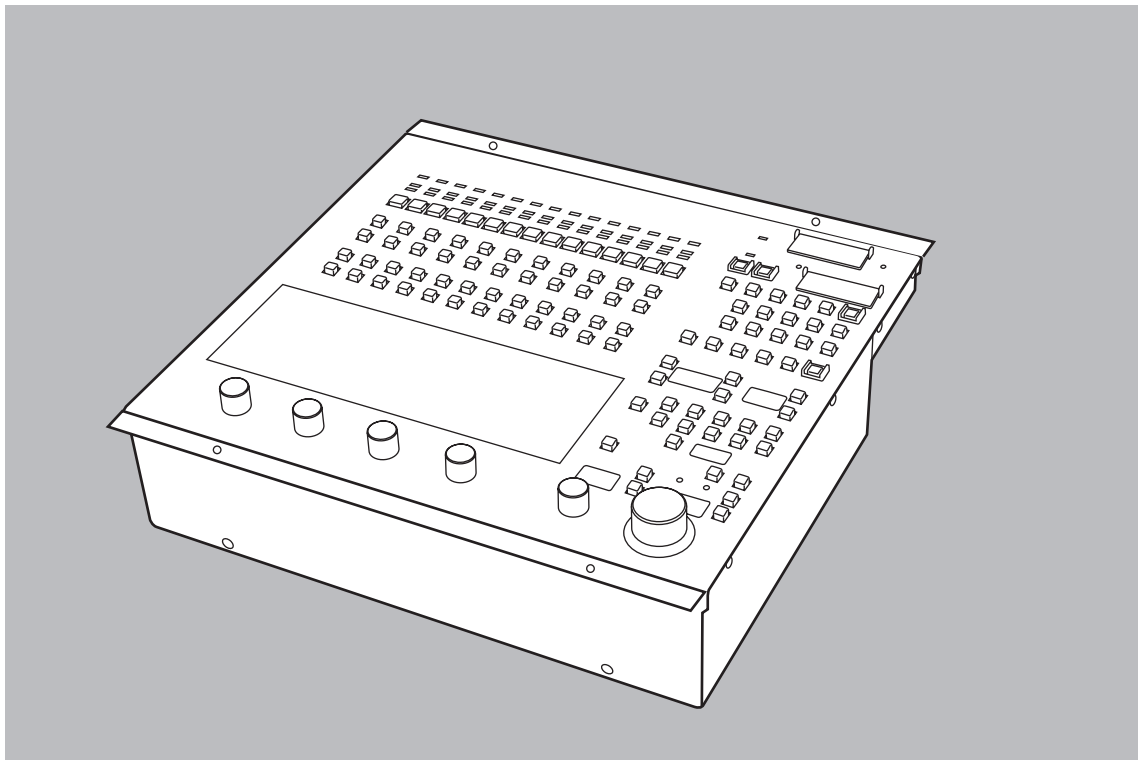# Operating Instructions

Master Setup Unit

AK-MSU930P

Panasonic

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

Safety precautions

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

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

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

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (service) instructions in the literature accompanying the appliance.

The serial number of this product may be found on the bottom of the unit.

For CANADA

This class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

FCC Note:
This device complies with Part 15 of the FCC Rules. To assure continued compliance follow the attached installation instructions and do not make any unauthorized modifications.

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

WARNING:
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION:
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE ONLY THE RECOMMENDED ACCESSORIES.

indicates safety information.

Thank you very much for purchasing this master setup unit.

Contents

Overview

- This master setup unit (MSU) is used to control the the multi-format cameras (AK-HC931P) and the camera control units (AK-HCU931P).
- A dedicated multi-cable is used to connect this unit with the remote operation panel.

Accessories

Mounting screws (M4, 8 mm) .... ×4

Operating precautions

- **Use the AW-PS505 dedicated AC adapter for the MSU's power supply.**

- **Handle the unit carefully.**
  Dropping the unit or subjecting it to strong impact may cause malfunctioning and failures.

- **Operate the unit within a temperature range of 32 °F to 104 °F (0 °C to 40 °C).**
  Operation in locations below 32 °F or above 104 °F may adversely affect the internal parts.

- **Be absolutely sure to turn off the power before connecting or disconnecting the cables.**

- **Do not use the unit outdoors.**

- **Install the unit at a distance of at least 1 meter from the monitor.**

- **Maintenance**
  Disconnect the power plug, and wipe the unit with a dry cloth. To remove stubborn dirt, soak a cloth in some diluted kitchen detergent and wring it out well, and then wipe the unit gently.

  ┌─ **Caution** ───┐
  - **Avoid using benzine, paint thinners and other volatile substances.**
  - **If a chemically-treated cleaning cloth is to be used, read the precautions for its use carefully.**
  └──┘
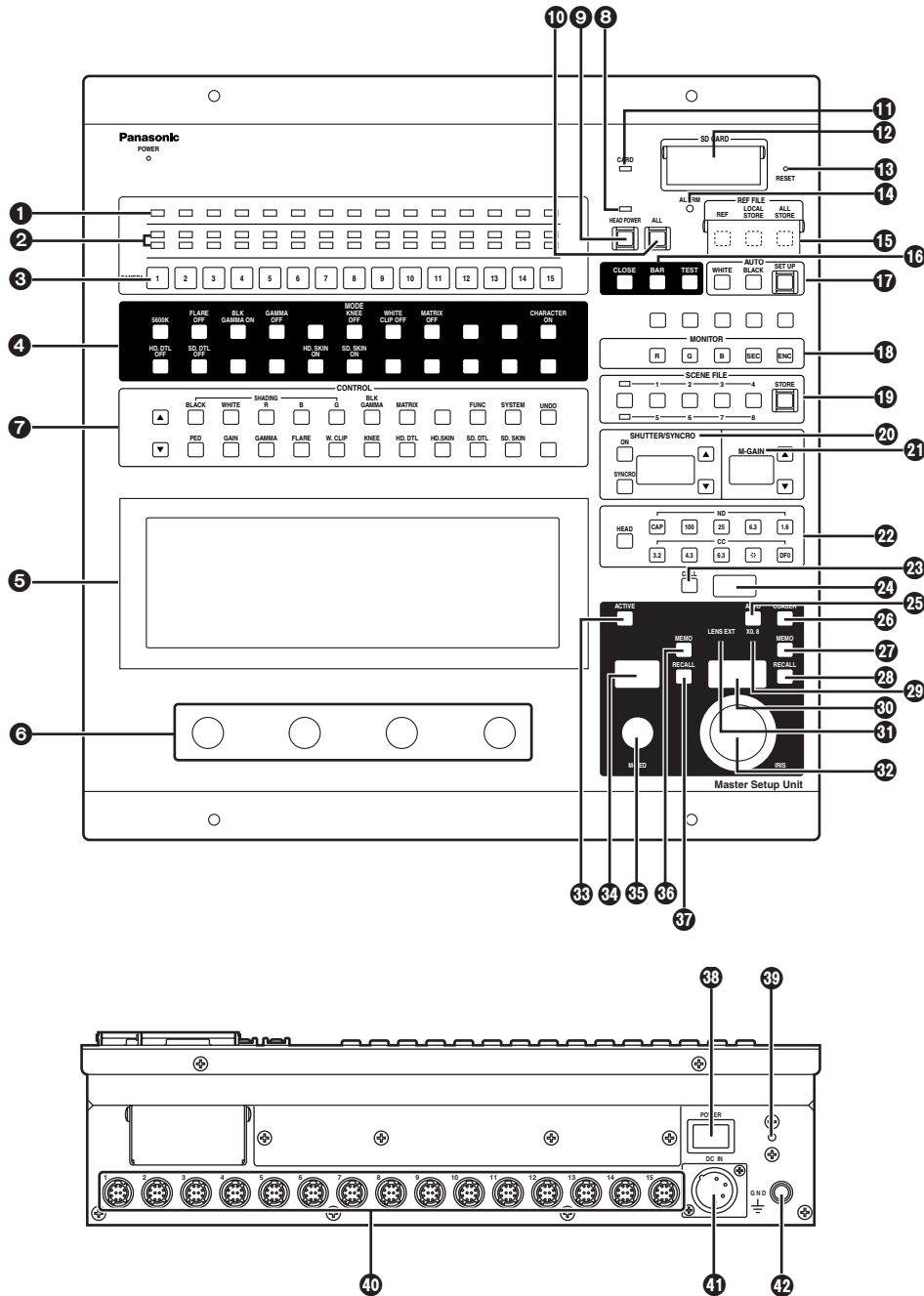
MSU operation panel

❶ Alarm LEDs [ALARM]

These LEDs light when optical transmission is not proceeding satisfactorily or when a problem has occurred in the camera, CCU fan or power supply.

Lighted green: Normal

Lighted orange: Head fan OFF, 3 dB optical level margin

Lighted red: Cable trouble, 0 dB optical level margin

Off: Failure to connect CCU, CCU power OFF

❷ Tally LEDs [TALLY]

The LEDs in the top row are the red tally indicators, and the LEDs in the bottom row are the green tally indicators. The tally LEDs are aligned in the numerical order of the camera numbers.

Parts and their functions

❸ **Camera selector switches [CAMERA]**
These are used to select one camera and one CCU as the pair which is to be controlled by the MSU.
A camera is selected by pressing the camera selector switch with the same number as the camera to be selected (its lamp will light). The selection is released by pressing the camera selector switch of the selected camera (its lamp will turn off).
When a camera selector switch is pressed, the MSU settings (such as the switch lamp lighting and selection) are performed using the information on the settings for the camera concerned.
The details of the functions given below apply when one or more camera selector switches have been selected.

❹ **MODE ON/OFF switches**
These switches are for setting the camera operation modes. The modes corresponding to the switches with the lighted lamps are selected.

5600K switch [5600K MODE]
This is used to change the amplification rate of the GBR signals by an electrical circuit to achieve the white balance that corresponds to the color temperature of 5600K. When it is pressed, the B video signal is attenuated by approximately -6 dB, the R video signal is boosted by approximately 3 dB, and the G video signal is not attenuated. Select this switch when shooting under a 5600K light source or shooting outdoors.
Lighted: 5600K
Off: 3200K

Flare switch [FLARE OFF MODE]
This is used to cancel the flare correction function (which suppresses the rise of the pedestal in proportion to the light quantity).
Lighted: Flare correction OFF (flare correction function is canceled)
Off: Flare correction function is valid.

Black gamma ON switch [BLACK GAMMA ON MODE]
This is used to enable the black gamma function (which changes the video signal amplification rate in parts where the light quantity is low).
Lighted: Black gamma ON (black gamma function is valid)
Off: Black gamma function is canceled.

Gamma OFF switch [GAMMA OFF MODE]
This is used to cancel the gamma correction function (which provides the signal level of the video signals with the reverse characteristics matching the TV video signal input and light-emitting level characteristics).
Lighted: Gamma correction OFF (gamma correction function is canceled)
Off: Gamma correction function is valid.

Knee OFF switch [KNEE OFF MODE]
This is used to cancel the knee function that attenuates those parts of the video signals where a particular level (knee point) has been exceeded so that they will not become saturated as easily.
Lighted: Knee OFF (knee function is canceled)
Off: Knee function is valid.

White clip OFF switch [WHITE CLIP OFF MODE]
This is used to cancel the white clip function by which the video signal output is clipped (saturated).
Lighted: White clip OFF (white clip OFF function is valid)
Off: White clip ON

Matrix ON switch [MATRIX ON MODE]
This is used to enable the matrix function by which the chroma saturation is compensated for the G (green), B (blue), R (red), Ye (yellow), Cy (cyan) and Mg (magenta) signals and by which the chroma saturation and hue are compensated for the I (skin tone) signals.
Lighted: Matrix ON (color correction function is valid)
Off: Matrix OFF

PM character display switch [CHARACTER]
This is used to set the characters to be displayed on the PM to ON or OFF.

HDTV detail OFF switch [HD.DTL OFF MODE]
This is used to cancel the detail enhancer function that enhances (adjusts the relative hardness/softness of) the picture quality in the detailed parts of the HDTV video output.
Lighted: Detail enhancer OFF (function for enhancing picture quality in detailed parts canceled)
Off: Detail enhancer ON

SDTV detail OFF switch [SD.DTL OFF MODE]
This is used to cancel the detail enhancer function that enhances (adjusts the relative hardness/softness of) the picture quality in the detailed parts of the SDTV video output.
Lighted: Detail enhancer OFF (function for enhancing picture quality in detailed parts canceled)
Off: Detail enhancer ON

HDTV skin tone detail ON switch [HD SKIN ON MODE]
This is used to suppress the detail in the skin color parts of the HDTV video output.

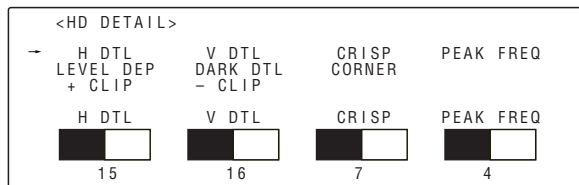**SDTV skin tone detail ON switch [SD SKIN ON MODE]**
This is used to suppress the detail in the skin color parts of the SDTV video output.

Parts and their functions

❺ EL display
When the control item selector switches are selected, the corresponding adjustment items and adjustment values appear on the EL display.

Example of EL display

```
    <HD DETAIL>
 →   H DTL        V DTL        CRISP      PEAK FREQ
    LEVEL DEP    DARK DTL     CORNER
    + CLIP       – CLIP

     H DTL        V DTL        CRISP      PEAK FREQ
    ▐▐▐▐░░       ▐▐▐▐░░       ▐▐░░░      ▐▐░░░
       15           16           7           4
```

The HD DETAIL switch will now be used as an example to describe the EL menu.
When the HD.DTL control item selector switch is pressed, what is shown in the example in the figure above appears on the EL display.
The adjustment item title appears on the first line. On lines 2, 3 and 4 are the adjustment item groups which can be selected each time an individual adjustment item is set. At the far left is the → arrow that indicates the adjustment item group now selected; on the third tier from the bottom is the adjustment item which has been selected; on the second tier from the bottom is the adjustment value level display; and on the bottom tier is the adjustment value itself.
To select an adjustment item group, press the ▽ or △ switch to move the → arrow to the far left of the line with the adjustment item group to be selected.
Once the adjustment item to be selected is displayed, turn the adjustment rotary encoder to set the adjustment value. To return (initialize) the changed data to the original data, press the UNDO switch.
If a control switch is pressed and its lamp is turned off or if another control switch is pressed and the menu screen has changed, the setting of the adjustment item so far will be stored.

❻ Adjustment rotary encoders
The data of an adjustment item shown on the EL display can be changed using the neighboring adjustment rotary encoder.

❼ Control item selector switches
When these switches are selected (their lamps are lighted), the corresponding adjustment items and adjustment values appear on the EL display. The adjustment values can be changed using the neighboring adjustment rotary encoder.

Undo switch [UNDO]
This is used to return the values controlled on the display to the statuses that existed prior to the control.

Flare OFF switch [FLARE OFF]
This is used to cancel the flare correction function.

Black shading selector switch
[BLACK SHADING CONTROL]
This is used to correct the black shading (the coloring of black images). When it is pressed (its lamp is lighted) and when one of the SHADING R, G or B switches is then pressed and selected, the adjustment items for the black shading appear on the LCD display. The black shading correction can be adjusted using the four neighboring adjustment rotary encoders.
HSAW: Horizontal sawtooth wave correction
This is used to correct the coloring of black screen images in the horizontal direction.
Adjustment range: –100 to 100
HPAR: Horizontal parabola correction
This is used to correct the coloring of black screen images in the horizontal direction.
Adjustment range: –100 to 100

VSAW: Vertical sawtooth wave correction
This is used to correct the coloring of black screen images in the vertical direction.
Adjustment range: –100 to 100
VPAR: Vertical parabola correction
This is used to correct the coloring of black screen images in the vertical direction.
Adjustment range: –100 to 100

White shading selector switch
[WHITE SHADING CONTROL]
This is used to correct the white shading. When it is pressed and its lamp is lighted and when one of the SHADING R, G or B switches is then pressed and selected, the adjustment items for the white shading appear on the LCD display. The white shading correction can be adjusted using the four neighboring adjustment rotary encoders.
HSAW: Horizontal sawtooth wave correction
This is used to correct the coloring of white screen images in the horizontal direction.
Adjustment range: –100 to 100
(0: Equivalent to OFF)
HPAR: Horizontal parabola correction
This is used to correct the coloring of white screen images in the horizontal direction.
Adjustment range: –100 to 100
(0: Equivalent to OFF)
VSAW: Vertical sawtooth wave correction
This is used to correct the coloring of white screen images in the vertical direction.
Adjustment range: –100 to 100
(0: Equivalent to OFF)
VPAR: Vertical parabola correction
This is used to correct the coloring of white screen images in the vertical direction.
Adjustment range: –100 to 100
(0: Equivalent to OFF)

R, G, B shading switches [R, G, B]
These are used to select the video signals targeted for shading correction from among the R, G and B signals. The lamp of the selected switch lights.

Parts and their functions

Black gamma control switch [BLK GAMMA CONTROL]
This is operable when the lamp of the BLK GAMMA ON switch among the MODE ON/OFF switches is lighted. It is selected to adjust the black gamma curve.
When the switch is selected, its lamp lights.

BLKR, BLKM, BLKB GAM:
Black gamma curve (R, MASTER or B)
Adjustment range: –32 (black compression) to +31 (black expansion)

LEVEL: Black gamma level
Setting: LOW (brightness level: approx. 20%), HI (brightness level: approx. 30%)

Matrix control switch [MATRIX CONTROL]
This is pressed to change the correction amounts for the R-G, R-B, G-R, G-B, B-R and B-G chroma saturation.

MTX 12, SATU, PHASE
These are used to select the following 12-axis matrix adjustment items: G, G_Cy, Cy, Cy_B, B, B_Mg, Mg, Mg_R, R, R_Ye, Ye and Ye_G.

FUNC switches [FUNC]
ALC LEVEL: Auto iris level
This is used to adjust the auto iris level of the lens iris.

SPEED: Auto iris speed
This is used to set the feedback speed of the auto iris.

WINDOW: Auto iris window
This is used to set the image detection area window of the auto iris.

PEAK: Peak/average setting
This is used to set the ratio between the average and peak values of the auto iris image detection.

FAN POWER: Fan power switch
This is used to set the power of the camera head's fan to ON or OFF.

FAN SPEED: Fan speed
This is used to set the speed of the camera head's fan.

2D-M: Component 2-dimensional low-pass filter
This is used to set whether to apply the 2-dimensional low-pass filter to the SDTV component output.

2D-E: Composite 2-dimensional low-pass filter
This is used to set whether to apply the 2-dimensional low-pass filter to the SDTV composite output.

COMB: Comb filter mode
This is used to set the comb filter mode.

SETUP MODE: Auto setup mode setting
This is used to select the auto setup mode setting.

REF FILE: File select
This is used to select the file attribute to be referenced when auto setup has been started.

MPED SET: Auto setup MPED convergence value
This is used to set the position where the master pedestal is to be converged when auto setup has been started.

BRIGHT: Dot matrix display brightness setting
This is used to set the brightness of the dot matrix display.

BUZZ: Buzzer setting
This is used to set the buzzer to ON or OFF.

<CARD>: SD card read/write setting
This is used to write the camera's data on the SD card or read it from the card.

System switches [SYSTEM]
These are the system setting switches used to set the down-converter mode, select the down-converter filter, select GBR or YPbPr for the HDTV video output, select GBR or YPbPr for the SDTV video output, select the up-converter mode, select whether the CCU waveform monitor control connector is to be used for SDTV or HDTV applications, and so on.

HEAD, CCU RCV LEVEL:
Camera head, CCU unit light reception strength level displays
These indicate the light reception strength margins of the camera head and CCU.

RET1, RET2, RET3, RET4: Return video settings
These are used to set the input allocations of the return signals.

D/C MODE: Down-conversion system selection
This is used to select the down-conversion system.

U/C MODE: Up-conversion system selection
This is used to select the up-conversion system.

D/C LINK: Down-conversion link
This is used to decide whether to go with the down-conversion system control based on the AUX external input or set the down-conversion independently.

U/C LINK: Up-conversion link
This is used to decide whether to go with the up-conversion system control that is linked to the down-conversion system or set the up-conversion independently.

HD BAR: HD color bar made setting
This is used to select the HD color bar mode.

SD BAR: SD color bar mode setting
This is used to select the SD color bar mode.

PATHO: Pathological pattern output
This is used to forcibly output the pathological pattern.

SET UP: Color bar setup setting
This is used to set the color bar setup.

OUTPUT SEL: Output selection
This is used to set the analog output of the CCU to RGB or YPbPr.

MONI SEL: Monitor switch selection setting
This is used to set the monitor switch selection to PM, WFM or the PM-WFM link mode.

Parts and their functions

MONI LINK: Shading link setting
This is used to set whether to link the monitor when the R, G or B shading switch has been selected.

ANALOG: CCU analog output setting
This is used to set the analog output of the CCU to the HD or SD component.

SDI4 OUT: HD SDI4 output selection
This is used to set the HD SDI4 output of the CCU as the PM or normal output.

SYNC: Sync waveform addition setting
This is used to select whether to add the sync waveform to the analog output.

TYPE: Analog sync waveform setting
This is used to set the sync waveform to be added to the HD analog output to binary or tri-level.

H_CO (HDTV): Horizontal sync signal phase coarse adjustment
This is used to coarsely adjust the phase in relation to the HDTV genlock sync signal.

H_FIN (HDTV): Horizontal sync signal phase fine adjustment
This is used to finely adjust the phase in relation to the HDTV genlock sync signal.

H_CO (SDTV): Horizontal sync signal phase coarse adjustment
This is used to coarsely adjust the phase in relation to the SDTV genlock sync signal.

H_FIN (SDTV): Horizontal sync signal phase fine adjustment
This is used to finely adjust the phase in relation to the SDTV genlock sync signal.

SCCO: Subcarrier phase coarse adjustment
This is used to coarsely adjust the phase of the subcarrier signal in relation to the SDTV genlock sync signal.

SCFIN: Subcarrier phase fine adjustment
This is used to finely adjust the phase of the subcarrier signal in relation to the SDTV genlock sync signal.

SH_H: SD/HD horizontal phase
This is used to adjust the horizontal phase of the SDTV output and HDTV output.

SH_V: SD/HD vertical phase
This is used to set the vertical phase of the SDTV output and HDTV output to line 0 and line 90 (advanced by 90H for HDTV).

Pedestal control switch [PED CONTROL]
This is selected to adjust the R, G and B pedestal levels in relation to the master pedestal position.
When it is selected, its lamp lights.

GPED: G pedestal level
Adjustment range: –100 to +100 (amount of G pedestal offset from master pedestal)

RPED, BPED: R, B pedestal level
Adjustment range: –100 to +100
The level is increased or decreased from the level at the pedestal position where the black balance was attained.
When the black balance is adjusted, 0 is set as the adjustment value.

Gain control switch [GAIN CONTROL]
This is selected to adjust the white balance. When it is selected, its lamp lights.

G GAIN: Adjustment range: –100 to +100
(Amount by which the G gain is to be increased or decreased from its reference setting)

R GAIN, B GAIN: Adjustment range: –100 to +100
(Amount by which the R or B gain is to be increased or decreased as referenced to their levels at the pedestal position where the white balance was attained; when the white balance is adjusted, 0 is set as the adjustment value.)

Gamma curve control switch [GAMMA CONTROL]
This is selected to adjust the gamma correction.
Since the M GAM adjustment value is independent of the R and B GAM adjustment values, the R and B GAM values remain unchanged even when M GAM is changed.
When the switch is selected, its lamp lights.

M GAM: Master gamma
Adjustment range: 0.600 to 0.300

RGAM, BGAM: Adjustment range: –75 to +75

Flare control switch [FLARE CONTROL]
This is selected to change the amount of flare correction. When it is selected, its lamp lights.

RFLR, GFLR, BFLR: R, G and B flare
Adjustment range: –50 to +50
(Flare correction operation is turned off at 0.)

White clip control switch [WHITE CLIP CONTROL]
This is valid when the lamp of the WHT CLIP OFF switch among the MODE ON/OFF switches is off, and it is selected to change the white clip level. When it is selected, its lamp lights.

WHT CLIP: White clip
Adjustment range: 95% to 110%

Knee control switch [KNEE CONTROL]
This is selected to adjust the knee slope and knee point.

MPNT: Master knee point
Adjustment range: 105% to 85%

RPNT, BPNT: R and B knee points
Adjustment range: +10% to –10%

MSLP: Master knee slope
Adjustment range: 63 to 0

RSLP, BSLP: R and B knee slopes
Adjustment range: +32 to –31

Parts and their functions

HD detail control switch [HD.DTL CONTROL]
This switch is selected to change the amount by which the picture quality in the detailed parts of the HDTV video output has been enhanced (by which the relative hardness/softness has been adjusted). When it is selected, its lamp lights, but it cannot be selected when the lamp of the HD detail OFF switch is lighted.
Since the SDTV video output is created from the HDTV video output, the adjustments made by the HD detail controls are reflected in the SDTV video output.

VDTL: Vertical detail level
This is used to adjust the amount of vertical detail.

HDTL: Horizontal detail level
This is used to adjust the amount of horizontal detail.

CRSP: Crisp
This is used to set the maximum amplitude of the very faint noise components which are removed from the detail components.

PEAK: Peak frequency
This is used to select the contour correction frequency band (boost frequency or peak frequency).

LEVEL DEP: Level dependent
This is used to remove the detail in the dark parts by means of a coefficient dependent upon the video signal level so that the dark parts will not appear unnatural.

DARK: Dark detail
This function boosts the detail in the dark parts.

CORNER: Corner detail
This function boosts the detail around the edges of the screen.

SOURCE: Detail source
This is used to select the source signals for creating the detail components.

+CLP: Detail edge overshoot clip
This is used to limit the length of the overshoot parts of the detail edge components.

–CLP: Detail edge undershoot clip
This is used to limit the length of the undershoot parts of the detail edge components.

DTL +KNEE: Detail edge overshoot knee
This function applies the knee to the detail edge overshoot parts.

DTL –KNEE: Detail edge undershoot knee
This function applies the knee to the detail edge undershoot parts.

KDTL: Knee detail
This is used to boost detail components of the parts where the knee has been applied.

KDTL CRSP: Knee detail crisp
This is used to remove the very faint noise components below the level set from the knee detail components.

KDTL FREQ: Knee detail boost frequency
This is used to select the knee detail boost frequency.

KDTL +CLP: Knee detail edge overshoot clip
This is used to limit the length of the overshoot parts of the knee detail edge components.

KDTL –CLP: Knee detail edge undershoot clip
This is used to limit the length of the undershoot parts of the knee detail edge components.

KDTL +KNE: Knee detail edge overshoot knee
This function applies the knee to the knee detail edge overshoot parts.

KDTL –KNE: Knee detail edge undershoot knee
This function applies the knee to the knee detail edge undershoot parts.

HD skin tone detail switch [HD.SKIN]
This is used to apply coring to the detail enhancement of the skin tone areas in the HDTV video signals to soften the skin tone detail enhancement.
It cannot be selected when the lamp of the HD detail OFF switch is lighted.

SKIN ZEB: Skin tone area zebra
This is used to set whether to apply the zebra pattern to the areas where coring is applied as the skin tones to the Y signals in the PM output.

PHASE: Skin tone area phase
This is used to move the areas to be recognized as the skin tones in the range of 153 to 93 along the Q axis on the color vector display.

WIDTH: Skin tone area width
This is used to widen the areas to be recognized as the skin tones in the range of 1 to 20 along the I axis on the color vector display.

CRISP: Skin tone detail crisp
This is used to remove the very faint noise components from the skin tone detail components.

SKIN LVL: Skin detail level
This is used to set the chroma saturation of the parts where the skin tone detail is applied.

SDTV detail control switch [SD.DTL CONTROL]
This switch is selected to change the amount by which the picture quality in the detailed parts of the SDTV video output has been enhanced (by which the relative hardness/softness has been adjusted). When it is selected, its lamp lights, but it cannot be selected when the lamp of the SD detail OFF switch is lighted.
Since the SDTV video output is created from the HDTV video output, the adjustments made by the SD detail controls are not reflected in the HDTV video output.
The SD detail control adjustments are independent of the HD detail control adjustments.

VDTL: Vertical detail level
This is used to adjust the amount of vertical detail.

HDTL: Horizontal detail level
This is used to adjust the amount of horizontal detail.

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Parts and their functions

CRISP: Crisp
This is used to set the maximum amplitude of the very faint noise components which are to be removed from the detail components.

PEAK1: Peak frequency
This is used to select one of the two contour correction frequency bands (boost frequency or peak frequency).

PEAK2: Peak frequency
This is used to select one of the two contour correction frequency bands (boost frequency or peak frequency).

LEVEL DEP: Level dependent
This function removes the detail in the dark parts by means of a coefficient dependent upon the video signal level so that the dark parts will not appear unnatural.

DARK: Dark detail
This function boosts the detail in the dark parts.

CORNER: Corner detail
This function boosts the detail around the edges of the screen.

SOURCE: Detail source
This is used to select the source signals for creating the detail components.

CLIP: Detail edge clip
This is used to limit the length of the detail edge components.

DTL KNEE: Detail edge knee
This function applies the knee to the detail edge parts.

CRM DTL: Chroma detail
This is used to enhance the contours of the areas with a high chroma saturation in the subjects.

CRM CRSP: Chroma detail crisp
This is used to ensure that the chroma detail is not added to the very faint noise components below the level set.

SDTV skin tone detail switch [SD.SKIN]
This is used to apply coring to the detail enhancement of the skin tone areas in the SDTV video output signals to soften the skin tone detail enhancement.
It cannot be selected when the lamp of the SD detail OFF switch is lighted.

SKIN ZEB: Skin tone area zebra
This is used to set whether to apply the zebra pattern to the areas where coring is applied as the skin tones to the Y signals in the PM output.

PHASE: Skin tone area phase
This is used to move the areas to be recognized as the skin tones in the range of 153 to 93 along the Q axis on the color vector display.

WIDTH: Skin tone area width
This is used to widen the areas to be recognized as the skin tones in the range of 1 to 20 along the I axis on the color vector display.

CRISP: Skin tone detail crisp
This is used to remove the very faint noise components from the detail components of the skin tone areas.

SKIN LVL: Skin detail level
This is used to set the chroma saturation of the parts where the skin tone detail is applied.

❽ Camera power switch indicator
This is the indicator of the camera's power ON/OFF switch.

Lights up green: The unit is communicating with the camera.
Lights up red: The unit is not communicating with the camera.
Flashes red: POWER OFF status established by software.

❾ HEAD POWER

❿ All switch [ALL]
When the lamp of this switch is lighted, the switch can be used to control the switch (CAM/BAR/TEST) inside the MODE frame, the switches inside the AUTO frame and GAIN frame as well as the IRIS CLOSE switch and the ND and CC filter positions for all the cameras whose power is on and which are connected to the MSU.
The camera selector switches flash, and the other switches light. When a switch with a lighted lamp is pressed and its lamp is turned off, the corresponding camera is no longer subject to the ALL function.
When the lamp of the ALL switch is off, the MSU's camera operations performed for the cameras selected by the camera selector switches are valid unless otherwise specified.
When the switch is pressed again while its lamp is lighted, the ALL function is released.

⓫ CARD
This lights up green when an SD card has been inserted.

⓬ SD card slot
This is where the SD cards (hereafter "cards") are inserted. By taking the prescribed steps, the data of the cameras connected to the MSU can be stored on these cards or the data can be loaded from the cards into the camera.

⓭ RESET
This is used to reset the CPU that operates the main unit. Under normal circumstances, refrain from touching it.

⓮ ALARM
This lights when optical transmission is not proceeding satisfactorily or when a problem has occurred in the camera, CCU.

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Parts and their functions

⓯ **Reference switch**

Reference file call switch [REF]
If one camera has been selected by the camera selector switch, this switch is used to call the reference setting information (reference file) for that camera.
A reference file can be changed by making the changes while calling the reference file and saving the changes.

How to call the data in a reference file
① Use one of the camera selector switches to select the camera whose reference file is to be called.
If REF is now pressed, REF and SCENE FILE ⓵ flash. If REF is pressed again for 3 seconds in this status, the call wait status is released.
*1) If ⓵ is pressed, the USER reference file is called.
*2) If REF is pressed, the FACTORY reference file is called.
② When the reference file is loaded, the data remaining on the current scene file up until this moment will be lost.

Reference file storage switch [LOCAL STORE]
This is used to store the data in the current scene file of the targeted camera in the reference file of that camera.

How to store data in a reference file
① Use one of the camera selector switches to select the camera whose data is to be called.   If the LOCAL STORE switch is now pressed, the data is stored in USER1.
If the LOCAL STORE and CALL switches are pressed, the data is stored in FACTORY.
② When the data is stored in the reference file, the lamp of the LOCAL STORE switch lights for approximately one second, after which it goes off.

Reference file all store switch [ALL STORE]
This is used to store the contents of the current file of the camera selected using one of the camera selector switches in the reference files of all the cameras connected to the MSU.

How to store data in all the reference files
① Use one of the camera selector switches to select the camera whose file is to be called.
② Press the ALL STORE switch so that its lamp comes on.
The contents of the current scene file of the camera selected using the camera selector switch are stored in the reference files of that camera. Even if the lamps of the scene file switches are lighted, they will all go off. The lamp of the REF switch lights.
③ The contents of the current scene file of the camera selected using the camera selector switch are stored in the reference files of all the cameras which have not been selected by the camera selector switches.
④ If the reference files are stored in all the camera connected to the MSU without any problems, the lamp of the ALL STORE switch goes off.
If a problem is encountered in any of the cameras, the lamp of the ALL STORE switch flashes.
When the camera selector switch concerned is selected, the lamp stops flashing and goes off.

⓰ **Camera video output selector switch [CLOSE/BAR/TEST MODE]**
This is used to select the camera video signals which are to be output from the CCU's rear panel. The camera video signal, color bar display signal or test display signal is selected by pressing the CLOSE switch, BAR switch or TEST switch.
The switches are self-illuminating, and the lighting of the lamp of a switch indicates that the switch has been selected.
CLOSE switch lamp lighted: Camera video output
BAR switch lamp lighted:　Color bar signal output
TEST switch lamp lighted:　Test signal output

⓱ **Automatic adjustment switch [AUTO]**
This is used to automatically adjust the camera video output.
Auto white balance switch [AUTO WHITE]
This is used to automatically adjust the white balance.
Lighted: This indicates that the switch has been pressed and that automatic white balance start has been accepted.
Flashing: This indicates that the automatic white balance adjustment has ended, but it warns that the white balance was not attained satisfactorily.
Off: If the lamp goes off after the automatic white balance was completed, it indicates that the white balance was adjusted satisfactorily.

Auto black balance switch [AUTO BLACK]
This is used to automatically adjust the black balance.
Lighted: This indicates that the switch has been pressed and that automatic black balance start has been accepted.
Flashing: This indicates that the automatic black balance adjustment has ended, but it warns that the black balance was not attained satisfactorily.
Off: If the lamp goes off after the automatic black balance was completed, it indicates that the black balance was adjusted satisfactorily.

How to initiate auto setup
Auto setup starts when the switch is pressed. The result is conveyed by the status of the lamp.
Lighted: This indicates that the auto setup has started.
Flashing at 1 sec intervals:
This indicates that the auto setup ended without being completed.
Flashing at 2 sec intervals:
When the AUTO SET UP switch is pressed while the indicator is off, the auto setup start preparation mode is established, and a square marker appears in the center of the camera's viewfinder. Roughly align this square with the white at the gray scale center. Auto setup now starts when the side switch is pressed. If the switch is pressed for 1 or more seconds, auto setup is canceled.
Off: This indicates that the auto setup was completed correctly.
*During the auto setup operation, the operation status is displayed using characters on the PM.

Parts and their functions

⑱ MONITOR

Monitor selector switches [R, G, B, SEQ, ENC MONITOR]
These are used to select what is to be displayed on the waveform monitor (WFM) and picture monitor (PM).
The output mode can be changed by selecting the MONI SEL and MONI LINK settings on the SYSTEM screen.
If MONI LINK is set to ON, the monitor display is also switched temporarily in linkage with the R, G and B shading switches when BLACK SHADING and WHITE SHADING are to be adjusted.

Monitor selector switch	HDTV		SDTV	
	Y/-G	P-M	Y/-G	P-M
R	R	R	R	R
G	G	G	G	G
B	B	B	B	B
SEQ	RGB	Y	RGB	Y/-G
ENC	RGB	Y	VBS	VBS

The R, G and B switches can be selected simultaneously. The RGB outputs on the WFM display are shown as a parade display.

⑲ Scene file switches [SCENE FILE 1 to 4, 5 to 8]

These are used to store the data that can be transferred to other cameras among the camera settings or adjustment data for individual scenes to be saved in the eight files that serve as scene files or to be called from them.

How to call scene file data
① From among the 1 to 8 scene file switches, press the number of the switch that corresponds to the scene file which is to be called and light its lamp.
② The scene file is now loaded. The data loaded from the scene file is input into the current file and then output.
③ When the scene file has been loaded, the data left in the current file until that moment is temporarily saved. The lamp of the scene file switch remains lighted even after the data has been called.
To stop calling the scene file, press the scene file switch with the lighted lamp to turn its lamp off. The setting information that was temporarily saved before the scene file was called is now returned to the current file, and the setting statuses established prior to the scene file call are also restored.
If a scene file switch other than the one with the lighted lamp is pressed and its lamp is lighted, the scene file corresponding to the number of the scene file switch with the lighted lamp is called.

Scene file 1-4/5-8 selector switch [SCENE SEL]
The scene file whose corresponding switch lamp is lighted is the one that is valid.

Scene file storage switch [SCENE FILE STORE]
This is pressed to store data in a scene file.

How to store the current file as the scene file
① When the STORE switch is pressed, its lamp lights up.
② When the switch with the number of the scene file in which the data is to be saved is pressed and its lamp is lighted, the storage of the current file starts and, upon completion, the lamp of the STORE switch goes off.

⑳ SHUTTER

㉑ Gain selector switch [M GAIN]

This is used to select the video input sensitivity.
The gain is selected using the △ and ▽ buttons.
–6 dB: The input sensitivity is increased by -6 dB.
–3 dB: The input sensitivity is increased by -3 dB.
0 dB: The input sensitivity is increased by 0 dB (standard setting).
3 dB: The input sensitivity is increased by 3 dB.
6 dB: The input sensitivity is increased by 6 dB.
9 dB: The input sensitivity is increased by 9 dB.
12 dB: The input sensitivity is increased by 12 dB.

㉒ Filter selector switch

This is used to select the effect filter.
HEAD switch [HEAD FILTER]
This is used to switch the control over the filter to the camera head.
The lamps of the HEAD switches on the ROP and MSU will also light when the LOCAL switch on the operation panel at the back of the studio camera has been pressed and its lamp is lighted.
Lighted: Filter control is exercised at the camera head.
Off: Filter control is exercised at the MSU and ROP.

ND filter switches [ND FILTER 1, 2, 3, 4, 5]
These are the ND filter selector switches. The filter setting can be changed when the HEAD switch lamp is off.
When the lamp of the HEAD switch is lighted, only the ND filter position is displayed.
ND1: CAP　　**ND2:** Through (green light emitted)
ND3: 1/4　　**ND4:** 1/16
ND5: 1/32

CC filter switches [CC FILTER A, B, C, D, E]
These are the CC filter selector switches. The filter setting can be changed when the HEAD switch lamp is off.
When the lamp of the HEAD switch is lighted, only the CC filter position is displayed.
CCA: 3200K (green light emitted)
CCB: 4300K　　**CCC:** 6300K
CCD: Cross　　**CCE:** DF0

㉓ Call switch [CALL]

This is pressed to call the camera. While it is held down, the lamp of the camera's call switch lights.
If the call switch on the camera has been pressed, the lamp of this switch lights and the buzzer sounds.
Lighted: This indicates that the camera's call switch has been pressed.
Off: This indicates that the camera's call switch has not been pressed.

Parts and their functions

㉔ **Red tally, green tally indicator**

Red tally indicator
This lights when the red tally signal is input to the tally INCOM connector on the CCU.

Green tally indicator
This lights when the green tally signal is input to the tally INCOM connector on the CCU.

㉕ **Auto iris switch [AUTO]**
This is used to activate the auto iris function.
Lighted: The auto iris mode is established.
Off: The lens iris is controlled by the iris control.

㉖ **Iris coarse switch [COARSE]**
This is used to change the variable range of the iris in respect of the displacement in the iris control.
When the iris active mode is transferred to ROP or RCP, the switch setting is automatically released.
Lighted: The changes in the iris in respect of the displacement in the iris control are increased.
Off: The changes in the iris in respect of the displacement in the iris control are reduced.

㉗ **Lens file storage switch [MEMO]**
This is used to store the iris rotary encoder information in the memory.

㉘ **Lens file call switch [RECALL]**
This is used to call the iris rotary encoder information stored in the memory.

㉙ **Lens shrinker display [× 0.8]**

㉚ **Iris f-number indicator**
This indicates the lens f-number.

㉛ **Lens extender display [LENS EXT]**
This lights to warn that the setting of the lens extender is other than 1×.
Lighted: The setting of the lens extender is other than 1×.
Off: This indicates that the lens extender is not being used or that the extender function is not available.

㉜ **Iris control [IRIS]**
This is used to adjust the iris level of the lens. The control is a rotary encoder.
When the auto iris mode is not established:
The iris can be adjusted manually.
When the auto iris mode is established:
The iris level is adjusted automatically.

㉝ **Active switch [ACTIVE]**
When this is pressed during the iris and the master pedestal function priority display, the iris and the master pedestal function priority changes, and the lamp of the switch lights. When the ACTIVE switch on the ROP is pressed, the iris priority is transferred to the ROP.

㉞ **Master pedestal level indicator**
This indicates the master pedestal level.
Variable range: –99 to 99

㉟ **Master pedestal control [M-PED]**
This is used to adjust the master pedestal level. The control is a rotary encoder. The level is increased by rotating the control clockwise.
Since the master pedestal adjustment is independent of the R, G and B GAM adjustments, the R, G and B pedestal adjustment values remain unchanged even when the master pedestal control is rotated.

㊱ **Master pedestal storage switch [MEMO]**
This is used to store the master pedestal rotary encoder information in the memory.

㊲ **Master pedestal call file switch [RECALL]**
This is used to call the master pedestal rotary encoder information stored in the memory.

㊳ **DC power switch [POWER]**
This sets the power of the main unit of the master setup unit (AK-MSU930P) to ON or OFF.

㊴ **Circuit breaker**

㊵ **CCU connectors [1 to 15]**
These connectors are for signal interfacing with the camera control unit (AK-HCU931P).

㊶ **DC 12V input connector [DC 12V IN] (XLR 4 pins)**
The model AW-PS505 AC adapter (optional accessory) is connected here.

㊷ **Ground terminal [GND]**

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Connections

Connections of the system components

1. Connect this panel by connecting its CCU connector to the MSU/CSU connector on the rear panel of the CCU using the dedicated ROP cable (optional accessory).
2. After having connected all the components, set the CCU's main power switch to ON, and then set the camera power switch to ON.
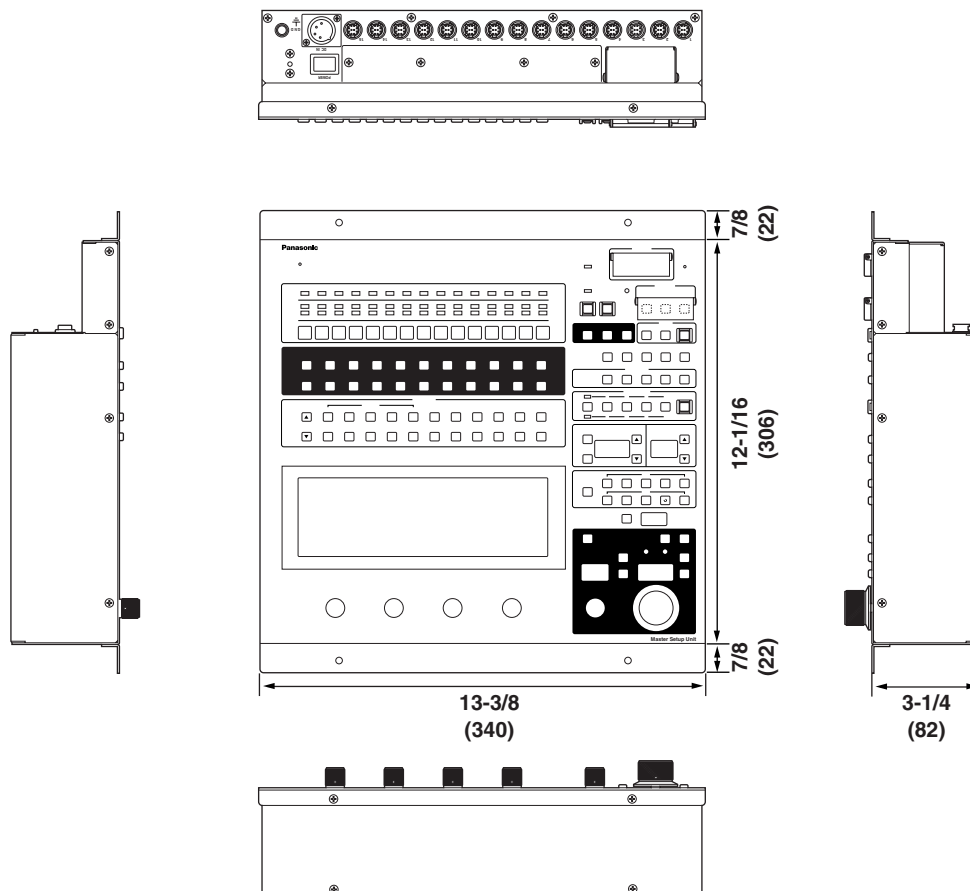
<Notes>
- When the camera is not connected, the functions which can be controlled using this panel are limited to the CCU control items.
- Before disconnecting the ROP able, be certain to set CCU's camera power switch to OFF.

AK-HCU931P

MSU/CSU

ROP cable

AK-HRP931P
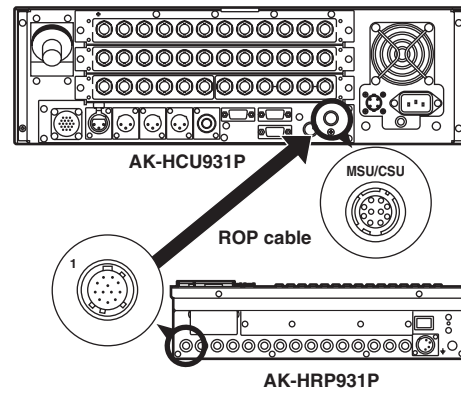
External dimension drawing

Unit: inch (mm)

7/8 (22)

12-1/16 (306)

7/8 (22)

13-3/8 (340)

3-1/4 (82)

Specifications

> **Power supply:** DC + 12 V
> **Power consumption:** 15 W

Pan-tilt head control input: Control signals (RJ-45 8-pin modular jack)

System tally input: Tally signals (2 pins, terminal block)

Switch functions: Camera selection, MODE ON/OFF (5600K, flare, black gamma ON, black gamma OFF, knee OFF, white clip OFF, HD matrix ON, PM character display, HDTV detail OFF, SDTV detail off, HDTV skin tone detail ON, SDTV skin tone detail ON), control item selection (UNDO, black shading selection, white shading selection, R/G/B shading, black gamma control, matrix control, FUNC, system, pedestal control, gain control, gamma curve control, flare control, white clip control, knee control, HD detail control, HD skin tone detail, SDTV detail, SDTV skin tone detail), ALL, reference, camera video output selection, automatic adjustments (auto white balance, auto black balance, auto setup), monitor selection (P-M, WFM), scene files, SHUTTER, gain selection, filter selection (HEAD, ND filter, CC filter), CALL, auto iris, lens file storage, lens file call, iris active, master pedestal storage, master pedestal file call

Adjustment functions: Iris, master pedestal

Operating temperature range: 32 °F to 104 °F (0 °C to + 40 °C)

Storage temperature range: –20 °C to +60 °C

Operating ambient humidity: Less than 80%

Dimensions (W × H × D): 13-3/8 × 3-1/4 × 14-3/16 inch(340 × 82 × 360 mm)

Weight: Approx. 2.0 lbs (4.4 kg)

Panasonic

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