

EDP Double Conversion UPS Series

Installation and Operation Manual



Documented Power Supply Models

The following uninterruptible power supply models, with their part numbers, are documented by this instruction manual. These power supply and their respective packages may be references using the part numbers listed below.

MODEL NUMBERS	PART NUMBERS	INPUTS	OPTIONS
1000 VA POWER RATING			
EDP-1000 120/60/24 UPS	010-028-20	120 VAC 60Hz / 24V Battery	See Specifications
EDP-1000 UPS Package	026-076-20	120 VAC 60Hz / 24V Battery	Turnkey Package
1500 VA POWER RATING			
EDP-1500 120/60/36 UPS	010-029-20	120 VAC 60Hz / 36V Battery	See Specifications
EDP-1500 UPS Package	026-077-20	120 VAC 60Hz / 36V Battery	Turnkey Package
2000 VA POWER RATING			
EDP-2000 120/60/48 UPS	010-030-20	120 VAC 60Hz / 48V Battery	See Specifications
EDP-2000 UPS Package	026-078-20	120 VAC 60Hz / 48V Battery	Turnkey Package

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Critical Safety Issues

Section 1: Critical Safety Issues

Safety admonishments

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS.

Three different levels of safety admonishments are used within this instruction manual; specifically **DANGER**, **WARNING**, and **CAUTION**.

*Trois niveaux différents d'avertissements de sécurité sont utilisés dans ce mode d'emploi; spécifiquement **DANGER**, **AVERTISSEMENT** et **ATTENTION**.*



DANGER

The statement following the **DANGER** heading alerts the equipment user of a potentially life or health-threatening situation unless precautions are taken against it. Admonishments of this nature usually entail the hazards of electrical shock or those encountered that may result in physical injury.

*La déclaration sous la rubrique **DANGER** avertit l'utilisateur de l'équipement d'une situation potentiellement mortelle ou mortelle, sauf si des précautions sont prises contre lui. Les admonistances de cette nature entraînent habituellement les dangers d'un choc électrique ou ceux rencontrés qui peuvent entraîner des blessures physiques.*



WARNING / AVERTISSEMENT

The statement following the **WARNING** heading alerts the equipment user of a condition or procedure that could result in interruption of service to the users or subscribers of the service receiving power from this product.

*La déclaration sous le chapitre **AVERTISSEMENT** avertit l'utilisateur de l'équipement d'une condition ou d'une procédure qui pourrait entraîner une interruption de service pour les utilisateurs ou les abonnés du service qui reçoit l'alimentation de ce produit.*



CAUTION / ATTENTION

The statement following the **CAUTION** heading alerts the equipment user of a condition that could result in damage to the subject equipment or ancillary equipment if care is not exercised during certain maintenance or operating procedures.

*La déclaration suivant la rubrique **ATTENTION** avertit l'utilisateur de l'équipement d'une condition qui pourrait endommager l'équipement concerné ou l'équipement auxiliaire si les soins ne sont pas exercés pendant certaines procédures de maintenance ou d'exploitation.*

EMI / RFI STATEMENT

This device has been designed and manufactured to comply with the EMI / RFI emission limits and immunity characteristics as set forth in Standards EN 55022 and EN 55024. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial

environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with this instruction manual, may cause harmful interference to radio communications.

Emergency Shutdown Procedure



Exercise extreme caution when performing the following procedure. Carry out the steps precisely in the order given to avoid the possibility of personal injury or equipment damage.

Faites preuve d'une extrême prudence lors de l'exécution de la procédure suivante. Effectuez les étapes précisément dans l'ordre indiqué pour éviter la possibilité de blessures ou de dommages matériels.

Perform the following procedure if the power supply must be shut down and disconnected on an emergency basis:

1. Open the Input circuit breaker.
2. Disconnect the Battery harness from its receptacle on the front panel of the UPS.
3. Remove the circular Power connector from the front of the UPS.
4. If a Safety Automatic Transfer Switch or Standard Transfer Switch is in use, open the AC Utility Input breaker and disconnect the Generator from its outside cabinet generator connector to complete shutdown of power to the load.

General Safety Issues:

The EDP Double Conversion Uninterruptible Power Supply documented in these instructions has been designed, tested and produced to ensure safe, trouble-free operation. Personnel using or installing this power supply should completely read and fully understand the following safety instructions. They are provided here as informational guidelines for your continued safety in usage of the product.

Safety Issues of Power Supply Installation and Use:

The UPS has been designed and built to power Department of Transportation and Intelligent Traffic Systems equipment only. It is not intended for any other usage and provides output voltages suitable only for its intended application.



This power supply operates from an AC source ranging from 55 to 155 volts and produces internal voltages in excess of 400 volts. DO NOT open any covers or panels or attempt to perform any service to the power supply without first removing and disconnecting all external AC and DC power sources. Only trained, qualified personnel should attempt service and repair work on the power supply.

Cette alimentation fonctionne à partir d'une source CA allant de 55 à 155 volts et produit des tensions internes supérieures à 400 volts. N'OUVREZ PAS de couvercles ou de panneaux ou n'essayez pas d'effectuer un service quelconque à l'alimentation électrique sans d'abord retirer et débrancher toutes les sources d'alimentation CA et CC externes. Seul du personnel formé et qualifié doit effectuer des travaux d'entretien et de réparation sur l'alimentation électrique.

Two Power Sources:

All power supplies documented in this instruction manual use more than one source of power. If any reason exists to open the power supply enclosure for maintenance or adjustments, first disconnect the Battery Harness from its receptacle and open the AC Input circuit breaker on the front panel. Internal DC circuits will retain harmful electrical charge after disconnecting both power sources from the UPS. Only trained personnel should be permitted to handle this UPS.

Ground Fault Protection

The power supply does not contain integral ground fault protection. Where such protection is required, the power supply input should be connected to a ground fault interrupter (GFI) outlet or to a branch circuit protected by a GFI circuit breaker of proper ratings.

Enclosure Safety Issues:

The enclosure and the power supply must be installed by qualified technicians or installers only, using appropriate mounting hardware in accordance with local codes and construction practices.

The power supply must be installed within a NEMA 3R or grounded metal enclosure suitable for accommodating DOT/ITS power supplies.

The enclosure housing the power supply must be of adequate strength to support the power supply and its associated batteries. Additionally, the enclosure must afford adequate ventilation for the power supply such that a minimum free air space of 52 mm (2 inches) remains around all sides and the top of the power supply.

Temperature of the air flowing around the power supply may be rated up to 74° C (165° F). Air intake and exhaust openings within the enclosure must not be less than what is required to maintain this temperature requirement. If these temperature limits are routinely exceeded or ventilation requirements cannot be attained, a suitable forced-air cooling system may be required within the enclosure.

Battery Safety Issues

When choosing a battery type (gelled electrolyte or AGM) for installation, it is not recommended mixing different types of batteries in the same string. **DO NOT** use flooded type batteries containing liquid electrolyte under any circumstances. Such batteries are hazardous to use within DOT/ITS enclosures and can degrade or destroy equipment installed in the enclosure with them. Flooded batteries also pose environmental hazards when acid containment methods cannot be employed. Use only gelled electrolyte or AGM batteries of suitable size, voltage and capacity for use in a DOT/ITS system.



Batteries can supply extremely large currents (>4000 amps) for a short period of time, sufficient to vaporize or melt metal objects. For this reason, installers must remove watches, rings and other jewelry before placing or connecting batteries in the cabinet. Insulating gloves and protective clothing should be worn during battery installation, consistent with local practices. Use only fully insulated tools designed for battery maintenance.

Les batteries peuvent fournir des courants extrêmement importants (> 4000 ampères) pendant une courte période, suffisant pour vaporiser ou faire fondre des objets métalliques. Pour cette raison, les installateurs doivent enlever les montres, bagues et autres bijoux avant de placer ou de connecter les piles dans le cabinet. Des gants isolants et des vêtements de protection devraient être portés pendant l'installation de la batterie, conformément aux pratiques locales. Utilisez uniquement des outils entièrement isolés conçus pour l'entretien de la batterie.



CAUTION / ATTENTION



- a. CAUTION: Risk of energy hazard, 12 V, 100 Ampere-hour (watt or kilowatt) batteries. Before replacing batteries, remove conductive jewelry such as chains, wrist watches, and rings. High energy through conductive materials could cause severe burns.**
- b. CAUTION: Do not dispose of batteries in a fire. The batteries may explode.**
- c. CAUTION: Do not open or mutilate batteries. Released material is harmful to the skin and eyes. It may be toxic.**

a. ATTENTION: Risque d'énergie, batteries 12 V, 100 Ampères-heures (watts ou kilowatts). Avant de remplacer les piles, retirez les bijoux conducteurs tels que les chaînes, les montres-bracelets et les bagues. Une énergie élevée à travers les matériaux conducteurs pourrait causer de graves brûlures.

b. ATTENTION: Ne jetez pas les piles dans un feu. Les piles peuvent exploser.

c. ATTENTION: N'ouvrez pas et ne mutiliez pas les piles. Le matériau libéré est nocif pour la peau et les yeux. Cela peut être toxique.

Batteries contain Sulfuric acid in gelled or semi-liquid form. Direct contact with any spilled electrolyte from a damaged battery may result in skin irritation or chemical burns. For this reason, handle batteries carefully to avoid puncturing the case and releasing any of the electrolytes. Replace any battery that is found to have a swollen or cracked case. Always recycle used batteries to reclaim lead and other materials that can pose environmental hazards if disposed of improperly.

In case of contact with the electrolyte, thoroughly wash any contaminated areas of the skin with soap and water. In case of contact with the eyes, immediately flush with copious amounts of water and seek medical attention. Minor surface spills can be neutralized with an appropriate neutralizing agent such as bicarbonate of soda (baking soda).

Always use proper lifting techniques when handling batteries. Each 12-volt battery weighs approximately 30 Kg or 66 lbs.



Personnel installing or servicing batteries must wear eye protection (goggles or full-face shield) and protective clothing (apron and gloves) if necessary, according to local practices. Additionally, only fully insulated tools specifically designed for battery installation and service should be used for that purpose. Tools wrapped with vinyl or fabric-based electrical tapes are NOT acceptable substitutes. (Insulated wrenches complying with IEC 60900 and ASTM F-1505 Standards¹ are distributed by various industrial supply organizations.)

The Battery harness MUST be removed from the receptacle on the front of the power supply before installing, changing, and/or connecting batteries.

Verify correct battery polarity and voltage at the end of the battery harness connector before connecting the battery harness. Applying DC input of improper polarity or voltage can seriously damage or destroy the power supply or the battery string.

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of all models of the EDP Double Conversion UPS series.

1 IEC 60900: Live Working – Hand Tools for Use Up to 1000VAC and 1500VDC
ASTM F-1505: Standard Specification for Insulated & Insulating Hand Tools

Introduction

Section 2: Introduction

Overall Operation

The EDP Double Conversion UPS series of power supplies provides fully regenerated, filtered, and regulated AC output power to operate traffic signals, conflict monitors, camera equipment, lighting, and additional applications used in Departments of Transportation and Intelligent Traffic Systems (DOT/ITS). These power supplies are designed to normally power an intersection or highway system from the commercial AC utility line while maintaining an emergency battery in a state of full charge. If the commercial AC line fails for any reason or if line voltage exceeds preset low or high limits, the low voltage inverter within the power supply continues to provide power to the intersection or highway system load while drawing its operating power from the battery string. After AC utility line power has been restored, the power supply will revert to Double Conversion operation, supplying power to the intersection or highway system while drawing operational power from the commercial AC utility line and simultaneously recharging the battery string. The power supply will continue providing AC power to the intersection or highway system load with zero loss of output power during outages, brownouts, or spikes. Both input and output voltages are rated at 120V/60Hz, pure sine wave.

Primary Voltage

The EDP Double Conversion series of power supplies have been designed for operation from standard AC utility lines with an overall voltage range of 55 to 155 volts for nominal 120VAC/60Hz models. UPS output frequency is matched with the AC input frequency, while the output voltage is dynamically regulated at 120VAC over the entire input voltage range. The input voltage range is output load dependent. Please see Specifications for output load requirements regarding input voltage range.

Inverter Operation

The EDP Double Conversion UPS series provides uninterruptible power in the event of line voltage brown-out, spike, or failure. During these events, the inverter draws power from the battery string and provides regulated output voltage to the load. The point at which the UPS switches to battery power is load dependent. A UPS with greater than 70% load and line voltage less than 96V will switch to inverter operation after 1 minute during brownout conditions and immediately switch to inverter during spikes and line failures. When input voltage returns within operating range, the UPS will automatically return to Double Conversion operation. Please see Specifications for Acceptance and Detect voltages.

Output Overcurrent Monitoring

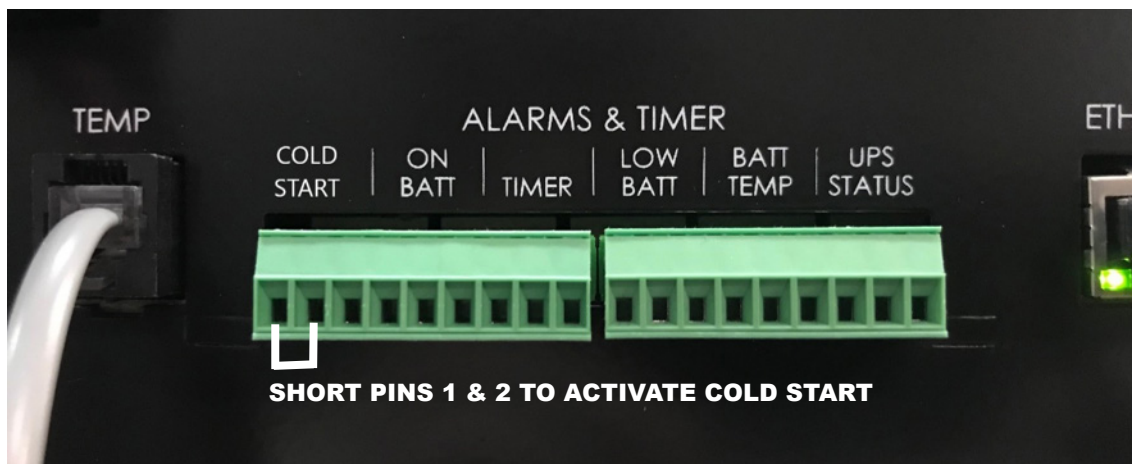
The output of the EDP Double Conversion UPS series provides three preset current limiting functions that will disconnect the inverter in the event of overload and short circuit of the output. Over-currents not exceeding 110% of the model specific output current will provide 10 minutes of runtime until the inverter is disconnected. At 150% of overload, the UPS will provide 10 second power intervals at which time the UPS will automatically attempt to provide power to the load until the over-current condition is removed. This condition will test the overload every 45 seconds. Short circuit conditions rating at 200% of the model specific output current will disconnect the inverter within 50ms of detection until the short circuit is no longer detected. These features are self-correcting upon removal of overload or short circuit.

Bypass Mode

In the event that the output is overloaded for an extended period of time while in Line Mode, the UPS will enter a Bypass state. The inverter will be bypassed, and the output powered directly from line voltage. This feature is self-correcting upon removal of the overload and the inverter will begin to operate, providing filtered and regulated output voltage.

Cold Start

Cold Start allows the UPS to operate from batteries, if no utility power is present. To initiate Cold Start, attach the battery harness, with the appropriate voltage, to the UPS. Using a piece of wire or pliers, short pins 1 and 2 of the left most green terminal block on the UPS for 3 seconds, or until an audible sound is heard. After a short period of time, the inverter will become active and the output of the UPS will become active, providing fully regenerated and filtered output voltage for load equipment to use.



Status Monitoring Interface

The EDP Double Conversion UPS series is factory equipped with Ethernet connectivity, providing status information regarding operation, alarm reporting, event notification via email and SNMP, and on-board web page for configuration and local monitoring of UPS operation. Ethernet communication is TCP/IP ready and supports SNMP, SMTP, SNT, and HTTP protocols. Access to the webpage is password protected and all UPS' ship with a default user ID and password. The default user ID is "user" and the default password is "multilink".

**EDP Double Conversion UPS Features:**

- All models have 120VAC/60Hz output.
- Ethernet status monitoring, with user authentication.
- High efficiency for economical line operation and longer run time from battery input.
- Pure Sine Wave output.
- Liquid Crystal Display (LCD) for local visual monitoring.
- Input power factor, typically 0.7 or better (line mode).
- Temperature compensated battery charger with battery temperature sensor.
- Robust rectifier/charger and inverter circuits.
- PWM controlled forced-air cooling.
- Certified UPS product per IEC Standard 60950-1/CSA 22.2.
- Complies with EMI/RFI limits of Standards EN 55022 and EN 55024.

Unpacking and Inspection

Before installing this equipment, inspect the power supply for shipping damage or missing components. If the power supply or other items were damaged in shipment, file a damage claim with the shipping company and contact your Multilink representative immediately. Be sure to retain the original shipping carton and all packing material for the power supply until you are certain that a warranty return will not be required.

All EDP Double Conversion power supplies include

- 1 Power supply, ready for installation in cabinet
- 1 Power harness
- 1 Battery temperature sensor cable
- 2 Relay and Timer connectors
- 1 Installation and Operations guide

Missing or Damaged Items

If items are found to be damaged or missing, contact the shipping company and your Multilink representative immediately. All damage claims must be filed with the shipping company conveying your equipment. Your Multilink representative will be able to assist with immediate equipment needs, if necessary.

Original Shipping Container:

When returning a unit for service, use its original shipping container and all original packing materials. Items damaged as a result of improper packaging will not be covered under provisions of warranty service.

Other Items

If you ordered other items such as batteries and cable kits for use with the power supply, ensure also that those items did not sustain shipping damage. As with the power supply itself, all damage claims must be filed with the shipping company and your Multilink representative should be contacted immediately.

Front Panel Connections, Controls, and Indicators

Section 3: Front Panel Connections, Controls, and Indicators

The front panel of each EDP Double Conversion UPS contains various connectors, controls, and indicators. These items are described as follows. See figure 3-1 and 4-1 for connector locations. Further details regarding use of controls and indicators may be found in the **Startup and Operation** section of this manual.

Controls

INPUT CIRCUIT BREAKER: 20-amp circuit breaker protects input circuitry and wiring. This circuit breaker is also used as an AC switch to apply and remove input power to the power supply. Input breaker is marked "ON" and "OFF" for clarity. NOTE: Opening this circuit breaker does not disconnect output power. Power may still be present if the circuit breaker is in the OFF or Open position and the battery harness is still attached to the UPS.

Connections

POWER CONNECTOR: The power supply contains a single Power connector located in the upper middle of the front panel. This four-position terminal block allows the power harness to be connected to the UPS. The Power represents utility Line Input. White represents Neutral. Red represents UPS Output Line. Green represents Ground. The internal Input and Output circuits share the Neutral return path and Ground conductors.

BATTERY INPUT: Anderson®2-type connector: used for connecting the external battery string to the power supply.

BATTERY TEMPERATURE PROBE: RJ-11 connector provides connection the external temperature probe for temperature compensated battery charging.

RELAY / TIMER CONNECTORS: On Shore Tech OSTTJ®3 9 pin terminal blocks: allows for Cold Start of the UPS (reserved on pins 1 and 2 of the left most connector) and external alarm reporting to a conflict monitor for the five, dedicated dry contact alarm relays. Each of the five relays has a set of three pins:

Pin 1 is Normally Open (NO). Pin 2 is Common (C). Pin 3 is Normally Closed (NC).

ETHERNET PORT: RJ-45 connector provides connection to DOT/ITS network interface.

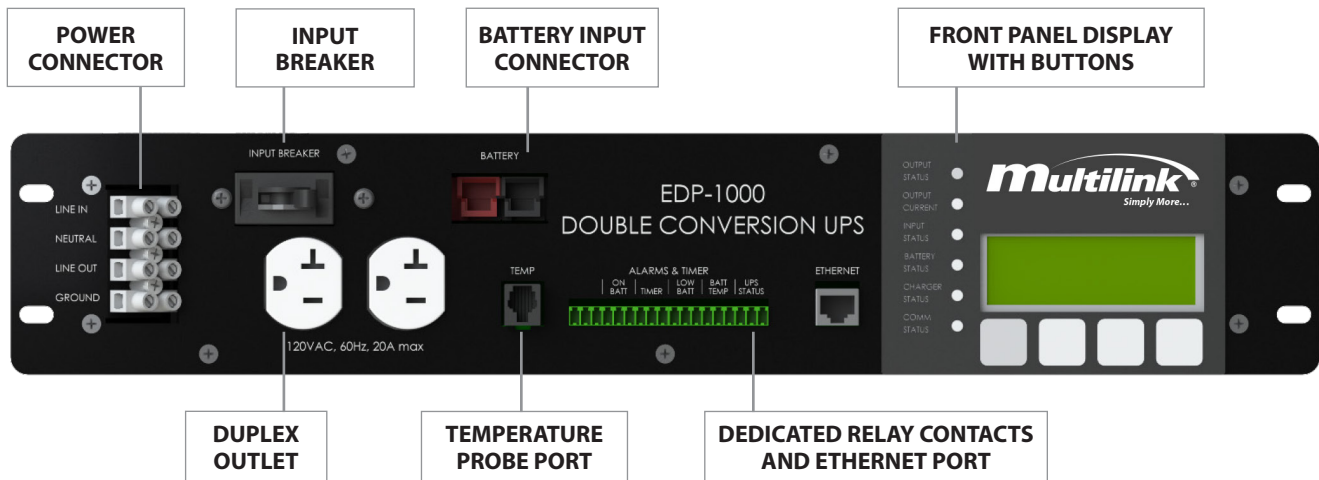


Fig. 3-1 Power Supply Front Panel Detail

Indicators

LIQUID CRYSTAL DISPLAY (LCD): The LCD display on the front panel of the power supply serves as the main visual communication device so the user can view a number of operational conditions of the power supply at any time desired. Four buttons associated with the LCD display provide a means for the user to navigate the individual screens. Further description of the menu tree may be found in the **Startup and Operation** section of this manual.

LEDs: Four green light emitting diodes (LEDs) on the central area of the front panel provide visual indication of power supply operational status. The operations of the LEDs are as follows:

STATUS LED FUNCTIONS	OFF	ON	SLOW BLINK (0.5 Hz)
OUTPUT STATUS	No Output / Output voltage is below 50% of the rated specification	Normal / Output voltage is within rated specifications	Low Output / Output voltage is less than the rated specification
BATTERY STATUS	Low Battery / Battery string voltage below 1.75V/Cell	Normal / Battery Voltage at the FLOAT voltage (>2.24V/Cell)	Low battery cutoff
INVERTER STATUS	Inverter OFF / Bypass Mode due to over-current	Normal / Inverter ON/Line voltage good	Line voltage low/ Inverter operation only
UPS ALARM/FAULT	Normal / No Alarms or Faults to report	Alarm or Fault Present Investigate and correct alarm or fault	N/A

Fig. 3-2 Front Panel LED Functions

Installation and Setup

Section 4: Installation and Setup

Installing and wiring any model within the EDP Double Conversion series of power supplies into an enclosure may be accomplished by connecting input and output wiring to the appropriate connectors of the power supply. The four conductors of the circular Power connector are to be used to connect the UPS to the cabinet's internal Utility Line and Load terminal block buses. If used with a mating transfer switch, the circular harness attached to the transfer switch is to be used to provide power to the UPS and points of connection for AC power and load. All other connectors on the front panels of the UPS mate with industry-standard connectors widely used. Moreover, connectors used in this power supply mate with accessory harnesses and assemblies designed and manufactured by Multilink Inc. Refer to the OPTIONS section of these instructions for further information.

In all installations, the following conditions apply and must be observed:

- A service disconnect switch containing over-current protection devices such as circuit breakers or fuses with appropriate AIC (amperes – interrupting capacity) rating should be placed between the AC utility source and the service entrance device for the power supply. Where used, the disconnect switch must be installed in compliance with all national, state and local codes as required.
- For outdoor installations, the AC utility conductors connected to the power supply service entrance device shall be physically protected through an appropriate restraining device and conduit, consistent with local codes and practices.
- Permission to mount the power supply enclosure at any site shall be made in accordance with all legal requirements and local practices of the area.

This power supply is designed for use in both existing and new ground-mount and pole-mount enclosures. Observe the following procedures during installation of any EDP Double Conversion series power supply.

Preparation

The EDP Double Conversion series power supplies have been factory assembled, tested, and prepared as a complete product ready for installation within an enclosure. The installer must verify that the correct type of AC power receptacle is installed in the enclosure for the input service and power supply selected for use at any given site. Additionally, the battery strings installed in the enclosure must match the EDP Double Conversion model specific battery voltage. Power supply ratings may be verified from the nameplate on the top of the power supply near the AC Input circuit breaker.

Grounding

Safety ground and earth ground connections must be in place for the power supply and enclosure for both personal safety and operational considerations. During power supply and/or enclosure installation, the following grounding connections must be provided or verified.



CAUTION / ATTENTION



Failure to provide and connect adequate safety and earth grounds at each installation site may result in improper power supply operation or permanent damage to the power supply itself. Grounding facilities and connections must conform to appropriate national codes and/or local practices.

Si vous ne fournissez pas et ne connectez pas des zones de sécurité et de mise à la terre adéquates sur chaque site d'installation, vous risquez d'endommager le bloc d'alimentation ou d'endommager l'alimentation électrique elle-même. Les installations de mise à la terre et les connexions doivent être conformes aux codes nationaux et / ou aux pratiques locales appropriées.

5. The AC utility conductors installed in the service entrance box must contain a safety ground conductor.
The power supply installer should verify that this grounding conductor is in place, having been installed along with the AC utility input.
6. A separate enclosure ground wire must be connected between the enclosure ground lug and an earth ground connection provided by a ground rod installed at the power supply site. In most cases, one copper or copper-clad steel ground rod of 2.5-meter (8 feet) length driven into the earth will be sufficient to provide the ground connection required. In some instances, a more elaborate grounding method (such as a ring ground) may be required; however, this may be dictated by state or local codes and depends on conductivity of the soil within the installation area.
7. The dead metal of the service entrance box must be bonded to the metal enclosure that houses the power supply. Additionally, the ground bar within the service entrance box should be bonded to the metal enclosures; however, this requirement may be subject to local codes and practices.
8. The grounding wire connected between the power supply enclosure and the earth ground rod should be no smaller in area than 13 mm² (6 AWG) copper. Both ends of the ground wire should be sealed with an appropriate anti-oxidation compound.
9. An optional ground bonding wire of the same size as specified in Step 4 above may be connected between the optional ground lug at the left side of the power supply chassis and earth ground where such connection enters the external system enclosure. Refer to the **OPTIONS** sections for more information

Placement in the Enclosure

This power supply has been designed primarily for use within a cabinet or enclosure offering protection from outdoor weather, entry of excessive dust, dirt or moisture, and from unauthorized contact by untrained personnel. If used in a controlled environment, the power supply may be located within an indoor equipment cabinet or may be mounted to a rack system. Place the power supply within 36 inches of the line and load terminal block buses inside the cabinet.

The power supply should be mounted on a ventilated shelf that allows free air circulation, especially through the right and left side panels of the power supply cabinet. Clearance of at least 1RU or 1.75 inches must be maintained around all surfaces of this power supply for unobstructed airflow. Temperature of the air entering the power supply should not exceed 74°C (165° F). System de-rating will occur at 55°C. See Specifications.

Wiring

Connect input, output, relay monitoring, and Ethernet wiring to the power supply according to the following procedure. Refer to Figs. 3-1 and 4-1 for control and connector positions.

1. Operate the AC line circuit breaker in the service entrance box to the OFF (O) position. If the power supply is located at a head end or other customer premise site, ensure that the branch circuit breaker chosen to protect the AC receptacle for the power supply is operated to the OFF (O) position.
2. Operate the Input circuit breaker on the front panel of the power supply to the OFF (O) position.



Verify the terminal block buses in the cabinet for Utility, Load, Generator, and any additional buses are not active and are clearly labeled prior to wiring the power supply to the terminal block buses.

Vérifiez que les bus du bornier dans l'armoire pour Utility, Load, Generator et tous les autres bus ne sont pas actifs et sont clairement étiquetés avant de câbler l'alimentation aux bus du bornier.

3. If the Safety Automatic Transfer Switch (SATS) is required, ensure that the UPS Input circuit breaker is turned off and then attach the corresponding wires of the cabinet's terminal block buses to the SATS and the power supply as show. If only an EDP Double Conversion power supply is in use, please continue to step 4.

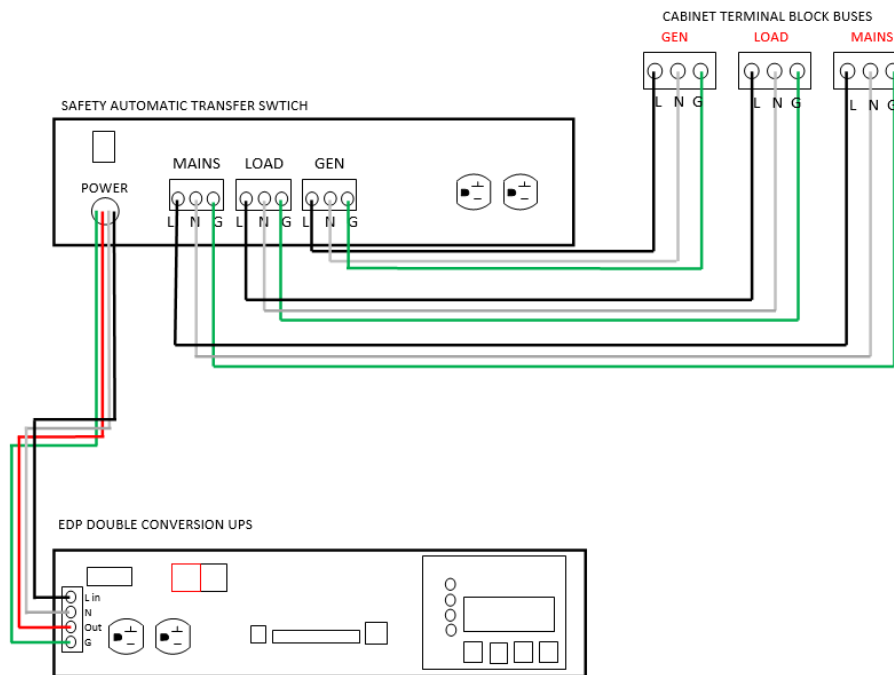


Fig. 4-1 SATS and EDP wiring example

4. Attach the corresponding wires of the power harness to their respective terminal block buses in the cabinet.

- a) **Black** – AC Utility Line Hot Terminal Block Bus
- b) **White** – AC Utility and Load Neutral Terminal Block Buses
- c) **Red** – AC Load Hot Terminal Block Bus
- d) **Green** – AC Line and Load Ground Terminal Block Buses

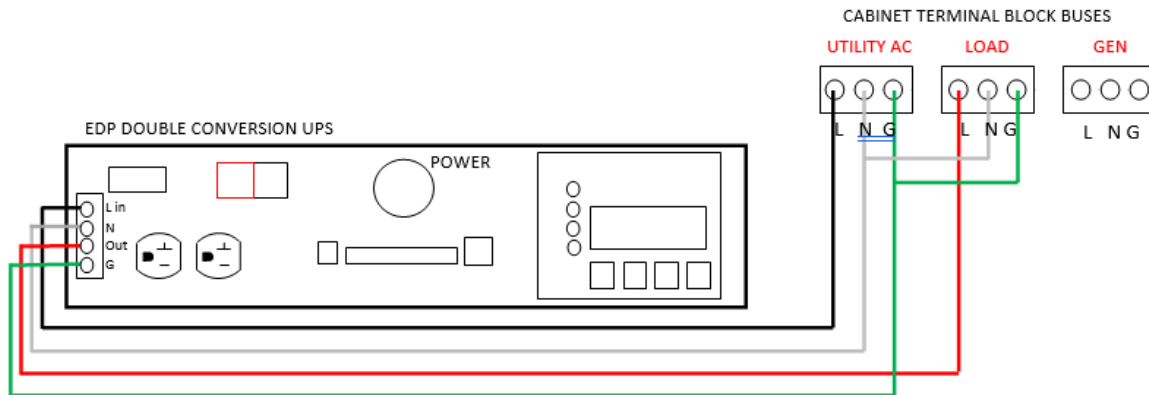


Fig. 4-2 EDP UPS ONLY wiring example

5. Connect the power harness wiring to the corresponding terminal block on the front panel of the power supply.
6. If a mating battery harness has been previously installed in the cabinet, verify the correct polarity and voltage prior to connecting the battery harness to the Battery receptacle. Otherwise, battery connections will be continued in the following sub-section.
7. Insert the temperature sensor plug into the mating temp receptacle on the front panel of the power supply. The body of the temperature sensor probe should be placed between two of the battery cases in the enclosure; secured with an appropriately rated tape.
8. If remote monitoring of the power supply is desired, connect an Ethernet cable to the Ethernet receptacle on the front panel of the power supply.

Initial installation and wiring are now complete. Verify all connections on the front panel of the power supply are securely in place.

Battery Placement and Wiring

Proper installation and wiring of the batteries are critical to the long-term backup capability of any power supply system. Gelled electrolyte, valve regulated, or AGM batteries are recommended for use in DOT/ITS power supply applications. All batteries should be tested and fully charged prior to installation. Interconnecting wiring must be no smaller than 8 mm² in area or 8 AWG. Longer run times and improved efficiency may be realized using battery wiring of 13 mm² in area or 6 AWG.

In light of the specialized handling and connection requirements for batteries, only trained personnel should install batteries in an enclosure. Personnel must always employ appropriate safety equipment (goggles or face shields, insulated gloves, etc.) and only use fully insulated tools for tightening hardware on the battery terminals. Additionally, proper lifting tools and techniques must always be used during battery installation to avoid personal injury or equipment damage.

Battery Installation Procedure

Each model in the EDP UPS series has a specific battery harness designed for their use. Each harness includes a main cabinet harness and individual disconnects for each battery. Please review the following steps and figures with respect to the EDP UPS model chosen before installing the battery strings.

1. The 1.0kVA system uses a 24VDC battery system. Refer to figure 4-3 when installing the battery harness for this system. **NOTE:** Follow diagram as pictured or system damage may occur.

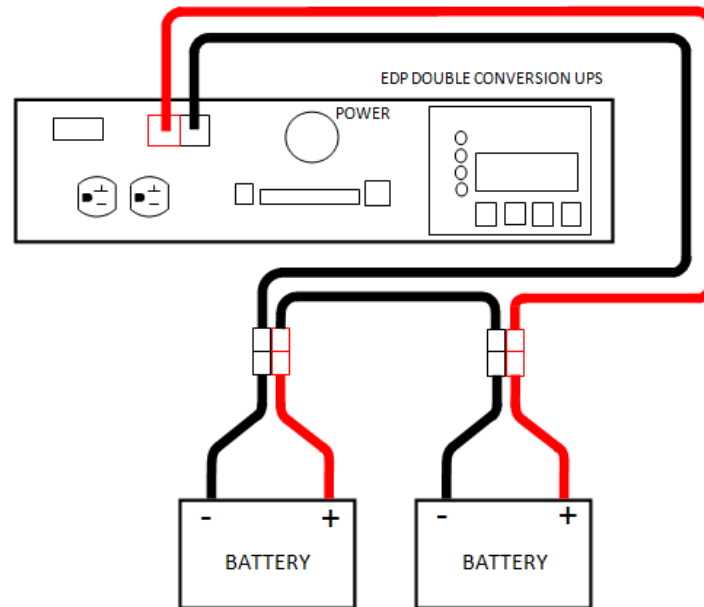


Fig. 4-3: 1kVA EDP model, 24VDC Battery Harness Kit

2. The 1.5kVA system uses a 36VDC battery string. Refer to figure 4-4 when installing the battery harness for this system. **NOTE:** Follow diagram as pictured or system damage may occur.

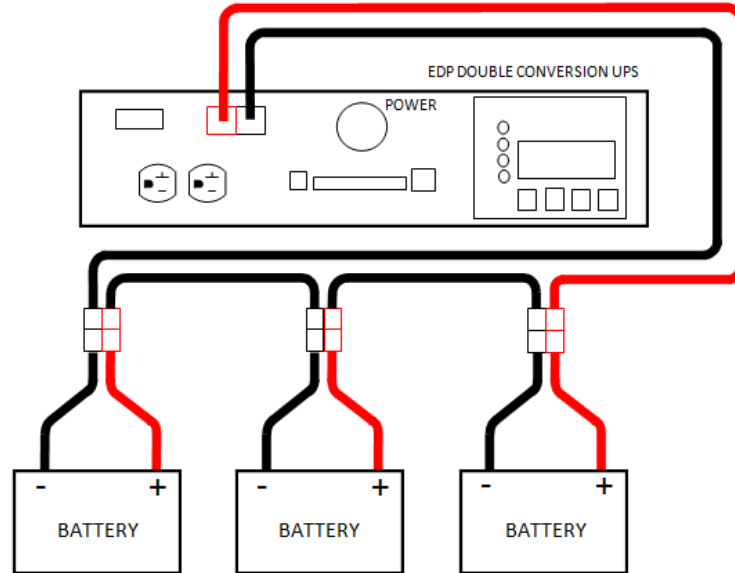


Fig. 4-4: 1.5kVA EDP model, 36VDC Battery Harness Kit

3. The 2.0kVA system uses a 48VDC battery string. Refer to figure 4-5 when installing the battery harness for this system. **NOTE:** Follow diagram as pictured or system damage may occur.

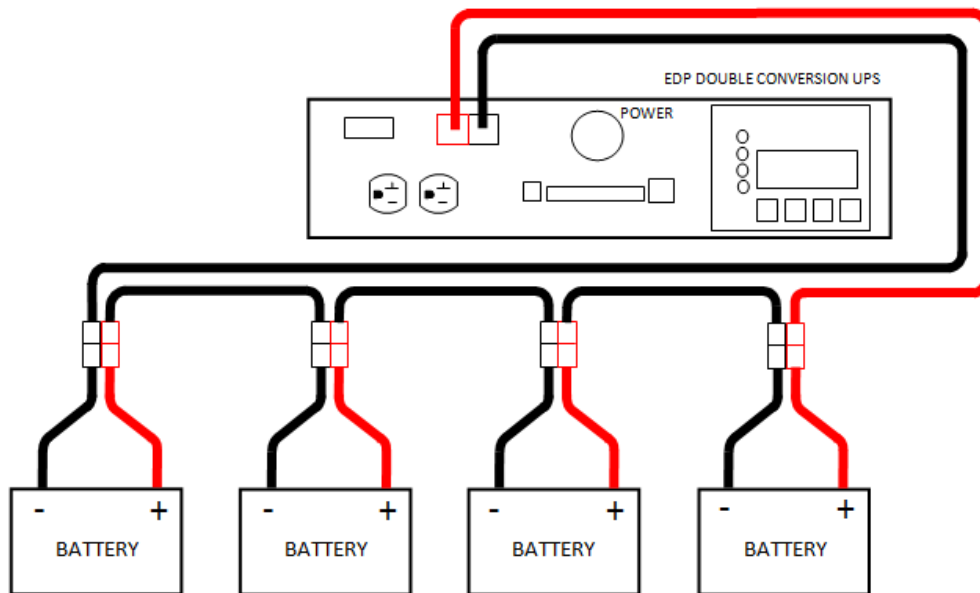


Fig. 4-5: 2.0kVA EDP model, 48VDC Battery Harness Kit

4. Place the batteries on the shelves of the enclosure with the positive terminal facing out. Choice of cabinet enclosure will dictate exact battery placement. Space the batteries approximately 25-mm (1 inch) apart to provide adequate airflow.
5. Route the main harness of the battery harness kit along the right side of the cabinet enclosure. The interconnecting harnesses will be used to connect each individual battery to the main harness. If terminal covers are necessary to prevent accidental short circuits, place them over the ends of the interconnecting harness wires at this time.
6. Batteries are wired in series, connecting the negative post of one battery to positive post of the next. Battery cables and terminals are color coded to aid in correct wiring. Black terminal is negative (-); red terminal is positive (+).
7. Use of an anti-oxidation compound, such as NO-OX-ID "A-Special"² is recommended at each battery termination including ring lugs and threaded hardware. **Use fully insulated tools only when tightening battery connections.**
8. After completing all connections to the battery terminals, use a digital multi-meter (DMM) to verify proper voltage and polarity at the battery harness connector that terminates to the power supply DC input port. For 2-battery systems, indicated voltage should be approximately 24 volts or slightly higher, 3-battery systems should be approximately 36 volts or slightly higher, and 4-battery systems should be approximately 48 volts or slightly higher. When the red and black meter probes are connected to the corresponding colored terminals of the battery harness connector, the meter should indicate positive (+) voltage, assuming proper connections at the meter itself.



WARNING / AVERTISSEMENT



If voltage and polarity indications do not correspond to those described above, determine the cause before mating the battery connector to the power supply. Incorrectly wired batteries can cause personal injury or permanent damage to equipment.

Si les indicateurs de tension et de polarité ne correspondent pas à ceux décrits ci-dessus, déterminez la cause avant d'accoupler le connecteur de la batterie à l'alimentation électrique. Des batteries mal câblées peuvent provoquer des blessures ou des dommages permanents à l'équipement.

9. Attach the body of the temperature sensor probe to the side of the center battery using self-adhesive tape rated for use in wide temperature ranges.

Care and Maintenance of Batteries

Once installed, batteries must not be allowed to sit idle without receiving a charge. The power supply must be started, even in the absence of load, and allowed to charge the batteries. Initial charging to ensure full reserve time may require as long as seven days to accomplish. Batteries connected to an idle system without receiving a charge can be irreparably damaged, thereby requiring replacement before the system can be fully commissioned into service.

NOTE: The charging requirement becomes a special consideration when the optional Battery Balance Manager is integrated into the cabinet installation. The BBM Plus product may be connected **only** when the power supply is fully operational and capable of charging the battery.

2 NO-OX-ID-"A-Special" is a registered trademark of Sanchem, Inc, Chicago, IL

Startup and Operation

Section 5: Startup and Operation

The power supply is ready to be placed into operation after it has been installed in its enclosure and all input and output connections have been made. Ensure that AC input power is available to the power supply receptacle then perform the following steps in sequence.



The following steps in the startup procedure MUST be performed exactly as presented; otherwise, permanent damage to the power supply may result. Observe the LED indicators and the LCD display as a guide in performing the startup procedure.

Les étapes suivantes de la procédure de démarrage DOIVENT être effectuées exactement comme présenté; Dans le cas contraire, un endommagement permanent de l'alimentation peut entraîner. Observez les indicateurs LED et l'écran LCD comme guide lors de la procédure de démarrage.

1. Verify that all connections and initial wiring is complete, as previously outlined and described.
2. Connect the battery harness to the Battery receptacle of the UPS. NOTE: The LCD screen and LEDs will illuminate, but the power supply will not activate its output until AC Line voltage has been applied, or pins 1 and 2 on the green, left most terminal block have been shorted together to initiate a Cold Start.
3. Operate the utility AC circuit breaker serving the power supply to the ON position. If a SATS or STS have been installed in the cabinet, operate the UPS Input circuit breaker to the ON position.
4. Operate the Input circuit breaker on the power supply and the power supply will begin to qualify AC line voltage and the Output will be activated.
5. The LED indicators on the front panel of the power supply should be illuminated as follows upon startup from the AC utility line:

OUTPUT STATUS: Solid Green

BATTERY STATUS: Solid Green

INVERTER STATUS: Solid Green

UPS ALARM/FAULT: OFF (If Lit, investigate any alarms or faults prior to continuing)

6. After the power supply initializes, the status screen should now be scrolling on the LCD display and should look similar to this:

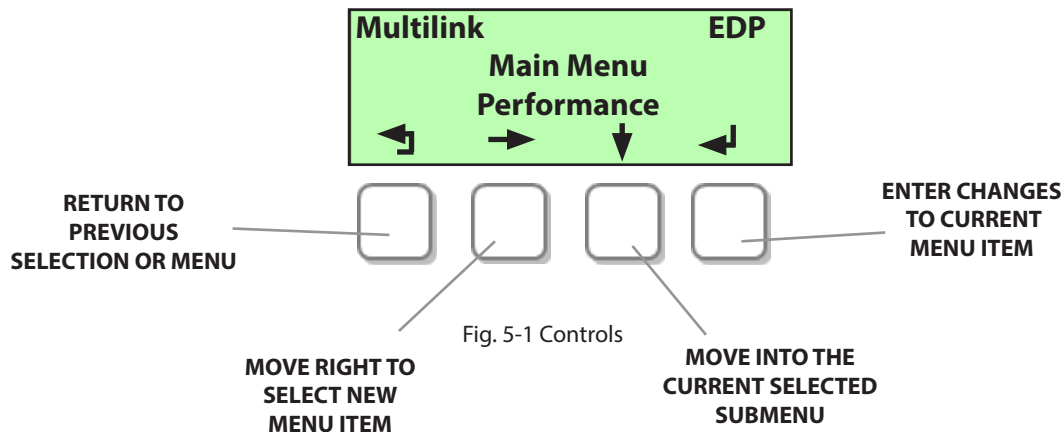


7. The power supply will automatically begin charging the batteries after AC Line voltage has been qualified.
8. The power supply is now operating in its normal double conversion mode, assuming application of appropriate AC line power and load.

Front Panel LCD Menus

The status of the power supply is indicated in the various menus available on the LCD display located on the front panel of the power supply. Operating parameters and various configuration items are presented to the user.

Four buttons, located below LCD display, provide user control for navigating the various menu items. Button functions are listed above each button on the bottom line of the LCD and may change depending on the menu item currently shown.



LCD Screen Display:

The LCD assembly chosen for the EDP Double Conversion series power supplies has been designed for use in a wide temperature range. As such, the characters displayed on the screen should be visible under nearly all temperature conditions. The user may note that under colder or hotter than normal conditions, the characters may fade and become less distinct as compared to those viewed at lower temperatures. The faded characters are temporary and will darken as temperature decreases.

The backlight feature of the LCD display is timed to automatically shut off 5 minutes after the last pushbutton is pressed. The auto-shutoff feature extends the life of the backlight.

LCD Menu Tree

The EDP Double Conversion menu layout allows for easy access to system performance parameters, configuration settings, history statistics, and operating conditions. A main menu structure provides the user with various menus to view and configure each UPS. The following sections describe the menu tree and each menu item.

Menu Options and Descriptions

Performance: Displays current measured operating conditions for various parameters.

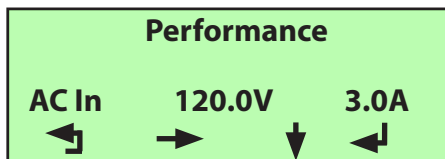
History: Displays number of events, current active event time, and previous event history.

Battery Status: Provides measured battery voltage, charger state, and charger status.

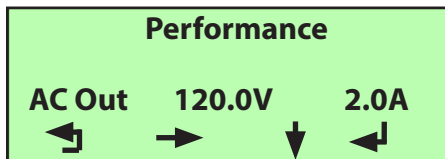
Configuration: Provides all user configurable options such as IP settings, date, time, etc.

Firmware: Displays the current firmware build and date of build.

Performance Main Menu



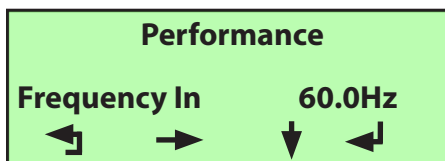
AC Input voltage and current as measured by the UPS.
Use the Right button (second button from left) to select next item.



Displays AC Output voltage and current as measured by the UPS.



Battery voltage and charge/discharge current as measured by the UPS.

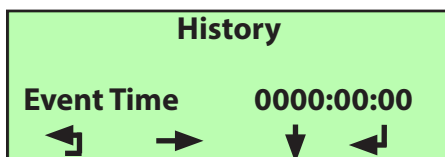


Measured AC Input frequency.

History Menu



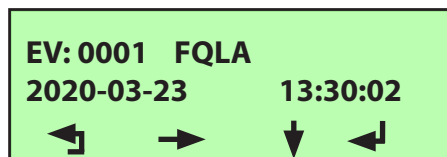
Displays the number of **events** for the UPS.
Use the Right button to select next item.



This is the **elapsed time** of the current active event, such as On Battery.



Event list showign the history of all events for the UPS.
Press the Down button (third button from left) to enter the list.

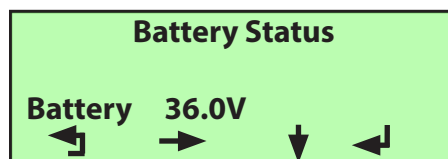


The currently viewed event number and alarm/fault event that occurred. Time and date of the event are shown on this line. Up to 1,000 events may be shown. Press the Down button to enter the list. Press the Left button (Left most ubtton) to return to the History menu. User may have to repeatedly press this button to return to the upper level menus.

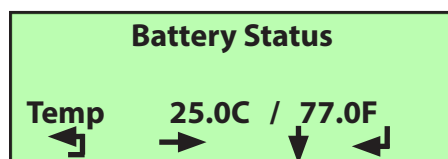
Refer to the following chart for event abbreviation descriptions for all alarm and fault events. Alarms or faults that are currently active will have an abbreviation appended with "A". When the alarms are cleared, an event occur showing the removal of the alarm. This abbreviation will be appended with an "R".

Alarm Description	Active Alarm Abbreviation	Recovered Alarm Abbreviation
AC Input Voltage High	ACHA	ACHR
AC Input Voltage Low	ACLA	ACLR
Frequeny High	FQHA	FQHR
Frequency Low	FQLA	FQLR
AC Line Voltage Failure	ACFA	ACFR
Battery Voltage High	BVHA	BVHR
Battery Voltage Low	BVLA	BVLR
Battery Temp High	BTHA	BTHR
Battery Temp Low	BTLA	BTLR
Temp Sensor Disconnected	TSOA	TSOR
Temp Sensor Shorted	TSSA	TSSR

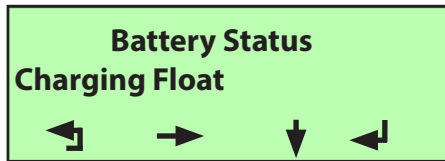
Battery Status Menu



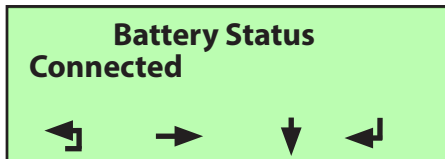
Displays the current measured **battery voltage** and charge/discharge **current**. Use the Right button (second button from left) to select next item.



Battery temp measured by external temp prove. Displays Celcius and Fahrenheit.



Indicates the state of the **charger**. OFF, Bulk and Float states are displayed.

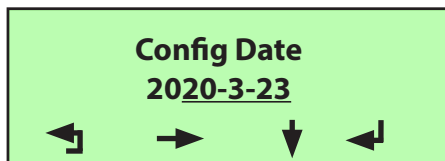


Indicates whether the battery string is connected, disconnected, or in test mode

Configuration Menu



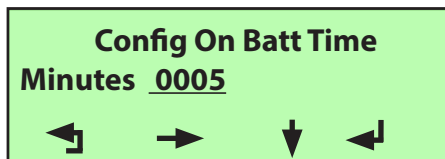
Allows the user to change the **date**. This view is similar for all menu items. Press the Down button (third from the left) to enter the selected items submenu. Any items that are changed and not saved by pressing the Enter button will revert to its previously-stored state.



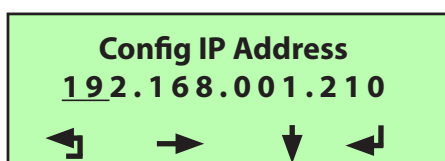
The **date** that can be changed may be selected using the Right or Left buttons. The selected item will be underlined. Use the Down button to select the new date. Press the Enter button (right most button from the left) to save the new date. Press the Back button to return. Dates that are not saved will return to previously-saved date.




Time may be adjusted based on a 24-hour clock format using the Right or Left buttons. The selected item will be underlined. Use the Down button to select the new time. Press the Enter button to save the new time. Press the Back button to return. Dates that are not saved will return to previously-saved date.



On Batt Timer is used to delay the activation of the On Batt Relay contact. Use the Right or Left buttons to select the minutes position. Press the Enter button to save the new On Batt Timer delay. Press the back button to return to the previous screen.




The Default **IP address** is 192.168.1.210. The user may apply a new static IP address. Use the Right or Left buttons to select the position to change. Use the Down button to select a new number for that position. Press Enter to save the new IP address. If changed, the **Subnet Mask** and **Gateway** must also change.


Config Sub Net Addr
255.255.255.000


When necessary, the user may change the **Subnet Mask** address. Use the Right or Left buttons to select the position to change. Use the Down button to select a new number for that position. Press Enter to save the new Subnet Mask.

When necessary, the user may change the Gateway address. Use the

Config Gateway Addr
192.168.001.001



Right or Left buttons to select the position to change. Use the Down button to select a new number for that position. Press Enter to save the new Gateway address.

Clear All Events
0005


The user may clear all events by pressing the Down button and selecting the Enter button. The Right and Down buttons will disappear after pressing the Down button. The currently shown number of events will then be cleared. Press the Back button to return to the previous menu.


Restart


This item restarts the communication board of the UPS. Press the Down button to enter the item and press the Enter button to restart the communication board. Network connectivity will be lost momentarily.


Config to Default IP


The user may use the Config to Default IP to reset the IP address, Subnet Mask and default gateway address to factory defaults. Press the Enter button to reset the IP. Device may lose network connectivity.

Firmware Menu

Firmware
Version 2.217


Provides the firmware version for the communications card.

Firmware
June 3 2022 1:30:00


Provides the date and time of the firmware build.

Ethernet Communication

Section 6: Ethernet Communication

Embedded in all EDP Double Conversion UPS models is a network device that allows the user to monitor operating conditions and send notifications of the UPS from a Network Management System (NMS) or for on-site use in configuration, maintenance, and monitoring the UPS. Access to a Desktop or Laptop PC/MAC is required.

NOTE: Configuration of the UPS' network device is recommended prior to use in the field.

Connection Setup

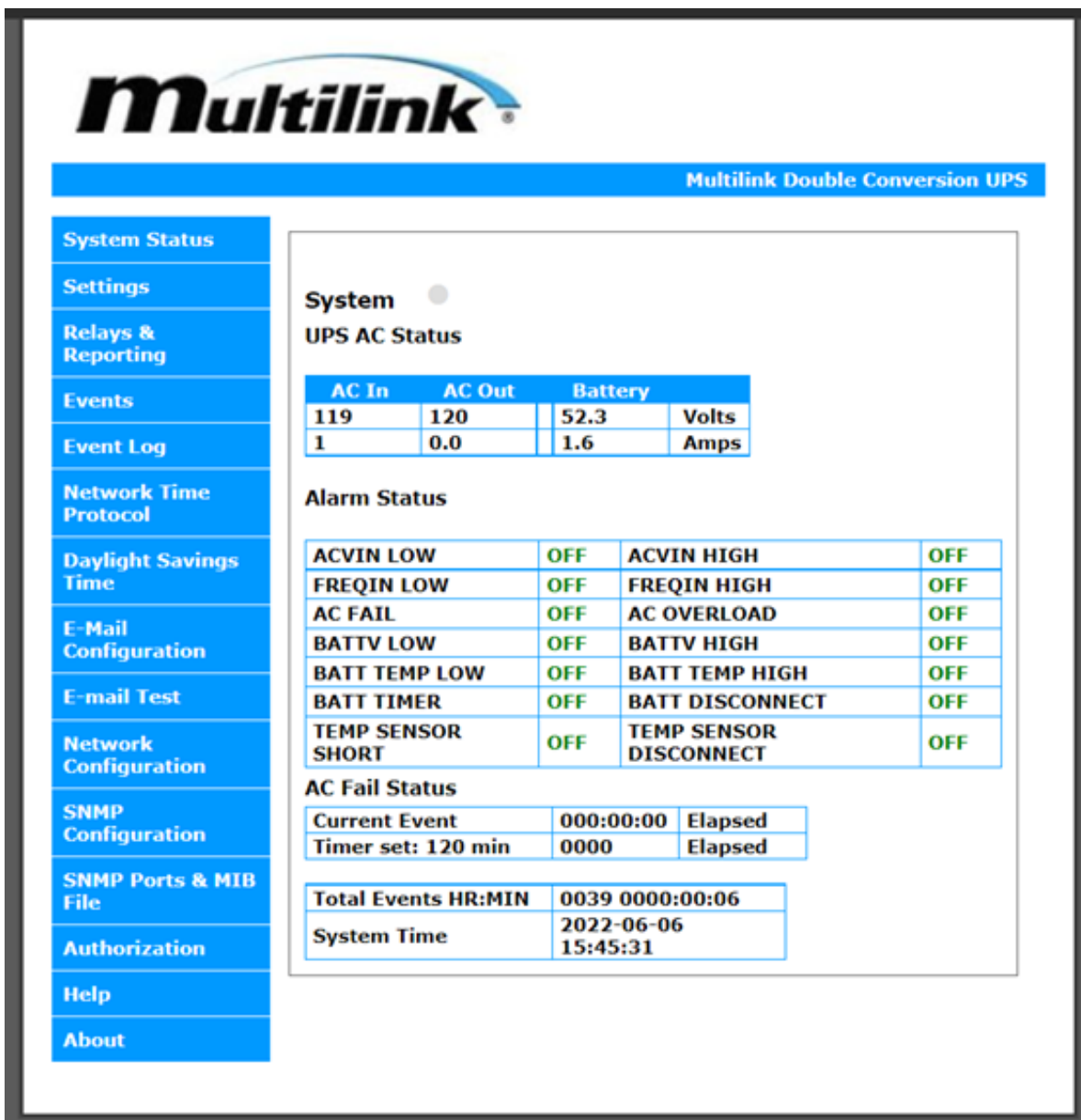
The following instructions shall be used to properly connect, configure, and monitor the network device in the UPS. These instructions assume the UPS is running, the user has local access to the UPS prior to connecting the UPS to the DOT/ITS network, and the user is operating a Windows XP/7 Based machine. Refer to the **Troubleshooting** section for network communication and connection problems.

1. With the UPS operating in its normal mode, connect a straight-through Ethernet cable to the "Ethernet" port on the front panel of the UPS. If the UPS is not operating in its normal mode, refer to **Section 5** for "Startup and Operations".
2. Connect the opposing end of the Ethernet cable to the Ethernet port of the Desktop or Laptop.
3. Verify the current IP Address of the UPS by scrolling through the configuration menu. **The factory IP Address** of the UPS is **192.168.1.210**.
4. The desktop or laptop's network interface card must be configured to the same IP range as the UPS in order to configure the UPS.
5. Navigate to the "Network and Sharing Center" and select "Change adapter settings" from the left panel.
6. Right click on the "Local Area Connection" and select "Properties". Click to highlight "Internet Protocol Version 4 (TCP/IP) and click the "Properties" button below.
7. Highlight the "Use the following IP Address" radio button and enter an IP Address in the range of 192.168.1.1-254. For example: 192.168.1.50. Be sure not to enter the UPS' IP Address in this textbox! If another IP Address has already been assigned to the UPS, place an IP Address in the same range of the UPS' IP Address in the textbox.
8. Enter the appropriate subnet mask into the "Subnet mask" text box if it has not already been auto-filled. For example: if 192.168.1.50 is the IP Address, the Subnet mask would be 255.255.255.0.
9. Select the "OK" button and then select "Close" on the Properties window. The computer's network interface card may now begin communication with the UPS.
10. Open a preferred web browser and enter the UPS' IP Address into the address box is display the embedded web page.
11. The user may be prompted with a user authentication page. Each UPS has factory default user ID and password. The default ID is "user" and the default password is "multilink".

Webpage Description

In each UPS, an embedded webpage provides the current operating conditions of the UPS as well as previous history of events, configuration settings, and maintenance tools. The intuitive design of the webpage makes it easy to find parameter values, views lists of pertinent alarms, faults, and events, and configure the UPS network settings to inform technicians via email or SNMP of timely events associated with each UPS. In the following section, each tab of the webpage will be explained

System Status: This is the main menu for each embedded webpage. It provides operating parameters, alarm indicators, currently active alarms, state of operation, timer info, and provides navigation to additional tabs for further information and configuration of each UPS.



Multilink

Multilink Double Conversion UPS

System ●

UPS AC Status

AC In	AC Out	Battery	
119	120	52.3	Volts
1	0.0	1.6	Amps

Alarm Status

ACVIN LOW	OFF	ACVIN HIGH	OFF
FREQIN LOW	OFF	FREQIN HIGH	OFF
AC FAIL	OFF	AC OVERLOAD	OFF
BATTV LOW	OFF	BATTV HIGH	OFF
BATT TEMP LOW	OFF	BATT TEMP HIGH	OFF
BATT TIMER	OFF	BATT DISCONNECT	OFF
TEMP SENSOR SHORT	OFF	TEMP SENSOR DISCONNECT	OFF

AC Fail Status


Current Event	000:00:00	Elapsed
Timer set: 120 min	0000	Elapsed

Total Events HR:MIN	0039 0000:00:06
System Time	2022-06-06 15:45:31

Clock and Timer: This page provides the ability to update the clock and date as well as the On Battery Timer delay for the On Batt relay. Be sure to click "Save" to save any changes made.

Multilink Double Conversion UPS											
System Status	Clock Settings <table><tr><td>Day:</td><td><input type="text" value="25"/></td></tr><tr><td>Month:</td><td><input type="text" value="7"/></td></tr><tr><td>Year:</td><td><input type="text" value="18"/></td></tr><tr><td>Hour:</td><td><input type="text" value="9"/></td></tr><tr><td>Minute:</td><td><input type="text" value="26"/></td></tr></table> System Clock: 2018-07-25 09:26:32	Day:	<input type="text" value="25"/>	Month:	<input type="text" value="7"/>	Year:	<input type="text" value="18"/>	Hour:	<input type="text" value="9"/>	Minute:	<input type="text" value="26"/>
Day:		<input type="text" value="25"/>									
Month:		<input type="text" value="7"/>									
Year:		<input type="text" value="18"/>									
Hour:		<input type="text" value="9"/>									
Minute:		<input type="text" value="26"/>									
Clock and Timer											
Message Options											
Events											
Event Log											
Network Time Protocol											
Daylight Savings Time											
E-Mail Configuration											
E-mail Test											
Network Configuration											
SNMP Configuration											
SNMP Ports & MIB											
	SSDC Timer Settings <table><tr><td colspan="2">On Battery Timer</td></tr><tr><td>Timer Minutes:</td><td><input type="text" value="120"/></td></tr></table> <input type="button" value="Save"/>	On Battery Timer		Timer Minutes:	<input type="text" value="120"/>						
On Battery Timer											
Timer Minutes:	<input type="text" value="120"/>										

Relays and Reporting: Displays the type of event message notifications that may be sent through email when the corresponding event occurs. The user may select or deselect a message if they do not wish to receive the notification when the event occurs. Be sure to click “Save” to save any changes made. Also allows for the user to configure each of the 5 front panel relays to a respective function as noted below.



Multilink Double Conversion UPS

System Status

Settings

Relays & Reporting

Events

Event Log

Network Time Protocol

Daylight Savings Time

E-Mail Configuration

E-mail Test

Network Configuration

SNMP Configuration

SNMP Ports & MIB File

Authorization

Help

About

UPS Message Options

☒ Enable On Battery Message

☒ Enable On Timer Message

☒ Enable Low Battery Message

☒ Enable Battery Temperature Message

☒ Enable UPS Shutdown Message

Relay 1:

1

Relay 2:

2

Relay 3:

3

Relay 4:

4

Relay 5:

5

(1) On Battery
(2) Timer Elapsed
(3) Low Battery
(4) Battery Temperature
(5) No AC Output (or other severe issue)

Save

Events: This page provides a means for clearing the events as well as testing the alarm relays for maintenance or functionality purposes.

Multilink Double Conversion UPS	
<ul style="list-style-type: none"> System Status Clock and Timer Message Options Events Event Log Network Time Protocol 	<h3>Event Reset</h3> <div> <input type="button" value="Clear Events"/> <input type="button" value="Test Relays"/> </div>

Events Log: Presents a list of events that have occurred during UPS operation. Events are listed in a list from newest to oldest with an abbreviation for the alarm that took place, date, and time of the event. When an alarm is active, the abbreviation for the alarm will be appended with an "A" for "active". When the UPS has recovered from the active alarm, it will be appended with an "R" for "recovered". Click on the Help page for definitions of all abbreviated events. For a printer friendly version of the log, click "Printer Friendly".

Multilink Double Conversion UPS																			
<ul style="list-style-type: none"> System Status Clock and Timer Message Options Events Event Log Network Time Protocol Daylight Savings Time 	<h3>Event Log</h3> <p>Printer Friendly</p> <hr/> <table> <thead> <tr> <th>Event Type</th> <th>Date</th> </tr> </thead> <tbody> <tr><td>0009 FQLR</td><td>2018-07-25 09:23:27</td></tr> <tr><td>0008 ACLR</td><td>2018-07-25 09:23:27</td></tr> <tr><td>0007 FQLA</td><td>2018-07-25 09:22:50</td></tr> <tr><td>0006 BVHA</td><td>2018-07-25 09:22:46</td></tr> <tr><td>0005 ACLA</td><td>2018-07-25 09:22:46</td></tr> <tr><td>0004 FQLA</td><td>2018-07-25 09:19:34</td></tr> <tr><td>0003 BVHA</td><td>2018-07-25 09:19:31</td></tr> <tr><td>0002 ACLA</td><td>2018-07-25 09:19:30</td></tr> </tbody> </table>	Event Type	Date	0009 FQLR	2018-07-25 09:23:27	0008 ACLR	2018-07-25 09:23:27	0007 FQLA	2018-07-25 09:22:50	0006 BVHA	2018-07-25 09:22:46	0005 ACLA	2018-07-25 09:22:46	0004 FQLA	2018-07-25 09:19:34	0003 BVHA	2018-07-25 09:19:31	0002 ACLA	2018-07-25 09:19:30
Event Type	Date																		
0009 FQLR	2018-07-25 09:23:27																		
0008 ACLR	2018-07-25 09:23:27																		
0007 FQLA	2018-07-25 09:22:50																		
0006 BVHA	2018-07-25 09:22:46																		
0005 ACLA	2018-07-25 09:22:46																		
0004 FQLA	2018-07-25 09:19:34																		
0003 BVHA	2018-07-25 09:19:31																		
0002 ACLA	2018-07-25 09:19:30																		

Network Time Protocol: This page allows the user to setup a NTP server to provide network date and time

to the UPS. This requires the UPS to have internet access. The user can also manually input a UTC (GMT) offset for proper time zone placement. Be sure to click "Save" to save any changes made.

Multilink Double Conversion UPS

System Status	<h2 style="margin: 0;">NTP Configuration</h2> <p>This page allows the configuration of the NPT server</p> <p>Note: Server field limited to 32 characters</p> <p>Enter the settings below:</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> NTP Enabled <input checked="" type="checkbox"/> NTP Server: <input type="text" value="time-a.timefreq.bldrdoc.gov"/> GMT Offset: + ▼ Hour 00 ▼ Min 00 ▼ <div style="text-align: center; margin-top: 5px;"><input type="button" value="Save"/></div> </div> <p>NTP Time Sync: NA NTP Status: Server Not Resolved DST State : ON System Time: 2018-07-25 09:28:42</p> <p>Note: May take up to 60 seconds to align system clock</p>
Clock and Timer	
Message Options	
Events	
Event Log	
Network Time Protocol	
Daylight Savings Time	
E-Mail Configuration	
E-mail Test	
Network Configuration	
SNMP Configuration	

Daylight Savings Time: This page allows the user to manually setup the UPS to adjust its time based on Daylight Savings Time, when enabled. Be sure to click "Save" to save any changes made.

Multilink Double Conversion UPS

System Status	<h2 style="margin: 0;">DST Configuration</h2> <p>This page allows the configuration DST</p> <p>Enter the settings below:</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> DST Enabled <input checked="" type="checkbox"/> Starts on 2nd ▼ Sunday in March ▼ at 01:59:59 Ends on 1st ▼ Sunday in November ▼ at 01:59:59 <div style="text-align: center; margin-top: 5px;"><input type="button" value="Save"/></div> </div> <p>DST Start: 2018-03-11 01:59:59 DST Stop : 2018-11-04 01:59:59</p>
Clock and Timer	
Message Options	
Events	
Event Log	
Network Time Protocol	
Daylight Savings Time	
E-Mail Configuration	
E-mail Test	
Network Configuration	
SNMP Configuration	

Email Config: Email configuration allows the user to setup email recipient and SMTP server information for which email notifications will be forwarded. This page provides information for each field in order to setup the SMTP forwarder. If necessary, contact the Network Administrator for SMTP IP address and user authentication information, if required by the network. An example is shown in the image below for setup. Be sure to click "Save" to save any changes made.

Multilink Double Conversion UPS	
System Status	<h3>Email Configuration</h3> <p>This page allows the configuration of the SSCD UPS Alert Email settings.</p> <p>Note: Fields are limited to between 22 (password) and 32 depending on field</p> <ul style="list-style-type: none"> • Contact: "Who to Contact in an Alarm Condition" • Location: "The Location of the UPS" • SMTP Server: Typically in the form "xxx.xxx.com" • To: Typically in the form "xxx@xxx.com" <p>Enter the settings below:</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>Contact: <input type="text" value="Tech1@maintenance.com"/></p> <p>Location: <input type="text" value="1st and Main"/></p> <p>Port: <input type="text" value="25"/></p> <p>User name: <input type="text"/></p> <p>Password: <input type="password"/></p> <p>Server Addr: <input type="text" value="10.20.0.207"/></p> <p>Email Addr: <input type="text" value="EDPUPS@gomultilink.com"/></p> <p style="text-align: center;"><input type="button" value="Save"/></p> </div>
Clock and Timer	
Message Options	
Events	
Event Log	
Network Time Protocol	
Daylight Savings Time	
E-Mail Configuration	
E-mail Test	
Network Configuration	
SNMP Configuration	
SNMP Ports & MIB File	

Email Test: After the Email configuration portion of each UPS has been filled out, the user can test the connection by entering this page. Click "Send Test Message" and the UPS will send an email to the email recipient listed. If an email has been received, a "success" message shall display, and the user can verify that an email has been received at the recipient's email address. The webpage will also display a message stating that the test email has been processed by the email server.

Multilink Double Conversion UPS

System Status
Clock and Timer
Message Options
Events
Event Log
Network Time Protocol
Daylight Savings Time
E-Mail Configuration
E-mail Test
Network Configuration
SNMP Configuration
SNMP Ports & MIB File

Send E-Mail Test

- **SMTP Server:** Typically in the form "xxx.xxx.com"
- **To:** Typically in the form "xxx@xxx.com"
- **User:** Your Email Account
- **Message:** Your Email Password

(Note Your SMTP server may not require a server name or password.)
(Note SLL currently not implemented.)

SMTP Server:

10.20.0.207

Port:

25

User Name:

Password:

To:

edp1000@gomultilink.com

Subject:

1st and Main

Message:

Tech1@maintenance.com

Send Test Message

Network Config: This portion of the webpage provides the user with the ability to modify the network settings for the UPS. The MAC address of the UPS will be listed along with the Host Name, which is the currently viewed UPS. It is recommended to change the Host Name for each UPS to something useful, such as the location of the UPS. The user may assign a new IP address, Gateway, Subnet Mask, and DNS address for the UPS. Changing these settings may disrupt network connectivity. Be sure to click "Save Config" to save any changes made.

Multilink Double Conversion UPS	
<div>System Status</div> <div>Clock and Timer</div> <div>Message Options</div> <div>Events</div> <div>Event Log</div> <div>Network Time Protocol</div> <div>Daylight Savings Time</div> <div>E-Mail Configuration</div> <div>E-mail Test</div> <div>Network Configuration</div> <div>SNMP</div>	<h3>Network Configuration</h3> <p>This page allows the configuration of the board's network settings.</p> <div style="border: 1px solid red; padding: 5px; margin: 10px 0;"> CAUTION: Incorrect settings may cause the board to lose network connectivity. Recovery options will be provided on the next page. </div> <p>Enter the new settings for the board below:</p> <div style="border: 1px solid gray; padding: 10px;"> <p>MAC Address: <input type="text" value="D8:80:39:C1:76:52"/></p> <p>Host Name: <input type="text" value="SSDC"/></p> <p>IP Address: <input type="text" value="192.168.1.210"/></p> <p>Gateway: <input type="text" value="192.168.1.1"/></p> <p>Subnet Mask: <input type="text" value="255.255.255.0"/></p> <p>Primary DNS: <input type="text" value="192.168.1.1"/></p> <p>Secondary DNS: <input type="text" value="0.0.0.0"/></p> <p style="text-align: right;"><input type="button" value="Save Config"/></p> </div>

SNMP Config: This page allows the user to setup SNMP security with Read and Write community strings. These field(s) are required for each UPS to provide SNMP and TRAP messages between the UPS and network management software suites or MIB browsers.

Multilink Double Conversion UPS	
<div>System Status</div> <div>Clock and Timer</div> <div>Message Options</div> <div>Events</div> <div>Event Log</div> <div>Network Time Protocol</div> <div>Daylight Savings Time</div> <div>E-Mail Configuration</div> <div>E-mail Test</div> <div>Network Configuration</div> <div>SNMP</div>	<h3>SNMP Community Configuration</h3> <p>Read/Write Community String configuration for SNMPv2c Agent.</p> <p>Configure multiple community names if you want the SNMP agent to respond to the NMS/SNMP manager with different read and write community names. If less than three communities are needed, leave extra fields blank to disable them.</p> <p>Note: Community String are limited to 15 characters</p> <div style="border: 1px solid gray; padding: 10px;"> <p>Read Comm1 : <input type="text" value="public"/></p> <p>Read Comm2 : <input type="text" value="read"/></p> <p>Read Comm3 : <input type="text"/></p> <p>Write Comm1: <input type="text" value="private"/></p> <p>Write Comm2: <input type="text" value="write"/></p> <p>Write Comm3: <input type="text" value="public"/></p> <p style="text-align: right;"><input type="button" value="Save Config"/></p> </div>

SNMP Ports and MIB: The user will setup the SNMP agent and Trap receiver ports and IP addresses for which SNMP messages and TRAPs may be sent. The MIB file, which is required for network management software or MIB browsers, is also available by clicking on the hyperlink to download the MIB file.

Multilink Double Conversion UPS	
System Status	SNMP MIB SNMP MIB File (click hyper-link to download)
Clock and Timer	
Message Options	SNMP Ports UDP port range is 0 to 65535, with default SNMP Agent port 161 (Unit's SNMP inbound request port) and SNMP Network Monitoring Port 162 (Unit's Trap / Notification outbound to destination port)
Events	
Event Log	
Network Time Protocol	SNMP Notification IP Addresses The UPS will send any Trap / Notification to the Enabled IP addresses listed below
Daylight Savings Time	
E-Mail Configuration	
E-mail Test	
Network Configuration	
SNMP Configuration	
SNMP Ports & MIB File	
Authorization	
Help	
About	

SNMP Agent:

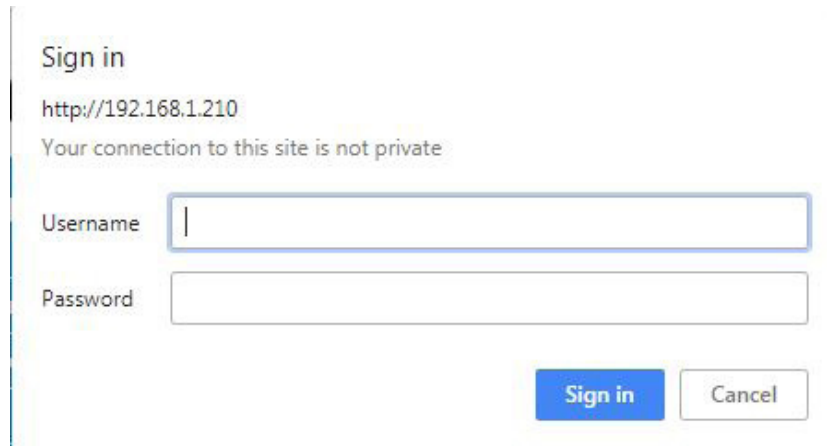
SNMP NMS :

Notification Destinations:

IP1
Enabled: ☒
Address:

IP2
Enabled: ☒
Address:

Authorization: This page is used for setting up a custom username and password. To enter this menu, enter the current username and password. This may be the default username and password. Once this has been entered, the user may change the user ID and password. Contain Multilink for information regarding errors in username or password submission.



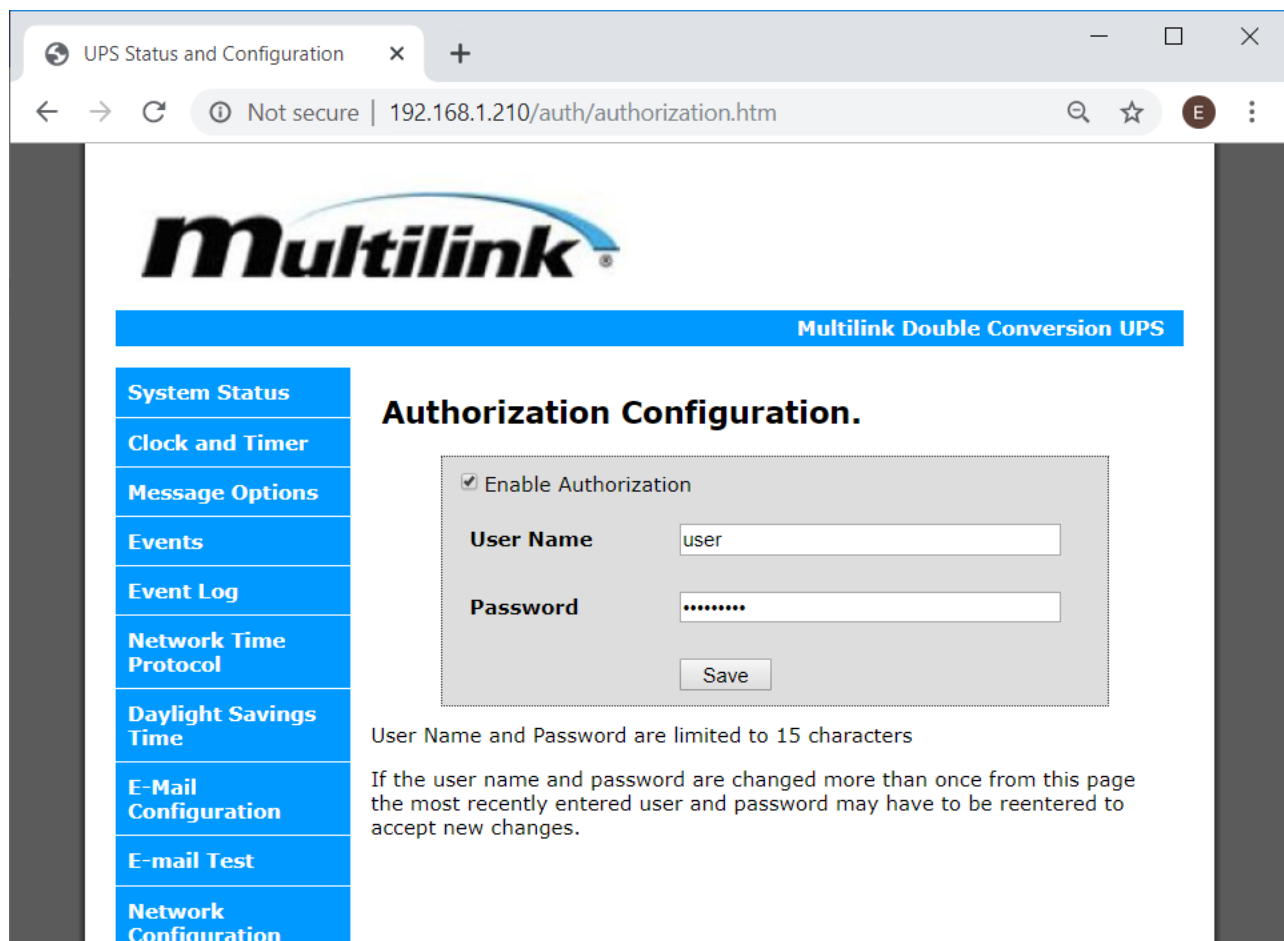
Sign in

http://192.168.1.210

Your connection to this site is not private

Username

Password



UPS Status and Configuration x +

← → ↻ ⓘ Not secure | 192.168.1.210/auth/authorization.htm 🔍 ☆ E ⋮

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Multilink Double Conversion UPS

- System Status
- Clock and Timer
- Message Options
- Events
- Event Log
- Network Time Protocol
- Daylight Savings Time
- E-Mail Configuration
- E-mail Test
- Network Configuration

Authorization Configuration.

☒ Enable Authorization

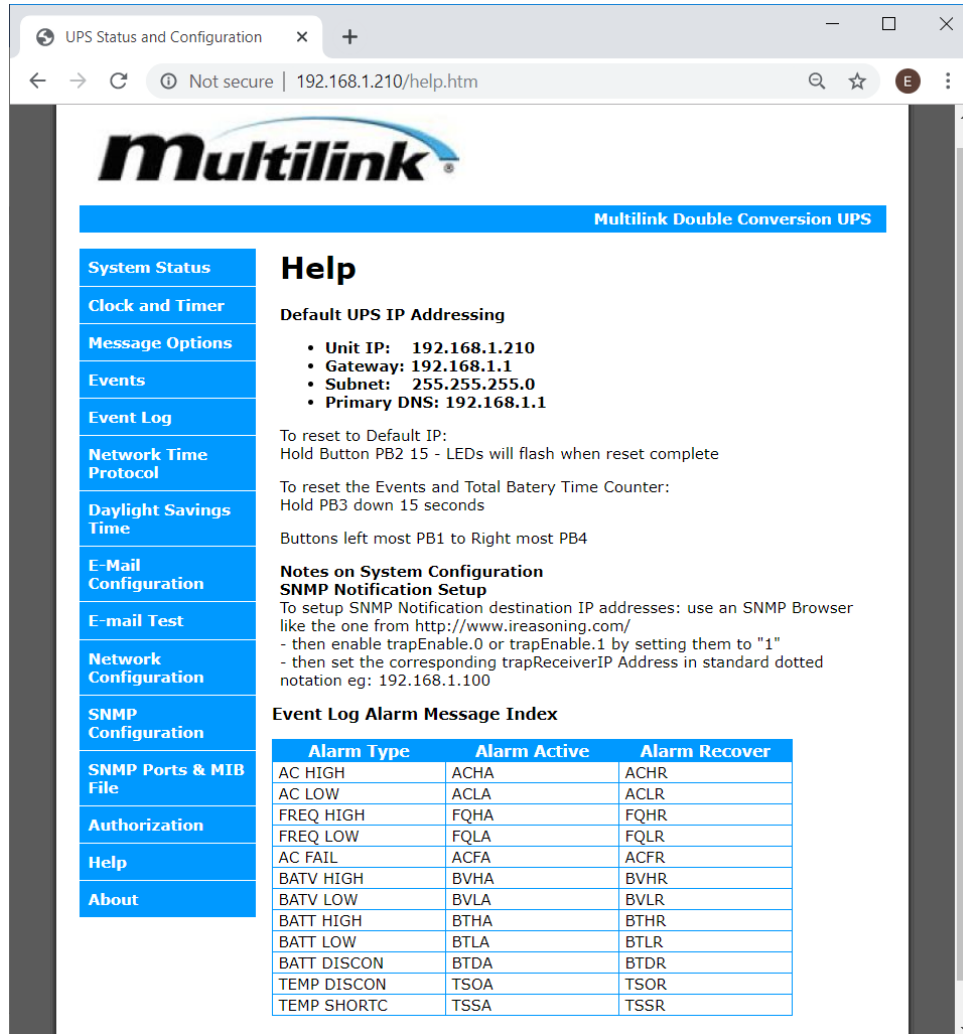
User Name

Password

User Name and Password are limited to 15 characters

If the user name and password are changed more than once from this page the most recently entered user and password may have to be reentered to accept new changes.

Help Page: The help page provides Default setting information, instructions to reset the IP address and Events counter using the buttons on the front panel of the UPS. It also provides information for SNMP communication and an index showing the definitions of the abbreviations used for alarm indication and event logging.



UPS Status and Configuration x +

← → ↻ ⓘ Not secure | 192.168.1.210/help.htm 🔍 ☆ E ⋮

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Multilink Double Conversion UPS

System Status

Help

Default UPS IP Addressing

- Unit IP: 192.168.1.210
- Gateway: 192.168.1.1
- Subnet: 255.255.255.0
- Primary DNS: 192.168.1.1

To reset to Default IP:
Hold Button PB2 15 - LEDs will flash when reset complete

To reset the Events and Total Battery Time Counter:
Hold PB3 down 15 seconds

Buttons left most PB1 to Right most PB4

Notes on System Configuration

SNMP Notification Setup

To setup SNMP Notification destination IP addresses: use an SNMP Browser like the one from <http://www.ireasoning.com/>

- then enable trapEnable.0 or trapEnable.1 by setting them to "1"
- then set the corresponding trapReceiverIP Address in standard dotted notation eg: 192.168.1.100

Event Log Alarm Message Index

Alarm Type	Alarm Active	Alarm Recover
AC HIGH	ACHA	ACHR
AC LOW	ACLA	ACLR
FREQ HIGH	FQHA	FQHR
FREQ LOW	FQLA	FQLR
AC FAIL	ACFA	ACFR
BATV HIGH	BVHA	BVHR
BATV LOW	BVLA	BVLR
BATT HIGH	BTHA	BTHR
BATT LOW	BTLA	BTLR
BATT DISCON	BTDA	BTDR
TEMP DISCON	TSOA	TSOR
TEMP SHORTC	TSSA	TSSR

System Status

Clock and Timer

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Daylight Savings Time

E-Mail Configuration

E-mail Test

Network Configuration

SNMP Configuration

SNMP Ports & MIB File

Authorization

Help

About

About Page: The About shows the current webpage and UPS firmware build numbers, time, and date.



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Multilink Double Conversion UPS

System Status

About

UPS Web Version:	2022-04-20
UPS Firmware Version:	2.219
Build Date:	May 9 2022 16:32:29

Settings

Relays & Reporting

Power Supply Shutdown

Section 7: Power Supply Shutdown

If power supply shutdown becomes necessary at any time, observe the following procedure:

Operate the Input breaker to the OFF (O) position or operate the circuit breaker serving utility power to the power supply to the OFF position. If a SATS or STS is in use, ensure the UPS Input circuit breaker on the SATS or STS is in the OFF position.

Disconnect the battery harness from the battery receptacle on the front panel of the UPS.

UPS is now shutdown and completely isolated from both power sources.

Options

Section 8: Options

The EDP Double Conversion series power supplies support several optional features appearing in the following list. The options and accessories listed enhance the usefulness of your power supply system as aids to installation and servicing and are available through Multilink as extra-cost items. Part numbers are listed as single piece ordering options.

UPS Packages

EDP UPS packages contain the required equipment for a complete, turnkey power supply solution. The kit contains an EDP Double Conversion UPS, Safety Automatic Transfer Switch, power harness, battery harness kit, temperature probe, pluggable terminal blocks, and this instruction manual. Battery options are available but are not included in the UPS packages. Please contact Multilink Inc. for available options.

Battery Cable Kits and Accessories

The following battery cable kits have been designed for 24V, 36V, and 48V applications. All harnesses are terminated using Anderson PP7535 housings and contacts.

870-230-20: 24V harness with 2, interconnect harnesses. Hardware included.

870-230-30: 36V harness with 3, interconnect harnesses. Hardware included.

870-230-10: 48V harness with 4, interconnect harnesses. Hardware included.

538-531-10: Battery terminal covers. Sold in single battery pairs, Black and Red.



Battery Heater Mats

In harsh climates where freezing temperatures can shorten the life of the batteries, Multilink has designed battery mat options for various battery string and cabinet shelf applications.

176-001-10: 3 Battery Heater Mat with thermostat for three batteries, single shelf cabinets.

20.75" X 13"

176-003-10: 2 Battery Heater Mat with thermostat for dual battery shelf cabinets. 13" X 14"

Transfer Switches

The Safety Automatic Transfer Switch (SATS) and Standard Transfer Switch (STS) provides automatic transfer of power between utility line voltage, UPS power, and Generator backup power (if applicable). The SATS or STS may be used with the EDP Double Conversion UPS series of power supplies to provide bypass and maintenance capability to the UPS without load interruption.

010-505-10: Safety Automatic Transfer Switch. Rack mounted. Provides Auto transfer, Generator hookup, and maintenance Bypass without loss of power to the load.

010-506-10: Standard Transfer Switch. Rack mounted. Provides Auto transfer and maintenance Bypass without loss of power to the load.

010-507-10: Standard Transfer Switch. Wall/Door mounted. Provides Auto transfer and maintenance Bypass without loss of power to the load.

Grounding Kits

If desired or required by state law, grounding kits are available to provide an isolated grounding point on the EDP Double Conversion UPS.

035-006-11: Ground lug kit.

Additional Parts

535-035-10: 9 Position, 3.5mm pitch, pluggable terminal block.

870-242-20: Power harness for EDP UPS.

172-002-10: Remote battery temperature probe with RJ11 plug. 10'.

Maintenance and Troubleshooting

Section 9: Maintenance and Troubleshooting



There are various circuit breakers and fuses inside the power supply. These items are not field-serviceable. The enclosure cover must not be removed in the field. Repair must be done by certified technicians.

Il y a divers disjoncteurs et fusibles à l'intérieur de l'alimentation. Ces articles ne sont pas réparables sur le terrain. Le couvercle du boîtier ne doit pas être retiré sur le terrain. La réparation doit être effectuée par des techniciens certifiés.

Preventative Maintenance

- For optimum performance from your power supply, the following maintenance items should be performed at least every six (6) months, especially in areas where the power supply is subjected to extreme heat or cold.
- Visually inspect the enclosure for signs of damage
- Inspect the external status lamps for proper operation
- Check the LCD display and the status LEDs for any alarm indications
- Check all electrical connections
- Check the batteries for signs of swelling, split cases or other damage
- Check and record individual battery voltages
- Check and clean battery terminals; bolts or wing nuts must be tight
- Measure and record AC output voltage
- Measure and record AC output current
- Measure and record DC battery string voltage
- Record all maintenance performed or parts replaced
- Verify the power supply is in its normal mode of operation as indicated by the LCD display. Most front panel LEDs should be illuminated green to indicate normal operation.
- Close and lock the enclosure

Troubleshooting

This troubleshooting guide has been designed to help you quickly locate and resolve common powering problems. The table assumes normal operation and configuration of the UPS at any given time. If you still cannot solve the problem, replace the power supply with a known good unit.

Operating Conditions	UPS LED/LCD Status	Corrective Action
No output voltage to load	Output Status LED is blinking and 0V and 0A are displayed on the LCD.	<ul style="list-style-type: none"> • Verify output wiring from the load to the cabinet and the power connector of the UPS. • Verify that the UPS is not overloaded. • Verify Line Voltage is within range. • Verify Battery Connector is connected, and Battery Voltage is within range. • Verify that UF fault is not present. If so, remove UPS for repair.
UPS will not transfer to Inverter Mode	UPS shuts down upon loss of Line power. LEDs and LCD may or may not still be powered. Inverter Status LED OFF.	<ul style="list-style-type: none"> • Verify Battery Connector is connected, and Battery Voltage is within range. • Verify that UPS is not overloaded. • Verify that UF fault is not present. If so, remove UPS for repair.
Battery string will not charge	LCD displays low battery voltage	<ul style="list-style-type: none"> • Verify that the Battery Connector is connected to the UPS front panel. • Verify charger current is present using DC current meter. • Check if battery casings are damaged or swollen. • Verify that UF fault is not present. If so, remove UPS for repair.
Excessive fan speed	LCD/LEDs may be inoperable	<ul style="list-style-type: none"> • Verify the correct battery harness connector is attached to the UPS. Refer to figures in Section 4. • Reduce load if UPS appears to be overloaded.

EDP UPS Specifications

Section 10: EDP UPS Specifications

Below are two charts containing specifications for all three EDP models. Various specifications are shared amongst all three models, with the 1.5kVA and the 2.0kVA models sharing the same chart. Please refer to the next two pages for model specifications.

1.0kVA EDP Double Conversion UPS Specifications

Parameter	Specifications	Notes
Dimensions	17.25" x 3.485" x 13.625"	WxHxD
Operating Temperature	-37°C to +74°C	-35°F to 165°F
Humidity	5 to 95%	Non-Condensing
Cooling System	Forced Air Cooling	
AC Input		
AC Circuit Breaker Rating	20Amps	
Connections	4 Position Terminal Block	
Phase	Single Phase 3-wire	
Voltage	120V Nominal	55V to 155V, Load Dependent
Frequency	60Hz Nominal	40-120Hz Operating Range
Line Voltage Acceptance Thresholds	145V when Line greater than 155V 108V at 70% or greater Load 96V at 69% or less Load	±2%
Low Line Voltage Thresholds	80V at 70% or greater Load 68V at 69% or less Load 55V at 40% or less Load	± 2
Power Requirements	0.9kVA	Max. Capacity during Recharging
Input Power Factor	≥ 0.95	At Rated Output, when Input Waveform Distortion is <1%
AC Output		
Output Power Connection	4 Position Terminal Block	
Phases	Single Phase 3-wire	
Voltage	120VAC	
Voltage Regulation	2%	
Rated Frequency	60Hz	
Frequency Regulation	5%	
Current Capacity	5.8A at Nominal Voltage	70% or less to achieve 96V of Input V 40% or less to achieve 55V of Input V
Efficiency	> 85% Line Mode at 100% Load	Approx. 83% Inverter Mode
Voltage Waveform	Sine Wave	

Distortion Factor of Voltage Waveform		Linear Load: 3% or less, 100% Rectifier Load: 7% or less	At Rated Output
Transient Voltage Variation	Rapid Load Change	Rated Voltage ±5% At Rated Output ±10% Variation	0% ↔ 100% at Transient or Output Switch
	Recovery		
	Rapid Input Voltage Change		
Response Time		2 Cycles or less	
Load Power Factor		0.7	Variation Range 0.7 to 1.0
Over Current Protection		Auto-Switch to Bypass Mode at 105% Load or more	Automatic Recovery
Overload Capability	Inverter	105%	
	Bypass	200%	
		800%	

Batteries Input		
Fuse	75A	
Connection	Anderson Powerpole 75	
Battery Type	12V Sealed Lead Acid Battery	
Rated Capacity	100 Ah	
Quantity	2	Connected in Series
Backup Time	Load Dependant	
Generated Heat	50W	
Input leakage Current	3mA or less	
Acoustic Noise	≤ 40dB	

Alarm & Timer Relay Contacts		
Switching Power	60W, 62.5VA	Minimum Contact Rating: 10mVDC, 10µA
Switching Voltage	220VDC, 250VAC	
Switching Current	2.0A	
Carrying Current	2.0A	

1.5kVA / 2.0kVA EDP Double Conversion UPS Specifications

Parameter		Specifications		Notes
Dimensions		17.25" x 5.250" x 13.625"		WxHxD
Operating Temperature		-37°C to +74°C		-35°F to 165°F
Humidity		5 to 95%		Non-Condensing
Cooling System		Forced Air Cooling		
AC Input				
AC Circuit Breaker Rating		20Amps		
Connections		4 Position Terminal Block		
Phase		Single Phase 3-wire		
Voltage		120V Nominal		55V to 155V Load Dependant See AC Output Current Capacity
Frequency		60Hz Nominal		40-120Hz Operating Range
Line Voltage Acceptance Thresholds		145V when Line greater than 155V 108V at 70% or greater Load 96V at 69% or less Load		±2%
Low Line Voltage Thresholds		80V at 70% or greater Load 68V at 69% or less Load 55V at 40% or less Load		±2%
Power Requirements		1.36kVA	1.8kVA	Max. Capacity during Recharging
Input Power Factor		≥ 0.95		At Rated Output, when Input Waveform Distortion is <1%
AC Output				
Output Power Connection		4 Position Terminal Block		
Voltage		120VAC		
Voltage Regulation		2%		
Rated Frequency		60Hz		
Frequency Regulation		5%		
Current Capacity		8.75A at Nominal Voltage	11.67A at Nominal Voltage	70% or less to achieve 96V of Input V 40% or less to achieve 55V of Input V
Efficiency		> 85% Line Mode at 100% Load		Approx. 83% Inverter Mode
Voltage Waveform		Sine Wave		
Distortion Factor of Voltage Waveform		Linear load: 3% or less, 100% rectifier load: 7% or less		At Rated Output
Transient Voltage Variation	Rapid Load Change	Rated Voltage ±5% At Rated Output ±10% Variation		0% ↔ 100% at Transient or Output Switch
	Recovery			
	Rapid Input Voltage Change			
Response Time		2 Cycles or less		
Load Power Factor		0.7		Variation Range 0.7 to 1.0
Over Current Protection		Auto-Switch to Bypass Circuit at 105% Load or more		Automatic Recovery
Overload Capability	Inverter	105%		
	Bypass	200%		
		800%		
Battery Input				
Fuse		100A		
Connection		Anderson Powerpole 75		
Battery Type		12V Sealed Lead Acid Battery		
Rated Capacity		100Ahr	60Ahr	
Quantity		3	4	Connected in Series
Backup Time		Load Dependent		
Generated Heat		200W	250W	
Input Leakage Current		3mA or less		
Acoustic Noise		≤ 40dB	≤ 45dB	
Alarm & Timer Relay Contacts				
Switching Power		60W, 62.5VA		Minimum Contact Rating: 10mVDC, 10µA
Switching Voltage		220VDC, 250VAC		
Switching Current		2.0A		
Carrying Current		2.0A		

Network Card Specifications

Ethernet Communication Card Specifications for EDP Series UPS'	
CPU	Microchip PIC24HJ128/ENC44J600
Memory	1MB Flash
Peripherals	Real Time Clock
Software	Microchip
Network Interface	10/100 BaseT with Auto-Detect
Connection	RJ45 with LEDs
Power Supply	12-60VDC, 200mA max
Protocols	TCP/IP, HTTP, SNMP, SNTp, SMTP, NTCIP, FTP, UDP, SSH, TFTP
Environmental	
Operating Range	-37°C to +74°C
Humidity	5 to 95%
Physical	
Mounting	Embedded Card on Front Panel
Connectors	RJ11; Two, Nine Position Terminal Blocks
Software Compatibility	
Web Browsers	Chrome, IE, FireFox, Safari, Edge
Operating Systems	Windows, OS, Linux
Firmware Upgrades	Embedded webpage or TFTP upgradable



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