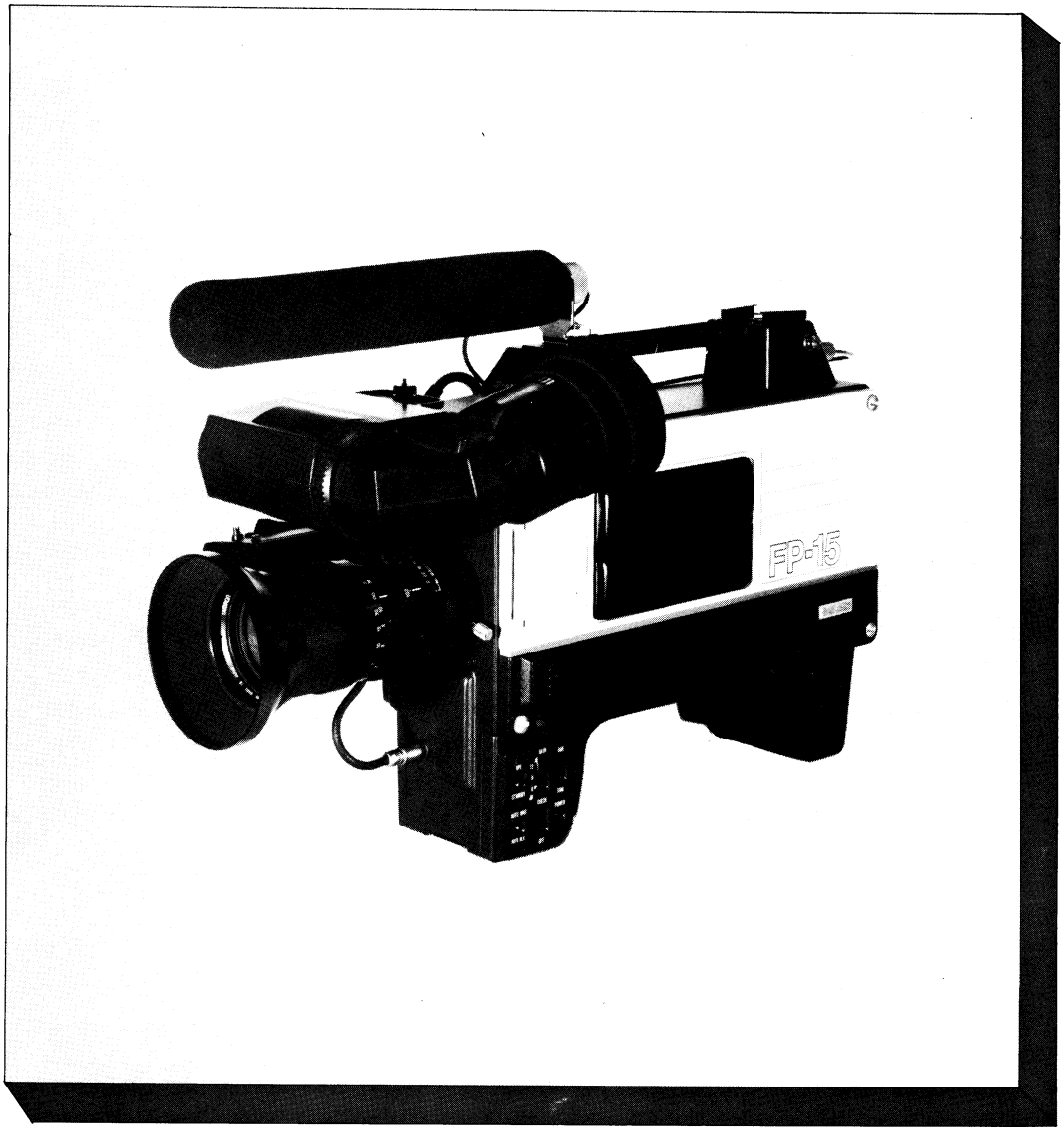
Operation Manual

Portable Color Camera

FP-15



Hitachi Denshi, Ltd.

TOKYO, JAPAN

CONTENTS

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

MODEL FP-15
PORTABLE COLOR CAMERA
Operation Manual

1. GENERAL

The Hitachi FP-15 is a 3-tube portable color camera using a prism optics featuring a high quality color picture with a horizontal resolution of 580 lines and a signal-to-noise ratio of 54 dB. It also features automatic functions and superior cost/performance.
The FP-15 provides auto white/black functions, automatic beam optimizer, auto-iris function for an operational ease.
A wide range of accessories are available as a portable camera for easy handling and applications in the studio.

Features

(1) High sensitivity

A high performance f1.4 prism optics assures a high level of sensitivity. When the +6dB or +12dB high gain function is applied, the low noise amplifier and the high performance optics provides a sharp and clear picture, even in the poor lighting condition.

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

High-resolution pick-up tubes, a high performance prism optics and a low-noise amplifier offer a picture of a high resolution and high signal-to-noise ratio. (Horizontal resolution: 580 lines at G ch. center; S/N: 54 dB for NTSC and 51 dB for PAL)

(3) Auto beam control function

The built-in ASBO circuit eliminates comet-tailing and expands the dynamic range to make it possible to pick-up the highlight sections.

(4) Built-in auto white/auto black functions

A back-up memory is provided for the auto white and auto black functions so that the balance is retained even when the power is switched off.

(5) Auto iris

The built-in auto iris circuit controls the lens iris automatically and provides sharp and clear pictures. The weighting function has been added to the auto iris circuit to obtain a stable iris operation even for outdoor shooting with the sun behind the subject.

(6) Color bars

The built-in color bars generator offers an easy camera adjustment.

(7) Video level display

A tiger stripe pattern appears in the VF monitor when video level is excessive. Even in the manual operation, the lens iris can be set appropriately.
The pattern can be erased when not needed by a switch.

2. SPECIFICATIONS

2.1 Camera head

(1)	**Color system:**	NTSC/PAL-B
(2)	**Pickup tube:**	2/3-inch Saticon
(3)	**Encoder:**	NTSC : IQ method PAL : U, V method
(4)	**Sync:**	Internal or genlock
(5)	**Horizontal resolution:**	580 lines (G-ch, center)
(6)	**S/N**	γ =1, DTL-OFF GAIN 0dB: 54 dB (NTSC) Reference : 51 dB (PAL-B)
(7)	**Sensitivity:**	2000 lux, f4 (3200°K, 89.9% reflection with a grey scale chart)
(8)	**High gain:**	0, +6, +12dB
(9)	**Geometric distortion:**	Zone 2 : 1% (Within circle of a diameter equal to the picture height) Zone 3 : 2% (Elsewhere)
(10)	**Registration:**	Zone 1 : 0.1% (Within the circle of a diameter equal to 80% of picture height) Zone 2 : 0.3% Zone 3 : 0.7%
(11)	**Optical filters:**	3200°K, 5600°K, 5600°K + 1/8ND
(12)	**Vertical contour correction:**	1H
(13)	**Lens mount:**	Bayonet
(14)	**Power voltage:**	12V (+10.5 to +16V DC)
(15)	**Power consumption:**	18W approx.
(16)	**Dimensions:**	98(W) x 270(H) x 330(D) mm (3.8 x 10.6 x 12.9 in)
(17)	**Weight:**	5 kg approx. (Excl. Lens) (11 lb)

2.2 1.5-inch viewfinder

(1) Input signal:	1 Vp-p composite VIDEO, Sync negative
(2) Picture tube:	1.5-inch B/W (40CB4 or equivalent)
(3) Power requirements:	9V DC
(4) Power consumption:	2 W approx.
(5) Dimensions/Weight:	200(W) x 52(H) x 105(D) mm, 650 g (7.8 x 2.0 x 4.1 in) (1.4 lb)
(6) Horizontal resolution:	350 lines or more at center 300 lines or more at corners
(7) Maximum video gain:	30 dB or more
(8) Maximum illumination:	200 fl. or more
(9) Deflection linearity:	±10%
(10) Distortion	3% or less

3. RATINGS

(1) Input signals

(a) GENLOCK input: VBS 1.0 ±3dB
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

(2) Output signal

(a) CAM OUT: VBS 1 Vp-p, 75-ohm BNC output

(b) MON OUT: Y or R/G/B, R-G, B-G selection by switch 1 Vp-p, 75-ohm BNC output

(c) VTR VIDEO : VBS 1.0 Vp-p 75-ohm, VTR connector

(d) AUDIO: -60 to -20 dBm (variable), VTR connector

(e) R, B, G: 0.7 Vp-p High impedance, for ROU connection

(3) Ambient temperature

(a) Temperature range: -10 to +40°C (14 to 104°F)

(b) Storage temperature: -25 to +55°C (0 to 122°F)

(4) Power supply voltage fluctuations: 10.5 to 16V DC

4. TYPICAL SYSTEM CONFIGURATION

4.1. Basic ENG configuration

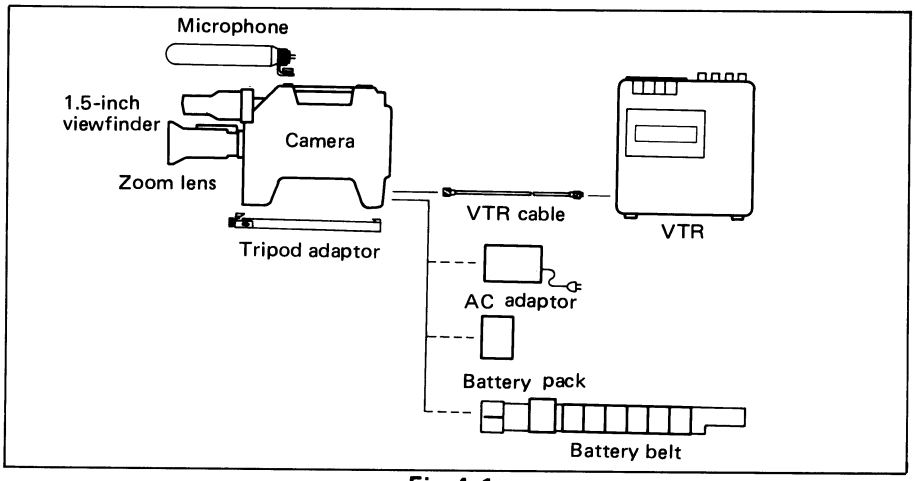


Fig. 4-1

4.2 Basic EFP configuration

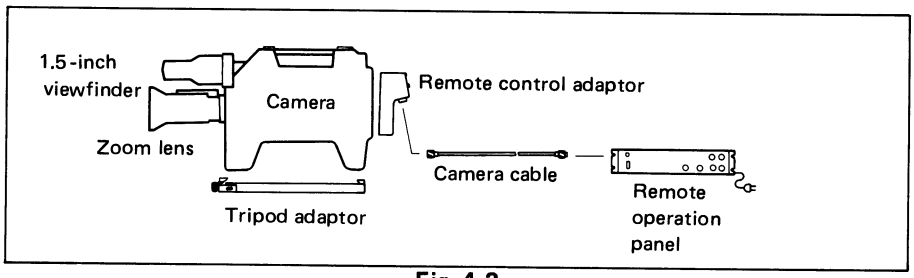


Fig. 4-2

4.3 Studio configuration

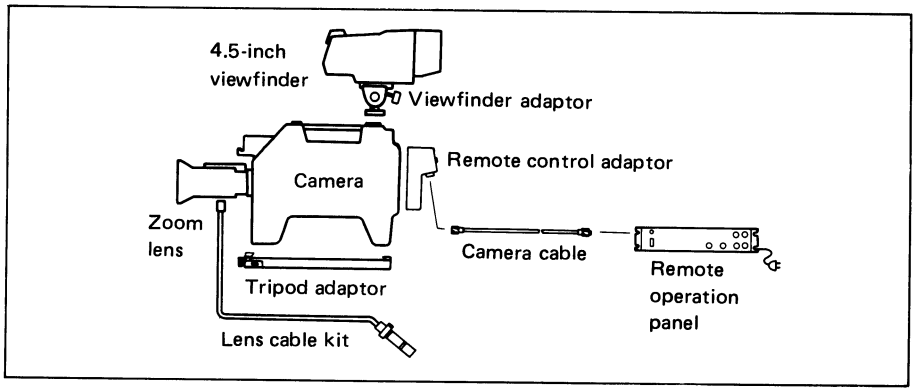


Fig. 4-3

Typical system configuration examples are shown above. Consult your dealer for other system configurations.

	Equipment	Model	Configurations			Remarks
			ENG	EFP	Studio	
1	Camera	FP-15	○	○	○	
2	1.5-inch viewfinder	GM-3B	○	○		
3	4.5-inch viewfinder	GM-5			○	
4	Viewfinder adaptor	AT-21			○	
5	Zoom lens 10x	181 H	○	○	○	
6	Lens cable kit	ZL-21W			○	
7	Battery belt	PB-20A	○* 1			Usable battery charger: BC-20B
8	Battery pack		○* 1			
9	AC adaptor	AP-60A	○* 1			
10	Remote operation panel	OP-15		○	○	
11	Remote control adaptor	RA-15		○	○	Supplied with OP-15
12	VTR cable 2 m	C-201CE, VE	○* 2			
13	VTR cable 5m	C-501CE, VE	○* 2			
14	Camera cable 15m	C-152 CR				
15	Camera cable 50 m	C-502 CG				
16	Microphone	MC-30C	△			
17	Tripod adaptor	TA-15	○	○	○	
18	Carrying case	CL-15	○			

○ Equipment required for system configuration

△ Recommended equipment

* Select one unit with the same number in line with the application in mind.

Table 4-1

5. DESCRIPTION OF PARTS

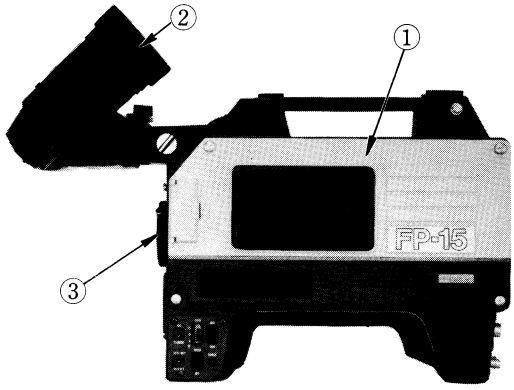


Fig. 5-1 Camera head

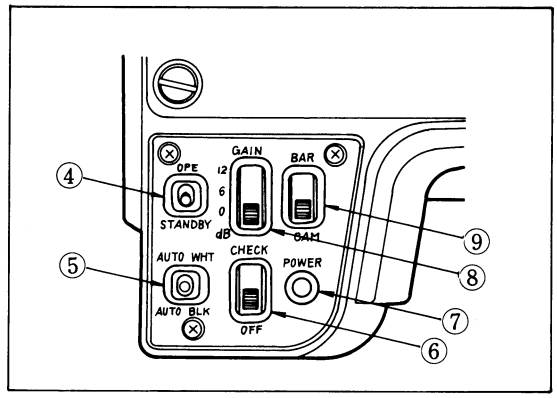


Fig. 5-2 Operation section

5.1 Camera head

① **Camera**

② **1.5-inch viewfinder (See 5.2 Viewfinder)**

③ **Color temperature compensation filter disk**

Select the filter disk in accordance with the color temperature of the subject illumination source. Check that it is positioned at a click-stop. Three filters are "3200°K" for tungsten and iodine lamps, and "5600°K" and "5600°K + 1/8 ND" for sunlight. See the chart behind the filter cover.

④ **Power OPE/STANDBY switch (OPE/STANDBY)**

The camera operates once this switch is set to OPE. When set to STANDBY, the camera is set to the standby mode and power is supplied to the lens and pick-up tube heater. The power lamp ⑦ lights up while power is supplied to the camera head regardless of OPE or STANDBY modes. When used with a battery, set the battery switch to OFF or set off the POWER switch on the rear panel, if the camera is not to be operated for an extended period of time.

⑤ **AUTO BLACK/AUTO WHITE switch (AUTO BLK/AUTO WHT)**

This provide automatic black balance and white balance.

For an auto black balance, set the switch downward to the AUTO BLACK.

The iris closes automatically, and in a few seconds the black balance is obtained. See page 23 under Auto white balance setting.

Wait till the black balance adjustment is completed and the subject appears in the viewfinder, then proceed to the white balance adjustment. Pickup a white subject fully on the screen.

A display lamp "W" in the 1.5-inch viewfinder illuminates when an appropriate white balance is obtained.

⑥ CHECK/OFF switch (CHECK)

This is used for the video level check and the white balance check. At the CHECK position, the excessive video level is warned with a tiger stripe pattern, and the appropriate white balance is displayed with "W" lamp in the viewfinder.
When the displays are not wanted, set the switch to OFF position.
When the tiger stripe pattern warns excessive video level, adjust the iris till it is properly adjusted and the pattern disappears.

⑦ POWER lamp (POWER)

This lamp indicates that power is supplied to the camera even in the STANDBY mode with the battery. Set off the POWER switch (See ㉜) on the rear panel when the camera is not in use for a long time, or cut off the battery power supply to the camera. Then confirm that the lamp is off.

⑧ GAIN switch (GAIN)

This raises the gain of all R, G, B channels by +6dB or +12 dB, for the shooting under poor lighting condition. "A" lamp in the viewfinder lights up to indicate that the high gain mode (+6 dB or +12 dB) is set.

⑨ BAR/CAM switch (BAR/CAM)

This switch selects the camera output signal: BAR for the color bar signal on the upper position, and CAM on the lower position for a camera signal. Set on BAR for adjustment of the camera and color monitors.

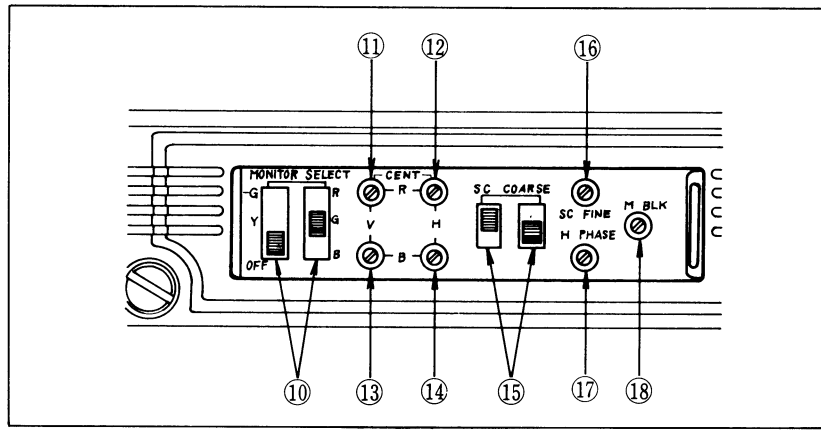


Fig. 5-3

⑩ MONITOR SELECT switches (-G/Y/OFF, R/G/B)

These two switches select the viewfinder and monitor (MON OUT) signals to be used for camera adjustment. The Y signal has the priority to the R, G, B selections, therefore set the –G/Y/OFF switch to the OFF position for an R, G, B selection.
When the switches are set to the –G and G position, the -G signal is obtained.

⑪ **R V CENT (centering) control (R V CENT)**

This is used for the R channel vertical positioning to align the position with the G channel vertical signal. Shoot the registration chart attached with this manual and select R-G signal by the switch ⑩ . Then adjust the vertical centering of R channel to that of G channel.

⑫ **R H CENT control (R H CENT)**

This control is used for the alignment of the R channel horizontal position to the G channel horizontal position. Set the switch ⑩ prior to the adjustment as explained above.

⑬ **B V CENT (B V CENT)**

This is used for the B channel vertical positioning to make alignment with the G channel position. The initial setting of the switch ⑩ for this adjustment is on the B-G.

⑭ **B H CENT (B H CENT)**

This is for the B channel horizontal adjustment to the G channel horizontal position. Set the switch ⑩ as above.

⑮ to ⑰ For genlock operation of the camera with the external video unit.

⑮ **SC COARSE switches (SC COARSE)**

These switches select each 90° of the subcarrier phase of the camera output signal by the combination of the lever position, in order to genlock the signal with the external video units.

⑯ **SC FINE adjustment control (SC FINE)**

This controls the fine adjustment of the subcarrier phase.

⑰ **H PHASE control (H PHASE)**

This is used for the adjustment of the horizontal phase of the camera output, in order to operate the camera with other external video systems.

⑱ **M BLK control (M BLK)**

This sets the master black level of the CAM OUT signal to 7.5% NTSC or 0% PAL.

⑲ **TALLY lamp**

This lights up when the VTR is in a recording mode or the remote operation is in use. This also lights up when the CALL button is pushed on the remote operation panel.

⑳ **1.5-inch viewfinder shoe**

For the mounting of the viewfinder GM-3B. See 6.1.4 for mounting procedure.

㉑ **Viewfinder connector (VF)**

For the connection of the viewfinder cable. Insert the guide-key in a right position, and lock it in the clockwise direction.

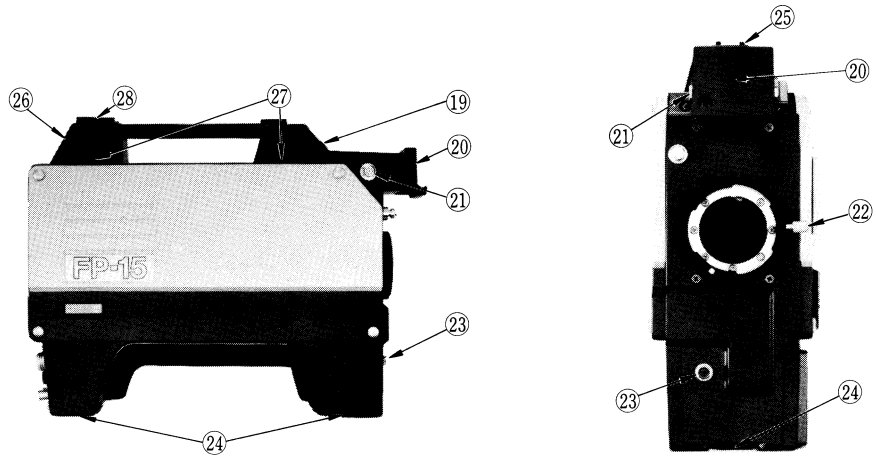


Fig. 5-4

(22) Lens hold lever (LOCK)

The clockwise rotation of this lever locks the lens on the camera. Secure the lens onto the bayonet mount correctly, hold lens securely for removal of the lens.

(23) Lens connector (LENS)

Connect the zoom lens cable plug for the auto-iris and power zoom operations. Pull on the lock ring with fingers, do not pull out cable for disconnection.

(24) Tripod adaptor mounting bracket

See 6.1.3 for mounting.

(25) Microphone shoe

Connect microphone MC-30C mounting bracket to the shoe and lock the screw.

(26) Microphone connector (MIC)

Connects the microphone MC-30C .

(27) Microphone cable clamps

These clamps fix microphone cable along the camera head.

(28) 4.5-inch viewfinder shoe

For the mounting of 4.5-inch viewfinder GM-5 with the adaptor AT-21. Connect the cable to the viewfinder connector VF (21). See 6.1.4 for mounting of 4.5-inch viewfinder.

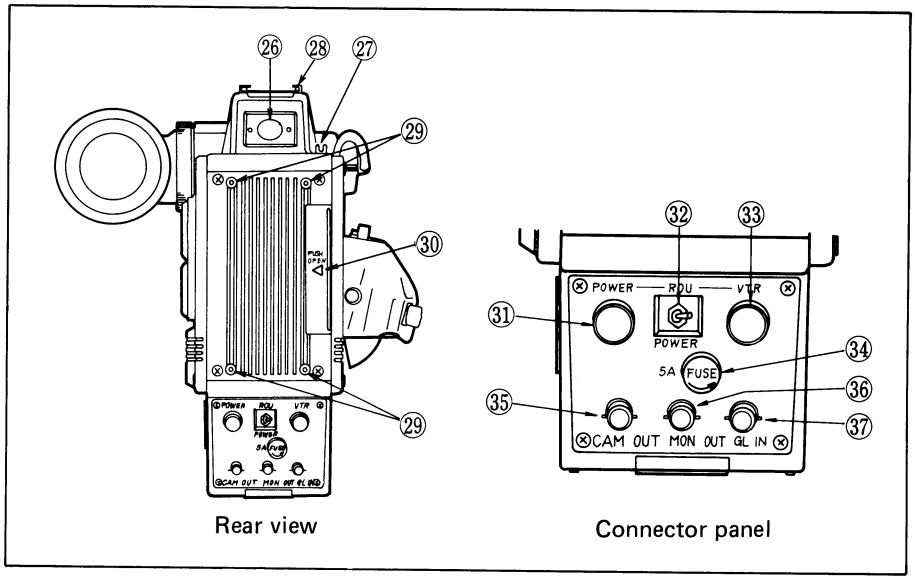


Fig. 5-5

(29) **Remote control adaptor and battery pack fixing screw holes**

Mount the remote control adaptor RA-15 or the battery pack, using these holes.

(30) **Remote control adaptor connector cover (PUSH OPEN)**

The connector for the remote control adaptor RA-15 is installed under this cover. Slightly press and slide the cover to the left to open. For mounting, connect the connectors first, and then fix the adaptor with the screw (29) .

(31) **POWER connector (POWER)**

For the connection of the battery belt PB-20A, AC adaptor AP-60A and other external power supply.

(32) **POWER switch (POWER, POWER/ROU/VTR)**

When the power is supplied from the POWER connector (31) set the switch to POWER. When the power is supplied from the VTR connector (33), select the VTR position. When the power is supplied from ROU (Remote Operation Panel), chose the ROU (mid position). When the power switch is correctly selected, the POWER lamp lights up.
Be sure to set the OPE/STANDBY switch (4) to STANDBY. When the camera is not to be used for a while select the position other than the connected power. Then the POWER lamp lit off and power is cut.

(33) **VTR connector (VTR)**

Connect the specified VTR cable.

㉞ **Fuse holder (5A)**

A 5A fuse is used. When the fuse is blown, shoot the trouble before replacement .

㉟ **Camera output connector (CAM OUT)**

For output of the composite color signal of 1 Vp-p, 75-ohm from the camera head.

㊱ **Monitor output connector (MON OUT)**

This is for the output of R,G,B, R-G, B-G or Y signal that is selected by the monitor select switch ⑩ .
Connect a B/W picture monitor for a registration adjustment and focus adjustment. When G-G are selected on the MON SEL switch ⑩, -G signal is supplied.

㊲ **Genlock input connector (GL IN)**

Connect a black burst signal or a composite color signal when the genlock operation is made with external video system.
For the use with the remote operation panel OP-15, connect above signals to the GL IN connector of the OP-15, and leave this connector open.

5.2 1.5-inch viewfinder

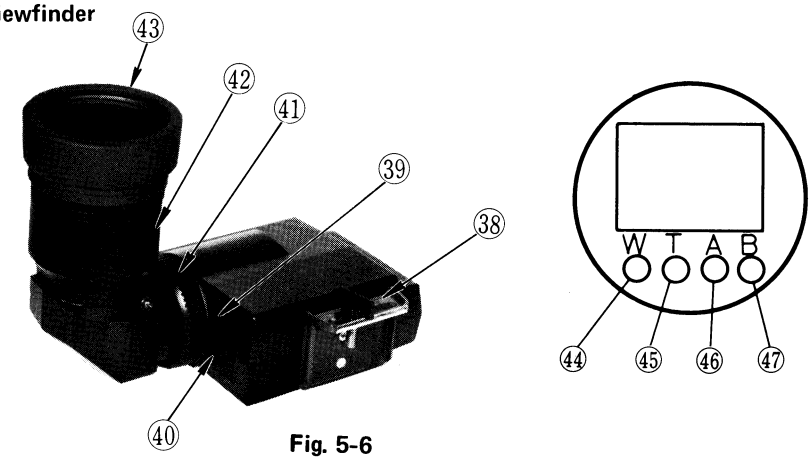


Fig. 5-6

㊳ **Viewfinder mounting bracket**

㊴ **BRIGHT control**

For the adjustment of brightness control.

㊵ **CONTR control**

For the adjustment of contrast control.

㊶ **Viewfinder hood lock**

For the adjustment and locking of viewfinder angle. Rotate the ring ccw to untighten the viewfinder, adjust the angle and choose a desired angle and lock the position by rotating the ring clockwise.

(42) **Correction ring lock**

Loosen the lock to enable the adjustment of the viewfinder hood (43).

(43) **Viewfinder hood**

Adjust the length of the hood properly.

(44) **White balance display lamp (W)**

This lights when the white balance is obtained when the CHECK siwtch (6) is on CHECK. Turn the CHECK switch OFF when the indicator is not necessary.

(45) **Tally lamp (T)**

This lights to indicate the followings:

1) VTR is in the recording mode.
2) The CALL switch on the remote control adaptor is pressed to call the base station.
3) The CALL switch is pressed on the remote operation panel to call the camera side.

(46) **High gain operation lamp (A)**

This lights to indicate that the high gain operation is taking place when the GAIN switch (8) is at +6 dB or +12 dB.

(47) **Battery alarm display lamp (B)**

This lights when the battery voltage falls below 10.8 V approximately. In a few minutes after the lamp has lit, the camera will loose the normal performance. Replace with a new battery as soon as possible.

5.3 Zoom lens

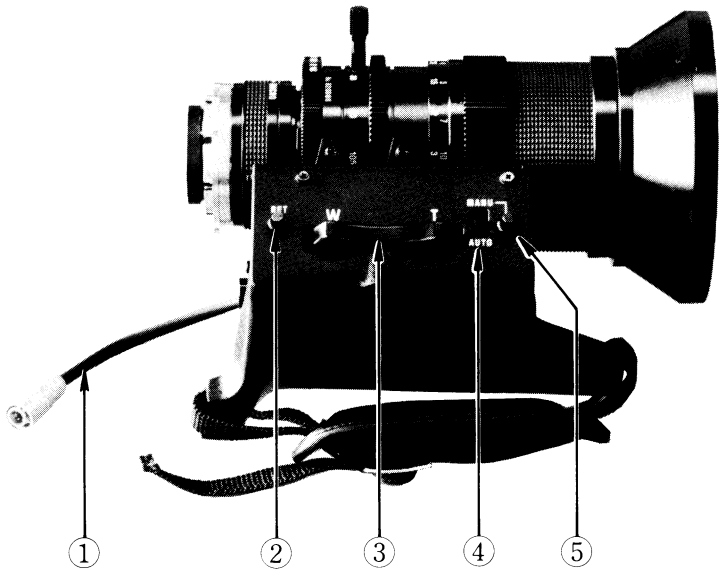


Fig. 5-7

① **Lens cable plug**

Connect the lens connector of the camera head. (LENS ㉓).

② **Return video switch (RET)**

The return video signal is displayed on the viewfinder while depressing.

③ **Zoom survo lever (T/W)**

This servo controls the zooming speed and direction.

④ **Iris mode selector switch (AUTO/MANU)**

AUTO : Select automatic iris control
MANU: Set the iris for the manual control

⑤ **Iris momentary switch**

Establishes the automatic iris mode only while depressing.

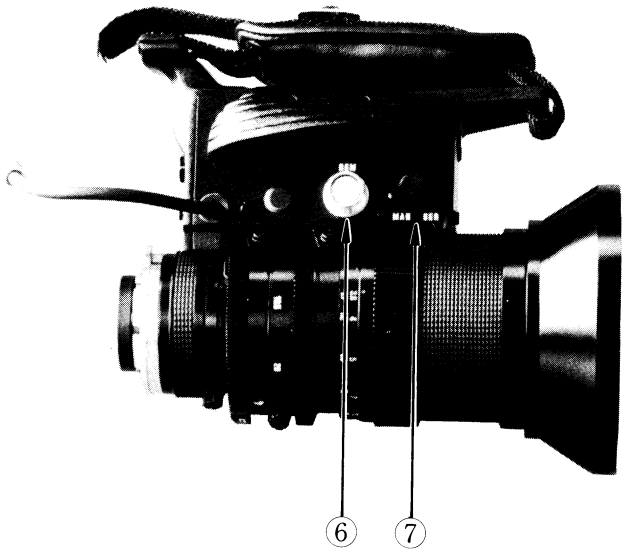


Fig. 5-8

⑥ REM connector

Connect the zoom servo control unit ZL-21W. This connector has a cap. Be careful not to loose it.

⑦ S/M selector lever (MAN/SER)

SER : Zoom servo control (Control with zoom servo lever)
MAN : Manual zooming.

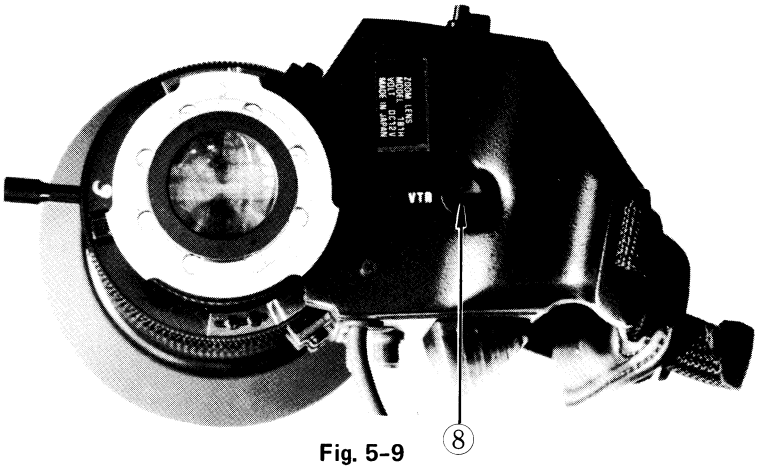


Fig. 5-9

⑧ VTR control switch (VTR)

This is a momentary switch to start and stop the VTR.
Each pressing alternately gives start and stop operation.

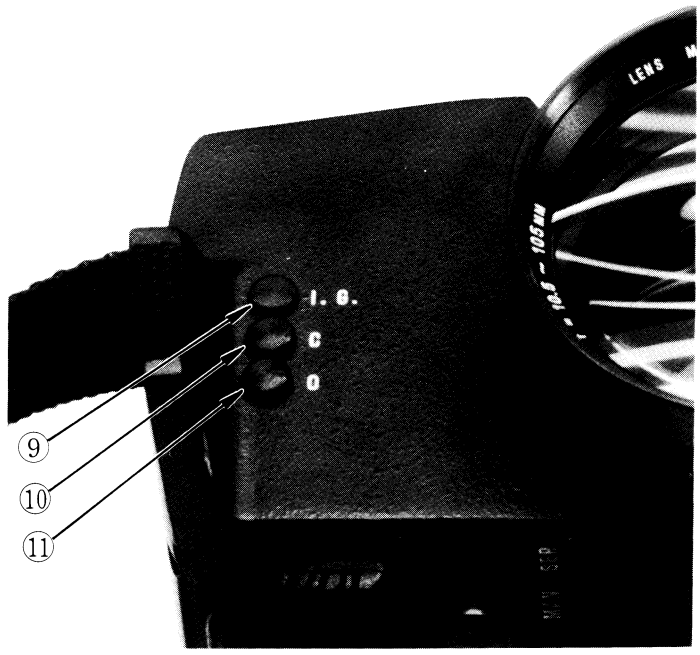


Fig. 5-10

⑨ **Iris gain control (I. G.)**

Controls the iris sensitivity adjustment. Rotate clockwise for higher sensitivity.

⑩ **Iris close adjustment (C)**

Level adjustment control for the auto-iris operation.
The adjustment is preset to f/16 with the iris control signal of 3.4 ±0.1 V. Clockwise rotation will open the iris.

⑪ **Iris open control (O)**

Controls the level at the time of auto-iris operation.
This has been preset to f/2.8 with the iris control signal of 6.2 ±0.1 V. Rotate clockwise to open the iris.

○ Do not loose the rubber caps for the controls ⑨ to ⑪ .

6. OPERATION AND PRECAUTIONS

6.1 How to assemble and connect the camera

6.1.1 Mounting of lens

A bayonet is used for the lens mount. Secure the lens firmly on the camera head with the lens hold lever (22).

For the operation of lens with auto iris function and power zooming, connect the lens connector to the connector (23).

Set the filter disk (3) at the position "4" before mounting or dismounting lens. Then set the POWER switch (32) on the rear panel to off (See (32)). Confirm that the POWER lamp is off.

6.1.2 Mounting of microphone

Mount the microphone MC-30C on the microphone mounting shoe (25), and lock the microphone with a fixing nut.

Connect the cable plug to the microphone connector (26), and clamp the cable with cable clamp (27).

6.1.3 Mounting of tripod

(1) Mounting tripod adaptor

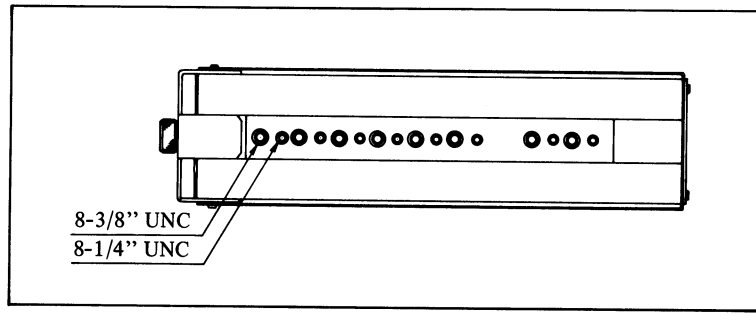


Fig. 6-1 Bottom view of the tripod adaptor

- Mount the camera on the tripod.
  There are 3/8"-16UNC and 1/4"-20UNC female screws.

(2) How to use the tripod adaptor

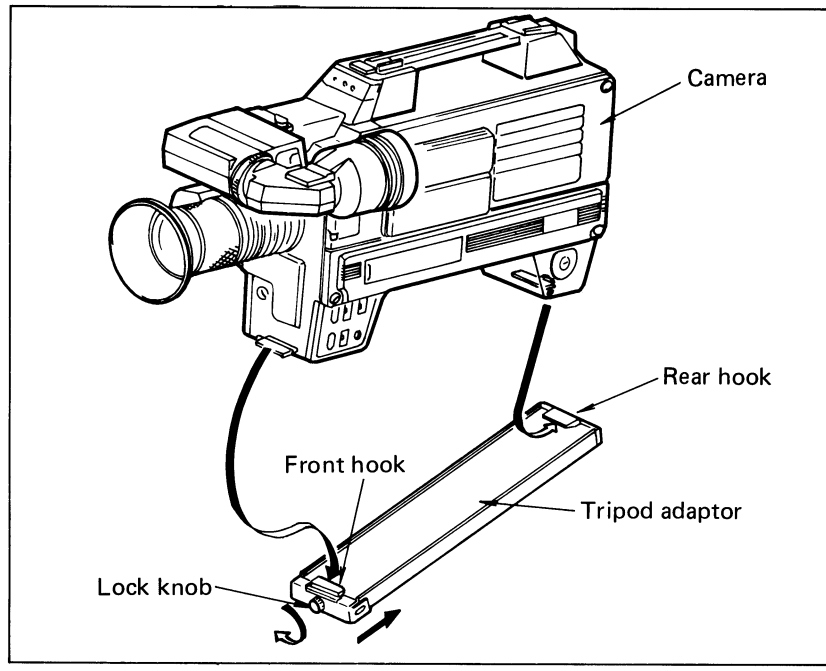


Fig. 6-2 Mounting of tripod adaptor

Loosen the lock knobs from the tripod adaptor TA-15, and fasten the hooks of the camera bottom with the hooks of the adaptor, and rotate to tighten the lock knob.

6.1.4 How to mount the viewfinder

(1) 1.5-inch viewfinder

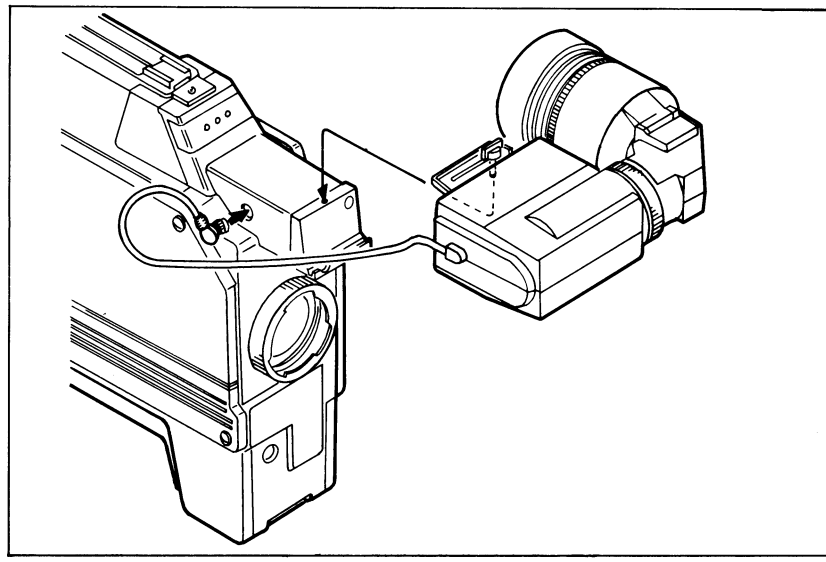


Fig. 6-3 How to mount 1.5-inch viewfinder

- Mount the viewfinder GM-3B on the camera using screws.
- Connect the cable plug of the GM-3B to the viewfinder connector (21) on the camera head.
- Loosen the screws on both sides for bilateral positioning of the viewfinder.
- Loosen the screw on the opposite side of the connector for the back and forth adjustment of the viewfinder position.
- To adjust the lateral position of the GM-3B, loosen the knob screw, and then tighten up again once the position has been determined.

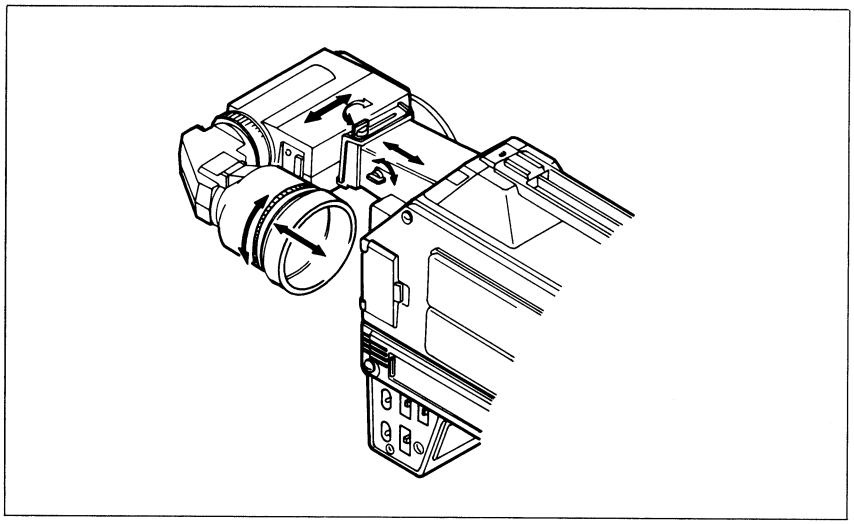


Fig. 6-4

(2) 4.5-inch viewfinder

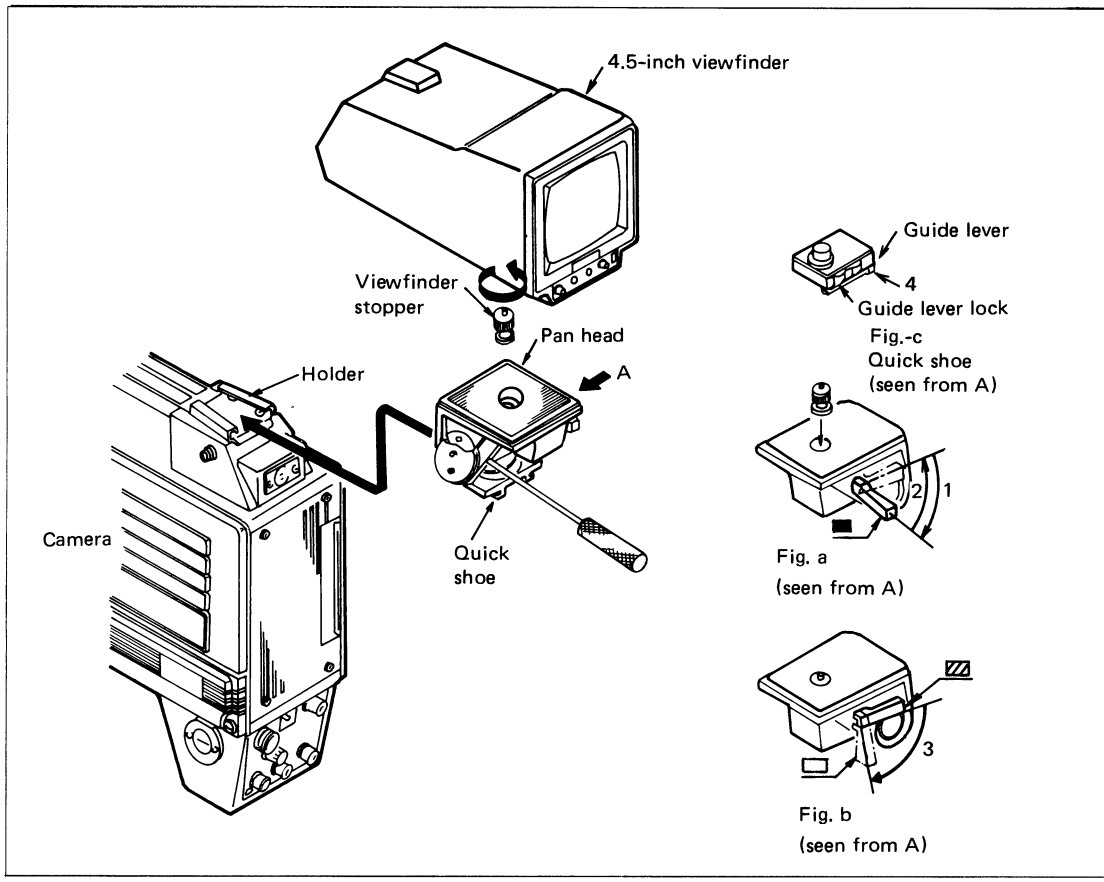


Fig. 6-5

- 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 shown by the arrow (Fig. a) from the ▨ state. In the raised state ■ , place the viewfinder on the pan head (the VF 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 shown by the arrow (Fig. b) as far as it will go and, in the □ state, the viewfinder will be properly secured.
- Fit together the quick shoe mounted on the pan head and the quick shoe holder mounted on the camera (when these two parts are fitted together, proceed while pushing the guide lever lock in Fig. c in the direction of arrow 4).
  The guide lever is properly secured when moved in the lock drection.

6.1.5 Replacement of the memory back-up battery

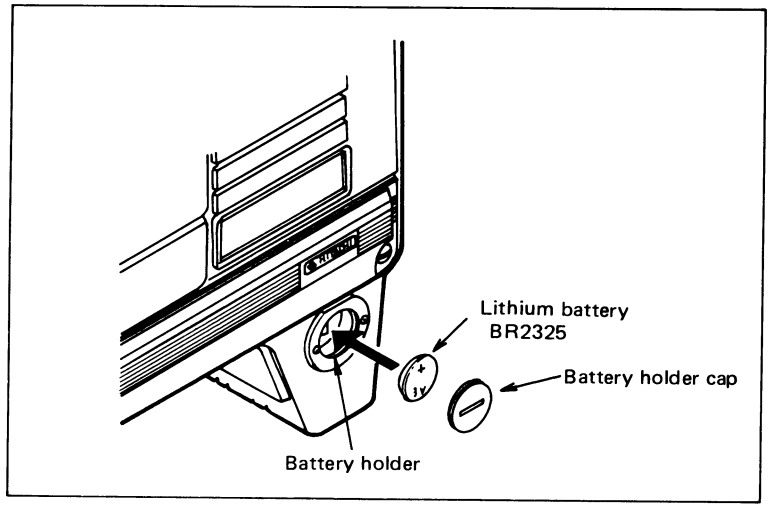


Fig. 6-6 Replacement of memory back-up battery

1) Unscrew the cover to the battery holder installed in the rear camera foot, and remove the battery.
2) Install a new battery with the negative pole inside.
3) Assemble the cover and screw in with a coin.

Note 1 : Do not use batteries other than BR2325 lithium battery.

Note 2 : Caution

1) Do not short circuit.
2) Do not throw into a fire.
3) Do not charge.
4) Do not give heat.
5) Do not disassemble.
6) Check the polarities before installation.

Note 3 : Adjust the auto-white balance and auto-black balance again, after the battery replacement.

6.2. Operational checks and initial adjustments

When the illumination 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 also when the camera has been stored or not used for a long period of time.

(1) Preheating

Allow the camera to warm up with the power unit ON, the POWER switch (32) a pelevant power source ON and the POWER OPE STANDBY switch (4) at STANDBY.

(This warming-up serves to protect the camera tube and prolong its 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 BAR/CAM selector switch ⑨ is set to BAR. Check the black balance, white balance and color bar vectors in the color bar signals and, if necessary, adjust with reference to the overall adjustment procedure.

(3) Video signal check

A color picture is obtained from the CAM OUT connector when the BAR/CAM selector switch ⑨ is set to CAM and filter disk is set to position "1" or "2".
Check the white balance and black balance as follows:

(a) Set the high gain switch ⑧ to 0 dB.

(b) Set the filter disk ③ to the position corresponding to the color temperature of the light source. Refer to Table 6-1 for the filter disk positions and their uses.

Filter disk number	Light source color temperature	Type of light source
1	3,200°K	Tungsten or halogen lamp
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	For unused conditions

Table 6-1

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

(d) Now set the auto black/auto white switch ⑤ to its upper position. The white balance is set after a few seconds.

Check: Set the CHECK/OFF switch to CHECK side. Then "W" LED should light on viewfinder when the white balance is obtained.

(e) Set the auto black/auto white switch ⑤ to its lower position.
The lens iris closes for about a few 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) When removing the AUTO unit.

(ii) When the back-up battery has completely discharged.
This camera uses a lithium battery for memory back-up.
It will discharge in about 2 years the memory contents will no longer be stored and held. When this happens, replace the battery following the procedure outlined in section 6.15. Even when the memory back-up battery has completely discharged, the camera can be operated normally by setting the auto black and auto white balance in the operational mode.

(iii) When the color temperature of the lighting has shifted, 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, set the color temperature of the lighting and reset the white balance when so required.

Auto white balance setting

Proceed in accordance with steps (c) and (d) for setting the auto white balance. If a large white subject 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 subject with an area which is more than 10% of the whole screen.
② The above white subject must be brighter than any other subject.
③ The signal level of the above subject must be less than 100% but more than 70%.

Note 1 : Auto white balance and the auto black balance are obtained regardless of the lens IRIS AUTO/MAN position. However, at the MAN position, the iris closes to obtain the auto black setting and it remains closed even after the setting has been completed. Open the lens iris.
When the lens iris is set to AUTO, the iris automatically opens and adjust itself at an appropriate setting.

Note 2 : Confirm each steps of auto black or auto white balance setting.
Be sure that the setting is completed before proceeding to the next step.

Note 3 : Confirm each switching of the AUTO WHITE/AUTO BLACK ⑤ or do not place fingers on the switch unless necessary as this is a very light switch.

(4) Tracking adjustment

Return the filter disk 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, re-adjust 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 images, remove the right-hand panel and loosen the R/G/B assembly lock screws and focus optimally using the tracking controls.

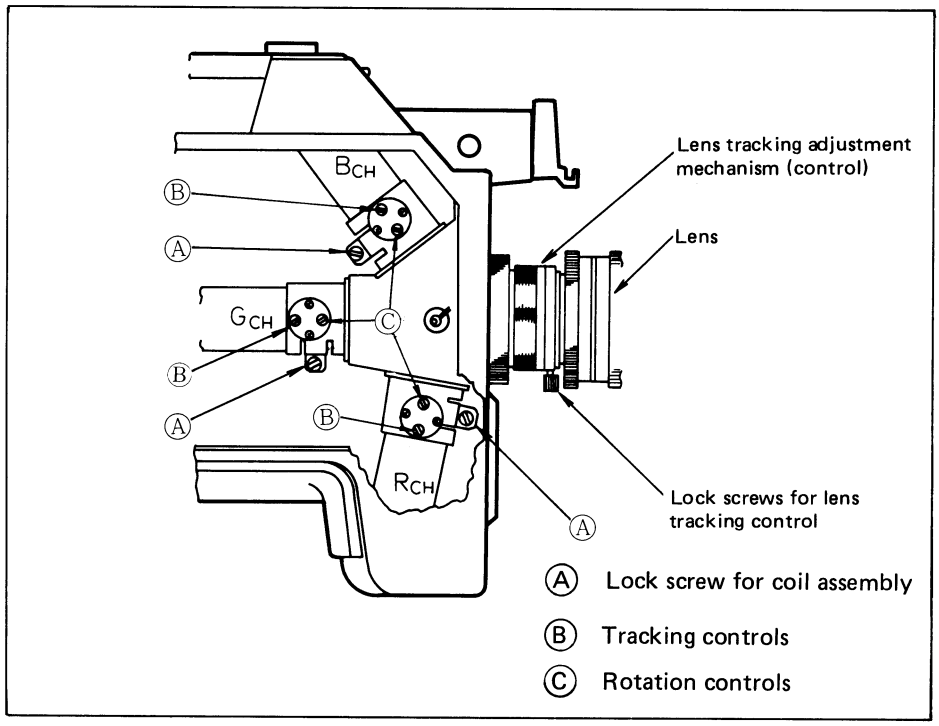


Fig. 6-7

(5) Registration adjustment

Connect the picture monitor to the MON OUT connector (36) on the rear.

Allow the registration chart to fill the whole picture monitor screen and check the registration. If the centering of the pictures in the center area deviates, adjust the R/B centering controls (11) to (14).

(6) VTR connections check

There are many different control methods. A selector switch for VTR control is provided inside the PWR unit. Refer to Tables 6-2 for its proper use.

(i) Operation of SWI in PWR unit

Set this switch to the position corresponding to the VTR which is being used in combination with the camera.

Switch mode	Details of operation	Compatible VTR	Compatible VTR cable
"S"	A +5 V voltage is fed out as the start control signal and 0V as the stop control signal to the VTR. The camera's tally lamp that indicates recording lights with the camera's start control signal.	CR–4400LS VO 3800	C201CE C501CE
		BVU – 50 BVH –500 CR –4700 VO –4800	C201VE C501VE
"J"	A voltage of 0V is fed out as the start control signal and +9V as the stop control signal to the VTR. The camera's tally lamp that indicates recording lights with the camera's start control signal.	SV–650 HR–4100 CR–4400	C–201CE C–501CE

Table 6-2

Note 1 : The start and stop control polarities are reversed in the "S" and "J" modes. If used incorrectly, the tally lamp will light when no recording is being undertaken and it will not light when recording is being undertaken.

Note 2 : Keep SW2 of the PWR unit always on "SJ" mode.

(ii) Adjustment of audio level

Set the MIC LEVEL control on the bottom of the camera's rear foot according to the VTR to be used.. See Table 6-3.

AUDIO LEVEL	MIC LEVEL control	VTR's
-20 dB	Fully CW (Maximum)	SV–650 CR4400LS HR–4100 CR–4700 CR–4400 BVH–500
-60 dB	Fully CCW (Minimum)	BVU–50 VO–4800 VO–3800

Table 6-3

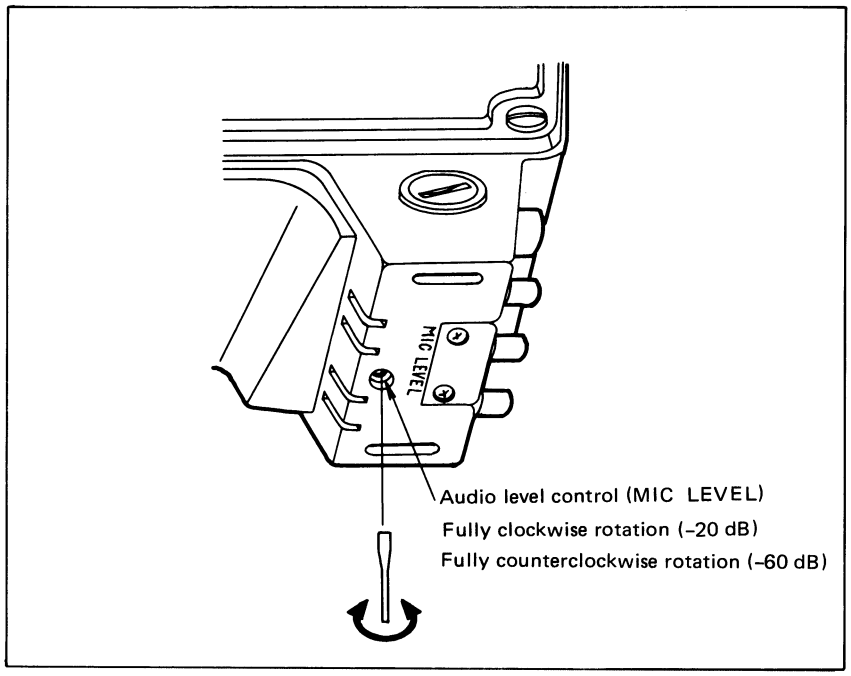


Fig. 6-8

Consult the nearest Hitachi Denshi representative for a combination with VTRs other than listed in Fig. 6-2.

As VTR cables are consumable parts, it is recommended to prepare for a possible replacement.

200
300
400
500
600
200
300
400
500
600

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