



RAYDON Electronics

PES-L Series

Portable Energy System

User Manual

Model: PES-L Series

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Your Best Outdoor Power Solution!

Thanks for you to choose **PES-L Series**. The product is light and portable, developed and designed by innovative technology, fashion and high quality, multiple functions and easy operation.

Nowadays, there are increasing outdoor activities and they become more popular; however, people getting difficult to find power source to re-charge their electronic applications and digital electronic devices when they are doing outdoor activities and works. The PES-L is designed to solve this problem perfectly.

Please read this instruction manual, in order to understand and know well all functions and operation ways of the **PES-L Series** providing.

When you read this introduction manual or use the **PES-L Series**, all component name and location for labeling numbers should see Components Figures in **Section 5**.

PES-L Series will be called “PES” in the following chapters.

Safety Information

Read this instruction manual carefully before using this product.

This instruction manual contains important content. It makes you use this product safe and correctly, and prevent you or others from personal injury and property loss.

Please keep this instruction manual in safe place, in order to the product’s owner can read it anytime.

The meaning of this instruction manual’s icons is following:



It is possible to get hurt or damage article, if people don’t follow this manual or have a wrong operation.



Important information for helping you use this PES better.

Warning information:



It needs to match with product’s specifications for this series product to use power and loading equipment. Otherwise, breaking down system, even damaging system will occur.



Total power from loading equipment must be less than PES’s design power.



Never put it on near radiator, fan, stove or other water heating equipment and heat sources.



Never keep or use gasoline and other flammable products near this product to prevent fire risk from occurring.



Never block up Cooling Fan and Circulation Vent, keep it in a place with good ventilation when the product is working.



Keep children away from using PES. DO NOT allow children to play with or operate this PES without supervision.

1. Preparation before Using

- To avoid battery self-discharge during shipment, the system fuse is removed during packaging. Please find the fuse in the accessories package and insert the fuse into the designed fuse socket at the back panel.
- Please fully charge the PES before using it for the first time.
- Please use the Car Charging Cable which is included in the accessories package when you need to charge in car.
- Please use the AC Adapter to charge PES when you are indoors and outdoors.

2. Accessories

2.1. Accessories List

ID	Accessory	View	Quantity (PCS)	Note
1	Car Charging Cable		1	<ul style="list-style-type: none"> ● Standard car lighter plug at one end and standard DC plug at the other end ● 1 meter in length
2	AC Adapter		1	<ul style="list-style-type: none"> ● Model: TA09A3 ● 90W, 19V 4.47A Continuous
3	User Manual		1	<ul style="list-style-type: none"> ● Read the document before using the unit
4	Powerbank		1	<ul style="list-style-type: none"> ● Available PES-L300 and L450 ● Input: 5V/2A ● Output: 5V/2.1A

3. Product Introduction

Nowadays, there are increasing outdoor activities and they become more popular; however, people getting difficult to find power source to re-charge their electronic applications and digital electronic devices when they are doing outdoor activities and works. The PES-L Series is designed to solve this problem perfectly.

The PES-L Series is power storage system which contains a Lithium battery pack and can be re-charged by AC adapter, solar panel or 12V car outlet.

Ideal cost-effective outdoor power solution, supporting AC and DC output, fully support all type outdoor power requires. Special for camping, construction site and power outages

This product has a compact body and easy to carry. On the other hand, this product combines many useful outputs, included 12V car charging output, USB 5V output, Type C output, AC output.

4. Product Features

- Ideal outdoor power solution, special for camping, yachting, shipping and outdoor activities.
- Internal battery powers mobile phone, laptop, camera, power tool, speaker, camping tools, flying drone etc.
- Multiple outputs: 5V USB x 2, 20V Type C x 1, 12V Car charger, 110V AC x 2. Cover all portable power requirements.
- Build-in LCD panel indicate system status.
- Temperature activated cooling system.
- Supporting DC, Solar panel input, ideal for outdoor activities (Solar panel not included).
- Easy to operate, just press power switch and connect with charging cable.
- Built-in cell balance protection, over current protection, over voltage protection, under voltage protection and short circuits protection.
- Detachable power bank for more flexible charging requirements.



Safety Protection



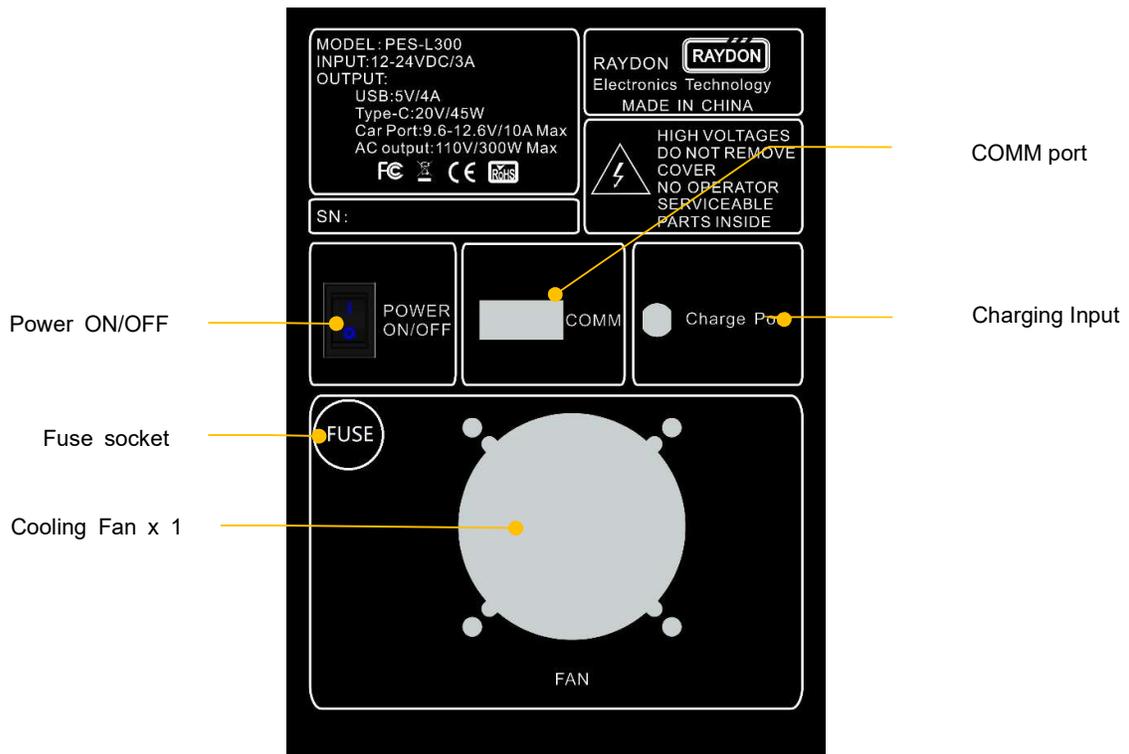
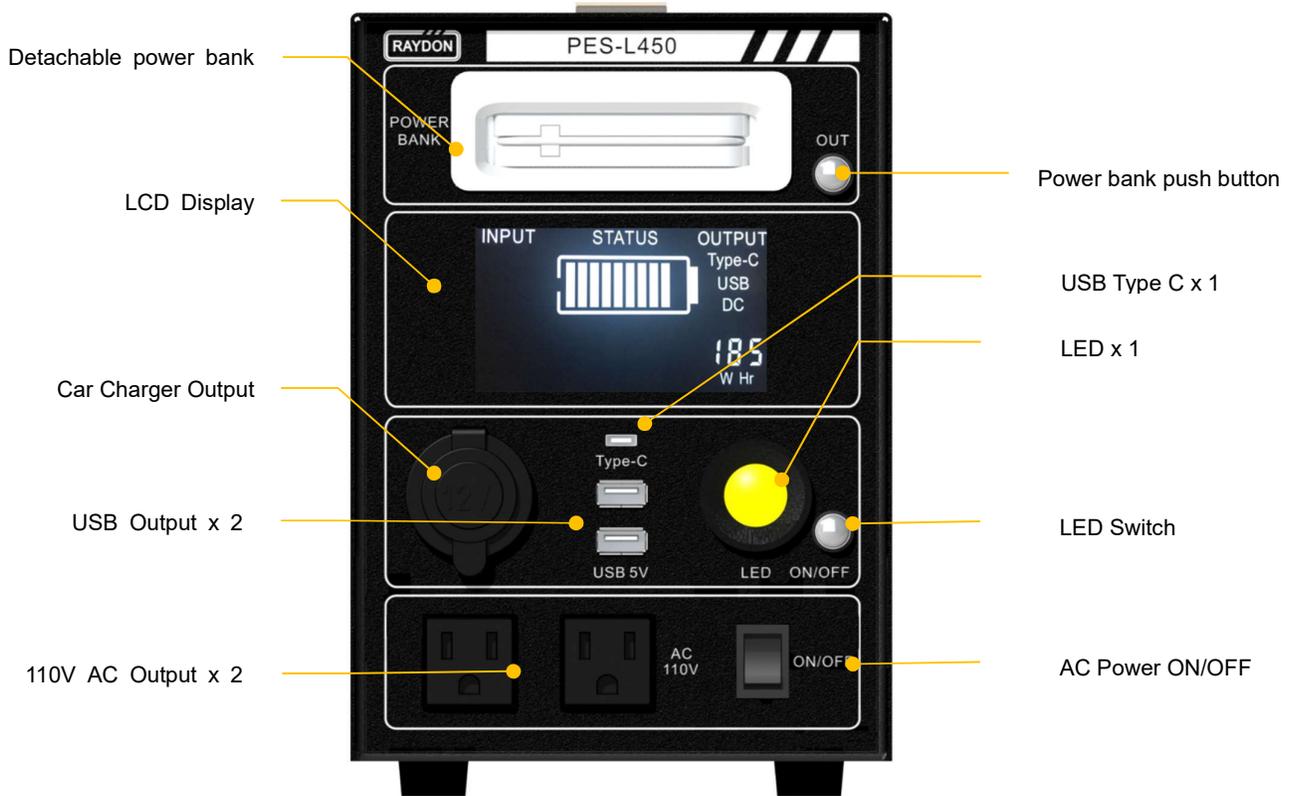
Solar Panel



Build-In LED Lighting

5. Top Panel Design

5.1. Top Panel Figure



5.2. Functions List

ID	Port	Function
1	Charging Input	Charging by Adapter (also need DC IN Cable).
2	Cooling Fan x 1	Cooling the heat for the main power component inner. It will be activated automatically when temperature is too high.
3	LED Light switch	LED Light switch indicate 3 LED light levels.
4	LED	3 LED light levels, 3W
5	USB Type C	Quick charging phone, tablet and more digital electronic product.
6	USB Type A x 2	Norma charging phone, tablet and more digital electronic product.
7	Car Charger Output	Charging vehicle equipment (such as vehicle freezer) by Car Charging Cable.
8	AC Output x 2	Charging small household electronic equipment.
9	AC ON/OFF	Power switch for AC Output.
10	LCD Display	Display power status.
11	Power ON/OFF	Main power switch.
12	COMM Port	Communication port for firmware update.
13	Detachable power bank	Detachable power bank socket
14	Power bank button	Push out power bank button
15	Fuse socket	Insert the fuse into the designed fuse socket at the back panel before 1 st time using.



Please turn on Power ON/OFF before using.

Please turn on AC ON/OFF before using AC outputs.

Please turn off Power ON/OFF when not using.

Please turn off AC ON/OFF if you don't need to using AC outputs, it will save more power.

Please charge this PES every month.



Follow all power and current ratings in the manual, do NOT overload the AC or DC outputs. Total power from loading equipment must be less than max power (see **Specification table**)

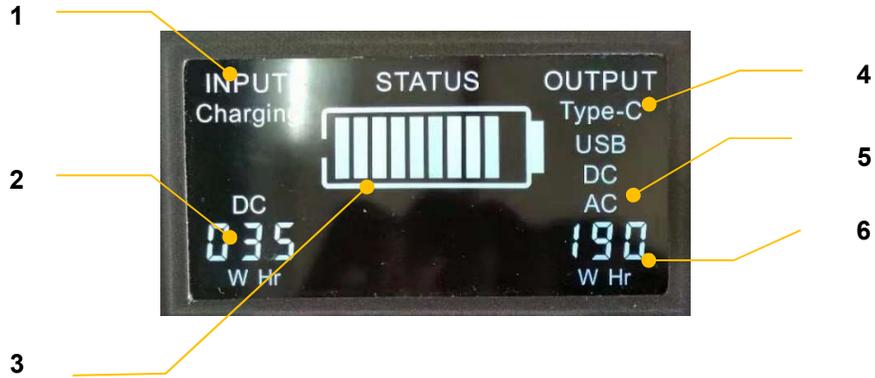
5.2.1. AC Output Standards

AC Output Standard (According to delivering location)		
Standard	Descriptions	Sockets
USA	Output voltage: 110~125V 60HZ.	
Germany	Output voltage: 220~250V50HZ.	
UK	Output voltage: 220~250V50HZ.	

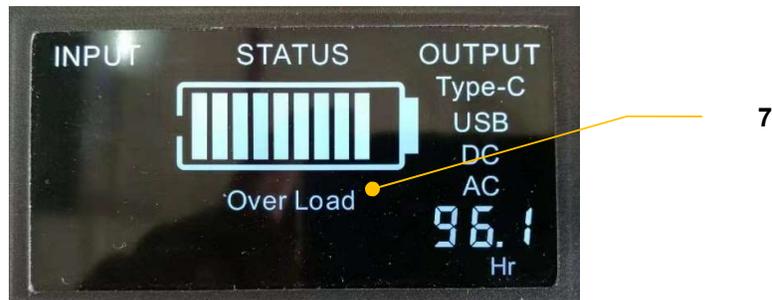


The output voltage must be match with AC Output Standard when you use AC Output to charge device.

5.3. LCD Display



ID	Item	Function
1	INPUT Charging	The “Charging” displaying when charging input
2	DC Charging status	Displaying total charging power (WHr) and charging time (Hr)
3	Battery Power Levels	Battery capacity level, 10 levels indicate 0%-100% power levels
4	OUTPUT DC	DC output ports status: Type-C, USB, Car Charging (DC) ON: available; Flashing: Over Load
5	OUTPUT AC	AC output ports status ON: available; Flashing: Over Load
6	Power loading Status	Displaying total remaining capacity (WHr) and remaining run time (Hr), accordingly current total loading (including DC and AC loading).



ID	Item	Function
7	Error Status	SYSTEM RESET MIGHT REQUIRED
7.1	Over Load	Total output power loading is too high, or a short circuit device is inserted. Remove ALL inserted devices from output sockets and reset the main Power switch at the back of the unit.
7.2	Over Heat	The inside box temperature too high, we should be stop loading or charging and wait for the unit cooling down.
7.3	Battery Low	The battery is less than 10%, buzzer will alarm. Recommended to stop operation and charge PES immediately.

6. Specifications

6.1. Power Specifications

Item	Features	Specifications	PES-L150	PES-L300	PES-L450
Input	DC Adapter Input	Input Voltage	16Vdc	16Vdc	16Vdc
		Maximum Input Current	3.2A	3.2A	3.2A
		Socket Type	DC Jack 5.5*21mm	DC Jack 5.5*21mm	DC Jack 5.5*21mm
Output	USB Type A Output	No. of Channel	2	2	2
		Output Voltage	5Vdc ±5%	5Vdc ±5%	5Vdc ±5%
		Maximum Output Power	20W (Combined)	20W (Combined)	20W (Combined)
	USB Type C Output	No. of Channel	1	1	1
		Output Voltage	20Vdc(5/9/12/15/18/20) ±5%	20Vdc(5/9/12/15/18/20) ±5%	20Vdc(5/9/12/15/18/20) ±5%
		Maximum Output Power	45W (Per Channel)	45W (Per Channel)	45W (Per Channel)
	Car Lighter Output	No. of Channel	1	1	1
		Output Voltage	9.6 ~ 12.6 Vdc ± 2%	9.6 ~ 12.6 Vdc ± 2%	9.6 ~ 12.6 Vdc ± 2%
		Maximum Output Power	10A/120W	10A/120W	10A/120W
	Power Bank	Channel	N/A	1	1
		Power charger	N/A	5V/2A	5V/2A
	AC Output	No. of Channel	2	2	2
		Output Voltage	110Vac ±10%	110Vac ±10%	110Vac ±10%
		Normal Output Power	120W (Combined)	200W (Combined)	400W (Combined)
		Maximum Output Power	150W (Combined)	300W (Combined)	450W (Combined)
Output Frequency		60Hz ±1Hz	60Hz ±1Hz	60Hz ±1Hz	
Output Wave		Modified Sine Wave			
Functional Accessories	LED Light Strip	Power	1W		
		Input Voltage	3V		
		Dimension	30mm		
		Color	White		
	LCD Display	Color	White color on black	White color on black	White color on black
	Power Output Switch	ON/OFF	Locked/Blue Light	Locked/Blue Light	Locked/Blue Light
	AC Output Switch	ON/OFF	Locked/Blue Light	Locked/Blue Light	Locked/Blue Light
	LED Light Switch	ON/ OFF	Momentary/No Light	Momentary/No Light	Momentary/No Light
	Cooling Fan	Temperature Activated	ON: > 40°C (104 F)	ON: > 40°C (104 F)	ON: > 40°C (104 F)
OFF: < 36°C (97 F)			OFF: < 36°C (97 F)	OFF: < 36°C (97 F)	
Battery Module	Battery Pack	Battery Type	Li-ion	Li-ion	Li-ion
		Cell Capacity	2600 mAh	2600 mAh	2600 mAh
		Pack Design Voltage	11.1 V	11.1V	11.1 V
		Cell Configuration	3S5P	3S8P	3S15P
		Pack Wh	145Wh	231 Wh	433 Wh

		Pack Capacity	13 Ah	21 Ah	39 Ah	
		Maximum Power Output	150 W	300 W	450 W	
Physical	Dimensions	W x H x L	155*167*205mm	155*2110*245mm	155*225*275mm	
	Weight		3.7kg/8.2lbs	5.4kg/11.9lbs	7.3kg/16.1lbs	
	Body Color		Black	Black	Black	
	Operating Temperature	Charge		0 ~ 45 °C	0 ~ 45 °C	0 ~ 45 °C
		Discharge		20 ~ 60 °C	20 ~ 60 °C	20 ~ 60 °C
	Storage Temperature	1 month		-10 ~ 60 °C	-10 ~ 60 °C	-10 ~ 60 °C
	(for Shipping State)	3 months		-5 ~ 45 °C	-5 ~ 45 °C	-5 ~ 45 °C

6.2. Power Efficiency

Model	PES-L150	PES-L300	PES-L450
Battery Type	Li-ion	Li-ion	Li-ion
Cell Capacity	2600mAh	2600mAh	2600mAh
Battery Spec.	3S5P	3S8P	3S15P
Pack Capacity (Ah)	13	21	39
Effective Power	145Wh/13AH	231Wh/21AH	433Wh/39AH
Power Rating (Wh)	145	231	433
Max Power Output	150W max	300W max	450W max

DC Output	Connection Device	Full Load Run Time (Hour)			
USB	Standard USB 500mA Output	43.3	69.0	129.4	
	Smartphone USB 1.4A Output	15.5	24.7	46.2	
	iPad USB 2.1A Output	10.3	16.4	30.8	
	Max USB 4.0A Output	5.4	8.6	16.2	
12V DC	USB Car charging max output 4.2A	2.1	3.4	6.4	
	Laptop Car charging 11.5V - 16VDC 5.6Amax 60W	1.8	2.9	5.4	
	10.5L Mini car refrigerator 0.36kW/24hrs	7.2	11.5	21.6	
	Surveillance camera DC12V ±10% 7W	15.5	24.7	46.2	
	Car radio station DC13.8V	37.9	60.3	113.1	
LED	5W LED Light	21.7	34.5	64.7	
AC Output	Connection Device	Full Load Run Time (Hour)			
Mini electrical equipment	32-inch LED TV	55	1.8	2.8	5.2
	Blu-ray DVD Player	19	8.8	13.9	26.1
Camping equipment	Electronic mosquito lamp	15	6.4	10.2	19.2
Office equipment	Ultra-Book: 45W Adaptor	45	2.1	3.4	6.4

AC Output	Connection Device	Full Load Run Time (Hour)	Full Load Run Time (Hour)	Full Load Run Time (Hour)	Full Load Run Time (Hour)
Office equipment	Medium laptop: 60W Adaptor	60	1.6	2.6	4.8
	High power laptop: 90W Adaptor	90	1.1	1.7	3.2
	Desktop PC	200	X	0.8	1.4
	Bubble Jet Printer	10	9.6	15.3	28.8
Power tool	Hand mill	300	X	0.5	1.0
	Electric hand drill	300	X	0.5	1.0
	Domestic pump (128W, 1.0cube, 12m head)	128	0.8	1.2	2.2
AC Output	Connection Device	Max Power (W)	Full Load Run Time (Hours)	Full Load Run Time (Hours)	Full Load Run Time (Hours)
Others	Blender: 150W	150	0.6	1.0	1.9
	Blender: 300W	300	X	0.5	1.0
	Blender: >450W	>450	X	X	X
	Other Device	>500	X	X	X
DC Output			Charge Cycle (Times)	Charge Cycle (Times)	Charge Cycle (Times)
Smart Phone	iPhone 8, 8P, X, XS etc.	11.80	9.2	14.6	27.4
	iPad	42.00	2.6	4.1	7.7
	iPad Mini	16.70	6.5	10.3	19.4
	iPad Air	32.00	3.4	5.4	10.1
	3000mAH Phone	11.10	9.8	15.5	29.1
	10000mAH Tablet	37.00	2.9	4.7	8.7
Input			Fully Charge (hrs)	Fully Charge (hrs)	Fully Charge (hrs)
Solar Panel	17.5V/21W		12.8	19.5	34.5
Wall Outlet	110V/220V, 16Vdc 3.2A max Adaptor		6.1	8.6	14.2
Model			PES-L150	PES-L300	PES-L450
					

7. Helpful Tips and Tricks

- When the battery level is less than 5%, the PES will shut off all outputs to protect the battery.
- When not in use, the main power switch must be turned off to avoid self-discharge of the battery, it is also recommended to charge your PES every 3 months to maintain the quality of the battery
- When system reset is required due to overloading or short circuit, remove **ALL** inserted devices from output sockets and reset the main Power switch at the back of the unit.

CAUTION



- Do NOT use PES if it is damaged, or has been modified or altered in any way
- Do NOT expose PES to water or any fluids.
- Do NOT store or place PES near fire, extreme heat, or where there are combustible fumes or gases.
- PES is not a toy and is not intended for use by children without adult supervision, in this regard, treat it as an outlet in your home.
- Do NOT clean the metal surfaces with water or solvents. Before cleaning, turn off the unit, unplug all devices and AC adaptor, and wipe gently with a dry, soft cloth.
- Store PES in environment between -10°C (14°F) and 55°C (131°F). Charge fully once every 3 months.

RISK OF INJURY



- Do NOT disassemble, modify in any way, or attempt to service PES yourself, as this may result in damage to the unit or injury to yourself or others, and will void your warranty.
- Do NOT insert foreign objects into any output sockets, ventilation slots, or any other openings. Use only the correct connector for each power socket.
- Do NOT strike or drop the PES.
- Do NOT charge or operate the PES in the temperature exceeding the operating temperature described in this manual. Unplug PES AC adaptor during lightning storms or when not in use.

Failure to operate, store and care for the PES according to these guidelines may damage the unit or diminish performance. Abuse of unit may lead to property damage, injury, or death.

8. Waste Disposal



This appliance is identified according to the European guideline 2002/96/EC on waste electrical and electronic equipment - WEEE. The guideline specifies the framework for an EU-wide valid return and re-use of old appliance. Please dispose of the individual parts separated according to type. Ask your dealer or inquire at your local authority for current means of disposal.