KENWOOD

525/60 WAVEFORM MONITOR

# CV-1240

625/50 WAVEFORM MONITOR

# CV-1245

# INSTRUCTION MANUAL

KENWOOD CORPORATION

# CONTENTS



This manual covers both CV-1240 and CV-1245. Most descriptions are common to both, with the information relating to the CV-1245 enclosed in brackets [ ]. Please read the descriptions that apply to your model.


A product of
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# 1. FEATURES

The waveform monitor CV-1240 [1245], fitted with a 150mm-rectangular high-luminance CRT with internal graticule, is an oscilloscope to monitor a video signal of the M (B, G, H, I, or D) system TV. The CV-1240 [1245] has the following features:

- The scale for K-factor measurement is provided.
- The line selector function enables the user to select one line for display, thereby enabling the user to observe the VIT signal and VIR signal. The field can be switched between 1 and 2 in one-touch operation.
- The BLANKING OUTPUT terminal is provided to output square waves synchronously with a selected line.
- RGB parade display is possible. (YRGB is available as option.)
- The DC restorer is provided to maintain back porch at a constant level regardless of the video signal type.
- Eight horizontal sweep modes available for selection are 2H (2 lines), 1H (1 line), 1$\mu$s/div (enlarged 2-line display), 0.2$\mu$s/div (enlarged 1-line display), 2V MAG (enlarged 2-field display), 1V MAG (enlarged 1-field display), 2V (2 fields), and 1V (1 field).
- The A input, B input, and external reference signal input (EXT REF) can be terminated at 75 ohms by switch operation at the rear of the CV-1240 [1245].
- 5-turn controls are used for the fine adjustment of the horizontal and vertical positions.
- The scale range for vertical sensitivity is switched to the calibrated 1V or 4V full scale. Moreover, the vertical sensitivity can be adjusted to 0.25V or less through 4V using a control.
- The auto focus function is provided.
- The built-in calibrator, 1Vp-p $\pm$ 1% and 100kHz $\pm$100Hz, enables the user to check the sweep range as well as amplitude.
- Two CV-1240s [1245s] can be placed on the 19-inch rack.
- The supply voltage can be selected from the rear of the CV-1240 [1245].

# 2. SPECIFICATIONS

| CHARACTERISTICS | | CV-1240 | CV-1245 |
|---|---|---|---|
| Number of scanning lines | | 525 | 625 |
| Field frequency | | 60Hz | 50Hz |
| Subcarrier frequency | | 3.58MHz | 4.43MHz |
| Applicable system | | M | B, G, H, I, D, K |
| Color system | | NTSC, PAL | PAL, SECAM |
| CRT | | | |
| Type | | 150mm rectangular with internal graticule | |
| Effective screen | | 80mm×100mm | |
| Acceleration voltage | | 12kV | |
| Scale | | 140IRE full scale with K factor | 1.0 full scale with K factor |
| Vertical axis | | | |
| Input terminal | | Loop through for both A and B, BNC | |
| Deflection sensitivity | 1V full-scale range | ±2% | |
| | 4V full-scale range | ±4% | |
| Input impedance | 1V full-scale range | 15kΩ±5%, 50pF or less | |
| | 4V full-scale range | 60kΩ±5%, 50pF or less | |
| Frequency response (1V full-scale range) | FLAT | 25Hz～5MHz± 2 % (50kHz REF) | |
| | LUM | In accordance with IEEE STD 205, 1972<br>* Response (to "FLAT") : Within ±2% | |
| | D' STEP | 400kHz band pass filter to measure the linearity of luminance component | |
| | CHROMA | 3.58MHz band pass filter<br>* Response (to "FLAT") : Within ± 2% | 4.43MHz band pass filter<br>* Response (to "FLAT") : Within ± 2% |
| | DG | The amplitude is about 3 to 5.5 times that of "CHROMA" | |

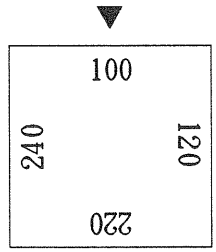
| CHARACTERISTICS | | CV-1240 | CV-1245 |
|---|---|---|---|
| Vertical axis | | | |
| Transitional response 1V full scale "FLAT" 2T pulse 2T ber | Preshoot | ±2% | |
| | Overshoot | ±2% | |
| | Ringing | ±2% | |
| | Pulse & bar ratio | ±2% | |
| | Tilt | ±2% | |
| Input sensitivity adjustment (input voltage range at full scale) | | 1V full scale : 0.25V or less to 1V<br>4V full scale : 1V or less to 4V | |
| ⚠Maximum input voltage | | ±5V (DC+ACpeak) | |
| Horizontal axis | | | |
| Sweep | 2H | 2-line display (10μs/div ±3%) | |
| | 1H | 1-line display (5μs/div ±3%) | |
| | 1 μs/div | 10-magnification enlargement of 2-line display (1μs/div±3%) | |
| | 0.2μs/div | 25-magnification enlargement of 1-line display (0.2μs/div±5%) | |
| | 2V | 2-field display | |
| | 1V | 1-field display | |
| | 2V MAG | 25-magnification enlargement of 2-field display | |
| | 1V MAG | 25-magnification enlargement of 1-field display | |
| | Linearity | ±3% | |
| * The first and last divisions are excluded with all regular displays. | | | |
| Synchronization | | | |
| Internal reference amplitude | | Sync level : 286mV ± 6dB | Sync level : 300mV ± 6dB |
| External reference input terminal | | BNC, loop through | |
| External reference input impedance | | 15kΩ, 50pF or less | |
| ⚠External reference maximum input voltage | | ±8V (DC+ACpeak) | |
| External reference amplitude | | Sync. level : 143mV to 5V | Sync. level : 150mV to 5V |

| CHARACTERISTICS | | CV-1240 | CV-1245 |
|---|---|---|---|
| RGB parade display | | | |
| Staircase input sensitivity | | 10V±15%/9div | |
| ⚠Maximum input voltage | | ±12V (DC+ACpeak) | |
| Sweep | 2H, 1H | 1H | |
| | 2V, 1V | 1V | |
| | Sweep trace length | About 30% of sweep trace length at composite display×3 | |
| Composite-RGB selection | | Remote control by external or internal control signal | |
| Remote control signal | | 10V (or −10V) to 15V (or −15V) (5mA) | |
| Signal input terminal | | 9P MT socket | |
| YRGB parade display | | Option<br>About 22% of sweep trace length at composite display×4 | |
| Video output | | | |
| Output level | | 1Vp-p±10% (75-ohm termination) | |
| Output impedance | | 75Ω±10% | |
| Frequency response | | 25Hz～5MHz±5% (50kHz REF) | |
| Output terminal | | BNC | |
| Calibrator | | | |
| Amplitude | | 1Vp-p±1% | |
| Frequency | | 100kHz±100Hz | |
| Blanking output | | | |
| Line selected by line select function | | 0V | |
| Other lines | | −2V | |
| Other than line select mode | | 0V | |
| Output terminal | | BNC | |
| Power source | | | |
| Voltage | | 100/120/220±10% 216V～250V 50/60Hz | |
| FUSE | 100, 120V | 1.0A | |
| | 220, 240V | 0.5A | |
| Power consumption | | Approx. 40W | |

| CHARACTERISTICS | CV-1240 | CV-1245 |
|---|---|---|
| Dimentions and weight<br>( ) dimensions include protrusion from basic outline dimensions. | | |
| Width | 215 (215) mm | |
| Height | 132 (147) mm | |
| Depth | 430 (460) mm | |
| Weight | Approx. 7.8kg | |
| Operating temperature and humidity | | |
| Within specifications | 10℃ to 35℃, 85%RH or less | |
| Full operation | 0℃ to 50℃, 85%RH or less | |
| Accessories | | |
| Instruction | 1 | |
| BNC cap | 8 | |
| AC power cord | 1 | |
| 9-pin MT plug | 1 | |
| Replacement fuse | 2 | |

# 3. PRECAUTIONS FOR USE

1. Make sure of the supply voltage before use. A combination fuse holder and voltage selector is located to the left of an AC inlet terminal at the rear of the CV-1240 [1245]. A value pointed by the ▼ mark above the holder is the supply voltage for the CV-1240 [1245].
Using a wrong supply voltage will cause a trouble. Before connecting the power cord, make sure of the supply voltage setting. To change the supply voltage, see Section 7 "Maintenance and Adjustment."




The supply voltage is set to 100V.

2. Avoid using the CV-1240 [1245] under the following conditions:
   ① Exposure to direct sunlight
   ② High temperature and high humidity
   ③ Exposure to mechanical vibration
   ④ Near a strong magnetic source or impulse voltage source
   ⑤ Near an explosive gas source or storage

3. A voltage applied to input terminals should not exceed their individual maximum input voltages.
   A and B input terminals : ±5V (DC+ACpeak)
   ⚠ EXT REF input terminal : ±8V (DC+ACpeak)
   RGB input terminal : ±12V (DC+ACpeak)
   Do not apply a voltage from outside to output terminals.

4. Do not increase luminance more than needed.

5. Do not leave a bright line in the spot state for long time.

6. Do not put a thing on the CV-1240 [1245] and avoid blocking the ventilation hole in the case. Otherwise, the internal temperature will rise causing a trouble.

7. The CV-1240 [1245] has high-voltage parts inside; when the case is to be removed, see Section 7 "Maintenance and Adjustment."

8. Ground the CV-1240 [1245] at the GND terminal for safety.

9. When the POWER switch is to be turned ON and OFF, put an interval of about 5 seconds in between.
Turning the POWER switch ON and OFF continuously may cause malfunction.

10. Warm up the CV-1240 [1245] for about 20 minutes for accurate measurement.

# 4. PANEL EXPLANATION

## 4-1 FRONT PANEL

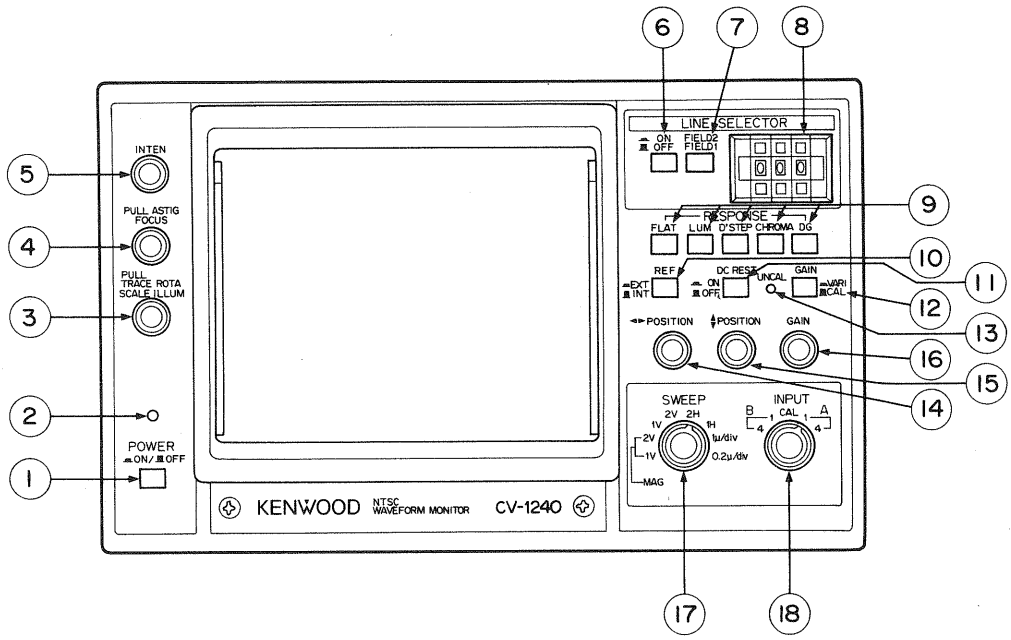



Fig. 1-1 Front panel

① POWER

A power switch. Pressing the switch turns the power on, and another press turns the power off.

② POWER LED

This LED interlocks with the POWER switch. When the POWER switch is turned on, the LED lights.

③ SCALE ILLUM/PULL TRACE ROTA control

SCALE ILLUM : Used to adjust the illuminance of the scale on the screen. If the illuminance of the scale is too high, halation will result at photographing; adjust it by turning this knob.

TRACE ROTA : Used to correct the inclination of the horizontal trace line caused with the Knob pulled, for example, by earth magnetism.

④ FOCUS/PULL ASTIG control

FOCUS : A focus control.

ASTIG : Used to adjust the trace or spot astigmation with the knob pulled. Optimize the waveform condition by astigmation adjustment and focusing. Make adjustment so that a round spot is observed.

⑤ INTEN control

Used to adjust the luminous intensity of waveform.

⑥, ⑦, ⑧ LINE SELECTOR switches

With push-button switch ⑥ held down, a line specified by digital rotary switch ⑧ is selected.

Push-button switch ⑦ is a selector switch for field 1 (odd) and field 2 (even). With the switch held down, counting starts from field 2.

⑨ RESPONSE switches

Used to select the type of frequency response from the following five:

FLAT : Display is made over the entire band.

LUM : A low pass filter conforming to IEEE STD 205 1972 is inserted.

D' STEP : A 400kHz band pass filter is used to measure the linearity of the luminance component.

CHROMA : A 3.58 [4.43] MHz band pass filter is inserted.

DG : A 3.58 [4.43] MHz band pass filter is inserted. The amplitude is about three to five times larger than CHROMA.

⑩ REF switch

Used to select an internal or external reference signal. Press the knob to select an external reference signal.

⑪ DC REST switch

With this knob set to ON, the back porch is maintained at a constant level to prevent a displayed waveform from fluctuating up and down even when an input waveform changes.

⑫ GAIN (switch)

Used to turn on (VARI) or off (CAL) the gain control function.

⑬ UNCAL LED

When the GAIN switch ⑫ is pressed, this LED lights indicating that the un-calibration state is established.

⑭ ◀▶POSITION control

Used to adjust the horizontal position of waveform.

⑮ ▲▼POSITION control

Used to adjust the vertical position of waveform.

⑯ GAIN (control)

A gain control. This control is effective only when the GAIN switch⑫ is held down. When the 1V full-scale range is used, a signal of 0.25V to 1V in input level can be adjusted to full scale.

⑰ SWEEP selector switch

Used to select the display mode of the horizontal axis.

2H : Two lines are displayed.

1H : One line is displayed.

1μs/div : The 2H display is enlarged at 10 magnifications.

0.2μs/div : The 1H display is enlarged at 25 magnifications.

2V : Two fields are displayed.

1V : One field is displayed.

2V MAG : The 2-field display is enlarged at 25 magnifications.

1V MAG : The 1-field display is enlarged at 25 magnifications.

Note

When the line selector is turned ON, the 1H sweep is conducted at any setting of 2H, 1H, 2V, and 1V.

The 1H display is enlarged at 10 magnifications when the display mode is set to 1μs/div. The 1H display is enlarged at 25 magnifications when the display mode is set to 0.2μs/div, 2V MAG, or 1V MAG.

In the RGB parade display, the 1H sweep is conducted at either setting of 1H and 2H, and the 1V sweep is conducted at either setting of 1V and 2V.

⑱ INPUT selector switch

Used to select the A or B input and to set sensitivity. With the knob set to the CAL position, a calibration signal is displayed. "1" indicates the 1V full-scale range, and "4" the 4V full-scale range.

## 4-2 REAR PANEL

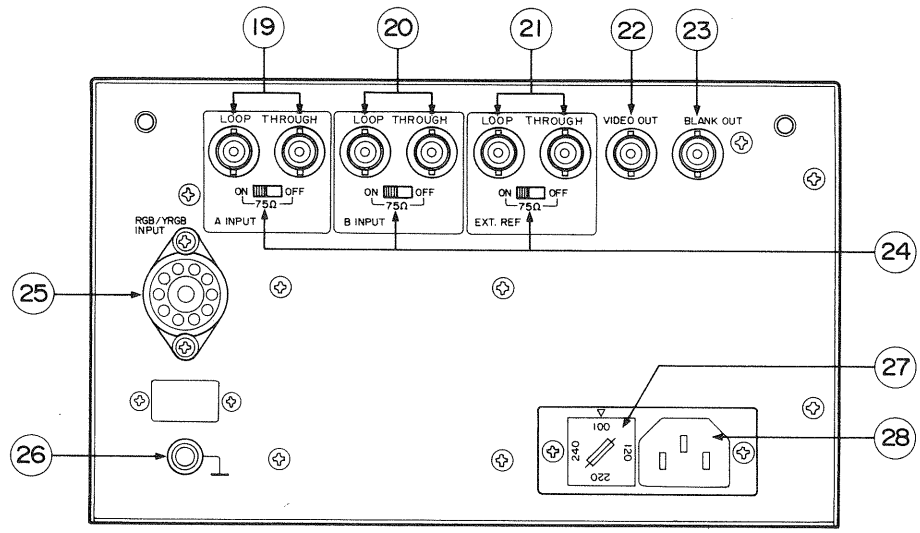



Fig. 1-2 Rear panel

⑲ A INPUT terminals

Signal input terminals of the loop through type. The input impedance is 15 kiloohms at the 1V full scale, and 60 kiloohms at the 4V full scale.

Connect a cable of 75 ohms in characteristic impedance. Terminate one of two terminals at 75 ohms using the 75-ohm switch ㉔, or connect it to equipment of 75-ohm family.

⑳ B INPUT terminals

Same as A INPUT. Select the A or B input using the INPUT knob ⑱ on the front panel.

㉑ EXT REF terminals

External reference signal input terminals. Two terminals are loop through type.

㉒ VIDEO OUT terminal

A signal input to the A or B terminal passes the internal amplifier and is output from this terminal. The amplitude is 1Vp-p per full scale at 75-ohm termination.

㉓ BLANK OUT terminal

In the line selecting operation, pulses are output from this terminal synchronously with a selected line. The voltage is 0V during the selecting operation and −2V in other than the selecting operation.

㉔ 75-ohm switches

Used to terminate the A INPUT, B INPUT, and EXT REF terminals at 75 ohms.

㉕ RGB/YRGB INPUT terminal

A terminal for receiving a staircase signal and a remote control signal that selects a circuit in the CV-1240 [1245].

㉖ ⏚

A grounding terminal.

㉗ Fuse holder and supply voltage selector

The fuse holder contains a 1.0A fuse for use in the 100V and 120V commercial voltage regions and a 0.5A fuse for use in the 220V and 240V commercial voltage regions. To change the supply voltage, disconnect the power cord from the outlet and set the voltage selector to a desired supply voltage. (See Section 7 "Maintenance and Adjustment".)

㉘ Power connector

An AC power input connector.

# 5. SCALE DESCRIPTION

The CV-1240 uses a scale for the NTSC system of 525 lines and 60Hz. The CV-1245 uses a scale for the PAL system of 625 lines and 50Hz. Both scales are marked on the inner surface of the screen against parallax during observation and photographing. Adjust the illuminance of the scale for easy observation using the ILLUM control.

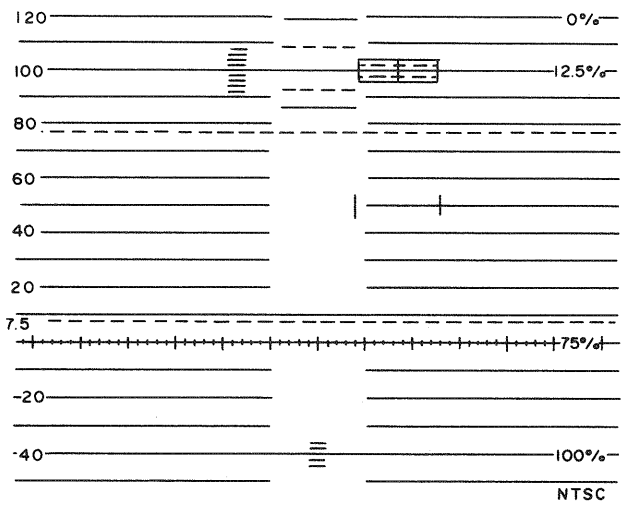



Fig. 2-1 Scale of the CV-1240

Figure 2-1 is the scale of the CV-1240. The left scale is marked in IRE and ranges from −50 IRE to +120 IRE at an interval of 10 IRE. 140 IRE corresponds to 1.0V.

- There is a scale graduated at an interval of 2 IRE slightly to the left of the center of −40 IRE line and the center of +100 IRE line. These scales are used to measure the amplitude of a synchronizing signal and white level.
- The black level is marked in the 7.5 IRE position and the 75% white in the 77 IRE position by a dotted line.
- The right scale is used to measure the modulation degree. +120 IRE corresponds to 0%, and −40 IRE 100%.
- Frames located slightly to the right of the center of the +100 IRE line are used to measure the line time distortion. The dotted-line frame indicates 2%, and the solid-line frame 4%. The 2T bar of 18$\mu$s in half-amplitude level is used for measurement.
- A dotted line and a solid line at the center of the +100 IRE line are used to measure the pulse-to-bar ratio. They are weighted with a K-factor of 2% and 4% respectively.

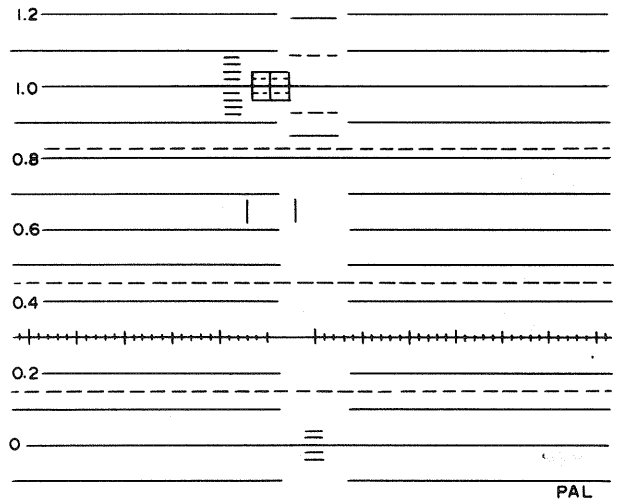



Fig. 2-2 Scale of the CV-1245

Figure 2-2 is the scale of the CV-1245. The left scale ranges from −0.1V to +1.2V at an interval of 0.1V.

- There is a scale graduated at an interval of 0.02V slightly to the left of the center of the 0V line and the center of the +1.0V line. These scales are used to measure the amplitude of a synchronizing signal and white level.
- The +0.15V and +0.45V dotted lines indicate a burst amplitude.
- The +0.825V dotted line indicates the amplitude of 75% white.
- Frames located slightly to the left of the center of the +1.0V line are used to measure the line time distortion. The dotted-line frame indicates 2%, and the solid-line frame 4%. The 2T bar of 18$\mu$s in half-amplitude level is used for measurement.
- A dotted line and a solid line at the center of the +1.0V line are used to measure the pulse-to-bar ratio. They are weighted with the 2% K-factor and 4% K-factor respectively.

For details of these scales, refer to CCIR STD VOL 5-1966.

# 6. OPERATING PROCEDURE

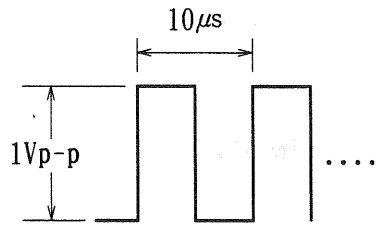
## 6-1 PREPARATION

1. Project the knob of POWER① (OFF).
2. Set INPUT⑱ to A-1.
3. Project the knob of GAIN⑫ (CAL).
4. Press the FLAT knob of RESPONSE⑨.
5. Project the knob of REF⑩ (INT).
6. Set SWEEP MODE⑰ to 1H.
7. Set ▲▼POSITION⑮ and ◀▶POSITION⑭ to the center position.
8. Project the knob of DC RESTORER⑪ (OFF).
9. Set INTENSITY⑤ to the center position.
10. Hold the knob of FOCUS/PULL ASTIG④ down.
11. Hold the knob of SCALE ILLUM/PULL TRACE ROTA③ down.

## 6-2 DISPLAYING WAVEFORMS

After completing the preparation in 6-1, make sure of the supply voltage and insert the power plug into an outlet.

1. Press POWER① to turn the power on. POWER LED② will light.
2. When a bright line appears on the screen, adjust the luminous intensity of waveform by turning INTENSITY⑤. Adjust the trace rotation, focus, and astigmation as needed.
3. Set INPUT ⑱ to CAL. The following calibration signal will be displayed.

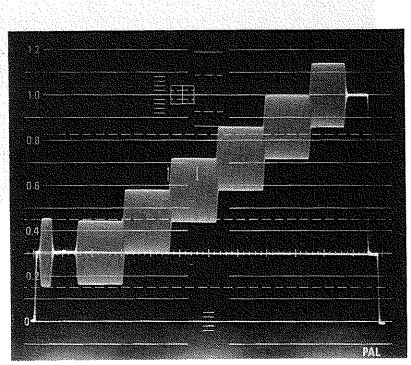



Calibration signal

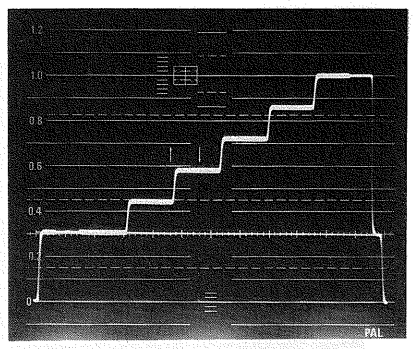
4. Supply a video signal to A INPUT ⑲. Supply the signal to either of two BNCs. Connect another BNC to equipment of 75-ohm family or turn the 75-ohm switch ON.

## 6-3 CHANGING THE SETTING OF RESPONSE

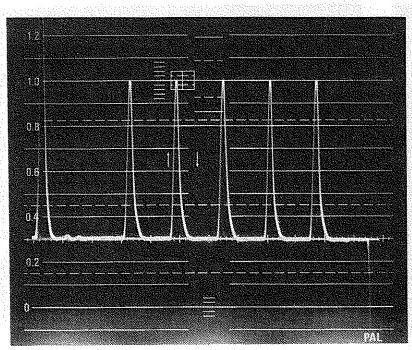
5. Set INPUT ⑱ to A-1. The supplied video signal will be displayed. Adjust the waveform position using ▲▼POSITION ⑮ and ◀▶POSITION ⑭.
6. If modulated staircase waves are added to the video signal, the resultant waveform is as shown below.



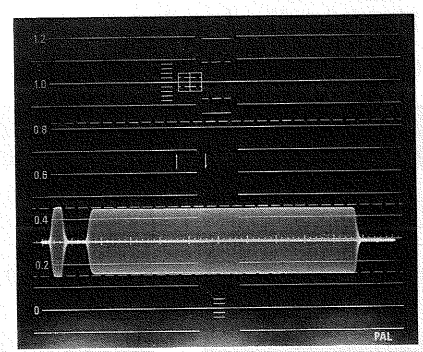

7. If RESPONSE⑨ is set to LUM, the luminance component of waveform is well represented as shown below.



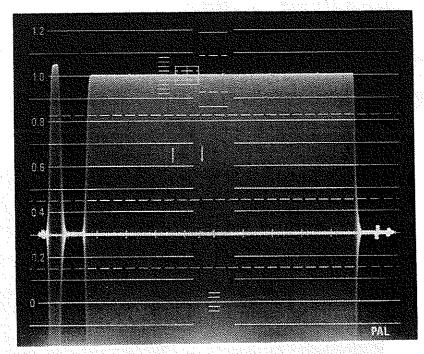

8. If RESPONSE⑨ is set to D'STEP, the following waveform appears. The waveform is useful for measuring the linearity of the luminance component.




9. If RESPONCE ⑨ is set to CHROMA, the following waveform appears.

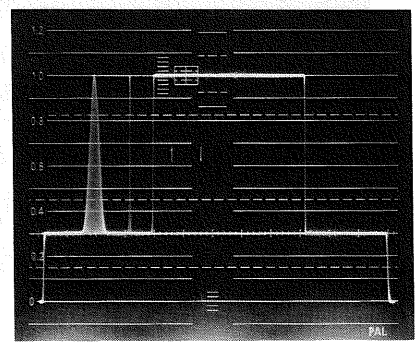


10. If RESPONSE⑨ is set to DIFF GAIN, the waveform about three to five times as large as CHROMA is obtained. The waveform is useful for measuring the differential gain.

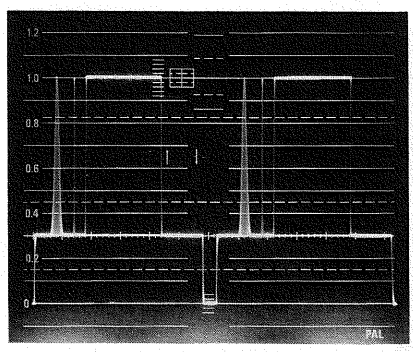
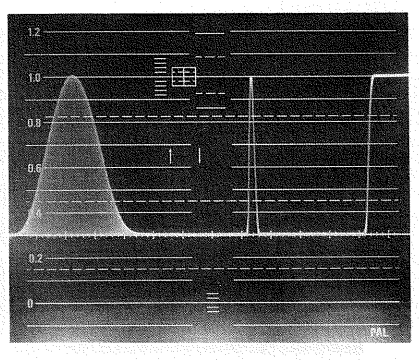
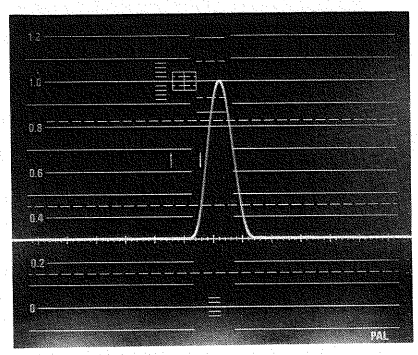


## 6-4 CHANGING THE SETTING OF SWEEP

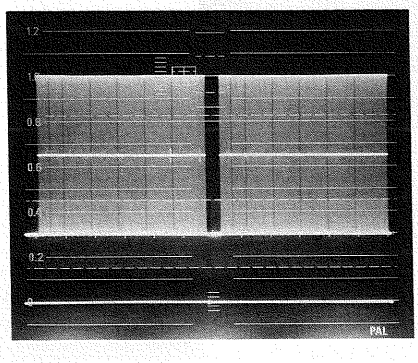
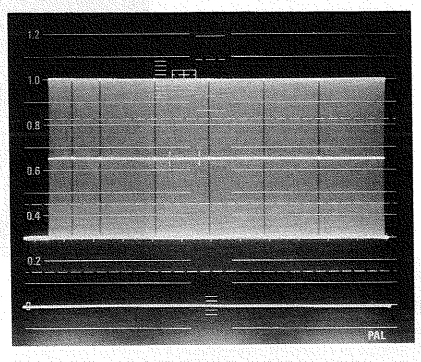
11. Set RESPONSE⑨ back to FLAT, and change the video signal supplied to A INPUT⑲ to a pulse-and-bar signal. The following waveform will appear.



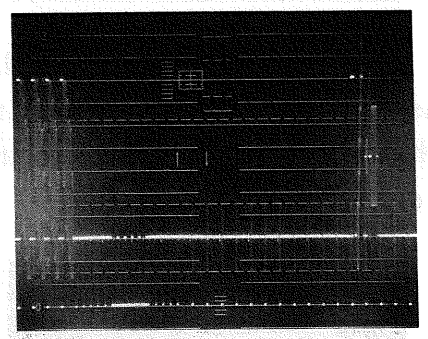
12. If SWEEP⑰ is set to 2H, 1μs/div, or 0.2μs/div, the following waveforms will be observed.

13. If SWEEP⑰ is set to 2V, the waveform of one frame is displayed. If SWEEP⑰ is set to 1V, the waveform of one field is displayed.
The waveform in the photo is a video sweep signal.

14. If SWEEP⑰ is set to 2V MAG, the vertical blanking period can be wel observed.



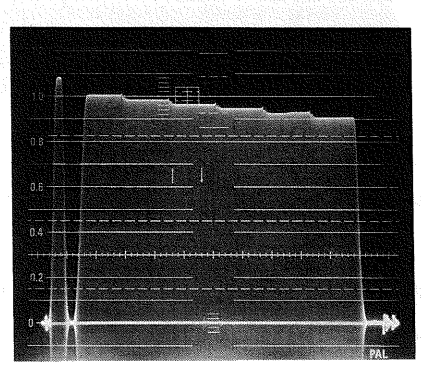
15. If DC REST⑪ is turned ON, the pedestal level becomes constant, thereby enabling the user to stably observe waveforms whose average picture level (APL) is fluctuating and waveforms disturbed by hum.
16. To use an external synchronizing signal, supply a composite sink signal or video signal to EXT REF㉑ on the rear panel, and set REF⑩ to EXT. The terminals of EXT REF㉑ are of the loop through type: cable connection is identical to that for the A INPUT and B INPUT terminals.

## 6-5 LINE SELECTOR

17. Set SWEEP⑰ to 1H, 2H, 1V, or 2V.
    The line selector enables the user to easily observe VITS and VIRS. Press switch⑥ to turn the line selector ON. Select a field containing a signal to be observed using switch⑦. The waveform corresponding to a line number indicated by switch⑧ appears on the screen. Set switch⑧ to the line number of a desired signal. Pulses are output from the BLANK OUT terminal synchronously with the selected line. Input the pulses to the Z INPUT terminal of the vectorscope CV-1250/1255 for vector display of the line. The use of the line selector causes luminance to drop below the regular display.

## 6-6 MEASURING DIFFERENTIAL GAIN (DG)

18. Turn LINE SELECTOR⑥ off, and set SWEEP⑰ to 1H or 2H. Input modulated staircase waves to a device to be measured, and input the output from the device to A INPUT⑲. Adjust the level to match the scale using GAIN⑫ and GAIN⑯. The photo is an example of waveform with a differential gain of 10%.




## 6-7 MEASURING K-FACTOR

19. Set RESPONSE⑨ to FLAT and SWEEP⑰ to 2H.
20. Use a test signal including 2T pulses and bar signal.
21. To measure the line time distortion and pulse-to-bar ratio, match the pedestal level of the signal with the pedestal line (0IRE10.3) of the scale. Match the rising edge of the composite test signal's bar with an upward arrow located slightly to the right of the scale center. Adjust the signal amplitude between the base line and the white bar center to 100IRE using the GAIN control ⑯. Check that the falling edge of the bar is on a downward arrow.
22. To obtain the K-factor of a line time distortion, measure the maximum deviation of bars within a frame. The first and last 1$\mu$s divisions are ignored and not included in the frame because of potential ringing, overshoot, or undershoot. The outer solid-line frame indicates the 4% K-factor, and the inner dotted-line frame the 2% K-factor. (For a signal having a bar of over 18$\mu$s in half-amplitude level, measure a deviation within the frame when a rising edge is matched with an upward arrow and a deviation within the frame when a falling edge is matched with a downward arrow.)
23. Measure the pulse/bar K-factor (Kpb) using solid lines and dotted-lines at the scale center. These solid lines and dotted-lines are graduated according to the following formulas:

$$\frac{1}{(1-4K)} \text{ and } \frac{1}{(1+4K)}$$

K = 0.02 ... 2% K-factor (dashed line)
K = 0.04 ... 4% K-factor (solid line)

For measuring Kpb, make sure that the bar center is at 100IRE (1.0) when the blanking level is 0IRE (0.3). Adjust gain using the GAIN control ⑯ as needed. Bring the 2T pulse in the measurement area using the ◀▶POSITION control and measure the amplitude. If the pulse top is in the dashed-line frame, the K factor is 2% o r less.

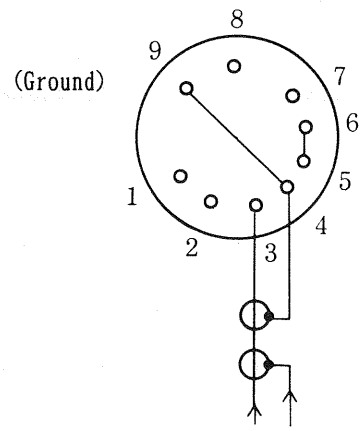
## 6-8 RGB/YRGB PARADE DISPLAY

The RGB input terminal on the rear panel is a 9-pin MT socket. The pin assignment is listed below.

| PIN No. | USE | PIN No. | USE | PIN No. | USE |
|---|---|---|---|---|---|
| 1 | NC | 4 | Remote control input ⊕ | 7 | −12V |
| 2 | NC | 5 | Remote control input ⊖ | 8 | NC |
| 3 | Staircase input | 6 | −12V | 9 | GND |

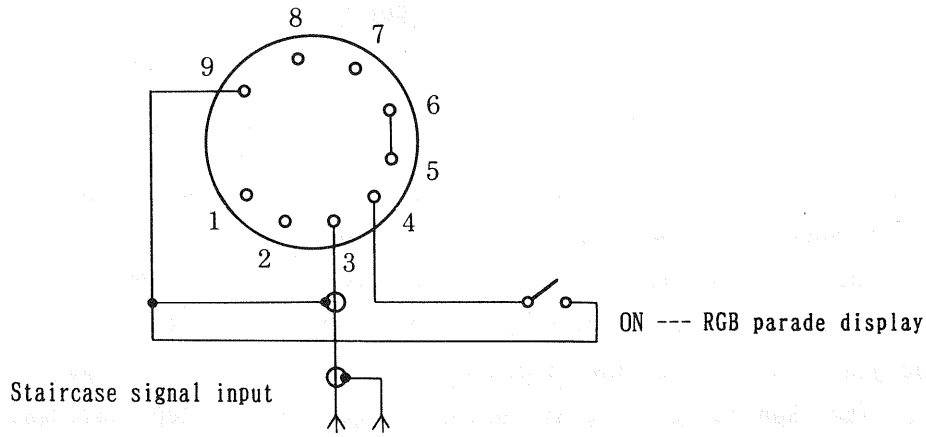
The RGB parade display requires a 3-step staircase signal. The regular bright line length is established at an amplitude of 10Vp-p. For connection, see the diagrams below.
Pins 6 and 7 of the MT socket are connected to the internal −12V power source. Use these pins for remote control. By applying 10V to 15V with pin 4 taken as ⊕ and pin 5 as ⊖, the RGB parade display is activated. Input a staircase signal to pin 3. The YRGB parade display (option) requires a 4-step staircase signal.

(1) Operation selection by using internal power source



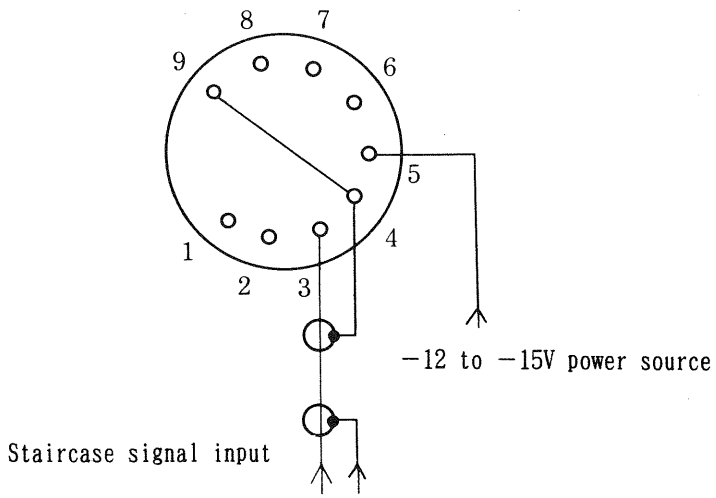

(2) Remote control by using internal power source

The following wiring enables the user to change operation with an external switch.

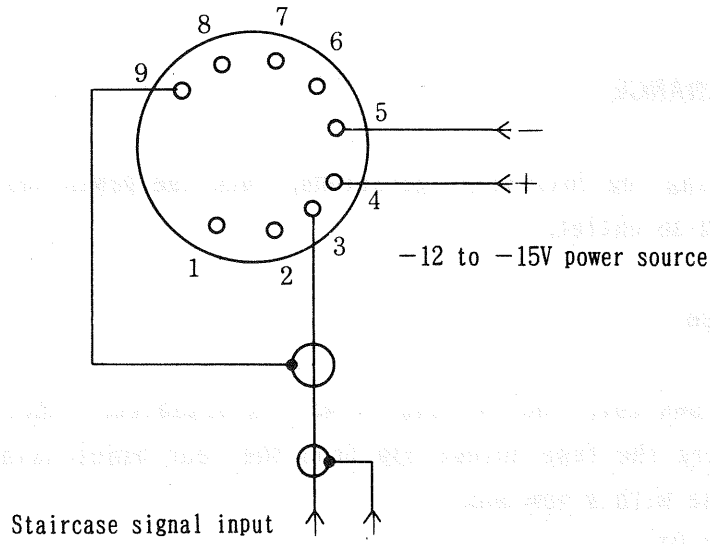



(3) Use of external power source

• Power source with common ground



• Power source without common ground



# 7. MAINTENANCE AND ADJUSTMENT

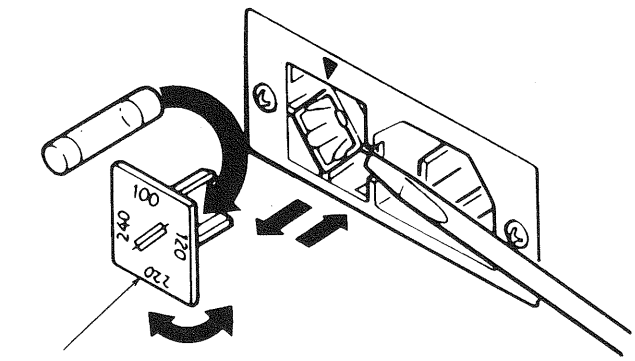
## 7-1 MAINTENANCE

⚠Before starting the following operations, turn the power switch off and disconnect the power cord from an outlet.

### Replacing a fuse

When a fuse blows out, the CV-1240 [1245] is disabled. Check for the cause of a fuse blowout. Remove the fuse holder cap from the rear panel using a standard screwdriver. Replace the fuse with a new one.

100V, 120V : 1.0A
220V, 240V : 0.5A



Fuse holder

### Changing the supply voltage

Remove the fuse holder from the rear panel using a standard screwdriver. Replace it in such a manner that the desired voltage marking comes to the ▼ mark position. When the supply voltage is to be changed from 100V or 120V to 220V or 240V, replace the fuse from 1.0A rating to 0.5A rating.

## 7-2 ADJUSTMENT

Removing the case

How to remove the case and bottom plate

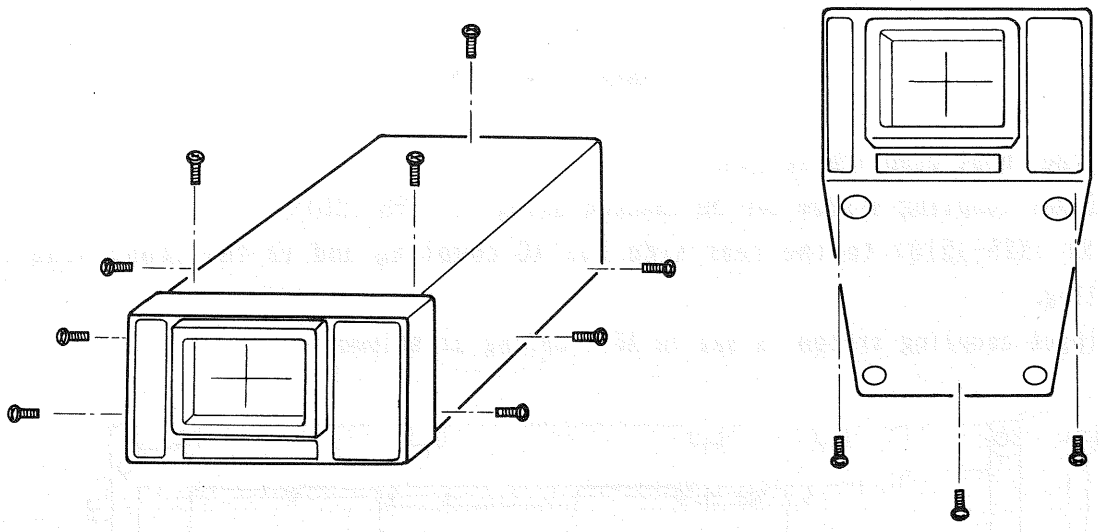
Note

Since a high voltage (12kV) is applied around the CRT, turn the power off before removing the case. After the case has been removed, be careful not to touch a high-voltage part with a hand or screwdriver.

Remove nine screws from the top and sides of the apparatus using a Phillips-head screwdriver, and lift the case to remove it. To remove the bottom plate, remove three screws using a Phillips-head screwdriver.

Note

The left-hand printed circuit board as viewed from the front side has a high-voltage part. Do not touch it when the case is removed. Even when the power is turned off, a circuit capacitor may be charged at a high voltage.



Note

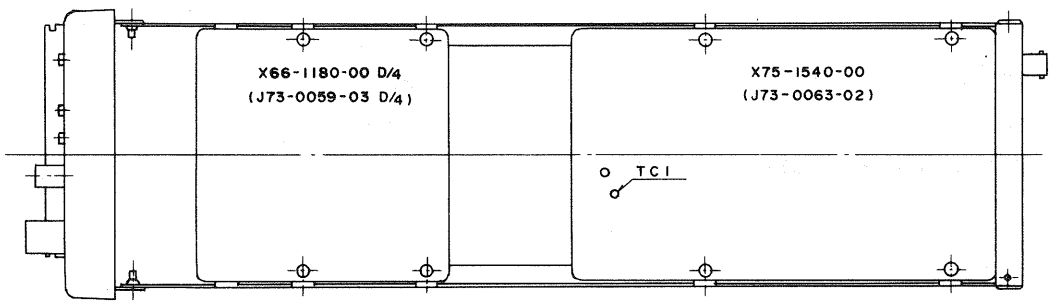
The following adjustment should be made by a specialized maintenance person.

The items below are already adjusted and require no further adjustment. However, if they are to be readjusted, follow the instructions listed below.

- Calibrate the supply voltage to the required voltage.
- Use well-insulated screwdrivers for adjustment.
- Wait over 30 minutes after turning the power on, and then start adjustment.
- Do not attempt to make an adjustment not covered in the user manual. For such an adjustment, contact your dealer or our distributer.

Adjusting 1H and 2H sweep time

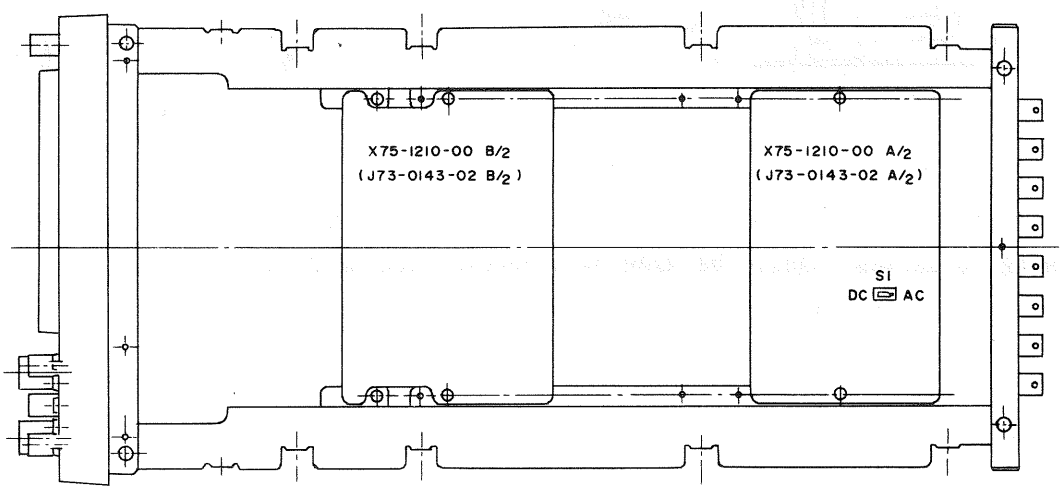
1. Set INPUT⑱ to CAL.
2. Set SWEEP⑰ to 2H.
3. The CAL signal is 100kHz square waves, so the cycle time is 10μs.
4. Adjust TC1 (X74-1540) so that one division corresponds to the cycle time.




Right side view

Changing the input coupling system

1. The input coupling system can be changed using S1 (X75-1210).
2. Set S1 (X75-1210) to the rear side for AC coupling and to the front side for DC coupling.
3. The input coupling system is set to AC coupling at shipment.




Upper view