Operation
Manual

FP-Z31

Portable Color Camera

Hitachi Denshi, Ltd.

CONTENTS

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

MODEL FP-Z31/Z31L/Z31P
PORTABLE COLOR CAMERA
Operation Manual

1. GENERAL

The Hitachi FP-Z31/Z31L is a 3-tube portable color camera employing 2/3-inch electromagnetic facusing/electrostatic deflection (MS type) tubes. It is designed to feature a high quality picture with a horizontal resolution of 750 lines (SATICON*)/650 lines (Plumbicon**) and a signal-to-noise ratio of 58 dB (SATICON)/56 dB (Plumbicon). Equipped with a wide range of automatic functions, this is a high-quality camera for professional uses embodying superior cost performance. Featuring Automatic Beam Optimizer (ABO), auto iris and microcomputer-based auto white, auto black, auto centering***, auto setup*** functions etc., the camera has excellent operational ease and displays sharp and clear pictures which can be produced even by non-skilled operators. The camera comes with a wide range of accessories which open up a whole host of applications both as a portable camera with top-notch mobility and as a studio camera.

* "SATICON" is a registered trademark.

** "Plumbicon" is a registered trademark.

*** These features are not provided with the model FP-Z31L.

Features

(1) High sensitivity

A high-performance f1.4 prism optics assures a high level of sensitivity. The +9 dB or +18 dB high gain function and the low-noise amplifier provide sharp and clear pictures under poor lighting conditions.

(2) High resolution and high signal-to-noise ratio

The adoption of electromagnetic focusing/electrostatic deflection type of pickup tube provides a high resolution evently over the entire picture from the center to the corners. Furthermore, the new structure (LOC-Low Capacitance type) adopted for the pickup tubes and the low-noise amplifier assembled into the yoke assembly contribute to the high signal-to-noise ratio (horizontal resolution of 750 lines (SATICON)/650 lines (Plumbicon) at center and a typical 58 dB (SATICON)/56 dB (Plumbicon) SN ratio for NTSC, PAL-M and 55 dB (SATICON)/53 dB (Plumbicon) for PAL-B).

(3) Automatic beam optimizer

The built-in automatic beam optimizer reduces comet-tailing and expands the dynamic range up to approximately 8 times the rated light.

(4) Auto white/auto black balance and memory function

The built-in microcomputer makes it possible to adjust the white balance and black balance automatically with a single switch operation. The adjusted values are retained for about two years (typically) by the memory function even when the camera's power is switched off.

Once the GAIN AUTO/PRESET switch has been set to the PRESET position, the white balance is set to 3,200 K and so shooting can start immediately without setting the white balance manually when the camera operator is in a hurry.

(5) Auto iris, auto iris close functions

The self-contained auto iris circuit automatically controls the lens iris and provides sharp and clear pictures. NAM (Non-Additive mixing) and weighting functions of iris control have been added to this circuit for stable operation even with monochromatic lighting or with the shooting of objects against a bright sky in the background.

In order to safeguard the pickup tubes from any kind of damage, the iris automatically closes while the auto black circuit is functioning when the

camera's OPE/STANDBY switch is at the STAND-BY position and its BAR/CAM switch is at the BAR position.

(6) Auto centering (FP-Z31/Z31P only)

The centering is automatically adjusted by the auto centering circuitry which employs a micro-computer. The adjusted value is retained by the memory function even when the camera's power is switched off.

(7) Auto setup (FP-Z31/Z31P only)

The black level set, black balance and white balance are all set automatically by means of simple switch operations and the adjusted values are retained by the memory function.

(8) Automatic black level (ABL) adjustment

The black level goes down automatically and adjusted for a sharper, better contrasted picture when the whole picture appears whitish when shooting under backlight or similar conditions.

(9) Flare compensation

Any flare generated by the lens, prism optics or pickup tubes is automatically compensated for to provide a picture quality in which the black is even and pure.

(10) Centering compensation function (FP-Z31/Z31P only)

Any shifts in the centering caused by temperature rise of the prism optics are compensated for in an on-line, real-time by the microcomputer.

(11) Fault diagnosis function (FP-Z31/Z31P only)

If there is anything wrong with the results of the auto setup or auto centering, the camera operator is warned by a character display on the viewfinder and monitor output, and he is directed what operation to perform next.

(12) Title insertion function (FP-Z31/Z31P only)

The built-in character generator makes it possible to insert title characters into pictures during shooting.

(13) Split color bars

The built-in split color bars (NTSC) facilitate the 100% modulation setting when pictures are recorded on a video taperecorder (PAL-M, PAL-B: EBU color bars).

(14) Masking function

The camera is provided with a masking function. This enables fine color adjustments, such as those for skin colors, without impairing the white balance.

(15) 4 MIX 2H enhancer

A 2H enhancer with a comb filter is provided as a standard accessory. The horizontal contour signals are generated not only from the G signal but also from the R signal, and good picture quality in the meaning of resolution and modulation depth is produced as a result.

(16) Video level display

A tiger stripe display appears on the viewfinder screen to warn the camera operator that the video signal level is too high. This display makes it possible for the lens iris to be correctly adjusted even in manual control. The level display can also be switched off.

2. SPECIFICATIONS

2.1 Camera head

(1) Color system	:	NTSC, PAL-B, PAL-M
(2) Pickup tubes	:	2/3-inch MS-type SATICON or Plumbicon
(3) Encoding system	:	I, Q systems for NTSC U, V systems for PAL-B, PAL-M
(4) Sync system	:	Internal or genlock with the external VBS or BB signal
(5) Horizontal resolution	:	750 lines (SATICON)/650 lines (Plumbicon) at center of G-ch
(6) Signal-to-noise ratio	:	NTSC, PAL-M: 58 dB (SATICON)/56 dB (Plumbicon) Typically PAL-B: 55 dB (SATICON)/53 dB (Plumbicon) Typically (γ = 1, DTL off)
(7) Sensitivity	:	2000 lux, approx. f4 (SATICON)/f4.5 (Plumbicon) (3,200 K, 89.9% reflectance, on gray scale chart)
(8) High gain	:	0 dB, +9 dB, +18 dB
(9) Geometric distortion	:	Zone 2: 1% (within center circle of a diameter equal to picture width) Zone 3: 1.5% (elsewhere)
(10) Registration	:	Zone 1: 0.1% (within center circle of a diameter equal to 80% of picture height) Zone 2: 0.2% (within center circle of a diameter equal to picture width) Zone 3: 0.4% (elsewhere)
(11) Optical filter	:	3,200 K, 5,600 K, 5,600 K +1/8 ND
(12) Vertical contour compensation	:	2H
(13) Lens mount	:	Bayonet
(14) Power requirements	:	12V DC (+10.5 to +17V DC)
(15) Power consumption	:	20W approx (SATICON)/22W approx (Plumbicon) (camera head only) 2.8W approx. during standby
(16) Dimensions	:	98(W) x 270(H) x 330(D) mm (3.9 x 10.7 x 13 in)
(17) Weight	:	Approx. 4.9 kg (10.8 lb) (camera head only)

2.2 1.5 -inch viewfinder

(1) Input signal	:	1 Vp-p, composite video signal, sync negative
(2) Picture tube	:	1.5-inch B/W (40CB4 or equivalent)
(3) Power requirements	:	9V DC
(4) Power consumption	:	2W approx.
(5) Dimensions and weight	:	200(W) x 52(H) x 105(D) mm (7.9 x 2.1 x 4.2 in) 650 g approx. (1.5 lb)
(6) Resolution	:	350 lines at center, 300 lines at corners
(7) Maximum video gain	:	30 dB or more
(8) Maximum illumination	:	200 ft-L or more
(9) Deflection linearity	:	±10% (based on JIS—Japan Industrial Standards measurement method for deviation factor of H & V bar interval)
(10) Geometric distortion	:	3% or less

Specifications are subject to change without notice.

3. RATINGS

(1) Input signals

(a) GENLOCK input	:	VBS 1.0V ±3 dB or black burst (sync: 0.3 ±0.1 Vp-p, burst: 0.3 ±0.1 Vp-p)
(b) VF AUX input	:	VBS 1.0 Vp-p ±3 dB
(c) Audio signal (microphone output)	:	-60 dBm (with MC-30E microphone)

(2) Output signals

(a) CAM OUT	:	VBS 1 Vp-p, 75 ohms, BNC
(b) MON OUT	:	VBS or VS (composite R/G/B, R-G, B-G selection by switch). 1 Vp-p, 75 ohms, BNC output
(c) VTR VIDEO	:	VBS, 1.0 Vp-p, 75 ohms, parallel connection with VTR and ROU connectors
(d) R, G, B	:	0.7 Vp-p, high impedance, ROU connector
(e) AUDIO	:	-60 to -20 dBm (variable), parallel connection to VTR and ROU connectors

(3) Ambient temperatures

(a) Safety operation temperature	:	-20 to +40°C (-4 to +104°F)
(b) Storage temperature	:	-25 to +55°C (-13 to 131°F)

(4) Power supply voltage fluctuations:

12V DC rated input voltage (Stable operation with 10.5 to 17V DC power supply)

4. EXAMPLES OF SYSTEM CONFIGURATION

Three examples of system configuration are given in Fig. 4.1 to Fig. 4.3. Your nearest Hitachi Denshi representative should be consulted on other system configurations.

4.1 Basic ENG configuration

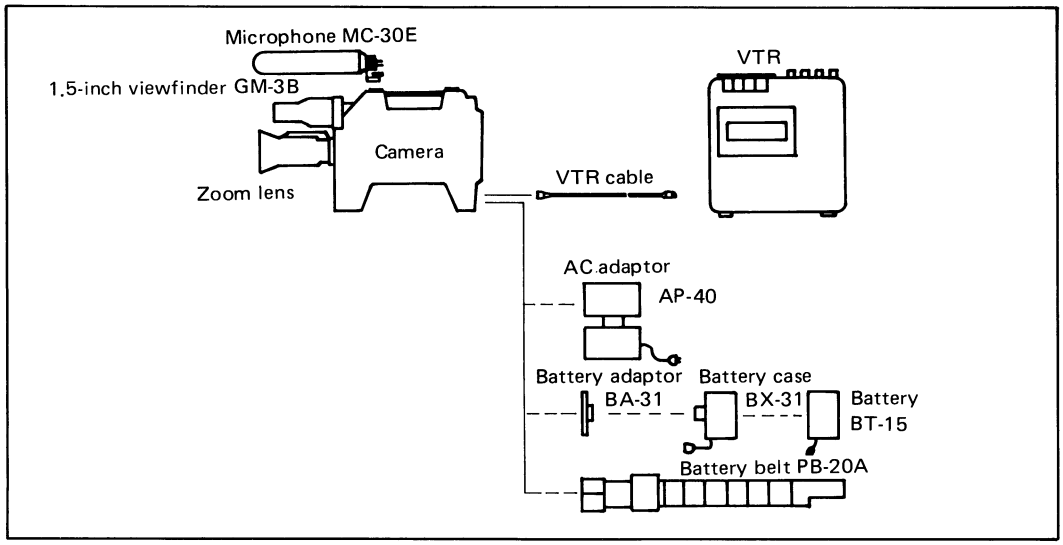


Fig. 4-1

4.2 Basic EFP configuration

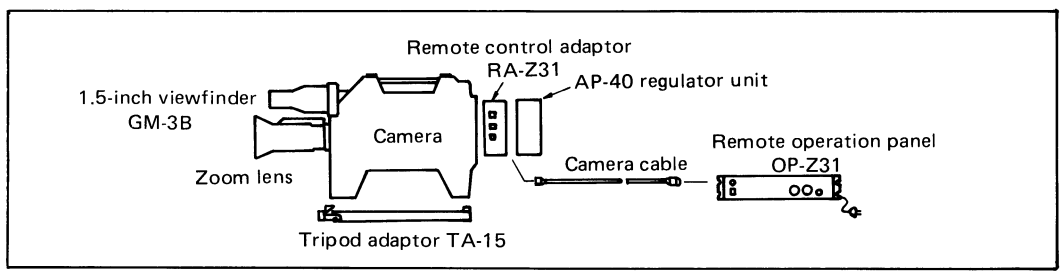


Fig. 4-2

4.3 Studio configuration

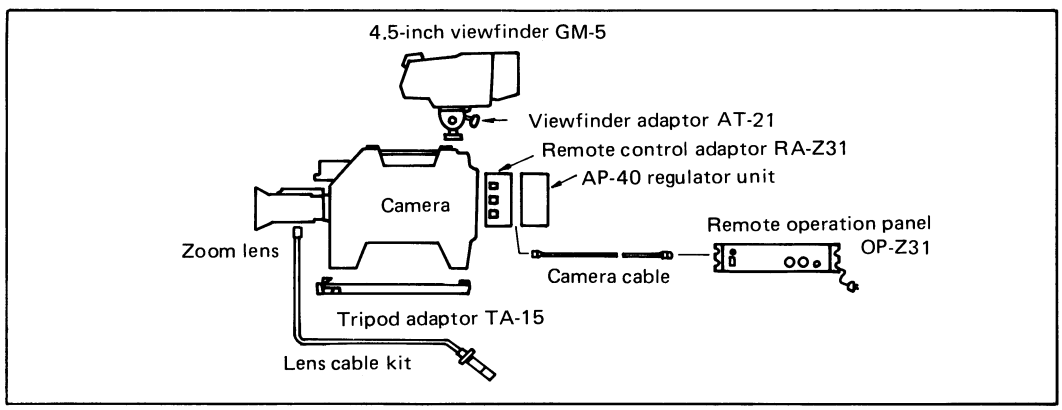


Fig. 4.3

	Equipment	Model	ENG configu-ration	EFP configu-ration	Studio configu-ration	Remarks
1	Camera	FP-Z31/Z31L	○	○	○	
2	1.5-inch viewfinder	GM-3B	○	○		
3	4.5-inch viewfinder	GM-5			○	
4	Viewfinder adaptor	AT-21			○	
5	10x zoom lens	181H	○*1	○*1	○*1	
6	14x zoom lens	466HE/466HD	○*1	○*1	○*1	
7	10x zoom lens	A10x10BRM-17	○*1	○*1	○*1	
8	12x zoom lens	A12x9BERM-87	○*1	○*1	○*1	
9	14x zoom lens	A14x10BRM-67	○*1	○*1	○*1	
10	14x zoom lens	A14x9BERM-67	○*1	○*1	○*1	
11	17x zoom lens	A17x9BERM-67		○*1	○*1	
12	13x zoom lens	J13x9B4IRSII	○*1	○*1	○*1	
13	15x zoom lens	J15x9.5B4KRS	○*1	○*1	○*1	
14	Lens cable kit	ZL-21W			○*2	For 181H, 466 HE
15	Lens cable kit	ZL-20W			○*2	For A series lens
16	Lens cable kit	ZL-15W			○*2	For J series lens
17	Battery belt	PB-20A	○*3			
18	Battery	BT-15	○*3			
19	Battery case	BX-31	○*3			
20	Battery adaptor	BA-31	○*3			
21	Battery charger	BC-20B	○*3			For PB-20A
22	Battery charge pack	BC-31	○*3			For BT-15
23	AC adaptor	AP-40	○*3			
24	Remote operation panel	OP-Z31		○*4	○*4	
25	Remote control adaptor	RA-Z31		○*4	○*4	OP-Z31 accessory
26	Camera cable 15m	C-152CR		○*4	○*4	
27	Camera cable 50m	C-502CR		○*4	○*4	
28	Camera cable 100m	C-103CR		○*4	○*4	
29	DCU	DU-22A		○*4	○*4	
30	Triaxial adaptor	TX-221S/R		○*4	○*4	
31	Triaxial cable	C-204-T5		○*4	○*4	200m

Table 1

	Equipment	Model	ENG configu-ration	EFP configu-ration	Studio configu-ration	Remarks
32	VTR cable 2m	C-201VG	○*5			U-matic 14-pin
33	VTR cable 2m	C-201VH	○*5			U-matic 10-pin VHS
34	VTR cable 5m	C-501VG	○*5			U-matic 14-pin
35	VTR cable 5m	C-501VH	○*5			U-matic 10-pin VHS
36	Microphone	MC-30E	△			
37	Tripod adaptor	TA-15	△	○	○	
38	Shoulder belt	SB-1	△			
39	Carrying case	CL-Z31	○			

Table 1 (continued)

○ : Equipment reguired for system configuration.
* : Select one out of those bearing the same number in line with the application in mind.
△ : Recommended equipment.

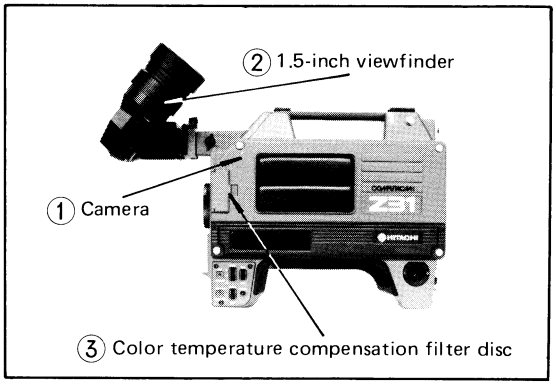


Fig. 5.1 Left side of camera

① Camera

② 1.5-inch viewfinder

③ Color temperature compensation filter disc

Select the filter in accordance with the color temperature of the object illumination source. The filter is selected by rotating the disc through one-fourth of a turn. Check that it is positioned at the click-stop and stop rotating. Three filters are provided: "3,200 K" for tungsten and halogen lamps, and "5,600 K" and "5,600 K + 1/8 ND" for sunlight. The filter numbers and color temperatures are indicated on the inside of the filter cover.

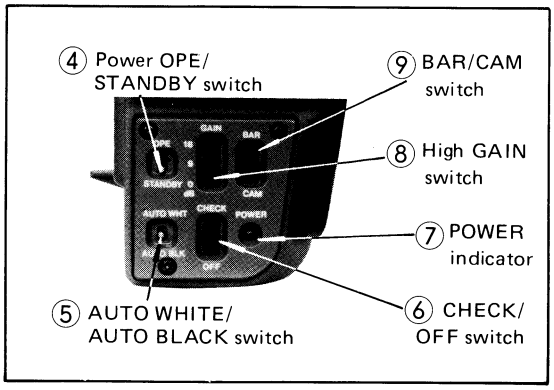


Fig. 5.2 Camera control section

④ Power OPE/STANDBY switch

The camera operates when this switch is set to OPE. When set to STANDBY, the camera is in the standby mode and only the lens and pick-up tube heaters are energized. When power is being supplied to the camera, the POWER indicator ⑦ lights whether the switch is set to OPE or STANDBY. Set the POWER switch at the rear of the camera to OFF when the camera is not to be operated for an extended period of time with power supplied from the battery. (Refer to ㉘ .)

⑤ AUTO WHT/AUTO BLK switch

Push the switch down to AUTO BLK for black balance settings. The iris closes automatically and the black balance setting is completed in several seconds. When this operation is being performed with the IRIS AUTO/MAN switch at AUTO, the iris will open after the setting; when the same switch is at MAN, the iris remains closed after the setting and so should be opened manually.

To set the white balance, shoot a white object so that it fills the screen and then set the switch to AUTO WHT position. The setting is completed in several seconds. For further details, refer to section 6.2(e)-(iii). Even if the lens IRIS AUTO/MAN switch is at MAN during an auto white operation, it is forcibly set to AUTO temporarily, and then the auto white setting is undertaken after the video level has been set to the appropriate value. Upon completion of the setting, the iris mode goes back to MAN. For further details, refer to sections 6.3.4 and 6.3.5.

⑥ CHECK/OFF switch

When the tiger stripes which appear on the viewfinder screen with an excessively high video level are a distraction during camera operation, they can be made to disappear by setting this switch to OFF. This switch must be set to ON for checking the video level. When tiger stripes appear in the viewfinder, it means that the video level is too high and thus the iris should be stepped down slightly. (Threse stripes will appear with a video level of 90% or more.)

⑦ POWER indicator

Power from the battery is consumed even when the power OPE/STANDBY switch ④ is at the STANDBY position. This indicator lights when power is supplied to the camera. Therefore, when the camera is not to be operated for a prolonged period of time, the POWER switch ㉘ at the rear of the camera should be set to OFF and it should be confirmed that the indicator has gone off.

⑧ HIGH GAIN switch

This switch can be set to increase the gain by 9 dB or 18 dB simultaneously for each channel (R, G, B). It should be set appropriately when there is not enough light. When set to 9 dB or 18 dB, the "A" indicator inside the 1.5-inch viewfinder lights to indicate high gain operation.

⑨ BAR/CAM selector switch

When this switch is set to the BAR position,* the camera output signals are switched into the color bar signals. Use them for camera and color monitor adjustments. The camera signals are fed out when the switch is set to the CAM position.

Note: When the BAR/CAM switch is set to the BAR position, the lens iris automatically closes.

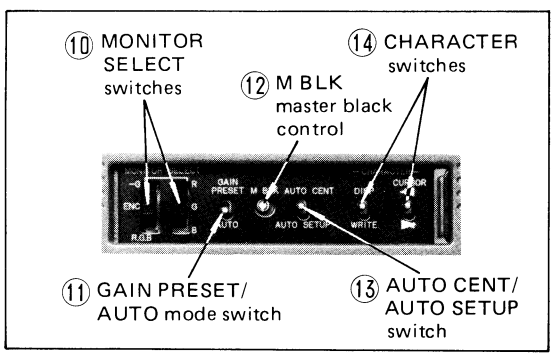


Fig. 5.3

⑩ MONITOR SELECT switches [-G, ENC, R.G.B., R/G/B]

These switches are used to switch the viewfinder and MON OUT (monitor output) signals and to select the ENC, R, G, B, R-G and B-G signals. When ENC is selected, the ENC signals are output to the MON OUT and the Y signal is output to the viewfinder.

Note 1: ENC signal selection takes priority and so the switch should be set to R.G.B to select the R, G, B signals.

Note 2: The -G signal is output when G and -G are selected simultaneously.

Note 3: When the -G signal is selected, the detail signal is cut off.

⑪ GAIN PRESET/AUTO switches

The switch sets the gain control mode to preset or auto.

PRESET: At this position the camera operates on the white balance adjusted with a 3,200 K color temperature set at (under a halogen lamp) the factory (with the filter disc at "1").
Set the switch to this position when there is no time to adjust the white balance. Auto white balance, auto centering* and auto setup* do not function at this position.

* The FP-Z31L does not have these functions.

AUTO: The switch is normally set to this position. The data in the memory, set during the auto white operation, are produced for the white balance adjustment.
When the camera is being used with the OP-Z31 remote operation panel or with the DU-22 digital command unit, this switch should be set to AUTO.

⑫ M BLK control

This control is provided for simultaneous adjustment of the black level of the R, G and B channels.

⑬ AUTO CENT/AUTO SETUP switch (FP-Z31/Z31P only)

The auto centering functions are activated by setting this switch to the AUTO CENT position, and red and blue pictures are automatically superimposed onto the green picture.
When the switch is set to the AUTO SETUP position, the black level setting, black balance and white balance are adjusted automatically with the BAR/CAM selector switch ⑨ set to CAM. If the switch ⑨ is at BAR, the black setting and black balance are adjusted automatically, the built-in test pulse is fed to preamplifier inputs, a check is automatically conducted to see if anything is wrong with the gain control system and the video levels of the R, G and B channels, and the results of this check are indicated in characters on the viewfinder and MON OUT. For further details, refer to sections 6.3.6 and 6.3.7.

⑭ CHARACTER switches [DISP/WRITE, CURSOR◀/▶] (FP-Z31/Z31P only)

DISP/WRITE switch

Every time this switch is set to the DISP, the viewfinder and MON OUT pictures are switched in the following sequence:

(1) Operation status and warning display (Normal mode).

*Color bar signals can not appear on the viewfinder. Color bar signals are fed out from MON OUT connector (32) only when the MONITOR SELECT switch (10) is set to the ENC position.

(2) Status display
(3) Title character setting display

The title characters (3) are output to CAM OUT in addition to the viewfinder and MON OUT.

When this switch is set to the WRITE position, characters can be selected and written. The characters which have been written are retained in the memory.

CURSOR switch

This switch determines where on the screen the characters should be written. When it is set to the ► position, the cursor moves from the top left to the right; when set to the ◄ position, it moves in the reverse direction. For further details, refer to sections 6.3.1 to 6.3.3.

Note: This switch does not function on the FP-Z31L.

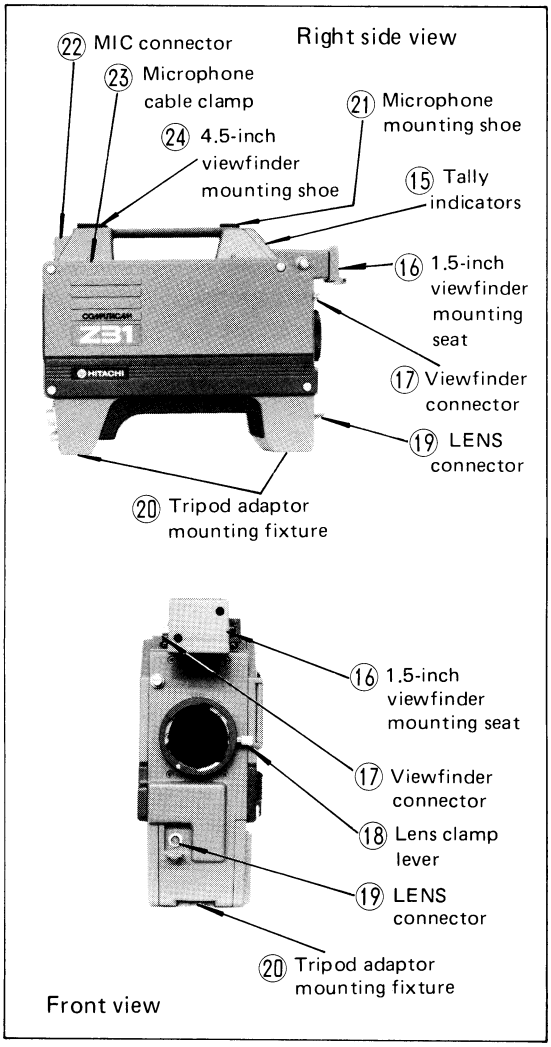


Fig. 5.4

⑮ Tally indicators

These indicators light in accordance with the external tally signals when the camera is being operated in a system employing a remote operation panel or when the VTR is set to the recording mode. They also light when the CALL button has been depressed for a call from the remote operation panel.

⑯ 1.5-inch viewfinder mounting seat

The fixture for the 1.5-inch viewfinder, GM-3B is slotted into the grooves and slid to the left or right onto this mounting seat. It is then secured with the screws on the fixture. For further details, refer to section 6.1.4(1).

⑰ Viewfinder connector

The viewfinder cable connector is inserted in the direction in which the guide key fits; the connector's locking ring is then rotated clockwise to lock the connector.

Note: It is not possible to use the 1.5-inch and 4.5-inch viewfinders at the same time.

⑱ Lens clamp lever

To mount the lens onto the camera, the lens is mounted with the lens clamp lever at a position approximately 20 degrees higher than the position shown in Fig. 5.4 and the lever is then rotated clockwise to clamp the lens. When mounting the lens, align the position of the lens guide key with the bayonet mount.

Securely hold the lens so that it will not drop when operating this lever to remove the lens.

⑲ LENS connector

The cable plug of the zoom lens is aligned with this connector and the guide key and inserted.

By the connection, the auto iris and power zoom operations are enabled. When the connector is to be disconnected, grasp the locking ring on the connector, pull it toward you to release the lock and then unplug the connector. Do not tug on the cable itself to unplug the connector.

⑳ Tripod adaptor mounting fixture

Refer to section 6.1.3 for details on how to attach the camera to the tripod adaptor.

㉑ Microphone mounting shoe

Insert the MC-30E microphone mounting foot into this shoe.

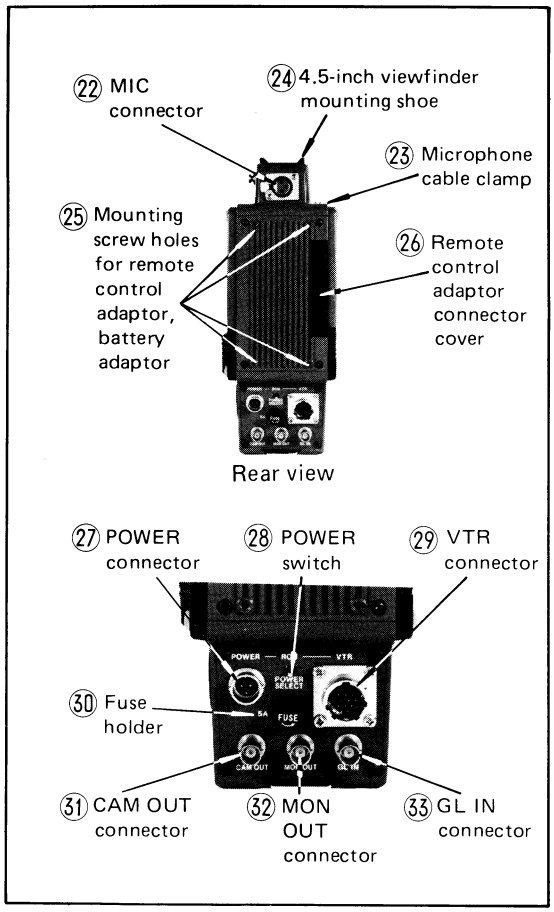


Fig. 5.5

㉒ MIC connector

Align the plug on the MC-30E microphone connector with the connector's guide key position and insert.

㉓ Microphone cable clamp

To attach the microphone, push the microphone cable into this clamp and secure.

㉔ 4.5-inch viewfinder mounting shoe

When the 4.5-inch viewfinder is to be used in place of the 1.5-inch viewfinder, insert the GM-5 4.5-inch viewfinder into this mounting shoe using the AT-21 viewfinder adaptor and secure. The viewfinder cable connector is then connected to the viewfinder connector ⑰ .

Refer to section 6.1.4(2) for details on how to attach the 4.5-inch viewfinder.

㉕ Mounting screw holes for remote control adaptor, battery adaptor

In systems employing a remote operation panel or a digital command unit, the mounting screws of the RA-Z31 remote control adaptor are inserted into these holes, and the screws are tightened to secure the adaptor. The BA-31 battery adaptor can be mounted when the camera is being used for portable applications.

㉖ Remote control adaptor connector cover [PUSH OPEN]

When attaching the RA-Z31 remote control adaptor using the holes ㉕ , push lightly on the center of this cover, slide it toward the left to open it. The connector for the RA-Z31 adaptor will then be accessible. To mount the RA-Z31, insert the RA-Z31's connector into this connector and then tighten up screws to secure.

㉗ POWER connector

The plug on an external power supply, such as the PB-20A battery belt, the AP-40 AC adaptor or the BX-31 battery pack, is connected to this connector.

㉘ POWER switch [POWER, POWER/ROU/VTR]

When this switch is set, the camera is set to the standby mode and POWER indicator ⑦ lights. To supply power from the POWER connector ㉗ , set the switch to POWER (left-hand position); to supply power from the VTR connector ㉙ , set to VTR (right-hand position); and to supply power from the remote operation panel, set to ROU (center position). With these settings, power is supplied to the heaters of the pickup tubes and to the zoom lens. Set this switch to off (position where power is not supplied), therefore, when the camera is not to be used immediately when power is being supplied from a battery.

㉙ VTR connector

When using a VTR, connect a specified VTR cable to this connector.

㉚ Fuse holder [5A]

A fuse (5A) has been placed in the power input line.

When the fuse has blown, first find out what caused it to blow and then replace it with the supplied fuse.

(Do not use any fuses other than the same kind as those supplied.)

㉛ CAM OUT connector

The color composite signal from the camera is fed out here (1 Vp-p, 75 ohms).

㉜ MON OUT connector

Connect a picture monitor (monochrome) to this connector for registration, focusing adjustments, etc. Besides the R, G and B signals, the ENC signal is selected by the MONITOR SELECT switch ⑩ .

When the G/-G signal is selected by the switch ⑩ , the -G signal is fed out.

㉝ GL IN connector

The black burst or color composite signal is connected to this connector when the camera is used in the genlock mode with other video systems. When it is used in the genlock mode with a system that uses the OP-Z31 remote operation panel, connect the black burst or color composite signal only to the GL IN connector of the OP-Z31 and nothing to the GL IN connector ㉝ of the camera.

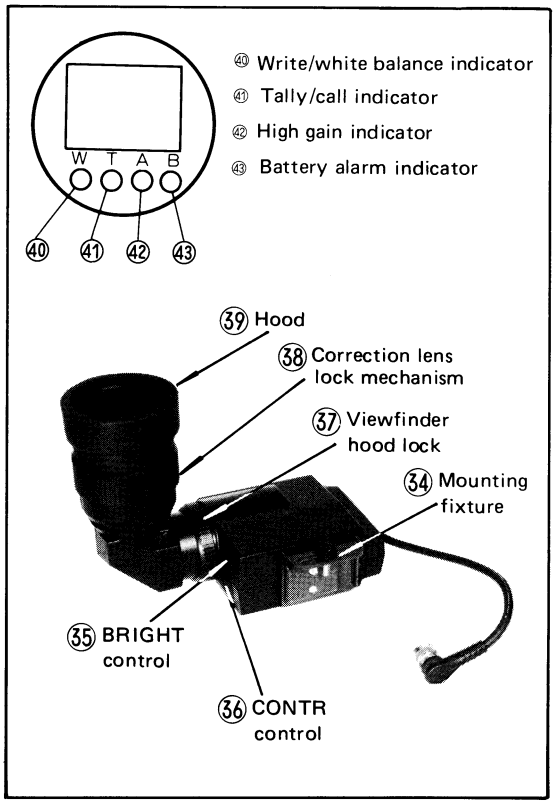


Fig. 5.6

㉞ Viewfinder mounting fixture

㉟ Brightness control (BRIGHT)

㊱ Contrast control (CONTR)

㊲ Viewfinder hood lock

Loosening this ring in the counterclockwise direction makes it possible to tilt the viewfinder hood vertically. Rotate it clockwise to a convenient angle and lock.

㊳ Correction lens lock mechanism

It is possible to change the distance between the viewfinder screen and the magnifying lens by loosening this ring in the counterclockwise direction and rotating the viewfinder hood ㊴ . If you have long sight and are prone to fatigue caused by looking through the viewfinder, loosen this lock and readjust the depth of focus.

㊴ Viewfinder hood

This hood can be used with the distance from the eye to the lens adjusted to either the "near" or "far" position. For the "far" position extend the hood; for the "near" position push the hood in.

㊵ Write mode indicator (FP-Z31/Z31P)/White balance indicator (FP-Z31L) [W]

FP-Z31/Z31P: "W" is indicated when the DISP/WRITE character switch ⑭ is set to the top position and the title write enable screen mode is produced. It indicates that titles can be written on the screen.

FP-Z31L: "W" lights for about 5 seconds after the auto white switch ⑤ has been operated, and the white balance achieved.

㊶ Tally indicator [T]

This indicator lights when the VTR is set to the recording mode, when an external tally signal has been supplied and when the CALL switch has been pressed employing the remote operation panel.

㊷ High gain indicator [A]

When the GAIN switch ⑧ has been set to 9 dB or 18 dB, the indicator lights to show that the camera is being used in the high gain mode.

㊸ Battery alarm indicator [B]

The indicator lights when the battery voltage drops to approximately 11.2 V. Although it depends on the characteristics of the battery and on the ambient temperature, trouble will occur with the camera operation several minutes after this indicator has come on. The battery should be replaced as soon as possible once the indicator lights.

6. OPERATION AND HANDLING PRECAUTIONS

6.1 How to assemble and connect the camera

6.1.1 Mounting the lens

A bayonet type of lens mount is used. Secure the lens to the camera with the lens holder lever ⑱.
When using the auto iris and power zoom functions with electrical power, connect the plug of the lens to the LENS connector ⑲.
When attaching the lens, set the filter disc ③ to "4" and set the external power unit switch to OFF first. (Power will still be supplid to the lens connected even when the POWER OPE/STANDBY switch ④ is set to STANDBY.)

6.1.2 Mounting the microphone

When securing the MC-30E microphone to the camera for use, mount it onto the microphone mounting shoe ㉑ and lock it into position with the microphone tightening nut. Connect the microphone cord plug to the MIC connector ㉒ and secure the microphone cable by the cable clamp ㉓.

6.1.3 Mounting the camera to the tripod

(1) Mounting the tripod adaptor

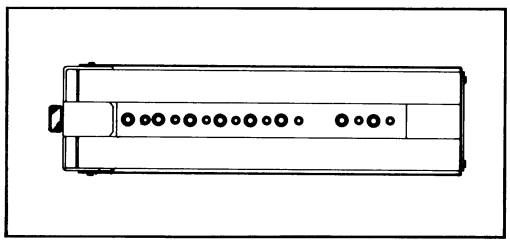


Fig. 6.1 Tripod adaptor bottom view

○ As shown in Fig. 6.1, 3/8"-16UNC and 1/4"-20UNC screw holes are provided. Select the hole that provides optimum balance in accordance with the weight of the tripod and camera being used.

(2) Using the tripod adaptor

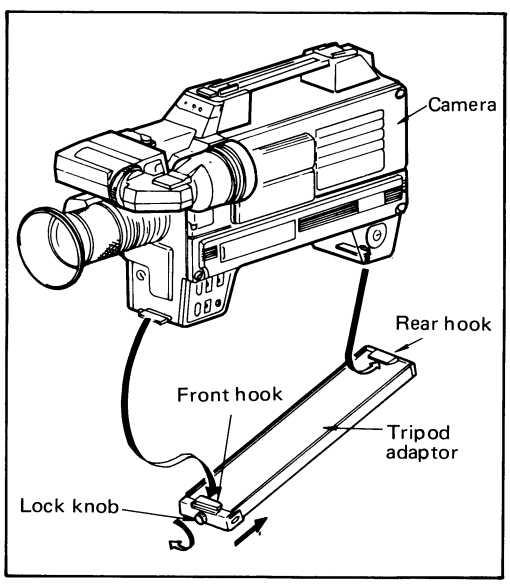


Fig. 6.2 Mounting the tripod adaptor

○ Loosen the lock knob of the tripod adaptor (TA-15), align the front and rear hooks on the adaptor with the hooks on the bottom of the camera, rotate the lock knob and tighten up.

6.1.4 Mounting the viewfinder

(1) 1.5-inch viewfinder

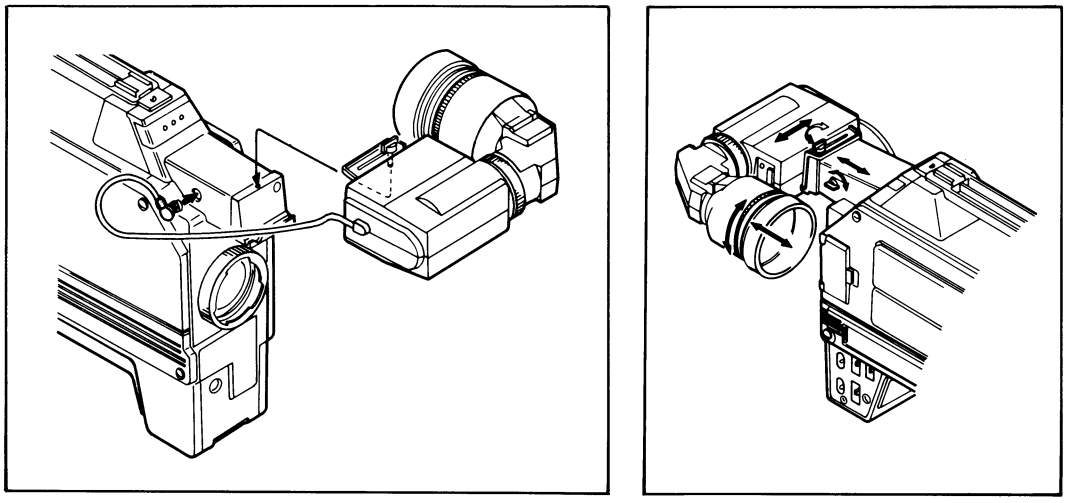


Fig. 6.3 Mounting a 1.5-inch viewfinder

- Attach the GM-3B viewfinder to the camera using its knob screw.
- Connect the GM-3B cable plug to the camera's viewfinder connector VF ⑰ .
- To adjust the viewfinder's lateral position, loosen the knob screw and then tighten it up again after the position has been determined.
- To adjust the viewfinder's longitudinal position, loosen the knob screw on the other side of the VF connector and then tighten it up again after the position has been determined.

(2) 4.5-inch viewfinder

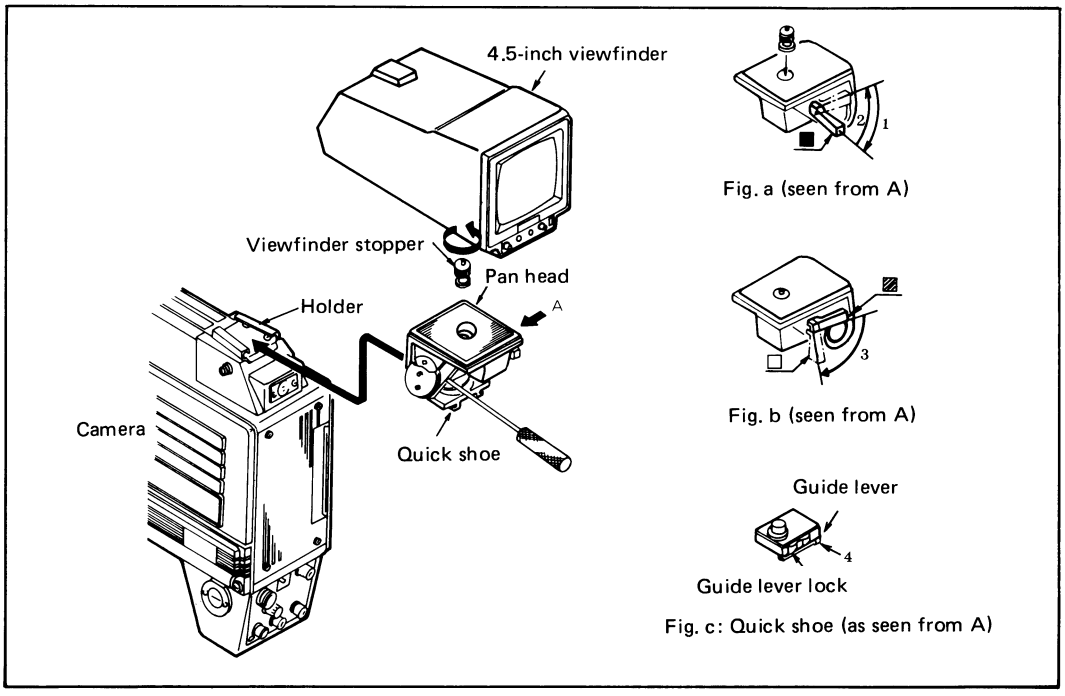


Fig. 6.4

- Screw the VF stopper in the direction shown by the arrow into the bottom of the 4.5-inch viewfinder.
- Raise the lever in the direction of the arrow (Fig. a) from the ▨ state. In the raised state ■, place the viewfinder on the pan head (the viewfinder stopper fits into the hole on the pan head). Next return the lever in the direction of the arrow (Fig. a) to the ▨ state. From the □ state, tighten the lever up in the direction of the arrow (Fig. b) as far as it will go and, in the □ state, the viewfinder will be properly secured.
- Interlock the holder on the camera with the quick shoe mounted on the pan head. (Interlock the two parts while pushing the guide lever in Fig. c in the direction of arrow "4". The pan head is secured properly when the guide leverlock is moved in the locking direction.)

6.1.5 Replacing the memory back-up battery

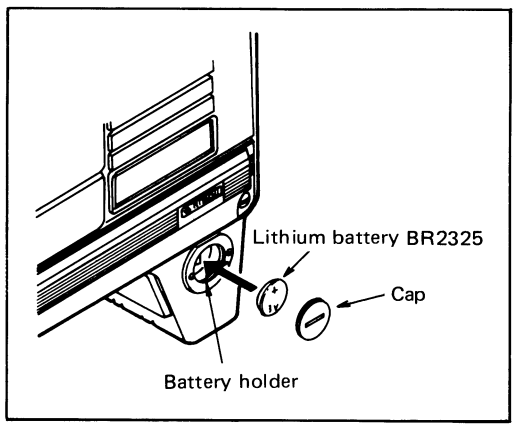


Fig. 6.5 Memory battery replacement

- Loosen the cap of the battery holder on the camera's rear foot and remove. Take out the old battery.
- Insert the new battery so that the negative pole is on the inside, screw in the holder's cap using a coin and tighten up.

Note 1: Use BR2325 lithium batteries and no other type.

Note 2: When handling the lithium battery, do not

- Cause shortcircuiting
- Throw the old battery into a fire
- Recharge the old battery
- Heat up the old battery
- Disassemble the old battery
- Connect the new battery with the polarities reversed.

Note 3: Reset the auto white balance, auto black balance, auto centering and auto set-up after the battery has been replaced.

6.2 Operational checks and initial adjustments

When the lighting equipment has been prepared upon completion of the assembly and connection operations, perform the operational checks on the camera in the order described below. Conduct the initial adjustments even when the camera has been stored or when it has not been used for a long period of time.

(1) Preheating

Set the external power unit to ON, the POWER switch ㉘ to ON and allow the camera to warm up with the power OPE/STANDBY switch ④ at STANDBY. (This warming-up serves to protect the camera tubes and prolong their service life.) Warm up for several dozen minutes.

(2) Color bar check

Color bar signals are obtained from the CAM OUT connector when the power OPE/STANDBY switch ④ is set to OPE and the CAM/BAR switch ⑨ is set to BAR. Check the black balance, white balance and color bar vectors in the color bar signals.

(3) Video signal check

A color picture is obtained from the CAM OUT connector when the CAM/BAR selector switch ⑨ is set to CAM and the filter disc is set to "1". Check the white balance and black balance as follows:

(a) Set the GAIN switch ⑧ to 0 dB.

(b) Set the filter disc ③ to the position corresponding to the color temperature of the lighting source. Refer to Table 6.1 for the filter disc positions and their uses.

Filter disc number	Lighting source color temperature	Type of lighting source
1	3,200 K	Tungsten or halogen lamps
2	5,600 K + 1/8 ND	For outdoor uses when ND filter is required (too bright)
3	5,600 K	For outdoor uses (except "2")
4	CAP	When camera is not being used

Table 6-1

(c) Shoot a white object so that it fills the screen. (Take care not to allow reflections from the light source or strong reflected light to shine on the object.)

(d) Now set the AUTO WHT/AUTO BLK switch ⑤ to the top position. The white balance is set in several seconds. Check: Once the white balance has been set, the "AUTO WHITE: COMPLETED" display (FP-Z31/Z31P only) appears on the viewfinder screen. For about 5 seconds after the white balance has been set, the "W" indicator inside the viewfinder lights up (FP-Z31L only).

(e) Set the AUTO WHITE/AUTO BLACK switch ⑤ to its bottom position. The lens iris closes for about 5 seconds and the black balance is obtained. After setting the auto black, set the white balance again by carrying out steps (c) and (d).

This completes the setting of the white balance and black balance. Both are held in the memory even when the power is switched off and so there is no need for resetting for intermittent use. Resetting is required, however, under the following conditions:

(i) After removing or replacing the ASU unit

(ii) When the back-up battery has discharged completely

This camera uses a lithium battery for memory back-up. It will discharge in about four months to 2 years and the memory contents will no longer be stored and held. When this happens, replace the battery following the procedure outlined in section 6.1.5. Even when the memory back-up battery has completely discharged, the camera can still be operated normally by setting the auto black and auto white balance again in the operational mode.

(iii) When the color temperature of the lighting has changed

The white balance shifts when the color temperature of the lighting changes in cases where the camera is being used outdoors or under similar circumstances. In such cases, reset the white balance in line with the color temperature of the lighting.

○ **Auto white balance setting**

Proceed in accordance with steps (c) and (d) for setting the auto white balance. If a big white object that fills the screen is not available, the auto white balance can be set if the following three conditions are satisfied:

(1) There must be a white object with an area which is more than 10% of the whole screen.

(2) The said white object must be brighter than another object.

(3) The signal level of the said object must be less than 100% but more than 70%.

Note 1: The auto white balance and auto black balance can be set with the lens IRIS AUTO/MAN switch at A (auto) or M (manual). If it is set at M with the black balance setting, the iris will close automatically and the auto black balance will be set. However, the iris will remain closed and must therefore be opened manually. At the A position, the iris will open to the appropriate value upon completion of the setting.

Note 2: The AUTO WHT/AUTO BLK switch (5) must be operated properly. If operated so that it is flipped with the finger(s), a mistake will occur in operation. This switch has a light operating force and so when it is not to be operated, try not to touch it.

(4) Tracking adjustment

Return the filter disc to the state in (3) (b) and set the lens zoom to T (telephoto) and adjust the lens focus optimally. Now set the lens zoom to W (wide) and check that the focus is still optimally adjusted. If not, readjust using the tracking control on the lens. If there is no tracking control on the lens or if the focal point differs between the R, G and B pictures, remove the right cover, open the PRA unit, loosen the R/G/B assembly lock screw and focus optimally using the tracking controls.

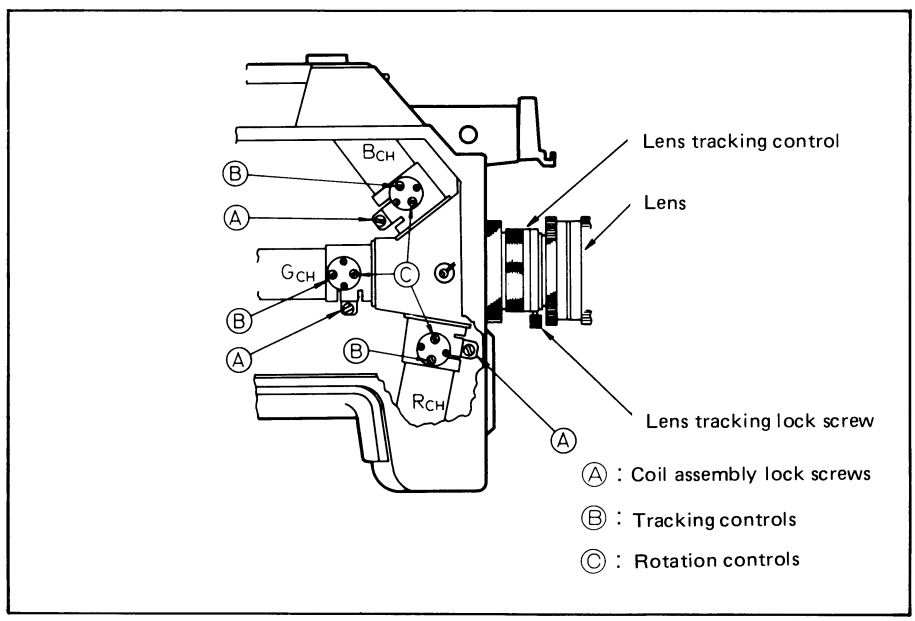


Fig. 6.6

(5) Registration adjustment

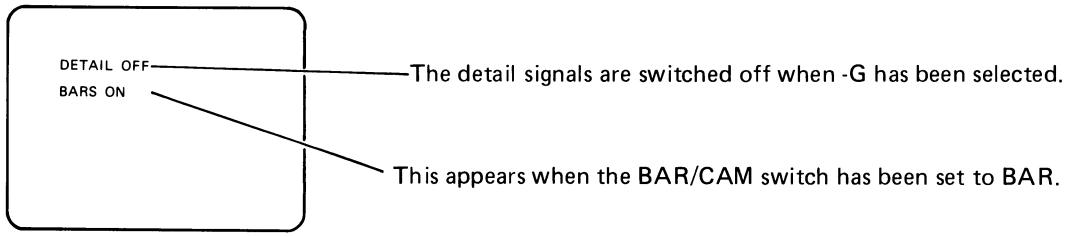
Connect the picture monitor to the MON OUT connector ㉜ on the camera's rear panel, set the monitor to the underscanning mode, allow a registration chart to fill the whole monitor screen and check the registration. If the centering of the pictures in the center area deviates, remove the left cover, and adjust the R/B centering controls on the DEF unit, referring to the arrangement of the controls on the side panel. If the registration deviates due to picture distortion at the corners of the picture or to picture tilt, adjust the DEF unit. The MON OUT waveforms can be selected by the MONITOR SELECT switch ⑩ and so with registration adjustments, select R-G and B-G as appropriate.

See 6.3.6, with the registration adjustment of the model FP-Z31/Z31P camera.

6.3 Character display and operation (FP-Z31/Z31P only)

6.3.1 Warning displays

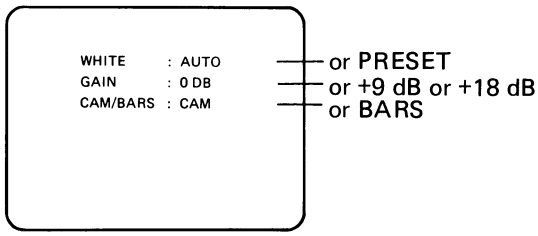
When the MONITOR SELECT switch ⑩ is set to -G, this has the effect of switching off the detail signals on the screen (the screen which is normally used) that appears when the camera's power is turned on. Warning characters, indicating that the detail signals are OFF, are fed out to the viewfinder and MON OUT connector. Furthermore, when the BAR/CAM switch ⑨ is set at the BAR position, characters indicating that the bar signals are being fed out to the CAM OUT connector are superimposed on the signals to the viewfinder and the MON OUT connector.



6.3.2 Status displays

When the DISP/WRITE switch ⑭ is set once to the top position, characters showing the status of the camera's switches are displayed.

The status of the GAIN mode switch PRESET/AUTO ⑪ shown is either PRESET or AUTO; the status of the high GAIN switch ⑧ shown is 0 dB, +9 dB or +18 dB; and the status of the BAR/CAM switch ⑨ shown is either BAR or CAM.

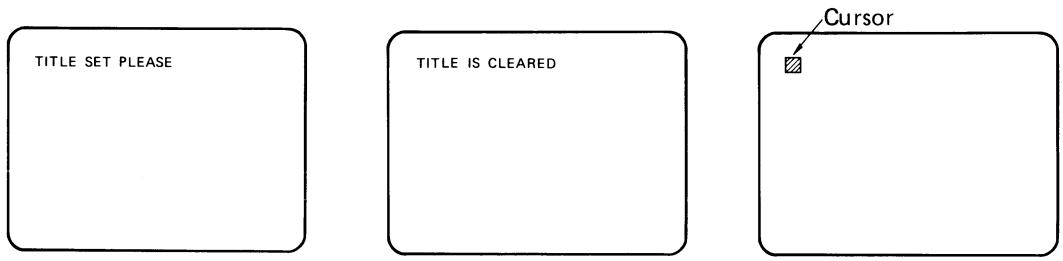


6.3.3 Title write and read operations

When the DISP/WRITE switch ⑭ is set again to the top position in the status display mode, "TITLE SET PLEASE" appears for about 3 seconds in the viewfinder and MON OUT connector signal. This indicates that titles can be written on the screen, which is indicated inside the viewfinder by the lighting of the "W" indicator.

(1) Clearing the screen (all clear)

Random characters may sometimes appear* on the screen or title characters have already been written. In such cases, set the AUTO WHT/AUTO BLK switch ⑤ to the top position and clear the display. The "TITLE IS CLEARED" message appears for about 3 seconds, indicating that the title memory has been cleared and the white cursor appears at the top left of the screen.



When the title screen is selected | When the title memory is cleared | When title can now be written

* Radom characters are displayed on all over the screen of the viewfinder CRT. When once the ASU unit is taken out or when the battery voltage drops to about 2 volt.

(2) Selecting and writing the characters

The characters can be selected and written by setting the DISP/WRITE switch ⑭ to the bottom position. When the switch is repeatedly pushed within about half a second, characters are selected one at a time, and when the switch is pressed continuously, the characters advance automatically.

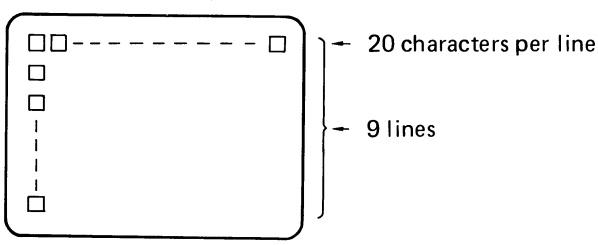
The character write position is indicated by the cursor position which moves to the right when the CURSOR switch ⑭ is set to the bottom position and to the left when set to the top position. When the switch is pressed repeatedly within about half a second, the cursor advances one character at a time; when it is pressed continuously, it advances continuously.

A total of 49 different alphanumerics and symbols, including spaces, can be written on the screen, and their sequence is as shown below:

(Space) (Space)

␣ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789:=?!& ␣* + - . / [ ]

Twenty characters can be accommodated in a single line and nine lines of characters can be accommodated on the screen.



After writing the characters, push up DISP/WRITE switch ⑭. Then, the characters are memorized. Starting position is able to be written only "space" marked as [ ]. Second position (right after starting position) can be usable to write character.

The characters which are written in this section are fed out to the viewfinder, MON OUT connector and CAM OUT connector.

(3) Reading out the title characters

Once a title has been written, it is retained in the memory and is read out even if the camera's power is switched off provided that it has been switched on again. Characters can be read out by setting the DISP/WRITE switch twice to the top position. When the cursor at the top left is not needed during readout, set DISP/WRITE switch ⑭ once to the bottom position in less than half a second to clear it (to write the space [ ]).

(Note)

While the title screen has been selected, the AUTO WHT/AUTO BLK, GAIN 0/9/18 dB, BAR/CAM and AUTO CENT/AUTO SETUP switches will not execute their prescribed functions even when set. The AUTO WHT switch, however, functions to clear the title memory.

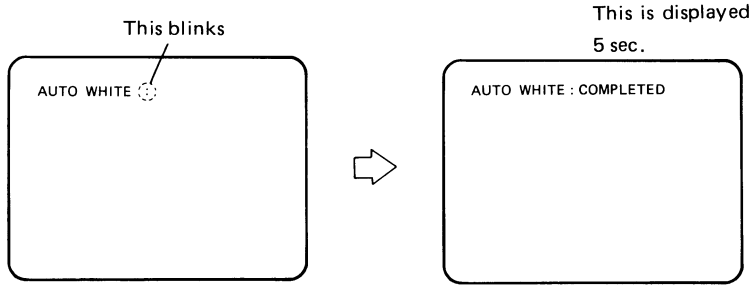
(Note)

When the DISP/WRITE switch ⑭ is set to the top position again in the title screen mode, a return is made to the initial warning display screen (the screen which is normally used).

6.3.4 Auto white setting

The white balance is set in order to obtain well balanced color pictures. Set the GAIN mode switch PRESET/AUTO ⑪ to the AUTO position, shoot a white object so that it fills more than 10% of the screen, and then set the AUTO WHT/AUTO BLK switch ⑤ to the top position.

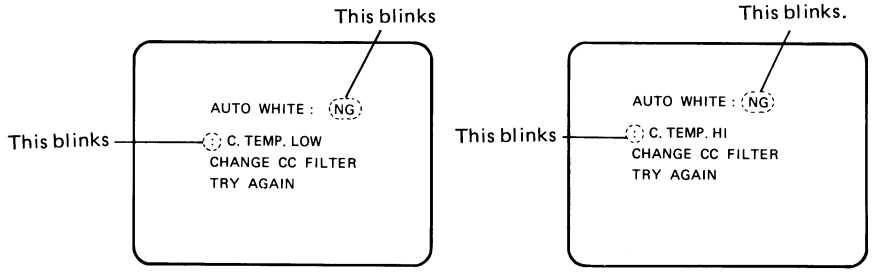
(1) The display messages below appear when the automatic white balance has been set properly.



Message displayed until balance has been set

Message displayed when the balance has been properly set

(2) The following messages are displayed when the color temperature of the lighting and the filter disc have not been set appropriately:

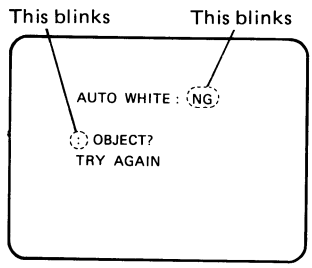


When the color temperature is too low

When the color temperature is too high

Set the color temperature compensation filter properly and reset the AUTO WHT/AUTO BLK switch ⑤ to the top position again.

(3) When the object or lighting is not suitable for attaining the white balance, the following display appears:



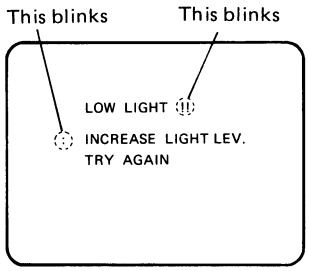
When the object or lighting is not suitable

Change the object or lighting and reset the AUTO WHT/ AUTO BLK switch ⑤ to the AUTO WHT position.

(Note)

Care should be taken with colored lighting for effects and with mercury lamps or other special lighting since they are not suitable for attaining the white balance in general.

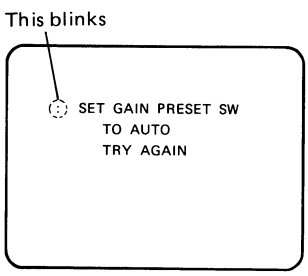
(4) The following display appears when the white balance cannot be properly set with insufficient light:



When there is insufficient light

In cases like this, increase the light or set the GAIN switch ⑧ to 9 dB or 18 dB and set the AUTO WHT/AUTO BLK switch ⑤ again to the AUTO WHT position.

(5) The following display appears when the cameraman has forgotten to set the GAIN mode switch PRESET/AUTO ⑪ to AUTO:



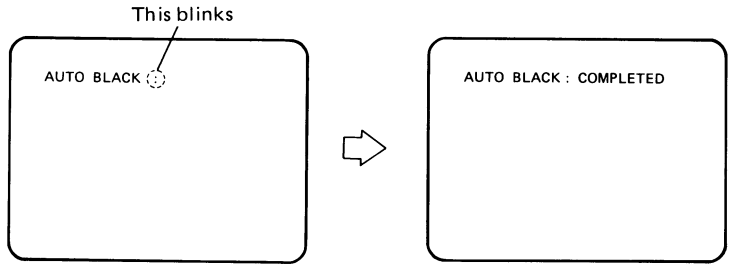
When the GAIN mode switch has been set to PRESET

In cases like this, set the GAIN mode switch ⑪ to AUTO and set the AUTO WHT/AUTO BLK switch ⑤ to the AUTO WHT position.

6.3.5 Auto black setting

The black balance is set in order to obtain well-balanced pictures. Set the A/M switch on the lens to "A" (AUTO) and the AUTO WHT/AUTO BLK switch ⑤ to the AUTO BLK position. The lens iris now closes automatically, the black balance is set and the iris opens again.

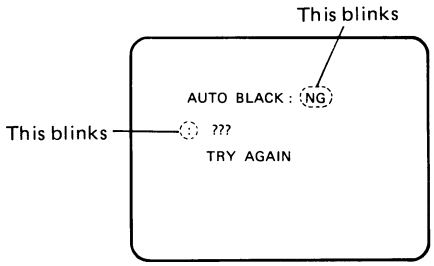
(1) The display below appears when the black balance has been set properly:



Message until setting is completed

Message when proper setting is made

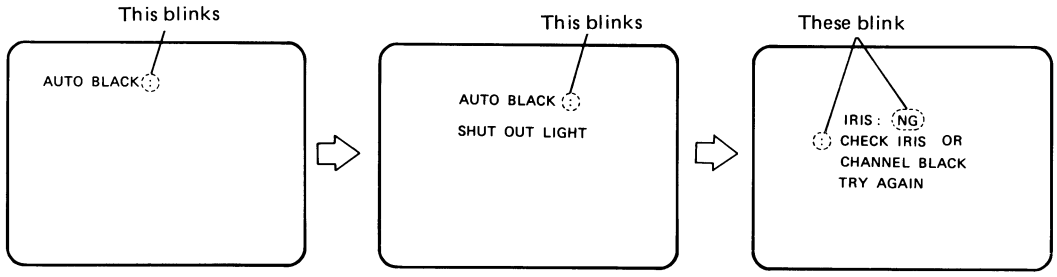
(2) When the black balance has not been set properly, the following display appears:



When the black balance has not been set properly.

In cases like this, start the auto black balance setting again.

(3) The following messages appear when the iris does not close because of some problem with the lens iris. In such cases, check the iris and set the black balance again. The "COMPLETED" message may appear when the light is at a low level. The iris should be checked and the black balance obtained again.



Message until setting is completed

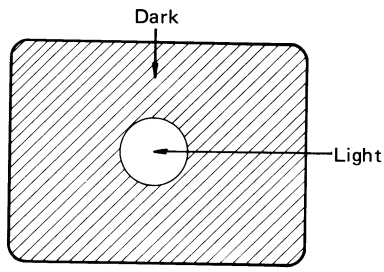
This message appears for about 5 sec. when the iris does not close.

This message is displayed for 5 sec. and then disappears.

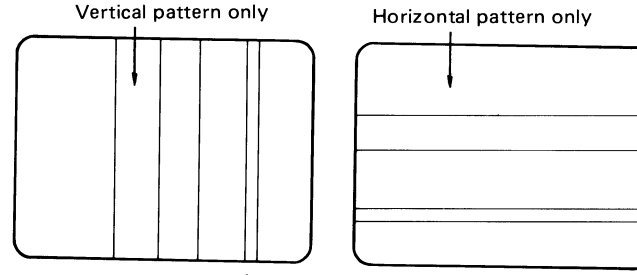
6.3.6 Auto centering setting

Auto centering is set when the centering is not aligned properly so that sharp pictures are produced.
Use an object suitable for the auto centering setting. If the object is not suitable, the "NG" message may appear or the alignment may not be precise enough even when the "COMPLETED" message appears.

(1) Unsuitable object

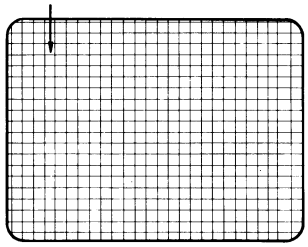


Too much contrast

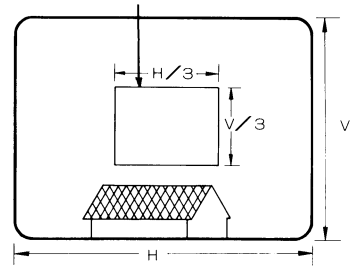


Patterns required both vertically and horizontally

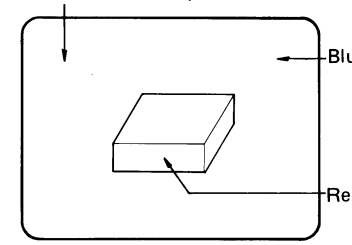
Detailed vertical/horizontal repeated pattern



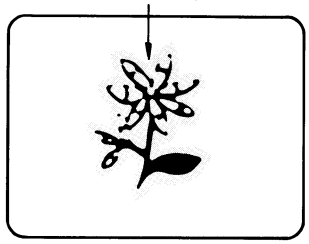
Detailed regular pattern



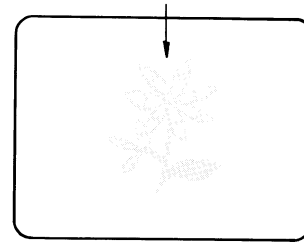
Pattern in a position deviating from detection zone



Not monochrome or light colors



Pattern without contours



Pattern with insufficient level

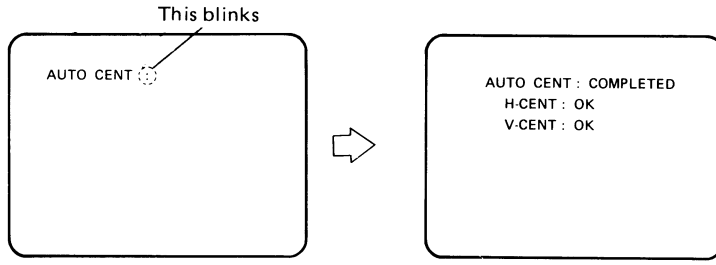
(2) Suitable objects

Shoot an object with the following specifications in the center of the screen (inside the detection zone):

a. A monochrome object or object with light colors.
b. A sharply focused object with a sufficient level (70—100%) and with both vertical and horizontal contours.
c. An object without a detailed repeated pattern.
d. An object illuminated by a lighting source suitable for the white balance.
e. A stationary object.

Then, set the AUTO CENT/AUTO SETUP switch ⑬ to the AUTO CENT position.

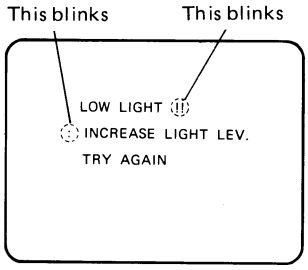
(3) The following messages are displayed when the centering has been set properly:



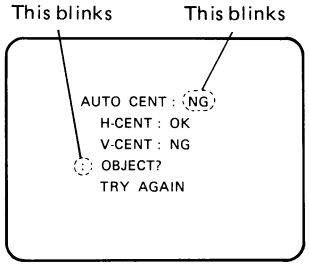
Message displayed until settins is completed.

Message with proper setting

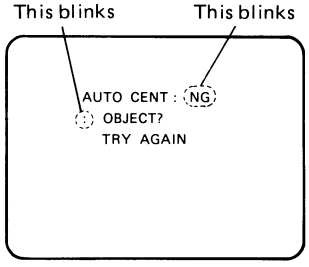
(4) Examples of messages indicating improper setting:



- When there is insufficient light
- When the object has deep red or blue colors



- When the object does not have vertical contours



- When the object has deep colors
- When the object's level is sufficient but the object has no contours

When the setting has not been made properly, change the object and set the AUTO CENT/AUTO SETUP switch ⑬ to the AUTO CENT position again.

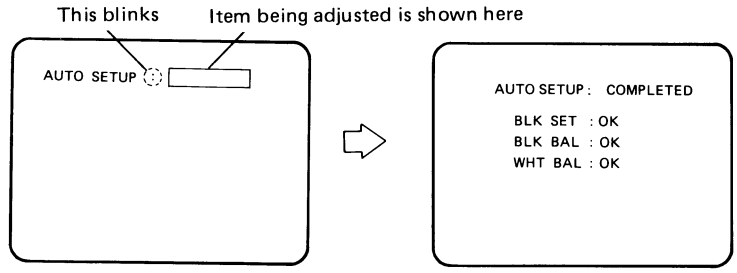
6.3.7 Auto setup setting

BAR/CAM switch ⑨ at "CAM":

When the AUTO CENT/AUTO SETUP switch ⑬ is set to the AUTO SETUP position, the auto black level, auto black balance and auto white balance are all set in sequence.

Shoot the object conforming to the conditions under which the white balance is set in section 6.3.4, and set the AUTO CENT/AUTO SETUP switch ⑬ to the AUTO SETUP position.

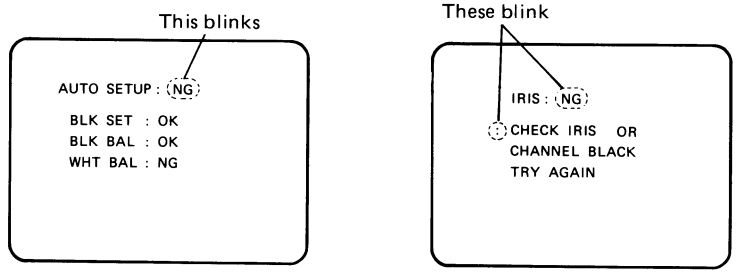
(1) The following messages appear when the setting has been made properly:



Display until settings are completed.

Display when settings have been made properly.

(2) Examples of displays when the settings have not been made properly:



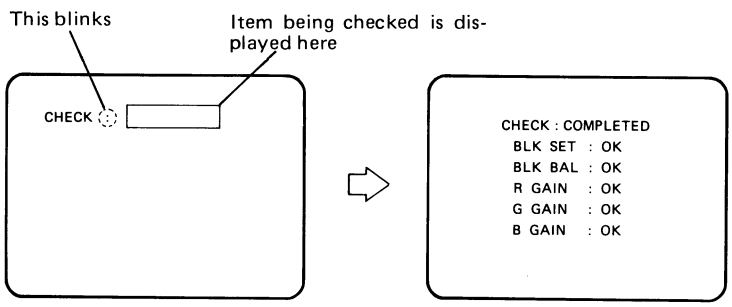
Display when auto white setting is "NG".

Display when light enters during black setting.

BAR/CAM switch (9) at "BAR":

When the AUTO CENT/AUTO SETUP switch ⑬ is set to the AUTO SETUP position, the auto black setting and auto black balance are set, and the R/G/B channel video levels and the gain control systems of the R/G/B channels are checked by using the built-in test pulses. It is helpful because the camera checks are completed while the bar signals are being transmitted.

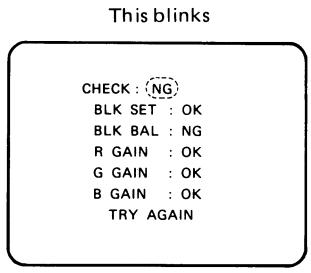
(3) Displays when the settings have been made properly:



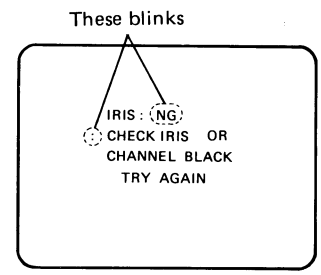
Display until checks are completed.

Display when settings have been made properly.

(4) Examples of displays when setting have not been made properly:



Display when auto black setting is "NG".



Display when light enters with black setting.

Find out which items have not been set properly and proceed with their resetting.

(Note)

The new adjustment values for the "COMPLETED" items resulting from the settings made in sections 6.3.4 to 6.3.7 are set and retained in the memory. Adjustment values for "NG" items are invalid and the values in force before the settings were undertaken are restored in order to prevent the camera's adjustments from being set more poorly than before the settings were made.

When the "C. TEMP. LOW" or "C. TEMP. HI" message indicates "NG" for the auto white setting, the adjustment value with the balance controlled to the optimum under the lighting and object conditions is adopted and the camera's utility value under poor conditions is enhanced.

The white balance is controlled using the test pulse signal in section 6.3.7 with the BAR/CAM switch at BAR but, even if the "COMPLETED" message appears, a return is made to the original adjustment value (value at which the auto white setting was made with a picture shot by the camera).

(Note)

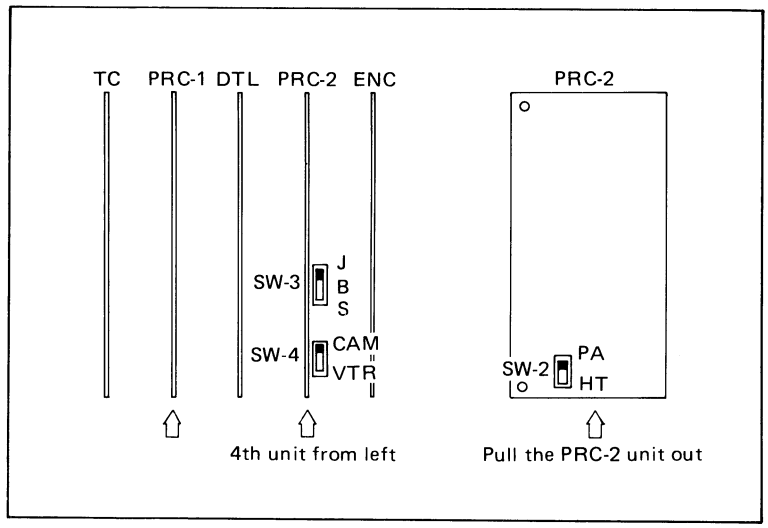
The displays indicating the setting results remain for about 5 seconds.

6.4 Connections with VTR

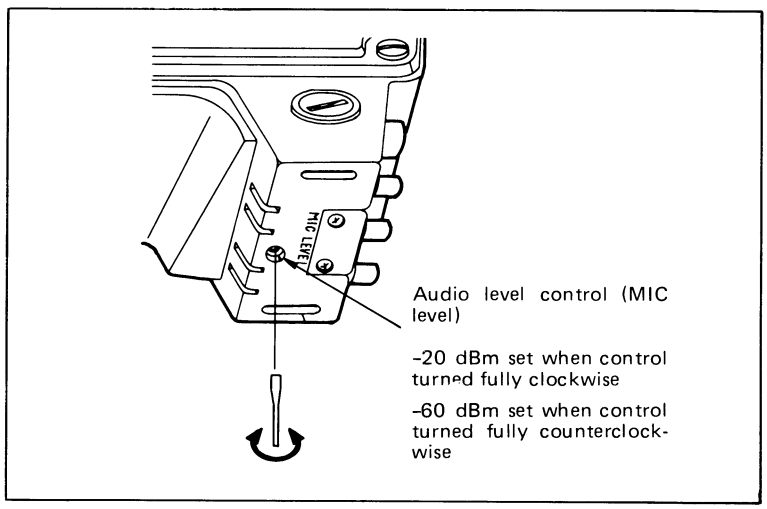
Not only do VTRs come in different formats (U-matic, VHS, Beta) but there are also a large number of models adopting each format and the control methods differ slightly in each case. This camera has 3 switches on its PRC-2 unit which, in addition to the audio level control, enable it to be connected to all leading VTR models. [See Note 1.]

(1) Types and positions of selector switches

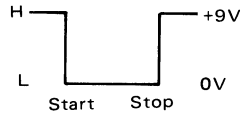
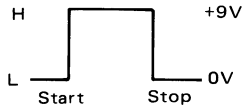
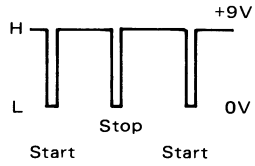
Unit name	Switch No.	Function
PRC-2	SW-2	Start/stop polarity selection
	SW-3	Start/stop signal selection
	SW-4	Selection of method by which recording lamp signal is supplied
MIC	RV-1	Varies audio level from -60 dBm to -20 dBm



(2) Audio level adjustment



SW-2 Polarity selection	SW-3 Start/stop signal selection	SW-4 REC signal supply method	Operation	Applicable VTR	Audio level		Applicable cable
					Level	Direction of rotation	
		CAM	VTR start at +5V VTR stop at 0V REC lamp lights with control signal from camera	CR-4400LS	-20 dBm		C-201VH
				VO-3800	-60		C-501VH
⬇ HT	⬇ S	⬆	H 5V L 0V start stop	BVU-50	-60		C-201VG
				BVU-110	-60		C-501VG
				BVU-500H	-60		
				CR-4700	-20		
				VO-4800	-60		

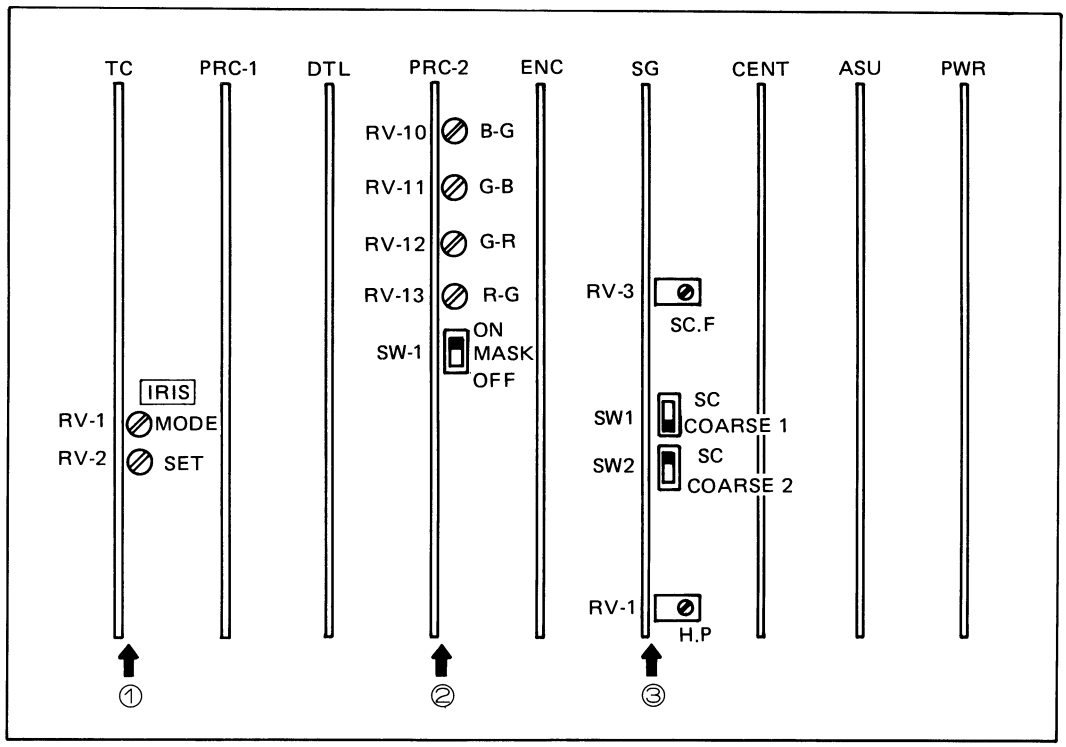
SW-2 Polarity selection	SW-3 Start/step signal selection	SW-4 REC signal supply method	Operation	Applicable VTR	Audio level		Applicable cable
					Level	Direction of rotation	
↓ HT	J ↑	CAM ↑	VTR start at 0V VTR stop at +9V REC lamp lights with control signal from camera 	CR-4400 HR-4100 SV-650 SV-690 VT-6800 VT-7	-20 -20 -20 -20 -20 -20	⊘	C-201VH C-501VH
See above.	See above.	See above.	See above.	HR-2650	-20	⊘	Note 1
PA ↑	J ↑	CAM ↑	VTR start at +9V VTR stop at 0V REC lamp lights with control signal from camera 	NV-8420 NV-100 NV-150 NV-180	-20 -20 -20 -20	⊘	C-201VH C-501VH
↓ HT	B ■	↓ VTR	Ssart/stop repeated with trigger palse 	SL-F1 SL-B5	-20 -20	⊘	Note 2

Note 1: The HR-2650 VTR can be connected although slight modification must be performed for this purpose. Consult your nearest Hitachi Denshi service station.

Note 2: Conversion to a special 14-pin cable must be made for the Beta format VTRs (such as SL-F1, SL-B5). Consult your nearest Hitachi Denshi service station.
The VTR cable is a consumable and thus it is recommended that a spare cable be kept at hand.

Note 3: For using the VTRs which are not listed above, contact a nearest Hitachi Denshi sales office.

6.5 Adjustments and cautions when operating the camera

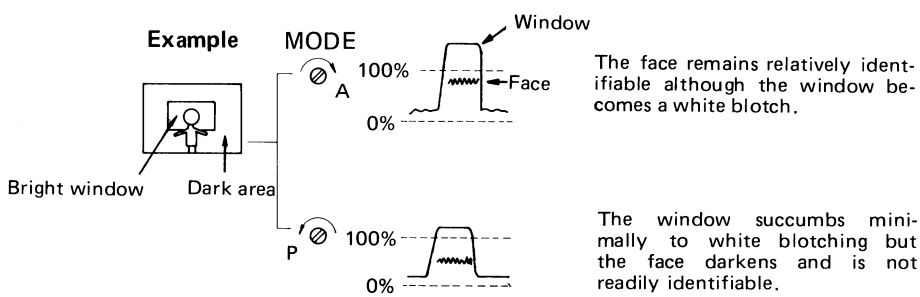


6.5.1 Auto iris control

This control circuit is located in the TC unit and it enables the video signal detection method to be selected.

(1) Peak value detection (P) : The iris is controlled by the peak value of the video signal.

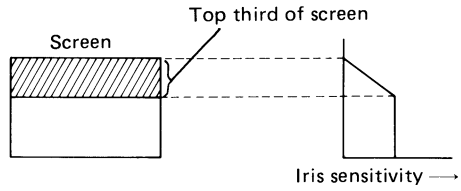
(2) Average value detection (A) : The iris is controlled by the average value of the video signal.



This kind of situation is also controlled by the area of the bright section. A mixture of peak and average detection can be provided at the "P" and "A" intermediate positions. The auto iris level is set by RV-2 [SET]. For a normal setting, shoot an EIA standard gray scale chart and set the video level to about 100%.

Auto iris weighting detection

A weighting system is used to prevent iris control from being effected by the bright area of the upper part of the screen. Inclined weighting is used for the top one-third of the screen and so the detection sensitivity decreases as the top edge of the screen is approached. Therefore, the iris moves minimally even when the sky or a bright object enters at the top edge of the screen which means that a natural picture quality is produced as a result.



A uniform iris sensitivity applies to the area in the lower two-thirds of the screen.

6.5.2 Masking

The masking is used for the fine color adjustment if required.

(1) Set SW-1 [MASK] to the ON position.

(2) Adjust RV-10, 11, 12 and 13 while monitoring a vectorscope or a picture. Because of the masking system, there is no change independently for each color.

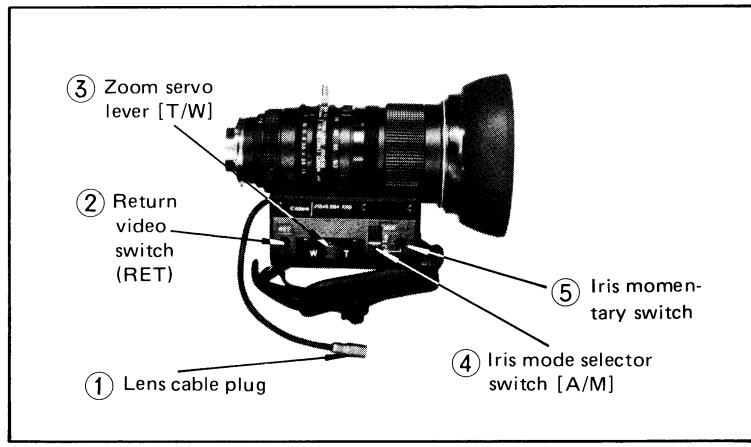
6.5.3 Adjustments with genlock

Proceed with the following adjustment for alignment with the system when the camera is used in the genlock mode.

(1) Horizontal sync signal phase (RV-1 [H.P])
Monitor the sync signal on a waveform monitor operating on external sync and adjust so that the phase coincides with the phase of the genlock source signal.

(2) Subcarrier phase (SW-1 SC COARSE 1) (SW-2 SC COARSE 2) (RV-3 SC.F)
Connect the camera's color bar signal to a vectorscope operating on external sync and adjust so that the burst phase of the camera output signal and burst phase of the external genlock signal coincide. Set to about 90 deg. with SW-1 and SW-2 in each case for a coarse adjustment and then use RV-3 for the fine adjustment.
RV-1 horizontal sync phase and RV-3 subcarrier phase controls are both 10-turn variable resistors, providing easy fine adjustment.

6.6 Description of zoom lens parts (J15X9.5B4KRS)



① Lens cable plug

Connect this to the LENS connector on the camera head. Once the plug is pushed into place, it is automatically locked. To disconnect the plug, grasp the body of the plug and pull to release the lock; then pull free.

② Return video switch [RET]

The viewfinder pictures are switched to signals which are connected to the AUX connector on the operation panel or into VTR playback signals only for as long as this switch is kept depressed.

③ Zoom servo lever [T/W]

This lever is for the servo control of the lens. The zoom speed can be varied continuously by the amount with which the switch is pressed.

Full range operating time = Approx. 2.5 to 20 sec.

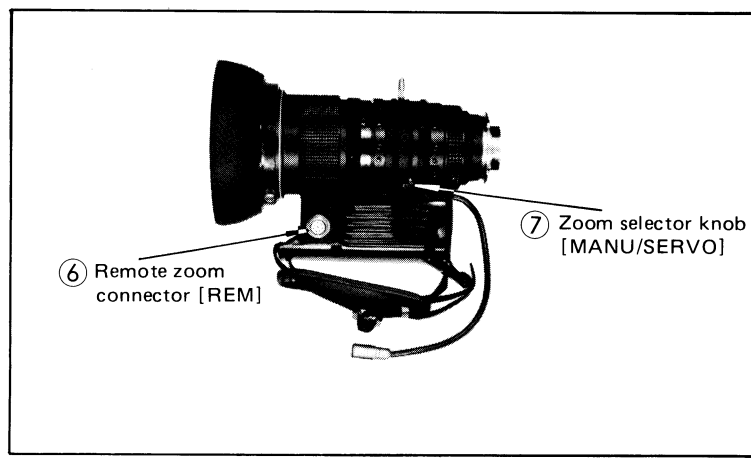
④ Iris mode selector switch [A/M]

A: Auto iris adjustment mode using rectified video signal

M: Manual iris adjustment mode

⑤ Iris monentary switch

Establishes the automatic iris mode only while depressing.



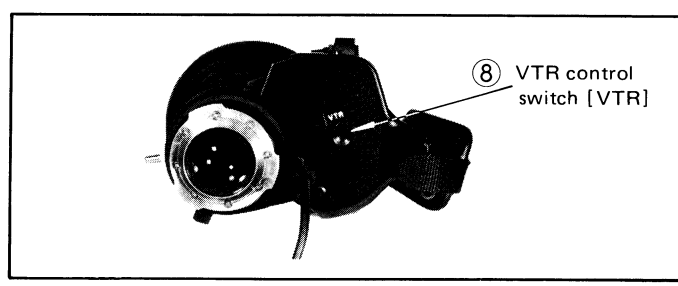
⑥ Remote zoom connector [REM]

This connector is used for servo zoom remote control. By using the ZL-15W (lens cable kit for 15x lens), it is possible to control the VTR start/stop and return video, in addition to the zoom.

⑦ Zoom selector knob [MANU/SERVO]

SERVO: Zoom servo control; controlled by lever ③

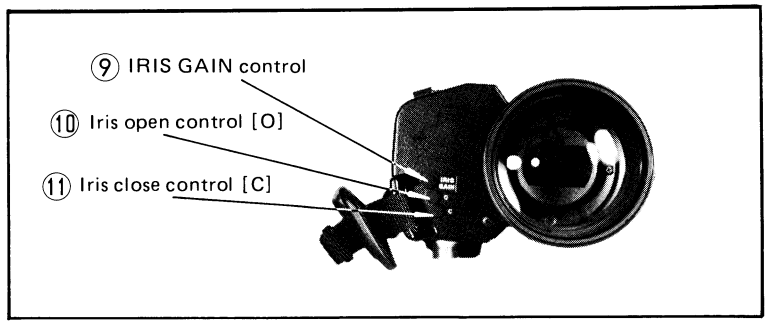
MANU: Manual zooming



⑧ VTR control switch*

This controls the VTR start/stop. Since it is a momentary switch, it is energized only while it is being pressed. Every time the switch is pressed, start and stop are controlled alternately.

* A alternating type switch is used in some type of lenses. In that case, the switch shall be depressed two times in succession.



⑨ IRIS GAIN control

This controls the iris speed. The iris moves faster when the control is rotated clockwise. When rotated counterclockwise, the response speed are reduced. Hunting (a condition in which the iris ring oscillates several times before stopping at the prescribed position) is caused if the speed is increased too much. The control should therefore be set so that hunting does not arise.

⑩ Iris open control [O]

Adjust the actual iris to the open position when the iris control knob of the operation panel indicates "open" during operation panel use.

⑪ Iris close control [C]

Adjust the actual iris to the close position when the iris control knob of the operation panel indicates "close" during operation panel use.

**: Do not touch carelessly the iris open and close controls, since the items, 10 and 11 are set carefully at the factory.

Attaching the filters

Two types of filters can be attached to the hood unit of this lens: 1, series IX-type filter and 2, screw-in filter. The filters are attached differently.

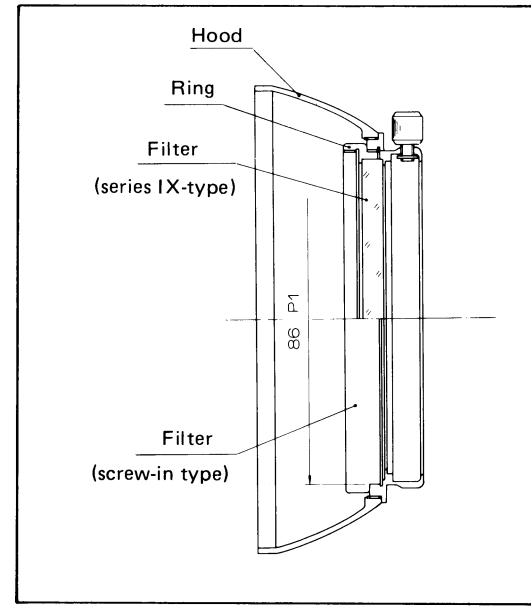
(1) Series IX-type filter

Remove the ring indicated in the figure by rotating it counterclockwise, fit the filter into the ring and then screw in the ring.

(2) Screw-in filter

Remove the ring indicated in the figure by rotating it counterclockwise. Screw the filter into the screw onto which the ring was screwed down. (Keep the ring in a safe place so that it will not be misplaced.) If the filter is screwd onto the ring directly without the ring having been first removed, partial lack of picture may be caused.

Filter size: 86P1 (86 mm diameter, 1 mm pitch)



7. LENS AND CAMERA ADJUSTMENT IN LENS REPLACEMENT

Take the following adjustment procedure when replacing the lens already mounted on your FP-Z31 camera by another lens.

7.1 Adjusting flange-back

In the case of defocus in telephoto or wide by zooming operation, adjust flange-back as shown below.

(1) Set the AUTO/MANU switch of a lens to MANU side.
(2) Fully open the IRIS.
Apply light to the object so that proper video level is obtained with iris opened.
(3) Loosen the screw securing the back focus ring of the lens.
(4) Set the zoom servo lever to the end of telephoto.
(5) Shoot an object at a distance of 3m or more while focusing by the focus ring.
(6) Set the zoom servo lever to the end of wide.
(7) Adjust the back focus ring of the lens, and focus on the same object as (5), without adjusting the focus ring.
(8) Repeat the steps (4) to (7) two or three times so that the object can be focused in both telephoto and wide.
(9) Fasten the securing screw.

7.2 Adjusting registration

If necessary, adjust registration as shown below after lens replacement.

(1) Shoot the registration chart in this manual at a distance of about 3m so that chart appears fully on the screen.
(2) Select the R-G on the MONITOR SELECT switch, and check the registration. If necessary, use the controls of (R H CENT, R V CENT, R WIDTH and R HEIGHT)* for registration adjustment.
Next, select the B-G on the same switch, and check the registration. If necessary, use the controls of (B H CENT, B V CENT, B WIDTH and B HEIGHT)* for registration adjustment.

Note: Since the controls indicated by ( )* are located inside of the FP-Z31/Z31L servicing to qualified service personnel of your local Hitachi Denshi representative.

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