Installation and Operations Manual



SEI DC-UPS
48Vdc SERIES

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DESCRIPTION

The SEI DC-UPS series is a compact unit designed to service a wide range of customer equipment requiring battery-backed 48 VDC power. The DC-UPS series comes equipped with up to 600 Watts of rectifier power. The output power distribution is provided on the right side of the unit. Commercial power is applied to the left side of the unit. The SEI DC-UPS can be mounted on a wall or on a 19-inch rack. Optionally, SNMP communications via the Power Management Package (PMP) is available. Two Alarm Contacts are also available.

The DC-UPS series offers three different models with a range of output current:

- SEI 125/48-P – 2.25 Amps (125 Watts)
- SEI 300/48-P – 5.5 Amps (300 Watts)
- SEI 600/48-P – 11.0 Amps (600 Watts)

Output power distribution is provided via a pair of fused 10/32 binding posts. The SEI 125/48-P contains a single output port. The SEI 300/48-P and SEI600/48-P each contain two individually-fused output ports. Customer-specified output modules are available.

The DC-UPS comes equipped with field replaceable, non-spillable sealed lead acid battery packs. Circuitry within the DC-UPS monitors and periodically tests the condition of the batteries and displays the results via external LEDs as well as over the network when equipped with the optional Power Management Package. 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 125/48-P

Electrical Specifications

Input

Voltage	100-264 VAC
Frequency	50-60 Hz
Current	1.5 Amps Typical (115 Vac input, 125 W output) 5.0 Amps Max

Output

Voltage	42-55.2VDC
Current	3 amps Max
Output Fuse	ATO 7.5A Littlefuse 166.7000.4752 or Equivalent

Mechanical Dimensions

Width	19.0 Inches
Depth	5.0 Inches
Height	7.0 Inches
Weight	20 lbs

Battery Pack

Capacity	2.5Ahr
Fuse	3AG 6A Littlefuse 0326006 or Equivalent

SEI 300/48-P

Electrical Specifications

Input

Voltage	100-264 VAC
Frequency	50-60 Hz
Current	3.3 Amps Typical (115 Vac input, 300 W output) 5.0 Amps Max

Output

Voltage	42-55.2VDC
Current	7.1 amps Max
Output Fuse	ATO 7.5A Littlefuse 166.7000.4752 or Equivalent

Mechanical Dimensions

Width	10.0 Inches
Depth	5.0 Inches
Height	14.0 Inches
Weight	32 lbs

Battery Pack

Capacity	9.0Ahr
Fuse	3AG 10A Littlefuse 0326006 or Equivalent

SEI 600/48-P

Electrical Specifications

Input		
	Voltage	100-264 VAC
	Frequency	50-60 Hz
	Current	6.5 Amps Typical (115 Vac input, 600W output) 8.5 Amps Max
Output		
	Voltage	42-55.2 VDC
	Current	15 amps Max
	Output Fuse	ATO 15A Littlefuse 142.6185.5152 or Equivalent
Mechanical Dimensions		
	Width	19.0 Inches
	Depth	5.0 Inches
	Height	10.0 Inches
	Weight	32 lbs
Battery Pack		
	Capacity	9.0Ahr
	Fuse	3AG 15A Littlefuse 0326015 or Equivalent

ENVIRONMENTAL SPECIFICATIONS

Temperature		
	Operating	-20° C to $^{+}$50° C
	Storage	-20° C to $^{+}$50° C
Humidity		0-95% non-condensing
Thermal Load		
	SEI 125/48-P	70 BTU/hr max
	SEI 300/48-P	140 BTU/hr max
	SEI 600/48-P	270 BTU/hr max

SAFETY INFORMATION

Always ensure 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:

- One SEI DC-UPS Unit.
- One AC Power Cord.
- One Plastic Terminal Cover with hardware
- One Installation and Operations Manual.

Room Requirements

Electrical Requirements

- Each unit requires a separate NEMA 5-15R receptacle protected by a 15 Amp circuit breaker.
- A standard 7 foot 6 inch power cord with a molded NEMA 5-15 plug is supplied with each unit.

Mounting Instructions

- The SEI DC-UPS weighs between 20 and 32 lbs, depending upon the model.
- The SEI DC-UPS 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 DC-UPS should be fastened to the backboard using number ten wood screws. A number 27 drill can be used to provide a pilot hole for the screws. All of the screws should be tightened with a torque of 30 in/lb minimum and 34 in/lb maximum.
- The unit should be mounted vertically in a clean dry area where the ambient temperature does not exceed 50°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 five inches of space be allocated around the top of the unit.
- The DC-UPS is supplied with mounting angles suitable for 19" standard racks or wall mounting.
- The mounting slots on each rack adapter are spaced in conformance with EIA standard RS-310-B.

START UP AND CHECKOUT

Wiring Instructions

1. Connect customer equipment to the 10/32 binding posts on the right side of the unit.
2. Install the provided automotive style ATO fuse into the output port fuse holder.
3. Attach the plastic terminal cover to the 4 standoffs using the provided hardware.
4. Attach the SNMP Network cable, or alarm contacts cable if so optioned.
5. Attach the supplied AC power cord to the IEC connector on the left side of the DC-UPS.

Power on Checkout

1. Once the unit is properly mounted, you may begin the checkout procedure. First, ensure that all the equipment to be powered by the unit is installed.
2. Install the provided battery fuse and fuse holder cap. The fuse holder is on the right side panel of the unit.
3. Plug in the DC-UPS power cord into the commercial AC outlet made available for this unit.
4. When power is first applied, the unit will display a flashing green Battery Charge Status LED and a solid green Battery Test Status LED.
5. About 5 seconds after AC power is applied, the outport will be turned on. Verify that the connected equipment is receiving power.
6. Unplug the AC power cord. Verify that the Battery Charge Status LED is red. If there is no load on the DC-UPS this may take several seconds. Verify that the connected equipment is still receiving power. The unit is now operating on battery 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. A DC-UPS is an uninterruptible power system. Therefore, cutting 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. Remove the battery fuse on the right side panel of the unit.
3. Disconnect the AC power feed.
4. The battery fuse can now be re-installed. The DC-UPS will remain shutdown until AC power is re-applied.

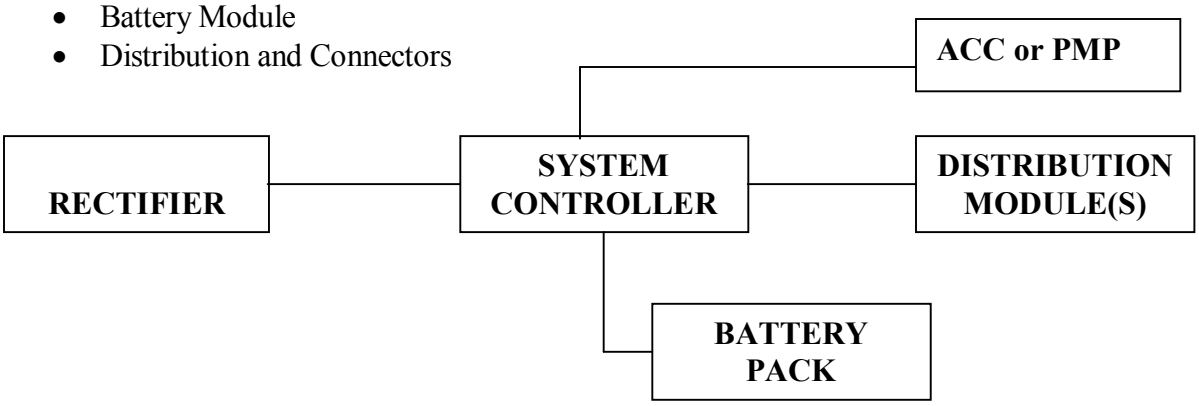
THEORY OF OPERATION

Theory of Operation

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

Modules

- Rectifier
- System Controller/LVD
- Battery Module
- Distribution and Connectors



Functional Block Diagram DC-UPS
Figure 1

Rectifier

The rectifier converts AC input power to regulated DC output power. The SEI-125 has a 150W rectifier. The SEI-300 has a 320W rectifier. the SEI-600 has a 600 W rectifier. The input of each rectifier is 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
- Battery Low Voltage Disconnect Function (LVD)
- Battery charge and test status indicators
- Automatic and manual battery test
- Local and Remote Alarms (optional)

LED Indicators

There are two LED indicators on the 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 rectifier Battery Test Status: Constant Green – Battery Good Fast Flash Red – Wait, Then Test Slow Flash Red – Replace Battery	Manual Battery Test Switch – Push to Test *NOTE*: 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 *Wait, Then Test* indication is displayed.

Low Voltage Disconnect Function

The low voltage disconnect function will disconnect the battery when the battery voltage drops below 42 Vdc. This is done to prevent deep discharge of the batteries, which can adversely affect battery life. Both internal and external batteries are disconnected.

External Connectors

- AC power is connected via a standard IEC connector located on the left side wall. 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.
- Output Power Distribution
    - Each port contains two 10-32 terminal posts suitable for ring lug connection. The 48VRTN connection of each port is fused. The SEI 125/48-P contains a single port. The SEI 300/48-P and SEI 600/48-P contain two ports.
    - Fuses:
        - SEI 125/48-P and SEI 300/48-P Littlefuse ATO 7.5A 142.6185.5152 or Equivalent
        - SEI 600/48-P: Littlefuse ATO 15A, 166.7000.5152 or Equivalent



Remote Alarm Option

The DC-UPS Alarm Contact Closures Option provides relay contacts 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 alarm contacts are accessible via an RJ45 connector on the side panel of the DC-UPS. The Alarm Contact connector pinouts are shown in Figure 2

Pin #	Function	Comment
1	Battery Test Fail NC	Battery OK
2	Battery Test Fail Common	
3	Battery Test NO	Battery has failed
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
Figure 2

Power Management Package

SEI's Power Management Package (PMP) for the SEI DC-UPS provides a variety of functions necessary to monitor and control output power to DC powered devices, as well as maximize the efficiency and reliability of the power systems and battery backup.

Ethernet communication is accessed via a panel-mounted standard RJ45 connector. Two Ethernet interfaces are provided to monitor and control the DC-UPS. A web page interface that can be viewed with any Internet browser is available for easy system status checks and fast system configuration tasks. An SNMP interface provides the ability to continuously monitor the DC-UPS status with a Network Management System (NMS) and to receive instantaneous notification of DC-UPS status changes and alarms via SNMP traps.

REPAIR AND MAINTENANCE

The SEI DC-UPS is engineered to operate unattended and with low maintenance overhead for extended periods of time. Although the electronics within the DC-UPS require no routine maintenance, the battery pack will have to be replaced periodically. When the unit indicates a Battery Test Failure via the front panel LED and the Alarm Contact Closure, the battery pack should be replaced immediately to ensure continued back-up power operation.

The battery pack can be removed and replaced without taking the power unit off-line. Follow the procedures outlined in the mounting instructions above to remove and re-install the battery pack.

STORAGE

The DC-UPS may be stored at temperatures of 25°C or below for up to six months. The DC-UPS must be powered up 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.
Note: The side panel battery fuse must be installed to charge the battery pack.