TEXIO
Test and Measurement Solutions

INSTRUCTION MANUAL

Audio Generator
AG-205

B71-0386-41

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USING THE PRODUCT SAFELY

■ Preface

To use the product safely, read this instruction manual to the end. Before using this product, understand how to correctly use it.
If you read this manual but you do not understand how to use it, please ask us or your local dealer. After you read this manual, save it so that you can read it, anytime as required.

■ Pictorial indication

This instruction manual and product show the warning and caution items required to safely use the product. The following pictorial indication and warning character indication are provided.

<Pictorial indication>	
	Some part of this product or the instruction manual may shows this pictorial indication. In this case, if the product is incorrectly used in that part, a serious danger may be brought about on the user's body or the product. To use the part with this pictorial indication, be sure to refer to this instruction manual.
 	If you use the product, ignoring this indication, you may get killed or seriously injured. This indication shows that the warning item to avoid the danger is provided. If you incorrectly use the product, ignoring this indication, you may get slightly injured or the product may be damaged. This indication shows that the caution item to avoid the danger is provided.

Please be informed that we are not responsible for any damages to the user or to the third person, arising from malfunctions or other failures due to wrong use of the product or incorrect operation, except such responsibility for damages as required by law.

USING THE PRODUCT SAFELY

■ Do not remove the product's covers and panels

Never remove the product's covers and panels for any purpose.
Otherwise, the user's electric shock or fire may be incurred.

■ Warning on using the product

Warning items given below are to avoid danger to user's body and life and avoid the damage or deterioration of the product.
Use the product, observing the following warning and caution items.

■ Warning items on power supply

- Power supply voltage

The rated power supply voltages of the product are 100, 120, 220 and 230VAC. The rated power supply voltage for each product should be confirmed by reading the label attached on the back of the product or by the "rated" column shown in the instruction manual. The specification of power cord attached to the products is rated to 125VAC for all products which are designed to be used in the areas where commercial power supply voltage is not higher than 125VAC. Accordingly, you must change the power cord if you want to use the product at the power supply voltage higher than 125VAC. If you use the product without changing power cord to 250VAC rated one, electric shock or fire may be caused. When you used the product equipped with power supply voltage switching system, please refer to the corresponding chapter in the instruction manuals of each product.

- Power cord

(IMPORTANT) The attached power cord set can be used for this device only.
If the attached power cord is damaged, stop using the product and call us or your local dealer. If the power cord is used without the damage being removed, an electric shock or fire may be caused.

- Protective fuse

If an input protective fuse is blown, the product does not operate. For a product with external fuse holder, the fuse may be replaced. As for how to replace the fuse, refer to the corresponding chapter in the instruction manual. If no fuse replacement procedures are indicated, the user is not permitted to replace it. In such case, keep the case closed and consult us or your local dealer. If the fuse is incorrectly replaced, a fire may occur.

USING THE PRODUCT SAFELY

■ Warning item on Grounding

If the product has the GND terminal on the front or rear panel surface, be sure to ground the product to safely use it.

■ Warnings on Installation environment

- Operating temperature and humidity

Use the product within the operating temperature indicated in the “rating” temperature column. If the product is used with the vents of the product blocked or in high ambient temperatures, a fire may occur.

Use the product within the operating humidity indicated in the “rating” humidity column. Watch out for condensation by a sharp humidity change such as transfer to a room with a different humidity. Also, do not operate the product with wet hands. Otherwise, an electric shock or fire may occur.

- Use in gas

Use in and around a place where an inflammable or explosive gas or steam is generated or stored may result in an explosion and fire. Do not operate the product in such an environment.

Also, use in and around a place where a corrosive gas is generated or spreading causes a serious damage to the product. Do not operate the product in such an environment.

- Installation place

Avoid installing the product on inclined places or on places subject to vibration. Otherwise, the product may slip or fall down to cause damages or injury accidents.

■ Do not let foreign matter in

Do not insert metal and inflammable materials into the product from its vent and spill water on it. Otherwise, electric shock or fire may occur.

■ Warning item on abnormality while in use

In abnormal situations, such as “smoke”, “fire”, “abnormal smell” or “irregular noise” occur from the product while in use, stop using the product, turn off the switch, and remove the power cord plug from the outlet. After confirming that no other devices catch fire, ask us or your local dealer.

USING THE PRODUCT SAFELY

■ Input / Output terminals

Maximum input to terminal is specified to prevent the product from being damaged. Do not supply input, exceeding the specifications that are indicated in the "Rating" column in the instruction manual of the product.
Also, do not supply power to the output terminals from the outside.
Otherwise, a product failure is caused.

■ Calibration

Although the performance and specifications of the product are checked under strict quality control during shipment from the factory, they may be deviated more or less by deterioration of parts due to their aging or others.
It is recommended to periodically calibrate the product so that it is used with its performance and specifications stable.
For consultation about the product calibration, ask us or your local dealer.

■ Daily Maintenance

When you clean off the dirt of the product covers, panels, and knobs, avoid solvents such as thinner and benzene. Otherwise, the paint may peel off or resin surface may be affected.
To wipe off the covers, panels, and knobs, use a soft cloth with neutral detergent in it. During cleaning, be careful that water, detergent, or other foreign matters do not get into the product.
If a liquid or metal gets into the product, an electric shock and fire are caused. During cleaning, remove the power cord plug from the outlet.

Use the product correctly and safely, observing the above warning and caution items. Because the instruction manual indicates caution items even in individual items, observe those caution items to correctly use the product.

If you have questions or comments about the instruction manual, ask us or E-Mail us

1 INTRODUCTION

1-1 Overview

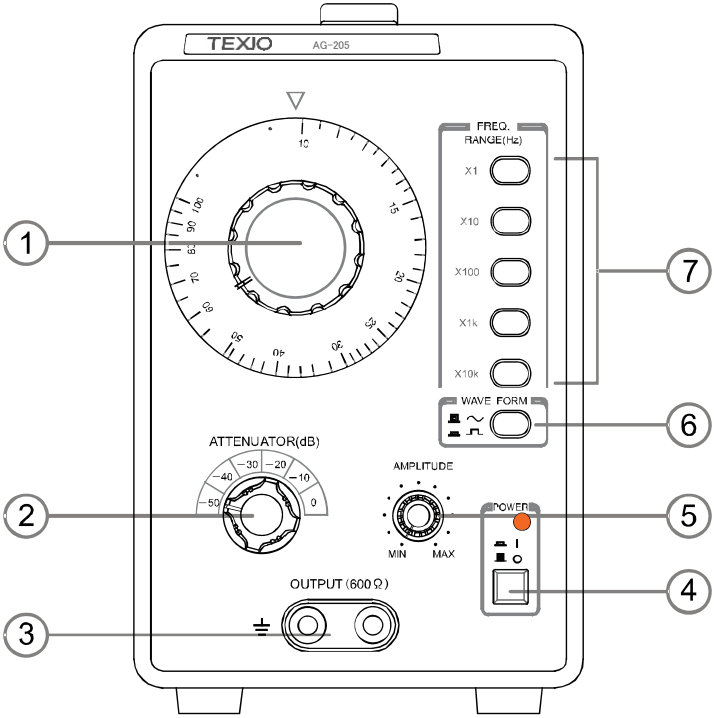
The AG-205provides a convenient solution for low frequency(10Hz～1MHz) signal generation, specifically for audio bandwidth. Intuitive and simple panel interface provides quick frequency and amplitude adjustment, with dial/key shortcuts to different ranges. Square wave generation covers digital application in addition to the traditional analog using sine wave. Distortion is kept at minimum level, especially at the audible frequency range: 0.02% or less distortion factor for 500Hz~20kHz. The external synchronization signal input helps collaborating with other measurement devices.

1-2 Features

- Low sine wave distortion,
- high stability, shorter warm-up time and less power consumption
- Compact styling with vertical type panel for easy operation.
- Frequency dial scale calibrated with single-scale graduations for frequency range from 10Hz to 1MHz selectable in 5 ranges.
- Low output impedance of 600Ω
- High output design; more then 5Vrms at 600Ω
- Output level is folly adjustable with a l0dB-step, 6 range attenuator and a level adjuster
- The attenuator provides accuracy of ± l.0dB at 600Ω
- Sine and square waves easily available
- External Synchronizing input terminal.

2 FRONT AND REAR PANELS

2-1 Front Panel



① Frequency Dial

This dial adjusts oscillating frequencies. Frequencies can be read by multiplying the reading on the dial scale by magnification of FREQ. RANGE.

10（Dial value） x 100（Range）= 1kHz

② Attenuator

6-position output attenuator selects attenuations of 0dB to -50dB in l0dB steps.

③ Output Terminal

Output terminal used for both sine wave and square wave. Output impedance is 600Ω.

④ Power Switch

This switch applies or removes AC power. Power indicator lights when POWER switch is ON

⑤ Amplitude Knob

Amplitude adjuster to continuously vary the amplitude of output voltage

⑥ Waveform Selector

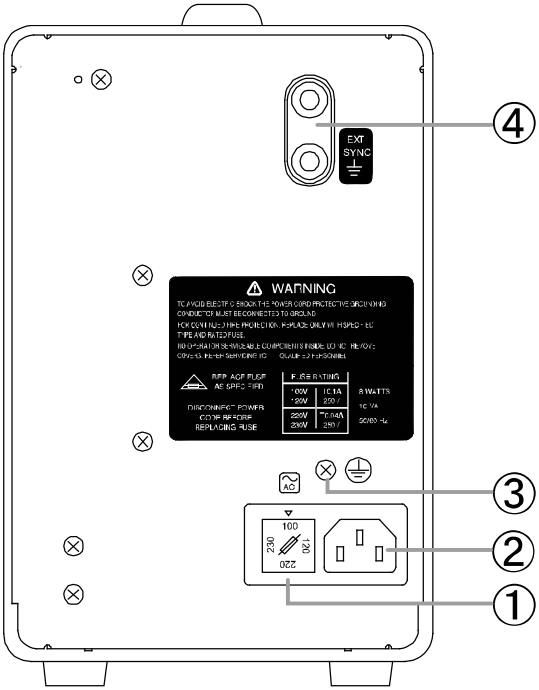
Output waveform selector switch. It toggles between sine wawve () and square wave ().

⑦ Frequency Selector

Oscillating frequency range selector switch which selects the ranges in 5 steps.

Range	Corresponding setting frequency
x1	10Hz～100Hz
x10	100Hz～1kHz
x100	1kHz～10kHz
x1k	10kHz～100kHz
x10k	100kHz～1MHz

2-2 Rear panel



① Fuse Holder /Voltage Selector

Ensure that the correct voltage is lined up with the arrow on the fuse cover on the rear panel.

② AC CONNECTOR

For connection of the supplied AC connector.

③ Grounded Terminal

④ EXT SYNC

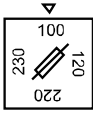
External synchronizing signal input terminals for connection of synchronizing signal to the instrument.

3 OPERATION INSTRUCTIONS

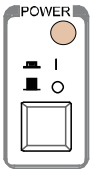
3-1 Basic operation

1 Start-up

(Example: 100V is selected)

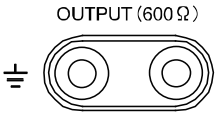


① Ensure that the correct voltage is lined up with the arrow on the fuse cover on the rear panel. Connect to the power cord.

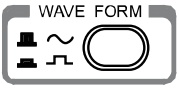


② Press the power switch and the pilot lamp will light indicating that the unit is ready for operation. Allow 2 or 3 minutes for the unit to warm up so that it is stabilized.

2 Waveform Selection

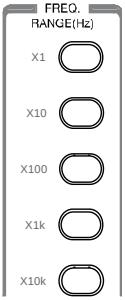


① Connect output terminal and DUT with output cable.



② Press the WAVE FORM switch to select sine waves or square waves。

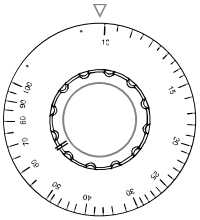
3 Frequency Selection



① First set the FREQ. RANGE switch to the desired range.

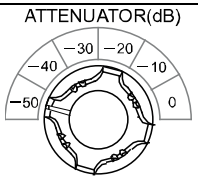
Range	Corresponding setting frequency
x1	10Hz～100Hz
x10	100Hz～1kHz
x100	1kHz～10kHz
x1k	10kHz～100kHz
x10k	100kHz～1MHz

② Set the frequency dial so that the dial pointer indicates your frequency.



4 Adjustment of Output Voltage

① Turn the Attenuator knob to select the attenuation rate.



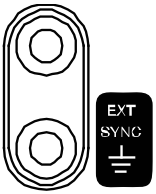
② Turn the Amplitude knob to fine tune the amplitude.

Note

- Because of the use of direct coupled circuits throughout the entire stage, a DC voltage will appear at OUTPUT terminal for a while when the power is on. This DC voltage will disappear about 20 to 30 seconds later when normal output waveform is obtained.
- A thermistor is used to control the oscillating voltage. Care should be used when operating instrument in atmosphere of excessive temperature variation because the thermistor is normally affected by ambient temperature variation.
- Be sure to press only one FREQ. RANGE switch. If two switches are pressed at the same time or all the switches are in released positions, your instrument will not work properly.
- Excessive noise from an outside source may affect the external synchronizing input terminal. If such a noise is evident, short this terminal (output voltage amplitude will somewhat deviate in this case)
- Even if the frequency adjustment dial is set to the same scale, it may cause a mechanically shifted by a direction turning.

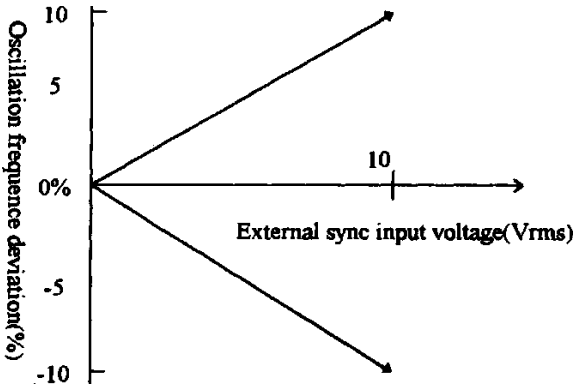
3-2 Use of Synchronizing Input Terminal

By applying an external sine wave signal to SYNC terminal the oscillating frequency of instrument can be synchronized to the external signal.
The synchronizing range is increased in proportion as the input voltage is increased as shown in Fig below



Input voltage ： 1Hz～1MHz, 10V rms or less

synchronizing range is about ± 1 % per input voltage of 1V rms

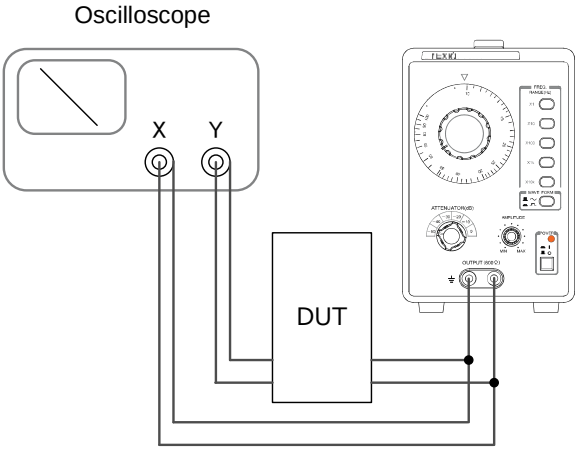


Note

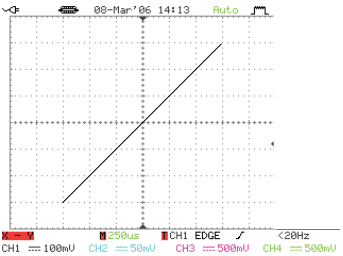
- Too high a synchronizing signal voltage will affect the amplitude and distortion factor, and care must therefore be taken when the signal voltage is higher than 3V rms
- If the synchronizing signal is largely deviated from the frequency of instrument, the synchronization is pulled out which affects the distortion factor. It is therefore advisable that the oscillating frequency be first synchronized with a low input signal voltage (less than 1V rms) and then the voltage be increased.

3-3 Application (Measurement of Phase Characteristic)

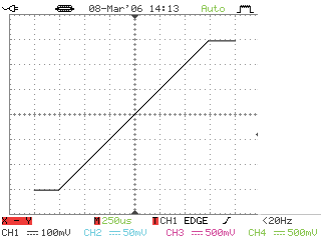
Connect the instrument and an oscilloscope to the amplifier to be tested as shown in figure below (DUT : amplifier)



If there is no phase shift about the output signal of the amplifier, the oscilloscope will display a straight line as shown on the right Fig.

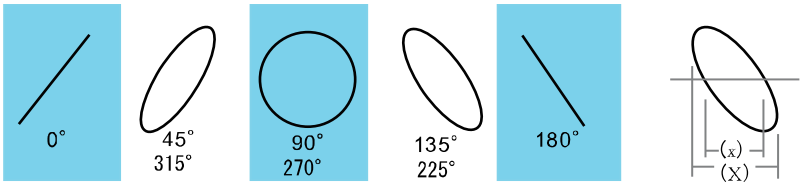


If the straight line on the oscilloscope is curved at its top and bottom sections as shown on the right Fig., it indicates that the output signal of amplifier is suffering from an amplitude distortion.



In this case, reduce the output level of instrument a little to vary the frequency. This causes the straight line on the oscilloscope to expand gradually to turn into an ellipse. By utilizing the configuration of this ellipse, the phase shift can be calculated as follows:

Measure the maximum horizontal deflection and suppose that this deflection is(X),and that the section at which the ellipse crosses the horizontal axis is(x) as shown in fig. below$X$



Check of Phase Shift Angle

And, the phase shift angle θ is given by the following:

$$\sin\theta = \frac{x}{X}$$

Find θ from the table of trigonometric functions and the value obtained gives the angle of phase shift.

4 SPECIFICATIONS

The following specifications temperature: 23℃ ± 5℃, Humidity: 50% or less of the environment and the power supply ON after leaving the instrument for more than 24 hours, will be applied to a case in which was aged for 30 minutes or more.

Frequency range	Range	x1：10Hz～100Hz
		x10：100Hz～1kHz
		x100：1kHz～10kHz
		x1k：10kHz～100kHz
		x10k：100kHz～1MHz
	Accuracy(TYP.)	±(5%+1Hz) (at 10,100 Dial value, Except x1 Range)
Sine Wave	Output voltages	5V rms or more(600Ω)
	Frequency characteristics	10Hz～1MHz, ±0.5dB (reference freq: 1kHz, 600Ω).
	Distortion factor	500Hz～20kHz：0.02% or less
		100Hz～100kHz：0.05% or less (100Hz：x10 range, 100kHz：x1k range)
		50Hz～200kHz：0.3% or less
		20Hz～500kHz：0.5% or less
		10Hz～1MHz：1.5% or less
Square Wave	Output voltages	10V p-p or more (600Ω)
	Rise and fall times	200ns or less
	Overshoot:	2% or less(at 1kHz, max. output)
	Duty ratio	50%±5%(at 1kHz, max. output)
External Synchronization	Synchronizing range	Approx. ±1% / V
	Max. allowable input:	15V (DC+AC peak)
	Input impedance:	Approx. 150kΩ
Signal output	Output impedance	Approx. 600Ω

	Output attenuator	10dB-step, 6 range: 0dB, -10dB, -20dB,-30dB, -40dB, -50dB (Approx. 600Ω±1dB)
Power requirement	Voltage	AC 100V/120V/220V/230V ± 10%
	Frequency	50Hz / 60Hz
	Power consumption	Approx. 10VA, 8W
Operation Environment	Indoor, Altitude: below 2000m	
	Continuous operation time: 72hour *1	
	Within specification temperature: 23°C±5°C	
	Operation temperature: 0°C～40°C	
	Operation humidity range:80% RH(Max) no condensed	
	Installation category II, Pollution degree 2	
Storage environment	-10°C～ 60°C, 80%RH(Max)	
Physical specification	Dimensions	132(W) × 196(H)× 250.5(D) mm
	Maximum Dimensions	132(W) × 210(H)× 292.3(D) mm
Weight	Approx. 3kg	
Accessories	Power cord ×1 CD(Instruction manual) ×1 Output cable ×1 USING THE PRODUCT SAFELY ×1	

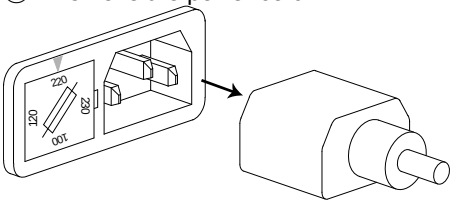
*1:After continuous operation temperature: 23℃±5℃, Humidity: 50% or less of the environment, you must have left for more than 24 hours.

5 APPENDIX

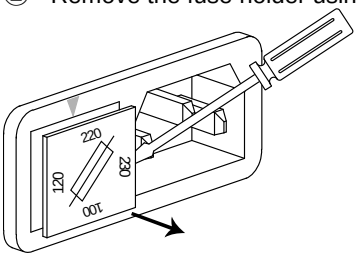
5-1 Fuse Replacement

Replace the AC source fuse

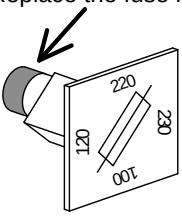
① Remove the power cord.



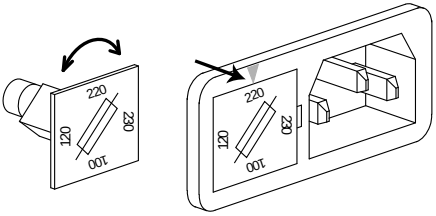
② Remove the fuse holder using a flat screwdriver.



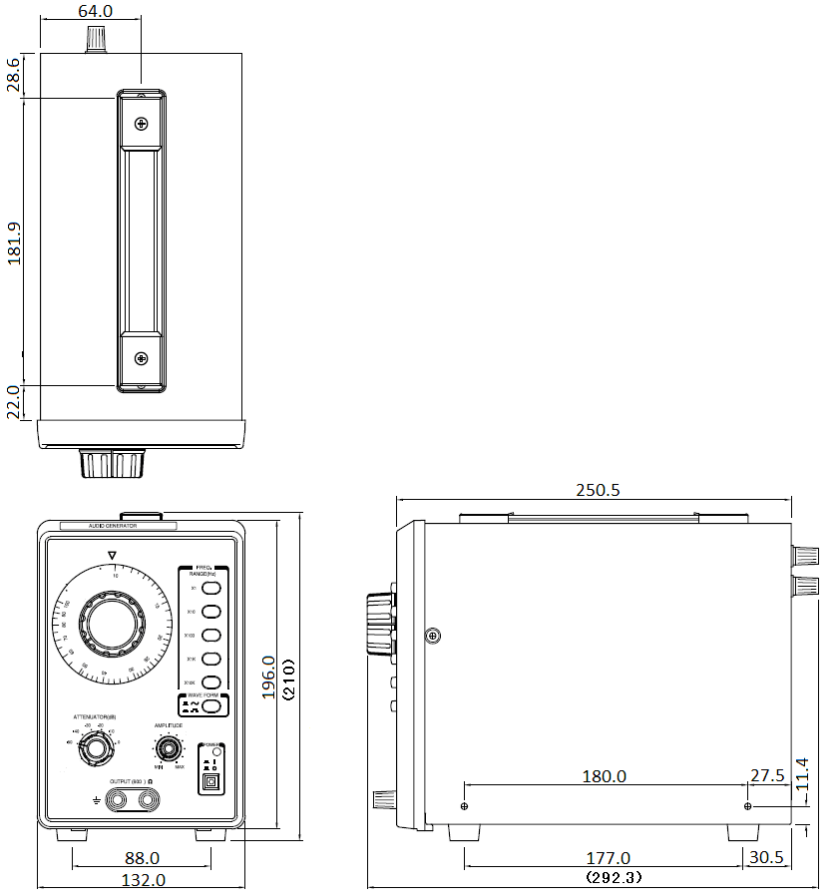
③ Replace the fuse in the holder.



④ Ensure the correct line voltage is lined up with the arrow on the fuse holder. Insert the fuse holder.



5-2 External Dimensions Figure



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