

USER MANUAL

1-3KVA ON LINE UPS

Uninterruptible Power Supply

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1. INTRODUCTION

The On-Line-Series is an uninterruptible power supply incorporating double-converter technology. It provides perfect protection specifically for Novell, Windows NT and UNIX servers.

The double-converter principle eliminates all mains power disturbances. A rectifier converts the alternating current from the socket outlet to direct current. This direct current charges the batteries and powers the inverter. On the basis of this DC voltage, the inverter generates a sinusoidal AC voltage which permanently supplies the loads.

Computers and periphery are thus powered entirely independently of the mains voltage. In the event of power failure, the maintenance-free batteries power the inverter.

2. IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This Manual Contains Important Instructions that should be Followed during Installation and Maintenance of the UPS and Batteries.

- Intended for Installation in a Controlled Environment.
- Servicing of Batteries Should be Performed or Supervised by Personnel Knowledgeable of Batteries and the Required Precautions. Keep Unauthorized Personnel Away from Batteries.
- **CAUTION** - To reduce the risk of fire, unit input connect only to a circuit provided with branch circuit overcurrent protection for 30 amperes rating in accordance with the National Electric Code, ANSI/NFPA 70".(For Models 2KS, 3KS)
- When Replacing Batteries, Replace With the Same Number and Type.
- **CAUTION** - Do Not Dispose of Battery or Batteries in a Fire. The Battery May Explode.
- **CAUTION** - Do Not Open or Mutilate the Battery or Batteries. Released Electrolyte is Harmful to the Skin and Eyes. It May be Toxic.
- **CAUTION** - A Battery can present a Risk of Electrical Shock and High Short Circuit Current. The Following Precautions Should be Observed When Working on Batteries:
 - A. Remove watches, rings, or other metal objects.
 - B. Use tools with insulated handles.
 - C. Wear rubber gloves and boots.
 - D. Do not lay tools or metal parts on top of batteries.
 - E. Disconnect charging source prior to connecting or disconnecting battery terminals.
- Use No.12 AWG (for Model 2KS) or 10 AWG (for Model 3KS) ,90°C copper wire and 22 lb-in Torque force when connecting to terminal block.

Transport

- Please transport the UPS system only in the original packaging (to protect against shock and impact).

Set-up

- Condensation may occur if the UPS system is moved directly from a cold to a warm environment. The UPS system must be absolutely dry before being installed. Please allow an acclimatisation time of at least two hours.
- Do not install the UPS system near water or in damp environments.
- Do not install the UPS system where it would be exposed to direct sunlight or near heat.
- Do not block off ventilation openings in the UPS system's housing.

Installation

- Connect the UPS system only to an earthed shockproof socket outlet. Please note the special installation aspects for the permanently connected unit in Chapter 4 "Connection and Operation".
- The building wiring socket outlet (shockproof socket outlet) must be easily accessible and close to the UPS system.
- Do not connect domestic appliances such as hair dryers to UPS output sockets.

2. IMPORTANT SAFETY INSTRUCTIONS

- Do not connect appliances or items of equipment which would overload the UPS system (e.g. laser printers) to the UPS outlet socket.
- Place cables in such a way that no one can step on or trip over them.

Operation

- Do not disconnect the mains cable on the UPS system or the building wiring socket outlet (shockproof socket outlet) during operations since this would cancel the protective earthing of the UPS system and of all connected loads.
- The UPS system features its own, internal current source (batteries). The UPS output sockets may be electrically live even if the UPS system is not connected to the building wiring socket outlet.
- In order to fully disconnect the UPS system, first press the Standby switch then disconnect the mains lead or, on the permanently connected unit, isolate the incoming feeder.
- Ensure that no fluids or other foreign objects can enter the UPS system.

Maintenance, servicing and faults

- The UPS system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.
- **CAUTION** - risk of electric shock. Even after the unit is disconnected from the mains power supply (building wiring socket outlet), components inside the UPS system are still connected to the battery and are still electrically live and dangerous. Before carrying out any kind of servicing and/or maintenance, disconnect the batteries and verify that no current is present.
- Only persons adequately familiar with batteries and with the required precautionary measures may exchange batteries and supervise operations. Unauthorised persons must be kept well away from the batteries.
- **CAUTION** - risk of electric shock. The battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground. Before touching, please verify that no voltage is present!
- Batteries may cause electric shock and have a high short-circuit current. Please take the precautionary measures specified below and any other measures necessary when working with batteries:
 - remove wristwatches, rings and other metal objects.
 - use only tools with insulated grips and handles.
- When changing batteries, install the same number and same type of batteries.
- Do not attempt to dispose of batteries by burning them. This could cause battery explosion.
- Do not open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.
- Please replace the fuse only by a fuse of the same type and of the same amperage in order to avoid fire hazards.
- Do not dismantle the UPS system.

3. SYSTEM DESCRIPTION

3.1 Front Panel

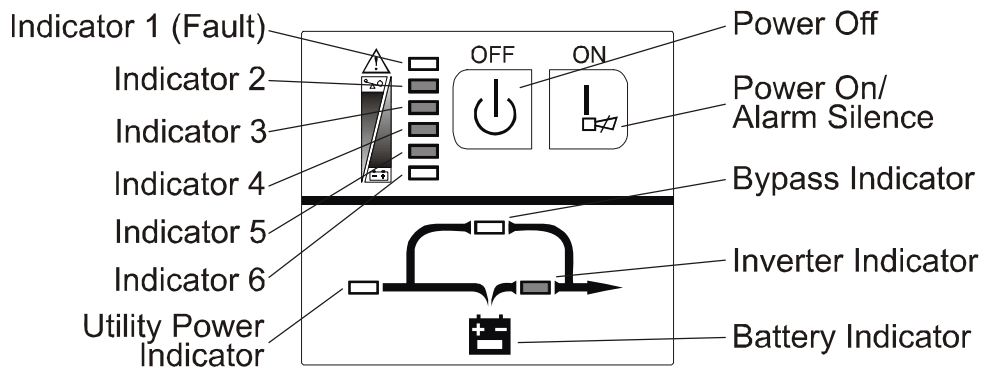


Figure 1 : Display panel

Switch	Function
ON - Switch	1. Turn on UPS system: By pressing the ON-Switch “ I ” the UPS system is turned on. 2. Deactivate acoustic alarm : By pressing this switch an acoustic alarm can be deactivated.
Standby - Switch	The UPS system switches to Standby mode when the Standby button “ ⏻ ” is pressed. Then the inverter is off.

3. SYSTEM DESCRIPTION

<i>Display</i>	<i>Function</i>
LINE-LED	<ol style="list-style-type: none"> 1. The green LINE LED lights up if mains voltage is applied to the UPS input. 2. LINE-LED blinks when the phase and neutral conductor have been reversed at the input of the UPS system. 3. If LINE-LED and BATTERY-LED light up, the mains power supply is out of tolerance.
BATTERY-LED	The orange-coloured BATTERY-LED lights up when the mains power supply has failed and the inverter is being powered by the batteries.
BYPASS-LED	The orange-coloured BYPASS LED lights up when the UPS system is supplying voltage provided by the mains power supply system via the bypass.
INVERTER-LED	The green-coloured INVERTER LED lights up when the UPS system is supplying voltage provided by the mains power via the inverter.
FAULT-LED	<p>The red FAULT-LED lights up and an acoustic warning signal is issued every second when the UPS system is in fault condition.</p> <p>Press the Standby switch in order to turn off the warning tone.</p>
Load and battery capacity LED	<ol style="list-style-type: none"> 1. These LEDs signal the UPS system load if the mains power is available (normal operation): <ul style="list-style-type: none"> 6th LED 0-30 % 5th LED 31%-50 % 4th LED 51%-70 % 3rd LED 71%-95 % 2nd LED 96%-108 %. 2. In the case of battery operation, the LEDs indicate the capacity of the batteries: <ul style="list-style-type: none"> 2nd LED 0-25 % 3rd LED 26%-50 % 4th LED 51%-75 % 5th LED 76%-95 % 6th LED 96%-100 %.

4. CONNECTION AND OPERATION

The system may be installed and wired only by qualified electricians in accordance with applicable safety regulations!

When installing the electrical wiring, please note the nominal amperage of your incoming feeder.

- 1) Inspect the packaging carton and its contents for damage. Please inform the transport agency immediately should you find signs of damage.
Please keep the packaging in a safe place for future use.
- 2) Please ensure that the incoming feeder is isolated and secured to prevent it from being switched back on again.
- 3) Connection method.

Connection Method of the UPS Input

If the UPS is connected via the power cord, please use a proper socket with protection against electric current, and pay attention to the capacity of the socket: over 12A for 1K (S) and over 20A for 1.5K(S)/1.5KE. Instead of using the socket for input, 2KS/3KS has the terminal block available for input as well. The wiring configuration is shown in the following diagram.

Model	Output Socket (pcs)	Terminal Block
1K/1KS	4	Nil
1.5K/1.5KS/1.5KE	4	Nil
2K/2KE	6	Nil
2KS	6	1
3K/3KE	6	Nil
3KS	6	1

- 4) Connect your computer to the outlet sockets of the UPS system as shown in the above diagram.
- 5) Fully charge the batteries of the UPS system by leaving the UPS system connected to the mains for 1-2 hours. You can also use the UPS system directly without charging it but the stored energy time may then be shorter than the nominal value specified.
- 6) Press the On button " I " on the front panel.
Note: The INVERTER-LED lights up after 10 seconds. The BYPASS-LED then goes out and the ventilation system switches on. The UPS system is now operating correctly.
- 7) Test the function of the UPS system by either pressing the On button " I " or disconnecting the input of the UPS system from the power supply.
- 8) Operation Procedure of External Battery for Long Backup time Model ("S" or "E" Model).

8-1 Use the battery pack with voltage: 36VDC for 1KS (3 pcs of 12V batteries), 48VDC for 1.5KS/

4. CONNECTION AND OPERATION

1.5KE (4 pcs of 12V batteries),96VDC for 2KS/2KE/3KS/3KE (8 pcs of 12V batteries), Connection of batteries more than or less than required will cause abnormality

CAUTION!

The output sockets of the UPS system may still be electrically live even if the power supply system has been disconnected.

8-2 Both two ends of the external battery cord are plugs for connecting the UPS and the battery pack. The battery connection procedure is very important. Any incompliance may result in the risk of electric shock. Please don't use any other power cord for connecting the UPS and the battery pack.

CAUTION!

**Do not connect equipment which would overload the UPS system (e.g. laser printer).
Do not connect document domestic appliances to the UPS system.**

8-3 Do not connect the UPS to any load yet. Then, connect the power cord of the UPS to supply utility power to the UPS to make the UPS operate in utility power mode.

8-4 Connect the plug of the external battery cord to the external battery socket on the rear panel of the UPS to complete the connection procedure and the UPS starts to charge the battery pack.

5. TROUBLESHOOTING

If the UPS system does not operate correctly, please attempt to solve the problem using the table below.

<i>Problem</i>	<i>Possible cause</i>	<i>Remedy</i>
No indication, no warning tone even though system is connected to mains power supply	No input voltage	Check building wiring socket outlet, check input cable
LINE LED blinks	Phase and neutral conductor at input of UPS system are reversed	Connect UPS system according to chapter 4
LINE-LED blinks and BATTERY-LED lights up	Input power and/or frequency are out of tolerance	Check input power source and inform dealer if necessary
LINE and BYPASS LED light up even though the power supply is available	Inverter not switched on	Press On button " I "
INVERTER LED lights up, warning tone at intervals (every 1 or 4 seconds)	Mains power supply has failed	Not necessary, battery operation; warning tone at intervals of 1 second means battery is almost empty
FAULT LED lights, warning tone once a second	Overload	Reduce number of users at UPS output
FAULT-LED lights up, permanent warning tone	UPS-mistake	Notify dealer !!
Emergency supply period shorter than nominal value	Batteries not fully charged / batteries defective	Charge the batteries for at least 1 - 2 hours. Check capacity. If the problem still persists, consult your dealer

Please have the following information at hand before calling the After-Sales Service Department:

1. Model number, serial number
2. Date on which the problem occurred
3. Detailed description of the problem

6.1 Operation

The UPS system contains no user-serviceable parts.

If the battery service life (3 - 5 years at 25 °C ambient temperature) has been exceeded, the batteries must be exchanged. In this case please contact your dealer.

6.2 Storage

If the batteries are to be stored in temperate climatic zones, they should be charged every three months for 1-2 hours (see Chapter "Connection and Operation"). You should shorten the charging intervals to two months at locations subject to high temperatures.

7. TECHNICAL DATA

7.1 Electrical specifications

Model	1K(S)	1.5K(S)/1.5KE	2K(S)/2KE	3K(S)/3KE
INPUT				
Voltage	60VAC~138 VAC			
Frequency	46Hz ~ 54Hz / 56Hz ~ 64Hz			
Amperage(maximum)	10A	15A	20A	24A
OUTPUT				
Power rating	1kVA 0.7k W	1.5kVA 1.05kW	2kVA 1.4kW	3kVA 2.1kW
Voltage	110/115/120VAC			
Frequency	(50Hz/60Hz)±0.2Hz (Battery Mode)			
Wave form	Sinusoidal			
BATTERIES(STANDARD)				
Number and type	3x12V7.2Ah	4x12V7.2Ah	8x12V7.2Ah	8x12V7.2Ah

7.2 Typical stored energy time (Battery mode)

Typical values at 25°C in minutes:

Model	100 % Load	50 % Load
1K	5	14
1.5K/1.5KE	5	14
2K/2KE	9	21
3K/3KE	5	17.5

Notes: 1.5KE/2KE/3KE UPS model do not connect external battery pack.

7.3 Dimensions and weights

Model	Dimensions W x H x D (mm)	Net Weight (Kg)
1K	145 x 220 x 400	14
1KS	145 x 220 x 400	7
1.5K/1.5KE	145 x 220 x 465	18.7
1.5KS	145 x 220 x 465	9
2K/2KE	192 x 340 x 460	35.5
2KS	192 x 340 x 460	16
3K/3KE	192 x 340 x 460	35.5
3KS	192 x 340 x 460	16

7.4 EMC

1/2/3K	-EFT	IEC61000-4-4	Level 4
	-Surge	IEC61000-4-5	Level 4
	-ESD	IEC61000-4-2	Level 4
	-RS	IEC61000-4-3	Level 3
	-Conduction	FCC PART 15	Class B
	-Radiation	FCC PART 15	Class B

7.5 Communication Port

The type of signals, serial command(RS232), is provided by the UPS to communicate with a host computer. The RS232 communication port transmits both utility power and UPS status to the host computer, providing the host computer with proprietary command sequence to monitor the utility power and UPS status and to control the UPS output.

The data format of RS232 is listed as followed:

- Baud Rate : 2400 bps
- Data Length : 8 bits
- Ending Bit : 1 bit
- Parity Bit : none

7.5.1 RS232 interface

The following is the pin assignment and description of DB-9 connector.

Pin#	Description	I/O
3	RS232 Rx	Input
2	RS232 Tx	Output
5	Ground	Input

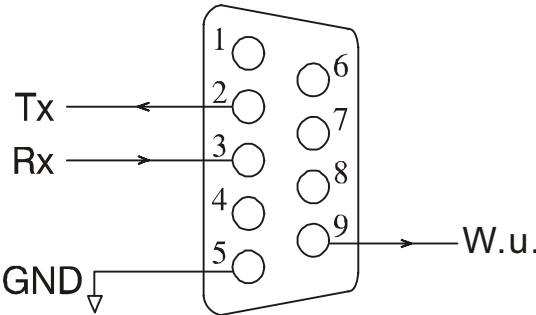


Figure 2: RS232 Interface

7. TECHNICAL DATA

7.5.2 AS400 Interface

Except for the communication protocol as mentioned above, this series UPS has AS400 card (an optional accessory) for AS400 communication protocol. Please contact your local distributor for details.

The following is the pin assignment and description of DB-9 connector in AS400 card.

Pin#	Description	I/O
1	UPS Fail	Output
2	Summary Alarm	Output
3	GND	Input
4	Remote Shutdown	Input
5	Common	Input
6	Bypass	Output
7	Battery Low	Output
8	UPS ON	Output

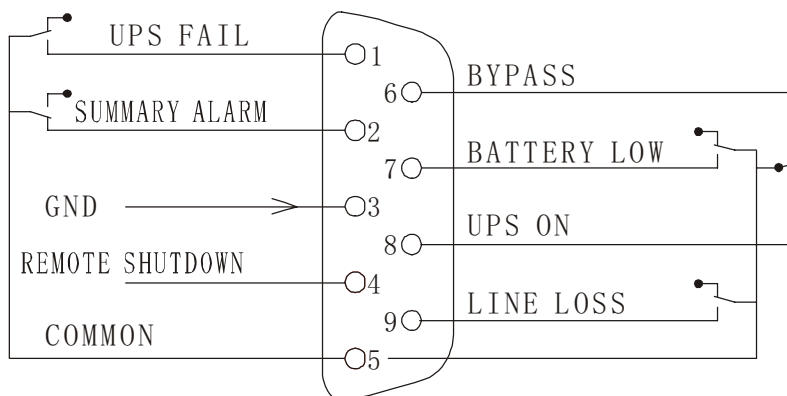


Figure 3: DB9 Interface of AS400 communication protocol

7.6 Operating environment

Temperature: 0 °C to 40 °C, Installation height < 1500 m

Relative humidity: 0 to 95%, non-condensing

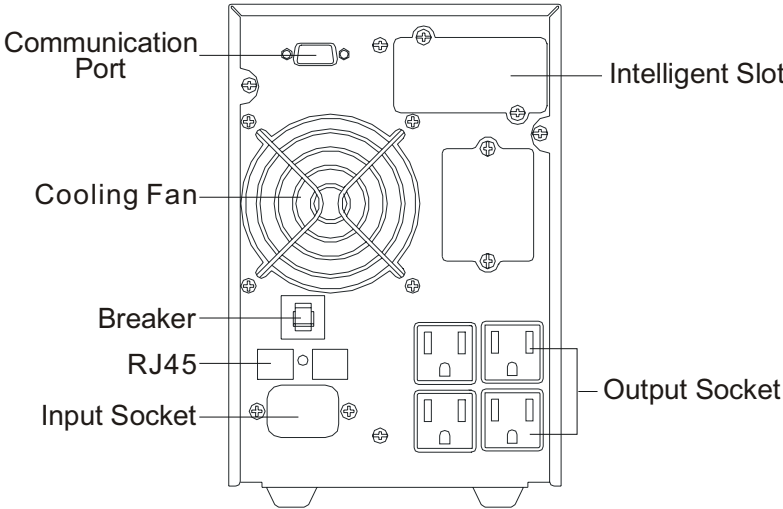


Figure 4: Back view of 1K

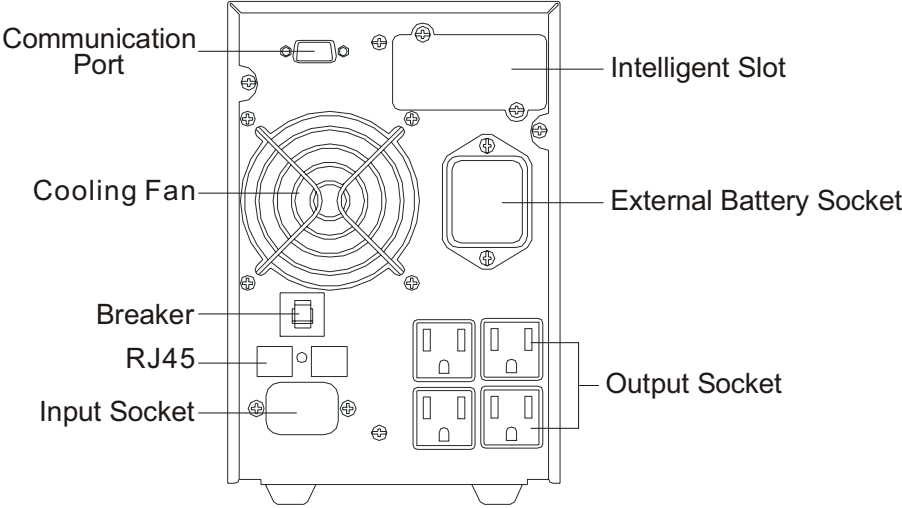


Figure 5: Back view of 1KS

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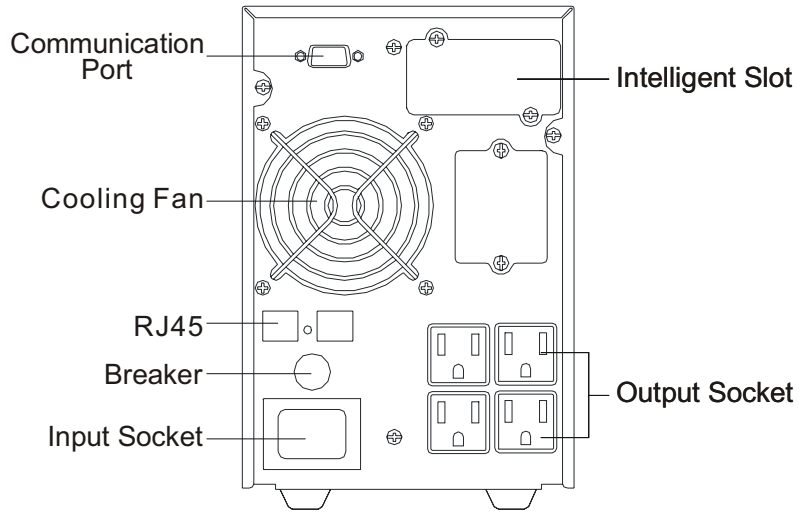


Figure 6: Back view of 1.5K

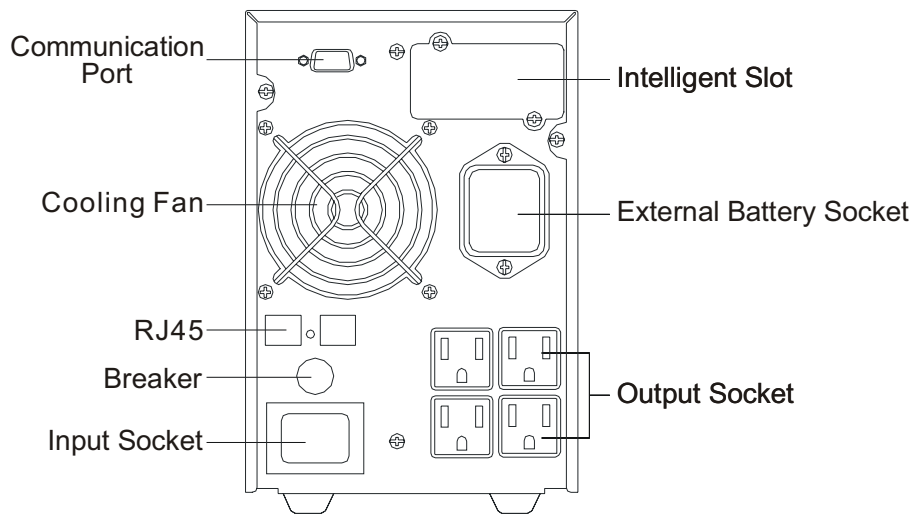


Figure 7: Back view of 1.5KE/1.5KS

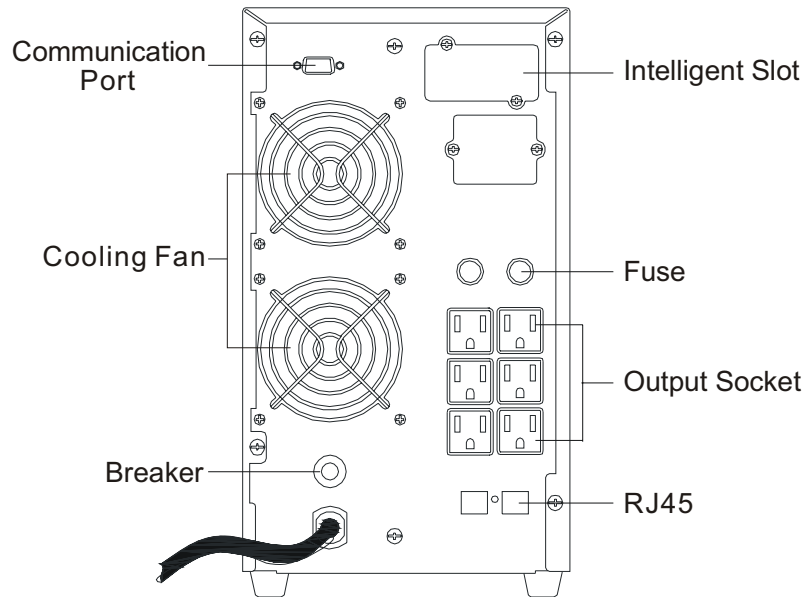


Figure 8: Back view of 2K/3K

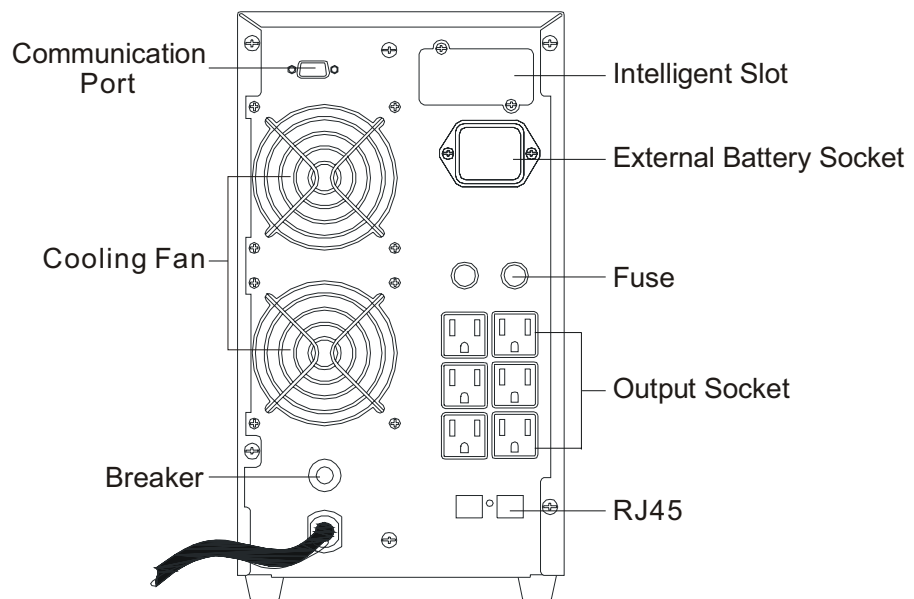


Figure 9: Back view of 2KE/3KE

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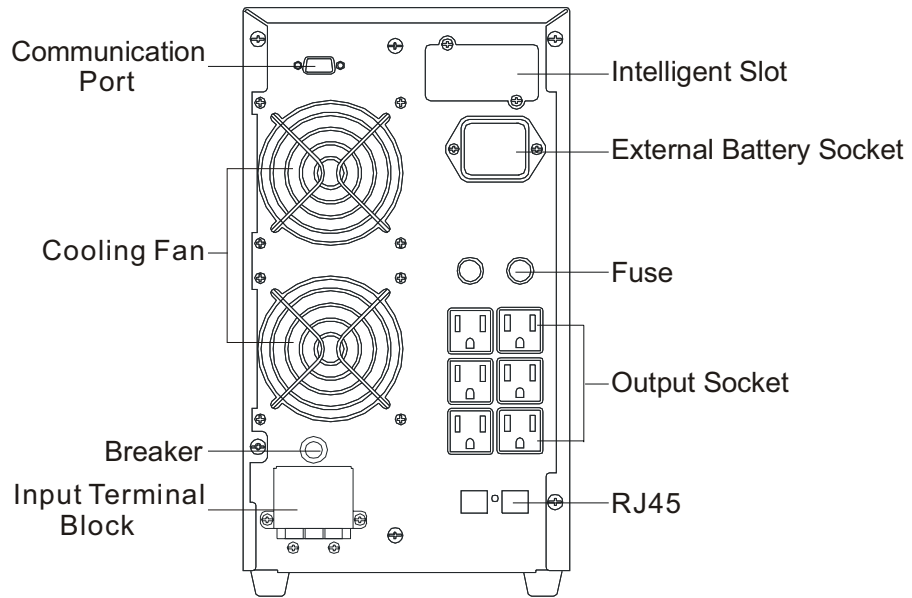


Figure 10 : Back view of 2KS/3KS

