



Wilmore®
ELECTRONICS CO., INC.

USER MANUAL
Series 1716
DC-to-AC Inverters

**SERIES 1716
250VA
DC-to-AC Inverters**



1716-48-120-60

This User's Information Manual is applicable for the following Models:

1716-12-120-60
1716-24-120-60
1716-48-120-60
1716-130-120-60

1716-36RR-120-60
1716-74RR-120-60



Wilmore Electronics Company, INC.
P.O. Box 1329, Hillsborough, NC 27278

Telephone 919.732.9351 | Fax 919.732.9359
www.wilmoreelectronics.com

Table of Contents

- I. General Description**
- II. Installation and Operation**
- III. Front-Panel Controls and Indicators**
- IV. Maintenance Information**
- V. Warranty Statement**

All information contained in this document is the property of Wilmore Electronics Company, Inc. The providing of this document to any person or organization external to Wilmore shall in no way be construed as a license or as permission to use this information for any purpose other than to facilitate the use and maintenance of Wilmore equipment.

WARNING – DANGER OF ELECTRIC SHOCK!

Hazardous voltages can be present on the front-panel wiring terminals and receptacles. Disconnect the DC input power at the source end of the input cables before working near the front panel.

The installer should read all of Section II (Installation and Operation) and refer to Figure 1 for additional information **BEFORE MAKING ANY CONNECTIONS TO THE INVERTER.**

CAUTION – TO AVOID EQUIPMENT DAMAGE DURING INSTALLATION...

Prior to installing the inverter, verify that its front-panel input power switch (a “rocker-arm” circuit breaker) is in the **OFF** position, indicated by a wedge-shaped section of the rocker arm protruding from the front panel and exposing white plastic in the rocker assembly. If the inverter does not appear to be turned off, push against the word “OFF” printed on the switch face to expose the white plastic indicator before making any connections to the inverter.

**...DO NOT “HOT PLUG” OR APPLY AN ENERGIZED CONNECTION TO A
“TURNED ON” INVERTER!**

I. General Description

The **Series 1716** dc-to-ac inverters provide an isolated, regulated, 120-Vac, 60-Hz output from station batteries and other widely-fluctuating battery systems, while the **Series 1716RR** are designed to work from vehicle battery systems aboard locomotives and rail vehicles.

The output-voltage waveshape is a three-level stepped approximation to a sine wave with peak, average and rms values approximating those of a sine wave. Maximum rated output power is 250 volt-amperes (continuous duty rating at 50°C ambient temperature and free-air convection cooling). The dc input and the ac output are isolated from the chassis and from each other. Isolation capable of passing an 1800 Vdc "hipot" test is provided between the input and output and between the input and chassis.

This inverter is electronically protected against output overloads and short circuits. Recovery to normal inverter operation is automatic upon removal of the fault. A front-panel circuit breaker provides protection against accidental reversal of input polarity during installation.

II. Installation and Operation

WARNING – DANGER OF ELECTRIC SHOCK

Hazardous voltages can be present on the front-panel wiring terminals and receptacles. Disconnect the DC input power source before working near the front panel. Prior to making any wiring connections to the inverter, read all of Section II, and refer to Figure 1 for additional information.

Connection and operation of Series 1716 inverters are almost entirely self-explanatory from the front panel markings on each unit. A combination circuit breaker and ON/OFF switch is provided on the front panel for **DC INPUT** power. Its rocker handle is flush with the front panel while in the ON position to guard against unintentionally turning the circuit breaker OFF through incidental contact. The **DC INPUT** power connections are made via a two-part (i.e. header and plug) connector. Input cabling can be connected to the inverter without separating the plug from the header. Alternately, the plug may be removed from the inverter by disengaging its mounting-flange screws, and the cabling can be connected to the plug prior to re-engaging it with the header on the inverter's front panel (be sure to re-engage the mounting-flange screws as well). The positive and negative terminals on the connector are clearly marked, and deliberate caution should be exercised to avoid polarity mistakes. To connect the power cables, simply strip 3/8" – 1/2" from one end of each cable and insert into the appropriate connector wire clamp. Tighten the wire-clamp screw securely and, if using stranded wire, check to make sure that all wire strands have been captured by the wire clamp.

Suggested wire sizes for dc-input cabling are shown in the chart below. It is desirable that these cables be kept as short as possible, and, if their length must exceed 10 feet, it may be desirable to use larger diameter (lower gauge) cables.

MODEL	INPUT VOLTAGE RANGE (VDC)	INPUT CURRENT (ADC)*	SUGGESTED CABLE (AWG)
1716-12-120-60	10.5-16	28.6	#8
1716-24-120-60	21-29	13.9	#10
1716-48-120-60	42-58	6.8	#12
1716-130-120-60	105-145	2.7	#16
1716-36RR-120-60	25-45	12.1	#14
1716-74RR-120-60	50-90	5.8	#14

*Typical at full load and minimum input voltage

Note that these inverters are constant-output-power devices, i.e., with a constant output load, the dc-input current and dc-input voltage are inversely proportional. This means that the maximum input current is drawn at the minimum input voltage.

The **AC OUTPUT** receptacles provide power to the user's load. The **CHASSIS GROUND** screw provided on the front panel is electrically common with the ground connection on the AC OUTPUT receptacle.

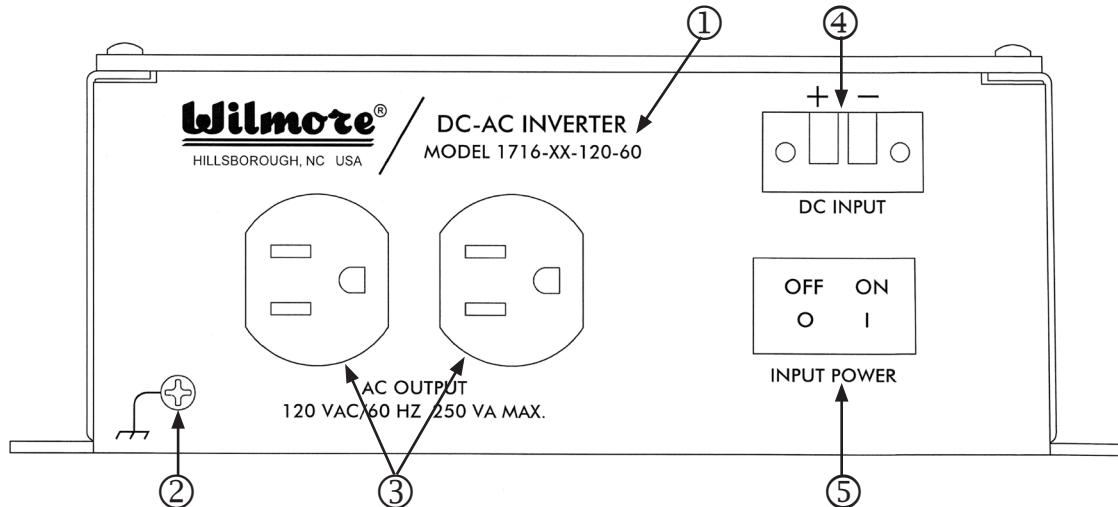
INPUT PROTECTION

Good installation practice for power conversion equipment dictates that an input fuse or circuit breaker should be located at the power-source end of the cables feeding the equipment. The type and rating of such devices are largely dependent on local and/or national codes and installation variables such as cable routing and wire gauge. Wilmore cannot anticipate these variables and consequently does not recommend specific fuse or circuit breaker values. However, it is important to note a few operating characteristics of this unit that may affect an installer's choice of protection devices.

- 1) As mentioned previously, this unit is a constant-power device; that is, it draws its maximum input current at its minimum input voltage.
- 2) As with essentially all electronic equipment with significant input capacitance, the unit will draw an initial peak current many times its normal operating current for a very brief period (a few milliseconds or so) when power is initially applied. **Consequently, instantaneous-trip circuit breakers or non-time-delay fuses may be activated by normal power-up events and are not recommended.**
- 3) Following the brief capacitor-charging current described above, the unit will exhibit a "soft-start" characteristic that limits its input current to approximately that of its full load current (see chart in Section II for specific load current information) as the circuit reaches its normal operating mode. Consequently, and even though the user's application may only require a fraction of the unit's power rating, the input circuit breaker or fuse must be sized to accommodate the full-load input current to avoid nuisance tripping.

III. Front-Panel Controls and Indicators

Figure 1. Front Panel



- ① **MODEL NUMBER:** This is the complete model number of the inverter, including any standard or special factory-assigned modification codes.
- ② **CHASSIS GROUND TERMINAL:** Connection to chassis ground is provided for use with #8 hardware.
- ③ **AC OUTPUT RECEPTACLES:** These receptacles are standard two NEMA type 5-15R receptacles. The load at these receptacles should not exceed the power rating of the inverter.
- ④ **DC INPUT CONNECTOR:** Connections for DC input power are provided via a two-part (plug and header) connector, which accommodates appropriate wire sizes. Please refer to Section II for recommended wire sizes for this inverter.
- ⑤ **DC INPUT CIRCUIT BREAKER:** This is a combination DC input switch and circuit breaker, provided in the positive (+) input line.

IV. Maintenance Information

Other than preventing dust and debris accumulation on internal components and external surfaces of the inverter, no periodic maintenance should be required.

A damaged or malfunctioning unit should be returned to Wilmore for repair. Multiple-component cascade failures in power conversion circuitry can greatly complicate trouble-shooting procedures, and factory technicians familiar with the circuitry can locate the problem quickly, explore adjacent circuitry for stressed or damaged components, and subject the inverter to a thorough retest.

Wilmore maintains a **Return Material Authorization** system in order to efficiently track your inbound shipment and expedite its repair and return to you. Before shipping material for repair to Wilmore, please call (919) 732-9351 or email info@wilmoreelectronics.com and request an **RMA Number** for your shipment. If possible, please provide the complete model number of the equipment, its serial number, and a brief description of the problem. Place this **RMA Number** on the outside of the package and ship prepaid to:

WILMORE ELECTRONICS CO., INC.
607 U.S. 70A East
P.O. Box 1329
Hillsborough, NC 27278

V. Limited Warranty

Wilmore Electronics Company, Inc. warrants this product to be free from defects in material and workmanship for one (1) year after delivery to the original purchaser. During this period, a defective product for which an authorization to return the product has been given, shall be returned to Wilmore freight prepaid. The products will be repaired, replaced, or credit allowed only if the defect, after examination by Wilmore, is determined to be a defect in material or workmanship. If this returned product is determined by Wilmore to have suffered from user misuse or abuse or to have been opened or modified without written instructions from Wilmore, or if the date of receipt of a request for return authorization exceeds the 1-year warranty period, the warranty is null and void. In such cases, Wilmore will determine the cost of repair, quote this price to the purchaser, and continue as advised by the purchaser.

The sole obligation of Wilmore and the purchaser's exclusive remedy under this or any other warranty, expressed or implied, is the repair or replacement of a defective product as provided above, or the issuance of credit in an amount not to exceed the contract price for the product deemed to be defective. Wilmore makes no warranty of merchantability or fitness for a particular use. Wilmore shall not be responsible for incidental or consequential damage, whether or not foreseeable, caused by defects in this product. There are no other warranties which shall extend the description above.