Teleline™

3-card Shelf model 751127
Description and Installation Guide

925W751006-09E

POSITRON

Positron Inc.

Contents

Chapter 1

General Information

1.1 Publication Information

3-card Shelf model 751127
Description and Installation Guide
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1.2 About this Guide

This guide introduces you to the Teleline 3-card shelf model 751127.

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 Service and Support

1.3.1 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

1.3.2 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.

1.3.3 Customer Training

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

1.3.4 Product Safety

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

1.3.5 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.

1.4 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.

1.4.1 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.

1.4.2 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

The 3-card Shelf, model 751127, is used indoors to accommodate 3 service cards. The shelf is molded from specially treated polyurethane, making it a lightweight, flame-retardant product of high dielectric strength. Its polyurethane body limits the possibility of many kinds of infiltration while providing reliable isolation from external ground potentials.

Power for the 3-card Shelf model 751127 is provided via an external power supply.

The features of the 3-card Shelf model 751127 include the following:

- The shelf maintains high voltage isolation between the Central Office (CO) and the Station side terminals by an isolation gap.
- Additional power inputs such as -24 Vdc, -48 Vdc or -130 Vdc can be fed to the shelf via designated pairs in the Station cable.
- The Station connector is located at the upper right-hand side of the shelf while the CO connector is located at the bottom right-hand side of the shelf. Both the Station and CO cables connect to the shelf via the back plane PCB.
- The material from which the shelf has been manufactured, has been successfully tested for the U.L. standard (94V0) for flame retardance.
- The unit is lightweight and easy to install. The weight of the shelf with the motherboard is 6.8 kg (15 lbs).
- The enclosure resists the infiltration of dust, mist, and water from sprinklers.
- Each of the three card slots can accommodate two Tip and Ring pairs for four-wire AC data applications, four-wire T1 applications, HDSL, ADSL or two POTS lines.
- The backplane of the shelf provides increased crosstalk immunity, better impedance-matching for high-speed circuits (135Ω) and better current-carrying capacity for CSA/CAN 60950-1.

Figure 1: 3-card Shelf model 751127 Dimensions

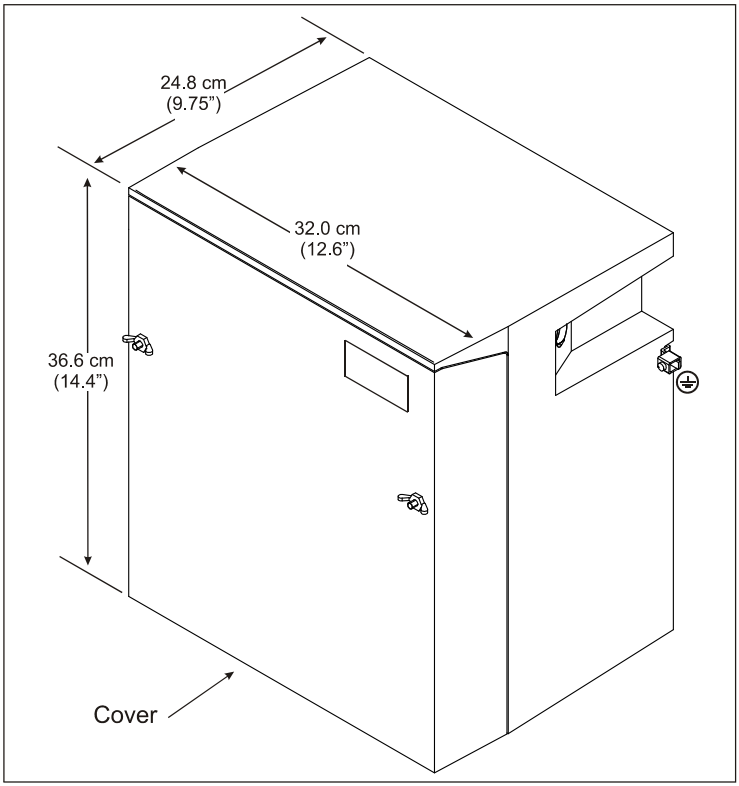
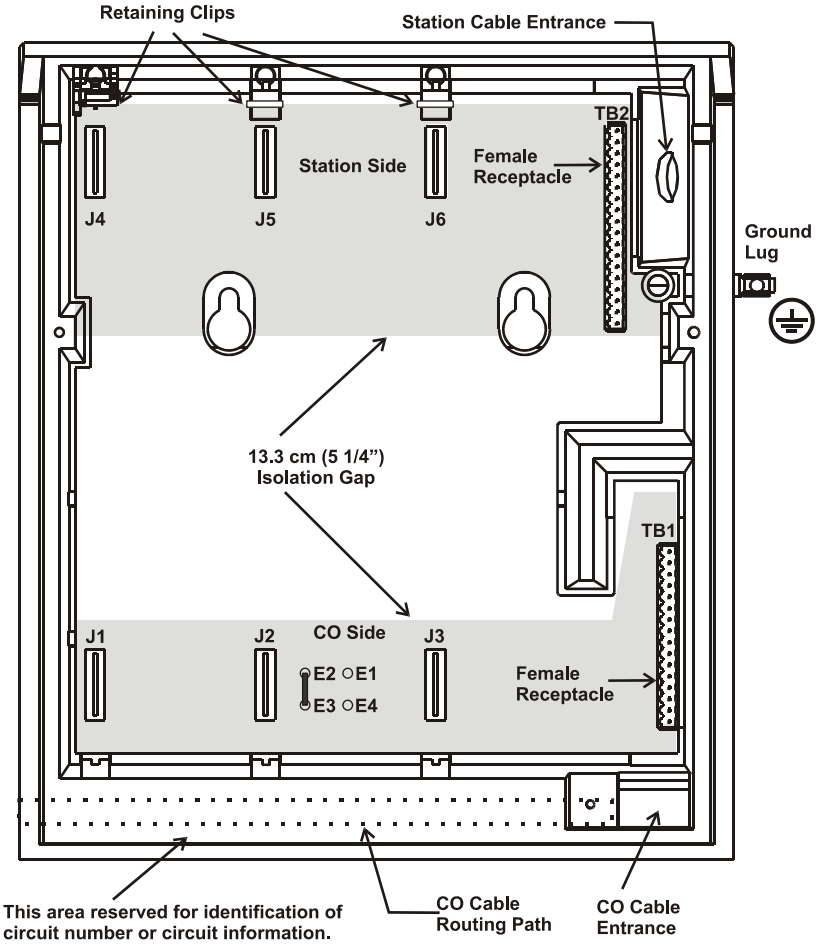


Table 1: 3-card Shelf model 751127 Physical Specifications

Parameter	Specifications
Height	36.6 cm (14.4")
Width	32.0 cm (12.6")
Depth	24.8 cm (9.75")
Weight	6.8 kg (15 lbs)

Figure 2: 3-card Shelf model 751127, Cover Open



2.2 Temperature Consideration

The 3-card Shelf enclosure is made of an insulating material, which under normal operating conditions (i.e., shelf closed) results in a higher temperature internally than externally (room temperature). Therefore, special care must be taken to ensure that the internal temperature never exceeds the operating temperature of each card. This section provides a step-by-step procedure for the calculation of the temperature inside the shelf. An example follows the outline of the procedure.

For a list of the thermal specifications for all Teleline cards designed for use with the 3-card Shelf model 751127, at the time of writing, refer to the table below:

Table 2: Thermal Specifications for Teleline Plug-in Cards

Model	Power Consumption	Power Dissipation	Operating Temperature Range	
7501-16B	8.4 W from -24 Vdc	8.5 W	0° to 50° C	32° to 122°F
7501-16C	6 W from -48 Vdc	6 W	0° to 50° C	32° to 122°F
7501-24	N/A	N/A	-20° to 65° C	-4° to 149°F
7501-72	N/A	< 200 mW if loop current is < 80 mA	-20° to 65° C	-4° to 149°F
	N/A	< 5 W if loop current is > 80 mA	-20° to 65° C	-4° to 149°F
751312	270 mA (charging)	N/A	0° to 50° C	32° to 122°F
751313MC	N/A	25% of output power	-20° to 65° C	-4° to 149°F
751318MC	N/A	25% of output power	-20° to 65° C	-4° to 149°F
751316	N/A	25% of output power	-20° to 65° C	-4° to 149°F
751323	1.7 W avg at -24 Vdc	1 W at (-24 Vdc)	-20° to 65° C	-4° to 149°F
	2.4 W avg at -48 Vdc	2 W at (-48 Vdc)	-20° to 65° C	-4° to 149°F
751322	1.8 W avg at -24 Vdc	1 W at (-24 Vdc)	-20° to 65° C	-4° to 149°F
	2.4 W avg at -48 Vdc	2 W at (-48 Vdc)	-20° to 65° C	-4° to 149°F
751322 &	2.6 W at -24 Vdc	2 W at (-24 Vdc)	-20° to 65° C	-4° to 149°F
751322/1	3.6 W at -48 Vdc	3.5 W at (-48 Vdc)	-20° to 65° C	-4° to 149°F
751325	1.8 W at -24 Vdc	1 W (-24 Vdc)	-20° to 65° C	-4° to 149°F
	2.4 W at -48 Vdc	2 W (-48 Vdc)	-20° to 65° C	-4° to 149°F
751322/2	2.6 W at -24 Vdc	2 W at (-24 Vdc)	-20° to 65° C	-4° to 149°F
	3.6 W at -48 Vdc	3.5 W at (-48 Vdc)	-20° to 65° C	-4° to 149°F
751329R2	N/A	0.75W	-20° to 65° C	-4° to 149°F
751329SP	3 W at -48 Vdc	2.5W	-20° to 65° C	-4° to 149°F
751333A	10.6 W at -24 Vdc	3 W (-24 Vdc)	-20° to 65° C	-4° to 149°F
	11 W at -48 Vdc	3.5 W (-48 Vdc)	-20° to 65° C	-4° to 149°F
751339R2	N/A	4W	-20° to 65° C	-4° to 149°F
751339SP	10 W at -48 Vdc	5W	-20° to 65° C	-4° to 149°F
751340R2	N/A	2W	-20° to 65° C	-4° to 149°F
751340SP	7 W at -48 Vdc	3W	-20° to 65° C	-4° to 149°F

➤ **To calculate the temperature inside the shelf:**

1. Complete the following worksheet by filling the Card model No, power dissipation and consumption found in the previous table.

Table 3: Temperature Calculation Worksheet

Slot No.	Card Model No.	Power Dissipation	Max. Operating Temp.
1			
2			
3			
		Total power dissipation =	Highest allowable temperature =
Temperature inside the shelf = (Total Power Dissipation x Shelf Thermal Resistance) + Max Room Temp.			

2. Add the power dissipation of all cards. This value represents the “Total power dissipation.”
3. The Maximum Operating Temperature of a card represents the highest temperature at which a card is guaranteed to operate within specifications. At the bottom of the maximum operating temperature column, enter the lowest of the maximum operating temperatures. This temperature is referred to as the “Highest allowable temperature.”
4. Evaluate your application’s maximum room temperature “**Max Room Temp.**”
5. The temperature inside the shelf is calculated using the following equation:

   Temperature inside the shelf = (**Total Power Dissipation x Shelf Thermal Resistance) + Max. Room Temp.**, where the “Shelf Thermal Resistance” of this 3-card Shelf model 751127 is 0.55°C/W (1°F/W).
6. Compare the calculated “Temperature inside the shelf” with the “Highest Allowable Temperature”. The “Temperature inside the shelf” should not exceed the “Highest allowable temperature.”

If the calculated temperature is higher than the “Highest allowable temperature,” the following can be done:

- Reduce the number of cards in the shelf by distributing the cards among other available shelves.
- Lower the temperature of the room where the equipment is installed, by adding ventilation or air conditioning.
- Move the cards between shelves to replace a card that dissipates heat with one that does not dissipate.

2.2.1 Temperature Calculation Example

Below is an example of a 3-card Shelf model 751127, fully populated with three different cards. The equipment would be installed in a telecom room that has no air conditioning but has some ventilation. For the purpose of this example, the “Max Room Temp.” is chosen as 37.8° C (100°F).
In this example, the resulting temperature 43.9°C (111°F) is lower than the Highest allowable temperature 50°C (122°F) and is correct.

Table 4: Temperature Calculation Example

Slot No.	Card Model No.	Power Dissipation	Max. Operating Temp.
1	751333A	3W	65°C (149°F)
2	751339R2	2W	65°C (149°F)
3	7501-16C	6W	50°C (122°F)
		Total power dissipation = 11W	Highest allowable temperature =50°C (122°F)
Temperature inside the shelf =(total power dissipation x shelf thermal resistance) + room temp.			
Max Room Temp.		= 37.8°C	= 100°F
Temperature inside the shelf		= (11W x.55°C/W) + 37.8°C = 43.9°C	= (11W x 1°F/W) + 100°F = 111°F

2.3 Temperature Calculation Worksheet

This sheet should be detached and photocopied since it must be filled-in when first installing the shelf, and for every reconfiguration thereafter. Attach the completed sheet to the shelf for future reference.

Table 5: 3-card Shelf model 751127 Temperature Calculation Worksheet

Slot No.	Card Model No.	Power Dissipation	Max. Operating Temp.
1			
2			
3			
		Total power dissipation =	Highest allowable temperature =
Temperature inside the shelf =(Total Power Dissipation x Self Thermal Resistance) + Max. Room Temp.			

The temperature inside the shelf must be lower than the “Highest Allowable Temperature.”

Shelf Thermal Resistance = 0.55°C/W (1°F/W)

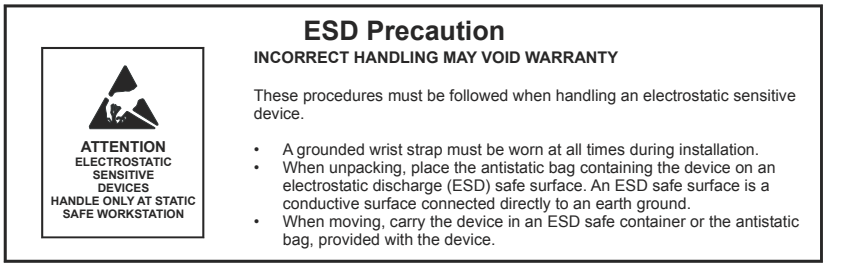
Chapter 3

Installation

3.1 Installation

Installations should conform to local practices and IEEE Std 487-2000 - IEEE Recommended Practice for the Protection of Wire-Line Communication Facilities Serving Electric Supply Locations.

The equipment must be installed in a restricted or secure area to prevent tampering.



3.2 Shelf Mounting

The 3-card Shelf model 751127 should be installed as close as possible to the point of entry of the CO cable. Power, when required, will need to be routed to the shelf via the Station cable (-24, -48 or -130 Vdc).

NOTE

- To increase system reliability and availability, a Non-Fragmenting Lightning Arrestor Unit (model 751126/1) is highly recommended.

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.
- It is strictly forbidden to install any additional hardware inside the shelf or to drill any holes in its surface. Doing so would greatly compromise safety and isolation, and would void the warranty.

➤ **To install the 3-card Shelf:**

1. Verify that you have the following customer-provided tools and hardware required to install the shelf:
   - Center punch
   - Electric drill with a 5/32” diameter bit
   - 7/16” hex wrench
   - 3/8” socket wrench
   - Phillips screwdriver
   - 2.5 cm (1”) thick plywood backboard and appropriate mounting hardware
   - Cable clamps and mounting hardware for routing cables exterior to the shelf (quantity determined by the cable lengths)
2. Unpack the 3-card Shelf model 751127 and its hardware from its protective box.
3. Verify the contents of the 3-card Shelf model 751127 kit. For a listing of the items included in the kit, refer to the table below:

Table 6: 3-card Shelf model 751127 Kit Contents

Items included	Qty	Orderable Part Number
3-card Shelf	1	244-040056-401
Description and Installation document	1	925W751006 (this document)
CO PIC cable (10’)	1	207-751229-401
Station cable (10’)	1	207-751230-401
3-card Shelf model 751127 accessory kit:	1	241-010186-401
#14 screw with washer	2	724-990000-026
Strain relief (0.5")	1	230-990400-038
Instruction sheet for the strain relief	1	924-010287-001
Nylon nut (1/2-14NDT)	1	714-990000-005
Cable clamp (9/16” D)	1	702-020001-008
#10 self-tap screw	1	724-990000-131
10-32 Phillips screw	1	724-990000-130
#10 Lock washer	1	738-990010-055
Jumper (0.3")	1	230-990400-188
Wing nut (10-32 THD)	2	714-990000-040
Holder, retainer	2	598-040001-001
Drilling Template	1	220-000297-201R1

4. To mount the shelf, install the 2.5 cm (1”) plywood backboard on the wall to provide the installation with additional isolation from the Station ground.
5. Place the drilling template in position on the backboard and mark the two holes for #14 screws using the center punch.
6. Using the 5/32 drill bit, drill a hole at the center punch mark and install a #14 screw in each hole. Do not tighten.
7. Mount the shelf using the keyholes at the rear of the shelf, and then tighten the #14 screws.

3.3 Ground Connections

➤ **To connect the ground of the 3-card Shelf:**

1. Ground the shelf by connecting the Station ground lug to Station ground using a #6 AWG wire.

CAUTION

- The equipment ground must be connected before any other connection is made to the shelf.
- Connect the Station ground lug to the Station ground using a green with yellow stripes #6 AWG wire.

NOTE

- All shelves must be permanently connected to earth.
- The ground wire must be of gauge AWG #6, color green with a yellow stripe.
- Installations must conform to local electrical code.

For an illustration of the shelf ground lug, refer to Figure 3 on page 28.

CAUTION

- HIGH LEAKAGE CURRENT: Earth connection is essential before making telecommunication network connections.

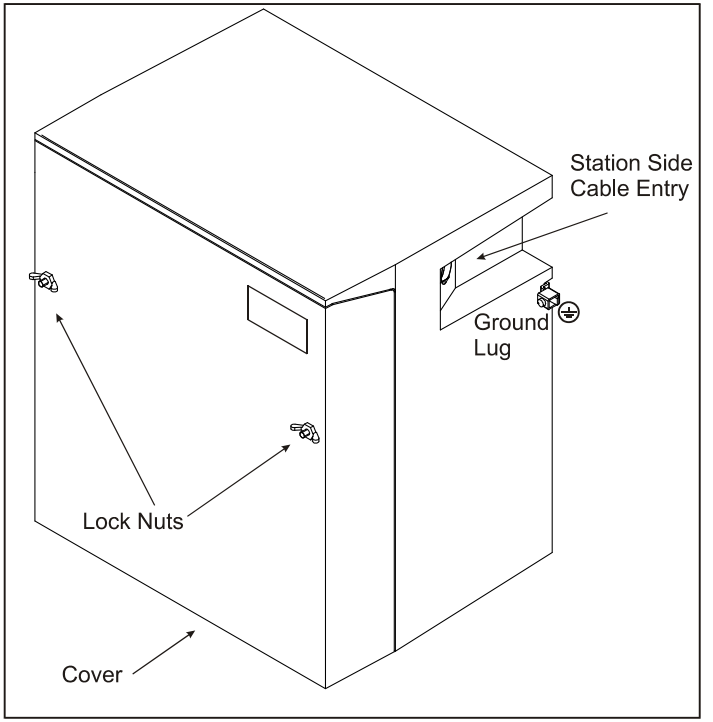
To ensure the safety of personnel, Positron recommends following these guidelines:

- If the return of the DC supply is grounded, it must be grounded at the source.
- The field wiring should include a readily-accessible disconnect device. The disconnect device shall disconnect both poles of the power input.
- When the DC supply system is grounded, this equipment is connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.

CAUTION

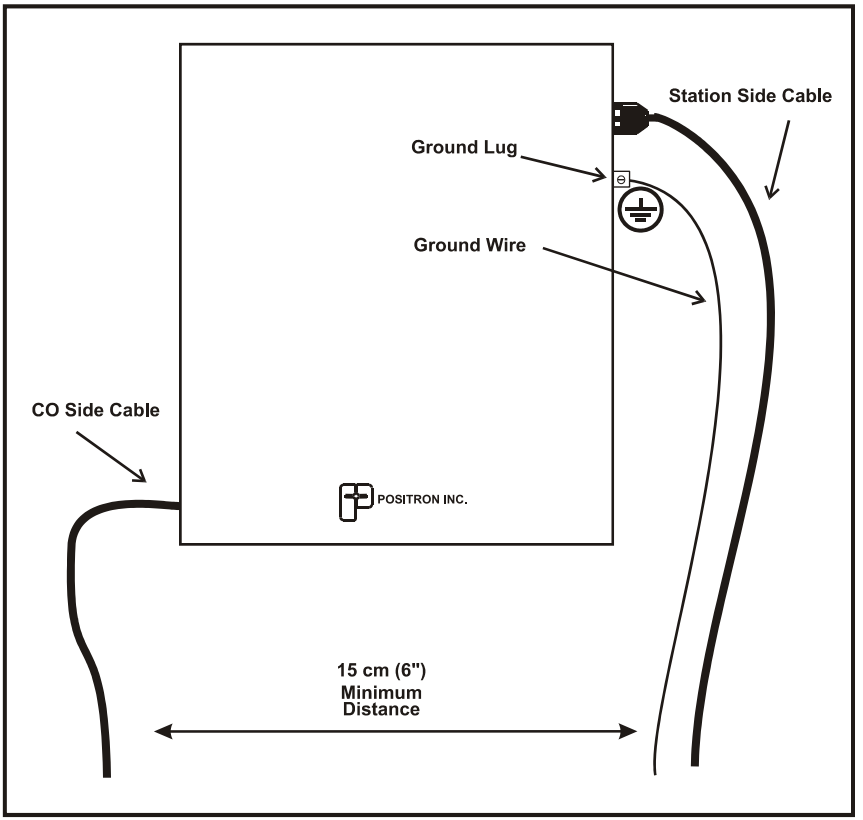
- This equipment must be located in the same immediate area as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.
- The DC supply source must be located within the same premises as this equipment.
- There shall be no switching or disconnecting devices in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

Figure 3: 3-card Shelf model 751127 Ground Connection



3.4 Cable Connections

Figure 4: Teleline Shelf CO and Station Cable Separation



CAUTION

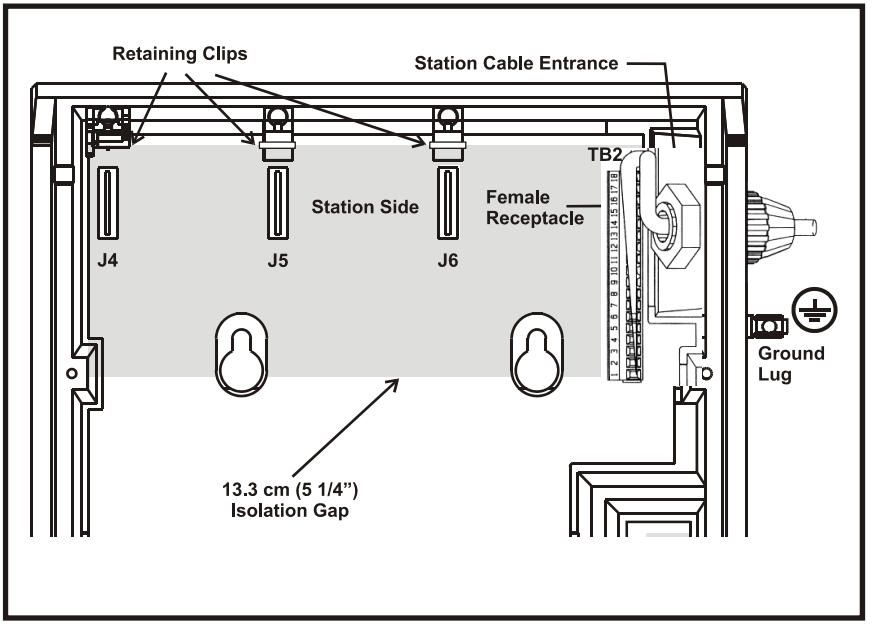
The CO cable should be kept at least 15.2 cm (6”) apart from the Station cable and the ground wire in order to prevent an electric fault between the two in the event of a GPR.

3.4.1 Station Side Cable Connections

➤ **To connect the Station Side Cable**

1. Plug the male connector of the Station cable into the female receptacle of TB2 as illustrated in Figure 5 below.

Figure 5: Station Side Cable Routing



2. Pass the stub end of the cable through the nut, and then through the opening of the shelf.
3. Take the remainder of the strain relief components, and slide them onto the cable.
4. Secure the cable by holding the nut inside the shelf and tightening the grip by turning the gland nut on the outside of the shelf.
5. Cross-connect the Station cable using the appropriate color codes, refer to Table 8 below.

Table 7: Pin-Out for Station Cable

Description	Wire Color	Connector Pin	Slot
Tip 1 Ring 1	White/Blue Blue/White	TB2-17 TB2-1	1
Tip A Ring A	White/Orange Orange/White	TB2-18 TB2-2	1
Tip 2 Ring 2	White/Green Green/White	TB2-15 TB2-3	2
Tip B Ring B	White/Brown Brown/White	TB2-16 TB2-4	2
Tip 3 Ring 3	White/Slate Slate/White	TB2-13 TB2-5	3
Tip C Ring C	Red/Blue Blue/Red	TB2-14 TB2-6	3
Ground Ground	Red/Orange Orange/Red	TB2-9 TB2-9	None None
N/A N/A	Red/Green Green/Red	Unused Unused	None None
-24 Vdc -24 Vdc	Red/Brown Brown/Red	TB2-11 TB2-11	None None
N/A N/A	Red/Slate Slate/Red	Unused Unused	None None
-48 Vdc (-130 Vdc) -48 Vdc (-130 Vdc)	Black/Blue Blue/Black	TB2-8 TB2-8	None None
AUX PWR (0 Vdc) AUX PWR (0 Vdc)	Black/Orange Orange/Black	TB2-10 TB2-10	None None

NOTE The 3-card Shelf model 751127 does not allow the connection of 48 Vdc (floating or grounded) and 130 Vdc at the same time. You can only feed one or the other.

3.4.2 CO Side Cable Connections

CAUTION

The Station and CO cables should be kept at least 15.2 cm (6") apart upon wiring in order to prevent an electric arc between the two in the event of damage to, or degradation of, their insulation.

➤ **To connect the CO side PIC cable:**

1. Route the PIC cable and secure it to the shelf as illustrated in below.
2. Plug the male connector of the PIC cable into the female receptacle of TB1.

Figure 6: CO Side Cable Routing

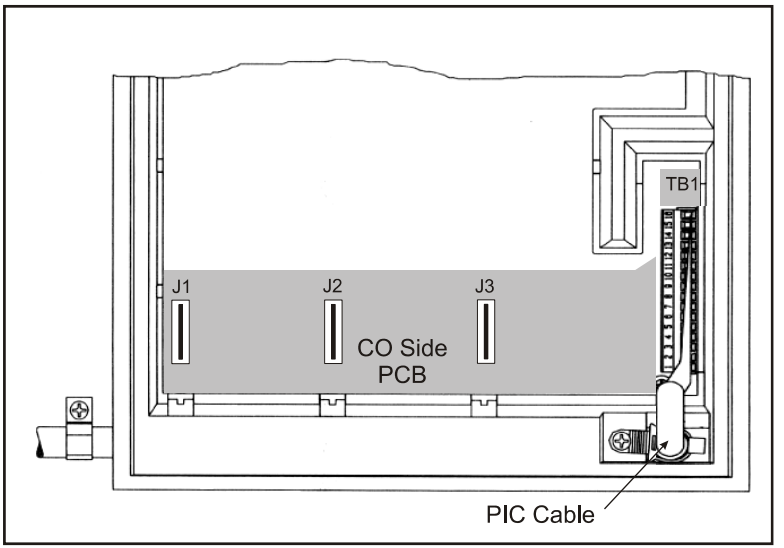
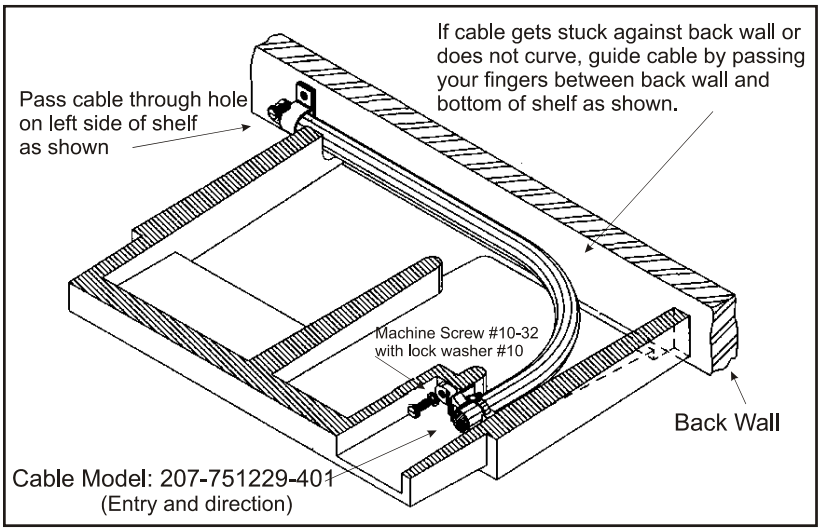


Figure 7: CO Side Cable Routing (Shelf Section View)



3. Cross-connect the PIC cable to the CO cable provided by the telephone company using the appropriate color codes.

DANGER

- The sheath of the CO cable **must not** be connected to the Station ground. The wires themselves should be tightly bundled together to minimize the chance of a wire extending into the isolation gap.
- The CO cable should be routed inside a PCV conduit for protection against hazardous voltage.
- The CO cable should have a 15.2 cm (6") clearance from any conductive material.
- The PIC stub must be spliced to the incoming CO cable using a high-dielectric splice case. All interconnections should be completely isolated from anything that is, or could eventually become, referenced to the Station ground.
- To increase system reliability and availability, it is highly recommended to install a lightening arrestor on CO cable (model 751126/1) if the GPR can attain more than 15 kV.

Table 8: Pin-Out for CO Cable

Description	Wire Color	Connector Pin	Slot
Tip 1 Ring 1	White Blue	TB1-2 TB1-16	1
Tip A Ring A	White Orange	TB1-1 TB1-15	1
Tip 2 Ring 2	White Green	TB1-4 TB1-14	2
Tip B Ring B	White Brown	TB1-3 TB1-13	2
Tip 3 Ring 3	White Slate	TB1-6 TB1-12	3
Tip C Ring C	Red Blue	TB1-5 TB1-11	3
N/A N/A	Red Orange	Unused Unused	None None
N/A N/A	Red Green	Unused Unused	None None
N/A N/A	Red Brown	Unused Unused	None None
N/A N/A	Red Slate	Unused Unused	None None
Remote Ground Remote Ground	Black Blue	TB1-8 TB1-9	All

3.5 Power Connections to the Station Cable

CAUTION

- External power sources must be fed through disconnect devices rated according to the voltage and current. Both the line and the return leads must have disconnect devices.
- Make sure the external power supplies are UL/CSA certified before connecting it to the shelf.

For a list of the possible power connections applicable to the 3-card Shelf, refer to the table below:

Table 9: Power Connections

External Supply		Connector Pin	Wire Color
-24 Vdc	Ground	TB2-9 TB2-9	Red/Orange Orange/Red
	-24 Vdc	TB2-11 TB2-11	Brown/Red Red/Brown
Grounded -48 Vdc	Ground	TB2-9 TB2-9	Red/Orange Orange/Red
	-48 Vdc	TB2-8 TB2-8	Black/Blue Blue/Black
Floating 130 Vdc (Station batteries)	0 V	TB2-10 TB2-10	Black/Orange Orange/Black
	-130 Vdc	TB2-8 TB2-8	Black/Blue Blue/Black

3.6 Card Insertion

Once the temperature of the shelf has been calculated, the desired cards can be inserted, and the cover replaced with the supplied nuts. For information relevant to any of the cards, refer to their respective documentation.

CAUTION

- No equipment other than Positron can be used in a Teleline shelf, otherwise this will compromise isolation, compromise safety and void the warranty.

➤ **To insert cards into the shelf:**

1. Push up on the yellow retaining clip slightly with one hand
2. Insert the cards with the other hand.
3. Close and secure the cover by fastening the wing nuts.

NOTE

- The yellow retaining clips prevent the dislodging of cards due to vibration when the shelf is mounted near mechanical equipment
- Two spare yellow retaining clips have been included with the installation kit to be used in the event that a clip becomes unusable.

DANGER

- The cover must be kept closed and secured at all times in order to protect personnel from potentially hazardous voltages, and to prevent damage to the cover.
- To prevent minor injury to your fingers when removing a card from the shelf, use your right hand only. Push up on the yellow retaining clip with your right thumb and then pull the card out.

Appendix A

Acronyms

Acronyms

ADSL	Asymmetric Digital Subscriber Line
AUX	Auxiliary
AWG	American Wire Gauge
CCC	Color Coding Convention
CO	Central Office
CSA	Canadian Standards Association
CT	Center Tap
DTU	Data Terminal Unit
ESD	Electrostatic Discharge
FCC	Federal Communications Commission
GND	Ground
GPR	Ground Potential Rise
IEEE	Institute of Electrical and Electronics Engineers
H4TU-C	HDSL4 Terminal Unit - Central Office
HDSL	High speed Digital Subscriber Line
HTU-R	HDSL Terminal Unit - Remote unit
HVI	High Voltage Interface
MD	Manufacture Discontinued
PCB	Printed Circuit Board
PIC	Polyethylene Insulated Cable

PWR	Power
RTU	Remote Termination Unit
RMT	Remote
RX	Receive
TX	Transmit
UL	Underwriters Laboratory