

MODEL 495A
SQUARE-WAVE GENERATOR
OPERATION MANUAL

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注意

KIKUSUI ELECTRONICS CORP.

The Model 495A is a compact, light-weight, square-wave generator to supply good-quality, continuously variable, square-wave signal for testing transient response, band-width, and phase-shift characteristics of various electronic equipments with frequency responses up to 15 megacycles.

The frequency is variable over a range from 0.5Hz to 500KHz divided in 6 ranges. The output is obtained through a 75-ohm coaxial connector, and is variable from 0.01 to 3 volts p-p. The output can also be obtained through a 600-ohm terminal, and in this case, the output is variable from 8 to 24 volts p-p.

SPECIFICATION

Power Requirement	_____volts, 50 to 60 Hz
	When output is maximum: Power consumption 120 VA.
Size - Cabinet	170 W x 230 H x 350 D mm
(maximum)	176 W x 245 H x 400 D mm
Weight (approx.)	9.3 kgs
Items Supplied with Equipment	1 Output cable equipped with 75-ohm UHF-type plug.
	1 924-75 75-ohm Coaxial Terminator
	2 941-B Terminal Adaptor
	1 Inclining Angle
	1 Operation Manual
	1 Test Data
Frequency Range	0.5 Hz to 500 kHz
Range	6 ranges. x 0.1, x 1, x 10, x 100, x 1 K, and x 10 K.

Accuracy	When symmetry is 1:1. Within 10% of indication.
75-ohm Output	Using supplied output cable and 75-ohm terminator.
Output Voltage	0.01 to 3 volts p-p.
Range	0.01 - 0.03/0.1/0.3/1/3
Accuracy	Within 5% of indication
Rise-Up Time	Less than 25 millimicro-seconds.
600-ohm Output	This output is terminated within the equipment.
Output Voltage	8 to 24 volts p-p.
Rise-Up Time	Less than 0.1 micro-second.
Waveform	Negative, rising-up from zero level.
Symmetry	Adjustable to 1:1.
Sag	Less than 1%.
Overshoot	Less than 2%.
Synchronization	Sync input and output terminals are provided on the backside.
Input Impedance	Approx. 1 megohm.
Output Voltage	More than 5 volts p-p.

FUNCTIONS OF CONTROLS

POWER OFF A power switch combined with SYNC IN which will be explained in the later paragraph. Turning this switch clockwise from OFF position, power is applied and pilot lamp lights on. The equipment is then in operating condition within 20 seconds of warm-up.

75-ohm These are output terminals. 75-ohm coaxial output is
600-ohm obtained from UHF type receptacle. 600-ohm high
GND impedance output is obtained between red-colored post
 marked 600-ohm and metal post marked GND. When
 75-ohm output is used, coaxial output cable together with
 924B 75-ohm Terminator is used. This terminator should
 not be removed during operation. 600-ohm output is
 terminated within the equipment.

OUTPUT RANGE This is an attenuator to control output voltage.
 Figures around the knob indicate maximum voltages
 available in volts p-p at respective ranges. When this
 knob is turned to 24V600Ω position, output is available
 through 600-ohm terminal.

V P-P This is a dial for fine adjustment of output voltage.
 External scale is calibrated from 1 to 3 and is used when
 OUTPUT RANGE is set at one of ranges 0.03, 0.3, and
 3. Internal scale is calibrated from 0.3 to 1 and used
 when OUTPUT RANGE is set at one of ranges 0.1 and 1.
 When OUTPUT RANGE is set at 24V600Ω position, reading
 of external scale should be multiplied by 8.

FREQUENCY A dual knob to adjust the frequency. External black
 colored knob is continuously variable and is to set at a
 desired figure, and internal red colored knob is to select
 a desired multiplier.

SYMMETRY This is to adjust the symmetry of output waveform.
 If symmetry is adjusted, frequency changes accordingly.

SYNC IN This is to adjust the input sync level. Turning this knob clockwise, the input level increases. As described above, this knob is also used as power switch.

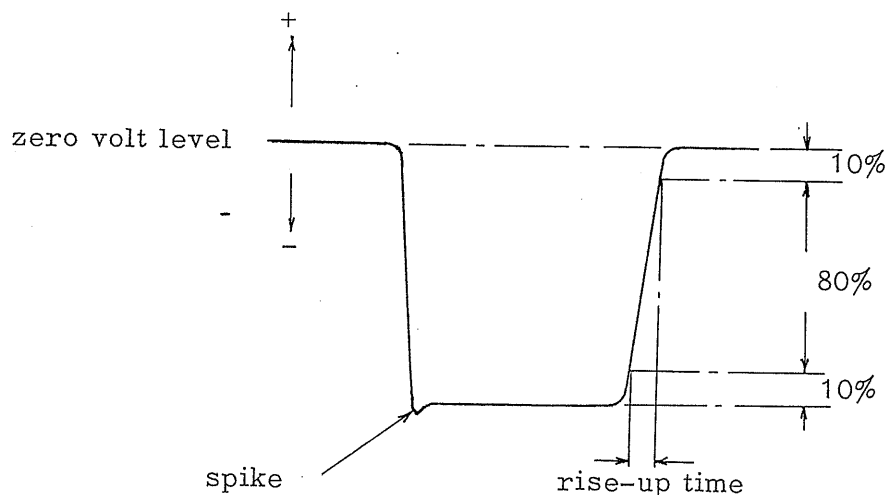
SYNC IN These terminals are provided on the backside of the
SYNC OUT equipment. Both are UHF type receptacles. In order to synchronize the generator's frequency to external signal, external signal is applied to SYNC IN, and the knob FREQUENCY is first set at lower frequency than any integral multiple of external frequency, and then, gradually turned for higher frequency till the generator's frequency synchronizes to external frequency.

Output from SYNC OUT is supplied to an oscilloscope so that the sweep frequency of oscilloscope synchronizes to the frequency of square-wave. This output is roughly square shaped.

ADJUSTMENT

Spike

Following figure is to illustrate the output waveform of this equipment exaggerating the details. As shown, no significant overshoot is observed in leading edge, however, a spike appears in trailing edge. This spike may be compensated adjusting C20, however, may vary as to setting position of V p-p dial.



Calibration of Output Voltage

Adjusting R107 in power supply circuit, supply voltage is set exactly at -225 volts. V p-p dial is then set at 3 and OUTPUT RANGE is set at 3.

Then, adjusting R37, output voltage is set at 3 volts p-p.

Turning V p-p dial gradually from 3 to 1, if there is discrepancy between dial reading and output voltage, R31 is adjusted to compensate the discrepancy.

When R31 is adjusted, R37 should again be adjusted. The output voltage of this equipment remains fairly constant over the entire frequency range.

In adjustment of output voltage, it is recommended to use Kikusui Model 494B or 494C Square-Wave Voltage Calibrator as a standard.

Calibration of Frequency

Range switch is first turned at x 100 position and vernier control is turned

at 50. SYMMETRY is also adjusted to obtain exactly symmetrical square-wave. Then, R13 is adjusted so as to obtain 5 kHz output.

Then, turning vernier control gradually from 50 to 5, discrepancy between dial reading and actual frequency is checked. If there is significant discrepancy, C9 should be adjusted. However, when C9 is adjusted, it is also necessary to adjust all of C6 through C12. Another approach is therefore to re-calibrate the frequency dial.