FREQUENCY DEVICES™, INC.

450 Series

Fixed Frequency Sinewave Oscillator

Description

The 450 Series are fixed frequency sinewave oscillators that deliver a single phase, high purity sinusoidal output. These fully finished devices can be user specified to operate to any frequency between 100 Hz and 50.0 kHz.

Each 450 model includes provisions for the user to adjust the output amplitude over a 1 to 20 Vp-p range by external resistive or voltage programming. Over the full output range, total harmonic distortion is 0.1% to 0.3% based on frequency, while the peak-to-peak amplitude stability of any fixed level selected is 0.002 dB/°C.

Features/Benefits:

- Stable high purity sinewave output.
- Adjustable output amplitude for applications requiring discrete or continuous output control.
- Plug-in ready-to-use, reducing engineering design and manufacturing cycle time.

Applications

- Reference oscillator
- Airborne equipment
- Mobile equipment
- Test Apparatus
- Telemetry Systems
- Distortion Testing

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Fixed Frequency Sinewave Oscillator

FIXED FREQUENCY OPERATION

The output signal frequency of each 450 Series sinewave oscillator is factory calibrated to within ±1% of the user-specified value. Independent of frequency setting, the output amplitude is preset to 20V p-p.

To put the oscillator into operation, simply connect the power supply common, voltages (±Vs), and ground pin T2. **Pin T2 must be connected to ground in this mode of operation.**

FINE FREQUENCY ADJUSTMENT (±5%)

For applications requiring a more accurate frequency setting, disconnect Pin T2 from ground. Connect a Cermet potentiometer as shown in Fig. 1 for a ±5% frequency adjustment range.

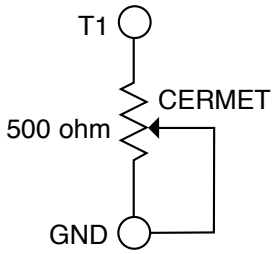

Figure 1

AMPLITUDE ADJUSTMENT (1 to 20V p-p)

For applications requiring either variable or lower level output signals, a single resistor or a dc control voltage can externally program the 450 output amplitude to any value between 1 and 20V p-p. Warning: Adjusting for outputs below 1Vp-p will cause loss of the output signal.

Discrete Resistive Programming: The method shown in Fig. 2(A) provides continuous control of the output amplitude. For both methods, Equation 1 defines the value of R1 for the specific set of conditions.

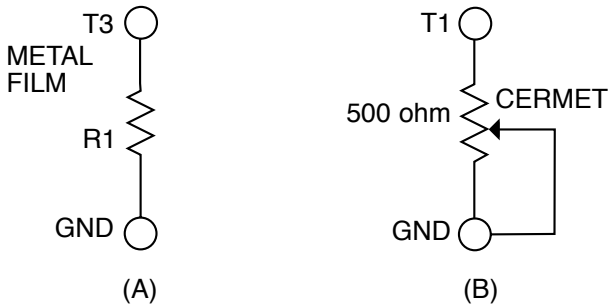

Figure 2

$$R1(k\Omega) = \frac{450V_O}{4V_S - 3V_O}$$

Equation 1

V_O = Output Voltage in V p-p
V_S = Supply Voltage

Continuous Resistive Programming: To determine the value of potentiometer R1 in Fig. 2(B), simply insert the appropriate values into Equation 1.

Suppose for example, the required output amplitude range is 1 to 10Vp-p and the positive power supply is +Vs = 15 Vdc. At maximum output voltage (10V p-p) equation 1 becomes

$$R1(k\Omega) = \frac{450\ (10)}{4(15) - 3(10)}$$

for potentiometer R1 = 150kΩ.

Voltage Programmable Amplitude: The output amplitude of the 450 can be voltage controlled by applying dc programming voltage V_{T3} to Pin T3. The output response is found from Equation 2, below:

$$V_{T3} = \frac{V_O}{2}$$

Equation 2

where Vo is the output voltage expressed in Vp-p, and V_{T3} is the dc control voltage applied to pin T3.

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450 Series

Specifications
(25°C and Vs ± 15 Vdc)

Pin-Out and Package Data
Ordering Information

Oscillation Frequency (fo)

Range	100 Hz to 50.0 kHz
Tolerance[1]	±1%
External Adjustment Range	±5%
Frequency Stability	
Temperature	0.02%/°C
Supply/Output Amplitude Variation	0.01%/%

Output Characteristics

Amplitude

Preset	20V p-p ±1%
Adjustment Range[2]	1 to 20V p-p
Stability vs. Temperature[3]	0.002 dB/°C
Stability vs. Supply Voltage[4]	0.1 dB/%

Drive Capacity

Output current @ 20V p-p[5]	±5mA pk
Output Resistance @ 20V p-p	<10 Ω

Distortion[6]

Harmonic	100 Hz to 10.0 kHz:	0.1%
	10.1 kHz to 25.0 kHz:	0.2%
	25.1 kHz to 50.0 kHz:	0.3%
Noise		50µVrms

DC Power Supply (±Vs)

Rated Voltage	±15 Vdc
Operating Voltage Range	±12 Vdc to ±18 Vdc
Maximum Safe Voltage	±18 Vdc
Quiescent Current	±8 mA typ
	±12 mA max.

Temperature

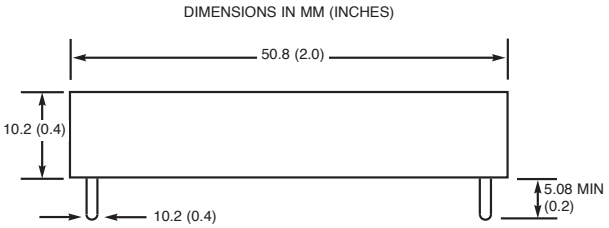
Operating	0 to +70°C
Storage	-25 to +85°C

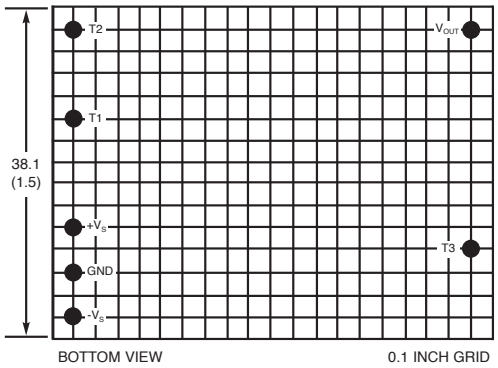
Notes:

1. Externally adjusted to zero.
2. All models can deliver 6V p-p to 600Ω external load.
3. The amplitude stability of a resistively programmed unit is directly proportional to the external programming resistor temperature coefficient.
4. The amplitude stability of a voltage programmed unit having the programming dc voltage applied to pin T3 is 0.1dB/%V_{T3}.
5. The output is short circuit protected.
6. Distortion is primarily third harmonic. Specification is for resistive loading.
7. How to Specify Oscillation Frequency:

   Oscillation frequencies are specified by attaching a three-digit frequency designator to the basic model number. Oscillation frequencies can range from 100 Hz to 50.0 kHz.

Pin-Out & Package Data





TERMINAL KEY

V_{OUT}	Signal Output
T1	Fine Frequency Adjust
T2	Frequency Adjust Enable*
T3	Output Amplitude Adjust
$+V_S$	Power Supply Voltage, Positive
GND	Ground
$-V_S$	Supply Voltage, Negative

*Must be connected to ground when fine frequency adjustment is not required.

Ordering Information

450-849 Hz

Oscillation Frequency[7]

e.g., 849 Hz
25.0 kHz
50.0 kHz

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