

# OWNER'S OPERATING & MAINTENANCE MANUAL

## CONTINUOUS POWER SYSTEMS

### DIGITAL TECHNOLOGY SRNDT SERIES 1000VA THROUGH 2000VA

**MODELS:** UPR1-1K-1G-SRNDT

UPR1-1.25K-1G-SRNDT

UPR1-1.25K-1G-SRNDTI

UPR1-1.5K-1G-SRNDT

UPR1-2K-1G-SRNDT

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## INTRODUCTION

The following text is a complete product description and operating guide of the CLARY/**NOVA UPR SRNDT Series** Rackmount, digital *continuous*, universal precision regulator (UPR). This UPR provides a fully on-line sinewave, completely regenerated for typical non-linear computer-type loads.

The SRNDT Series includes units with output ratings ranging from 1000VA up to 2000VA. The output power factor rating is 0.7, which means these units can deliver 700 watts and up to 1400 watts respectively.

This instruction manual is provided with this unit to enhance your understanding of the product and its applications. Read this handbook carefully in the order it is presented prior to operating or servicing to avoid harm or damage to you or the unit. The UPR may be referred to in the text as the **UPR SRNDT Series**, DT Rackmount, etc. Certain references may be made to specific model numbers, however, the basic difference between models is the output power it can supply. Refer to the OPTIONS Section for a further detailed explanation of the model numbering system.

## IMPORTANT SAFETY INSTRUCTIONS, SAVE THESE INSTRUCTIONS

This manual contains important safety instructions that should be followed during installation and maintenance of the UPR.

Always operate the unit within the guidelines and specifications presented to maximize this system's efficiency and lifetime.

## THE UPR SERIES RACKMOUNT

A digital on-line, sinewave UPR is the only total solution to virtually any power problem. It effectively provides *CONTINUOUS* POWER, by regenerating the incoming AC to DC and then back to a highly regulated AC generator. A battery can be provided at the input of the AC generator to support the load in case of utility interruption. The *CONTINUOUS* power concept is a step above the typical power conditioner, in that, power protection is maintained under any circumstance for the most complete and reliable service to the critical load. This *CONTINUOUS* power UPR is designed for the critical, *must-not-fail* applications.

The **Digital Technology (DT) Series** rackmount is engineered with the latest IGBT/PWM technology for high efficiency and reliability. The *Universal Precision Regulator (UPR)* **SRNDT** is the *ruggedized* version of the **DT** family of products. The electronics are completely governed by an on-board microprocessor. This allows for not only a digitally processed precision output waveform, but also provides for full interactive access and control for the user through an RS232 computer port.

Refer to the simplified block diagram, Figure 1, for system description. An AC source is fed to an input tap selectable isolation transformer through a double pole breaker for both Hot and Neutral protection. This breaker then feeds the power circuits and all internal microelectronics. Input voltage is monitored to allow for operation over a -25% to +35% range of nominal voltage for all load conditions. An input voltage variation outside this preset window will discontinue power to the critical load. A detection circuit working with the microprocessor pre-selects the appropriate tap on the input transformer to optimize operation.

The input AC, when it is within this specified window is power factor corrected and then sent to the rectification stage. The DC rectifier stage provides both positive and negative voltages to a DC rail stage, which then feeds the digitally controlled inverter AC generator. The AC inverter generator in turn supplies the load. Normally the output inverter generator is at 60Hz independent of the input line frequency.

During a utility power-loss if an external battery is added, the AC rectification and battery charging capabilities of the UPS become inactive. The fully charged external battery system now becomes the source of power feeding the AC Inverter generator. All systems are controlled by the digital microprocessor at all times.

The **DT Series** on-line topology is unique to other on-line systems in that it is designed to meet the needs of all non-linear type loads while providing input power factor correction. Computers and telecommunications equipment, with their switching power supplies are considered a non-linear load, which can be very abusive to most power protection equipment and could decrease life expectancy. The **DT Series** is specially designed with a power factor corrected input to eliminate harmonics back into the power source as well as accept non-linear loads and protect them efficiently without any output waveform degradation common to other UPS designs.

For load protection, if the unit is overloaded, it will shutdown completely if the overload is not corrected within 3 seconds.

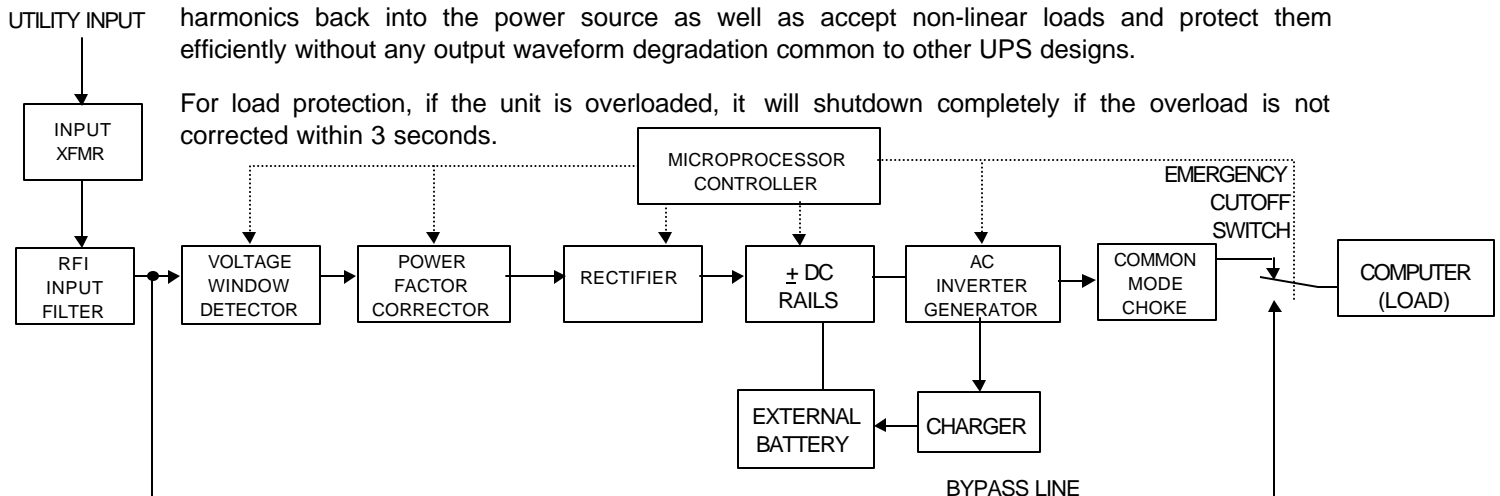
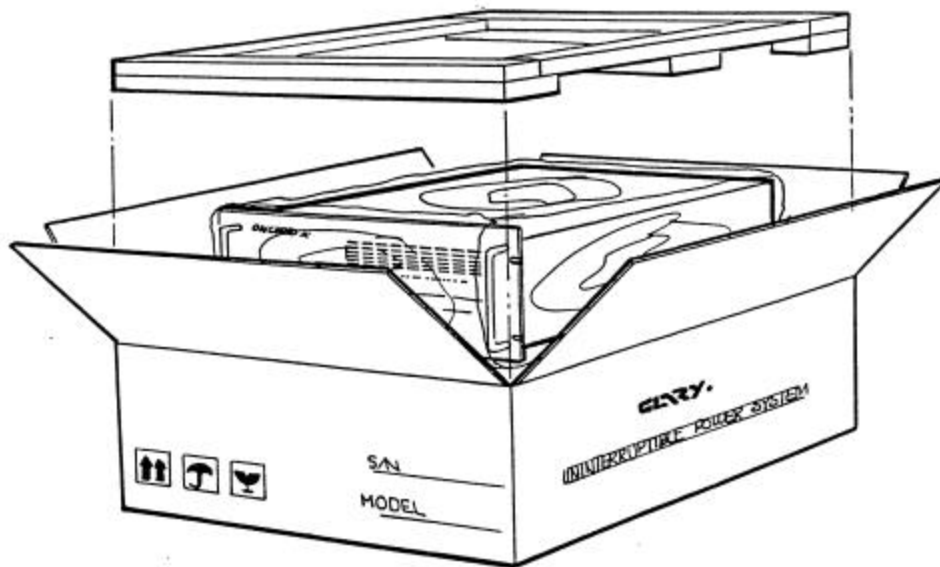


FIGURE 1: DT SERIES BLOCK DIAGRAM

## UNPACKING THE UNIT

This UPR has been carefully packaged to withstand most abuse sustained during shipment. If there is significant damage to the carton, or if there is any physical damage to this unit, report this to your carrier.

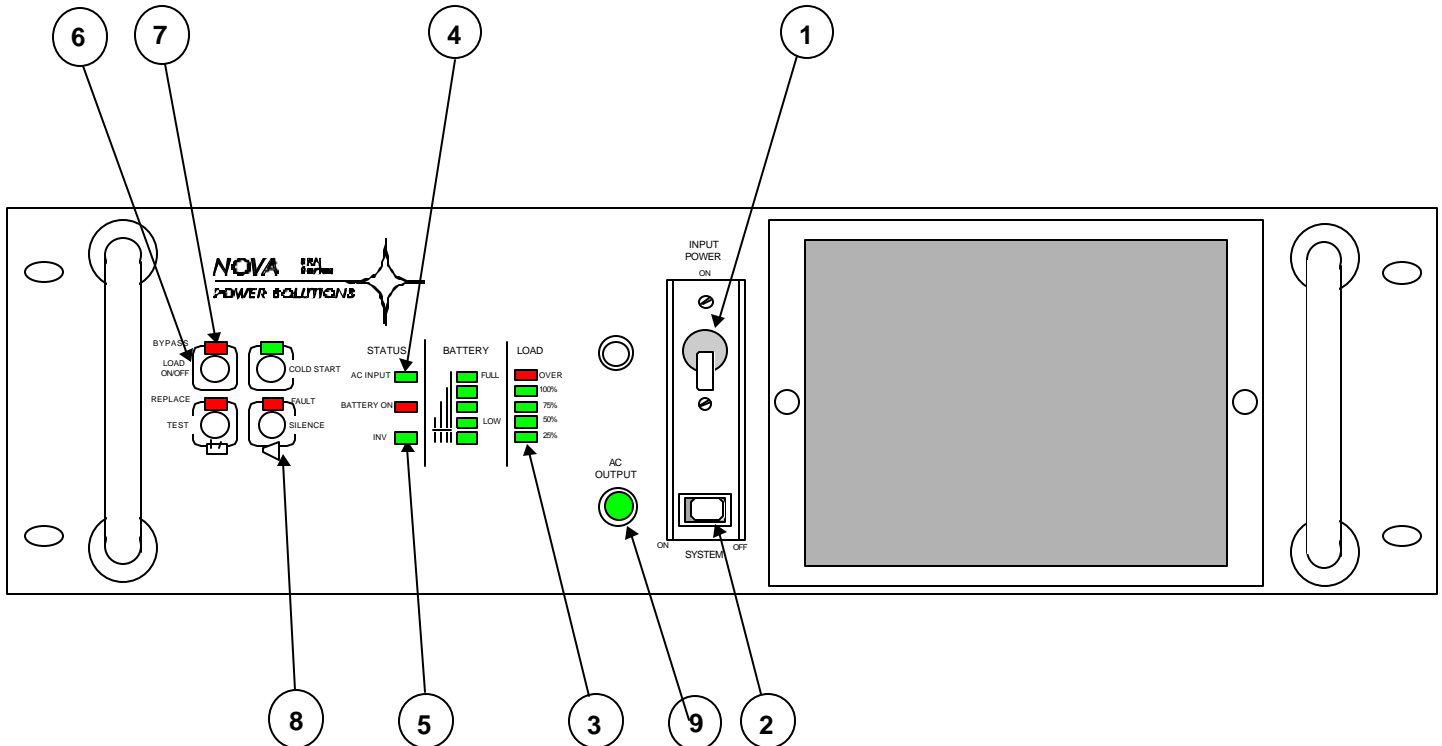
It is recommended to save the shipping container and packaging materials for future transporting, if necessary. Transporting the unit in other than supplied shipping materials can result in unit damage not covered by the manufacturer's warranty.



**FIGURE 2: UNPACKING THE UNIT**

## PHYSICAL DESCRIPTION

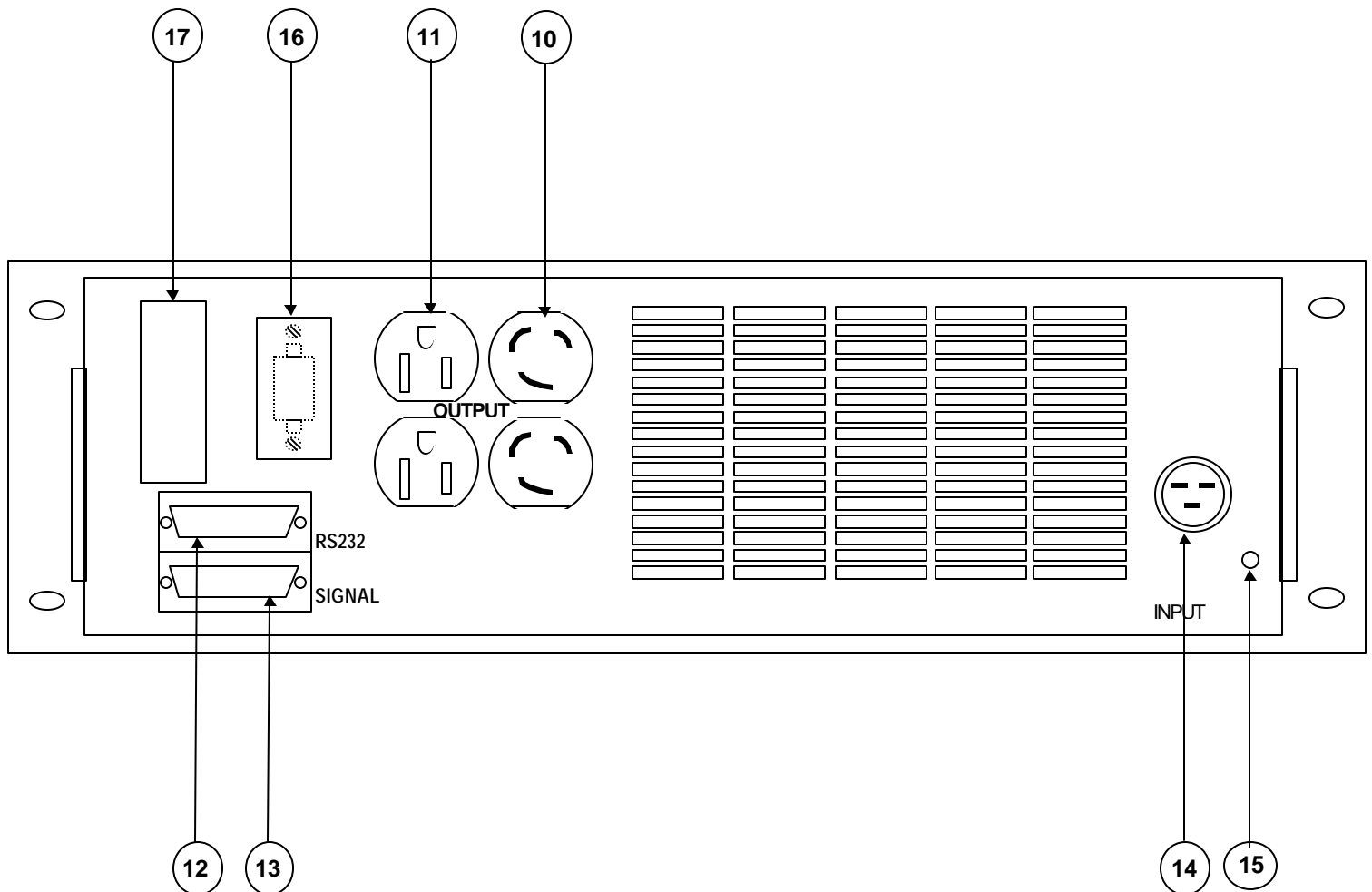
The following illustrations depict the basic Rackmount **UPR SRNDT Series** unit. Reference the SUMMARY OF INDICATORS AND CONTROLS Section for a further description of the call-outs.



**FIGURE 3: RACKMOUNT FRONT VIEW**

- |  |  |
|--|--|
| ① <u>INPUT POWER</u> - AC PROTECTION BREAKER | ⑥ <u>LOAD ON/OFF</u> - OUTPUT ENABLE SWITCH                  |
| ② <u>SYSTEM ON/OFF</u> - INVERTER OPERATING  | ⑦ <u>BYPASS</u> - EMERGENCY BYPASS MODE INDICATOR            |
| ③ <u>LOAD</u> - LOAD LEVEL INDICATOR         | ⑧ <u>SILENCE</u> - ALARM SILENCE SWITCH WITH FAULT INDICATOR |
| ④ <u>AC INPUT</u> - AC LINE INDICATOR        | ⑨ <u>AC OUTPUT</u> - OUTPUT ACTIVE NEON INDICATOR            |
| ⑤ <u>INV</u> - INVERTER OPERATING INDICATOR  |  |

## PHYSICAL DESCRIPTION (Continued)



**FIGURE 4: RACKMOUNT REAR VIEW**

- ⑩ **OUTPUT**- TWIST LOCK DUPLEX OUTPUT TO CRITICAL LOAD
- ⑪ **OUTPUT**- STRAIGHT BLADE DUPLEX OUTPUT TO CRITICAL LOAD
- ⑫ **SIGNAL**- 25-PIN "D" SUBMINIATURE FEMALE RS232 CONNECTOR (COMMUNICATIONS PORT)
- ⑬ **SIGNAL**- 25-PIN "D" SUBMINIATURE FEMALE OPEN-COLLECTOR CONTACTS CONNECTOR
- ⑭ **INPUT**- UTILITY SOURCE INPUT CONNECTOR
- ⑮ **GROUND**- CHASSIS GROUND STUD
- ⑯ **DC IN**- EXTERNAL BATTERY INPUT CONNECTOR
- ⑰ **SNMP INTERFACE**- (OPTIONAL) OPEN SLOT FOR SOPHISTICATED COMPUTER NETWORK MANAGEMENT



## SUMMARY OF INDICATORS AND CONTROLS

**INPUT POWER** - This is system input AC power protection and interruption for both hot and neutral lines. This is a circuit breaker that if tripped, the unit will shutdown. This circuit breaker is rated at 15A (20A, 2KVA) and is guarded to prevent inadvertent operation.

**SYSTEM ON/OFF** - This is system input enable switch. This switch is used to power down the system. This switch must be in the **ON** position with the input circuit breaker to start the UPS.

**LOAD** - Four green L.E.D.s and one red OVERLOAD L.E.D. that illuminate to update status of the amount of load the INVERTER is powering at the UPS system output. Each green L.E.D. represents approximately 25% of full load. As more load is added to the UPS, the L.E.D.s will sequentially turn "**ON**" until the red L.E.D. comes "**ON**". This indicates an OVERLOAD situation and the system will discontinue operation shortly.

**AC INPUT** - A green L.E.D. that is illuminated when both the **INPUT POWER** Circuit Breaker and the **SYSTEM ON/OFF** switch are closed and there is utility power present at the input of the system.

**INV** - A green L.E.D. that illuminates when the INVERTER generator is operating and available to deliver power to the system output.

**LOAD ON/OFF** - This is a momentary, two-position push button keyswitch. When the system initially powers up for the first time no INVERTER generator power will be present at the output load receptacles at the rear panel. Once this switch is pressed in for at least two seconds, output power will then be enabled to the rear panel outlets. If the system should be powered down for any reason other than with the **SYSTEM ON/OFF** Switch, the output state of these outlets will be remembered by the internal microprocessor and the UPS will start up with the output in the state it was last left. The output neon lamp, in the center of the panel, will light when the output has been enabled.

**BYPASS** - A red L.E.D. above the **AC OUTPUT** Switch will light to indicate when the system output is operating in the filtered, emergency BYPASS mode. This is not a regenerated source of regulated power.

**SILENCE** - This is a momentary, two position push button keyswitch. During a system *FAULT* or power failure, an audible alarm will be present. If a *FAULT* condition occurs, the red L.E.D. above this switch will light. Once this switch is pressed in for at least two seconds, the audible alarm will be silenced. The L.E.D. above the switch will remain unchanged.

**AC OUTPUT** - A green neon lamp that will light to indicate output power is present at the load receptacles.

## **SUMMARY OF INDICATORS AND CONTROLS (Continued)**

**OUTPUT** - One NEMA type L5-15R duplex and one 5-15R duplex receptacle provided for critical loads. Reconditioned power is provided here and is monitored by the **LOAD** L.E.D.s as long as the INVERTER is functioning. The **AC OUTPUT** Switch must be enabled for power to be present here. The output neon lamp, in the center of the panel, will be lit when power is available at these outlets.

**SIGNAL** - DB-25 subminiature female connectors provided for intelligent computer monitoring systems. See SIGNALS AND INTERFACING Section for specific pin-outs. The top connector is the RS232, communications port. The lower connector has open-collector alarm contacts for compatible interfaces.

**INPUT** - A special twist lock 20 Amp inlet that accepts the input utility power cord. The six-foot input utility cord is terminated with a NEMA type 5-15P. 2000VA units have a NEMA type 5-20P.

**GROUND** - A 10-32 x 3/4-threaded stud for system rack grounding.

**DC IN** - An interface connector provided for an external battery connection. Batteries may be added to allow for load operation during a utility power failure.

**SNMP INTERFACE** - (OPTIONAL) An add-on card that provides sophisticated system network management protocol. Direct hook-up is via an RJ45 or BNC connector.

# SPECIFICATIONS

## ELECTRICAL

Input		
Voltage		120VAC +35%, -20% / 208VAC (STD) or 240VAC
Frequency		60Hz or 50Hz
Current	120VAC 208VAC	7.2A (1000VA), 8.7A (1250VA), 10.5A (1500VA), 14A(2000VA) 4.0A (1000VA), 4.4A (1250VA), 5.3A (1500VA), 7.0A(2000VA)
Output		
Voltage		120VAC $\pm$ 3%
Frequency		60Hz or 50Hz $\pm$ .25% (software selectable)
Current		8.3 Amps (1000VA), 10.4A (1250VA), 12.5A (1500VA), 16.7A(2000VA)
Crest Factor Ratio (Non-linear load and less than 5% THD) Typical		@50% Load Up to 4.8:1 @75% Load Up to 3.2:1 @100% Load Up to 2.4:1
Harmonic Distortion		5% Max. THD
Dynamic Response		$\pm$ 4% for 100% Step Load Change, 0.5 Millisecond Recovery Time
Overload		110% for 10 Minutes; 200% for 0.5 Seconds
Efficiency (UPS)		92%
UPS Protection		Input and Output Short Circuit; Input and Output Overload;

## MECHANICAL

Input (AMP CPC Type 12 inlet)		NEMA Type 5-15P Connector (5-20P for 2000VA units)
Output		NEMA Type 5-15R and NEMA Type L5-15R duplex Connectors
Overall Dimensions L x H x W		17 in x 5.25 in x 19 in. (43.2 cm x 13.3 cm x 48.3 cm)
Weight	lbs.(kg)	48 (22) {58 (26) 2KVA}
Cooling		Low Velocity, Forced Air

## CONTROLS AND INDICATORS

Visual Indicators Sequenced LED's Single Indicators		Load Level AC Input Inverter On Bypass On AC Out Fault
Audible Alarms		Utility Interrupt Inverter Failure Overload
Intelligent Computer Interface (DB-25F)		Full Interactive, Remote Computer Monitoring and Control of UPS Functions (RS232 Interface); Open-collector Alarm Signals

## DESIGN

Standard Features		Regenerative™ On-Line, Sinewave Inverter Powers Load Continuously Extended Brownout Protection Auxiliary Battery Connector High Frequency, Digitally Controlled IGBT PWM Power Factor Corrected on Input Designed for Non-linear Loads Operation on +35% Line
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## ENVIRONMENTAL

Operating Temperature		32°F to 122°F (0°C to 50°C) {-40°F to 165°F (-40°C to 74°C) on UPR-SRNDTI Model*}
Humidity		0% to 95% non-condensing
Altitude		Sea Level to 7000 Feet

Audible Noise	39-42 dBA at Five Feet
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\*De-rate load to 700Watts max. at 165°F operation.

## INSTALLATION

This Rackmount system is designed for installation in a protected environment. This system may be installed in a 19" rack system. Some important points to consider when positioning a unit for operation:

- A 15A, 20A for 2KVA systems, (preferably dedicated) outlet is accessible for the power connection to the unit. It is not recommended to modify the power cord in any way nor should an extension cord of any kind be used. **WARNING: Never use a plug strip on the front end of the UPS.**
- The cord paths in the system installation should remain clear of foot traffic or anything else that may disturb permanent connection.
- The installation site should maintain an ambient air temperature of less than 122°F (50°C), unless extreme temperature model **SRNDTI** is used. When the environment for the system remains cooler during operation, there is less stress on the batteries and the internal electronics.
- The air inlets, vents and fan should not be obstructed or blocked in any way. The more breathing space the system has, the cooler it operates.
- The air should remain free from excessive dust and chemical fumes.
- The front panel is designed to fit in a standard 19" rack. This panel fills a 5/8 inch slot. Guide Rails or slides are recommended to support the unit's mainframe. This system can weigh in excess of 60 pounds, therefore front panel mounting is not intended to support the entire unit. The system comes with pre-tapped aluminum slide bars to accept Jonathan QD-145 slides and other commercially available off-the-shelf models. Separate shims are included for correct slide bar spacing if the unit is installed in a DTC-2 (C3) rack.

Once a location has been selected and the unit is installed, it is ready for operation.

## OPERATION

This system is very simple to use.

- ⇒ Be sure the power cord is plugged into an appropriately rated outlet.
- ⇒ Activate the **INPUT ON/OFF** Circuit Breaker to the “**ON**” position.
- ⇒ Activate the **SYSTEM ON/OFF** Switch to the “**ON**” position.

The system will go through a diagnostic test routine and test all the L.E.D.s.

- ⇒ The green **AC INPUT** light will flash several times before it illuminates steady state.
- ⇒ The audible alarm will sound a short burst.
- ⇒ Push and hold in the **AC OUTPUT ON/OFF** Switch for at least two seconds.
- ⇒ The **AC OUTPUT** neon indicator, in the center of the panel, will illuminate indicating output power is available at the rear panel outlets and the Inverter is operating.

Activate the **SYSTEM ON/OFF** Switch to the “**OFF**” position to discontinue system operation.

Turn “**OFF**” the devices you wish to plug into the UPR. Connect them to the output at the rear of the unit. Do not exceed the output ratings of the system.

- ⇒ Activate the **SYSTEM ON/OFF** Switch to the “**ON**” position.
- ⇒ The green **INV** light illuminates.
- ⇒ Push and hold in the **AC OUTPUT ON/OFF** Switch for at least two seconds.
- ⇒ The **AC OUTPUT** neon indicator, in the center of the panel, will illuminate indicating output power is available at the rear panel outlets and the Inverter is operating.
- ⇒ Turn “**ON**” each of your devices.
- ⇒ Some of the four green L.E.D. **LOAD** indicators should illuminate. The actual number of indicators lit determines the amount of load.

Each L.E.D. signifies approximately 25% of load capacity. If all four L.E.D.s illuminate, full load has been achieved. If the red light illuminates, an OVERLOAD condition is present. If this situation continues beyond three seconds, the unit will automatically shut off, discontinuing all operation including the output to the load. The red **FAULT** L.E.D. will light and a continuous alarm will be heard. The load must be reduced and the **SYSTEM ON/OFF** Switch will have to be reset in order to return to normal operation.

If the system overheats causing the INVERTER to fail, the unit automatically transfers power to the BYPASS line to maintain uninterrupted power to the load. The red **BYPASS** L.E.D., above the **AC OUTPUT** Switch, will light. A continuous alarm will sound and the red **FAULT** light will illuminate.

To escape this condition, the problem must first be corrected, and then the **SYSTEM ON/OFF** Switch must be reset.

The **SILENCE** Switch on the front panel can be used at any time to disable the audible alarm. This switch must be held in for at least two seconds before the alarm will quiet. The **FAULT** L.E.D. above this switch will remain unchanged while operating this switch.

## SIGNALS AND INTERFACING

This system is designed to be compatible with most sophisticated operating systems when they feature a UPS monitoring function. These signals are made available through two DB-25 subminiature female connector at the rear of the unit. Interfacing cables are available. The top connector is for RS232 interface connection. The bottom connector features open-collector alarm signals. These signals may be converted to dry contact closures (optional). Closing the points between pins 6 and 8 while running on battery will shutdown the UPS. Below is a diagram of the signal jacks and their pin-outs:

### RS232 CONNECTOR

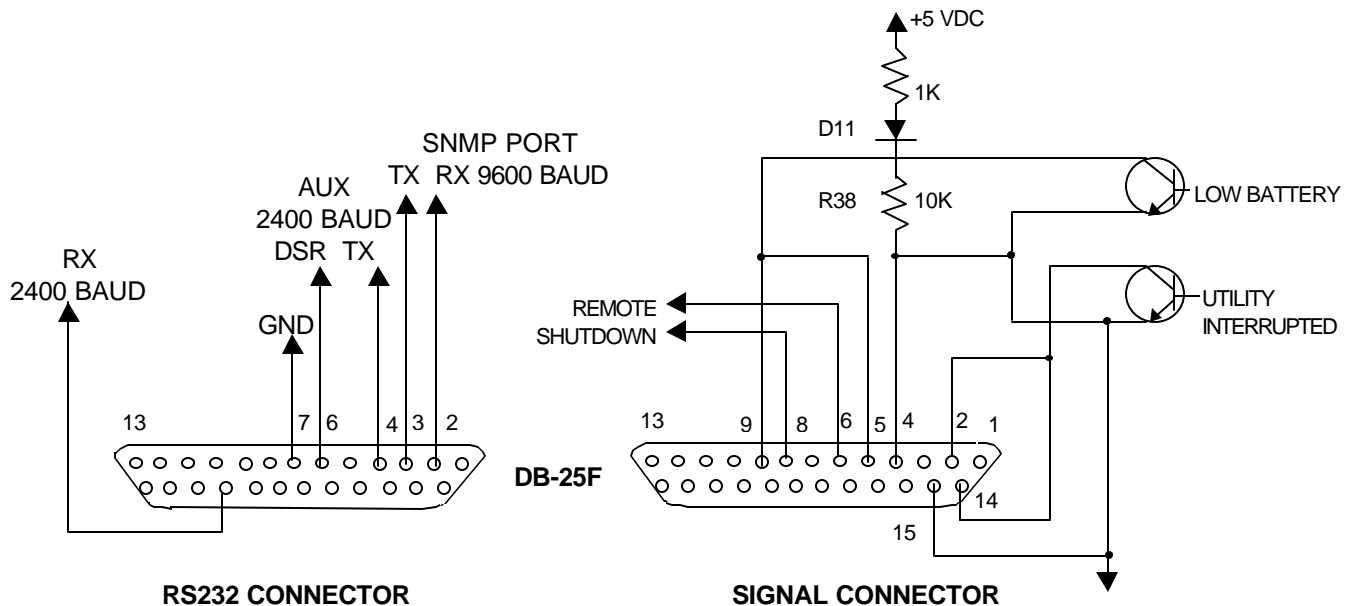
2-	RECEIVING DATA	6-	DATA SET READY
3-	TRANSMITTING DATA	7-	SIGNAL GROUND
4-	AUX TX	22-	AUX RX

### SIGNAL CONNECTOR

2, 14	UTILITY INTERRUPT SIGNAL	6	REMOTE SHUTDOWN
4, 15	COMMON SIGNAL RETURN	8	REMOTE SHUTDOWN (RETURN)
5, 9	LOW BATTERY SIGNAL		

### SNMP AGENT

1. SEE PROCEDURE 506-12664 & USHA MANUAL 510-12221



**FIGURE 5: INTERFACE CONNECTORS**

## CARE & MAINTENANCE

This system is designed to be maintenance-free. It can be cleaned with a damp cloth or non-abrasive cleanser.

Be sure filters and vents are kept free from accumulation of dust, dirt or lint. They should be cleaned periodically.

No other maintenance is required. The cooling fans should be replaced every five (5) years.

The output is short circuit protected by an electronic current limiting circuit, controlled by the microprocessor. If this current limiter should ever fail, there is output protection on the output line provided by an internal fuse. If this fuse should ever clear, do not replace. The unit requires factory service. Replacing this fuse may cause more extensive damage to the unit.

If system cooling is not adequate, operation or reliability may be affected. The system is normally assembled with the flow of cool air being pulled in the front panel and exhausting warm air out the back. If in final installation this air path conflicts with the entire rack, the airflow may be reversed. Reference the following procedure for a step-by-step explanation. A right angle, Philips head screwdriver will simplify this task:

1. Remove all power from the unit.
2. Remove the top cover.
3. Remove the mounting screws on the cooling fans. If the screws are not accessible with the available tools, the rear panel may have to be removed.
4. Reverse the cooling fans and remount.
5. Reinstall the rear panel (if necessary).
6. Reinstall top cover.



## OPTIONS

This rackmountable UPR may be supplied with a matching rackmountable auxiliary battery box. This battery box is designed to host one or two strings of batteries, to add battery support time. The time will depend on the unit capacity and load size.

The battery pack is rated at 72VDC (96VDC for 2KVA) and comes with a mating cable that directly connects to the auxiliary battery port at the rear of the UPR. This connector is exposed, after removing the attached cover plate. The connector on the battery and UPR are the same so that the cable can be plugged in either way. The connector used is a locking type that, when fully engaged, will not allow the cable to be pulled apart, unless the locking ears are depressed.

The battery box fits a 5¼" slot into a 19" rack just like the UPR. The full depth of the battery is 17". It is slide ready and weighs approximately 48 pounds in a single battery configuration. It weighs 85 pounds in a dual battery configuration. An additional port is available at the rear of the battery box to add continuous battery strings if necessary.

The battery box is designed to be upgradeable. If the single string is not adequate, the user may order an additional string of batteries that can be easily installed in the existing box. By removing the existing mounting screws on the existing battery, it can slide over and the additional set can now be secured, with four additional screws, adjacent to the original set. The internal harness has an open connector provided for the second set. After plugging this connector together, the upgrade is complete.

## MODEL NUMBER

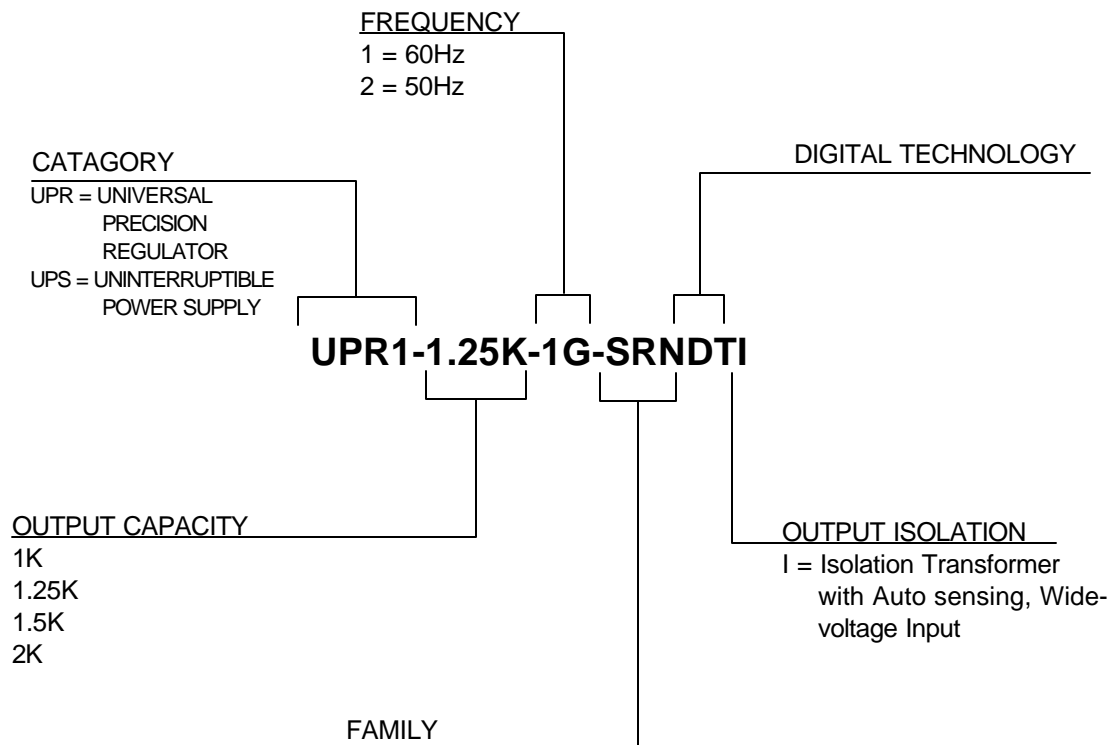
The **SRNDT** Series is designed as a versatile piece of equipment that can be customized into most specific system applications. Because it is digitally controlled, many modifications can be accomplished entirely through the interactive software.

This unit has a specific *Part Number* and a *Model Number*. The Model Number is very important when trying to determine the systems full capabilities. Refer to the Model Number Breakdown, below to encode or order a specific unit. Basic models end with **SRNDT**.

If input isolation is desired, a properly sized isolation transformer is installed at the input. The system output neutral is then bonded to the chassis ground. This input transformer is tapped for 120VAC and 220VAC at its primary. An input sensor automatically sets the input tap, depending on the primary AC source. This model is designated **SRNDTI**.

Systems can be ordered with different operating frequencies. If 50Hz input is required, the model ending in **-2G-SRNDT** should be requested.

Contact **CLARY/NOVA** for your specific model applications.



**FIGURE 6: MODEL NUMBER BREAKDOWN**

## SERVICE AND REPAIR

This **SRNDT Series** Rackmount is backed by one of the finest customer service teams assembled. Write or call them at any time to obtain information about your unit.

**Clary Corporation**  
**1960 S. Walker Avenue**  
**Monrovia, CA 91016**

**626-359-4486**  
**800-551-6111**  
**SERVICE@CLARY.COM**

If a problem should occur, it is important that you obtain a Return Material Authorization (RMA) number from the Service Department to process any unit returned to the factory. In consulting the factory, always have the unit model number and serial number at hand. This information is located on the identification label at the rear panel and is essential in retrieving your unit's performance and history record.

The RMA number issued to you should appear on the outside of the carton, if the unit is returned, or on any correspondence regarding your unit. When shipping a unit back to the factory, try to use the original packing container and shipping materials. Shipping materials are available through the Service Department if the original container is unobtainable. The Service Department cannot take responsibility for any unit damaged in return shipment. All units must be returned prepaid to:

**DT Service Center**  
**1960 S. Walker Avenue**  
**Monrovia, CA 91016**

## FCC CONSIDERATIONS

This equipment generates and uses radio frequency energy and if not installed and used properly in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. The unit in this manual has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the unit with respect to the receiver.
- Move the unit away from the receiver.
- Plug the unit into a different outlet so that the unit and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office,  
Washington, DC 20402, Stock No. 004000003454.

# WARRANTY

## **1. TIME AND SCOPE OF WARRANTY:**

- 1.1 Clary Corporation hereby warrants parts shipped under this Agreement to be free from defective workmanship for a period of 2 years following date of shipment. Accidental damage, misuse or normal wear and tear shall not be construed as a defect.
- 1.2 The date of shipment as used herein will be the date on the Bill of Lading. If no Bill of Lading is issued the date of shipment shall be shown on seller's shipping document.
- 1.3 No provision of this warranty shall cover equipment, which has been altered or modified from the original specifications to which it was manufactured unless authorized in writing.
- 1.4 No provision of this warranty shall cover batteries. However, battery manufacturer's warranties will be passed through to the customer whenever applicable.

## **2. LIMITS OF "IN WARRANTY" SERVICE LIABILITY:**

- 2.1 Clary is obligated during the in-warranty period to provide service and/or adjustments to equipment returned to the factory at the expense of buyer. (The term "factory" as used here in shall also include any field service centers, which may be established by Clary) Clary is to repair or replace any part(s) thereof, which in the opinion of authorized Clary personnel are found to have been defective.
- 2.2 Equipment requiring in-warranty services must be returned to the factory with all transportation charges prepaid, clearly tagged, and stating the nature of the trouble experienced, and the disposition of the equipment after repair. The equipment will be returned collect by Clary to the location specified via the best least expensive carrier available or via customer's shipping instructions.
- 2.3 The nature of certain equipment installations may be such that it would be impractical or technically infeasible to remove the Clary portion of the equipment from the customer's premises to the Clary factory. In such cases, and at the request of the buyer, Clary will perform such service as can be satisfactorily rendered at buyer's location. The buyer will be charged only for travel expenses incidental to the service call, provided that the warranty is applicable.
- 2.4 During the in-warranty period, no service charges shall be payable by the buyer for service performed other than for service necessitated by accident, misuse, theft, abnormal line or source voltage fluctuations, abnormal conditions of operation, damage by the elements or damage resulting from adjustments, repairs, modifications made by other than Clary Authorized personnel, or the buyer's failure to reasonably maintain the equipment.

**THE FOREGOING WARRANTY IS EXCLUSIVE AND IS GIVEN AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE REMEDIES OF BUYER SHALL BE LIMITED TO THOSE PROVIDED HEREIN. IN NO EVENT WILL SELLER BE LIABLE FOR COLLATERAL OR CONSEQUENTIAL DAMAGES.** No person is authorized to assume in behalf of Clary any obligation or liability in connection with the sale, warranty or service policy of any products manufactured and/or marketed by Clary Corporation beyond the warranty description on the face hereof.

- 3.1 **Clary Corporation reserves the right to make changes, additions, and/or improvements in its products without incurring any obligation to install them on its products previously sold.**