

**KENWOOD**

FUNCTION GENERATOR

**FG-272**

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**INSTRUCTION MANUAL**

KENWOOD CORPORATION

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A product of  
**KENWOOD CORPORATION**

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## INTRODUCTION

The MODEL FG-272 Sweep/Function Generator provides functions of a function generator, pulse generator, and sweep oscillator.

## FEATURES

1. Wide-band design : seven ranges cover full oscillation frequency from 0.2 Hz to 2 MHz
2. Selectable output of sine waves, square waves, and triangular waves through one-touch operation.
3. TTL square wave output connector facilitates using TTL-level output square waves as the signal source for experiment of a digital circuit.
4. The symmetry Function varies symmetry of saw-tooth waves and pulse waves.  
It can invert the wave polarity.
5. Applying voltage from 0 to +10V to the VCF IN connector implements external sweep as well as output frequency control.
6. The linear sweep function provides sweep frequency control up to max. 100 : 1, Sweep frequency is variable

from 0.5 Hz ( 2 seconds) to 50 Hz ( 20 milliseconds). Sweep control is implemented by applying sweep signal to the VCF connector from an external device.

7. DC voltage ( 0 to  $\pm 10$  V) can be overlaid upon output waveform.
8. Combined use of the ATT -20 dB pushbutton and the continuous attenuator provides maximum attenuation over 40 dB.
9. A small and light-weight case with convenient carrying handle, which also serves as a tilting stand.

## PRECAUTIONS

1. Do not use the FG-272 Function Generator under the following conditions :
  - Places exposed to the direct sun light
  - Very hot and humid rooms
  - Rooms with excessive mechanical vibrations
  - Near devices which irradiate strong magnetic forces or pulse voltage
2. The FG-272 operates immediately after turning on power.

For accurate measurement, however, wait until it warms up sufficiently after pressing the POWER switch.
3. Do not repeat switching on and off the Generator.
4. Follow the instructions in section "MAINTENANCE" if the supply voltage is to be changed.

## SPECIFICATIONS

### < FREQUENCY CHARACTERISTICS >

#### GENERAL

- Output Waveform . . . . . Sine wave, square wave,  
triangl wave, pulse wave,  
TTL-level square wave, &  
ramp wave
- Oscillation Frequency Range . . . 0.2 Hz to 2 MHz  
7 ranges (1/10/100/1k/10k  
/100k/1M)
- Frequency Accuracy . . . . .  $\pm 5\%$  of full scale
- External Frequency Control (VCF)  
Input Voltage . . . . . 0 to +10 ; frequency  
increases with positive  
voltage
- Frequency Variable Range . . . 100 : 1 or more
- DC Offset . . . . .  $\pm 10$  V (open circuit)  
 $\pm 5$  V (into  $50\Omega$ )  
continuous variable
- Polarity . . . . . Inverted or non-inverted

#### SINE WAVE

- Distortion Ratio . . . . . 1% or less (10 Hz to 100 kHz)
- Output Frequency Response . . . Within  $\pm 1.0$  dB up to 100  
kHz (into  $50\Omega$  at max.  
output level)
- Output . . . . . Variable

#### SQUARE WAVE

- Symmetry . . . . .  $\pm 3\%$  or less (at 100 Hz)
- Rise/Fall Time . . . . . 100 ns or less (at max.  
output level)
- Output . . . . . Variable

#### TRIANGL WAVE

- Linearity . . . . . 1% or less (at 100 Hz)
- Output . . . . . Variable

## TTL OUTPUT

Rise/Fall Time . . . . . 25 ns or less

Output . . . . . TTL level

## < SWEEP CHARACTERISTICS >

Internal Sweep . . . . . Linear

Sweep Frequency . . . . . 0.5 Hz (2 sec) to 50 Hz (20 msec), continuous Variable

Sweep Width . . . . . 1 : 1 to 100 : 1, peak-to-peak variable and continuous variable

External sweep . . . . . By means of VCF input  
(Input impedance : 13 k $\Omega$ )

## < OUTPUT CHARACTERISTICS >

Output Voltage . . . . . 20 Vpp or more (open circuit)  
10 Vpp or more (into 50 $\Omega$ )

Attenuator . . . . . -20 dB step, and continuous variable

Impedance . . . . . 50 $\Omega$   $\pm$  10%

## < POWER SUPPLY >

Input Voltage . . . . . 100/120/220/240 VAC  $\pm$  10%  
(Max. 250V AC)

Frequency . . . . . 50/60 Hz

Power Consumption . . . . . Approx. 20 VA

## < ENVIRONMENTAL CONDITIONS >

Storage Temperature . . . -20 to 60  $^{\circ}$ C, 70% or less

Operating Temperature . . . 0 to 40  $^{\circ}$ C, 80% or less

With Specifications . . . . . 23  $\pm$  5  $^{\circ}$ C, 70% or less

**< SIZE & WEIGHT >**

**Dimensions (WHD) . . . . . 240 × 64 × 190 mm**

**Weight . . . . . 1.8 kg**

**< ACCESSORIES >**

**Instruction Manual . . . . . 1**

**AC cable . . . . . 1**

**Fuse (0.3A) . . . . . 1**

**(0.2A) . . . . . 1**

# OPERATOR'S CONTROLS AND INSTRUCTIONS

## FRONT PANEL

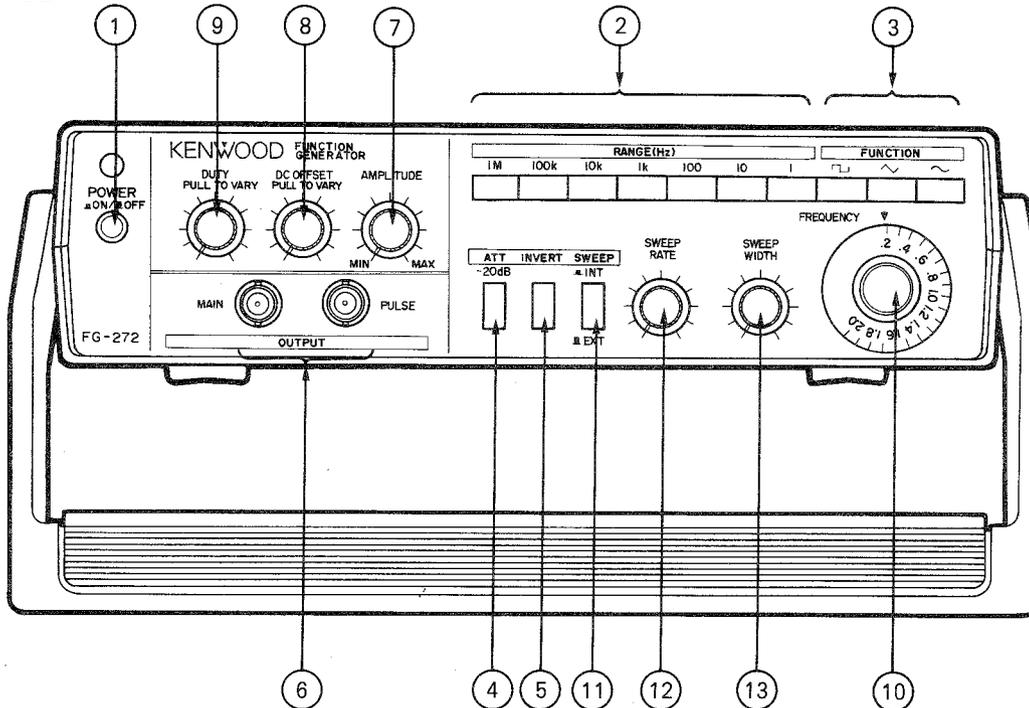


Fig. 1

① **POWER Pushbutton**

Pressing this pushbutton turns on power. LED lights up to indicate power is on.

④ **ATT -20 dB Pushbutton**

pressing this pushbutton attenuates input signal by 20 dB.

② **RANGE (Hz) Selector Switch Assembly**

Selects the following seven ranges of oscillation frequency :

X 1 :            0.2 Hz   to   2 Hz

X 10 :           2 Hz   to   20 Hz

X 100 :           20 Hz   to   200 Hz

X 1k :            0.2 kHz   to   2 kHz

X 10k :           2 kHz   to   20 kHz

X 100k :           20 kHz   to   200 kHz

X 1M :            0.2 MHz   to   2 MHz

③ **FUNCTION Selector Switch Assembly**

Selects output waveform out of sine wave () ,  
triangl wave () , and square wave () .

⑤ **INVERT Pushbutton**

Depressing (button engaged) inverts polarity. Another press (button released) recovers the former polarity. Fig. 2 illustrates effects of the INVERT pushbutton with respect to DUTY control knob setting.

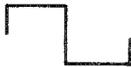
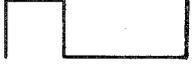
Waveform \ Polarity Knob Position	Normal	Inverted	Normal	Inverted
	Counterclockwise Rotation	Counterclockwise Rotation	Clockwise Rotation	Clockwise Rotation
Square Wave				
Triangl Wave				
Sine Wave				
TTL Wave				

Fig. 2 Effect of INVERT Pushbutton with respect to DUTY Control Knob Setting

- ⑥ **MAIN/PULSE OUTPUT Jack**  
**MAIN :** Outputs sine wave, triangle wave, or square wave selected with the FUNCTION switch assembly.  
**PULSE :** Outputs pulse wave, regardless of FUNCTION switch setting.
- ⑦ **AMPLITUDE Control**  
 Rotating this knob varies amplitude of output waveform.

- ⑧ **DC OFFSET Control**  
 Pulling this knob admixes DC voltage with output signal.  
 Clockwise rotation admixes positive voltage.  
 Counterclockwise rotation admixes negative voltage.  
 Fig. 3 illustrates several types of waveform with the DC OFFSET knob pulled and 50-ohm load connected.

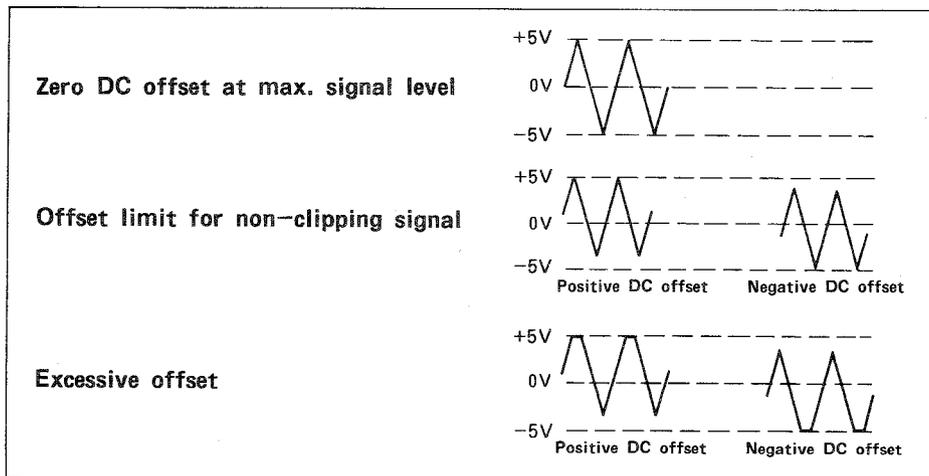


Fig.3 Application Example of DC Offset

⑨ **DUTY/PULL TO VARI (Symmetry Adjustment) Control**

Controls symmetry of output signal.

Pulling this knob, and clockwise rotation varies the duty ratio from 1:1 to 5:1.

This adjustment makes pulse wave of square wave, ramp wave or saw-tooth wave of triangle wave, and asymmetric sine wave of sine wave.

Note : Note that controlling this knob changes frequency.

⑫ **SWEEP RATE Control**

Controls sweep rate (sweep frequency) of the internal sweep oscillator.

⑬ **SWEEP WIDTH Control**

Rotating the knob controls sweep width.

⑩ **FREQUENCY Control Dial**

Variable potentiometer varies frequency within the range selected with the RANGE selector switch assembly ②. The dial is scaled from 0.2 to 2.0.

⑪ **SWEEP Selector Pushbutton**

Depressing (button engaged) selects internal sweep.

Another press (button released) selects external sweep.

## REAR PANEL

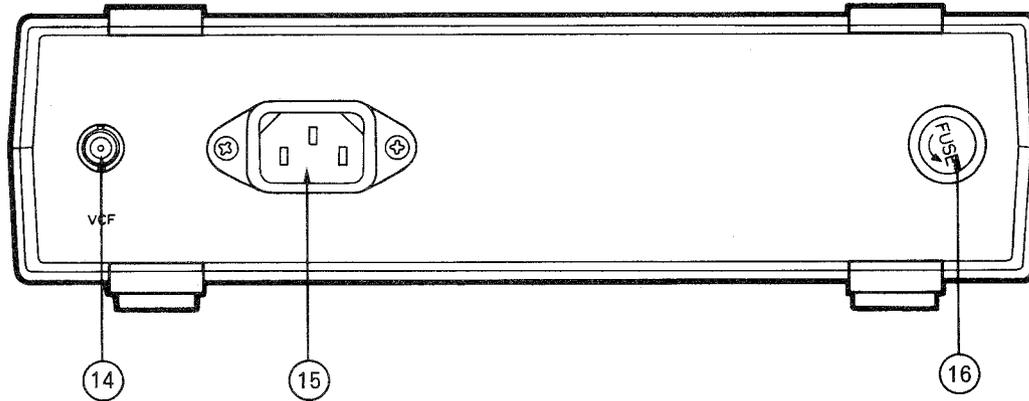


Fig. 4

⑭ **VCF Input Jack**

By applying voltage to this jack in the state where the SWEEP selector pushbutton ⑪ is another press (button released), frequency of output signal can be varied.

Application of voltage from 0 to 10V varies frequency up to max. 100 : 1.

⑮ **Power Connector**

Connector for supplying AC power.  
Use the dedicated power cord.

⑯ **Fuse Holder**

Fuse holder for AC power supply.

## MAINTENANCE

### 1. Fuse Replacement

If the fuse has blown out, find out and eliminate the cause.

Then, replace it with a new fuse. Use a 0.3 A slow-blow fuse for supply voltage of 100 to 120 V, or a 0.2 A fuse for supply voltage of 220 to 240 V. Fuse holder is provided on the rear panel of the unit.

### 2. Changing Supply Voltage

**WARNING :** Prior to opening the case, be sure to disconnect the power cord from the socket.

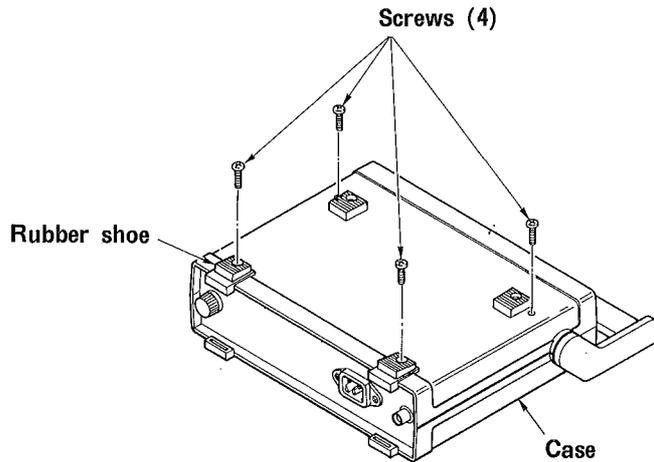
#### 2-1 How to Remove Case

To open the case, turn the unit upside down, and remove four screws from the case base plate. (See Fig. 5.) Then, lift the base plate to detach it.

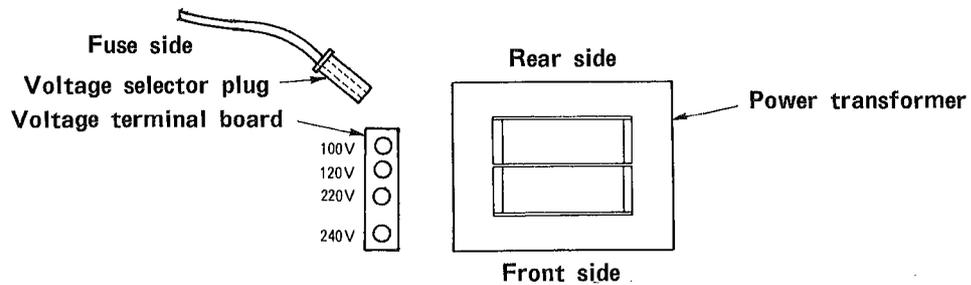
#### 2-2 How to Change Supply Voltage

The FG-272 is available for supply voltage of 100, 120, 220, and 240 VAC, 50/60 Hz.

To change the supply voltage, remove the case (in accordance with item 2-1 above), and reconnect the voltage selector plug on the printed circuit board in the unit to a desired voltage position on the voltage terminal board. (See Fig. 6.)



**Fig. 5 Disassembly and Assembly of Case**



**Fig. 6 Internal Selection of Supply Voltage**