IRON-E

User manual

PESS ENERGY

Please read this user manual carefully.

We would like to thank you for choosing a PESS Energy product and we hope that you will enjoy using your device in your daily work.

If, in spite of this manual, you encounter any misunderstandings or situations that have not been mentioned in this document, please contact us by e-mail at contact@pessenergy.com or by telephone on +334 91 58 86 74. Please read all the instructions in this manual carefully.

Follow all warnings and information contained in this manual. PESS Energy cannot be held responsible for any damage or injury caused by incorrect use. This user manual applies to the Powerbank IRON-E, hereinafter referred to as 'the device'.

In order to continuously improve our products and ensure customer satisfaction, we reserve the right to make technical changes to the device without prior notice.
For more information about our company and our products, you can find us on our official website www.pessenergy.com.

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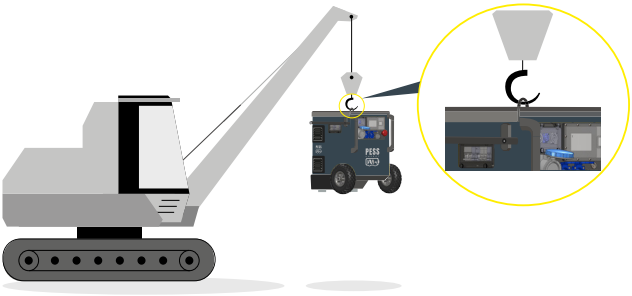
I. Use case illustrations

LIFTING WITH THE LIFTING RING

Weight 120 kg



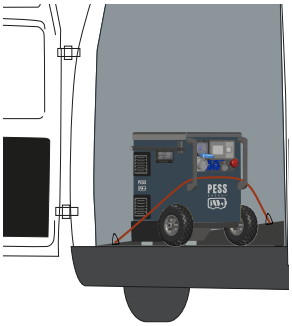
LOADING INTO A VAN

Heavy load 120 kg

Optional : electric winch for autonomous product setup

LASHING IN A VAN

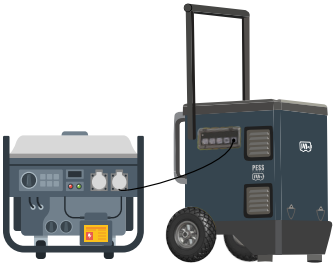
Use the handles to secure the Iron-E



ON THE MOVE

DRY CONTACT

Automatic generator set start and stop via dry contact



gas-powered generator : 4 kVA min

Dry contact cable available as accessory

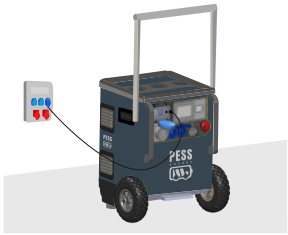
Different ways to recharge your Iron-E

RECHARGE ON 16A MAINS

Charging time: <4h = 100%
Charging power: 3000W

RECHARGE ON 32A MAINS

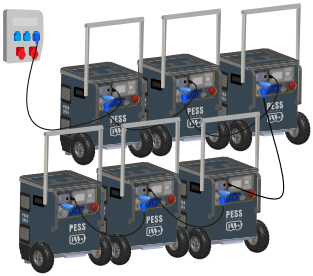
Charging time : 10h = 100%
Charging power : 1000W



32 A cable available as accessory

RECHARGE ON DAISY CHAIN 32A

Input : 32A
Output : P17 32A
Max 6 devices = 6000W with 1000W/device



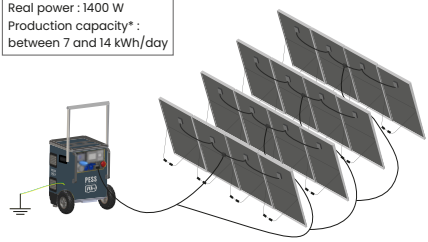
- Do not connect anything to the output of the devices (when charged by 6)
- Devices must be switched on
- It is not necessary to disconnect the paralleling cables
- Lower the circuit breakers on the paralleling box
- Do not disconnect under charge : use solar circuit breaker

RECHARGE ON SOLAR PANELS

Produce your own energy anywhere

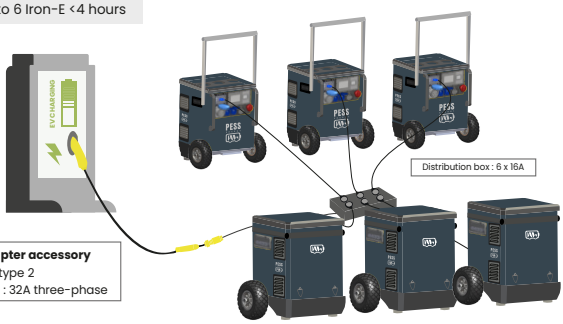
Maximum PV input power: up to 5500W
Theoretical cumulative capacity : 18 800Wh/day*
(10 000Wh for Iron-E and 8800Wh/day produced by Ekla)

Ekla accessory
Max power : 1700 Wc
Real power : 1400 W
Production capacity* :
between 7 and 14 kWh/day



RECHARGE ON ELECTRIC VEHICLE CHARGING

Recharging time : Up to 6 Iron-E <4 hours



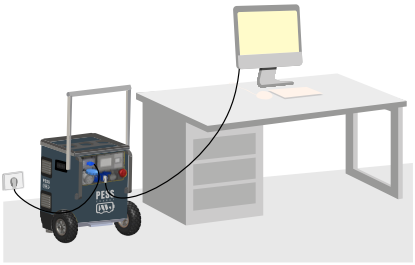
EV adapter accessory
Input : type 2
Output : 32A three-phase

BACK UP 16A

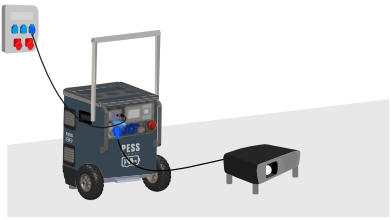
BACK UP 32A

Securing your equipment

Max output 500 W if battery not charged
Max output 3600 W when battery is charged



Max output 6000 W if battery not charged
Max output 7400 W when battery is charged

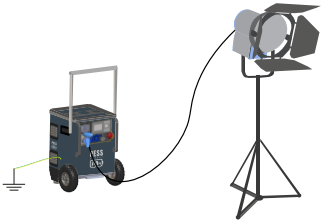


16A POWER SUPPLY

Output: 3600 W max

32A POWER SUPPLY

Output: 7400 W max



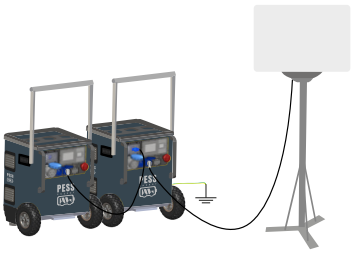
Example: charging an Arri Tungstene Fresnel projector 5000W

DAISY CHAIN 16A

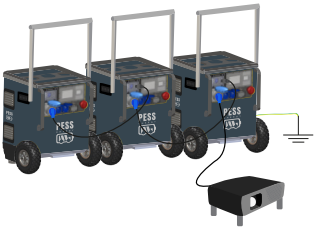
DAISY CHAIN 32A

Add up the capacity (duration) of your Iron-E devices (2 to 8 devices = 20 to 80 kWh)

Example: 640 W lighting mast over 2 Iron-E = 31 h



Example: 4000 W cinema projector on 3 Iron-E = 8h



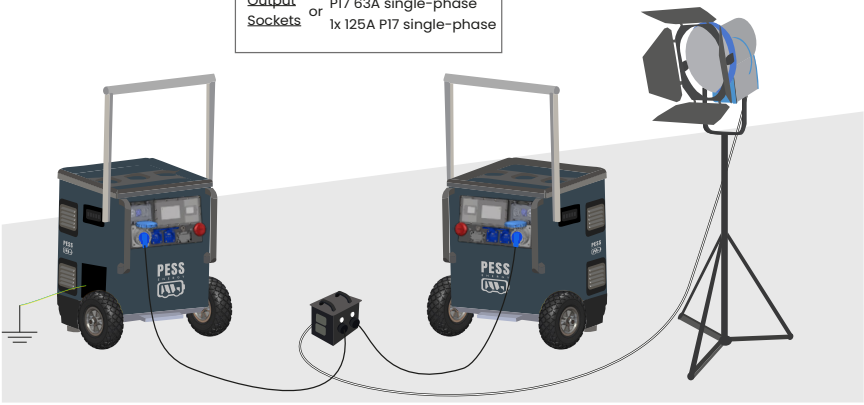
Add up the power and capacity (duration) of your Iron-E

CONNECTION OF 2 IRON-E SINGLE-PHASE

Max output : 20 kW single-phase
Total capacity : 20 kWh

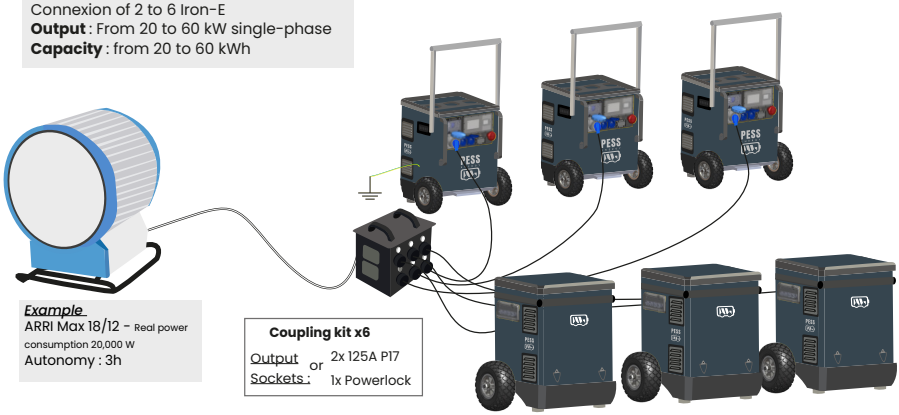
Example
Arri HMI M90 – Real power consumption 11,200 W
Autonomy : 1h30

Coupling kit x2
Output Sockets or P17 63A single-phase
1x 125A P17 single-phase



CONNEXION OF 6 IRON-E IN SINGLE-PHASE

Connexion of 2 to 6 Iron-E
Output : From 20 to 60 kW single-phase
Capacity : from 20 to 60 kWh



Example
ARRI Max 18/12 – Real power consumption 20,000 W
Autonomy : 3h

Coupling kit x6
Output Sockets : or 2x 125A P17
1x Powerlock

II. Instructions

1. General safety instructions

— This device generates electricity on a private network, under the responsibility of the user. Only qualified personnel may use this device.
— For optimal and safe operation of the device, please follow the required specifications on the electrical power of your devices to be powered.
— Equipment with a combined continuous electrical power of more than 8000 W must not be connected to the device.
— If you wish to disconnect the AC or DC terminals, please follow the operating procedure carefully *(see section III.2 'Starting up the device').*
— Neutral system :
— TN-S for mobile use : Before any use, the device must be earthed using an earth rod (Provided with the device).
— TT for grid use : the device is earthed to the mains socket via its charging cable. Make sure you comply with local requirements and applicable regulations when installing the device.
— The device must be stored charged at a temperature between 0°C and +45°C, in a dry, ventilated, clean area away from direct sunlight.
— The photovoltaic (PV) input is a maximum of 5500 W (MPPT from 90 to 450 VDC - 500 Voc) *(see §II.2 'Technical characteristics of the device')*.
— When not in use, the device must be switched off by pressing the 'POWER' button. *(see §III.3 'Switching off the appliance' & §II.3 Figure 1 and 2)*.
— Do not use the device when it is completely discharged.
— The battery isolating switch also marked 'Emergency off switch' on the device *(see §II.3 Figure 1)* must only be used in the following cases :
- Smoke and/or fire emanating from the device (use only if possible).
- Long-term storage of the device (more than 3 months).
- In the event of a device fault (see section V.1).
- Problem caused by equipment connected to the device.
- During a maintenance procedure.

- It is forbidden to connect electrical equipment to the output of the device during charging to a 16A mains socket (risk of INPUT and mains overload). **However, it is allowed to charge the device on a 32A socket while discharging at a maximum continuous power of 2000W.** Do not short-circuit any of the device's input or output.
- It is forbidden to connect 2 output sockets to each other.
- It is forbidden to connect an output plug to the device's recharging socket.
- It is forbidden to connect an output socket to a PV input socket on the device.
- Do not open the device (risk of electric shock, loss of manufacturer's warranty). Repairs may only be carried out by repairers authorised by PESS Energy. If any faults remain after repair, please return your device to the authorised PESS Energy repair centre or to the retailer who sold it to you.
- Do not cover the device when in use.
- When in use, the device should be kept in the shade.
- The device must be handled with care.
- It is forbidden to use the handlebars of the device as a lifting point.
- The device must only be lifted using its lifting points *(see IV 'FAQ')*.
- It is forbidden to climb on the device.
- Do not immerse the device.

2. Important instructions for the environment

- PESS Energy is responsible for the end-of-life and recycling of the product.
- To prevent damage to the environment and human health, this device must not be discarded with other waste. Contact the retailer who sold it to you so that you can recycle it safely and responsibly.
- The cardboard packaging and wooden pallet support that protect the device during transport can be recycled. They should be discarded in the appropriate containers. Other plastic waste should be discarded in the rubbish bin.

III. Presentation of the device

This device is a mobile energy unit, combining inverter, solar charger and battery charger functions to provide uninterrupted power supply. Its LCD screen allows the user to control the device's functions and easily access information such as the battery's state of charge, temperature, error messages and the device's input and output power.

1. General characteristics of the device

- 8000W max continuous inverter.
- Integrated battery charger.
- MPPT: Integrated solar charge controller - 5500W max continuous.
- Compatible with 230VAC mains voltage or a 170-280VAC generator.
- Protection against overloading, overheating and short circuits.

2. Technical characteristics of the device

Technical data		IRON-E
AC Production[1]	Rated output power	8 000 W
	Max power	10 000 W
	Battery capacity	10 000 Wh
	Yield	90 - 93 %
	AC output voltage	230 VAC ±5%
	Frequency	50 Hz
	Signal type	Pure sinus
	UPS/Off-grid Transfer Time	300ms on 16A input 200ms on 32A input

(1) At ambient temperature (20°C)

Connections	AC output connections (OUTPUT)	1x single-phase sockets 16A 1x single-phase socket 32A
	AC input connections (INPUT)	1x Power Twist 20A (NAC3 MPXXA) 1x Input Neutrik 32A (NAC3M-PHC)
	DC input connections (SOLAR)	1x Anderson SBSX-75A
	Parallel connections of Power-banks (up to max 6)	1x Parallelization socket (50A) 2x XLR female 3P socket 2x SUB-D9 female socket
	Dry Contact	1 SpeakON 4P socket - Automatic generator start
Recharge	AC power supply	170-280VAC, 50-60 Hz
	Max. charging power 16A AC socket	3000 W
	Charging time (when empty)	< 4h at 16A
	Max. charging capacity AC socket 32A	1000 W (slow charging)
	Charging time (when empty)	10h at 32A
Protections	AC Protection	1x earth leakage switch 30mA 63A
	AC circuit breaker	2x 16A circuit breaker 1 x 32A circuit breaker
	DC Emergency stop	1x punch button
	DC Protection (battery)	Fuse + BMS
	DC Protection (PV)	Fuse + 20A DC circuit breaker
	Neutral earthing system	TN-S
Battery	Battery chimie	Lithium Fer Phosphate (LFP)

Solar panels	Max PV power	5500 W
	MPPT voltage range	90 VDC - 450 VDC
	Integrated Maximum Power Point Tracking (MPPT)	
	PV max current	20 A
Use times	300W	> 32 h
	500W	20 h
	1000W	10 h
	2000W	5 h
	3000W	> 3 h
	4000W	2 h 30
Temperatures	Recharge temperature	0 ~ 60 °C
	Use temperature [1] [2]	-20 ~ 60°C
	Storage température [3]	0 ~ 45°C
Physicals	Dimensions (H x L x l)	70 x 65 x 74 cm
	Net weight	120 kg
Environnement	Protection class	IP 54, IK 08
	Noise	< 55 dB
	Certifications	CE / Directive BT (2014/35/UE) et CEM (2014/30//UE)
	Manufacturer's warranty	2 years
	EMC Class	Class A / Pollution degree: 3
	Diversity factor (RDF)	1
	Maximum altitude	2000 m
	Relative humidity	Max 100% at 25°C non-condensing

(1) Refer to section III.2 for information on how to start up the device according to the scenarios identified at ambient temperature (20°C).
(2) Maximum usable power may vary depending on the outside temperature
(3) For short-term storage (<1 month)

3. Basic system architecture

The following illustration shows the basic functions of the device, which can be used as an electrical power source and/or solar energy generator.

Contact PESS Energy for other possible system configurations to suit your needs. This device can be used to power all types of domestic or professional equipment, including motorised equipment such as grinders, hoovers, jigsaws, compressors, etc.

The man-machine interface is located mainly on the rear of the device *(see Figure 1)*. Some functions, such as circuit breakers or paralleling sockets, are located on the side panels *(see Figure 2)*.

1. IRON-E

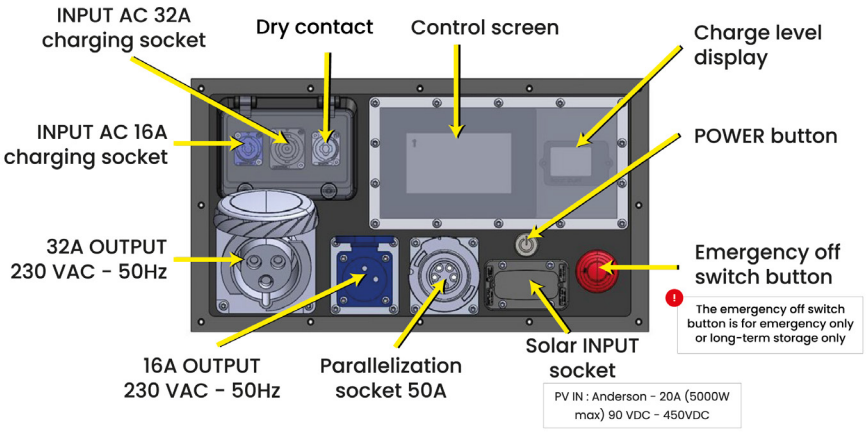


Figure 1 : Sockets layout

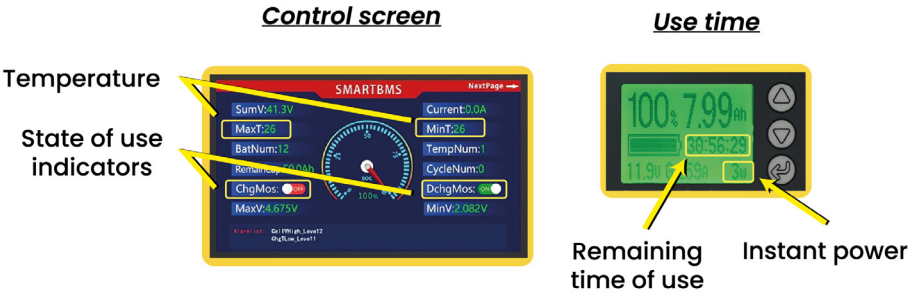


Figure 2 : Zoom on the screen

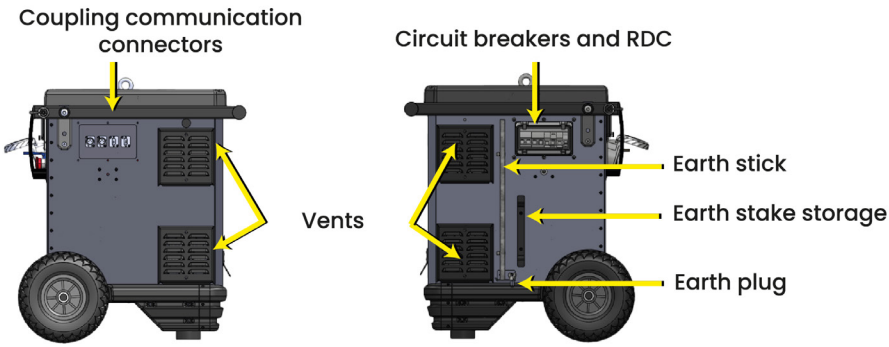


Figure 3 : Lateral surfaces of the device

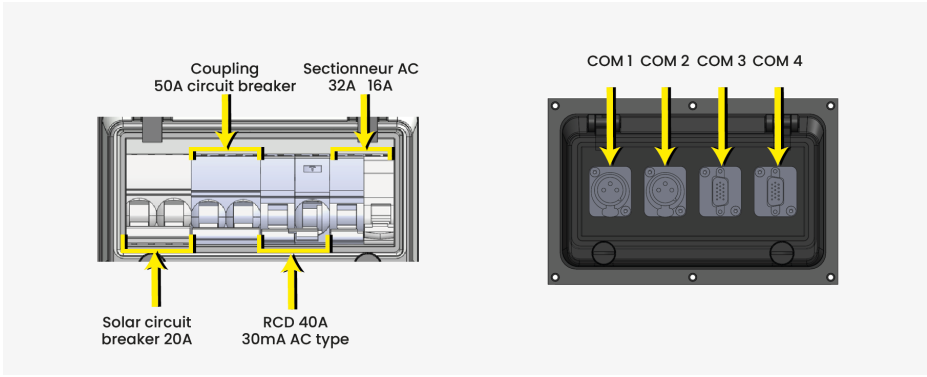


Figure 4 : Circuit breaker & coupling communication connectors

IV. Setting up and using the device

1. Before powering on

— Make sure that the air/ventilation intakes (see §II.3. Figure 3) on the device are not obstructed.
— Connect the device to earth, using an earth rod (see §II.3. Figure 3).

2. Using the device

Throughout the duration of use of the device, monitor the device's charge levels and the remaining time of use (on the charge level screen) not to be surprised by the shutdown of the device and to anticipate its recharging.

Do not connect too many devices at the same time (max 8 000W continuous), which will cause the device to overload and fail.

In the event of exposure to excessively extreme temperatures, beyond the ranges specified in III.2 «Technical characteristics of the device», the device will stop to get to safety.

a. Getting Started

For the location of the buttons, refer to III.3 Figure 1.
1. Ensure that the emergency off switch button is in the «pulled» position and the circuit breakers and differentials are in the ON position (Up position).
2. Press the «Power» button to start the powerbank.
3. The LED on the «Power» button illuminates when there is power on the output sockets.

b. Powering your electrical equipment

Connect your equipment to the Powerbank's AC sockets, making sure in advance that the maximum electrical power of your equipment does not exceed the maximum power of the Powerbank.

— Check that the device is working. The value displayed on the load level screen must not exceed 8000W *(see II.3. Figure 3)* and check the remaining operating time.

Never unplug an equipment while it is in use. Make sure you switch off all power-consuming equipment before unplugging.

c. Shutting down the device

1) Turn off the device by pressing the «POWER» button, the white light of the device will then turn off.
2) Check that the screens turn off (this can take up to 30sec).
3) Unplug all your equipment.

The emergency off switch button must be held in the «pulled» position. It must only be positioned in the «pushed» position in the special cases mentioned in III.1 «General safety instructions»; transport and shut down of the device are excluded. Abusive and improper use of the device may cause the device to malfunction.

d. Pair the devices

It is possible to connect 2 IRON-E in series using 16A sockets and up to 3 on 32A sockets to increase autonomy (daisy chain), or up to 6 IRON-E in parallel to increase power.

i. Increased autonomy 16A series connection (Daisy Chain)

1. Using the recharging cable, connect the 16A output socket on device n°1 to the 16A input socket on device n°2.
2. Device n°2 will start recharging; you need to wait until recharging is complete in order to obtain the 3600W output power (the output power of device n°1 must be less than 500W, which is only possible if recharging is complete).

The capacity is cumulative, so using 2 IRON-E in series will provide up to 20,000 Wh of electrical capacity.

ii. Autonomy and power gain – Parallel coupling

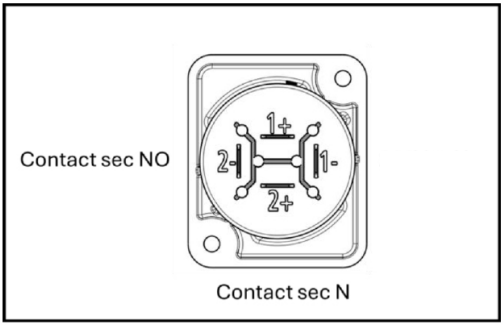
The use of parallelization connectors makes it possible to combine the capacity (and therefore the autonomy) and the power of the devices. It is possible to configure up to 6 IRON-E in parallel and thus obtain an electrical installation of up to **60kW and 48kWh.**

The use of an external parallelization box as well as parallelization cables are necessary. These elements are available as an option. Refer to the user manual of this parallelization box for the different possible connections.

It is forbidden to use the 50A paralleling connector unless you are using the PESS paralleling box, otherwise you could be electrocuted. (This socket is not protected by a differential).

e.Automatic starting of a gas generator

The «Dry Contact» socket is a SpeakON 4P socket. 2 poles allow you to trigger the start automatically. See the following wiring diagram.



- Wire a 32A output of your gas generator to the 32A input socket of the IRON-E.
- Also connect the dry contact cable to the starter motor and the charging of the starter battery of your gas generator.
- Turn on your IRON-E to power your electrical loads.

  When the IRON-E approaches 0%, the external generator will start automatically.

f. Electrical overload or leak

In the event of an overload, switch the device off and on again by pressing the the 'POWER' button. If necessary, contact PESS Energy. In both cases (overload or electrical leak), the device will shut down. As soon as possible, you should disconnect all cables (input and output) and check the earth connection of the device and your equipment if necessary. If the device is working correctly, check that the equipment connected to it has no electrical or insulation faults. Then reset the differential switch. If the differential switch cuts out again, contact PESS Energy.

g. Device failure

If the device does not start or if it switches off suddenly, contact the retailer who sold it to you.

h. Long-term storage of the device (more than 3 months)

- Store the device charged.
- Press the emergency stop button to switch the device off.
- We recommend storing the device at a temperature between 0 and 45°C, in a dry, ventilated, clean area away from direct sunlight.

i. Maintenance

- Clean filters monthly, no water required.
- Cycle (complete charge and discharge) the battery at least once a month.
- Check sockets, charging cables and ground stakes.

3. Recharging the device

a. Recharging the device from the grid

First connect the cable to the 'INPUT AC' charging port on the device, then connect the plug to the mains (e.g. 230VAC, 16A or 32A socket) using only the cable supplied with the device *(see II.3. Figure 1).*

— Check that the device starts recharging :
- To enable charging at 32 A, you must press the device's ON/OFF button.
- The green colour of the charge level screen should appear and then disappear cyclically.
- The value displayed on this charge level screen must not exceed 3.0kW at 16A and 5.0kW at 32A (optional 32A charging cable).

In the event of exposure to extreme temperatures, beyond the ranges specified in II.2 'Technical characteristics of the device', the device will not be able to charge and will automatically shut down.

Do not connect the both INPUT sockets at the same time.

When charging is complete, first disconnect the mains plug and then the cable from the device's 'INPUT AC' charging port.

Do not leave the device charging unattended.

The 'SumVHigh_Level1 ' alert appears on the screen when the batteries are 100% charged.
The 'SumVlow_Level1' alert appears when the device needs to be recharged.

b. Recharging the device on photovoltaic panels

The photovoltaic installation must be sized within the power limits allowed by the device, as specified in II.2 'Technical characteristics of the device'. A total solar installation voltage of less than 90VDC will not activate recharging.

1) Lower/position the «PV IN» circuit breaker to «OFF» *(see III.3. Figure 4)* before connecting the PV system
2) Make sure the emergency off switch button is in the «pulled» position
3) First connect the Anderson solar panel socket to the device *(see III.3. Figure 1)* and then connect your photovoltaic installation
4) **You will only be able to raise the «PV IN» circuit breaker when your installation is connected** (see previous steps).

- Charging starts automatically.
- The value displayed on the charge level screen must not exceed 5.5kW.
- It is possible to use the device while recharging on solar panels.

Do not handle the Anderson solar panel plug when the 'PV IN' circuit-breaker is in the 'ON' position.

Do not leave the device charging unattended.

When the recharging is complete, turn the circuit breaker to 'PV OFF' and disconnect your solar system before using the Anderson socket on the device. For further information, please refer to the user manual for the EKLA kit (PV solution from PESS Energy).

c. Recharging the device at an electric car recharging point

An EV adapter (type 2 plug) is required (available as an option). Carefully follow the instructions in the EV adapter user manual.

V. FAQ

1. How do I transport the device?

- The device can be transported upright or lying on its front (with the sockets facing upwards).
- The device must be lashed in the vehicle when transported. To do this, use a number of straps which must be positioned over the reinforcements on the device.
- Before being transported, the device must be switched off by pressing the 'POWER' button.
- The device's circuit breakers must be turned down/off during transport.
- The transport and/or shipment of the Product by the User may be subject to the mandatory provisions governing the transport of dangerous goods (lithium ion batteries contained in equipment - UN3481). For further information, please consult the Product's Safety Data Sheet and/or contact your freight forwarder.

The emergency stop button must be kept in the 'pulled' position. It should only be in the 'push' position in the specific cases mentioned in §I.1 'General safety instructions'; transporting and stopping the device are excluded. Improper and inappropriate use of the lever may cause the device to malfunction.

2. How do I lift the device?

- It can only be lifted using the lifting ring on the top of the unit.
- The rings on the side are for storing the ground spike only.
- Do not lift the device using these rings.
- The lashing rings are only for securing the IRON-E during transport, never for lifting.
- Do not leave the device suspended when lifting.
- Lift the device to move it quickly.
- Do not lift the device by the handles.

3. Why is there no power in the sockets?

— Check that the circuit breakers are in the 'ON' position.
— Check that the emergency stop button is pulled out.

4. Why don't the screens light up?

— Check that the emergency stop button is pulled out.
— The screens may take up to 10 seconds to light up.
— The device may have run out of battery. Plug it into a mains socket and check that it lights up.

VI. Repairs and warranty work

The devices are warranted for 2 years, parts and labor, from the date of shipment from the PESS Energy production site, only for European Union countries (Schengen Area), excluding French overseas departments and territories.

a. Warranty repairs

Any breakdown not resulting from misuse and occurring within 2 years of the date of dispatch of the device may be repaired under the manufacturer's warranty. The location of the warranty repair will be decided on the basis of the breakdown analysis provided by the customer. Repairs under the manufacturer's warranty (transport, spare parts and labour) are paid for by PESS Energy.

b. Out-of-warranty repairs

Any breakdown occurring after the 2-year manufacturer's warranty period may be repaired by an approved repairer, or, where applicable, by PESS Energy, at the Customer's expense, on the basis of estimates that may be provided prior to the repair.

c. Warranty exclusions

PESS Energy cannot be held responsible for a defect (breakdown or wear and tear) if this is the result of incorrect use of the device. In this case, the repairs and guarantee on the device may also be cancelled.

d. End of life of the device

For information on how to dispose of your device at the end of its useful life, please refer to §I.2 'Important environmental information'.

VII. Misuse of the device

- Unauthorised opening of the device.
- Shocks, perforations, falls (significant damage to the chassis or casings).
- Water ingress, immersion, humidity in excess of 95%.
- Non-maintenance of filters, excessive dust.
- Storage outside temperature range.
- Operation outside temperature range.
- Short-circuit of input and output sockets.
- Prolonged storage of discharged equipment.
- Overloading of the device's inputs and/or outputs.
- Modification of factory settings.
- Fitting components not approved by the manufacturer.
- Use in a case of exclusion of use (see §VII 'Exclusions of use')
- The product must not be used :
  - In ATEX environments
  - In nuclear environments
  - In the mining industry
- Do not recharge the device with a cable not supplied by PESS energy.

Misuse of the device will result in total loss of the manufacturer's warranty.

VIII. Usage exclusions

In addition to the 'Safety instructions' given in §I, it is forbidden to :

- Climb onto the device.
- Lift the device more than one metre off the ground without using the dedicated attachment points.
- Dropping the device.
- Piercing the device.
- Inserting foreign objects into the device.
- Short-circuiting in and around the device.
- Set fire to the device.
- Run over a person or a fragile surface with the device.
- Spray the device with any liquid other than water, or immerse it.
- Store the device unloaded.
- Device stored outdoors for long periods (>3 months).
- Transporting the device in an unsuitable vehicle.
- Throw the device into the environment.
- The device is not properly strapped down when being transported.

PESS
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Find all the technical documentation here

PESS ENERGY *PILLOT ENERGY STORAGE SOLUTION*

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