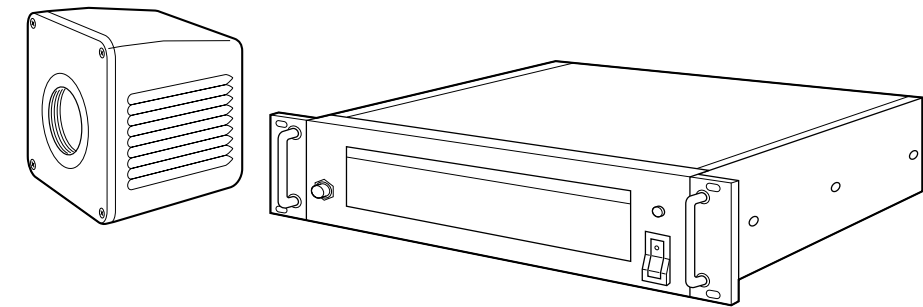


SERVICE MANUAL

MICRO HD CAMERA

DZ-VCA1SE

DZ-VCA1SE



SPECIFICATIONS

* Design and specifications subject to change without notice.

Camera head section

■ Image sensing device	: 1/3-inch IT-CCD (410,000 pixels)
■ Shooting system	: 4-CCD new dual green system
■ Colour separation optical system	: 1/3 type F1.4 3-colour separation prism
■ Number of effective pixels	: 768 (horizontal) x 494 (vertical), 380,000 pixels
■ Camera output	: 19 pins
■ Lens mount	: Special mount (C mount form, flange back: 28.0 mm)
■ Dimensions	: Camera head; 59 (W) x 70 (H) x 79 (D) mm (2-3/8" x 2-13/16" x 3-1/8") (not including insulating rubber covers)
■ Weight	: Camera head; 230 g (0.51 lbs.) (not including insulating rubber covers)
■ Classification	: Type BF

Camera control unit section

■ Number of scanning lines	: 1125 (980 effective)
■ Scanning system	: 2:1 interlace
■ Scanning frequency	: 33.75 kHz (horizontal), 60 Hz (vertical)
■ Aspect ratio	: 4:3
■ Horizontal resolution (center)	: More than 800 TV lines (Y signal)
■ Vertical resolution (center)	: More than 650 TV lines (Y signal)
■ S/N	: 52 dB
■ Sensitivity	: F5.6, 2000 lx
■ Minimum subject illuminance	: 10 lx (F1.6 + 12 dB, 1/30 shutter, 50% level)
■ Sync system	: Internal sync/external sync
■ External sync signal input	: Composite video signal of 1 Vp-p or composite sync signal of ± 0.3 Vp-p, 75 ohms, BNC x 1
■ Colour bar	: Full colour bar
■ Contour correction	: Horizontal dual-edged (9-step variable) Vertical dual-edged (9-step variable)
■ Electronic shutter speed	: 1/30 s, 1/60 s (normal), 1/100 s (flicker-free), 1/175 s, 1/250 s, 1/375 s, 1/500 s, 1/1000 s, 1/2000 s
■ Video output	: 0.7 Vp-p, 75 ohms for each (no sync), BNC connector x 3 (one for each)
• R/G/B signal	: 1 Vp-p, 75 ohms (including sync)
• Y/PB/PR	: 0.7 Vp-p, 75 ohms (including sync)
• PB	: 0.7 Vp-p, 75 ohms (including sync)
• PR	: 0.7 Vp-p, 75 ohms (including sync)
• Sync signal	: HD; BNC x 1 (TTL) VD, BNC x 1 (TTL) C. SYNC; BNC x 1 (± 0.3 Vp-p, 75 ohms, compliant with HDTV standard ITU-R Rec. 709)

■ SCSI Interface	: 50 pin mini x 2
■ Camera input	: 20 pins
■ Date indication	: Menu system 1) Year, month, day 2) Day, month, year 3) Month, day, year
■ Time indication	: Menu system, hour: minute: second
■ Power supply	: DC 12 V, 1.3 A XLR 4 pins, AA-V112E AC power adaptor (optional) When using this unit for medical purposes, be absolutely sure to use the separately sold AA-V31E isolation transformer.
■ Power consumption	: 18 W
■ Operating environment	: +5°C to +35°C (41°F to 95°F), 35 – 75%
■ Allowable storage environment	: –20°C to +50°C (–4°F to 122°F), 35 – 80%
■ Dimensions	: 430 (W) x 93 (H) x 322 (D) mm (16-15/16" x 3-11/16" x 12-11/16") (excluding the handle for rack mounting)
■ Weight	: 4.9 kg (10.8 lbs.)
■ Accessories	: Handle set x 1
■ Supplied documentation	: Instruction manual x 1 Warranty card x 1 Service center information x 1

TECHNICAL AND SERVICE ASSISTANCE

JVC offers technical and customer service assistance. Please contact us at the following address.

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TABLE OF CONTENTS

Section	Title	Page	Section	Title	Page
Important Safety Precautions INSTRUCTIONS					
1. PRECAUTIONS ON SERVICING			4. CHARTS AND DIAGRAMS		
1.1	BEFORE DISASSEMBLING AND REASSEMBLING	1-1		NOTES OF SCHEMATIC DIAGRAM	4-1
1.1.1	Precautions	1-1	4.1	CIRCUIT BOARD NOTES	4-2
1.1.2	Disassembly of optical block assembly	1-1	4.1	BOARD INTERCONNECTIONS	4-3
1.2	PREPARATION AND PRELIMINARY CHECK		4.2	CAMERA UNIT BLOCK DIAGRAM	4-5
	REQUIRED FOR ADJUSTMENT	1-1	4.3	CCD BLOCK DIAGRAM	4-7
1.2.1	Before adjustment	1-1	4.4	ANALOG SCHEMATIC DIAGRAM	4-9
1.2.2	Tools and jigs required for repair and adjustment	1-1	4.5	ADC SCHEMATIC DIAGRAM	4-11
1.	Tools and test instruments necessary for check		4.6	DSP1 SCHEMATIC DIAGRAM	4-13
	and adjustment	1-1	4.7	DSP2 SCHEMATIC DIAGRAM	4-15
2.	Standard setup	1-2	4.8	MICOM SCHEMATIC DIAGRAM	4-17
3.	Complementary explanation of functions of internal		4.9	SVP SCHEMATIC DIAGRAM	4-19
	switches of boards (CCU section)	1-2	4.10	MTX SCHEMATIC DIAGRAM	4-21
2. ELECTRICAL ADJUSTMENT			4.11	MAIN CIRCUIT BOARD	4-23
2.1	ADJUSTMENT OF CAMERA	2-1	4.12	POWER SCHEMATIC DIAGRAM	4-35
2.1.1	Initial setting	2-1	4.13	POWER CIRCUIT BOARD (YB10204-01-01)	4-37
1.	Standard shooting conditions	2-1	4.14	FCP SCHEMATIC DIAGRAM	4-39
2.	Functions and initial settings of internal switches of		4.15	FCP CIRCUIT BOARD	4-41
	boards (CCU section)	2-1	4.16	DR SCHEMATIC DIAGRAM	4-43
2.1.2	Adjustment procedure	2-2	4.17	PA SCHEMATIC DIAGRAM	4-45
1.	Standard adjustment procedure	2-2	4.18	TG SCHEMATIC DIAGRAM	4-47
2.	Adjustment procedure at installation		4.19	DR CIRCUIT BOARD	4-49
	(On attaching lens to camera)	2-2	4.20	PA CIRCUIT BOARD	4-50
3.	Adjustment procedure at camera head replacement	2-2	4.21	TG CIRCUIT BOARD	4-51
2.1.3	Adjustment of camera head	2-3	4.22	I/O1, I/O2 AND LED SCHEMATIC DIAGRAMS	4-52
1.	Reset bias	2-3	4.23	I/O1, I/O2 AND LED CIRCUIT BOARDS	4-53
2.	G1/G2-ch DL gain	2-3	4.24	ISB AND ISG1 SCHEMATIC DIAGRAMS	4-54
3.	Vsub voltage	2-4	4.25	ISB AND ISG1 CIRCUIT BOARDS	4-55
2.1.4	Adjustment of CCU section	2-4	4.26	ISG2 AND ISR SCHEMATIC DIAGRAMS	4-56
1.	Initial setting of CCU section	2-4	4.27	ISG2 AND ISR CIRCUIT BOARDS	4-57
2.	Pedestal level	2-5	5. PARTS LIST		
3.	Input gain	2-5	5.1	PACKING AND ACCESSORY ASSEMBLY <M1>	5-1
4.	Knee level	2-6	5.2	CAMERA CABI. AND OP BLOCK ASSEMBLY <M2>	5-2
5.	Clock phase	2-7	5.3	CAMERA CONTROL UNIT ASSEMBLY <M3>	5-3
6.	Encoder Y signal level	2-7	5.4	ELECTRICAL PARTS LIST	5-7
7.	Encoder Y sync signal level	2-8		MAIN BOARD ASSEMBLY <01>	5-7
8.	Encoder Pb signal level	2-9		POWER BOARD ASSEMBLY <02>	5-20
9.	Encoder Pr signal level	2-9		FCP BOARD ASSEMBLY <03>	5-21
10.	Encoder Pb gain	2-10		I/O1 BOARD ASSEMBLY <04>	5-22
11.	Encoder B gain	2-11		I/O2 BOARD ASSEMBLY <05>	5-23
12.	Encoder Pr gain	2-11		LED BOARD ASSEMBLY <06>	5-23
13.	Encoder R gain	2-12		PA BOARD ASSEMBLY <07>	5-23
14.	Encoder Y/R gain	2-13		ISB BOARD ASSEMBLY <08>	5-24
15.	Encoder G gain	2-13		ISG1 BOARD ASSEMBLY <09>	5-24
16.	R gain for tint adjustment	2-14		ISG2 BOARD ASSEMBLY <10>	5-24
17.	B gain for tint adjustment	2-15		ISR BOARD ASSEMBLY <11>	5-25
18.	G1 and G2 balance (horizontal)	2-15		DR BOARD ASSEMBLY <12>	5-25
19.	G1 and G2 balance (vertical)	2-16		TG BOARD ASSEMBLY <13>	5-26
20.	G1 and G2 balance (fine adjustment)	2-17			
21.	Automatic AGC	2-17			
22.	Automatic DC balance	2-18			
23.	Gen-lock PLL	2-18			
24.	Dynamic shading	2-19			
2.1.5	Setting of white balance	2-19			
3. INSTALLATION MANUAL					
	INSTALLATION MANUAL	3-1			

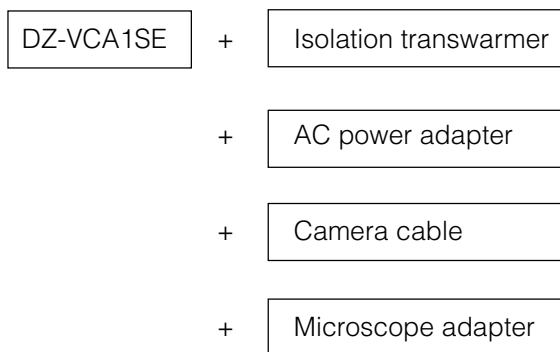
The DZ-VCA1SE installed for medical use requires a special service manner different from that for general use.

When servicing the DZ-VCA1SE for medical use, pay heed to the following points.

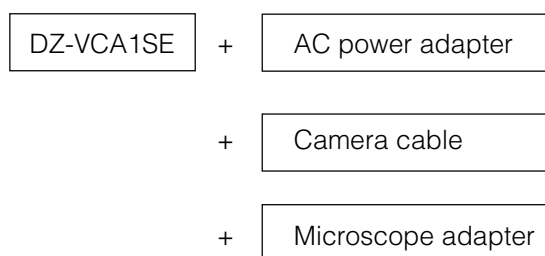
1. Pre- and post-service sterilization is required.
2. Isolation transwarmer is needed.
3. Leak current is different from that for general use.
4. Service history must be put on record.

When installing the DZ-VCA1SE, carefully proceed to it following the instructions of the installation guide.

<Example of system configuration for medical use>



<Example of system configuration for general use>



Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the \triangle symbol and shaded (■) parts such as fuses and circuit protectors are critical for safety. Replace only with specified part numbers.

3. Fuse replacement caution notice.
Caution for continued protection against fire hazard.
Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
1) Wires covered with PVC tubing
2) Double insulated wires
3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
1) Insulation Tape 3) Spacers 5) Barrier
2) PVC tubing 4) Insulation sheets for transistors

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

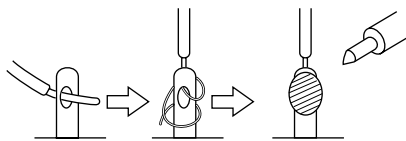


Fig.1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

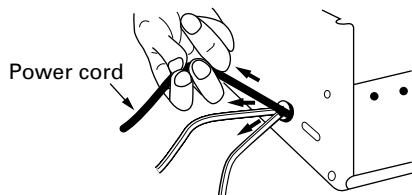


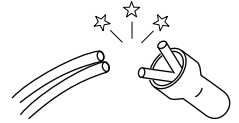
Fig.2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

- 1) **Connector part number** : E03830-001
- 2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
- 3) **Replacement procedure**
 - (1) Remove the old connector by cutting the wires at a point close to the connector.
Important : Do not reuse a connector (discard it).



cut close to connector

Fig.3

- (2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

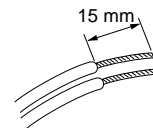


Fig.4

- (3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

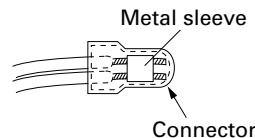


Fig.5

- (4) As shown in Fig.6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.



Fig.6

- (5) Check the four points noted in Fig.7.

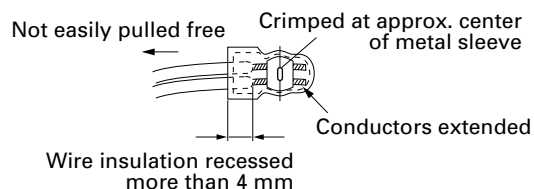


Fig.7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method : (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

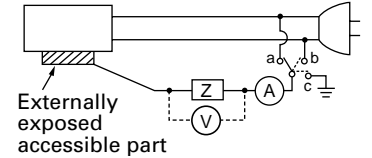


Fig. 8

2. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin and exposed accessible parts. See figure 10 and grounding specifications.

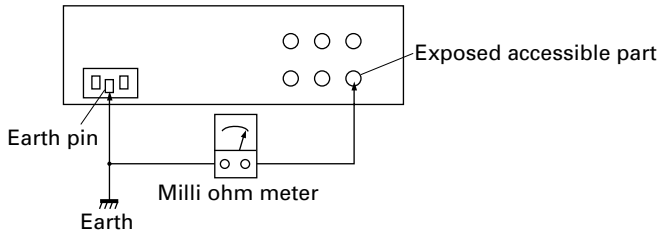


Fig. 9

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	$Z \leq 0.2 \text{ ohm}$
Europe & Australia	$Z \leq 0.2 \text{ ohm}$

< MEDICAL USE >

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan		$i < 0.1 \text{ mA}$	Exposed accessible parts
110 to 130 V	USA & Canada		$i < 0.1 \text{ mA}$	Exposed accessible parts
110 to 130 V	Europe & Australia		$i < 0.1 \text{ mA}$	Antenna earth terminals
220 to 240 V			$i < 0.1 \text{ mA}$	Other terminals

Table 1 Leakage current specifications for each region

< GENERAL USE >

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	$R \geq 1 \text{ M}\Omega/500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3 \text{ mm}$
100 to 240 V			AC 1.5 kV 1 minute	$d, d' \geq 4 \text{ mm}$
110 to 130 V	USA & Canada	$1 \text{ M}\Omega \leq R \leq 12 \text{ M}\Omega/500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3.2 \text{ mm}$
110 to 130 V	Europe & Australia	$R \geq 10 \text{ M}\Omega/500 \text{ V DC}$	AC 3 kV 1 minute (Class II)	$d \geq 4 \text{ mm}$
200 to 240 V			AC 1.5 kV 1 minute (Class I)	$d' \geq 8 \text{ mm (Power cord)}$ $d' \geq 6 \text{ mm (Primary wire)}$

Table 2 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan		$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada		$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	Europe & Australia		$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
220 to 240 V			$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

Table 3 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

SECTION 1

PRECAUTIONS ON SERVICING

1.1 BEFORE DISASSEMBLING AND REASSEMBLING

1.1.1 Precautions

1. When disconnecting and reconnecting connectors, pay careful attention to their wirings not to damage them, particularly to the wiring of the CCU's camera connector that requires the most meticulous care for disconnection and connection.
2. When unsoldering chip parts (IC in particular) for replacement, completely remove solder particles from them and their surroundings beforehand. Moreover, pay heed to the circuit pattern not to exfoliate it from the substrate during replacement of a chip part.
3. Don't use any chip part that was once removed.
4. Handle the optical block assembly with meticulous care. Don't apply it a strong shock.
5. There is a lithium battery for backing up the timer on the POWER board assembly. Pay careful attention to the lithium battery for accident prevention.

1.1.2 Disassembly of optical block assembly

Since the CCD is precisely glued to the prism in the optical block assembly, the CCD cannot be replaced individually if it comes into failure. Therefore, the optical block assembly is subject to repair by the JVC Video Division. If there is something wrong in the optical block assembly, send the camera head assembly whole with a written request filled out with necessary matters to the Service Engineering Section, Video Products Division, JVC.

1.2 PREPARATION AND PRELIMINARY CHECK REQUIRED FOR ADJUSTMENT

1.2.1 Before adjustment

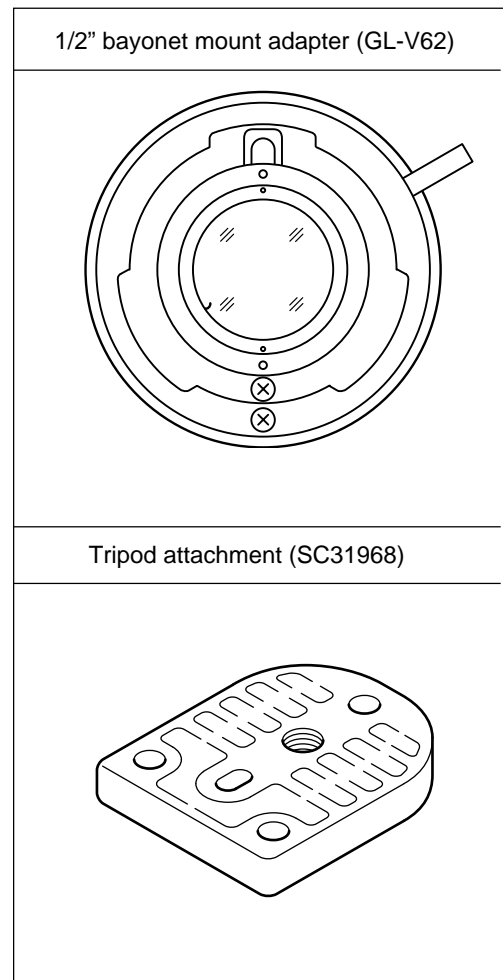
1. Use two or more lighting apparatuses whose color temperature is 3200 K for illuminating the test pattern, and uniformly light up the test pattern surface with illuminance of 2000 lx approximately while checking it with an illuminometer. If the pattern surface is unevenly illuminated, adjustment may result in failure. Carefully set up lighting apparatuses so that the test pattern is illuminated uniformly. (It is desired to use two or more light sources.)
2. Be sure to use a clean test pattern as far as circumstances permit.

1.2.2 Tools and jigs required for repair and adjustment

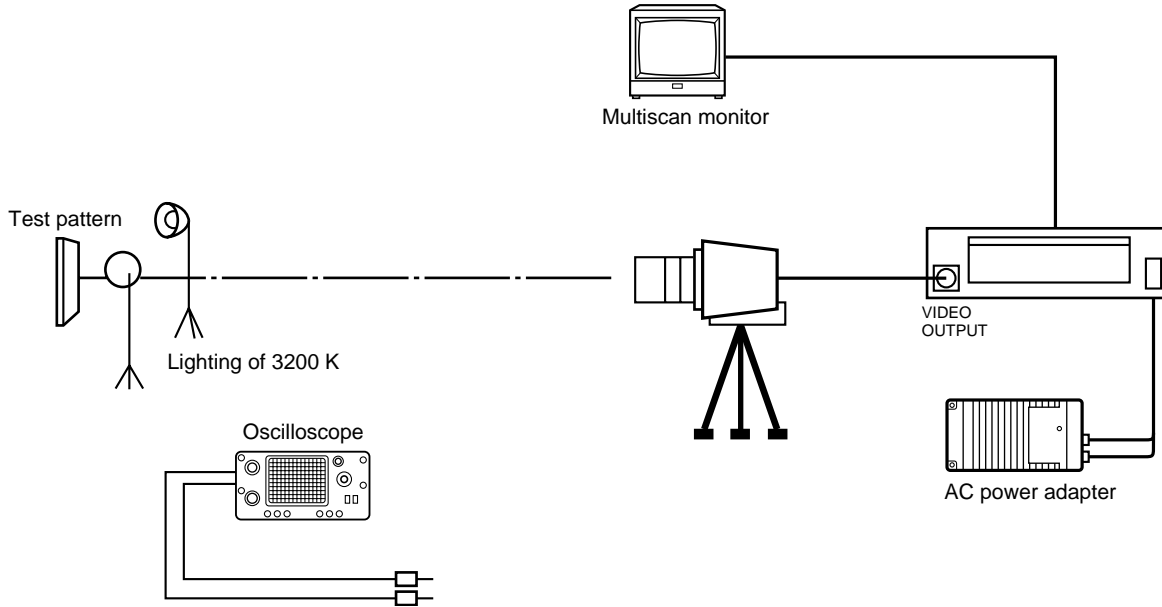
Use the following tools, jigs and test instruments to perform check and adjustment properly.

1. Tools and test instruments necessary for check and adjustment

- 1) Multiscan monitor or HD color monitor
- 2) 1/2" professional zoom lens (Model No. YH13x7.5B12 or YH13x7.5K12 is recommended by the Professional Video Division)
- 3) 1/2" bayonet mount adapter (Model No. GL-V62)
- 4) Tripod
- 5) Tripod attachment (Part No. SC31968)
- 6) Tripod attachment fitting screw (Part No. SPSP2612Z)
- 7) Resolution chart for HDTV
- 8) Gray scale chart (for NTSC, Part No. GS-2A)
- 9) AC power adapter (Model No. AA-P200)
- 10) NTSC signal generator
- 11) Oscilloscope (for 300 MHz or more)
- 12) Wrench for removing connector ring
- 13) Illuminometer
- 14) Color temperature meter
- 15) Camera cable (standard accessory)
- 16) Digital voltmeter
- 17) Lighting apparatus (3200 K halogen lamp)



2. Standard setup



3. Complementary explanation of functions of internal switches of boards (CCU section)

SW1701: DSP (IC1701, IC1707) reset switch (toggle switch)

SW1704: Switch to operate DSP2 directly

SW1710: Switch to output a camera picture forcedly replacing characters in the upper part of the screen

SW1711: TEST signal generation ON/OFF switch

SW1712: TEST signal generation ON/OFF switch

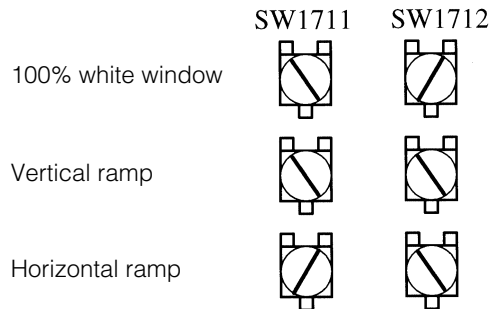
1: Direct operation mode ON/OFF switch

2: TEST signal generation ON/OFF switch

3,4: TEST signal selector switch

3	4	TEST signal waveform
OFF	OFF	Color bar
OFF	OFF	100% white window
OFF	ON	Blue back
OFF	ON	Cross pattern

Note: Turn on SW1704-1 to generate the TEST signal.



Warnings for accident prevention in handling battery

WARNING: Fire, Explosion, Leakage and Burn Hazard. Do not recharge, Disassemble, Heat Above 212°F, Incinerate, Or Expose Contents To Water. Be Sure The Battery Is Inserted In The Right Direction.

The lithium battery incorporates inflammable substances such as lithium and organic solvent, etc. inside.

If the lithium battery is handled in a wrong way, it may cause injury, fire and other dangerous accident caused by heating, bursting, firing, etc. Be sure to follow the instructions mentioned below to prevent you from an unexpected accident before unpacking, in and after using the battery.

1. Be careful of short-circuit.

If the positive (+) and negative (-) terminals come into contact with each other or with other metallic material, the battery is shortcircuited. If many batteries are left disorderly and their terminals are in contact with others, some of the batteries may generate heat, burst or fire and resultingly cause accident.

2. Neither immerse battery in water nor throw it into fire.

If the lithium battery is immersed in water or thrown into fire, it may fire or burst violently.

3. Avoid heating the battery.

If the lithium battery is heated at a temperature of 100°C or more, the electrolyte may leak from the battery because the plastic materials such as gasket and separator are damaged or the battery may burst or fire because the battery is heated by internal shortcircuit.

4. Avoid directly soldering the battery.

If the lithium battery is directly soldered, the electrolyte may leak from it because the plastic materials such as the gasket and separator are damaged or the battery may burst or fire because it is heated by internal shortcircuit.

5. Avoid charging the battery.

If the primary battery is charged, the battery may generate gas inside and it may resultingly cause expansion, burst or fire of the battery.

6. Avoid dismantling the battery.

If the lithium battery is dismantled, some kind of gas is generated and it stimulates the throat or the dismantled battery may fire because the negative lithium reacts on water and generates heat.

7. Avoid deformation with pressure.

If the lithium battery is deformed with pressure, the electrolyte may leak from it because of warp or damage in the sealing, or the battery may burst or fire because it is heated by internal shortcircuit.

8. Don't use batteries of different types or old ones mixedly.

If batteries of different brands/types are mixedly used or new and old batteries are mixedly used, it may cause expansion, burst or fire of the batteries because they are over-discharged by difference in their characteristics of voltage, capacitance, etc.

9. Avoid setting of the battery in wrong polarities.

If the battery is set in wrong polarities (+ and - poles are set reversely), the battery may be shortcircuited and it may resultingly cause heating, bursting or firing in the battery.

SECTION 2 ELECTRICAL ADJUSTMENT

2.1 ADJUSTMENT OF CAMERA

2.1.1 Initial setting

1. Standard shooting conditions

- 1) Ambient temperature: +20° to +25°C
- 2) Standard lighting: 3200 K, 2000 lx (When the illuminance is 4000 lx, stop down the lens aperture by 1 stop.)
- 3) Lens: YH13x7.5B12 or YH13x7.5K12
- 4) GAIN: NORMAL
- 5) Shutter: OFF
- 6) Aperture: F5.6 (F8 when illuminance is 4000 lx)

2. Functions and initial settings of internal switches of boards (CCU section)



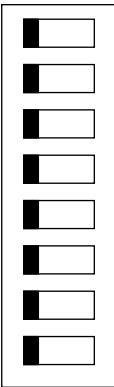
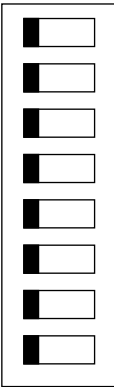


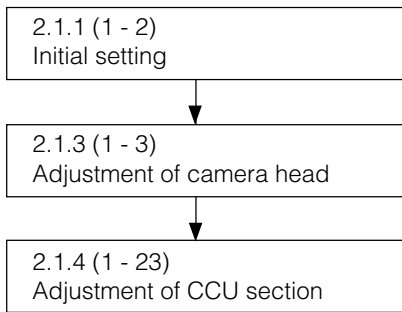
Switch	Function	Initial setting
SW1701	DSP (IC1701, 1707) reset switch	(Toggle SW)
SW1702	Direct GAMMA ON/OFF	ON(GND) 
SW1703	Direct OB clamp control signal ON/OFF	ON 
SW1704	Octuplet DIP switch for DSP2 (IC1707) (All OFF)	<div style="display: flex; justify-content: space-between;"> OFF (GND) ON </div> 
SW1705	Octuplet DIP switch for SVP (IC1718, 1719) (All OFF)	<div style="display: flex; justify-content: space-between;"> OFF (GND) ON </div> 
SW1710	Character display in the upper part	ON 
SW1711, 1712	TEST signal setting switch	ON 

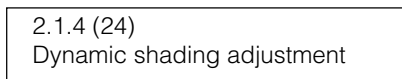
Table 2-1-1

2.1.2 Adjustment procedure

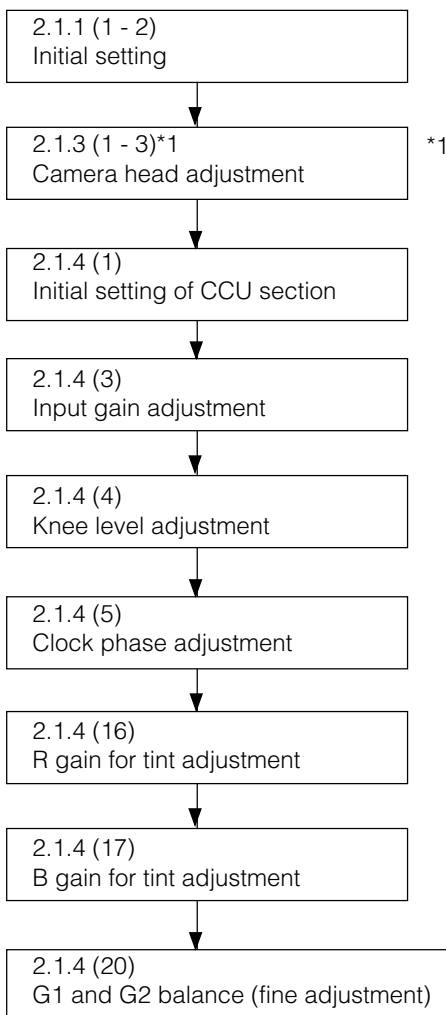
1. Standard adjustment procedure



2. Adjustment procedure at installation (On attaching lens to camera)



3. Adjustment procedure at camera head replacement



*1: When the camera head has individually been adjusted, this adjustment is unnecessary.

2.1.3 Adjustment of camera head

1. Reset bias

Unless otherwise indicated, test points and adjustment parts are located on the TG board.

Signal	—
Mode	CAMERA
Test instrument	Digital voltmeter
Test points	TP301[B], 302[G1], 303[G2], 304[R]
External trigger	Use TP205 (PA board) as the ground.
Adjustment parts	VR301[B], 302[G1], 303[G2], 304[R] (Reset bias)
Specified value	Indicated by a symbol appearing on each connector of the IMAGE SENSOR board

- (1) Adjust each VR to obtain the voltage specified in the following table referring to the symbol appearing on each connector of the IMAGE SENSOR board.

Symbol	1	2	3	4	5	6	7
Specified value [V]	1.0	1.5	2.0	2.5	3.0	3.5	4.0

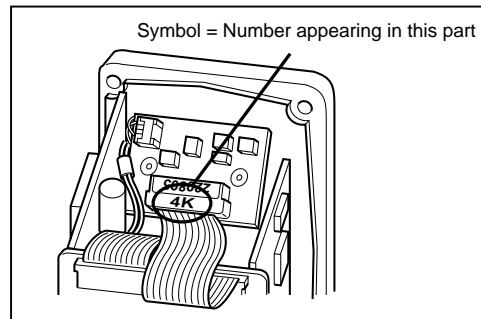


Fig. 2-1-1 Reset bias

2. G1/G2-ch DL gain

Unless otherwise indicated, test points and adjustment parts are located on the PA board.

Signal	NTSC gray scale, CN102[G1], CN103[G2]
Mode	CAMERA
Test instrument	Oscilloscope
Test points	TP202[G1], 203[G2]
External trigger	<ul style="list-style-type: none"> • Use TP205 (PA board) as the ground. • Input NTSC signal.
Adjustment parts	VR202[G1], 203[G2] (DL gain)
Specified value	Minimum waveform at each test point

- (1) Disconnect CN102 (CN103) and input an NTSC gray scale signal to it directly from a signal generator.
- (2) Adjust VR202 (VR203) to minimize the waveform at TP202 (TP203).
- (3) After adjustment, be sure to reconnect the connector that was once disconnected for adjustment.

3. Vsub voltage

Signal	Shoot the gray scale chart under the standard shooting condition.
Mode	CAMERA
Test instrument	Oscilloscope
Test points	TP207[B], 208[G1], 209[G2],210[R] (PA board)
External trigger	<ul style="list-style-type: none"> • TP2406[VD] (MAIN board) • Use TP205 (PA board) as the ground.
Adjustment parts	VR305[B], 306[G1], 307[G2], 308[R] (Vsub) (TG board)
Specified value	Saturated waveform at each test point

- (1) Shoot the gray scale chart with the lens aperture of F2.8* under the standard lighting condition (*F4 when the illuminance is 4000 lx).
- (2) Adjust each VR so that the waveform at each test point is saturated.

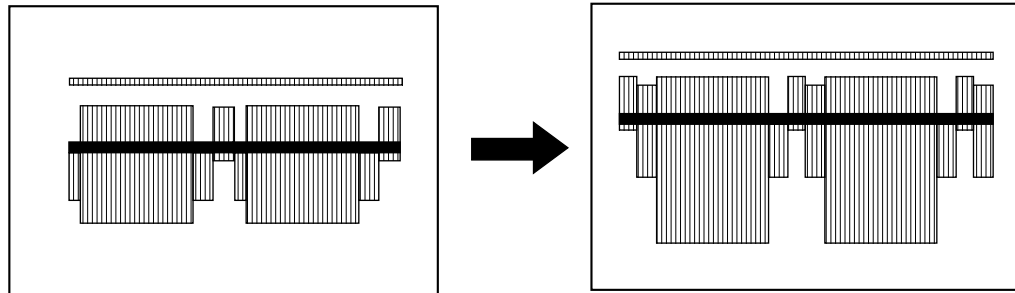


Fig. 2-1-2 Vsub voltage

2.1.4 Adjustment of CCU section

Unless otherwise indicated, test points and adjustment parts are located on the MAIN board.

1. Initial setting of CCU section

Signal	Shoot the gray scale chart under the standard shooting condition.
Mode	CAMERA
Adjustment parts	<ul style="list-style-type: none"> • Set the following VRs (six) at the respective center positions. VR1101, 1201, 1301, 1401, 1503, 1504 • Turn the following VRs (four) full clockwise. VR1101, 1202, 1302, 1402 • Turn the following VRs (three) full counterclockwise. VR2107, 2207, 2307 (The full counterclockwise position is the setting position of these VRs for adjustment.)

2. Pedestal level

Signal	Shoot the gray scale chart under the standard shooting condition.
Mode	CAMERA
Test instrument	Oscilloscope
Test points	TP1102[G1], 1202[G2], 1302[B], 1402[R]
External trigger	<ul style="list-style-type: none"> • TP1509 [NTSC HD] • Use TP2402, 2404 or the chassis as the ground.
Adjustment parts	VR1103[G1], 1203[G2], 1303[B], 1403[R]
Specified value	Pedestal level at each test point is 500 mV.

- (1) Shoot the gray scale chart under the standard shooting condition.
- (2) Adjust each VR so that the pedestal level at each test point is 500 mV above the ground level.

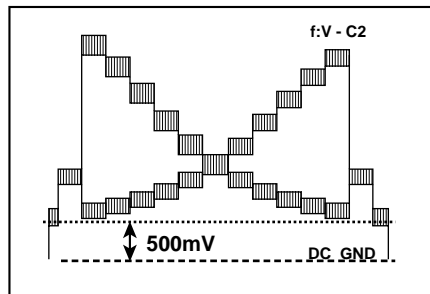


Fig. 2-1-3 Pedestal level

3. Input gain

Signal	Shoot the gray scale chart under the standard shooting condition.
Mode	CAMERA
Test instrument	Oscilloscope
Test points	TP1102[G1], 1202[G2], 1302[B], 1402[R]
External trigger	<ul style="list-style-type: none"> • TP1509 [NTSC HD] • Use TP2402, 2404 or the chassis as the ground.
Adjustment parts	VR1101[G1], 1201[G2], 1301[B], 1401[R]
Specified value	Level difference between the pedestal level and the white peak level is 2.5 V at each test point.

- (1) Shoot the gray scale chart under the standard shooting condition.
- (2) Adjust each VR so that the level difference between the pedestal level and the white peak level is 2.5 V at each test point.

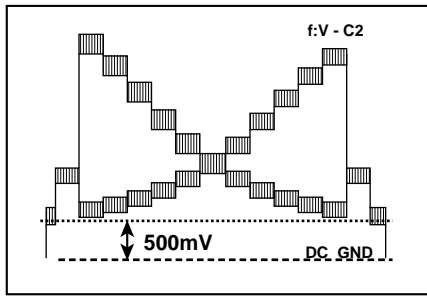


Fig. 2-1-4 Input gain

4. Knee level

Signal	Shoot the gray scale chart with the lens aperture of F2.8* under the standard shooting condition (*F4 when the illuminance is 4000 lx).
Mode	CAMERA
Test instrument	Oscilloscope
Test points	TP1102[G1], 1202[G2], 1302[B], 1402[R]
External trigger	<ul style="list-style-type: none"> • TP1509 [NTSC HD] • Use TP2402, 2404 or the chassis as the ground.
Adjustment parts	VR1102[G1], 1202[G2], 1302[B], 1402[R]
Specified value	Level difference between the pedestal level and the white peak level is 3.1 V at each test point.

- (1) Shoot the gray scale chart with the lens aperture of F2.8* under the standard shooting condition (*F4 when the illuminance is 4000 lx).
- (2) Adjust each VR so that the level difference between the pedestal level and the white peak level is 3.15 V at each test point.

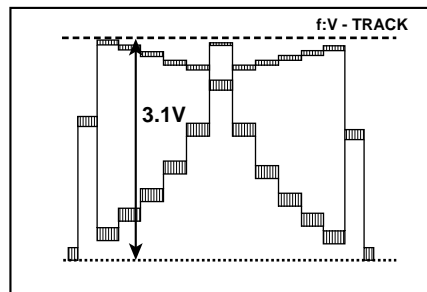


Fig. 2-1-5 Knee level

5. Clock phase

Signal	Close the lens aperture.
Mode	<ul style="list-style-type: none"> CAMERA Set the GAIN switch at "+12dB" manually.
Test instrument	Oscilloscope with FET probe
Test points	TP1103[AD IN], 1501[AD CLK]
External trigger	<ul style="list-style-type: none"> TP1501 Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR1502[AD CLK PHASE]
Specified value	Adjust the timing of waveforms at TP1103 and TP1501 with the VR so that the respective waveforms become as shown in the figure below.

- Close the lens aperture.
- Set the GAIN switch at "+12dB" manually.
- If the result of adjustment with the VR1502 is unsatisfactory, turn the VR to the extent.

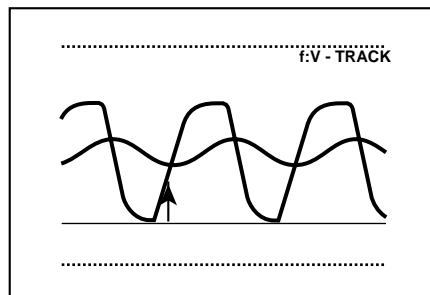


Fig. 2-1-6 Clock phase

- After the adjustment is complete, set the GAIN switch at the NORMAL (0 dB) position without fail.

6. Encoder Y signal level

Signal	TEST SG (100% white window)
Mode	TEST SG
Test instrument	Oscilloscope
Test point	Y OUT terminal
External trigger	<ul style="list-style-type: none"> TP2403 (HD) Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR2108[Y LEVEL]
Specified value	Adjust the VR so that level difference between the blanking level and the white peak level of the Y OUT signal is 700 mV as the Y OUT terminal is terminated by 75 Ω resistance.

- (1) Set the MODE switch at "TEST SG".
- (2) Terminate the Y OUT terminal with a 75 Ω resistance.
- (3) Adjust the VR so that level difference between the blanking level and the white peak level is 700 mV.

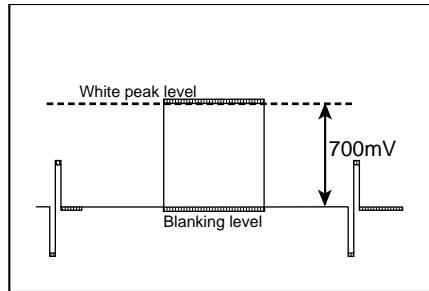


Fig. 2-1-7 Encoder Y signal level

7. Encoder Y sync signal level

Signal	TEST SG (100 % white window)
Mode	TEST SG
Test instrument	Oscilloscope
Test points	<ul style="list-style-type: none"> • Y OUT terminal • C SYNC OUT terminal
External trigger	<ul style="list-style-type: none"> • TP2403 (HD) • Use TP2402, 2404 or the chassis as the ground.
Adjustment parts	VR2402[Y SYNC LEVEL], 2401[C SYNC LEVEL]
Specified value	Sync level at the Y OUT terminal and C SYNC terminal is 600 mV as each terminal is terminated with 75 Ω resistance.

- (1) Set the MODE switch at "TEST SG".
- (2) Terminate the Y OUT terminal and C SYNC terminal with a 75 Ω resistance.
- (3) Adjust the VRs so that the sync level at the Y OUT terminal and C SYNC terminal is 600 mV as each terminal is terminated with a 75 Ω resistance.

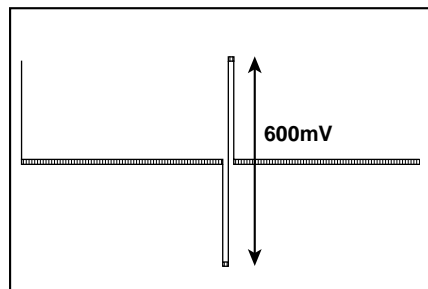


Fig. 2-1-8 Encoder Y sync signal level

8. Encoder Pb signal level

Signal	Built-in color bar signal
Mode	BAR
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> Pb OUT terminal
External trigger	<ul style="list-style-type: none"> TP2403 (HD) Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR2208[Pb LEVEL]
Specified value	Level variation of Pb OUT signal is 700 mV centering at the blanking level as the Pb OUT terminal is terminated with 75 Ω resistance.

- (1) Set the MODE switch at "BAR".
- (2) Terminate the Pb OUT terminal with a 75 Ω resistance.
- (3) Adjust the VR so that the level variation of the Y OUT signal is 700 mV centering at the blanking level as the Y OUT terminal is terminated with a 75 Ω resistance.

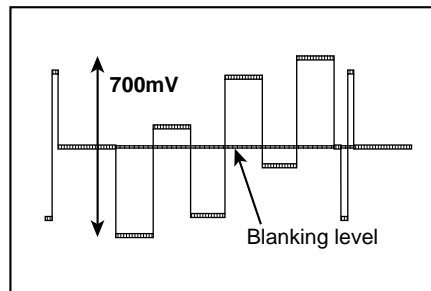


Fig. 2-1-9 Encoder Pb level

9. Encoder Pr signal level

Signal	Built-in color bar signal
Mode	BAR
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> Pr OUT terminal
External trigger	<ul style="list-style-type: none"> TP2403 (HD) Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR2308[Pr LEVEL]
Specified value	Level variation of Pr OUT signal is 700 mV centering at the blanking level as the Pr OUT terminal is terminated with 75 Ω resistance.

- (1) Set the MODE switch at "BAR".
- (2) Terminate the Pr OUT terminal with a 75 Ω resistance.
- (3) Adjust the VR so that the level variation of the Pr OUT signal is 700 mV centering at the blanking level as the Pr OUT terminal is terminated with a 75 Ω resistance.

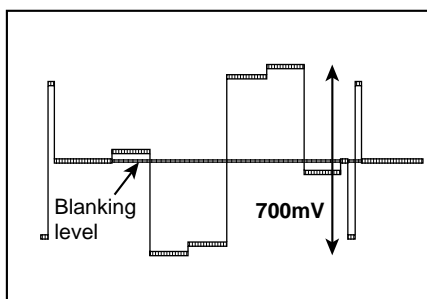


Fig. 2-1-10 Encoder Pr level

10. Encoder Pb gain

Signal	Built-in color bar signal
Mode	BAR
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> • TP2203[B]
External trigger	<ul style="list-style-type: none"> • TP2403 (HD) • Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR2204[Pb GAIN]
Specified value	Voltage is equalized at the test points of "a", "b", "c" and "d" by the VR.

- (1) Set the MODE switch at "BAR".
- (2) Adjust the VR so that the voltage is equalized at the points of "a", "b", "c" and "d" (see the figure below).

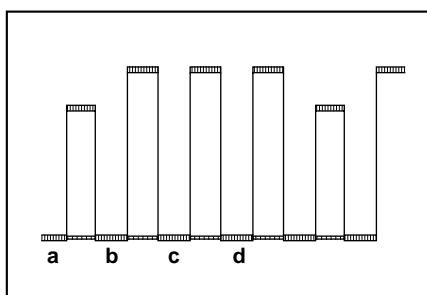


Fig. 2-1-11 Encoder Pb gain

24. Dynamic shading

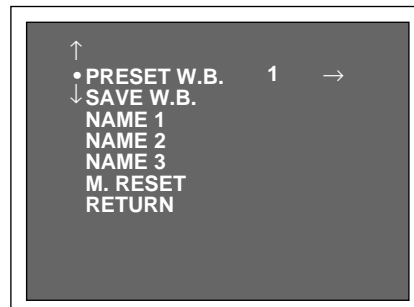
Signal	Shoot a white paper or the like under the standard shooting condition.
Mode	<ul style="list-style-type: none"> CAMERA Set the WHITE BALANCE switch at "MANUAL". Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	-
Test point	<ul style="list-style-type: none"> Monitor screen
External trigger	-
Adjustment parts	VR1503[Dynamic shading]
Specified value	Vertical tint observed on the monitor screen is minimized by the VR.

- (1) Set the MODE switch at "CAMERA".
- (2) Shoot a white paper or the like under the standard shooting condition.
- (3) Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- (4) While looking at the monitor screen, adjust the VR to minimize the vertical tint.

2.1.5 Setting of white balance

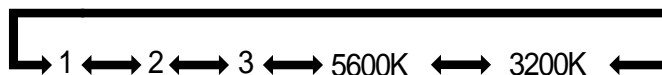
When setting the preset white balance (3200K/5600K) or user's original white balance (1 to 3), follow the procedure mentioned below. (The preset value of 3200K/5600K is the initial setting on shipment from the factory. Keep it in mind that the preset value will be eliminated from the memory if it is changed for another.)

- (1) Set the GAIN switch on the front panel at "NORMAL". While pressing the GAIN UP and DOWN switches together, turn the MENU switch on to get the SERVICE MENU to appear on the display.

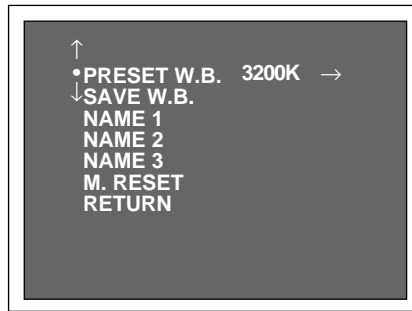


Display of SERVICE MENU

- (2) Show the name of white balance on the display.
 - ① Select "PRESET W.B." with the UP or DOWN key of the MENU.
 - ② Get the name of desired white balance to appear on the display with the RIGHT or LEFT key of the MENU. Each time the RIGHT/LEFT key is pressed, the indication changes as shown below. (1 to 3 are the symbols of user's original white balance.)

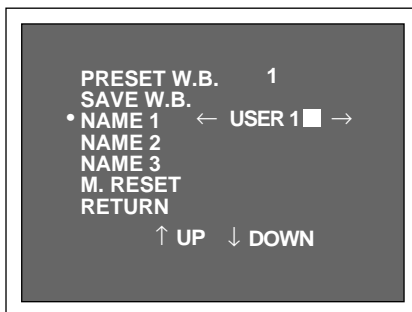


Example: When the white balance of 3200K is selected, the indication of the SERVICE MENU is as shown below.

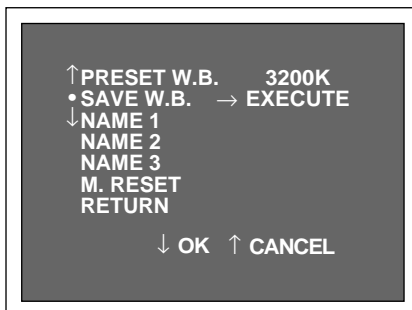


- (3) When a user's original white balance (1, 2 or 3) is selected, enter the name of the white balance. (Select the number following the name corresponding to the number of the user's original white balance.)
- ① Characters selective for input are "A to Z", "0 to 9", ".", ":", "-", "/" and space.
 - ② For inputting a name, select the preset name with the UP or DOWN key of the MENU and then press the RIGHT key to enter the MENU into the character input mode.
 - ③ Select characters with the UP and DOWN keys of the MENU in the character input mode. Use the RIGHT and LEFT keys to move the cursor.
 - ④ To quit the character input mode, move the cursor to the preset name selection mode with the RIGHT or LEFT key.

Example: When "USER 1" is entered as the name of the user's original white balance "1" (NAME 1), the indication of the SERVICE MENU is as shown below.

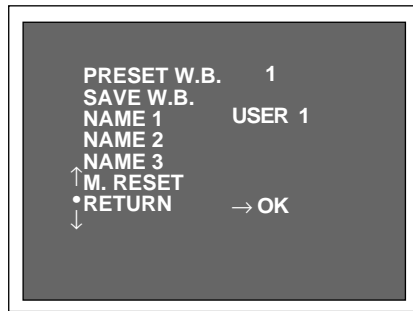


- (4) Set a white balance automatically or manually.
- ① For setting a white balance manually, use the R/B VR on the front panel.
 - ② For setting a white balance automatically, continue to press the SET button until the "AUTO WHITE OK" message appears on the display while shooting a white chart with the lens set in the defocus status under the specified lighting condition (specified color temperature and illuminance).
- (5) Save the setting of the white balance in the memory.
- ① Move the cursor to "SAVE W.B." with the UP or DOWN key of the MENU, and then press the RIGHT key.

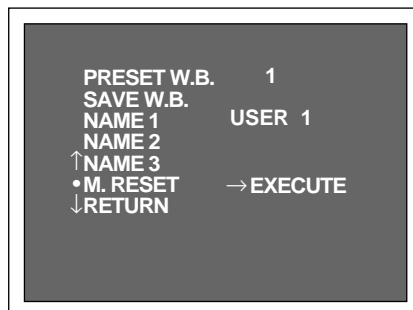


- ② To save the setting of the white balance in the memory, select "OK" with the DOWN key. To cancel this saving operation, select "CANCEL" with the UP key.

- (6) With completion of setting the white balance and saving it in the memory, move the cursor to "RETURN" with the UP or DOWN key of the MENU and then press the RIGHT key to revert the MENU to the standard status (initial status).



- (7) Effectuate the setting of user's original white balance (USER 1 to 3).
- ① Set the WHITE BALANCE switch on the front operation panel at "PRESET".
 - ② Select a setting of user's original white balance (1 to 3) for "PRESET W.B." of the standard menu.
 - ③ Set the standard MENU switch to "OFF".
 - ④ When a user's original white balance is selected, the 3200K/5600K switch for the preset white balance is ineffective.
- (8) M. RESET (MASTER RESET)
To recover the initial MENU status for all settings of user's original white balance (USER 1 to 3) and preset white balance, execute the function of "M. RESET".



- ① Set the WHITE BALANCE switch on the front operation panel at "PRESET".
- ② Select a setting of user's original white balance (1 to 3) for "PRESET W.B." of the standard menu.
- ③ Set the standard MENU switch to "OFF".
- ④ When a user's original white balance is selected, the 3200K/5600K switch for the preset white balance is ineffective.

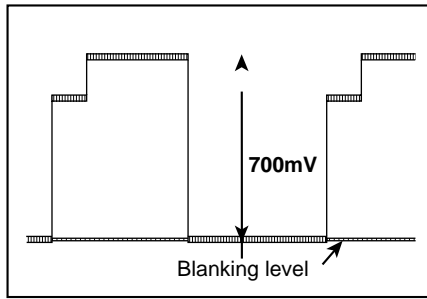


Fig. 2-1-16 Encoder G gain

16. R gain for tint adjustment

Signal	Shoot the white chart under the standard shooting condition.
Mode	<ul style="list-style-type: none"> CAMERA Set the WHITE BALANCE switch at "MANUAL". Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> TP2301[Pr]
External trigger	<ul style="list-style-type: none"> TP2406 (VD) Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR1401[R IN GAIN]
Specified value	Minimum signal level at the test point.

- (1) Set the MODE switch at "CAMERA".
- (2) Shoot the white chart under the standard shooting condition.
- (3) Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- (4) Adjust the VR to minimize the signal level at the test point.

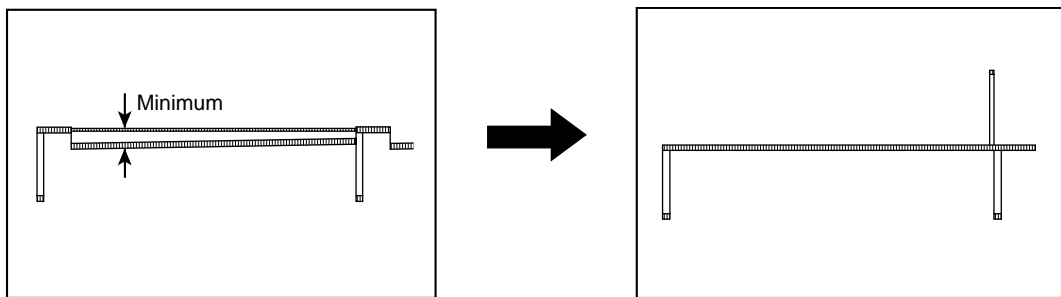


Fig. 2-1-17 R gain for tint adjustment

17. B gain for tint adjustment

Signal	Shoot the white chart under the standard shooting condition.
Mode	<ul style="list-style-type: none"> CAMERA Set the WHITE BALANCE switch at "MANUAL". Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> TP2406[Pb]
External trigger	<ul style="list-style-type: none"> TP2406 (VD) Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR1301[B IN GAIN]
Specified value	Minimum signal level at the test point.

- (1) Set the MODE switch at "CAMERA".
- (2) Shoot the white chart under the standard shooting condition.
- *3) Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- (4) Adjust the VR to minimize the signal level at the test point.

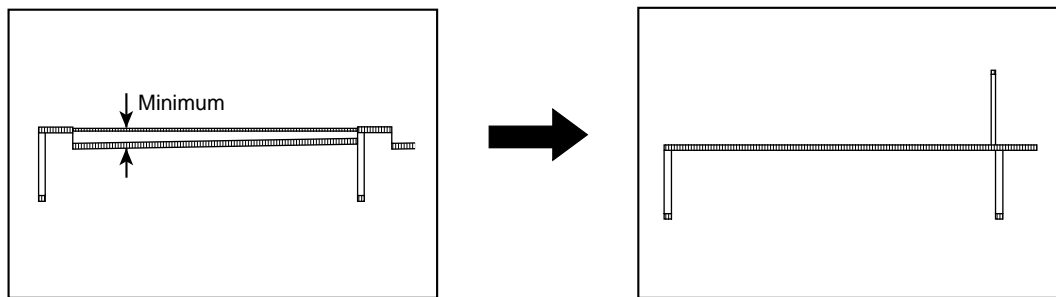


Fig. 2-1-18 B gain for tint adjustment

18. G1 and G2 balance (horizontal)

Signal	Shoot the white chart under the standard shooting condition.
Mode	<ul style="list-style-type: none"> CAMERA Set the WHITE BALANCE switch at "MANUAL". Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> Y OUT terminal
External trigger	<ul style="list-style-type: none"> TP2406 (VD) Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR1201[G2 IN GAIN]
Specified value	Minimum signal level at the test point.

- (1) Set the MODE switch at "CAMERA".
- (2) Shoot the white chart under the standard shooting condition.
- (3) Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- (4) Adjust the VR so that the signal level of the test point is minimized in the center of the waveform (in the center of the monitor screen).

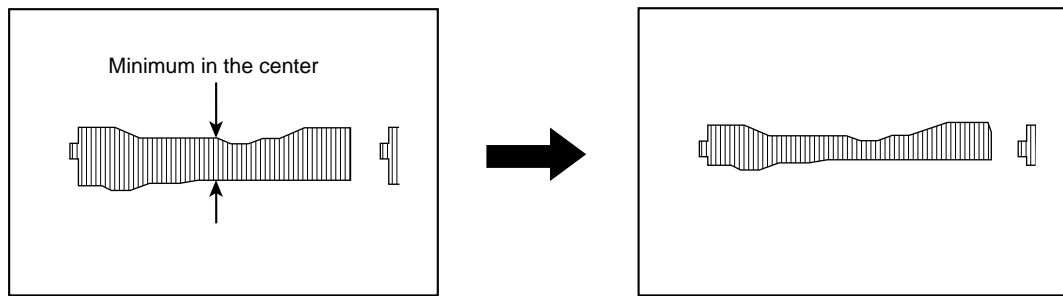


Fig. 2-1-19 G1 and G2 balance (horizontal)

19. G1 and G2 balance (vertical)

Signal	Shoot the white chart under the standard shooting condition.
Mode	<ul style="list-style-type: none"> • CAMERA • Set the WHITE BALANCE switch at "MANUAL". • Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> • Y OUT terminal
External trigger	<ul style="list-style-type: none"> • TP2406 (VD) • Use TP2402, 2404 or the chassis as the ground.
Adjustment part	VR1504[G1/G2 vertical deflection adjustment]
Specified value	Minimum signal level at the test point.

- (1) Set the MODE switch at "CAMERA".
- (2) Shoot the white chart under the standard shooting condition.
- (3) Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- (4) Adjust the VR to minimize vertical deflection of the signal level in the right and left sides of the waveform.

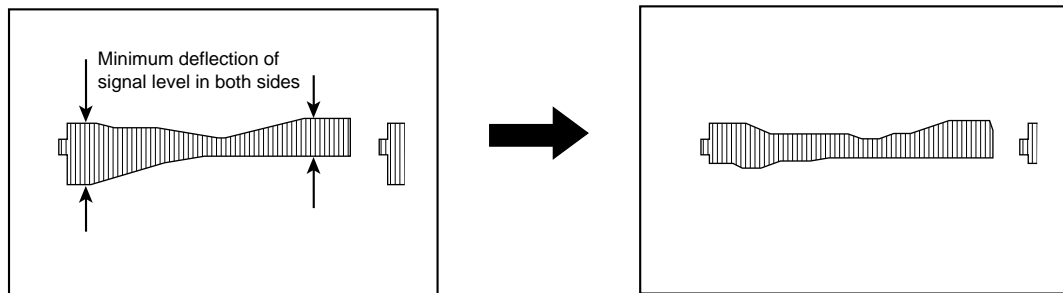


Fig. 2-1-10 G1 and G2 balance (vertical)

20. G1 and G2 balance (fine adjustment)

Signal	Shoot the gray scale chart under the standard shooting condition.
Mode	<ul style="list-style-type: none">• CAMERA• Set the WHITE BALANCE switch at "MANUAL".• Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	-
Test point	<ul style="list-style-type: none">• Monitor screen
External trigger	-
Adjustment parts	VR1201[G2 IN GAIN] VR1504[G1/G2 vertical deflection adjustment]
Specified value	Adjust the VRs so that no scanning line is observed on the monitor screen.

- (1) Set the MODE switch at "CAMERA".
- (2) Shoot the gray scale chart under the standard shooting condition.
- (3) Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- (4) While looking at the monitor screen, fine adjust VR1201 so that horizontal scanning lines become hard to see in the center part of the screen.
- (5) While looking at the monitor screen, fine adjust VR1504 so that vertical scanning lines become hard to see in the center part of the screen.

21. Automatic AGC

Signal	Shoot the gray scale chart under the standard shooting condition.
Mode	<ul style="list-style-type: none">• CAMERA• Set the WHITE BALANCE switch at "MANUAL".• Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none">• TP1507[APL]
External trigger	<ul style="list-style-type: none">• TP1508[NT VD]
Adjustment part	VR1507[AMP GAIN]
Specified value	Peak voltage of the signal at the test point is 1.35 V when it is observed at the V-rate.

- (1) Set the MODE switch at "CAMERA".
- (2) Shoot the gray scale chart under the standard shooting condition.
- (3) Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- (4) While observing the signal of the test point with an oscilloscope set at the V-rate, adjust the VR so that the peak voltage of the signal is 1.35 V.

22. Automatic DC balance

Signal	Shoot the gray scale chart under the standard shooting condition.
Mode	<ul style="list-style-type: none"> CAMERA Set the WHITE BALANCE switch at "MANUAL". Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	Oscilloscope
Test point	<ul style="list-style-type: none"> TP1505[APL]
External trigger	<ul style="list-style-type: none"> TP1508[NT VD]
Adjustment part	VR1506[DC BAL]
Specified value	Voltage of the signal at the test point is levelled as flat as possible when it is observed at the V-rate.

- Set the MODE switch at "CAMERA".
- Shoot the gray scale chart under the standard shooting condition.
- Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- While observing through the oscilloscope set at the V-rate, adjust the VR so that the voltage of the signal at the test point is levelled as flat as possible.

23. Gen-lock PLL

Signal	<ul style="list-style-type: none"> Shoot the gray scale chart under the standard shooting condition. Input Y signal or composite sync signal of HDTV standard to the GEN-LOCK terminal of the CCU.
Mode	<ul style="list-style-type: none"> CAMERA MENU ON
Test instrument	-
Test point	<ul style="list-style-type: none"> Monitor screen
External trigger	-
Adjustment part	VR1701[PLL]
Specified value	Characters appearing on the monitor screen are stabilized by the VR.

- Set the MODE switch at "CAMERA".
- Input Y signal or composite sync signal of the HDTV standard to the GEN-LOCK terminal of the CCU.
- Shoot the gray scale chart under the standard shooting condition.
- Set for the MENU ON mode to display characters on the monitor screen.
- Adjust the VR so that characters are stabilized on the monitor screen.

24. Dynamic shading

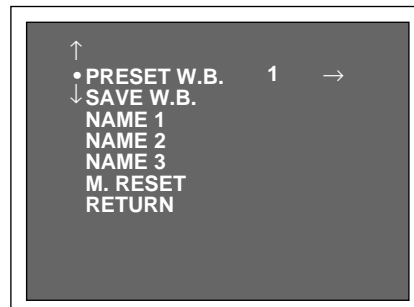
Signal	Shoot a white paper or the like under the standard shooting condition.
Mode	<ul style="list-style-type: none"> CAMERA Set the WHITE BALANCE switch at "MANUAL". Set the R/B adjustment VRs at the respective center detent positions.
Test instrument	-
Test point	<ul style="list-style-type: none"> Monitor screen
External trigger	-
Adjustment parts	VR1503[Dynamic shading]
Specified value	Vertical tint observed on the monitor screen is minimized by the VR.

- Set the MODE switch at "CAMERA".
- Shoot a white paper or the like under the standard shooting condition.
- Set the WHITE BALANCE switch of the CCU at "MANUAL" and set the R/B adjustment VRs at the respective center detent positions.
- While looking at the monitor screen, adjust the VR to minimize the vertical tint.

2.1.5 Setting of white balance

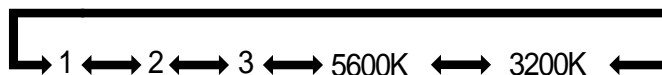
When setting the preset white balance (3200K/5600K) or user's original white balance (1 to 3), follow the procedure mentioned below. (The preset value of 3200K/5600K is the initial setting on shipment from the factory. Keep it in mind that the preset value will be eliminated from the memory if it is changed for another.)

- Set the GAIN switch on the front panel at "NORMAL". While pressing the GAIN UP and DOWN switches together, turn the MENU switch on to get the SERVICE MENU to appear on the display.

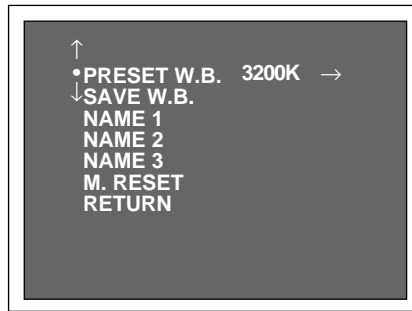


Display of SERVICE MENU

- Show the name of white balance on the display.
 - Select "PRESET W.B." with the UP or DOWN key of the MENU.
 - Get the name of desired white balance to appear on the display with the RIGHT or LEFT key of the MENU. Each time the RIGHT/LEFT key is pressed, the indication changes as shown below. (1 to 3 are the symbols of user's original white balance.)

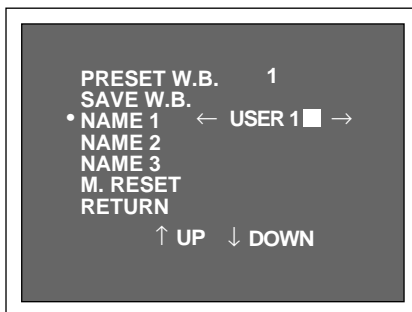


Example: When the white balance of 3200K is selected, the indication of the SERVICE MENU is as shown below.

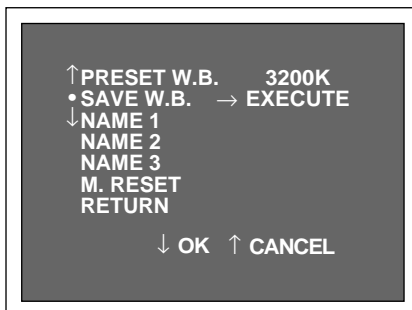


- (3) When a user's original white balance (1, 2 or 3) is selected, enter the name of the white balance. (Select the number following the name corresponding to the number of the user's original white balance.)
- ① Characters selective for input are "A to Z", "0 to 9", ".", ":", "-", "/" and space.
 - ② For inputting a name, select the preset name with the UP or DOWN key of the MENU and then press the RIGHT key to enter the MENU into the character input mode.
 - ③ Select characters with the UP and DOWN keys of the MENU in the character input mode. Use the RIGHT and LEFT keys to move the cursor.
 - ④ To quit the character input mode, move the cursor to the preset name selection mode with the RIGHT or LEFT key.

Example: When "USER 1" is entered as the name of the user's original white balance "1" (NAME 1), the indication of the SERVICE MENU is as shown below.

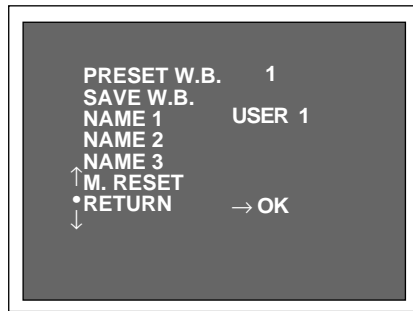


- (4) Set a white balance automatically or manually.
- ① For setting a white balance manually, use the R/B VR on the front panel.
 - ② For setting a white balance automatically, continue to press the SET button until the "AUTO WHITE OK" message appears on the display while shooting a white chart with the lens set in the defocus status under the specified lighting condition (specified color temperature and illuminance).
- (5) Save the setting of the white balance in the memory.
- ① Move the cursor to "SAVE W.B." with the UP or DOWN key of the MENU, and then press the RIGHT key.

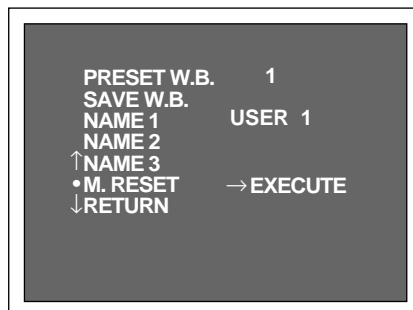


- ② To save the setting of the white balance in the memory, select "OK" with the DOWN key. To cancel this saving operation, select "CANCEL" with the UP key.

- (6) With completion of setting the white balance and saving it in the memory, move the cursor to "RETURN" with the UP or DOWN key of the MENU and then press the RIGHT key to revert the MENU to the standard status (initial status).



- (7) Effectuate the setting of user's original white balance (USER 1 to 3).
- ① Set the WHITE BALANCE switch on the front operation panel at "PRESET".
 - ② Select a setting of user's original white balance (1 to 3) for "PRESET W.B." of the standard menu.
 - ③ Set the standard MENU switch to "OFF".
 - ④ When a user's original white balance is selected, the 3200K/5600K switch for the preset white balance is ineffective.
- (8) M. RESET (MASTER RESET)
To recover the initial MENU status for all settings of user's original white balance (USER 1 to 3) and preset white balance, execute the function of "M. RESET".



- ① Set the WHITE BALANCE switch on the front operation panel at "PRESET".
- ② Select a setting of user's original white balance (1 to 3) for "PRESET W.B." of the standard menu.
- ③ Set the standard MENU switch to "OFF".
- ④ When a user's original white balance is selected, the 3200K/5600K switch for the preset white balance is ineffective.

SECTION 3 INSTALLATION MANUAL

For installing and operating the system which this camera is incorporated in, be sure to follow the instructions mentioned below.

1. Use the AA-V31E isolation transformer to supply the power to every unit of the system.
2. Ground the AA-V31E. (Please refer to “4. Check of grounding (AA-V31E)”))
3. Cover disused power outlets of the AA-V31E with protection brackets respectively.

1. Safety precautions

- Before starting installation, carefully read “Safety precautions” appearing on pages 3 to 6 of the instructions.

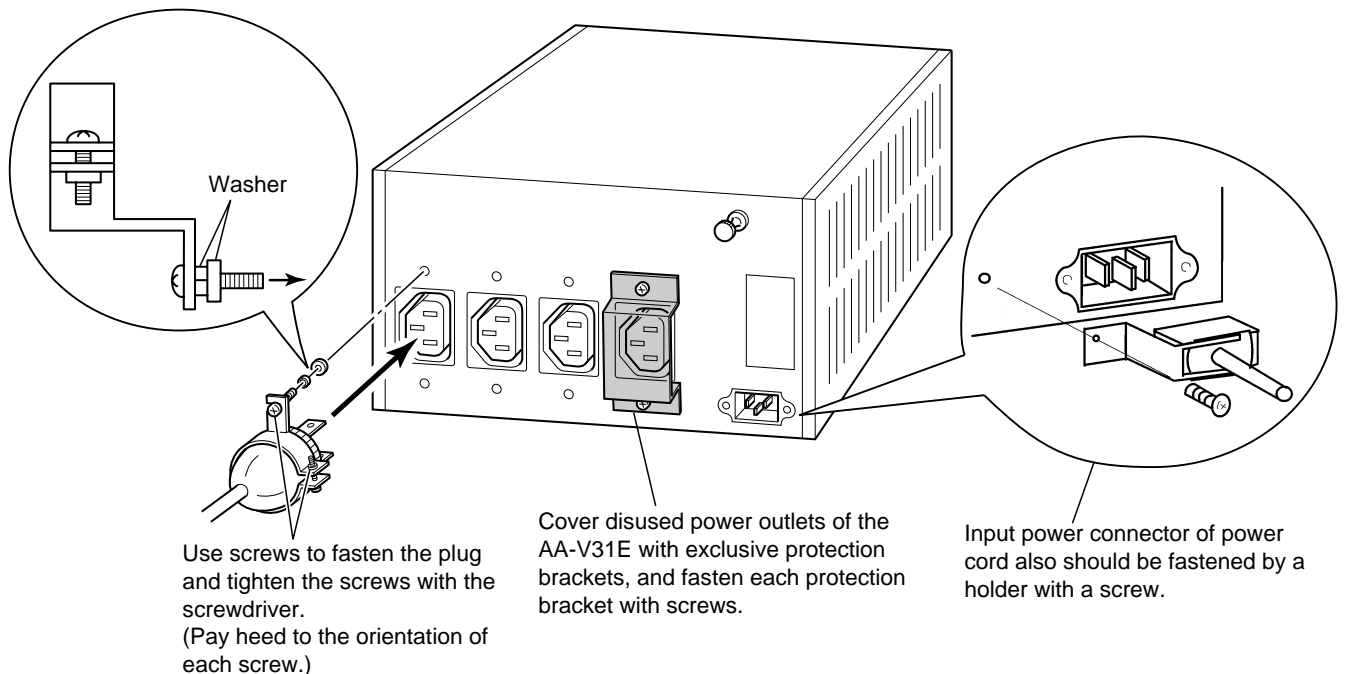
2. Connection of system components

- Connect each unit referring to “Connection” appearing on page 9 of the instructions.
- Please install isolation transformer near the equipotential terminal of video cart.
- When installing the system, power supply cords should be routed so that they are not pinched by items placed upon or against them. Besides that, when moving the system, please pay special attention to power cords as the cart will not be fallen down. Please do not connect other equipment to the signal in - or outputs during use of the system at the patient - unless you are using facility for galvanic separation, e.g. electro-optical transmitter.

The system may not be changed without additional checking of the safety provisions of EN 60601-1-1. Please note that the party (person or company) which is assembling, installing or modifying a medical system is responsible that it complies with all relevant requirements of that standard.

3. Connection of each unit to the power supply unit

- Connect the power cable of each unit to the isolation transformer (AA-V31E) referring to the following figure. The plug of each power cable must be fastened by a band and a holder, which needs to be fastened with a screwdriver.



When fastening the band to the AA-V31E with an exclusive screw, be sure to put two washers (two different types) on the screw so that they are inserted between the band and the AA-V31E.

- When fitting the cover to the DZ-VCA1SE for medical use, be sure to disconnect the power cord from the AC outlet in the hospital/clinic to avoid getting an electric shock.
- Be careful not to insert a screwdriver or the like into the AC outlet.

4. Check of grounding (AA-V31E)

- If the AA-V31E is connected to an AC outlet that is not grounded or is poorly grounded, the indicator lamp of the AA-V31E goes on. In such a case, reconnect the AA-V31E to another AC outlet that is perfectly grounded.

5. Check of operation

- Check main operations of the system referring to the instructions.

6. Liaison slip of customer data

- When all the above-mentioned work is complete, fill out the liaison slip of customer data and send it to the sales office concerned.

7. Sterilization

When returning to repair this camera, the camera head must be sterilized by following the instructions of the sterilizing apparatus referring to the following example of sterilization.

Example of sterilization

- Sterilization by ethylene oxide gas

Gas composition	: Ethylene oxide gas	20%
	Carbon dioxide	80%
Temperature	: 104° to 140°F	
Humidity	: 40 to 60% RH	
EO density	: 500 to 600 mg/liter	
Action time	: 4 hours	
Degassing method	: Aeration	
Shelf condition	: By aerator, 122°F	
Shelf time	: 18 hours or more	
	(48 hours or more at the room temperature and a general atmospheric pressure)	

This equipment is not waterproof.
Don't sterilize the equipment and accessories in a way other than the above-mentioned condition, otherwise it may cause a failure in the equipment.

8. Report of complaints dealt with

When a complaint about the system is settled on the spot (except repair of system failure), write details of dealing with the complaint in the part of "Details of complaint and progress to settlement" of the "Complaint reception slip about medical instrument GMP (Good Manufacturing Practice)", and send the slip to the following addresses.

JVC Professional Product (UK) Limited
United Kingdom, Ireland
Ullswater House, Kendal Avenue, London, W3 0XA U.K.

JVC Professional Product GmbH
Germany
Gruener Weg 10, D-61169 Fredberg/Hessen Germany