



Wilmore[®]
ELECTRONICS CO., INC.

USER MANUAL

Model 1743-74-10
DC-DC Converter

MODEL 1743-74-10 DC-to-DC Converter



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I. General Description

The Model 1743-74-10 dc power conditioner is a dc-to-dc converter that enables nominal 74-Vdc locomotive electronics to operate through wide variations in the locomotive power bus while also providing additional filtering and transient-withstand protection. The converter automatically boosts abnormally low input voltages and limits abnormally high input voltages such that its output remains between 55 Vdc and 82 Vdc. At input voltages in the normal operating range between these undervoltage/overvoltage thresholds, the converter provides a filtered and protected output voltage that is directly proportional to its input voltage.

The normal operating input voltage range is 40.0 to 135.0 Vdc, and the converter will accommodate input undervoltages down to 20 Vdc for up to 10 seconds in any 2-minute interval. The output current rating is 0-10 amperes (continuous duty) across the temperature range from -40°C to +70°C with simple convection cooling. Isolation capable of passing a 2000 Vdc "hipot" test is provided between the converter circuitry and chassis. The input and output share a common return.

Protection against output overloads and short circuits is provided electronically, and the unit will return to normal operation upon removal of the fault. 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.

At input voltages below approximately 60 Vdc and above approximately 80 Vdc, this converter is a constant-output-power regulator, i.e., with a constant 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:

$$\text{Input Current} = \frac{(\text{Output Voltage}) (\text{Output Current})}{(0.9) (\text{Input Voltage})}$$

This approximation applies for output load currents equal to or greater than 20% of rated load current. For loads less than 20% of this rating, linearly decrease input current from its calculated value at 20% load to 150 milliamperes at no load.

II. Installation and Operation

**Caution: The Model 1743-74-10 converter is NOT internally fused.
Externally fuse input at 40 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 1743-74-10 to protect against fault conditions at the input to the converter. It is recommended, instead, that a 40-ampere fuse or circuit breaker be connected near the dc input source in series with the positive (+) input line to the converter.

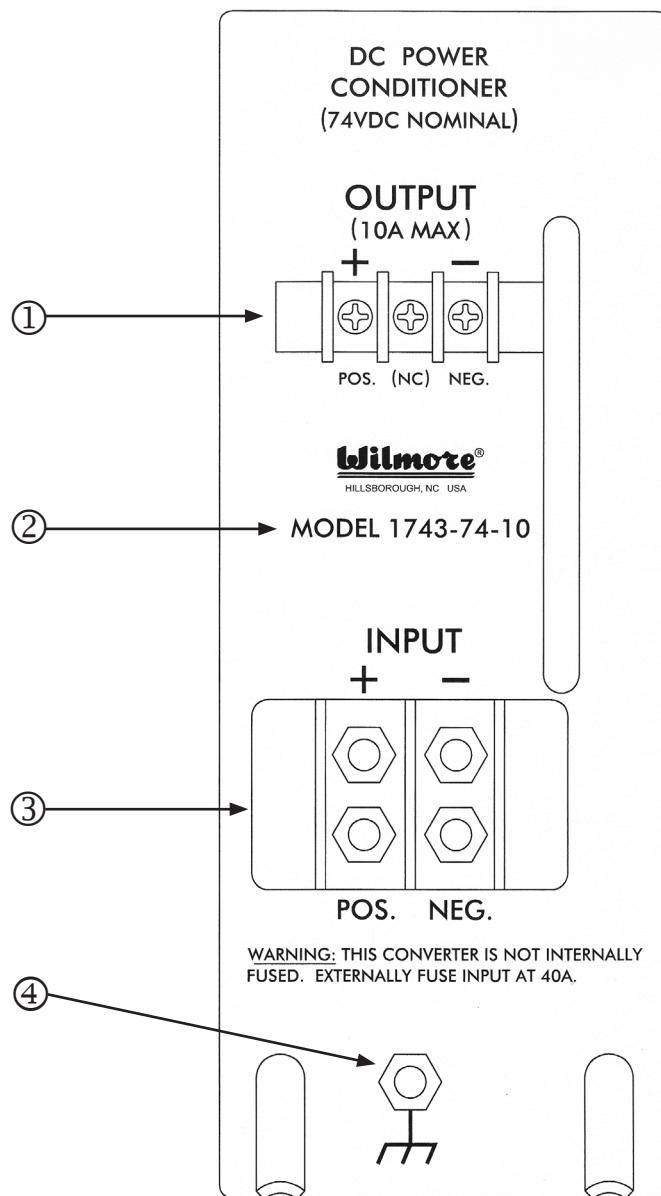
The Model 1743-74-10 power conditioner is approximately 9.3" h x 3.6" w x 11.5" deep, excluding front-panel protrusions. It is designed to be mounted into an LSI (Locomotive Systems Integration) equipment rack and occupies 3 MCU's (Modular Concept Units) within the rack.

Connection and operation of the Model 1743-74-10 power conditioner 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. The input and the output of the converter are dc-isolated from the chassis and share a common return.

The input 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 lb-in. It is suggested that #8 AWG power cables be used to connect the converter to its input power. The output terminal block screws accept lugs for use with #6 hardware, and the manufacturer's recommended application torque for these connections is 9 lb-in. It is suggested that #14 AWG output power cables be used. Input and output cables should be kept as short as possible, and if their length must exceed 10 feet, it may be desirable that larger cable be used.

III. Front-Panel Connectors and Indicators

Figure 1: Front Panel



SEE NEXT PAGE FOR ADDITIONAL INFORMATION

- ① **OUTPUT TERMINAL BLOCK:** The output terminal block screws accept lugs for use with #6 hardware, and the manufacturer's recommended application torque for these connections is 9 lb-in. It is suggested that #14 AWG output power cables be used.
- ② **MODEL NUMBER:** This is the complete model number of the converter, including any standard or special factory-assigned modification codes.
- ③ **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.
- ④ **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.