GL-42

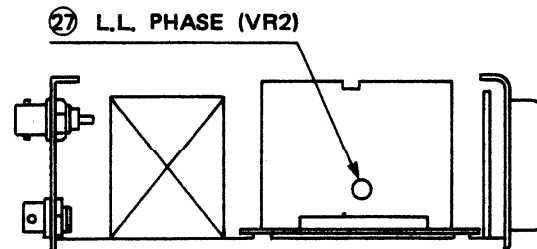


#### (5) POWER Board (with extension board)



#### (6) POWER Board

(Adjustable from outside)



### 8-3. Internal Operation and Adjustment Procedure

#### (1) Video board

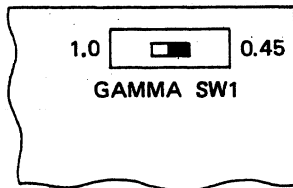
##### ⑫ Pedestal (VR12)

The pedestal adjusts the black level in video-out signal. Picture a test chart and adjust the black level for 0.1 Vp-p under standard illumination conditions.

This adjustment is usually not necessary, but is needed when the gamma switch has been operated.

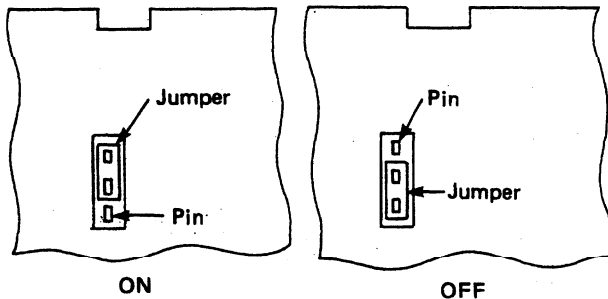
##### ⑮ GAMMA switch (SW1)

This switch selects between gamma levels 1.0 and 0.45.



Whenever the gamma level is switched over, be sure to adjust the pedestal because its reference voltage changes.

##### ⑯ AGC ON/OFF Jumper (JP1)



AGC is turned ON and OFF by changing the jumper position.

#### (2) Genlock board

##### ⑳ H. Phase (VR2)

It is used to adjust the H. phase when the camera has been genlocked.

Since the phase alignment position for the composite genlock input signal is different from that for the separate HD/VD input signal, it is necessary to make adjustment.

The camera is factory adjusted for composite signal use. When it is to be genlocked by the separate HD/VD signal, phase adjustment is needed. This knob is also used to adjust the signal delay arising with the cable in the case of the composite signal input.

The adjustment procedure is as follows:

##### (a) Genlock by composite signal

Align the H. sync. leading edge of the input signal with the H. sync. leading edge of the video out signal.

##### (b) Genlock by separate HD/VD signal

Align the leading edge of the input HD signal with the H. blanking leading edge of the video out signal.

##### ㉔ V. Delay (VR1)

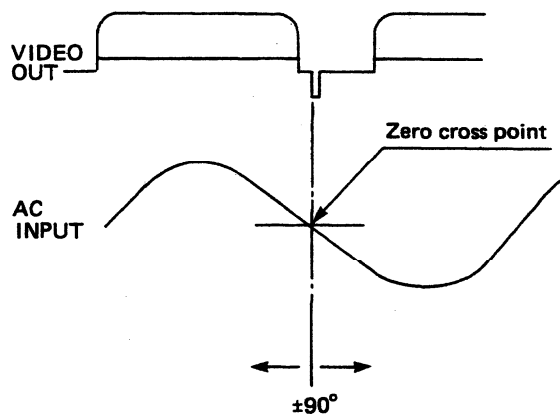
It is used to adjust the V. phase when the camera has been genlocked by the separate HD/VD signal.

When the camera is genlocked by the composite signal, the V. delay is not used. If necessary, align the leading edge of the input VD signal with the V. blanking leading edge of the video out signal. This knob has something with the field index pulse (VRS). If the signals were out of synchronization (when HD/VD is inputted), adjust synchronization with this knob.

#### (3) Power board (for AC type only)

##### ㉗ L.L. Phase (VR2)

When the camera has been line-locked, this knob should adjust the phase of the video out signal (V. sync. rise) within the range of  $\pm 90^\circ$  against to the input AC line zero cross point.



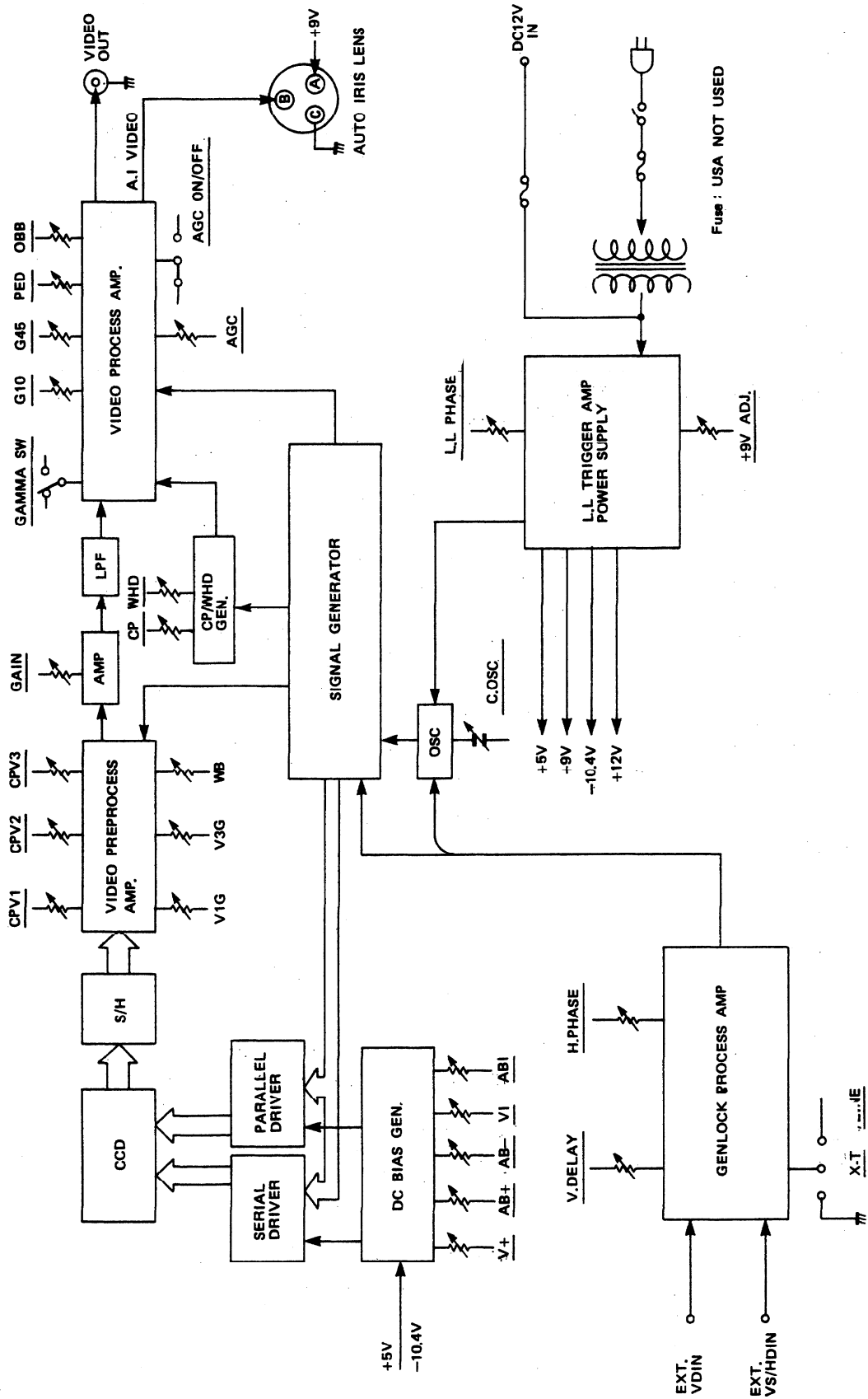
## 9. SPECIFICATIONS

(1) Image Pick-up Device	1/2 Inch Type, Frame-transfer System CCD	
(2) Picture Elements	Horizontal	756
	Vertical	484 (242x2)
(3) Image Size	6.3 mm(H) x 4.8 mm(V)	
(4) Scanning System	525 lines/60 Hz, 2:1 interlace	
(5) Sync System	Line-lock, Phase adjustable (Option: Genlock)	
(6) Scanning Frequency	Horizontal	15.75 kHz
	Vertical	60 Hz
(7) Genlock Input Signal	Composite signal; VS or VBS .....1.0 Vp-p $\pm$ 6 dB	
		BBS .....0.45 Vp-p $\pm$ 0.1 Vp-p
		C. SYNC .....4.0 Vp-p $\pm$ 2 Vp-p
	Separate signal; HD/VD .....4.0 Vp-p $\pm$ 2 Vp-p (In any case, the sync. signal polarity is negative.)	
(8) Genlock Input Impedance	75 ohms	
(9) Video Output	1.0 Vp-p, VS composite	
(10) Video Output Load Impedance	75 ohms	
(11) Resolution	Horizontal	560 TV lines
	Vertical	350 TV lines
(12) S/N Ratio	46 dB (p-p/rms) or better	
(13) Illumination (Light source of color temperature 2850°K)	Faceplate	* Scene
	Standard illumination:	0.25 Lux (0.023 fc)    2.5 Lux (0.23 fc)
Minimum illumination:	0.01 Lux (0.001 fc)    0.1 Lux (0.01 fc)	
$(\gamma=0.45, \text{AGC ON, W/O IR cut filter})$		
* Measurement conditions of scene illumination: Lens F 1.4, 89% reflectance object		
(14) AGC	Provided, ON-OFF Switching	
(15) GAMMA	0.45 or 1.0 Switching	
(16) Peak White Clipper	Provided	
(17) Auto iris function	Normally equipped with video signal and +9V output connector.	
(18) Power Source	ICD-4220 .....	AC117V $\pm$ 10%, 60 Hz
	ICD-4224 .....	AC24V $\pm$ 10%, 60 Hz
(19) Power Consumption	8 watts approx.	
(20) Ambient Temperature	-10°C ~ +50°C	
(21) Lens Mount	C mount (CS mount usable)	
(22) I/O Connector	Video output;	BNC
	Auto iris;	R05-R3F
	AC24V input;	2P terminal plate (ICD-4224 only)
(23) Dimensions	2.76(W) x 2.36(H) x 6.3(D) inches	
	70(W) x 60(H) x 160(D) mm	
(24) Weight	ICD-4220 .....	930 g approx.
	ICD-4224 .....	860 g approx.

■ Accessories

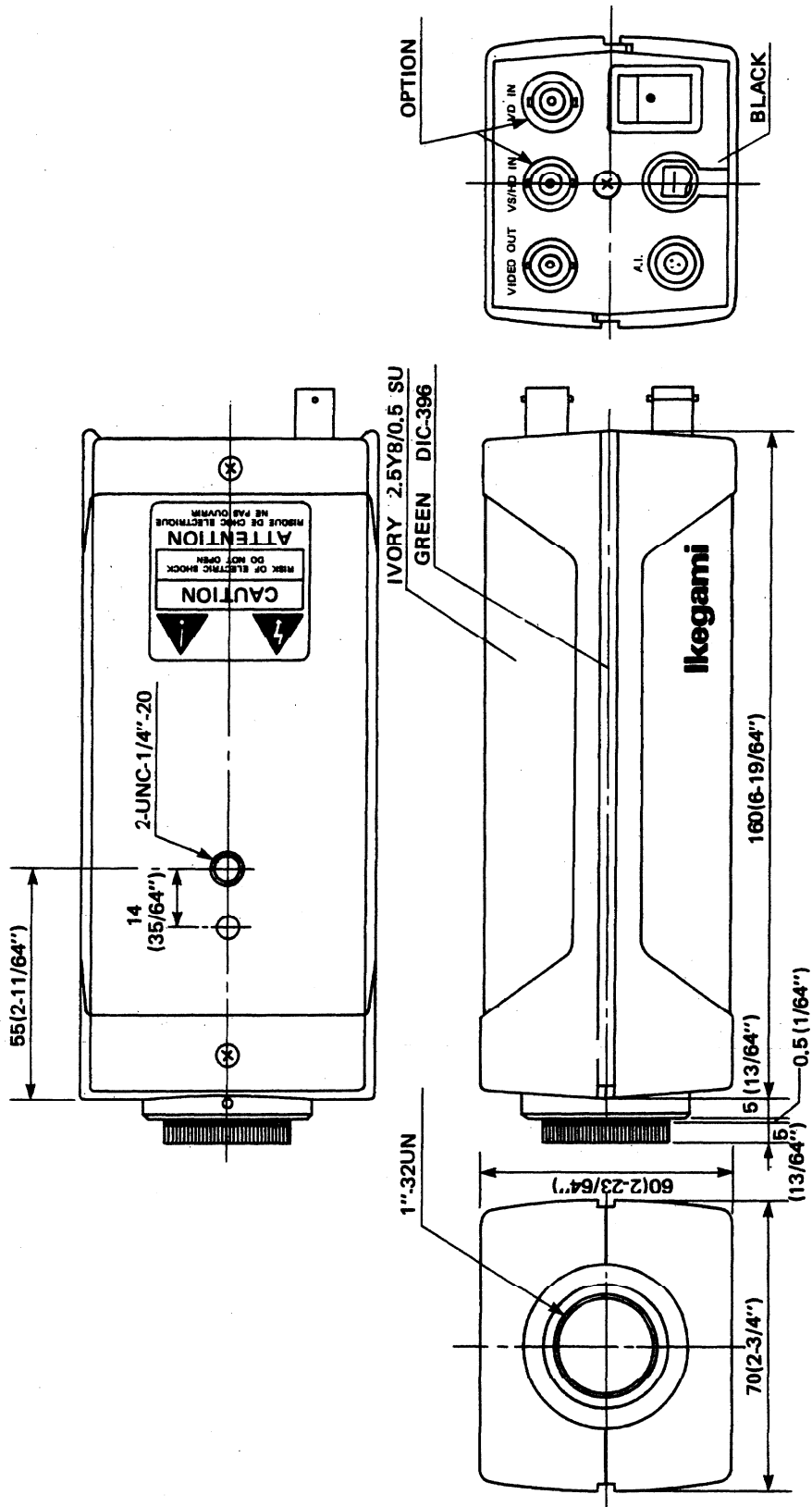
- Auto iris lens connector plug; R05-PB3M ..... 1 pce.
- Instruction Manual ..... 1 vol.

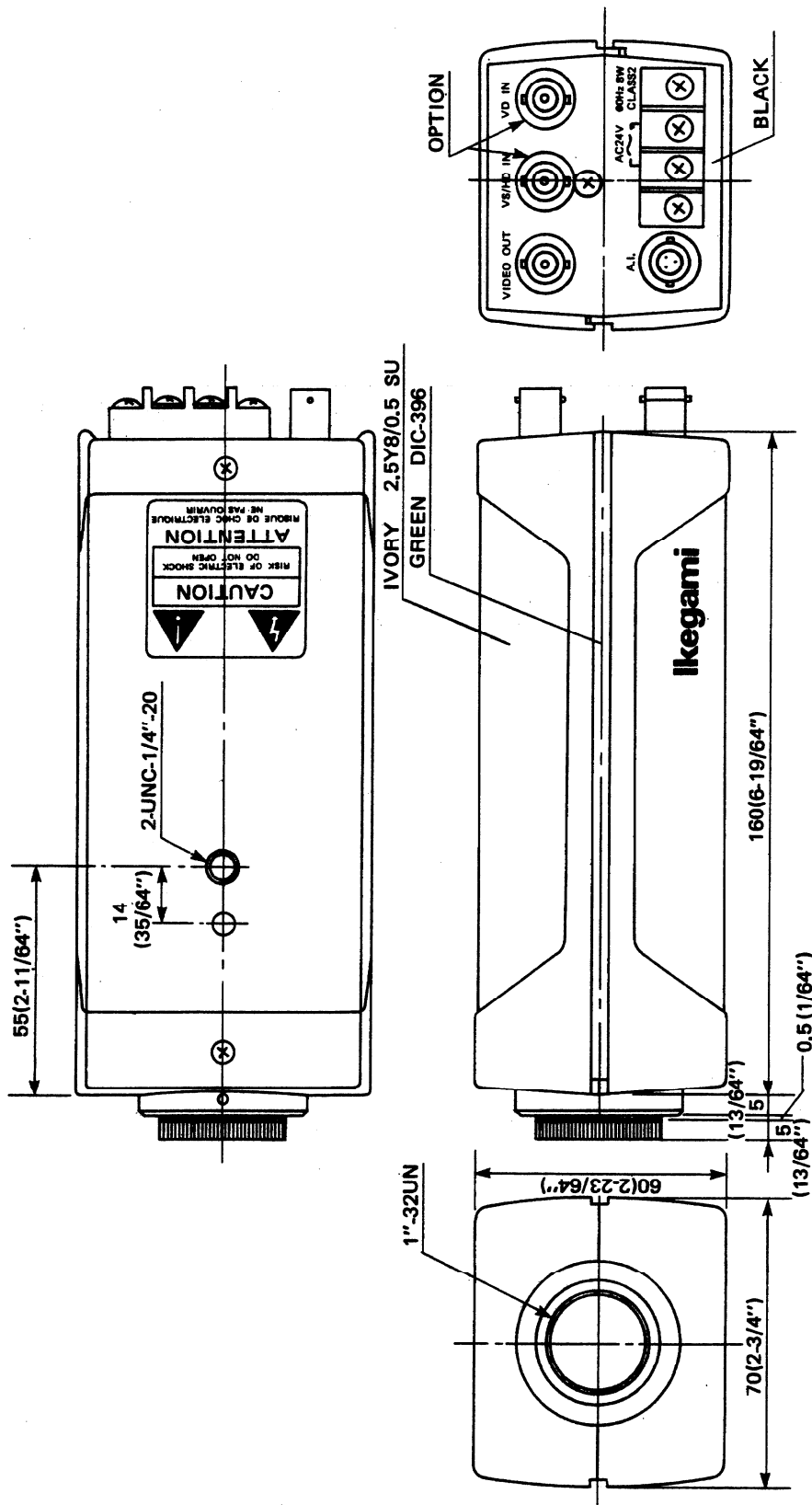
# 10. BLOCK DIAGRAM



# 11. EXTERNAL APPEARANCE

(1) ICD-4220





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