

DC-TO-AC POWER INVERTERS

- 50-, 250-, 500-, 1000-VA Outputs
- 50-Hz and 60-Hz Models
- Highly Efficient Operation
- 2:1 Power Surge Capability
- Frequency-Stable Inverter
- Rugged, Compact Construction



MODELS 1401 TO 1404

General Description

Wilmore Electronics Co., Inc specializes in the design and manufacture of state-of-the art dc-to-ac inverters in the power range of a few volt-amperes output to several thousand volt-amperes of output power. The Series 1400 line of standard inverters consists of fourteen units with a choice of either 12-volt or 24-volt battery input, 115-volt 60-hertz or 230-volt 50-hertz output, and four output power levels covering the range from 50 volt-amperes to 1,000 volt-amperes.

All Series 1400 inverters have a shaped output waveform that is a three-level-step approximation to a sine wave. This waveform achieves the same high-efficiency performance as square-wave inverters which are well adapted to powering loads such as small motors, heaters, lighting, and power hand tools. At the same time, by providing peak and rms voltages that approximate those of a pure sine wave, the Series 1400 inverters effectively power many additional loads such as electronic instruments, small computers, chart recorders, and video recording equipment. This waveshape has been specifically designed for compatibility with most sensitive electronic equipment for which sine-wave power would normally be specified. At the same time, these units offer a significant price savings over true sine-wave inverters.

An important feature of the three high-output-power inverters in the 1400 Series is the surge capability of these units. This feature permits these inverters to supply up to twice the continuous ac output rating thereby accommodating such difficult-to-handle loads as small motors, heaters, and hand tools that demand

large inrush current on starting. The frequency of all models is held to within ± 0.15 Hz over the full range of output power and input voltage.

Inverter efficiency is a characteristic of primary importance in any inverter system because it directly affects the drain on the battery and the internal temperature rise of the unit. The high efficiency of the Series 1400 inverters (greater than 80% from half load to full load for the 250-, 500-, and 1000-VA units and greater than 60% for the smaller regulated 50-VA unit) insures effective utilization of the batteries in maximizing operating times for any size battery and permits the conservative rating of components essential for reliable operation. An additional feature that contributes significantly to long operating times is the very small battery drain and power loss that occurs when the inverter is providing the output voltage but there is no ac load demand. This stand-by power loss is on the order of only four to six percent of the full-load input power.

Every Wilmore inverter is well protected and characterized by conservative design and rugged construction. All Series 1400 inverters are protected either electronically or by a front-panel circuit breaker from over loads or short circuits on the output. The 250-, 500-, and 1000-VA units are also protected against either over voltage or under voltage at the battery input terminals. Individual electronic components are well derated in both voltage and current, and a great deal of attention has been paid to mechanical layout and ruggedization. As a result, our inverters are used in countless applications involving harsh mechanical and electrical environments.

SERIES 1400 INVERTER SPECIFICATIONS

Model Number	AC Output			Battery Input Voltage Range (Volts DC)	Efficiency Half to Full Load at Nominal Input Voltage	Typical No-Load Input Power (Watts)	Size (h" x w" x d")	Weight (Pounds)
	Power (Volt-Amps)	Nominal Voltage (Volts rms)	Nominal Freq. (Hertz)					
1401-12-115-60	50	115	60	11 to 14.5 (Nom. 12 V)	Greater than 60%	5	4.25 x 5.25 x 7	6
1401-12-230-50		230	50					
1401-24-115-60		115	60	22 to 29 (Nom. 24 V)				
1401-24-230-50		230	50					
1402-12-115-60	250	115	60	11 to 14.5 (Nom. 12 V)	Greater than 80%	15	7.75 x 9 x 12	31
1402-12-230-50		230	50					
1402-24-115-60		115	60	22 to 29 (Nom. 24 V)				
1402-24-230-50		230	50					
1403-12-115-60	500	115	60	11 to 14.5 (Nom. 12 V)	Greater than 80%	20	8.75 x 12.5 x 11	44
1403-12-230-50		230	50					
1403-24-115-60		115	60	22 to 29 (Nom. 24 V)				
1403-24-230-50		230	50					
1404-24-115-60	1000	115	60	22 to 29 (Nom. 24 V)	Greater than 80%	30	8.75 x 12.5 x 11	47
1404-24-230-50		230	50					

ADDITIONAL SPECIFICATIONS

Optional Input Voltages

Inverters for 36-V and 48-V battery input systems are available in most sizes.

Optional Output Voltages and Frequencies

Other voltage/frequency combinations are available in most sizes.

Output-Voltage Waveshape

Three-level-step approximation to a sine wave with peak, average, and rms values approximating those of a sine wave.

Output-Voltage Regulation

Peak and average values of output voltage vary directly with dc-input voltage except in the Model 1401 where the regulation over the input voltage range is $\pm 3\%$.

Output-Frequency Stability

± 0.15 hertz maximum variation with load and input voltage variations. Temperature coefficient is ± 0.02 maximum per $^{\circ}\text{C}$.

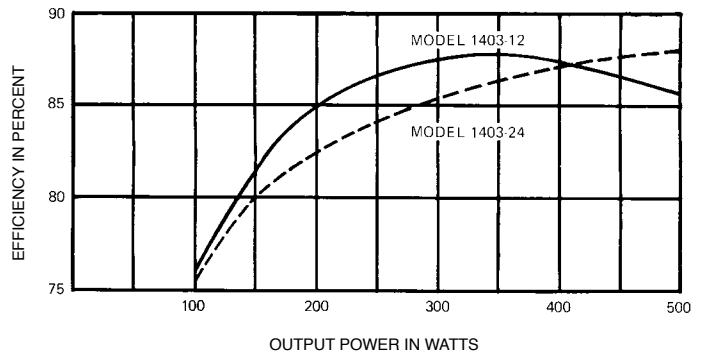
Surge Capability

Models 1402, 1403 and 1404 have surge capabilities that permit supplying of up to twice rated output power for loads that demand large inrush current for starting.

Protection

Front-panel circuit breaker helps to protect against accidental

TYPICAL INVERTER EFFICIENCY VS OUTPUT POWER AT NOMINAL DC INPUT VOLTAGE



reversal of input polarity when connecting batteries, and against long-term output overload.

Short-circuit protection with automatic recovery once normal operating conditions return is provided electronically.

For Models 1402, 1403 and 1404, electronic-protection circuit turns off the inverter when the input voltage lies outside the range of 9.0 to 16.5 Vdc for 12-volt batteries or 18.0 to 33.0 Vdc for 24-volt batteries. This protection is not incorporated in the Model 1401.

Operating Ambient Temperature

-20°C to $+55^{\circ}\text{C}$

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