

MODEL SRG-24
R-C OSCILLATOR
OPERATION MANUAL

Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark)

Input voltage

The input voltage of this product is _____ VAC,
and the voltage range is _____ to _____ VAC. Use the product within this range only.

Input fuse

The rating of this product's input fuse is _____ A, _____ VAC, and _____.

WARNING

- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.



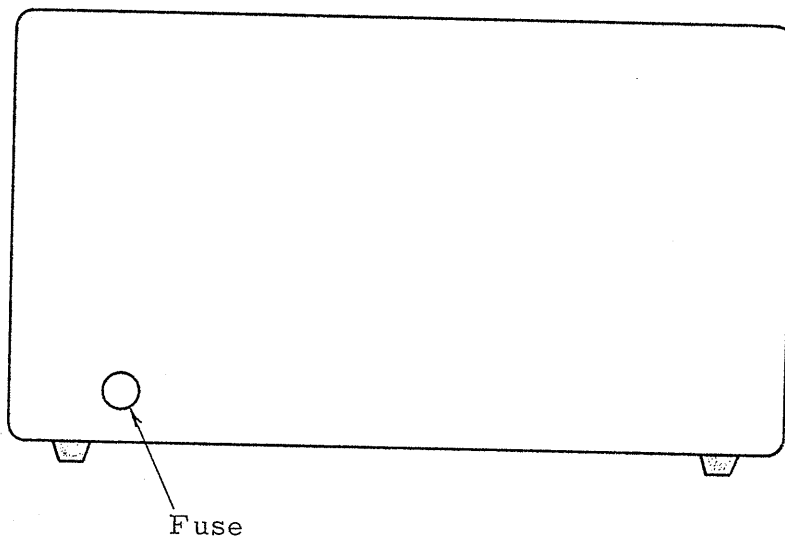
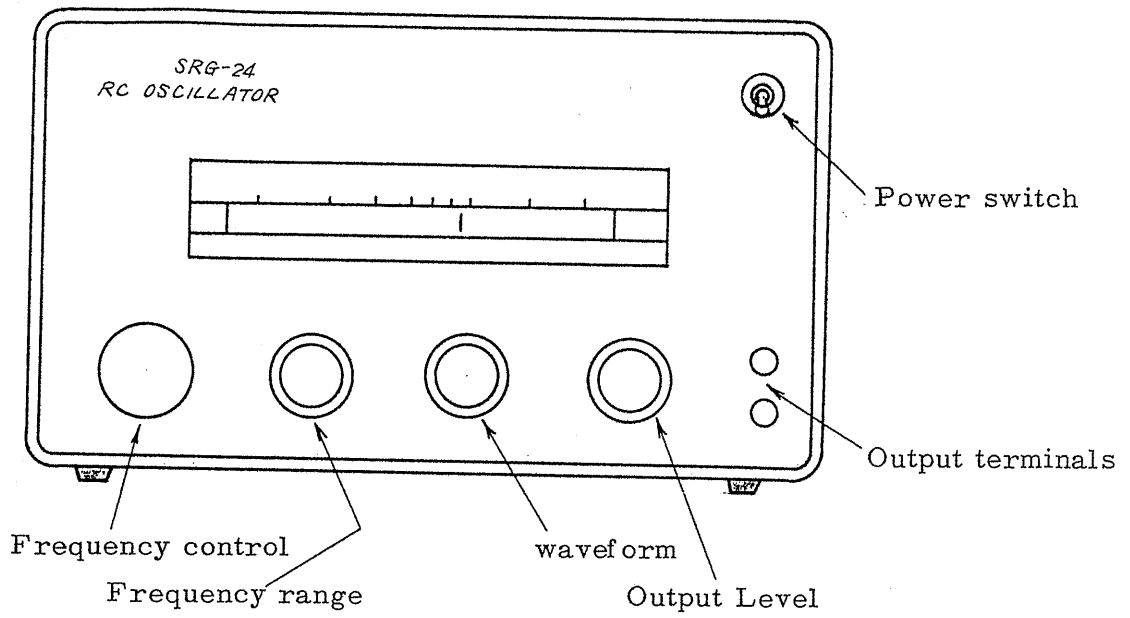
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1. SPECIFICATIONS

Type	Wien Bridge RC Oscillator	
Power Requirement	V, 50/60Hz Approx. 30VA	
Dimensions	300(W) x 170(H) x 153(D) mm	
(Max.)	305(W) x 180(H) x 190(D) mm	
Weight	Approx. 4.9kg	
Vacuum Tube	6AV6	1
	6AR5	2
	12AT7	1
	6X4	1
Accessories	Operation Manual	1
	Test Data	1
Frequency Range	x 1	18 - 200Hz
	x 10	180 - 2000Hz
	x 100	1800 - 20000Hz
	x 1k	18 - 200kHz
Calibration Accuracy	From 18Hz to 200kHz	± (2% + 1 Hz)
Frequency regulation	For AC	V, ± 5%, Less than ± 1%
Frequency response	Sine: Less than ± 0.5 dB (reference: 1kHz)	
	Square : Less than ± 0.5 dB (reference : 1kHz) up to 20kHz	
Maximum Output	Sine : more than 5V rms	
	Square : more than 10Vp-p	
	Complex : more than 10Vp-p	
Distortion of Sine Wave	Less than 1% at 1kHz	
Sag or Overshoot of Square Wave	Less than 1 dB	
Complex Wave	Base	line frequency
	Superposed Wave	18Hz - 200kHz
	Amplitude Ratio	Approx. 4:1
Output Impedance	Less than 3 kΩ	

2. FUNCTION OF CONTROLS AND TERMINALS



3. OPERATION

3.1 INITIAL PROCEDURE

Connect the power cable to a power line of the specified voltage and frequency. Turn the power switch to ON. The lamp of dial illumination will light and the instrument will operate after a few minutes warmup. It will be within specifications after 30 minutes.

3.2 FREQUENCY

Set the RANGE and FREQUENCY controls for the desired frequency. The frequency dial scale must be multiplied by the multiplying factor indicated by the RANGE switch setting to obtain the oscillator frequency.

EXAMPLE : 100 (on dial scale) x 10 (multiplying factor indicated by RANGE SWITCH setting) = 1 kHz

When the rotary switch which selects WAVEFORM is set in the position of COMPLEX., the value obtained above is the frequency of superposed wave, while the base frequency is constant (=line frequency) at any position of the RANGE and FREQUENCY controls setting.

3.3 OUTPUT TERMINALS

The unbalanced output is obtained from the potentiometer connected between the cathode of the cathode follower and ground. The value of the output impedance varies nearly from zero to 3 k Ω according to the position of the output control, being maximum near its center position. The load resistance higher than 10 k Ω is desired to avoid the increase of distortion in output waveform.

The lower value of resistance may be used at the lower voltage of the output without the increase of distortion.

4. OPERATING CONSIDERATION

4.1 CHANGE IN OUTPUT CAUSED BY LINE VOLTAGE VARIATION

The example of change in the frequency of oscillation and the output voltage is shown in Fig. 1.

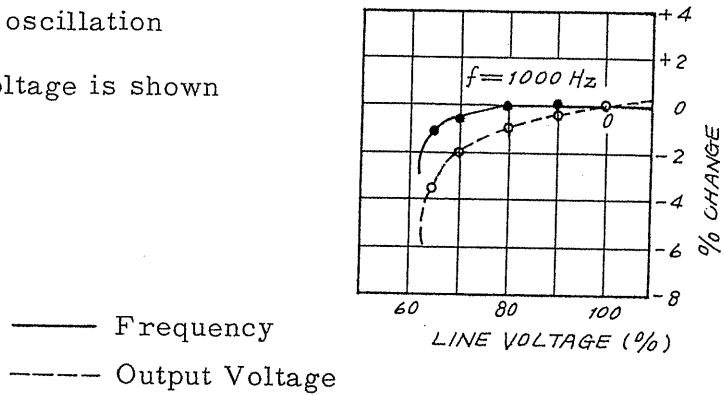


Fig. 1

4.2 FREQUENCY RESPONSE

Frequency response of sine and square wave output are shown in Fig. 2.

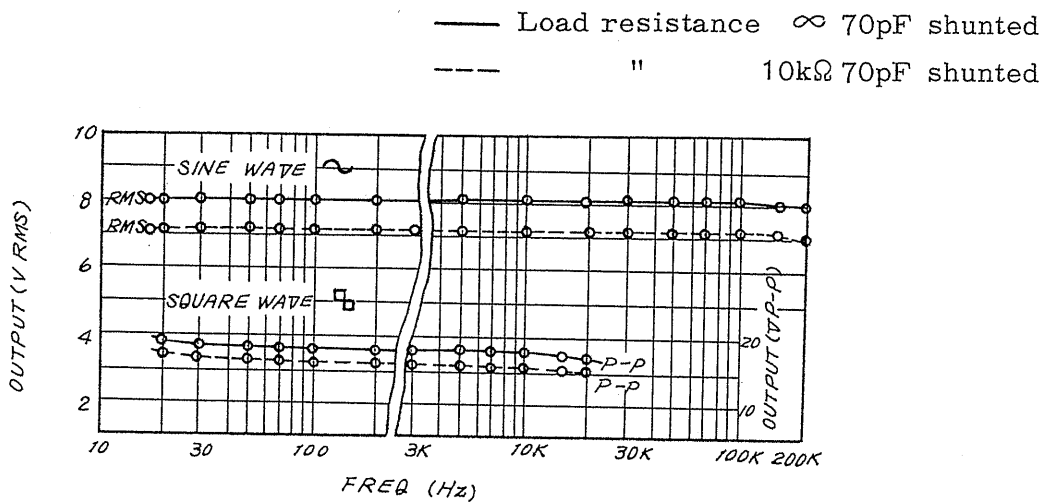


Fig. 2

4.3 SQUARE WAVE

Square wave in this instrument is shaped from sine wave through the clipper circuit. The faster rise time is obtained nearly proportional to frequency. However, the quality of the waveform becomes poor because of the upper frequency limit of the circuits.

5. MAINTENANCE

The instrument was thoroughly tested and inspected before being shipped, but in the case of defect, refer to the following descriptions and the typical DC voltage written in the circuit diagram.

5.1 REMOVAL OF CASE

To remove the case, remove five screws on the top and bottom of the front panel shown in Fig.3, and slide the case to the rear and off the instrument. It is recommended to pull off the power cable from the line during above procedure,

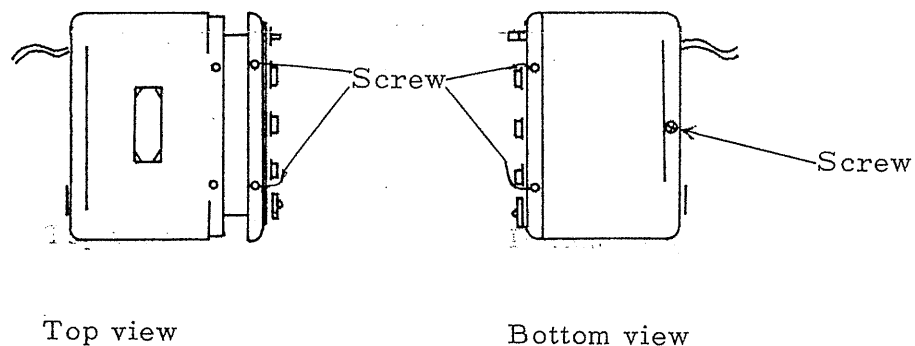


Fig. 3

5.2 FREQUENCY CALIBRATION

The resistors and tuning capacitor of the frequency determining network in the instrument are selected according to the specified rating.

The instrument will oscillate over all ranges properly at the frequency indicated on the frequency dial if the calibration is made at only one point near high end of the dial. The following procedure is recommended when the frequency standard of 2000Hz for instance is available.

(1) CHECK FOR LOW OF DIAL

Check the dial needle is exactly on "0 " of the even scale beneath the mirror when turning capacitor is in the position of maximum capacitance.

(2) CAPACITY BALANCE OF BRIDGE

Set the turning capacitor in the maximum capacitance position and the RANGE switch on " x10 ". Replace the thermistor with the variable resistor of about $10k\Omega$ and adjust its value to get the oscillator output nearly the same in the level with thermistor. Turn frequency dial slowly toward high end and the oscillator output level will fluctuate.

Adjust trimmers Ct1, Ct2 to keep the output level nearly constant.

(3) CALIBRATION AT 2000Hz

Adjust trimmers Ct1, Ct2 in approximately same quantity to get the oscillator frequency of 2000Hz on the dial scale " 200 ".

This adjustment may be done with thermistor connected instead of the variable resistor for the stable output voltage. In this case, however, when trimmers are adjusted in relatively much quantity because of a large error in frequency, adjustment in step (2) should be repeated.

Check the frequency error on every point in every range and a large error is still found after above adjustment or further accuracy is desired, the following procedure may be adopted.

- (a) In the range of x1, resistance value of $20M\Omega$ is adopted as a branch of Wien Bridge. Such a high resistor shows generally a larger drift in its value, besides the deterioration of the insulation resistance parallel to the resistor may become unnegligible after long period of operation. Check the resistor and the associated circuit. Adjust the effective value of resistance of necessary.

- (b) The oscillation frequency is often slightly lower than dial indication of "200" in the range of x100 and x1k. Then, adjust the frequency by connecting high resistor or small capacitor parallel to R1.
- (c) If the more precise calibration is desired on each point on the dial between both end of the range, bend the plate segments of turning capacitor rotor associated with each dial poing.