Manuals+ — User Manuals Simplified.

DSS1500RT-TBF Line Interactive UPS

DSS1500RT-TBF Line Interactive UPS User Guide

Contents

EMERGE
POWER SOLUTIONS

DSS1500RT-TBF Line Interactive UPS

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for DSS1500RT-TBF & DSS2200RT-TBF that should be followed during installation and maintenance of the UPS and batteries. Please read all safety and operating instructions before operating the UPS. Adhere to all warnings on the unit and in this manual. Follow all operating and user instructions.

Introduction

This line-interactive UPS series is a compact pure sine wave UPS designed for essential applications and environments, such as servers, workstations, and other networking equipment. This model is available with the output rating of DSS1500VA & DSS2200VA and is designed to protect your sensitive electronic equipment against power problems including power sags, spikes, brownouts, line noise, and blackouts.
The product is convertible to rack and tower forms. It can be placed either in Rack 2U or Tower form. The front panel of the UPS includes an LCD and four control buttons that allow users to monitor, configure, and control the units. The LCD includes a graphical bar, two status indications, and four alarm indications. A control button from the front panel allows users to silence the AC failer alarm and initiate the UPS self-test sequence as well. The UPS case for 1500VA & 2200VA is made of metal. This product is powered from the AC mains and supply AC outputs via receptacles on the rear panel. Communication and control of UPS are available through serial or USB ports located on the rear panel. The serial port will support communications directly with a server.

Features

- Microprocessor control guarantees high reliability
- High-frequency design
- Built-in boost and buck AVR
- Easy battery replacement design
- Selectable input and output range

- Cold start capability
- Built-in Dry contact/RS-232/USB communication port
- SNMP allows for web-based remote or monitoring management
- Enable to extend runtime with scalable external battery module (EBM)
- Overload, short-circuit, and overheat protection
- Rack/Tower 2 in 1 Design
- 19 inches rack mount available for all models

Safety Warning

DANGER: This UPS contains high voltages. All repairs and services should be performed by authorized service personnel only. There are no user-serviceable parts inside the UPS.

WARNING

- This UPS contains its energy source (batteries). The UPS output may carry live voltage even when the UPS is not connected to an AC supply.
- To reduce the risk of fire or electric shock, install this UPS in a temperature and humidity-controlled, indoor environment, free of conductive contaminants. (Ambient :0-40°C)
- To reduce the risk of fire, connect to a circuit breaker provided with 20 amperes maximum branch circuit over-current protection.
- To comply with international standards and wiring regulations, the sum of the leakage currents of the UPS and the connected loads must not exceed 3.5 mA.
- The socket outlet that supplies the UPS shall be installed near the UPS and shall be easily accessible.
- Protective earthing connections shall be such that disconnection of protective earth should be made at one point that is the furthest away from the UPS, maintaining the dedicated line to secure equipotential connection.
- The UPS and EBMs connected in series should be installed closely such that the operators can not touch the interconnecting wire which is insulated from the primary circuit.

CAUTION:

- Batteries can present a risk of electrical shock or burn from high short-circuit current. Observe proper precautions. Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.

The following figure shows the basic internal circuit configuration of the UPS

INPUT FILTER → AVR → OUTPUT 1

DC/DC → DC/AC → OUTPUT 2, OUTPUT 3

CHARGER → BATTERY
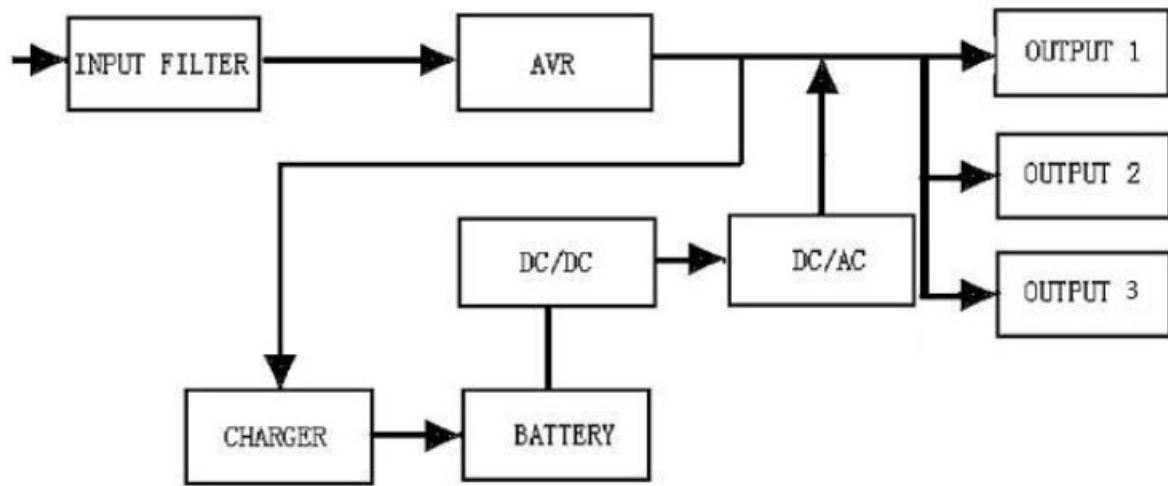
Description of Commonly Used Symbols

Some or all of the following Notations may be used in this manual and may appear in your application process. Therefore, all users should be familiar with them and understand their explanations.

Table1. Description of Commonly Used Symbols

Symbol	Description
⚠	Alert you to pay special attention
⚡	Caution of high voltage
∿	Alternating current source (AC)
⎓	Direct current source(DC)
⏚	Protective ground
♻	Recycle
🗑	Keep UPS in a clear area

Installation

Inspection of Unit

Inspect the UPS upon receiving. If the UPS is damaged during the shipment, please keep the box and packing material in original form for the carrier and notify the carrier and dealer immediately.

Unpacking the Cabinet

To unpack the system:

1. Open the outer carton and remove the accessories packaged with the cabinet.

2. Carefully lift the cabinet out of the outer carton and set it on a flat, stable surface.

3. Discard or recycle the packaging responsibly, or store it for future use.

UPS Setup

All model series are designed for tower and rack purposes. They can be installed into a 19-inch equipment rack. Please follow the instructions for Tower Setup and Rack-Mount Setup.

Tower setup

This series of UPS can be placed horizontally and vertically. As a tower configuration, it is provided with the optional UPS stands to stabilize the UPS when the UPS is positioned vertically. The UPS stand must be attached to the bottom of the tower.
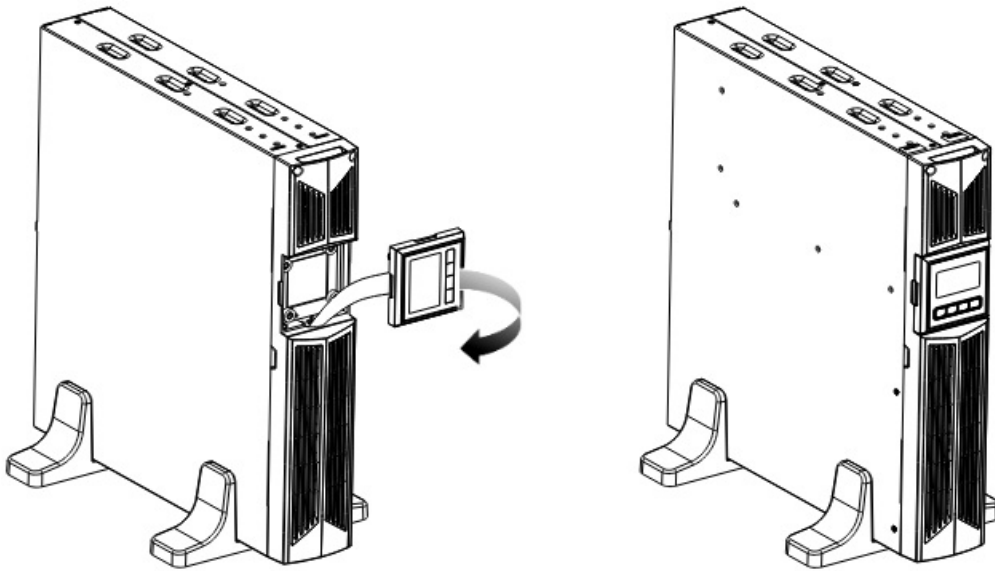
Use the following procedure to install UPS in UPS stands.

1. Hold the UPS vertically and put two UPS stands at each end of the tower.
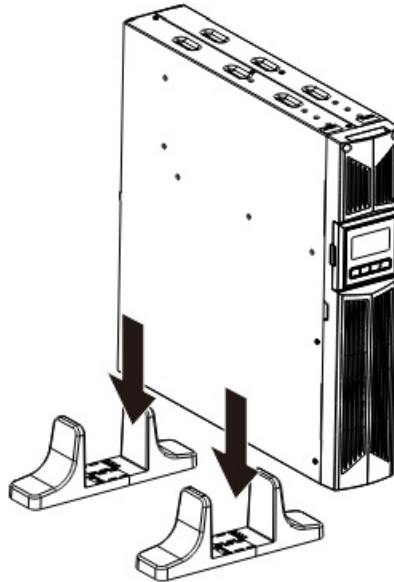
2. Place the UPS into two stands carefully.
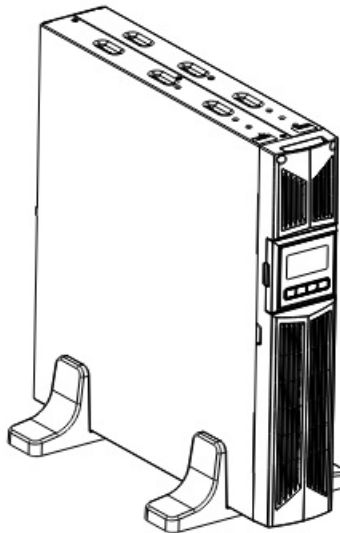
3. Pull out the LCD box rotate it in a clockwise direction to 90 degrees and then push it back in the front panel.

Rack-mount setup

The series can be installed in 19-inch racks. Both the UPS and external battery enclosure need 2U of valuable rack space.

Use the following procedure to install UPS in a rack.

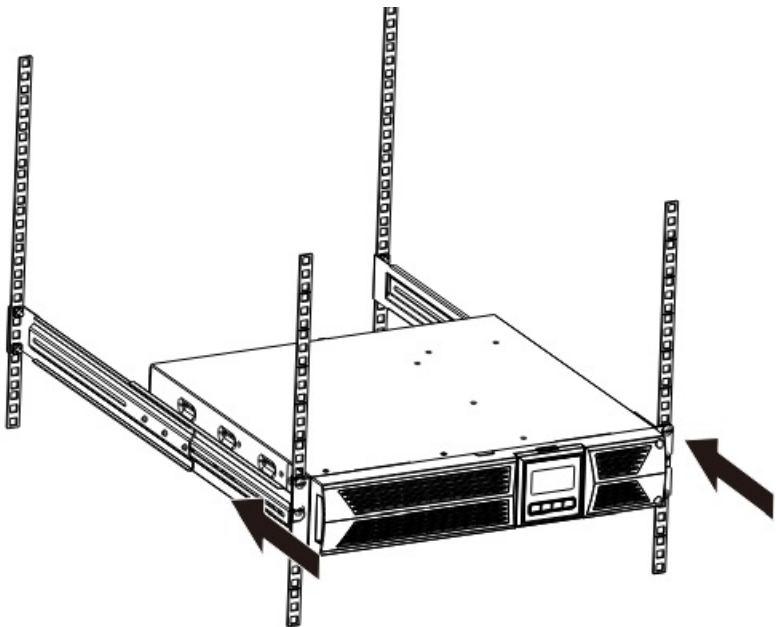1. Align the mounting ears with screw holes on the side of the UPS, and tighten the screw.
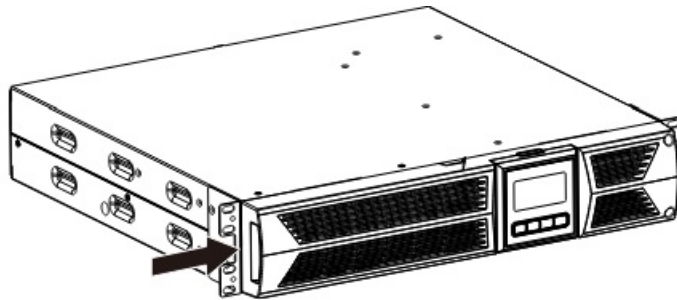
2. Assemble the rack rails with the rack mounting.
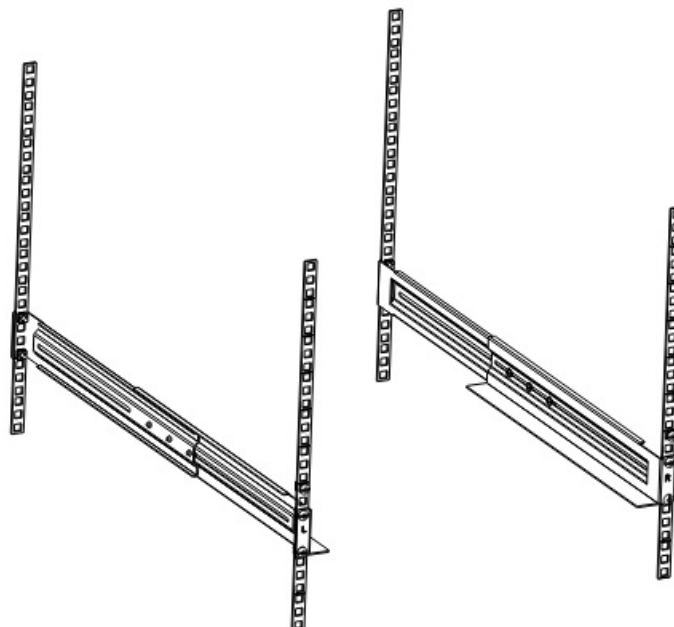
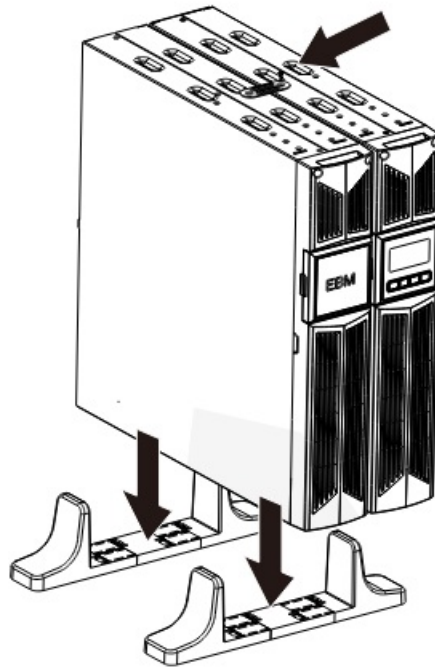3. Slide the UPS into the rack rail and lock it in the rack enclosure.
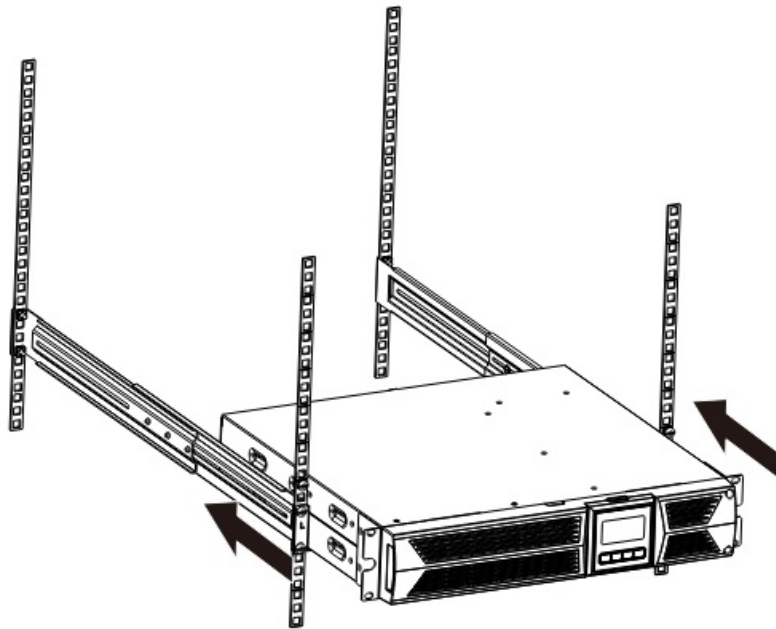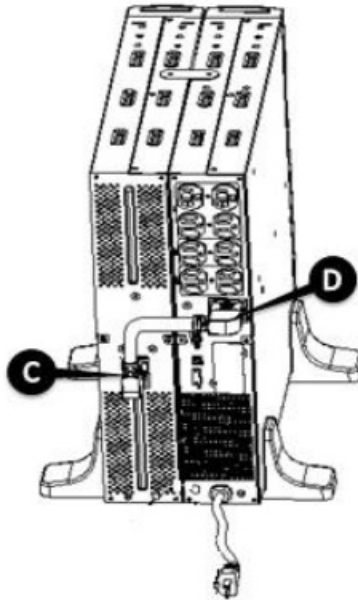
4. Tighten the screw, and the load can then be connected

EBM Installation (Optional)

Connecting the EBM in Tower form:

1. Hold the UPS and EBM vertically and place two UPS stands with the extended part at each end of the tower.
2. Tighten the screw on the metal sheet for stabilization

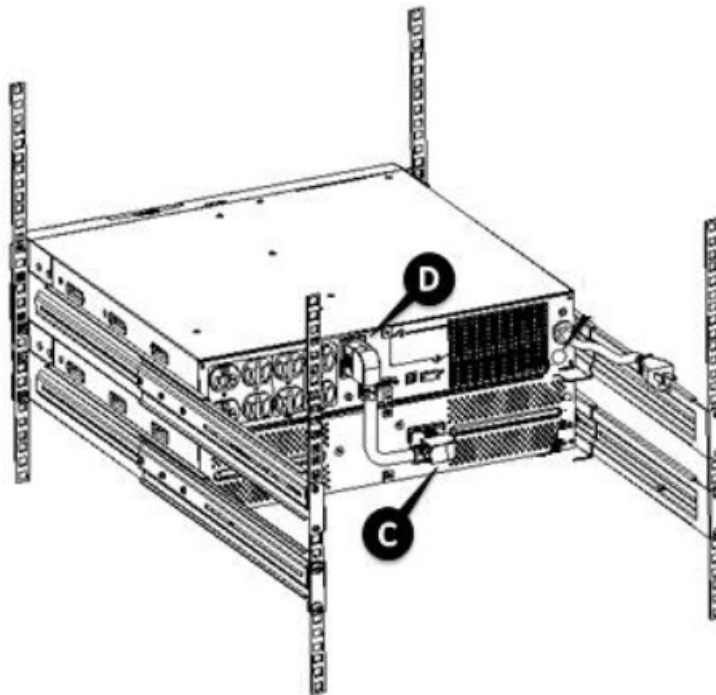3. Connect EBM port C to UPS port D with one of the accessory wires.

Connecting the EBM in a rack form

1. Using the same method as assembling UPS in a rack form, assemble EBM into the rack-mounting on the top or bottom of the UPS.
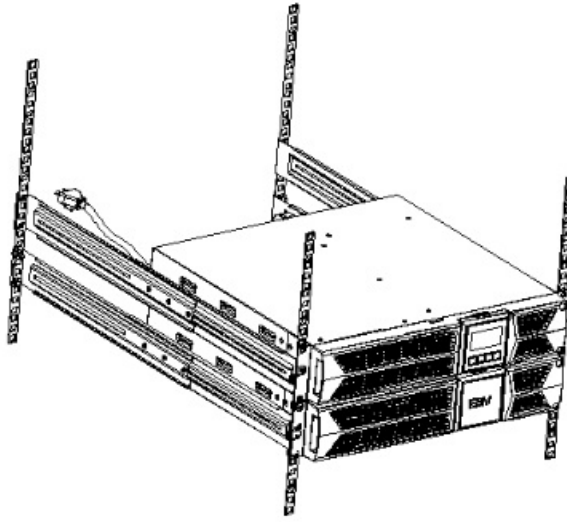
2. Connect EBM port C to UPS port D with one of the accessory wires.

**UPS Initial Startup**

To start up the UPS:

1. Verify that the internal batteries are connected. If optional EBMs are installed, verify that the EBMs are connected to the UPS.
2. Plug the equipment to be protected onto the UPS, but do not turn on the protected equipment.
3. Plug in the UPS input power cord. The UPS front panel display illuminates and the UPS status display shows "STbY"
4. Press and hold the button ⏻ more than 3 seconds. The UPS status display changes to "NORM"
5. Check the UPS display for active alarms or notices. Resolve any active alarms before continuing. See "Troubleshooting"
6. If optional EBMs are installed, see "Configuring UPS for EBM numbers" on page 17 to set the number of installed EBMs.
7. To change any other factory-set defaults, see "Operation"

Note: At initial startup, the UPS sets system frequency according to input line frequency.

Operation

Display Panel

The UPS has a four-button graphical LCD with dual color backlight. Standard backlight is used to light up the display with black text and a blue background. When the UPS has a critical alarm, the backlight changes the background to red. See Figure below:
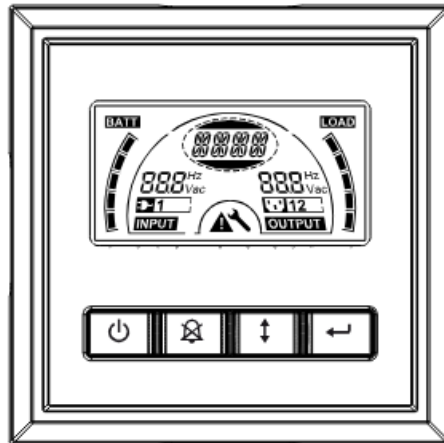
Control Buttons functions

There are four buttons on the control panel.

⏻ ON/OFF

🔔 UPS Test /Alarm Silence

↕ Select

↵ Enter

The following table describes the functions of the LCD control buttons.
Table2. Description of the control button

| Control Button	Switch	Function
⏻	ON/OFF	--*To turn on/off the UPS* Press and hold the button ⏻ more than 3 seconds. --*To release the UPS from faulty mode* Cut off input power and then press and hold the button ⏻ more than 2 seconds to shut down the UPS.
⍾	UPS Test Alarm Silence	--*To perform basic function test* Press and hold the button ⍾ for 3 seconds. --*To perform Battery life test* Press and hold the button ⍾ for 10 seconds. -- *To disable alarm buzzer* Press the button ⍾ for one second.
↕	Select	Press the Select button ↕ to select the settings value one by one
↵	Enter	-- *Enter settings mode* Press and hold the button ↵ more than 3 seconds. -- *Enter settings item* Press and hold the Enter button ↵ more than one second, the UPS allows users to configure the settings, and the settings string will flash. -- *Confirm settings* Press and hold the Enter button ↵ for one second. -- *Exit Settings mode* Press and hold the Enter button ↵ for 3 seconds or button ⏻ for 0.5 second.

- **Note**: Ensure the battery is fully charged during line mode when conducting functional tests.
- **Note**: A list of events shown below is not able to disable the alarm buzzer:

  Low Battery, Fan Failed, Fan Fault Time Out, and Overheat.
- **Note:** The user can disable the alarm buzzer when it's sounding, but an alarm will still sound when a new alarm event is encountered.

LCD functions:
The following table describes the functions of the LCD.

Table3. Description of LCD function

No.	Description	Function
888ᴴᶻⱽₐc	Input frequency and voltage	Indicates the value of input frequency and voltage
▷1▭	Input plug indicator	Light on when the input power is at no loss.
888ᴴᶻⱽₐc	Output frequency and voltage	Indicates the value of output frequency and voltage
▽123	Output plug indicator	The UPS has three groups of outlets. The output plug indicator will light on if there is output power respectively. LS3 is the main outlet and cannot be configured.
8888	UPS status/user setting display String	Strings Indicate the UPS status (see Table 4) Strings Indicate user setting options (see Table 5)
⚠	Warning indication	Light on when the UPS is failure or alarm.
🔧	Settings	Light on when the UPS under settings mode.
BATT	Battery volume level display	Indicates the amount of battery volume remaining. Each battery volume level bar indicates a 20% of total battery volume
LOAD	Load capacity level display	Indicates the percentage of UPS load capacity which is being used by the protected equipment. Each LCD level bar indicates a 20% of the total UPS output capacity.

UPS Status Display String Description:
The following table shows the description of the LCD display string.

Table 4. UPS Status Display String

LCD Display String	Description
STbY	UPS work at Standby mode
IPVL	Input voltage is too low
IPVH	Input voltage is too high
IPFL	Input frequency is too low
IPFH	Input frequency is too high
NORM	UPS work at Line mode
AVR	UPS work at AVR mode
bATT	UPS work at Battery mode
TEST	UPS work at battery life / function test mode
OPVH	Battery mode, the output is too high
OPVL	The output is too low
OPST	Output short circuit
OVLD	Overload
bATH	Battery voltage is too high
bATL	Battery voltage is too low
OVTP	Internal temperature is too high
FNLK	Fan is blocked
bTWK	Batteries are weak
SITE	Site wiring fault (No safety ground or reverse polarity of Line/Neutral

User Setting String Description:
The following table shows the options that can be changed by user.

Table 5. User Setting String

OPV	Output voltage mode select	120V	
AVR	Input type select	[000] = Normal range mode [001] = Wide range mode [002] = Generator mode	
EbM	External battery module(EBM)	0~1 is the number of external battery module	
TEST	Auto self-test	[000] = Disable	[001] = Enable
AR	Automatic restart	[000] = Disable	[001] = Enable
GF	Green function	[000] = Disable	[001] = Enable
bZ	Buzzer control	[000] = Disable	[001] = Enable
LS1	Load segment 1	[000] = Turn off	[001] = Turn on
LS2	Load segment 2	[000] = Turn off	[001] = Turn on
SITE	Site fault	[000] = Disable	[001] = Enable

Operating Mode

- **Normal range mode**: Under Input mode, the UPS accepts AC input voltage range for +20% ~ -25%.
- G**enerator mode:** Under generator mode, the low-frequency transfer point can go as low as 40Hz and as high as 70Hz before being transferred to battery mode.
- **Wide range mode:** Under Input settings mode, the UPS accepts AC input voltage range for -30% ~ +30%.
- Battery mode

  When the UPS is operating during a power outage, the alarm beeps once every four seconds and the LCD string shows "bATT" to indicate the UPS works at battery mode.

  If the battery volume becomes low while in Battery mode, the alarm beeps once every second and the LCD string shows "bite".
- **Standby mode**

  When the UPS is turned off and remains plugged into a power outlet, the UPS is on Standby mode. The LCD string shows "STbY" to indicate that power is not available to your equipment. The battery recharges when necessary.

Configuring Load Segment
Load segments are sets of receptacles that can be controlled through the display. Each UPS has two configurable load segments. See "Rear Panels" on page 26 for the load segment for each UPS model.
LS3 are main outlets and cannot be configured, only follow the ON/OFF switch. Note: This configuration can be operated when UPS is powered on.

To configure the load segment through the display:

1. **Enter settings mode**: Press and hold the Enter button more than 3 seconds. Then UPS will transfer to setting mode.

2. **Select settings items**: Press the Select button to select the setting items shown in Table 5.

3. **Enter settings item**: When the LCD "LS1" or "LS2", press the enter button more than one second to enter

the setting item and the settings string will flash.

4. **Select setting value:** Press the Select button ⬍ to select the settings value. Select the value [001] or [000] to set the desired load segment ON or OFF.

5. **Confirm settings:** Press and hold the Enter button ↵ for one second, ups will return to the current setting item.

6. **Exit Settings mode**: Press and hold the Enter button ↵ for 3 seconds or button ⏻ for 0.5 seconds to exit the setting mode.

Configuring UPS for EBM Numbers

To ensure the LCDs the correct battery volume, configure the UPS for the correct number of EBMs:

1. **Enter settings mode:** Press ↵ more than 3 seconds to enter setting mode.

2. **Select settings items:** Press ⬍ to selects setting items as "EbM".

3. **Enter settings item:** Press ↵ more than one second to enter the setting item.

4. **Select setting value:** Press the Select button ⬍ to select the number of EBM according to your UPS configuration.

5. **Confirm settings:** Press and hold the Enter button ↵ one second, ups will return to the current setting item.

6. **Exit Settings mode:** Press and hold the Enter button ↵ for 3 seconds or button ⏻ for 0.5 seconds to exit the setting mode.

Configuring Green Function

Green Function is that when an insignificant amount of load is detected, the UPS will shut down output automatically on battery mode. The green function is disabled on default mode and the user can configure the Green Function through the display:

- **Enter settings mode:** Press ↵ more than 3 seconds to enter setting mode.

- **Select settings items:** Press ⬍ to select setting items as "GF".

- **Enter settings item:** Press ↵ more than one second to enter the setting item.

- **Select setting value:** Press the Select button ⬍ to select "001".

- **Confirm settings:** Press and hold the Enter button ↵ for one second, ups will return to current setting item.

- **Exit Settings mode:** Press and hold the Enter button ↵ for 3 seconds or button ⏻ for 0.5 seconds to exit the setting mode.

Communication Port

RS-232 and USB Communication Ports

- To establish communication between the UPS and a computer, connect your computer to one of the UPS communication ports using an appropriate communication cable.
- When the communication cable is installed, power management software can exchange data with the UPS.

The software polls the UPS for detailed information on the status of the power environment. If a power emergency occurs, the software initiates the saving of all data and an orderly shutdown of the equipment.

- The cable pins for the RS-232 communication port are identified as below, and the pin functions are described in Table 6.

Table 6. DB9 Female (RS232 +dry contact)

PIN #	Description	I/O	Function Explanation
1	BATLOW	Output	Battery low
2	RXD	input	RXD
3	TXD	Output	TXD
4	DTR	Input	N/A
5	Common	—	Common (tied to chassis)
6	DTR	Input	N/A
7	RING	Output	Ring
8	LNFAIL1	Output	Line fail
9	Vcc	——	N/A
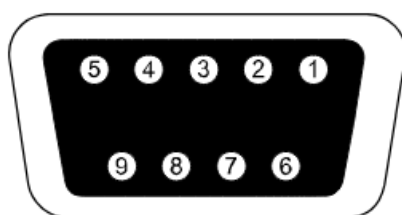
RS232 Communication Port

Emergency Power Off (EPO)
EPO is used to shut down the load from a distance. This feature can be used for shutting down the load on Emergency.

Warning:
This circuit must be separated from hazardous voltage circuits by reinforced insulation.

Caution:
The EPO must not be connected to any utility-connected circuits. Reinforced insulation to the utility is required. The EPO Switch must have a minimum rating of 24Vdc and 20mA and be a dedicated latching-type switch not tied into any other circuit. The EPO signal must remain active for at least 20ms for proper operation

EPO Connections		
Wire Function	Terminal Wire Size Rating	Suggested Wire Size
EPO	4-0.32mm^2 (12-22AWG)	0.82mm^2 (18AWG)

Note: Leave the EPO connector installed in the EPO port on the UPS even if the EPO function is not needed.

EPO Connector
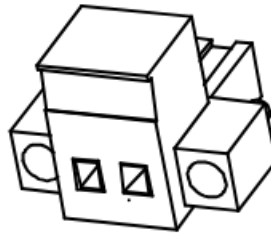
Network Management Card (Optional)
Network Management Card allows the UPS to communicate in a variety of networking environments and with different types of devices. The UPS series has one available communication slot for an NMC card or other optional card to achieve remote management of the UPS through the internet/ intranet. Please contact your local dealer for further information.

USB for HID power device
The USB interface is equipped with the standard "Human Interface Device" (HID) protocol. Using this protocol, various devices can be connected directly to the UPS system. Additional software (e.g., Winpower) is not required for this purpose. Communication with the UPS system takes place using the integrated hardware controllers in the connected devices

UPS Maintenance

UPS and Battery Care
For the best preventive maintenance, keep the area around the UPS clean and dust-free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner. For long battery life, keep the UPS at an ambient temperature of 25°C (77°F)

Storing the UPS and Batteries
When the UPS is intended to store for a long period, recharge the battery every 6 months by connecting the UPS to utility power. The batteries charge to 90% capacity in approximately 4 hours. However, it is recommended that the batteries charge for 48 hours after long-term storage.

Time to Replace Batteries
When the LCD backlight turns red, the screen displays "bTWK" and there is a continuous sound, the battery may need to be replaced. Please check the battery connection or contact your local dealer to order a new battery.

WARNING

- Turn off the UPS and disconnect the utility power cord from the wall outlet.
- Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries
- Batteries can present a risk of electrical shock or burn from high short-circuit currents. The following precautions should be observed:
    - Remove watches, rings, or other metal objects.
    - Use tools with insulated handles.
    - Do not lay tools or metal parts on top of batteries.
    - Wear rubber gloves and boots.
    - Disconnect the charging source before connecting or disconnecting the battery terminal.
- When replacing batteries, replace them with the same type and number of batteries or battery packs. Contact your service representative to order new batteries.
- Do not dispose of the battery in a fire. Batteries may explode when exposed to flame.

- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not open or mutilate the battery. Released toxic electrolytes are harmful to the skin and eyes.

Note: If you are not qualified service personnel to replace the battery, do not attempt to open the battery cabin. Please call local dealer or distributor immediately.

Replacing UPS Internal Batteries
Follow the steps and Charts as below to replace batteries:

1. Take off the LCD box, and remove the screws.
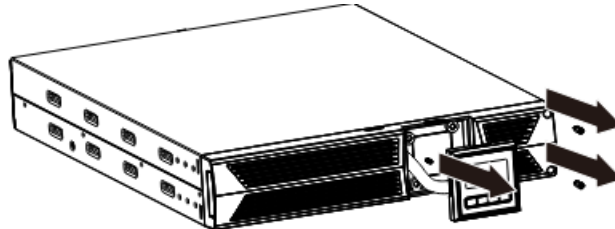
2. Slide and pull the front panel leftward and then take it off.

3. Disconnect the cable from the UPS and battery pack.

4. Remove the right inner battery bracket.

5. Pull the battery pack out onto flat area.

6. Install new battery pack into UPS.

7. Screw up the battery bracket and reconnect the battery cables A and B

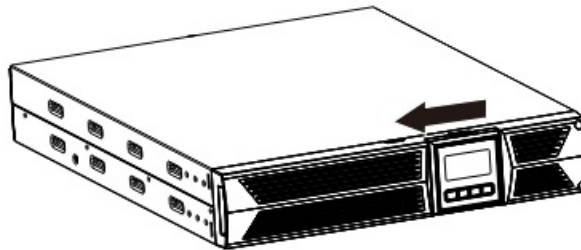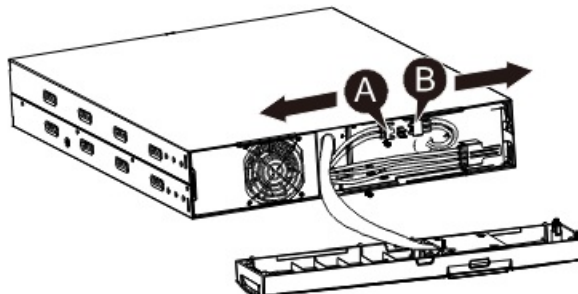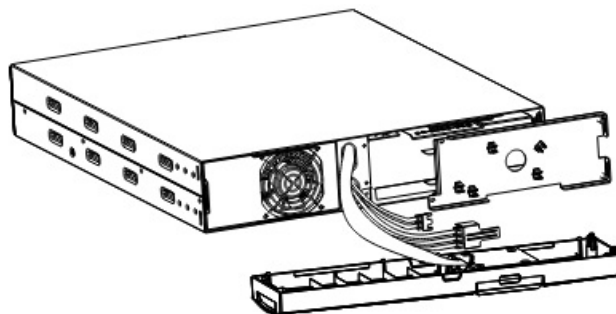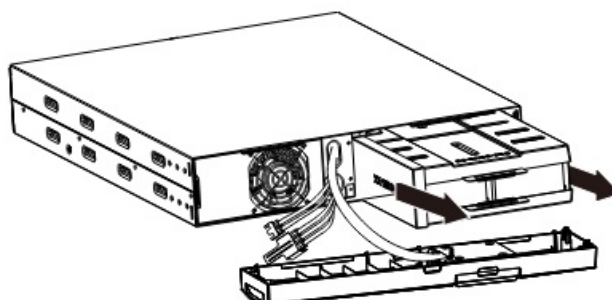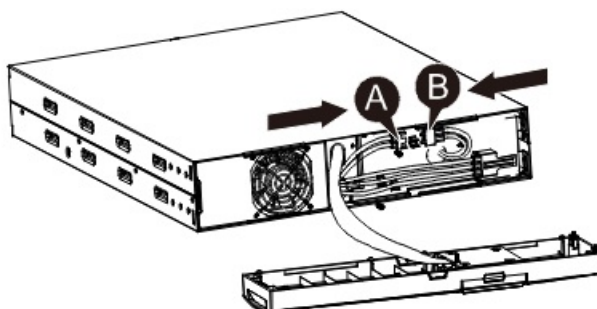8. Re-install the front panel back to UPS.

Testing New Batteries
For a battery test, please check:

- The batteries must be fully charged.
- The UPS must be in Normal mode with no active alarms.
- Don't take on/off the load.

To test batteries:

1. Connect the UPS to utility power for at least 48 hours to charge the batteries.

2. Press and hold the ⊠ button for 10 seconds to start the battery test. The status display string shows "TEST"

Recycling the Used Battery:

Warning:

- Never dispose of the batteries in a fire. It may explode.
- Do not open or mutilate the batteries. Released electrolytes are harmful to the skin and eyes. It may be toxic. A battery can present a risk of electrical shock and high short circuit current.

To recycle the used battery properly, please do not discard the UPS, battery pack and batteries into the trash bin. Please follow your local laws and regulations; you may contact your local recycling waste management center for further information to dispose properly of the used UPS, battery pack, and batteries.

Specification

Table 7. Electrical Specification

Model		DSS1500RT-TBF	DSS2200RT-TBF
Rated Capacity	**VA/Watt**	1500VA/1350W	2000VA/1800W
Maximum Capacity	**VA/Watt**	1500VA/1350W	2200VA/1980W

Load Type		SPS load: 1500VA/1350W; Resistive load: 1350VA/1350W; PFC load: 1392VA/1350W.	SPS load: 2200VA/1800W; Resistive load: 1920VA/1920W; PFC load: 1979VA/1920W.
Input	Input voltage range	89-144VAC	
	Frequency range	50/60Hz ±5Hz for Normal Mode 40-70Hz for Generator Mode	
Output	Voltage	120VAC	
	Voltage Regulation (Batt. Mode)	±5%	
	Frequency	50Hz or 60Hz	
	Waveform	Pure sine wave	
Overload rating	Line Mode	110% ±10%: shutdown after 3 minutes. 150% ±10%: shutdown after about 200ms	
	Battery Mode	110% ±10%; shutdown after 30 seconds. 120% ±10%; shutdown after about 100ms.	
Internal battery	Battery Type	Lead Acid Battery	
	Typical Backup Time (at full PFC load)	3′	
	Recharge Time	3 hours from 10% to 90% after discharged	2 hours from 10% to 90% after discharged

External battery module (EBM)	Battery Type	Lead Acid Battery
Interface	RS-232	Yes
	Dry-Contact	Yes
	USB	Yes
	SNMP	Optional
	EPO	Yes

Table 8. Indicators and Audible alarm

Indicator	AC Mode	NORM—normal mode
	Backup Mode	Displays "bATT" and beeps every 4 seconds
	Load/Battery Level	LCD displays
	UPS Fault	LCD displays red screen and " **** "
	Overload	LCD displays red screen and " OVLD "
	Low Battery	LCD displays red screen and " bATL "
Audible alarm	Backup Mode	Beeps every 4 seconds
	Low Battery	Beeps every second
	UPS Fault	Continuously beeps
	Overload	Beeps every second
	Battery Replacement	Continuously beeps

Table 9. Operating Environment

Temperature	0 to 40°C
Humidity	20%-80% relative humidity (non-condensing)
Altitude	2000m
Storage Temperature	-15° to 45° C

Table 10. Dimensions and weights

| Model		DSS1500RT-TBF	DSS2200RT-TBF
UPS Case	**Net weight (lbs./kg)**	41.88 / 19	47.39 / 21.5
	Dimension (in/mm) (W x H x D)	17.24 x 3.40 x 17.16 / 438 x 86.5 x 436	17.24×3.40 x 17.16 / 438 x 86.5 x 436
EBM Case	**Dimension (in/mm) (W x H x D)**	17.24 x 3.40 x 17.16 / 438 x 86.5 x 436	17.24 x 3.40 x 17.16 / 438 x 86.5 x 436
	Net weight (lbs./kg)	48.94 / 22.2	60.62 / 27.5

Rear Panels
The UPS rear panel description table and pictures are shown below:

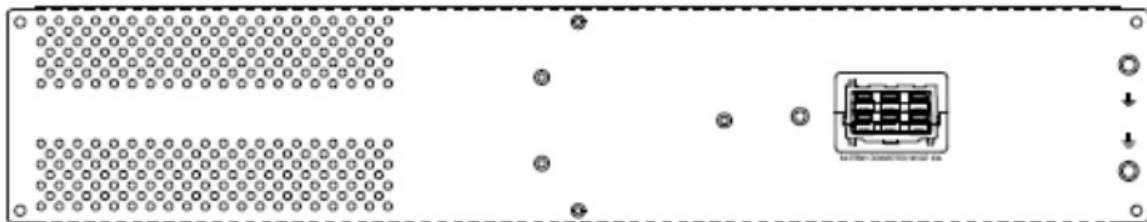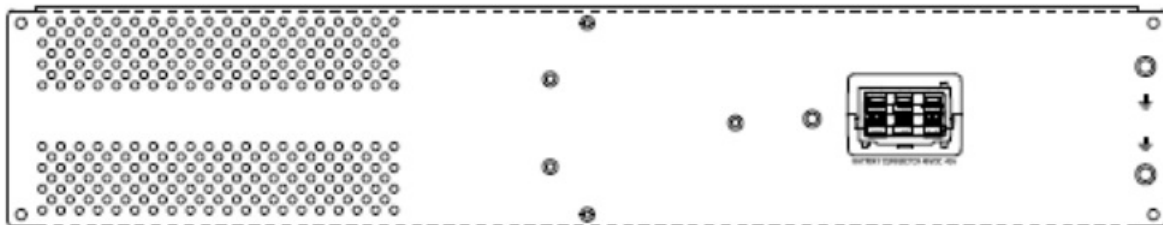| No.	Function
1	AC Output
2	External battery connector
3	SNMP Port
4	AC Input
5	RS232 / Dry-Contact Communication Port
6	USB Port
7	EPO
8	Earth Line Port
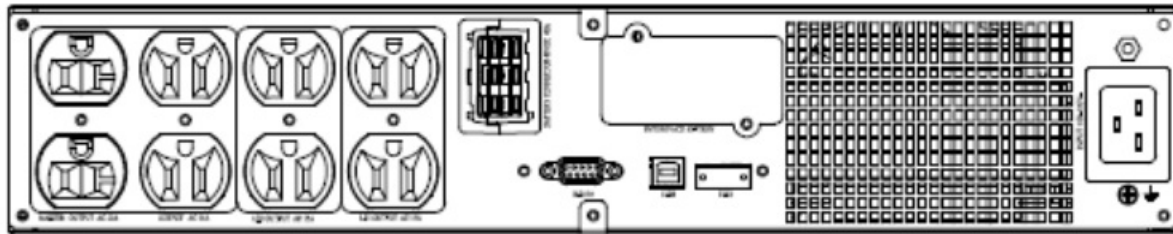
DSS22000RT REAR PANEL LAYOUT
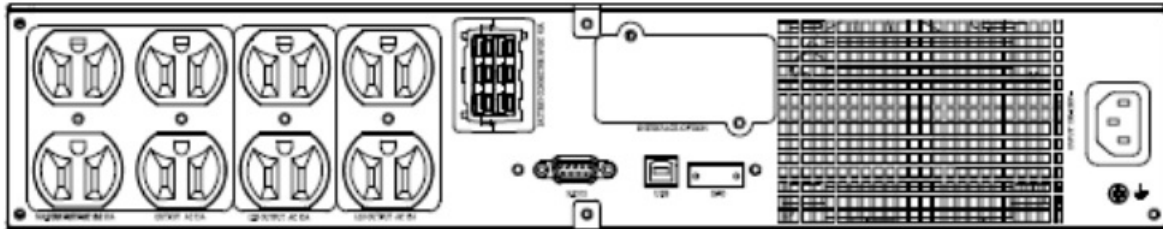
DSS1500RT REAR PANEL LAYOUT

The EBM rear panel description table and picture are shown below:

No.	Function (36V & 48V EBM)
1	Ground Line Port

DSS1500RT EBM rear panel

DSS2200RT EBM rear panel

Trouble Shooting

Audible Alarm Trouble Shooting

Indication	Cause	Solution
Beeps every 4 seconds	The UPS is on battery mode	Check the input voltage
Beeps every second and "bA TL" on screen	The battery voltage is low	Save your work and turn off your equipment
Beeps every second and "O VLD" on screen	Output overload	Check load level indicator and remove extra loads
Continuous beep and red display	The UPS fails	Please contact your local dealer

General Trouble Shooting

Problem	Cause	Solution
The UPS can't be turned on when power switch is pressed	Internal fuse may be broken	Please contact your local dealer
UPS is on and no power to load	No power on LS1 and LS2 output receptacle	Check if the LS1 and LS2 are set up from "001 to 000".
Backup time is short	Battery power is drained	Re-charge the battery for at least 24 hours
	Battery is old	Replace battery
Continuously beeps and display turns to red	The UPS failed	Please contact your local dealer
Buttons do not work	The setting mode is not a right path	Please see right configuring method
	Button is broken	Please contact your local dealer
SITE	No safety ground or L/N reverse	Check input power cord and the power outlet

Documents / Resources

DSS DSS1500RT-TBF Line Interactive UPS [pdf] User Guide
DSS1500RT-TBF Line Interactive UPS, DSS1500RT-TBF, Line Interactive UPS, Interactive UPS, UPS

References

- [**User Manual**](#)