Teleline™

Plug-in Power Supply Card
120 Vac / 129 Vdc to -24 Vdc Output (751313MC)
Description and Installation Guide

925W751012-02E

POSITRON

Positron Inc.

Contents

Chapter 1

General Information

1.1 Publication Information

Teleline Plug-in Power Supply Card (751313MC)
120 Vac / 129 Vdc to -24 Vdc Output
Description and Installation Guide
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1.2 About this Guide

This guide introduces you to the Teleline Plug-in Power Supply Card 120 Vac / 129 Vdc to -24 Vdc Output (751313MC), and describes how to install it in a Teleline shelf. This guide was designed to be read from beginning to end.

1.2.1 Related Documentation

For any other technical document relating this system installation or applications cards and shelves, please refer to the Positron Web site: www.PositronPower.com.

1.2.2 Positron Products and Services

Positron engineers and manufactures high voltage isolation products to protect personnel and telecommunications circuits in high voltage areas that are susceptible to the effects of Ground Potential Rise (GPR).

Positron is the leader in isolation technology with its Teleline wireline products and TeleLite optical fiber wireline isolation/protection product families. Positron provides total flexibility in product configuration – from standalone units protecting a single circuit to high-capacity, multi-shelf HVI preconfigured systems.

Positron also provides a wide range of consulting, analysis and training services for communications companies and electrical utilities.

Full details and contact information are available at www.PositronPower.com.

1.3 Compliance Information

1.3.1 FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.4 Service and Support

Table 1: Positron Contact Information

General information:	Positron Inc. 5101 Buchan Street, Suite 220 Montreal, Quebec, Canada H4P 2R9 US and Canada: 1-888-577-5254 International: 1-514-345-2220 Fax: 514-345-2271 E-mail: info@positronpower.com Website: www.positronpower.com
Customer Service and Repairs:	US and Canada: 1-888-577-5254 International: 1-514-345-2220 E-mail: customerservice@positronpower.com

1.4.1 Technical Customer Support

Positron is committed to providing excellent ongoing technical support to its customers. A team of specialists is always available for telephone consultations or for on-site visits to assist in the maintenance and troubleshooting of Positron equipment.

For pricing information or assistance in the planning, configuration and implementation of the installation of equipment, contact Technical Customer Service.

1.4.2 Customer Training

Full customer training courses on High Voltage Interface (HVI) are also available. For more information, contact Positron.

1.4.3 Product Safety

This equipment is compliant with CSA CAN/CSA-C22.2 No. 60950-1-07.

1.4.4 Repair Service

All warranty repairs are performed at no cost. Positron reserves the right to repair or replace any equipment that has been found to be defective.

For information about out-of-warranty repairs, contact Positron's Repair Department. Due to the varied nature of repairs, no specific turnaround can be guaranteed, but average turnaround time is 20 working days from date of receipt. In emergency situations, special arrangements can be made. All repaired items are warranted for a period of 90 days.

Before returning any items to Positron for repair, warranty repair or replacement, call the Repair department to obtain a Return Material Authorization (RMA) number. Parts returned without RMA numbers cannot be accepted. The RMA number must always be clearly marked on all boxes, crates, and shipping documents. Bulk repairs (more than five items) will require additional processing time, so please take this into consideration when requesting an RMA number.

To accelerate the repair process, whenever possible, include a report detailing the reason for return with the unit(s). Also, please include the name and phone number of a person who can be contacted should our Repair department need further information.

When packing items being returned for repair, please ensure they are properly packed to avoid further damage. Plug-in cards should never be shipped while installed in a shelf; this will cause damage that can extend the repair period.

1.5 Teleline Warranty

Subject to the provisions of this paragraph, Positron warrants that the equipment shall perform in accordance with Positron's specifications. The warranty remains valid for five (5) years from the date of shipment. The warranty fully covers workmanship, materials and labor. Positron shall, at its sole discretion, repair or replace the problem unit.

Freight costs to ship defective equipment to Positron are borne by the Customer, with return of replaced or repaired equipment to be at Positron's expense.

1.5.1 Limitation of Liability

Subject to anything to the contrary contained herein, Positron's sole obligation and liability and the customer's sole remedy for Positron's negligence, breach of warranty, breach of contract or for any other liability in any way connected with or arising out of, the equipment or any services performed by Positron shall be as follows:

- In all situations involving performance or non-performance of the equipment or any component thereof, the customer's sole remedy shall be, at Positron's option, the repair or replacement of the equipment or said component.
- For any other claim in any other way related to the subject matter of any order under, the customer shall be entitled to recover actual and direct damages; provided that Positron's liability for damages for any cause whatsoever, and regardless of the form of the action, whether in contract or in tort (including negligence), shall be limited to the value of the order.

Positron shall not be obligated to repair or replace any item of the equipment which has been repaired by others, abused or improperly handled, improperly stored, altered or used with third party material or equipment, which material, or equipment may be defective, of poor quality or incompatible with the equipment supplied by Positron, and Positron shall not be obligated to repair or replace any component of the equipment which has not been installed according to Positron specifications.

IN NO EVENT SHALL POSITRON BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SIMILAR OR ADDITIONAL DAMAGES INCURRED OR SUFFERED INCLUDING

LOSS OF PROFITS, LOSS OF REVENUES, LOSS OF DATA, LOSS OF BUSINESS INFORMATION, LOSS OF GOODWILL, LOSS OF EXPECTED SAVINGS OR BUSINESS INTERRUPTION ARISING OUT OF OR IN CONNECTION WITH THE EQUIPMENT, A PURCHASE ORDER, SUPPLIES, MAINTENANCE SERVICES OR OTHER SERVICES FURNISHED HEREUNDER, EVEN IF POSITRON HAS BEEN ADVISED OR IS AWARE OF THE POSSIBILITY OF SUCH DAMAGES.

EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, POSITRON DISCLAIMS ANY FURTHER CONDITIONS, REPRESENTATIONS OR WARRANTIES, WHETHER WRITTEN OR ORAL, EXPRESSED OR IMPLIED, INCLUDING THE CONDITIONS AND WARRANTIES OF MERCHANTABILITY, MERCHANTABLE QUALITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, PERFORMANCE AND THOSE ARISING FROM STATUTE, TO THE EXTENT PERMITTED BY LAW. POSITRON DOES NOT WARRANT THAT THE SYSTEM WILL OPERATE WITHOUT INTERRUPTION OR THAT IT WILL BE ERROR FREE.

1.5.2 Cancellation and Rescheduling Charges

Should the customer cancel, prior to shipment, any part of an order, the customer agrees to pay to Positron cancellation charges, not as a penalty, which shall total all expenses, including labor expenses, incurred by Positron prior to said cancellation. Equipment that has been specially developed for the customer's specific applications shall not be subject to cancellation. Cancellation or rescheduling is not permissible after shipment of the System.

Chapter 2

Overview

2.1 Introduction to the Plug-in Power Supply Card (751313MC)

The Plug-in Power Supply Card (751313MC), provides an isolated conversion from 120 Vac / 129 Vdc to -24 Vdc. This module is compatible with our 5 and 8 card shelf that contains a power slot such as the 5-card Shelf, model 751112/xx, or the 8-card Shelf, model 751109/xx. When battery back-up is required, this power supply also provides recharging for the Plug-in Battery Backup Card, model 751312.

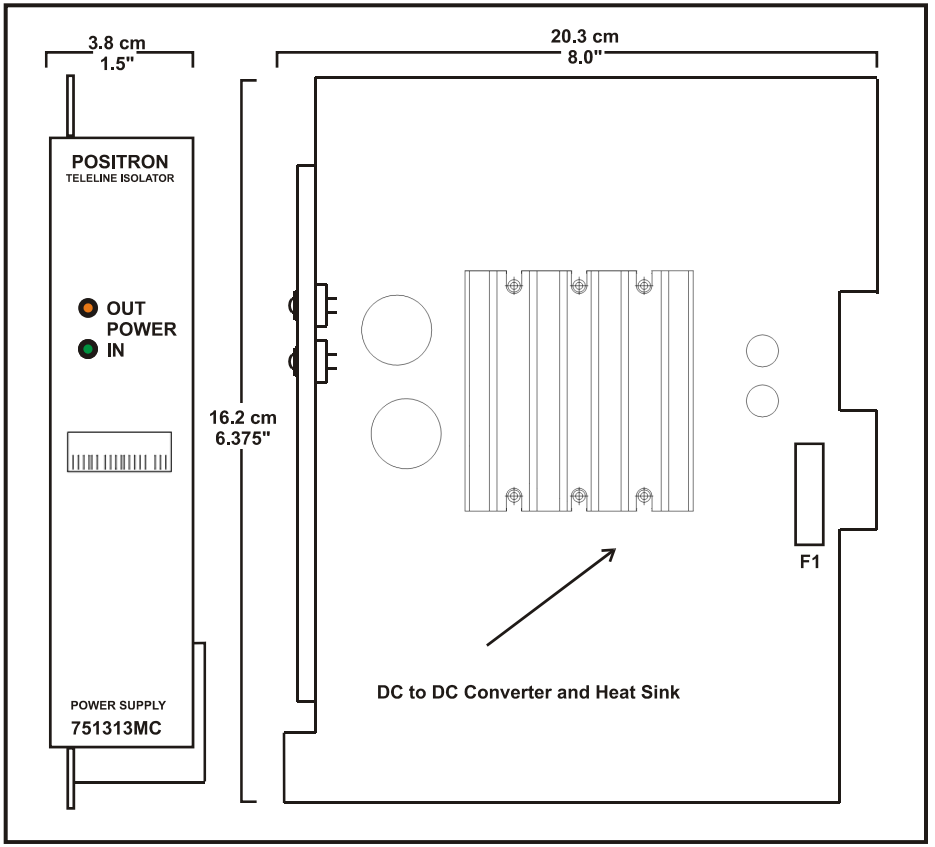
When a Battery Backup Card is not required, two Plug-in Power Supply Cards may be installed in the 5- or 8-card Teleline shelf for redundancy. Each card is capable of providing the power required by a fully loaded shelf. When two cards are available, the load is shared by the two cards. If one of them fails, the other one takes over the full load without interruption of power.

The power supply card provides the following features:

- The card input voltage is 120 Vac or 129 Vdc without jumper setting.
- The card provides 1500 V_{rms} isolation between the supply input and backplane output.
- The card allows for redundancy if two are connected in the shelf. If one card fails, the other takes over the full load.
- The card can be used in conjunction with the Plug-in Battery Backup card, model 751312, to provide an uninterruptible power supply.
- A “Power In” LED and a “Power Out” LED allow easy assessment of power supply functionality.

For a view of the Plug-in Power Supply Card, see Figure 1 on page 15.

Figure 1: Plug-in Power Supply Card (751313MC) Component Layout



2.1.1 Input Characteristics

The Plug-in Power Supply Card can be housed in any two half slot of the 5 and 8 card shelf. This card provides:

- Isolated electrical conversion between the station 120 Vac / 129 Vdc to 27 Vdc. Maximum output capacity of 50 W
- Alarm contacts, indicating the proper operation of the unit
- Over-current and over-voltage protection using fuses, one on each input terminal

NOTE

- Fuses F1 and F2 are not user-replaceable, if damaged, send the unit for repair.

2.1.2 Power Contacts

The Plug-in Power Supply Card can accommodate an input of either 129 Vdc or 120 Vac and provides - 27 Vdc power to the shelf. Polarity markings on the terminal block on the backplane are used when providing an input of 129 Vdc. When providing an input of 120 Vac, the (N) terminal is for the neutral (white wire connection) and (L) input for the live (black wire).

2.1.3 Power Alarm Contacts

The Plug-in Power Supply Card has a power alarm contact available via a terminal block on the backplane and provides a contact closure between the two pins when the -27 Vdc output is not present on the card. This mechanism can be used to provision an audio or visual indication of a fault condition. Two LEDs (see section 2.1.4 on page 16 below) are also provided for local indication of power.

2.1.4 LED Indicators

Two LED indicators, In and Out are provided.

- The In LED glows green when the input power is correct, and will be off if input power is not correct.
- The Out LED glows amber when the output power of the card is at -27 Vdc and will be off if output power is not correct.

Figure 2: Power Card Face Plate View

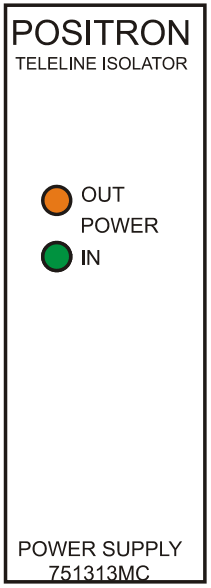


Table 2: Plug-in Power Supply Card (751313MC) LED Status Indications

Power In LED (Green)	Power Out LED (Yellow)	Power Supply Card Status
On	On	Both input and output power are available (normal condition).
On	Off	Input power is present but output power is not available, the converter is not functioning, or the -27 V has been short-circuits by one of the cards in the shelf.
Off	On	Both input and output power are available, but the input voltage is below the acceptable threshold.
Off	Off	Input power is not present, or a Battery Backup Card, model 751312, is powering the shelf (in which case the Power Out LED on the right-hand side of the shelf should be lit).

2.2 Technical Specifications

Table 3: Environmental Specifications

Parameter	Specifications
Operating Temperature @ 50W	-20°C to 50°C (-4°F to 122°F)
Operating Temperature @ 40W	-20°C to 65°C (-4°F to 149°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Altitude	-60 m to 3050 m (-200 ft to 10,000 ft)
Humidity	20 - 80% non-condensing
Height	16.2 cm (6.375”)
Width	3.8 cm (1.5”)
Depth	20.3 cm (8.0”)
Weight	1 kg (2.2 lbs)

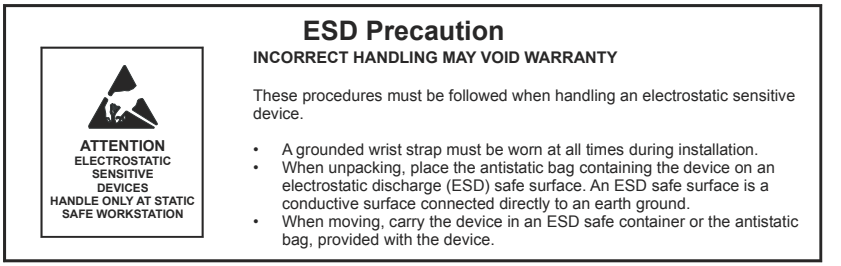
Table 4: Electrical Specifications (measured at 25°C (77°F), 50% R.H.)

Parameter	Specifications
Input AC voltage	85 to 130 V_{rms}
Input AC frequency	60 Hz nominal
Input DC voltage	105 to 150 Vdc
Output DC voltage	-25Vdc to -28V dc
Maximum output current	1.8 A at -27 Vdc
Maximum output power	50 W, derated at 0.6 W/°C (0.3 W/°F) above 50°C (122°F)
Power dissipation	30% of power to load
Output ripple voltage (120 Hz)	Less than 100 mV_{pp}
Switching noise	Less than 200mV_{pp}
Efficiency	75%
Load regulation	Better than 2%
Line regulation	Better than 0.1%
In rush current	18 A maximum for 0.005 msec.
Alarm Contact Rating	2 A @ 30 Vdc, 0.5 A @125 Vac.

Chapter 3

Installation

3.1 Installation



CAUTION

- Hazardous voltages are present on the card during operation. Remove the card with extreme caution.

The Plug-in Power Supply Card (751313MC) plugs into its upper left hand location on the 5- or 8-card Teleline Shelf.

- When using an internal or external power supply as part of a Teleline installation, the power leads feeding the shelf MUST be fed through disconnect devices rated at 3A, 125 Vac
- Grounding of the card is done through the shelf. See the grounding section of the shelf's installation manual for more information.

CAUTION

- Stand on a thick rubber mat and wear rubber gloves during the installation procedures. It is preferable to perform these procedures on a clear dry day when a Ground Potential Rise (GPR) or transients are less likely to occur.
- Manipulate the card exclusively by the faceplate to prevent any damage to the card and to limit the possibility of electric shock.
- When moving the card, carry it in an ESD safe container or the antistatic bag, provided with the card.
- Failure to follow ESD precautions may void the warranty. For further information concerning ESD precautions, contact Positron's Customer Support department.

➤ To install the Plug-in Power Supply Card (751313MC):

1. Unpack the Plug-in Power Supply Card from its protective box and the shielded anti-static bag.
2. Confirm that the unit is a Plug-in Power Supply Card (751313MC) by identifying the name and model number on the faceplate of the card.
3. Install the 5- or 8-card Teleline shelf power cable as per its installation instructions.
4. The card must be inserted right side up and may be plugged into the shelf with the power ON or OFF.
5. Slide the card into its designated shelf slot until the two card-edge connectors lock into the Teleline shelf. For an illustration of its installation location, see Figure 3 on page 22.
6. Choose an installation option for the Power Supply Card. For a list of options, see Table 5 below.
7. If the redundant option is required, repeat step 4 and install a second Power Supply Card.
8. Verify the installation by verifying that the “Power In” and the “Power Out” LEDs of the card, and the “Power Out” LED of the shelf are all lit

Table 5: Plug-in Power Supply Card (751313MC) Installation Options

Option	Station Side Slot Connectors
Single: one Power Supply Card	J9/J10
Redundant: two Power Supply Cards *	J9/J10 (primary card) and J11/J12 (second card)
* Only possible if the Plug-in Battery Backup Card, model 751312, is not used	

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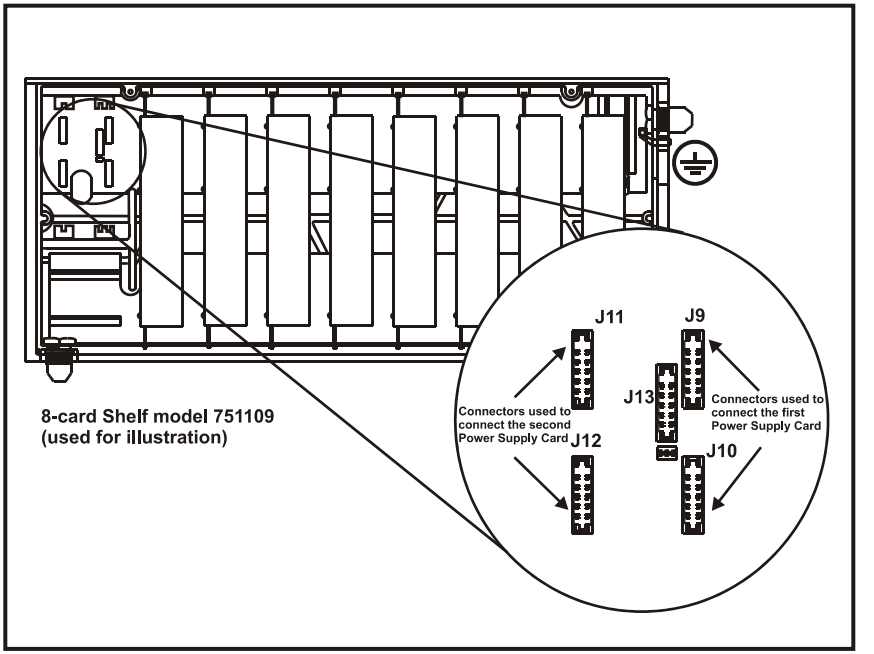
Figure 3: Plug-in Power Supply Card (751313MC) Installation Location



NOTE

- The 5-Card shelf model 751112 has the same connector layout.
- The J13 connector is used to connect the 751312 Battery Backup Card. In this case, the second 751313 cannot be used.

Appendix A

Acronyms

Acronyms

CSA	Canadian Standards Association
CO	Central Office
CT	Center Tap
DTU	Data Terminal Unit
FCC	Federal Communications Commission
GND	Ground
GPR	Ground Potential Rise
HDSL	High bit-rate Digital Subscriber Line
H4TU-C	HDSL4 Terminal Unit - Central Office
HTU-R	HDSL Terminal Unit - Remote Unit
RMA	Returned Material Authorization
RMT	Remote
RTU	Remote Termination Unit
RX	Receive
TX	Transmit
UL	Underwriter's Laboratories