

Měniče napětí s čistou sinusovkou -FS serie

Dostupné modely:

FS600 FS1000 FS1500 FS2000 FS2500 FS3000 FS4000



Uživatelský manuál

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Users manual

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Gebrauchsanweisung

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Vážení zákazníci,
děkujeme Vám za Vaši důvěru a za nákup tohoto produktu. Tento návod k obsluze je součástí výrobku. Obsahuje důležité pokyny k uvedení výrobku do provozu a k jeho obsluze. Jestliže výrobek předáte jiným osobám, dbejte na to, abyste jim odevzdali i tento návod. Ponechejte si tento návod, abyste si jej mohli znovu kdykoliv přečíst!

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1. Vysvětlení symbolů



Nebezpečí!

Bezpečnostní pokyny: Nedodržení tohoto pokynu může způsobit smrt nebo vážné zranění.



Varování!

Bezpečnostní pokyny: Nedodržení tohoto pokynu může způsobit smrt nebo zranění.



Upozornění!

Nedodržení tohoto pokynu může způsobit poškození nebo zničení produktu.



Poznámka

Doplňkové informace pro provozování výrobku.

2. Obecné bezpečnostní pokyny

2.1 Obecná bezpečnost

The manufacturer accepts no liability for damage in the following cases:

- . Faulty assembly or connection
- . Damage to the product resulting from mechanical influences and incorrect connection voltage
- . Alterations to the product without express permission from the manufacturer
- . Use for purposes other than those described in the operating manual

Note the following basic safety information when using electrical devices to protect against:

- . Electric shock
- . Fire hazards
- . Injury

2.2 General safety



DANGER!

- . In the event of fire, use a fire extinguisher which is suitable for electrical devices.



WARNING!

- . Only use the device as intended.
- . Ensure that the red and black terminals never come into contact.
- . Disconnect the device from the power supply:

- Before cleaning and maintenance
- Before changing a fuse
- . If you disassemble the device:
 - Detach all connections

Make sure that no voltage is present at any of the inputs and outputs

- . The device may not be used if the device itself or the connection cable are visibly damaged.
- . If this power cable for this device is damaged, it must be replaced by the manufacturer, customer service or a similarly qualified person in order to prevent safety hazards.
- . This device may only be repaired by qualified personnel. Inadequate repairs may cause serious hazards.
- . This device can be used by children aged 8 years or over, as well as by persons with diminished physical, sensory or mental capacities or a lack of experience and/ or knowledge, providing they are supervised or have been taught how to use the device safely and are aware of the resulting risks.
- . Electrical devices are not toys.

Always keep and use the appliance out of the reach of children.

- . Children must be supervised to ensure that they do not play with the device.



NOTICE!

- . Before start-up, check that the voltage specification on the type plate is the same as that of the power supply.
- . Ensure that other objects cannot cause a short circuit at the contacts of the device.
- . Never pull the plug out of the socket by the connection cable.
- . Store the device in a dry and cool place.

2.3 Safety when installing the device



DANGER!

- . Never mount the device anywhere where there is a risk of gas or dust explosion.



CAUTION!

- . Ensure that the device is standing firmly.
- The device must be set up and fastened in such a way that it cannot tip over or fall down.



NOTICE!

- . Do not expose the device to a heat source (such as direct sunlight or heating). Avoid additional heating of the device in this way.

- . Set up the device in a dry location where it is protected against splashing water.

2.4 Safety when connecting the device electronically

DANGER! *Danger of electrocution*



- . If you are working on electrical systems, ensure that there is somebody close at hand who can help you in emergencies.

WARNING!



- . Make sure that the lead has a sufficient cross-section.
- . Lay the cables so that they cannot be damaged by the doors or the bonnet.

Crushed cables can lead to serious injury.

CAUTION!



- . Lay the cables so that they cannot be tripped over or damaged.



NOTICE!

- . Use duct-work or cable ducts if it is necessary to lay cables through metal panels or other panels with sharp edges.

- . Do not lay the 230 V mains cable and the 12 V DC cable in the same duct.

- . Do not lay the cable so that it is loose or heavily kinked.

- . Fasten the cables securely.

- . Do not pull on the cables.

2.5 Operating the device safely

DANGER! *Danger of electrocution*



- . Do not touch exposed cables with your bare hands.

WARNING!



- Only use the device in closed, well-ventilated rooms.

CAUTION!



- . Do not operate the device
 - In salty, wet or damp environments
 - In the vicinity of corrosive fumes
 - In the vicinity of combustible materials
 - In areas where there is a danger of explosions.
- . Before starting the device, ensure that the power supply line and the plug are dry.
- . Always disconnect the power supply when working on the device.
- . Please observe that parts of the device may still conduct voltage even if the fuse has blown.

. Do not disconnect any cables when the device is still in use.

NOTICE!



. Make sure the air inlets and outlets of the device are not covered.

. Ensure good ventilation.

3. INTRODUCTION

Read this user manual completely before using the device. In the appendices you will find the technical specifications of the pure sine wave power inverters.

This DC-AC inverter converts a 12 or a 24 or a 48 Volts DC voltage into a AC voltage with a pure sine wave (100-127V/220-240VAC). With this device it is possible, with use of the right battery, to supply equipment that normally requires a mains supply.

Important

Always check the actual power rating of the equipment (power consumption). In addition, bear in mind the surge powers. These (start-up) peaks can be as much as 5-7 times the continuous power consumption. Check whether these values are within the capacity limits of the inverter. Equipment with high surge power are for example: air conditioning, vacuum cleaner, tools and pumps. If you want to use multiple equipment at the same time, then add up the power consumption.

4. INSTALLATION

4.1 Mounting

The inverter must be mounted in a space that complies with the following:

- Mount the inverter in a dry place where there is no chance of it being affected by moisture or dirt. Also be aware of moisture or dirt that can be sucked in by the fan.
- Leave enough space on all sides of the inverter (min. 10cm) for air circulation. Make sure that there are ventilation vents.
- The ambient temperature must be between 0°C and 40°C. Ideal is between 15°C and 25°C.
- Keep the inverter out of the reach of children.
- A working inverter produces a dangerous voltage.
- Do not use the inverter in places where gases are released or flammable materials are stored.
- The distance between inverter and battery should be as short as possible, but place the inverter in a separate room.
- Place the inverter on a stable underground and prevent (heavy) vibrations and shocks.

4.2 Connection with the battery

Important

- *Before connecting to the battery, make sure that the inverter is turned off.*
- *When the battery is connected a spark may be generated due to the internal capacitor being loaded.*

Preferably use the supplied battery cable set. If you want this inverter to have a permanent connection to the battery, we recommend replacing the clamps with terminal rings. For the other models, the connections to the battery already consist of terminal rings. With the models FS2500 and FS3000 two red and two black cables are included. In this case, always connect both cables on the + and - side!

If you wish to use an own cable set, keep the cables as short as possible and ensure the connections make good contact. Below formula indicates the required cable thickness

$$(\text{Watt/voltage}) \times \text{length in meters} \times 0,2 = \text{cable in mmq}$$

Example (1500W/12V) \times 2 meters \times 0,2 = 50mmq

Working method:

1. Connect the cables to the inverter first:
the red cable to the red + input connection. The black cable to the black – input connection.
Tighten the connections firmly.
2. Connect the other side of the cable to the battery:
The red cable to the + pole of the battery. The black cable to the – pole of the battery.

Important

Make sure that you connect the correct cable to the correct pole! The inverter can become broken in this case. The repair costs are not covered by the guarantee.

Grounding

The AC output ground wire should be connected with the grounding point for the connected equipment. Also wire the ‘ground’ connection on the inverter with the chassis of the vehicle or the minus (6mmq wire).

4.3 Connection with the equipment

All inverters from the FS series have a socket for the connection of the 110/230VAC equipment. The models from 1500Watt have double sockets.

When connecting multiple users it is important that the total load (Watts) and surge powers fall within the capacity specifications of the inverter.

Important

- *If the surge power is exceeded, the inverter will become heavily damaged. Repair costs will not be covered by warranty.*
- *Don't mount the cables against the housing of the inverter.*

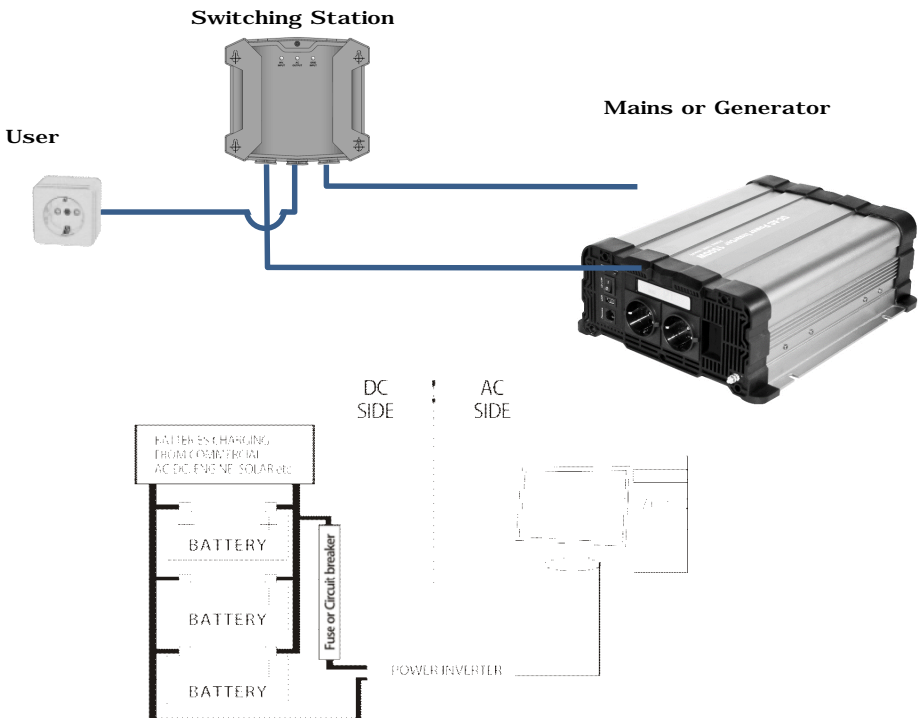
4.4 The inverter in combination with other AC power supplies

In many situations it is desirable that the equipment will work on the mains supply (or generator) when this is available. The inverter and mains supply (or generator) then become one circuit. Pay attention to the following:

Important

At the presence of a second power supply (mains, generator) this 110/230VAC will be parallel on the output of the inverter. This will damage the inverter heavily!. The repair costs are not covered by warranty. If you want the equipment to work on both an inverter and a second power source, then mount the power transfer switch. Important feature is that this power transfer switch is bipolar.

The power transfer box takes care of automatic switch between the two 110/230VAC circuits, without any intervention for the connected equipment. A back-up system also can be created this way.



4.5 Insulation monitoring

Is this inverter being mounted in a vehicle of any other mobile or movable unit? And is the 110/230VAC going to be used outside the vehicle/unit? Then please pay attention to the following:

Important!

*If this inverter is used in mobile unities, like mobile workplaces, fire trucks, workmen's huts etc, it is usually difficult to get a good and reliable safety connection to earth. However, by law it is **obligated** to make sure that a person can use an inverter or mobile generator safely. If the inverter is mounted inside vehicle/unit, and one goes to work outside the vehicle/unit with the connected 110/230VAC equipment, then it is mandatory to mount an insulation monitoring device. An RCD (not any type!) will not meet! When an accident occurs because an insulation monitoring device isn't mounted in the system, it has serious consequences. In these situations, always mount an insulation monitoring device from our SS-series between de inverter and equipment. For more info, please contact us. The law applies to all vehicles/mobile units that are use professionally. Caravans, mobile homes etc. are excluded from this law, however the circumstances are identical.*

5. IN USE

Check that the cables are mounted correctly. Never use the inverter when the cables are damaged. Set the power switch to "ON" position.

A warm housing is normal when the inverter is operating.

If you will not be using the inverter for a significant period (during winter storage for example), we recommend disconnecting it from the battery.

5.1 LED indications

'power' (green) Battery connected and the on/off switch is in 'on' position

'fault' (red) Fault occurred on the input side or internal temperature

'fault' (red, blinking) Fault occurred on the output side.

In cause of a fault, consult the chapter 'protections' and the trouble shooter.

5.2 USB output

All models have an USB port. Here you can connect your 5Volt users, like mobile phone charger, directly. The maximum load for this output is 2,1Amp.

5.3 Remote control

If the remote controller CR80 or CRD80 or CRW80 is connected, it is important that the main switch of the inverter is in the 'off' position. After this, the inverter can be switched on and off by using the remote control.

5.4 LCD display function (optional)

It display the battery voltage(V), output power(W) , battery capacity(Ah), lower voltage protection, over voltage protection, over load protection, over temperature protection.

5.5 Fan

The fan is both temperature- and load controlled. At a certain load level, depending per model, the fan will switch on automatically. Also at an internal high temperature the fan will switch on automatically.

What does the inverter consume from the battery?

A quick formula which gives a global indication of the current draw from the battery is:

Watt : voltage = current draw per hour

Example: a 1500Watt inverter in 12Volt consumes at full load:

1500W : 12V = 125Amp. per hour. Has the inverter delivered this power for 5 minutes, then the current draw from the battery is about 10Amp.

Remark: when a 1500Watt inverter delivers a power of 600Watt, then it consumes also only 600Watt from the battery.

6. PROTECTIONS

6.1 Pre-warning (buzzer)

If the input voltage is becoming low, the inverter will emit an acoustic signal as a warning.

	Activation	De-activation
12Volt models	10,5Vdc +/-0.5	11,5Vdc +/- 0.2
24Volt models	21Vdc +/-0.5	23Vdc +/- 0.2
48Volt models	42Vdc +/-0.5	46Vdc +/- 0.2

6.2 Low voltage protection.

If, after the pre-warning, the input voltage still drops further, the low voltage protection will eventually take effect. The 230VAC output is shut down and the red indicator 'fault' will light. The buzzer will also continue to sound.

If the input voltage has risen again sufficiently, the inverter will automatically restart.

	Shut down	Auto-restart
12Volt models	10,0Vdc +/- 0.5	12,6Vdc +/- 0.2
24Volt models	20Vdc +/- 0.5	25,2Vdc +/- 0.2
48 Volt models	40,0Vdc +/- 0.5	50.4Vdc +/- 0.2

6.3 Over voltage protection

If the input voltage rises too high, the overvoltage protection will come into effect. The 230VAC output is shut down and the red 'fault' LED lights up. If the input voltage has dropped sufficiently, the inverter will automatically restart.

	Shut down	Auto-restart
12Volt models	15,5Vdc +/-0.5	12.6Vdc +/- 0.2
24Volt models	31Vdc +/- 0.5	25.2Vdc +/- 0.2
48Volt models	62Vdc +/- 0.5	50.4Vdc +/- 0.2

Important

The maximum input voltage that the inverter can tolerate is 16 Volts/32Volts. If the voltage that is supplied is higher than this, then the inverter will break. In this case the repair costs are not covered by warranty.

6.4 Temperature protection

If the cooling provided by the fan is insufficient, the temperature protection will be activated. The inverter will shut down the 110/ 230VAC output and the red 'fault' indicator will light. Once the inverter has cooled down sufficiently, it will restart automatically.

6.5 Short-circuit on the output

The inverter will switch off the 110/230VAC output voltage if there is a short-circuit of the output. During this protection, the red 'fault' led will flash slowly. The inverter will restart automatically, once the problem has been resolved.

6.6 Overload protection

The inverter will shut down the 110/230VAC output if the requested power on the output is higher than the continuous power of the inverter. The red 'fault' indicator will flash slowly. The inverter will restart automatically, once the problem has been resolved.

Important

The overload protection only works with the maximum power and not with the surge power. If the surge power of the inverter is exceeded then the inverter will break! In this case the repair costs are not covered by warranty.

7. TROUBLE SHOOTING

Problem	(Possible) Cause	Solution
A buzzer sounds	The input voltage is becoming too low.	Charge the battery.
Red indicator 'fault' lights	Problem at the input side. Battery voltage too low or too high. The 110/ 230VAC output is shut down.	Check the input voltage. Make sure that this value falls between specifications of the inverter. The inverter will restart automatically when the input voltage is between the limits again.

	Temperature protection active	<ul style="list-style-type: none"> - check that the fan is working and that the inverter has sufficient ventilation possibilities - inverter is located in a location with a high ambient temperature. Place the inverter in a cooler environment. - reduce the load.
Red indicator 'fault' blinks slowly	Problem on the output	There is a short-circuit or overload. Check the consumers on faults and the height of the total load. When the problem has been resolved, the inverter will restart automatically.
	Battery capacity too low to supply the requested power.	Connect a higher capacity battery (set).
'Power' led lights, but the connected equipment does not work	Weak connection between battery and inverter.	Check all connections and cables.
	The cables used are too thin.	Mount cables matching the length and capacity.
	The requested power is more than the inverter can deliver.	Check the consumption of the connected equipment. Make sure that this falls within the specifications of the inverter.
	No input voltage present.	Check the connections between battery and inverter.
Inverter does not function at all. All led's are off.	External fuses in battery cable defective.	Replace the fuses (only equivalent values)
	Input voltage below the minimal value.	Battery voltage too low or battery defective.
	Input voltage higher than the maximum value.	<ul style="list-style-type: none"> - Check if the system-voltage matches with the inverter. - Check the system on DC power supplies that give a too high voltage.

	Internal defect	When after checking the total system the inverter still doesn't work, it can be send back for repair.
Connected equipment gives disturbance.	'Ground' not connected	Connect the 'ground' connection of the inverter to the chassis of the vehicle or the minus.
	Cabling is against the housing of the inverter.	Make sure that the cables do not touch the housing of the inverter.

8. ACCESSORIES



CR80
Plug and play remote control with:
On/off switch



CRD80
Plug and play remote control with:
On/ off switch; working status LCD and error display



CRW80
Wireless remote controller, on/off switch

9. MAINTENANCE

To keep your inverter operating properly, there is very little maintenance required. You should clean the exterior periodically with a damp cloth to prevent accumulation of dust and dirt. Also check periodically:

- all wires and connections. Replace damaged wires immediately.
- the ventilation vents

ATTENTION: turn off the inverter before you start the maintenance activities!

10. WARRANTY AND SERVICE

Before sending back the inverter, always advice the Trouble Shooter and other information in this manual firstly. If a problem could have been solved by means of this manual, we are obligated to charge the repair/research costs. In case of a malfunction, the inverter can be send to us directly or you can choose to arrange the return with your dealer. Always include your contact details and description of the problem. The inverter must be send prepaid. The FS&NK

inverters carry a two-year warranty from selling date. The warranty period is only valid when the (copy) purchase ticket is handed over with the repair. The warranty only covers the costs of parts and labor for the repair. The warranty will lapse when a third party has attempted to repair the inverter or when the inverter is not installed or used in accordance with the instructions. Do not attempt to repair the inverter yourselves.

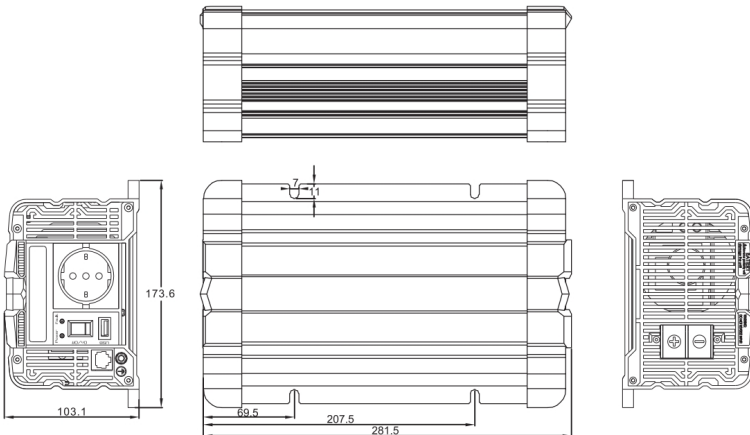
The use of this inverter is the responsibility of the customer. The manufacturer and importer cannot be held responsible for any damage resulting from use of the inverter.

Kosten in Rechnung zu stellen. Im Fall eines Defekt können Sie das Gerät Ihrem Händler zurückbringen oder direkt an die Adresse auf der Rückseite schicken. Schicken Sie das Gerät immer frankiert ab. Für die Wechselrichter der PurePower-Serie gilt eine Garantie von ein Jahr ab Verkaufsdatum und nur für die Reparaturzeit sowie für Einzelteile in Zusammenhang mit der Reparatur. Die Garantiedauer gilt nur, wenn zur Reparatur auch ein(e Kopie des) Kaufbon übergeben wird. Die Garantie verfällt bei unsachgemäßem Gebrauch oder Anschluss sowie bei Reparaturen durch Dritte.

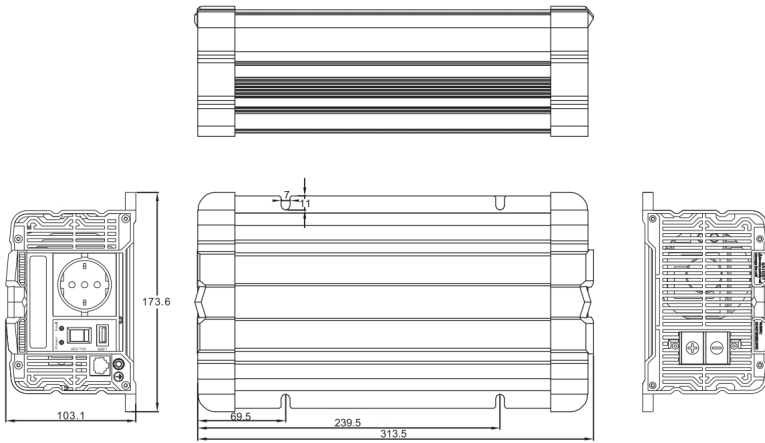
Keinesfalls dürfen Einzelteile selbstständig ersetzt oder andere Reparaturen ausgeführt werden!
Der Kunde verwendet diesen Inverter in eigener Verantwortung. Hersteller und Zulieferer sind für (Folge-)Schäden nicht haftbar.

Mechanical drawing

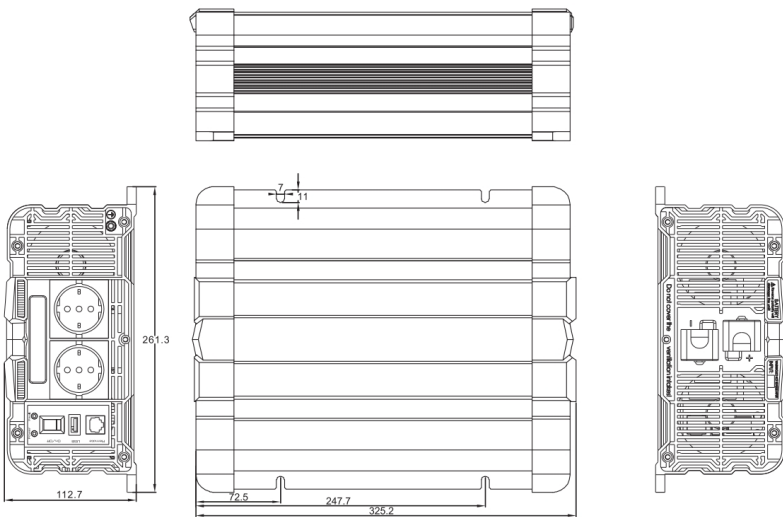
FS 600 models



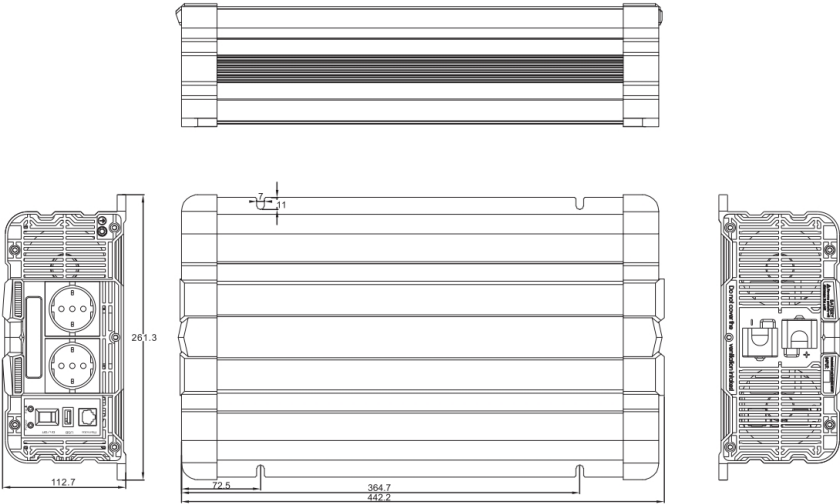
FS 1000 models



FS 1500 & FS 2000 models



FS 2500 & FS3000 models



FS 4000 models

