

Installation and Operations Manual



SEI DC-UPS 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 750 Watts of rectifier power using parallel 250Watt rectifiers for reliability. The 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, a 19-inch rack or an optional DIN Rail mount. Optionally, SNMP communications via the Power Management Package is available. Two Alarm Contacts are standard.

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

- SEI-250 – 4.5 Amps (250Watts)
- SEI-500 – 9.0 Amps (500 Watts)
- SEI-750 – 13.5 Amps (750 Watts)

Three output distribution modules are available. The ‘M’ module contains two, individually fused 8-pin Molex® Minifit™ connectors. The ‘A’ module contains two, individually fused 2-pin AMP® Mat-N-Lok™ connectors. The ‘P’ module features two individually fused binding posts. The 250 houses one output distribution module, the 500, two modules, and 750 accommodates three output distribution modules. 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 LED’s 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-250

Electrical Specifications

Input

Voltage	120 +10/-15% VAC
Frequency	50-60 Hz
Current	3 amps Max

Output

Voltage	42-56VDC
Current	4.5 amps

Mechanical Dimensions

Width	19.00 Inches
Depth	5.00 Inches
Height	14.00 Inches
Weight	32 lbs

SEI-500

Electrical Specifications

Input

Voltage	120 +10/-15% VAC
Frequency	50-60 Hz
Current	6 amps Max

Output

Voltage	42-56VDC
Current	9 amps

Mechanical Dimensions

Width	19.00 Inches
Depth	5.00 Inches
Height	20.00 Inches
Weight	34 lbs

SEI-750

Electrical Specifications

Input

Voltage	120 +10/-15% VAC
Frequency	50-60 Hz
Current	9 amps Max

Output

Voltage	42-56VDC
Current	13.5amps

Mechanical Dimensions

Width	19.00 Inches
Depth	5.00 Inches
Height	20.00 Inches
Weight	36 lbs

ENVIRONMENTAL SPECIFICATIONS

Temperature

Operating	0 °C to +40 °C
Storage	-20 °C to +50 °C

Humidity

0-95% non-condensing

Thermal Load

SEI-250	190 BTU/hr max
SEI-500	380 BTU/hr max
SEI-750	570 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:

- One SEI DC-UPS Unit.
- One AC Power Cord.
- One warranty card.
- One Installation and Operations Manual.

Room Requirements

Electrical Requirements

- 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 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 32 and 36 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 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 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

Power On Checkout.

- 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.
- Install the provided battery fuse and fuse holder cap. The fuse holder is on the right side panel of the SEI-250. The fuse holder is on the left side panel of the SEI-500 and SEI-750.
- Attach the optional SNMP Network cable, or alarm contacts cable if so optioned.
- Attach the supplied AC power cord to the left side of the DC-UPS.
- Plug in the DC-UPS power cord into the commercial AC outlet made available for this unit.
- When power is first applied, the unit should display a flashing green Battery Charge Status LED and a solid green Battery Test Status LED.
- Connect the user equipment to the DC-UPS output connectors located on the right side of the unit.
- Verify that the connected equipment is receiving power.
- If you have a specific question not addressed in this manual, please call **1-800-765-4SEI (1-800-4734)**, for technical support.

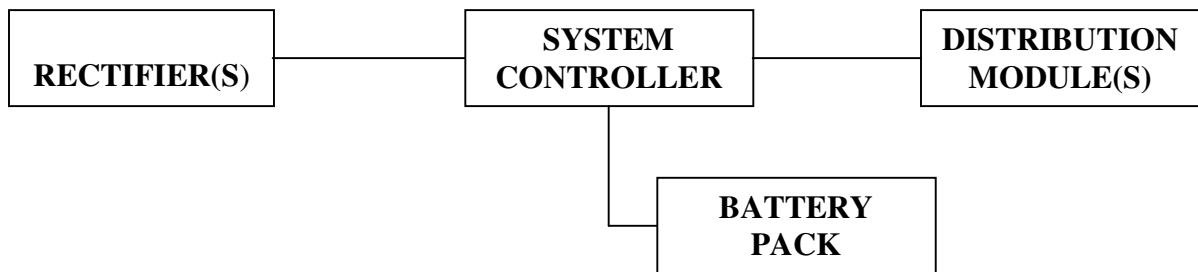
THEORY OF OPERATION

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



Functional Block Diagram DC-UPS

Figure 1

Rectifier

The rectifier converts AC input power to regulated DC output power. Each DC-UPS rectifier provides up to 250 watts of power. The SEI-250 has one 250W rectifier; the SEI-500 has two rectifiers and the SEI-750 contains 3 rectifiers. 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 a 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.
- Distribution Module – See Appendix

Remote Alarm Option

The DC-UPS Remote Alarm 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

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 charge voltage may drift with time and operating temperature. The DC-UPS continuously monitors the battery charge voltage. If the battery charge voltage is out of adjustment, the Battery Charge Status indicator will flash red.

Tools and Test Equipment

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

Rectifier Adjustment Procedure

The rectifier should only be adjusted with the nominal system load connected. 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:

SEI-250

1. Remove the battery fuse located on the right side panel. Disconnect any external battery packs.
2. Loosen the front panel mounting screws and remove the front panel.
3. Connect the digital voltmeter to one of the external battery (2 pin) connectors of the unit
4. Locate the blue potentiometer in the center of the right edge of the rectifier. Adjust the potentiometer on the power supply until the voltmeter reading is 54.8 Vdc.
5. Replace the front panel.
6. **Re-install the internal battery fuse and re-connect any external battery packs.**

SEI-500 and SEI-750

1. Remove the battery fuse on the side panel. Disconnect any external battery packs.
2. Loosen the front panel mounting screws and remove the front panel.
3. Using the digital voltmeter, measure the sense voltage on each of the power supplies. The sense voltage is measured on the power supply connector, between the pin with the red wire and the pin with the black wire. Adjust the potentiometer on each power supply until the voltmeter reading is 56.2 Vdc.

Note: When setting sense voltages, always adjust the potentiometer until the sense voltage reading changes, and then set it to the desired voltage. Additionally, anytime one power supply is adjusted, all other power supply sense voltages must be re-checked.

4. Once the sense voltages have been balanced, connect the digital voltmeter to the external battery connector. Verify that voltmeter reading is 54.8 Vdc.
5. If the voltmeter reading is not correct, tweak each of the power supplies until the voltage reading at the external battery connector is 54.8 Vdc. Then re-measure the sense voltage on each of the power supplies. Adjust the power supplies such that the sense voltages are equal by adjusting any unit with a lower sense voltage up. Once the sense voltages have been balanced, connect the voltmeter to the external battery connector and verify the voltmeter reading is 54.8 Vdc.

NOTE: The final value of the power supply sense voltage is not important. As long as the sense voltages on all power supplies are equal and the voltage reading at the external battery connector is correct, the unit is properly adjusted.

7. Replace the front panel.
8. **Re-install the battery fuse and re-connect any external battery packs.**

Appendix

Output Module –A

The –A version output module contains two individually fused TYCO/AMP Mat-N-Lok™ connectors.

Mating Connector: 1-480698-0
Mating Pin: 350873-3
Wire Gauge: 14-18 AWG

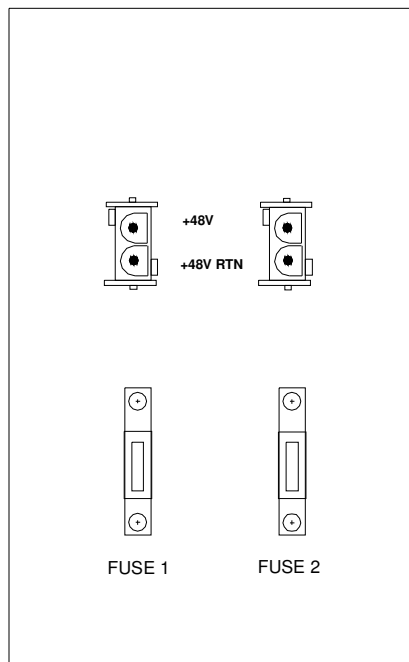
Fuse: PORT 1, PORT2

GMT-7.5A, Cooper Bussmann or Equivalent.

PORT3, PORT4, PORT 5, PORT6

GMT-15A, Cooper Bussmann or Equivalent

Note: The fuse is sized to provide full output power from each connection. If multiple connections are used, the fuse can be re-sized to limit current at a lower value.



OUTPUT MODULE –A Layout and Polarity

Output Module –M

The –M version output module contains two eight pin, individually fused MOLEX Mini-fit connectors.

Mating Connector: 39-01-2085
Mating Pin: 39-00-0078
Strain relief 15-04-9343
Wire Gauge: 14-18 AWG

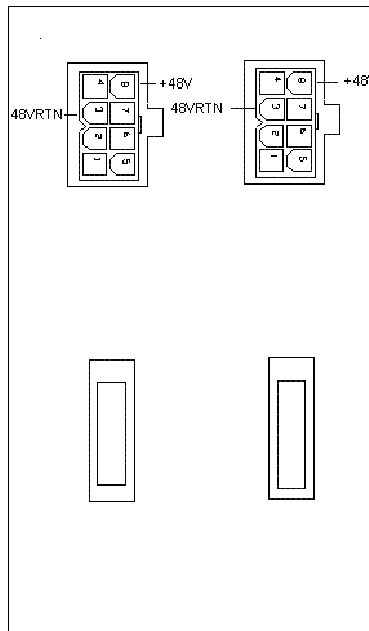
Fuse: PORT 1, PORT2

GMT-7.5A, Cooper Bussmann or Equivalent.

PORT3, PORT4, PORT 5, PORT6

GMT-15A, Cooper Bussmann or Equivalent

Note: The fuse is sized to provide full maximum power from each connection. If multiple connections are used, the fuse can be re-sized to limit current at a lower value.



OUTPUT MODULE M Layout and Polarity

Output Module –P

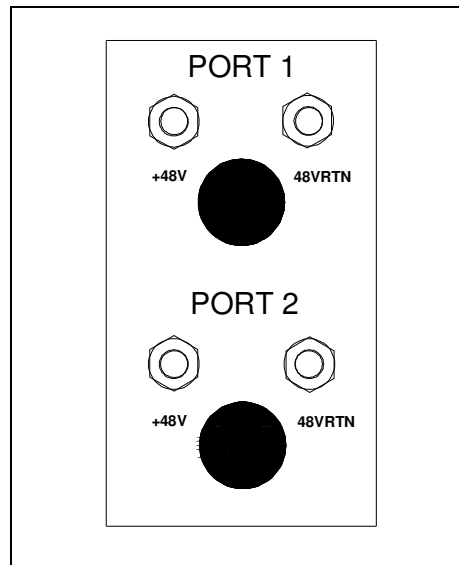
Each port contains two ¼ -20 terminal posts suitable for ring lug connection. The 48VRTN connection of each port is fused.

Fuses:

Ports 1-2 3AG 6A, 0312006 Littlefuse or Equivalent.

Ports 3-6 3AG 15A, 326015 Littlefuse or Equivalent.

Note: The fuse is sized to provide maximum output power from each connection. If multiple connections are used, the fuse can be re-sized to limit current at a lower value.



OUTPUT MODULE P Layout and Polarity