

Installation and Operations Manual

PoweRack 300e



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19-0059-000 REV A

TABLE OF CONTENTS

Table of Contents	1
Table of Illustrations	1
Safety Information	2
Description	2
Technical Specifications	3
Installation Instructions.....	4
Startup and Checkout.....	6
Theory of Operation.....	8
Remote Alarm Contacts	11
Repair and Maintenance	13
Troubleshooting	14

TABLE OF ILLUSTRATIONS

PoweRack300e Right SideView	Figure 1.....	7
Functional Block Diagram	Figure 2.....	8
Alarm Contact Location.....	Figure 3.....	12
U Connections and S/T Connections	Appendix A	16,17
PoweRack300e-24	Illustration A	18
PoweRack300e-48	Illustration B.....	19
PoweRack300e-72	Illustration C.....	20
PoweRack300e-96	Illustration D	21

SAFETY INFORMATION

Always insure that the person assigned to the job can perform the job safely.

Always lift all equipment properly.

Always disconnect commercial power and remove the battery fuse before working on the unit.

Always replace the batteries with batteries of the same type and style.

DO NOT work on this equipment during an electrical storm.

DO NOT work in locations where there is condensing moisture or standing water.

DESCRIPTION

The PoweRack300e is an integrated unit designed to provide high density ISDN CPE, power and NT1 racking. The unit comes equipped with a rectifier providing 250 watts of power. The PR300 is designed for use with B300 NT1 circuit packs. There is capacity for quantities of 12 to 48 NT1B-300's, which provide power, and signal for 24 to 96 multipoint phones. Each B-300 is a PC card NT1 with single "U" input.

Input connections for the "U" Interface are made via a 25 pair Amphenol connector on the left side of the unit. The output connections, "S/T", are provided via 25 pair Amphenol connectors and a quantity of 24 RJ-45 connectors. These connectors are located just to the right of the NT1 cage.

On the right side of the power unit is an 8-pin connector that provides DC power to the NT1 cages. DC power is daisy-chained from one NT1 cage to the next.

TECHNICAL SPECIFICATIONS

Electrical Input

Voltage	120+10/-15% VAC (240 VAC factory option)
Frequency	50/60Hz

Electrical Output

Voltage	42-56 VDC
Current	4.5 Amps

Dimensions W x D x H (In.),		Weight
PR300e-24	19.00 x 5.8 x 12.3	20lb
PR300e-48	19.00 x 5.8 x 17.5	28lb
PR300e-72	19.00 x 5.8 x 30.0	52lb
PR300e-96	19.00 x 5.8 x 35.0	56lb

Environmental

Temperature	-20° C to +40° C
Humidity	0- 95% non-condensing
Thermal:	BTU/Hr
PR300e-24	150
PR300e-48	190
PR300e-72	230
PR300e-96	270

INSTALLATION INSTRUCTIONS

GENERAL

The installation section of this manual will provide the necessary information for room requirements, proper inspection and installation, as well as instructions on checking and bringing the PoweRack300e on line for use.

Unpacking and Inspection

This equipment has been fully tested and inspected prior to shipment. Although it has been packed in accordance with good commercial practices, this does not preclude damage in transit.

The following actions should be taken on receipt of the equipment:

- Visually inspect the shipping container for damage. If damaged, request that the carrier inspect the equipment.
- Unpack the shipping container and remove the unit from the packaging.
- Inspect the unit for visible damage.

If a claim for damages is to be made it should be filed promptly with the transportation company. In addition notify SEI Corporation within two days of delivery. SEI Corporation will advise the customer of any further procedures that may be required including an RMA number in the event that the unit has to be returned to the factory for repair.

Make sure that the following items are included inside the package:

- One PoweRack300e unit.
- One AC power cord.
- One to four power interconnection cables (depending on system configuration.)
- One warranty card.
- One Equipment Manual.
- Mounting Instructions.

Electrical Power Requirements

PR300e

- All units are shipped from the factory for use with 120 VAC. In the event that operations at 240 VAC is required please notify the factory.
- Each unit requires a separate NEMA 5-15R receptacle with a maximum of six units per 20 amp service.
- A standard 7 foot 6 inch power cord with a molded NEMA 5-15 plug is supplied with each unit.

Room Requirements

A clean dry room environment should be picked for the installation of the PoweRack300e. The PoweRack300e-96 will produce 318 Btu's of heat when fully loaded and running at maximum capacity. Lesser power configurations (PoweRack300e-24) will produce as little as 132 Btu's of heat when fully loaded.

Mounting Instructions

- When mounting the PoweRack300e keep in mind the weight range of the unit is between 15lb and 48lb depending on the model.
- The PoweRack300e is designed to mount to a rack or wall without further requirements for additional mounting kits. For wall mounting a user supplied 3/4 inch plywood backboard or equivalent is required. The PoweRack300e should be fastened to the backboard using number ten wood screws for each unit. A number 27 drill should be used to provide a pilot hole for the screws. All of the screws should be tightened with a torque of 30in pounds minimum and 34 in pounds maximum.
- Whether the unit is to be rack or wall mounted it should be mounted vertically in a clean dry area where the ambient temperature does not exceed 40°C (104° F)
- It is important that ventilation for the unit be provided. Leave adequate space above and below the unit so that unrestricted airflow is allowed to the unit. It is suggested that 5 inches of space be allocated around the top of the unit.
- The PoweRack300e is supplied with mounting angles suitable for 19" standard, racks or wall mounting. Optional 23" angles for wider racks are available.
- The mounting slots on each rack adapter are spaced in conformance with EIA standard RS-310-B.

Installing the NT1B-300

The caging below each power unit holds between 12 NT1B-300's (minimum configuration) and 48 NT1B-300's (maximum configuration.) In either case the NT1's are installed by inserting each NT1 into the number of positions desired.

START UP AND CHECKOUT

General

When the unit is shipped from the factory the PoweRack300e is configured for 115 VAC operation. If operation at 230 VAC is required, please notify the factory.

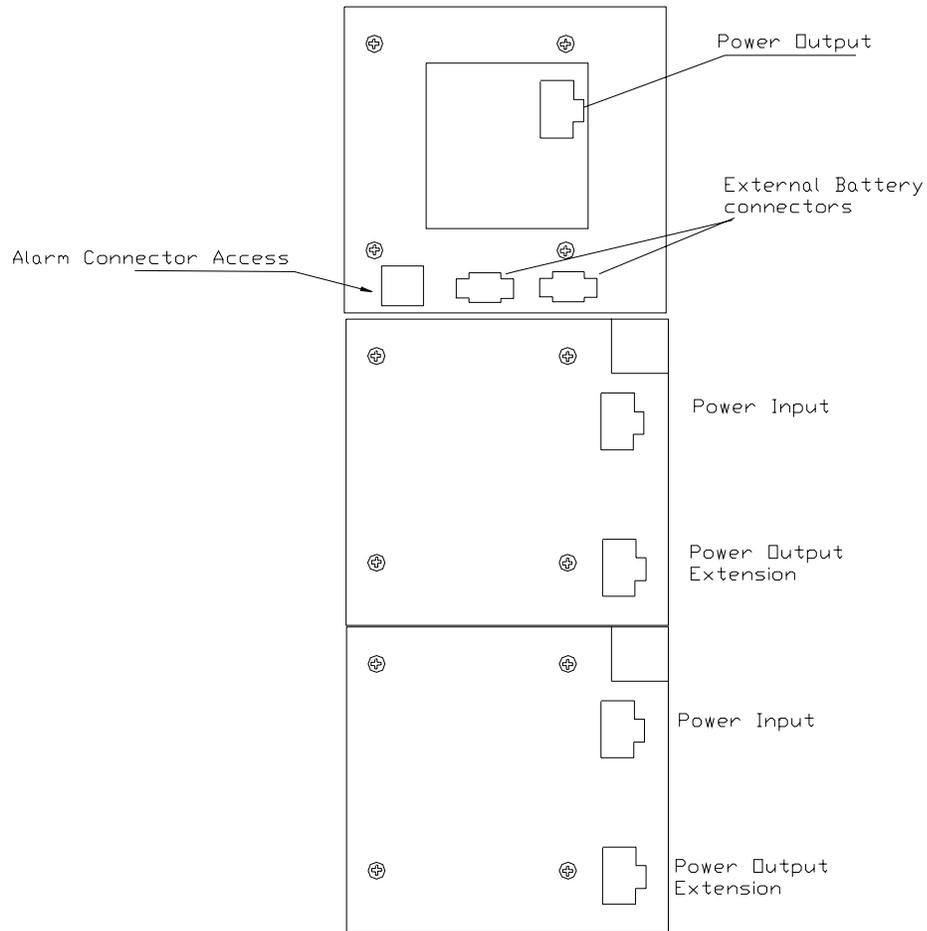
Power Checkout

- Check out the following before plugging in the unit. Make sure that the unit(s) are being plugged into their own circuits. Make sure that there are no other loads on these circuits.
- Measure the utility voltage at the service outlet. The voltage should be between 102 to 132 volts.

Power Up Procedure

- Once the unit is mounted, attach the “U” 25 pair connector on the left side of the unit. It is suggested that telco connectors, 25 pair, male cables be used with the termination end readied for punch down connection.
- The “U” 25 pair input connector provides the signal to the NT1’s. Each 25 pair input distributes the signal to 12 NT1’s.
- The NT1B-300 "S/T output connectors" are located to the right of the card cage. You may use either the 25 pair connectors or the RJ45 modular connectors.
- Install the first NT1 in its appropriate slot, making sure that the pin connections are made at the rear of the unit.
- Connect the power cord to the unit. You should have a flashing green led indication for the Battery Charge Status led, and a solid green Battery Test Status led on the front of the unit. If any problems arise, consult the troubleshooting guide in the installation manual.
- If the unit has more than one cage, connect the remaining “U” input cable(s).
- Connect the remaining NT1B-300's and “S/T output cable(s)" to the terminal(s).
- Wait about 2 minutes from initial power on before performing the following check.

- Disconnect the AC power cord from the unit. The green Battery Charge Status indicator should turn red. This indicates loss of AC power and the system is on battery.
- If all of the above checks are completed and if the results obtained are satisfactory, the system is ready to be connected to operational loads.



**PowerRack300e Right Side View
Figure 1**

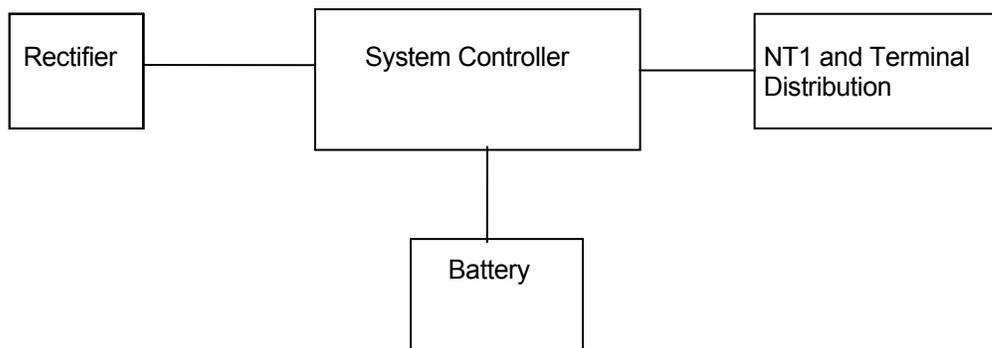
THEORY OF OPERATION

Theory of Operation

The following will provide you with an outline of operations of the system.

The following is a list of the modules found in the PoweRack300e:

- Rectifier
- System Controller Card
- Battery Modules
- Backplane and Distribution
- NT1 Card Cage
- Distribution and Connectors



Functional Block Diagram PR300e

Figure 2

Rectifier

The PoweRack 300e rectifier provides up to 250 watts of power for the NT1s and terminals. AC Power is applied to the unit on the left side. Power is input through the chassis IEC connector. From there it is taken to the input of the rectifiers. A fuse located at the left side of each rectifier protects their input. The output of the rectifier is located on the right side of the unit and is distributed to the racking below through an 8-pin power cable.

System Controller

The System Controller has the following functions:

- Distribution of the DC power
- Local and Remote Alarms
- Low Voltage Disconnect Function
- Automatic and manual battery test
- Battery charge and test status indicators

DC Power Distribution

The System Controller, which is mounted inside of the upper power unit, takes power from the rectifier and distributes it to the battery modules, distribution board, and racking.

Local Alarms And LED Indicators

There are two led indicators front of the unit; Battery Charge Status and Battery Test Status. The functions of these indicators are as follows:

Battery Charge Status: Constant Green – Fully Charged Flashing Green – Charging Constant Red – On Battery Fast Flash Red- Adjust supply	Manual Battery Test Switch –Push to Test
Battery Test Status: Constant Green – Battery Good Fast Flash Red – Wait, Then Test Slow Flash Red – Replace Battery	<i>NOTE:</i> The Manual Battery Test switch is disabled when the battery is charging. Also, to prevent unnecessary battery discharge, the Manual Battery Test is disabled for 5 minutes following a Battery Test. In both cases, the <i>Wait, Then Test</i> indication is displayed.

Low Voltage Disconnect Function

The low voltage disconnect function will disconnect the battery when the voltage drops below a preset limit (42.0V). This is done to prevent deep discharge of the batteries which can adversely affect battery life. Both internal and external batteries are disconnected.

Backplane Distribution

The power distribution is incorporated into the backplane for the NT1 cage. Each pair of terminals has its own .5 amp re-settable fuse (PTC) When the PTC current limit has been exceeded for that circuit, the PTC heats up and goes to a large resistance, removing power from that circuit. To reset the PTC you need to remove all excessive current flow from that circuit.

NT1 Card Cage

The NT1 card cage will hold 12 NT1B-300's . Power and signal get to the NT1 via connectors mounted at the rear of the card cage.

Distribution and Connectors

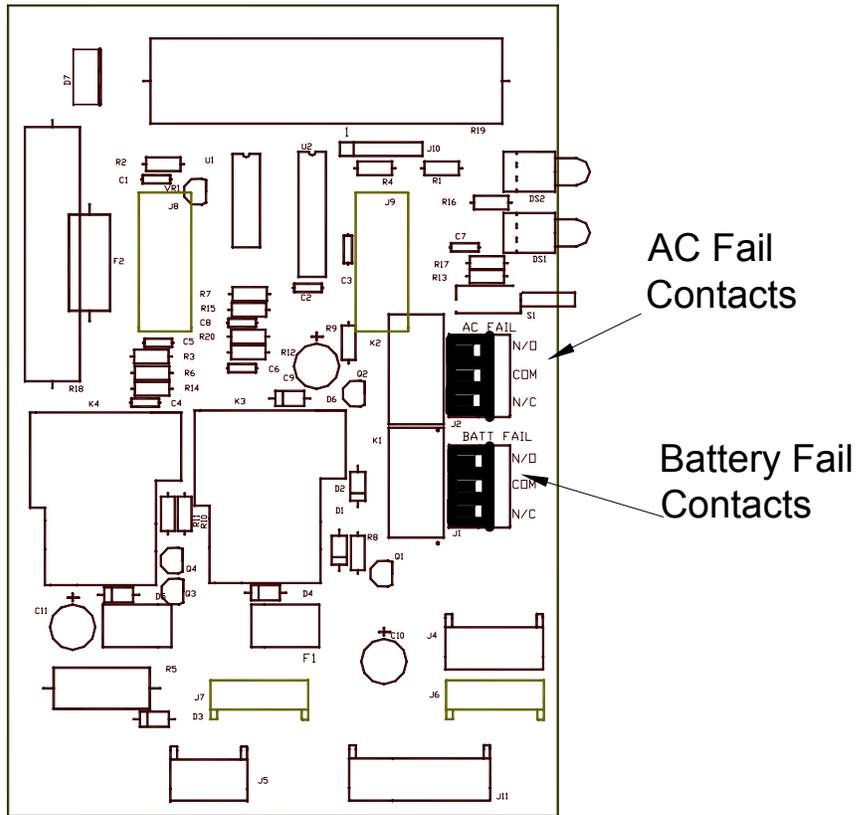
- All telco signals enter through a standard 25 pair telco connector "U" interface. These connectors are located on the left side of the PoweRack300e. Mating to this interface requires a 25 pair male connector on the cable.
- All terminal signals exit through a standard RJ45 modular connector. These connectors provide the power and signal for the terminal equipment. Each rack has 24 of these connectors, which are located inside of the racking above the NT1's. The mating cable connector should be an eight conductor Male RJ45 plug. An alternative set of 25 pair connectors has been added to the U units for output distribution.
- AC power enters through a standard IEC connector. This connector is located on the left side wall, and plugs into the PoweRack300e from the left. The mating connector should be an IEC female connector three-conductor power cord.
- External Batteries are connected through a two pin locking connector. Two of these connectors are located on the right side wall. The mating cable should have male pins inside of a male housing.
- External Alarm connection access is provided through an opening in the side panel.

Remote Alarm Contacts

The PoweRack 300e includes external alarm contacts to provide the ability to remotely monitor the status of the unit. These alarms will indicate either an AC Fail or a Battery Test Fail condition. Both normally open and normally closed contacts are provided to suite the user's external monitoring circuitry. The alarm contacts have a 2 Amp rating. The NO and NC contacts will change state when an alarm condition occurs. The connector state pin-outs are printed on the System Controller Card.

Alarm Access and Connection

The alarm connectors are located on the front edge of the System Controller Card. To access these connectors, remove the front panel, remove the square plastic connector, located on the right side panel (Figure 1). A 1/2in rubber grommet (not supplied) may be inserted into the opening to prevent chafing of the wire insulation. The user supplied wire is fed through this opening to the alarm connectors (Figure 2). The ends of the wires should be stripped back 1/8in, and inserted into the metal contacts. A small screwdriver is needed to tighten the contacts against the inserted wires.



Alarm Contact Location on System Controller

Figure 3

Repair and Maintenance

The PoweRack 300e is an integrated telecommunications power supply with NT1 card cage(s). This unit has been designed to operate unattended and with a low maintenance overhead for extended periods of time. Although the electronics within the PoweRack 300e requires no routine maintenance, system voltage should be maintained within set limits to ensure maximum life of the battery pack. It is recommended therefore that this should be checked at least on a yearly basis and reset as necessary.

Tools and Test Equipment

No special tools other than those normally contained in an electronic technicians toolkit are required to service the PoweRack 300e. To check the system voltage and reset as necessary, it is recommended that a quality digital voltmeter (DVM) be used.

Rectifier - Output Voltage Adjustment

It is essential that the final output voltage adjustment should only be done with a fully charged battery. Ensure that all battery packs, both internal and external are properly connected. Do not perform power supply adjustment if there has been a recent power failure or if the Battery Charge Status led is flashing. The rectifier should only be adjusted with the nominal system load connected.

Adjustment Procedure

Connect a DVM to one of the external battery connectors. Measure the voltage; it should be between 54.0 and 55.5 volts. If the measured voltage is outside of this range, perform the following steps:

- Loosen the front panel mounting screws and remove the front panel.
- Locate the blue potentiometer in the center of the right edge of the rectifier.
- While monitoring the voltage at the external battery connector, adjust the potentiometer to achieve a reading of 54.8VDC.
- Replace the front panel and re-tighten the mounting screws

Troubleshooting

The attached instructions will help you determine the problem and correctly devise the solution to the most common problems found.

QUESTION - I have just installed the system. All lines are hooked up. However I have **no Indicators on the front panel**.

ANSWER - You will need to check the following items:

- a. Check the power cord on the left side of the unit. Make sure that it is plugged in all the way into the mating connector.
- b. Check the power cord at the wall service outlet. Make sure it is plugged in all of the way.

Go to the circuit breaker box and check the circuit breaker is on.

Using your voltmeter check the voltage at the wall service outlet. This voltage should be between 92 and 132 volts AC.

- e. Check the fuses on the power supplies.

QUESTION - I have just installed the system. All of the lines are hooked up. I have front panel indicators. However the **NT1's do not light up**.

ANSWER - You will need to check the following:

- a. Make sure that all of the NT1's are installed into the cage securely.

QUESTION - I have just installed the system. All of the lines are hooked up. I have front panel indicators. **All NT1's show power indication except for one group of 12, numbers 25 to 36.**

ANSWER - You will need to check the following:

- a. Disconnect the terminals for lines 25 through 36.
- b. Unplug the NT1's 25-36. Inspect the connectors for shorted pins. (This would be pins, which are bent over so two adjoining pins touch.)
- c. Reinsert the NT1. If power indications are not on, unplug and swap with working NT1.

- d. NT1 power indicator is on. Reconnect one terminal at a time. When power is lost to a group of NT1's remove last terminal connected and check for a short on the Tx and Rx pairs, (PS1 power).

QUESTION - I have just installed the system with all of the lines are hooked up. I have a Normal front panel indicator and all NT1's show power indication. **NT1 32 shows terminal error (slow flash.)**

ANSWER - You will need to check the following:

- a. Swap with a working NT1.
- b. Is there a cable in the output connector for terminal 32.
- c. Is there a terminal wired to terminal 32.
- d. At the user location is there a terminal in the terminal 32 position.
- e. Is there a short on terminal 32 power (check both PS1 and PS2).

QUESTION - I have just installed the system. All of the lines are hooked up. I have front panel indicators. All NT1's show power indication. **NT1 27 shows line error(Fast Flash).**

ANSWER - You need to check the following:

- a. Swap with a working NT1.
- b. Check to see if there is a cable on the input connector for line 27.

QUESTION - The system has been up and running. Everything was working fine. We just had a power outage and the **system crashed**. We had a power outage last week but at that time the system worked fine.

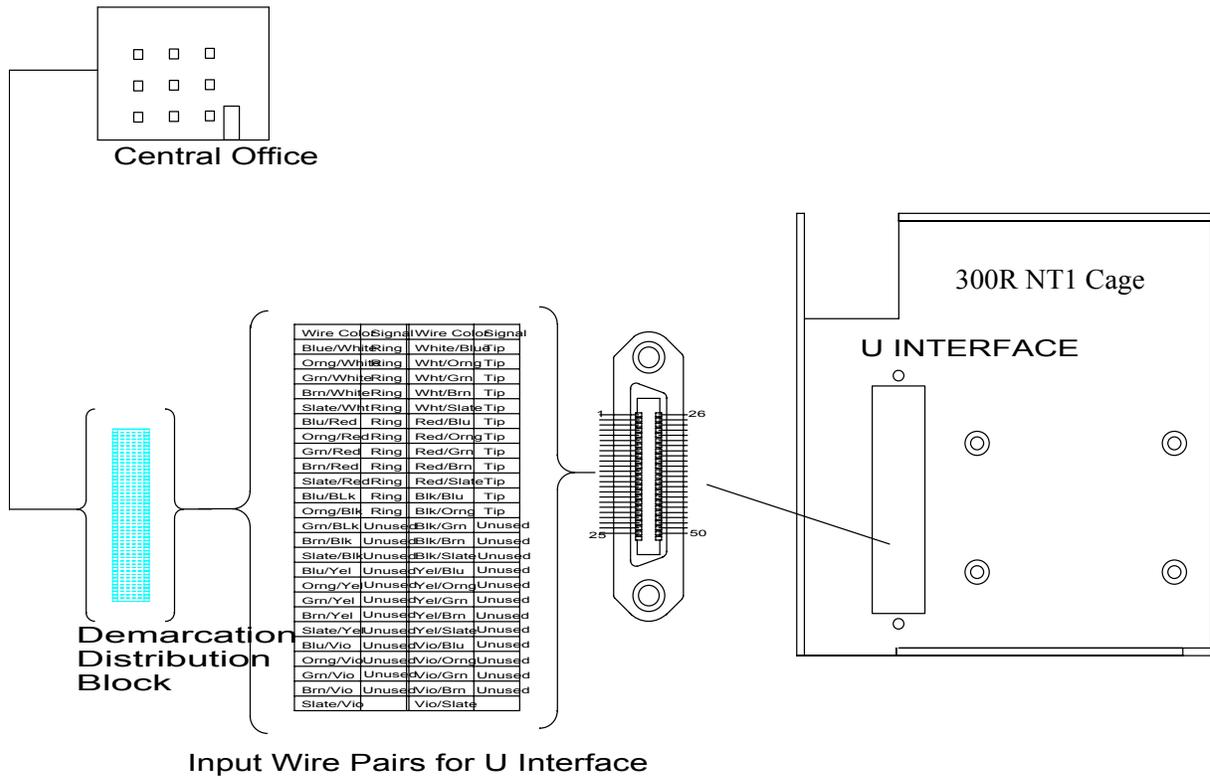
ANSWER - You need to check the following:

- a. Check the circuit breaker for the unit and see if it has tripped.
- b. Check front panel indicators. The Battery Charge Status and Battery Test Status leds should both be solid green.
- c. With a voltmeter check the voltage at the external battery connector. You should have 54.0 to 55.5 VDC.

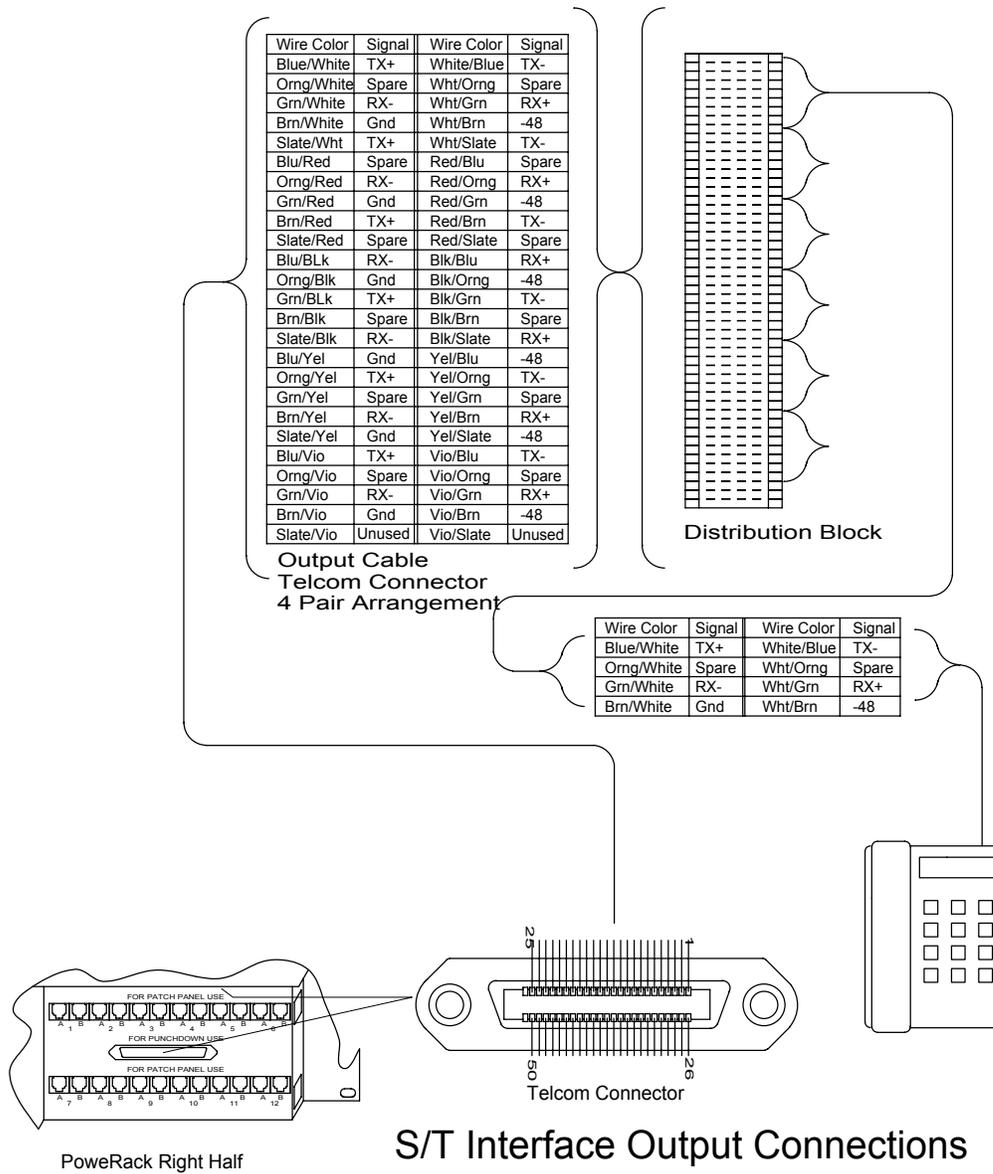
- d. Remove the battery fuse from the right side of the unit and check to see if it has blown.

Further investigation into the unit requires a trained technician who is more familiar with the system and its operation.

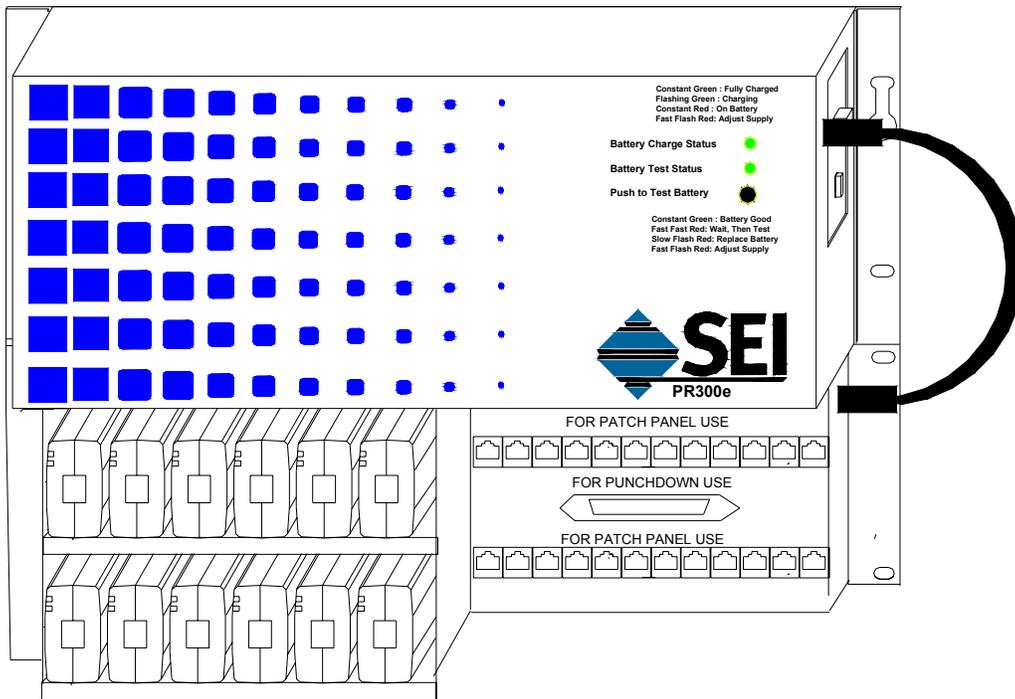
If you have a specific question not addressed in this manual, please call 1-800-765-4SEI and ask for technical support.



U Interface Connection to the PowerRack300r Appendix A.1

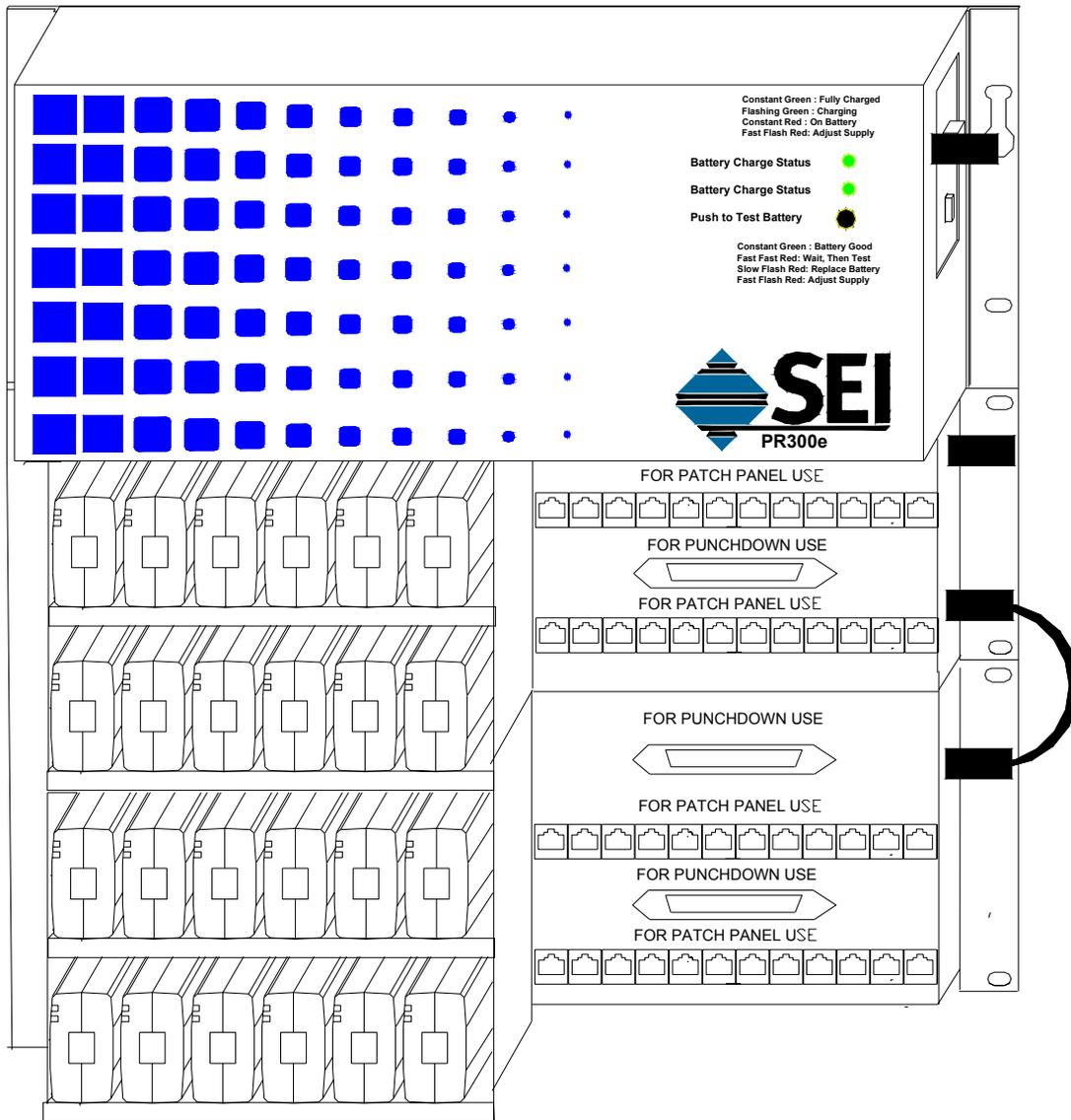


Appendix A.2



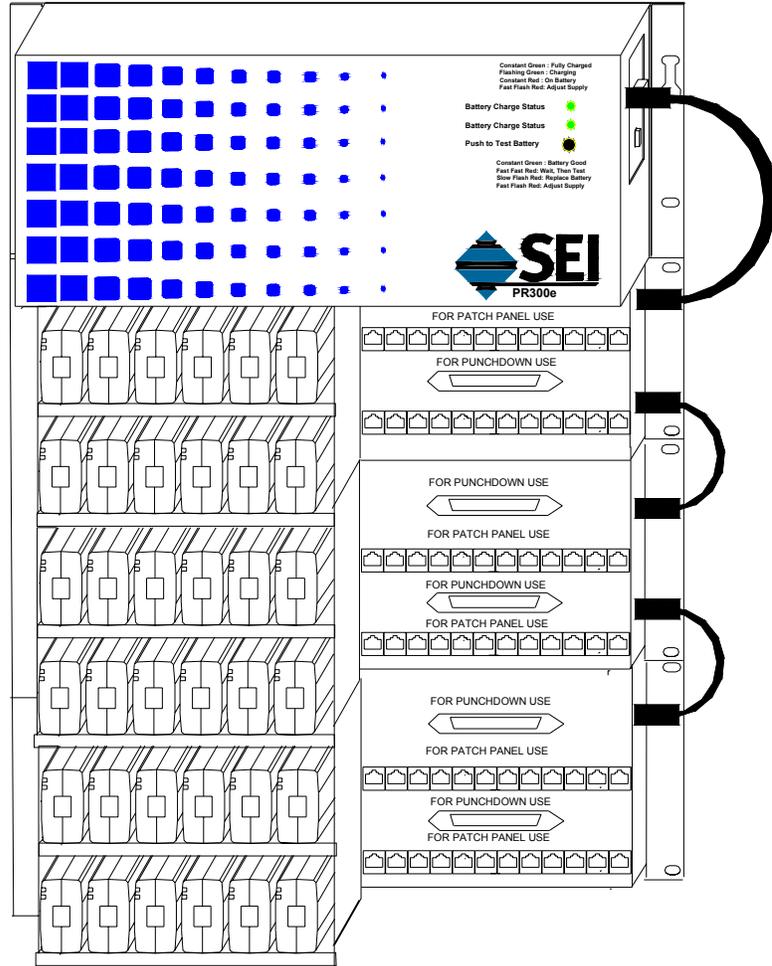
PR300-24 using 300R-U rack

Illustration A



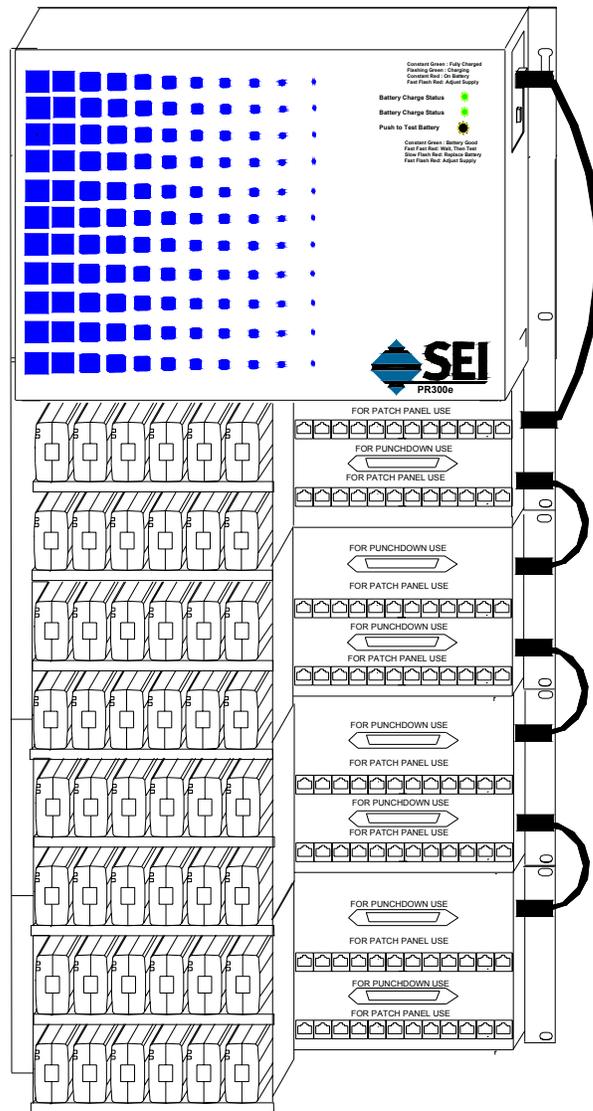
PR300e-48using 300R-U racks

Illustration B



PR300e-72 using 300R-U racks

Illustration C



PR300e-96 using 300R-U racks

Illustration D

