Installation and Operations Manual

SEI 1800/48-2U-P-ACC
DC-UPS

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DESCRIPTION

The SEI 1800/48-2U-P-ACC DC-UPS is a compact unit designed to power a wide range of customer equipment requiring battery-backed 48 VDC power. The unit comes equipped with 1800 Watts of rectifier power. The power distribution is provided on the rear of the unit via fused 10/32 studs suitable for a two-hole compression lug. Commercial power is applied to the left side of the rear unit via a hard-wired unterminated 3 conductor cable. The Alarm Contact Closures are accessed via an RJ-45 jack on the left side of the rear of the unit. The SEI DC-UPS can be mounted on a 19-inch rack and occupies 2U (3.5 inches) of rack space.

The SEI 1800/48-2U-P-ACC comes equipped with two field replaceable, non-spillable sealed lead acid battery packs. Both battery packs must be installed to provide back-up power. Circuitry within the DC UPS monitors and periodically tests the condition of the batteries and displays the results via front panel LEDs as well as via the Alarm Contact Closures. The DC UPS also utilizes a Low Voltage Disconnect, (LVD), circuit that prevents damage to the Battery Packs during an extended AC outage.

TECHNICAL SPECIFICATIONS

SEI 1800/48-2U-P-ACC

AC Input Power

Voltage	85-264 Vac
Frequency	47-63 Hz
Current	(240 Vac input, 1800 W output) 9.0 Amps Typical 12.8 Amps Max (120 Vac input, 1800 W output) 18 Amps Typical 25.5 Amps Max

DC Output Power

Voltage	42.0 – 54.8 Vdc
Power	1800W max
Current	40.0 Amps max
Fuse Rating	40 amps

Internal Battery

Capacity Range	9 Ahr
Fuse Rating	50 amps

Mechanical Dimensions

Width	19.00 Inches
Depth	22.00 Inches
Height	3.50 Inches
Weight	45 lbs

ENVIRONMENTAL SPECIFICATIONS

Temperature

Operating	0 °C to +50 °C
Storage	-20 °C to +50 °C

Humidity 0-95% non-condensing

Thermal Load

SEI-1800	820 BTU/hr max

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.

Service to the DC UPS should be performed by a qualified technician.

INSTALLATION INSTRUCTIONS

GENERAL

The installation section of this manual will provide all the necessary information for room requirements, proper inspection, and installation.

Inspection

The equipment has been fully tested and inspected prior to shipment. Although the unit has been packed in accordance with good commercial practices, it 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 shipment.

- Unpack the inner container from 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 within two days of delivery. SEI 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 the following items are included inside the package:

- SEI 1800/48-2U-P-ACC DC-UPS
- One Installation and Operations Manual.

Room Requirements

Electrical Requirements

The unit is supplied with an unterminated 6 foot long, 3 conductor cable for AC input power.

Mounting Instructions

1. Unit Weight - The SEI 1800/48-2U-P-ACC weighs 45 lbs with the battery packs installed and 20 lbs without the battery packs installed. It is recommended to mount the unit before installing the battery pack.
2. Rack Mounting - The SEI DC-UPS is designed to mount to a 19" rack using two racks screws per side. The mounting slots on each rack adapter are spaced in conformance with EIA standard RS-310-B.
3. Ventilation - It is important that the DC-UPS's ventilation ports not be blocked. Therefore, leave adequate space on front and both sides of the unit to ensure unrestricted airflow to the unit. It is recommended that a minimum of 3 inches of space be allowed on both sides of the unit. The unit should be installed in a clean dry area where the ambient temperature does not exceed 50°C.
4. Battery Pack Installation
    a. Open Front Panel – Loosen the two thumbscrews on the front of the DC-UPS. Fold down the front panel.
    b. Install Battery Packs – Slide each of the two battery packs into the DC-UPS Chassis. The battery packs should be oriented so that the attached connectors point to the middle of the unit.
    c. Attach the red and black connector of each battery pack to the one of the red and black connectors in the center conduit of the DC-UPS. Either battery pack can be connected to either DC-UPS connector
    d. Gently push the connected red and black connectors into the center conduit.
    e. Close the Front Panel – Fold up the front panel and secure the two thumbscrews.
5. Attach Customer Equipment - Attach the equipment to be powered to the 10/32 studs on the rear of the DC-UPS. Install the provide ATO style fuse.

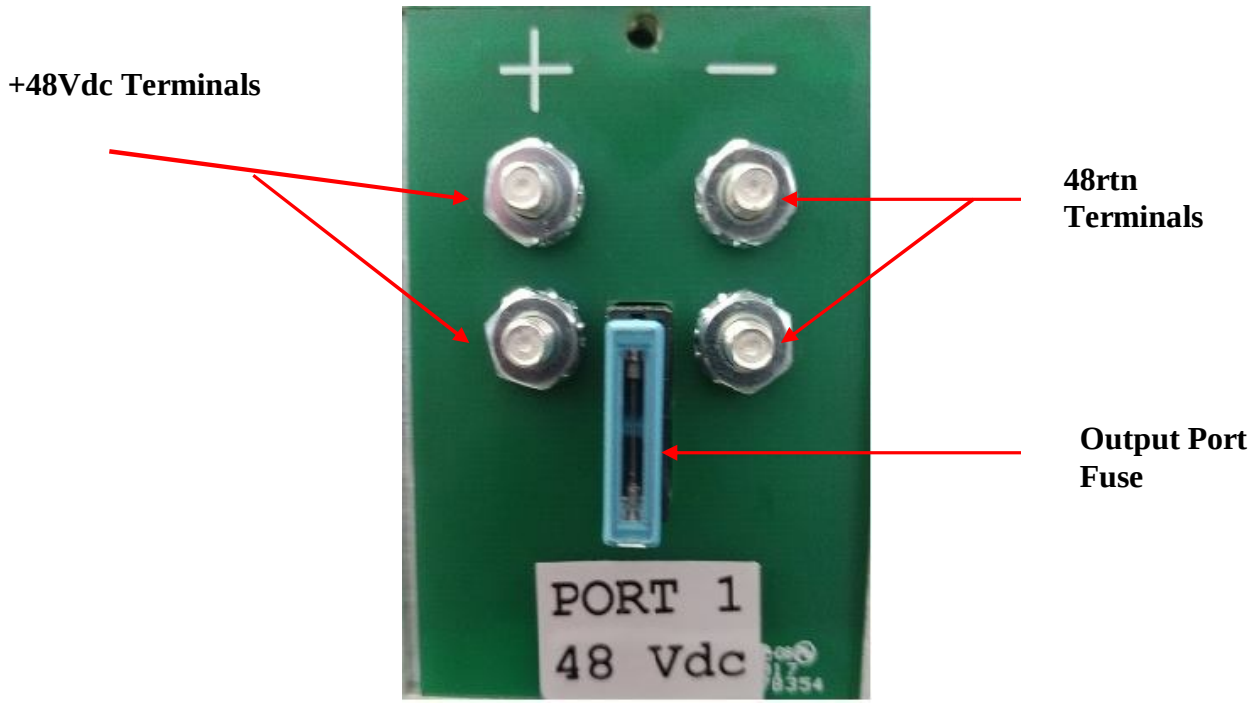

Figure 1 10/32 terminal Output Port

6. Attach to the ACC connector – Using a standard patch cord, connect to the DC-UPS Alarm Contact Closures via the RJ45 receptacle on the rear of the DC-UPS.
7. Connect the AC Power Cord – Connect the attached AC power input cable to your AC power distribution panel.

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START UP AND CHECKOUT

Power On Checkout.

1. Once the unit is properly mounted, you may begin the checkout procedure. First, insure that all the equipment to be powered by the unit is installed.
2. Turn on the AC power feed.
3. When power is first applied, the front panel LEDs will go through a start-up sequence of red, green and flashing yellow. The DC-UPS fans will also start-up.
4. After the start-up sequence, the Port 1 LED will turn on green. Verify that the connected customer equipment is receiving power.
5. The Battery Charge Status LED will flash green. This indicates that the Battery Pack is charging.
6. Disconnect the AC power cord. Verify that the Battery Charge Status LED and the System Status LED are flashing red. If there is no load on the DC-UPS this may take several seconds. Verify that the connected equipment is still receiving power.
7. Reconnect the AC power cord. The Battery Charge Status LED will flash green. This indicates that the batteries are charging.

8. If you have a specific question not addressed in this manual, please call **301-694-9601**, for technical support.

SYSTEM SHUTDOWN

1. The SEI 1800/48-2U-P-ACC DC-UPS is an uninterruptible power system. Therefore, removing the AC power feed to the unit will not shutdown the DC power distributed to the loads until the battery pack is full discharged.
2. Disconnect the AC power feed.
3. Verify that the Battery Status LED and the System Status LED are flashing red.
4. Press and hold the Manual Battery Test Switch for 5 seconds. The Battery Test Status LED will quick flash red.
5. All front panel LEDS will turn off, the unit fans will stop and the connected equipment will power down.

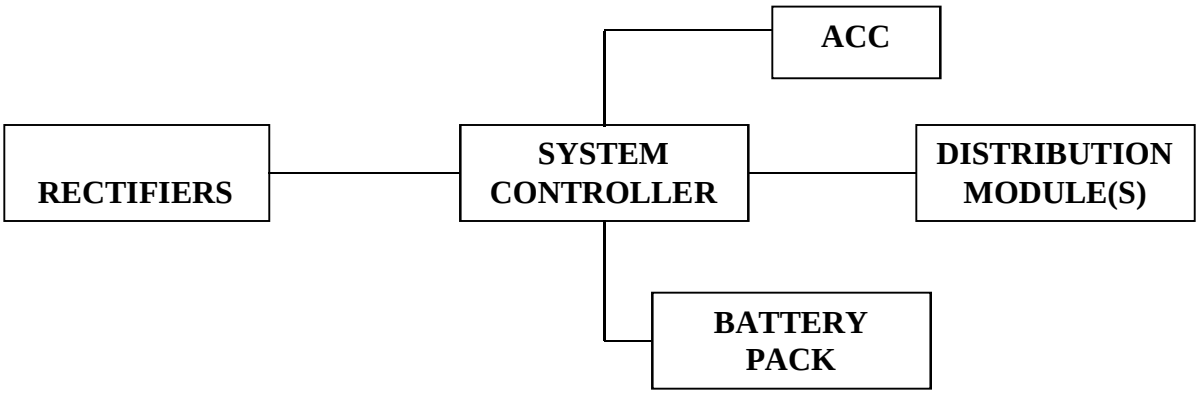
THEORY OF OPERATION

Theory of Operation

The following will provide you with an outline of operations and a list of modules found in the DC-UPS.

Modules

- Rectifiers
- System Controller/LVD
- Battery Module
- Distribution and Connectors
- Alarm Contact Closures



Functional Block Diagram DC-UPS

Rectifiers

Three 600W rectifiers convert AC input power to regulated DC output power. The input of the rectifier are fused for protection...

System Controller/LVD

The System Controller has the following functions:

- Distribution of the DC power
- Battery charge voltage and current control and monitoring
- Load monitoring and overload control
- Battery Low Voltage Disconnect Function (LVD)
- Battery charge and test status indicators
- Automatic and manual battery test

Low Voltage Disconnect Function

The low voltage disconnect function will disconnect the battery when the battery voltage drops below a 21.0 Vdc. This is done to prevent deep discharge of the batteries, which can adversely affect battery life. Both internal and external batteries are disconnected

LED Indicators

There are three sections of LED indicators on the front panel of the unit; Output, System Status and Battery Status. The functions of these indicators are as follows:

Output Section:

LED state	Indication
Off	Output Port DISABLED or not implemented
Solid Green	Output Port ON and operating normally
Flashing Yellow	Output Port Load Warning – Output Port power exceeds the user-settable Port Power Warning Level
Solid Red	Output Port Overload – Output Port OFF - Output Port power exceeds the user-settable Port Power Shutdown Level

System Status Section:

LED	LED state	Indication
System Voltage	Solid Green	Operating normally
	Slow Flash Red (once per second)	System Voltage below optimal battery charge voltage. If Battery Charge Status LED is also flashing, unit is operating on battery
	Fast Flash Red (5 times per second)	Battery almost depleted – less than 10% of battery life remains
Temperature	Solid Green	Operating Normally
	Flashing Yellow	Warning Internal temperature > 40° C
	Flashing Red	Fault - Internal temperature > 50° C – Battery charging inhibited.
Overload	Solid Green	Operating Normally
	Flashing Yellow	Total Output power exceeds the user-settable UTILIZATION ALARM THRESHOLD percentage
	Flashing Red	Total Output power exceeded available power. In units with multiple output ports, the lowest priority ports will be SHUTDOWN until the OVERLOAD is removed.
Rectifier Status	Solid Green	Operating Normally
	Flashing Red	One of the Rectifiers has failed.

Battery Status Section:

LED	LED state	Indication
Battery Charge Status	Solid Green	Battery fully charged
	Flashing Green	Battery charging
	Flashing Red	Unit operating on battery power
Battery Test Status	Off	Battery under Test
	Green	Battery Test Pass – Battery OK
	Slow Flash Red (5 times per second)	Battery Test Fail – Replace Battery Packs.
	Fast Flash Red (5 times per second)	Battery Test not Allowed
Manual Battery Test Switch	Push to Test	Battery Test not allowed when battery is charging, when there is a system fault condition, or within one minute of a previous battery test

Alarm Contact Closures

The DC-UPS Alarm Contact Closures provide relay contacts to remotely monitor the status of the unit. The AC Fail relay indicates whether the unit is operating on AC power or on battery power. The function of the Battery Test Fail relay changes based on the status of the AC Fail relay. If the DC-UPS is operating on AC power, The Battery Test Fail Relay indicates the status of the last battery test. If the DC-UPS is operating on Battery power, the Battery Test Fail Relay indicates whether the battery voltage is greater than or less than 44Vdc.

AC Fail Relay State	**Battery Test Fail Relay State**	**DC-UPS Operating Status**
NO	NC	On AC Power, Battery Test Pass
NO	NO	On AC Power, Battery Test Fail
NC	NC	On Battery Power, Battery Voltage > 44.0Vdc Or DC-UPS shutdown
NC	NO	On Battery Power, Battery Voltage < 44.0Vdc

The alarm contacts are accessible via an RJ45 connector on the rear panel of the DC-UPS. The Alarm Contact connector pinouts are shown below.

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.

Pin #	Function	Comment
1	Battery Test Fail NC	Battery OK/Battery Voltage > 44 Vdc
2	Battery Test Fail Common	
3	Battery Test NO	Battery Test failed /Battery Voltage < 44 Vdc
4	No connection	
5	No connection	
6	AC Fail NC	AC Failure has occurred
7	AC Fail Common	
8	AC FAIL NO	Operating Normally

Alarm Contact pinouts

STORAGE

The DC-UPS batteries may be stored at temperatures of 25°C or below for up to six months. The DC-UPS must be powered up with the battery packs installed for at least 48 hours every six months to maintain the batteries. For storage temperatures between 26°C and 40°C, the un-powered storage time must not exceed three months. For storage temperatures above 40°C, the un-powered storage time must not exceed one month. Failure to maintain the batteries will result in decreased battery capacity, decreased battery life and battery failure.