

MODEL 1740-74-14-30 DC-to-DC Converter



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I. General Description

The Model 1740-74-14-30 dc-to-dc power converter provides an isolated, regulated 14.2-Vdc output from nominal 74-Vdc vehicle battery systems aboard locomotives and rail vehicles. The normal operating input voltage range is 40 Vdc to 100 Vdc. In addition, the converter will operate through brief input-voltage excursions down to 20 Vdc (operation at less than 40 Vdc is limited to 4 seconds maximum in any 2-minute period). The output current rating is 0-30 amperes at ambient temperatures up to 70° C with simple convection cooling. Isolation capable of passing a 1500-Vdc “hipot” test is provided between the input and output, and between the input and chassis. The converter output is galvanically isolated from the chassis ground and, therefore, may be connected as either a positive or a negative output.

This converter is electronically protected against output overloads, short circuits and converter-induced output over-voltage faults. Recovery to normal operation is automatic upon removal of an overload or short-circuit fault. Following an over-voltage shutdown, input power to the converter must be removed and then reapplied to resume converter operation. Protection against accidental reversal of the input-voltage polarity during installation is provided by a shunt diode working in conjunction with a user-supplied input fuse or circuit breaker (see Section II: Installation and Operation).

This converter is a constant-input-power device, i.e., with a constant output load, the input current and input voltage are inversely proportional. This means that the maximum input current is drawn at the minimum input voltage. An approximation of input current for a specific input voltage and output load current can be determined as follows:

$$\text{Input Current} = \frac{(\text{Output Voltage}) (\text{Output Current})}{(0.85) (\text{Input Voltage})}$$

This approximation applies for output load currents equal to or greater than 20% of maximum rated current. For loads less than this value, linearly decrease input current from its calculated value at 20% load to 0.2 amperes at no load.

II. Installation and Operation

Caution: The Model 1740-74-14-30 converter is NOT internally fused. Externally fuse input at 30 amperes.

Good installation practice for mobile electronic equipment dictates that input fuses or circuit breakers should be located at the power distribution end of the cables feeding the converter. For this reason, no protection devices are located inside the Model 1740-74-14-30 to protect against fault conditions at the input to the converter. It is recommended, instead, that a 30-ampere fuse or circuit breaker be connected near the dc input source in series with the input lines to the converter.

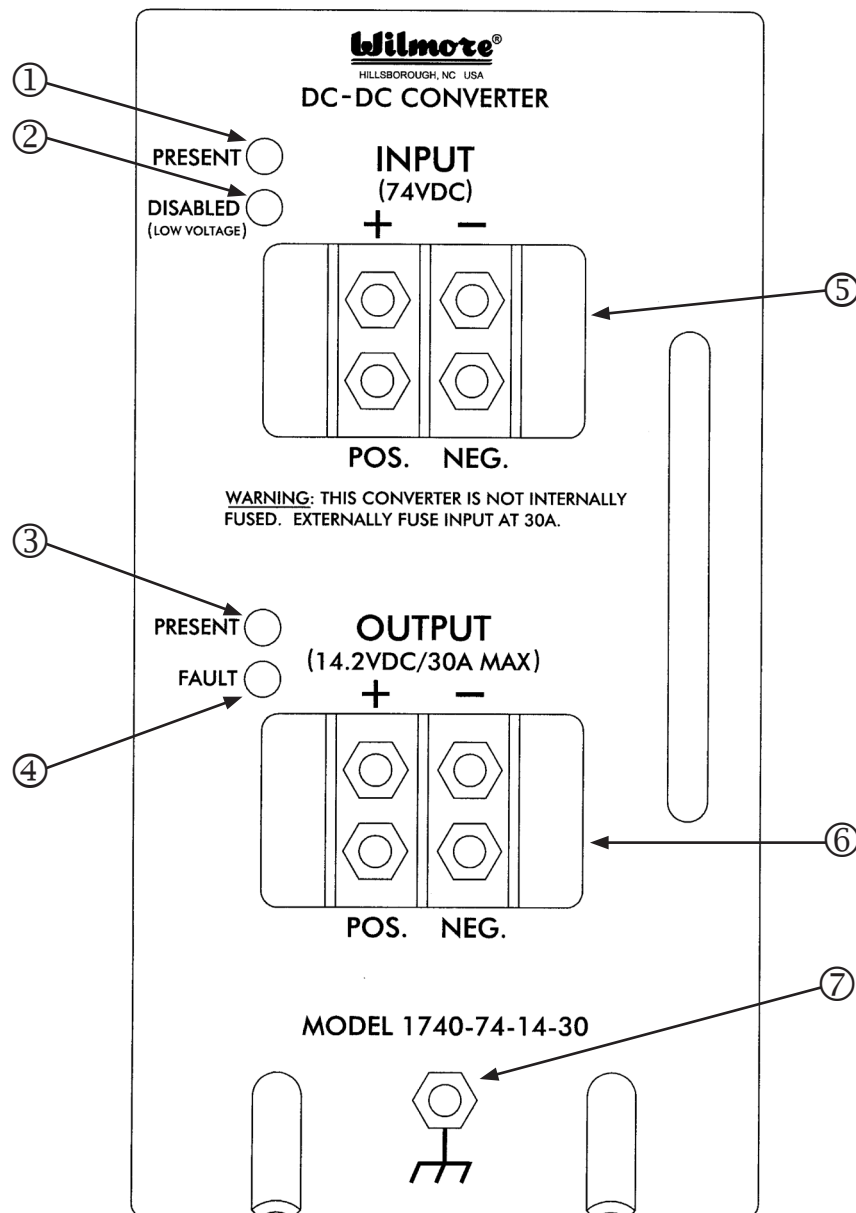
The Model 1740-74-14-30 power converter is approximately 9.3"h x 4.9"w x 11.5" deep, excluding front-panel protrusions. It is designed to be mounted into an LSI (Locomotive Systems Integration) equipment rack and occupies 4 MCU's (Modular Concept Units) within the rack.

Connection and operation of the Model 1740-74-14-30 converter is almost entirely self-explanatory from the front-panel markings on each unit. The positive and negative terminals are clearly marked beside the input and output terminal blocks, and deliberate caution should be exercised to avoid polarity mistakes. Both the input and the output of the converter are dc-isolated from the chassis and from each other.

The terminal block connections are 1/4-20 studs on 0.625-inch centers, designed for use with industry-standard one- or two-hole compression lugs. The manufacturer's recommended application torque for these connections is 50 lbf-in. It is suggested that #10 AWG power cables be used to connect the converter to its input power source and that #8 AWG cables be used to connect the converter to its load. These cables should be kept as short as possible, and if their length must exceed 10 feet, it may be desirable that larger cables be used.

III. Front-Panel Connectors and Indicators

Figure 1: Front Panel



SEE NEXT PAGE FOR ADDITIONAL INFORMATION

- ① **INPUT PRESENT LED:** This green LED is “on” when input power is present at the input terminal block connections.
- ② **DISABLED (LOW VOLTAGE) LED:** This amber LED is “on” when the output of the converter has been automatically disabled due to the presence of a low input voltage (less than 40 Vdc) for substantially more than 4 seconds. The LED will remain “on” (and the output voltage will remain disabled) until the input voltage has been increased to above 40 Vdc for about 1 minute.
- ③ **OUTPUT PRESENT LED:** This green LED is “on” when normal output voltage is present at the output terminal block connections.
- ④ **OUTPUT FAULT LED:** This red LED is “on” when the voltage at the output terminals is low or absent (including its absence due to the low-input-voltage disable function described above).
- ⑤ **INPUT TERMINAL BLOCK:** Connections for input cabling are provided via 1/4-20 studs on a heavy-duty barrier-strip terminal block with tethered cover. To remove the cover for making wiring connections, gently squeeze the outside barriers of the terminal block inward to release the cover tabs. The manufacturer’s recommended application torque for these connections is 50 lbf-in.
- ⑥ **OUTPUT TERMINAL BLOCK:** Connections for output cabling are provided via 1/4-20 studs on a heavy-duty barrier-strip terminal block with tethered cover. To remove the cover for making wiring connections, gently squeeze the outside barriers of the terminal block inward to release the cover tabs. The manufacturer’s recommended application torque for these connections is 50 lbf-in.
- ⑦ **CHASSIS GROUND TERMINAL:** Connection to chassis ground is provided via a 1/4-20 stud.

III. Maintenance Information

Other than preventing dust accumulation on external surfaces of the converter, 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

IV. 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.