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Ultra Sine Inverter (US) Generation 4 (G4) User Guide

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Product description

The new IBS Ultra Sine inverters for island operation in mobile or stationary applications produce pure sine wave alternating voltage with 230VAC / 50Hz from 12V or 24VDC battery voltage. Latest technology allows the construction of lightweight and compact inverters. High-frequency hi-tech transformers with a powerful software-controlled IGBT transistor bridge guarantee impressive performance. The latest generation has reduced its own consumption by 30% to 1.2A @ 12.3V / 1.1A @ 24.6V, which is ideal for use in insulated solar systems. Consumers such as hairdryers, vacuum cleaners, coffee machines, hand-held machines, computers, laser printers, measuring instruments, medical devices can be operated in most cases.

Applications

- Motorhomes, Camper
- 4WDs / Expedition / Rallye
- Yachting
- Solar (island installations)
- Commercial and industrial use
- Energy back-up for computers, communications and medicine
- Mobile power for craftsmen

Data

Technologie	High frequency Dual processor Galvanic separation
Remote Control RP03	Available as an option
Monitoring	Over- / Undervoltage Overtemperature, overload Short circuit, current limiter Reverse polarity / fuse Dynamic Surge Control (DSC)
Housing	Aluminum, IP40
Cooling	Cooling plates / cooling tunnel, fan, µC monitored

Standardization

Low Voltage Directive	**2006/95/EC** -EN60950:2005
EMV guideline	**2004/108/EC** -EN 61000-6-3:2006 -EN 61000-6-1:2005
RoHS guideline	**2002/95/EC**

Special features

DSC (Dynamic Surge Control)

The inverter is equipped with dynamic surge control. The more battery capacity or charging current support (alternator) is available, the larger consumer devices can be started. If the starting current exceeds the safe value, it results in a safety cut-off (red error LED flashes), reset by switching the inverter off and on again.

DSC Classes

			Inverter type	US160	US80	US40
Classe	**Input voltage Ue**	**dUe at load**	**Time allowed**	**Power output**		
S1	>13.5V/ >27.0V	2.7 V	800 ms	3.8 kW	1.9 kW	1.0 kW
S2	13.0-13.5V/26-27V	2.0 V	400 ms	3.5 kW	1.7 kW	0.8 kW
S3	12.3-13.0V/24.6V-26V	1.5 V	200 ms	3.2 kW	1.6 kW	0.7 kW
S4	<12.3V/24.6V	1.2 V	100 ms	3.0 kW	1.5 kW	0.6 kW

Protection of deep discharge of the battery

The inverter is equipped with an intelligent, current-dependent deep-discharge circuit. Switch-off value 11.8V / 23.6V, re-activation 12.3V / 24.6V. Immediate shutdown when battery drops below 10.5V / 21.0V.

Performance

The IBS inverters are very powerful, as long as the batteries provide the necessary energy. Use as much charged, high-performance batteries as possible. Recommended battery capacities see P. 8. If the inverter is used for a long period, allow the engine to run for support (continuous currents up to 150A and starting currents up to 350A / 180A are possible). If charging support is provided by alternator or solar / charger (U> 13.0V /> 27V), the starting power according to DSC class S1 is available.

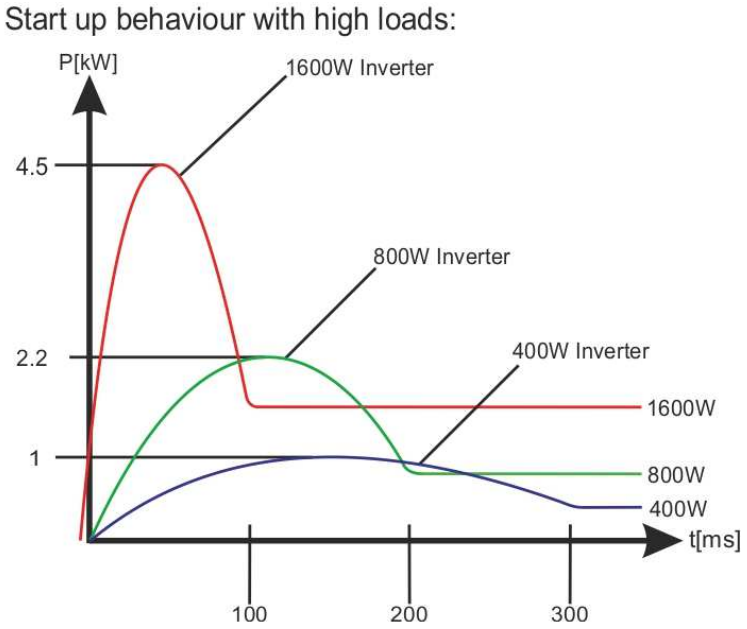


Abb. 1 Chart peak power

Warning

Have the wiring carried out by a qualified technician. Before the Connection is started, make sure that all cables and connections are voltage-free. Short circuits and polarity reversal can lead to serious damage to the battery, the Ultra Sine inverter and the electrical installation. Fuses cannot prevent damage caused by polarity reversal. Such damages are not included in the warranty.

Inverter output cannot be connected to the public network! (Use US-TS for automatic landline / inverter switching)

Never insert objects through the openings and ventilation slots of the device!

Supplied content

- US160/80/40
- Mounting feet

Informations

Front view

US160 / US80

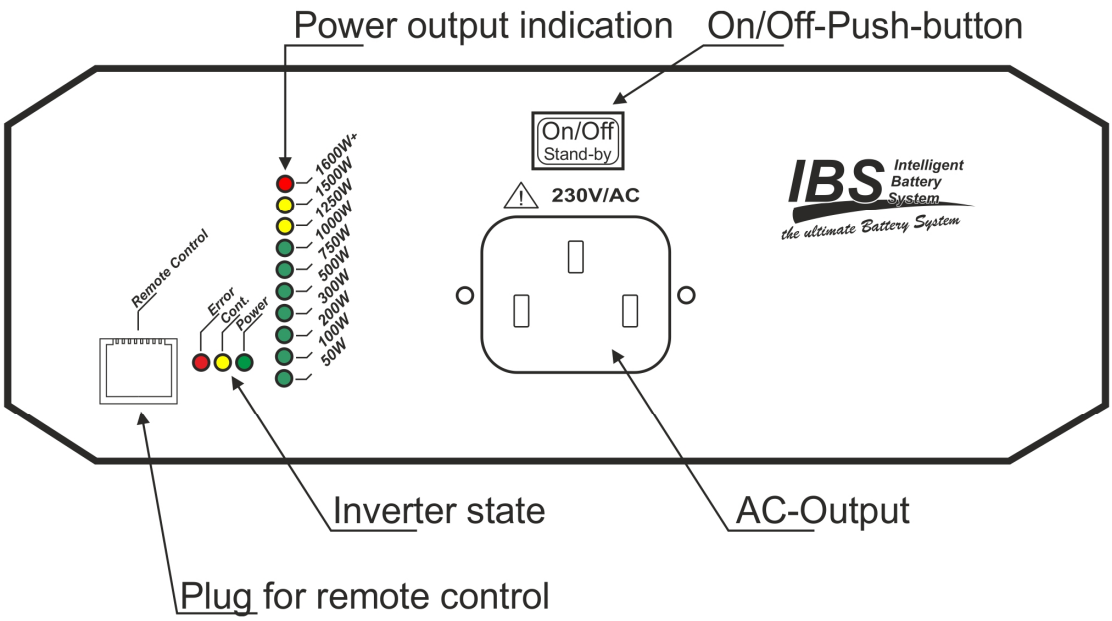


Abb. 2 Front view US160/80

US40

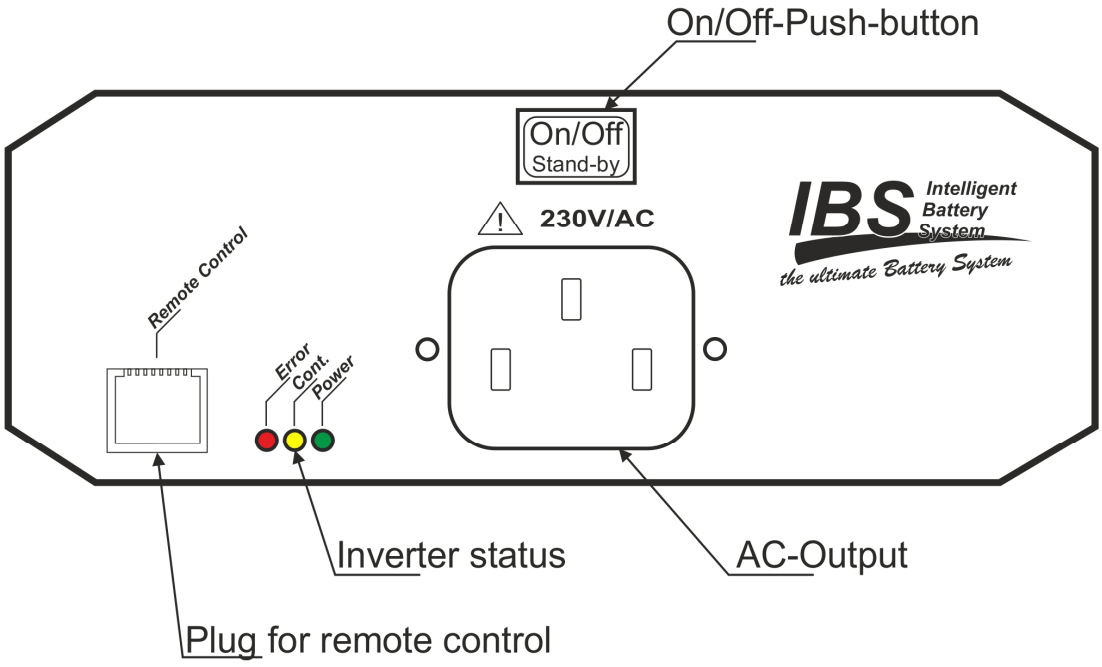


Abb. 3 Front view US40

Rear view

US160

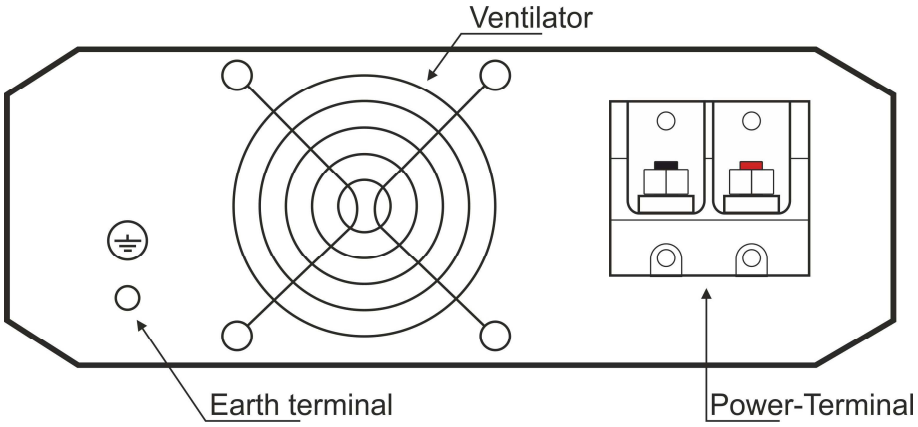


Abb. 4 US160 Rear view

US80

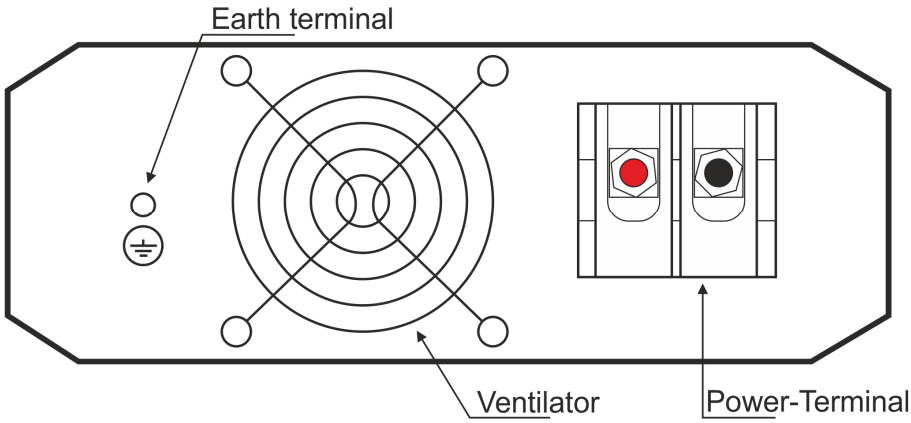


Abb. 5 US80 Rear view

US40

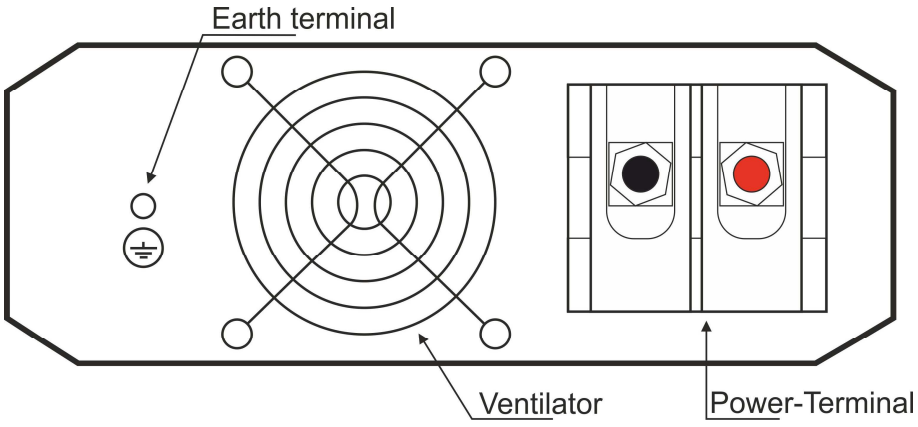


Abb. 6 US40 Rear view

Installations

Recommended cable cross section

When using a thinner cable cross-section than recommended, large losses and dangerous heating can occur in the connection cable. This may cause the Ultra Sine inverter to fail its full performance.

Model	US40		US80		US160	
Voltage value	12V	24V	12V	24V	12V	24V
Min. cable cross section	16 mm^2	10 mm^2	25mm^2	16mm^2	50mm^2	35mm^2
Connection to the device	M6		M6		M8	

Data refer to the copper cross-section of the cables!

Recommended battery capacity

High loads caused by an inverter system need sufficient available battery capacity. To ensure that the required application has enough energy, refer to the following table for recommended battery capacities.

Load	Capacity of 12V System	Capacity of 24V System
< 500 W	60 Ah	2 x 30 Ah
> 500 W	80 Ah	2 x 40 Ah
> 1000 W	100 Ah	2 x 50 Ah
> 1500 W	140 Ah	2 x 70 Ah

External fuse

The value fort he external fuse can be found in the following table.

Model	Battery voltage	Fuse to use
US40	12 V	40A
	24 V	20A
US80	12 V	80A
	24 V	40A
US160	12 V	150A
	24 V	80A

Installation Steps

Wiring

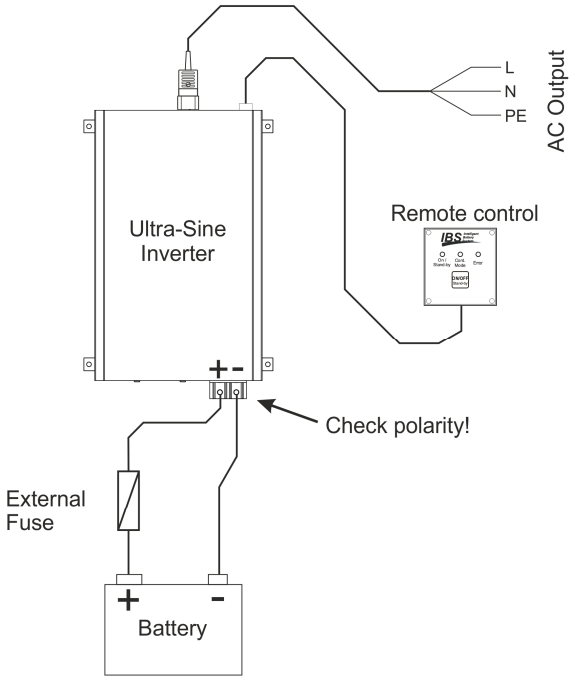


Abb. 7 Cabling normal use

In mobile applications such as travel trailers or yachts with a possible landline, the two-230V networks (inverter and landline connection) may only be connected via the US-TS FI switch! The same applies if 230V emergency generators are used! For parallel IBS operation, use the US-TS FI transfer switch.

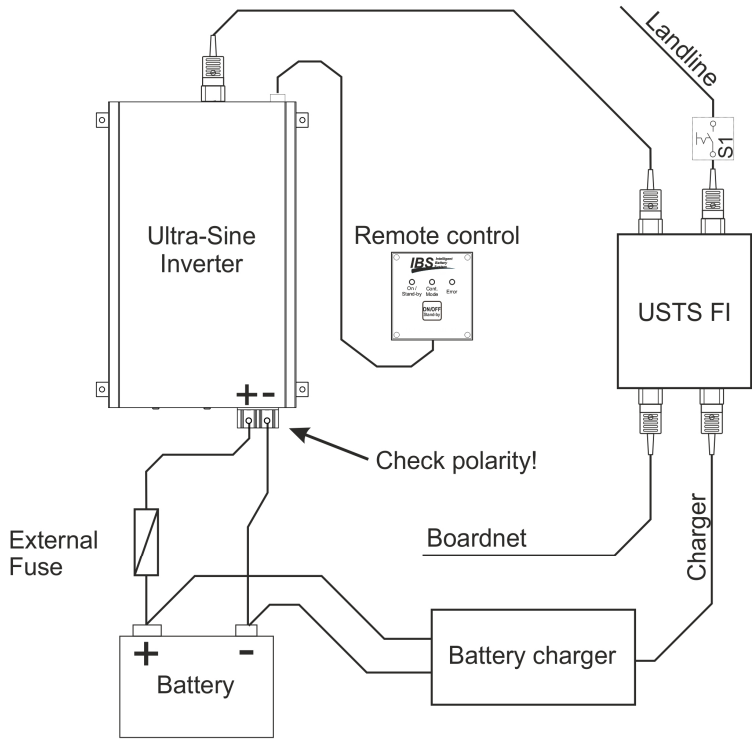
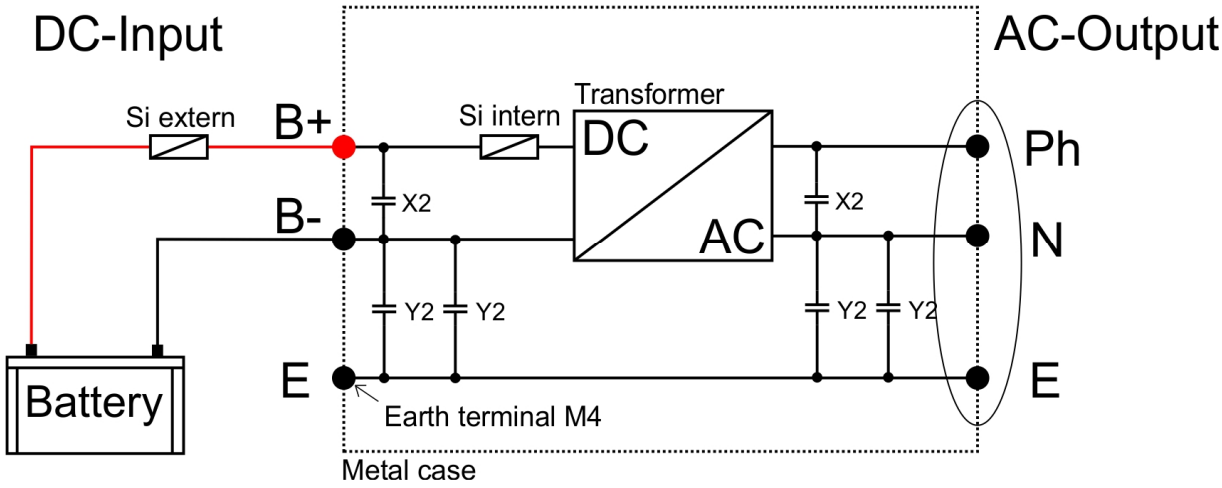


Abb. 8 Cabling with US transferswitch

Warning: Ensure correct polarity! Closing the circuit can cause a spark! Never connect the AC output of the inverter to the public network!
Caution: When installing the USTS FI, please consult the manual for instructions and safety instructions!
A main switch (S1) must be provided to allow emergency disconnection of incoming shore power supply!

Grounding

The grounding scheme of the US Inverter G4 is as follows:



Connecting the consumer device

Connectors for device

The Ultra Sine inverter is equipped with a socket according to IEC 60320-1 C13. A plug according to IEC 60320-1 C14 must be used as a counterpart.

Commissioning the unit

Connect the remote control

Plug the connection cable of the remote control into the remote control plug.
A non-crossed 8-pin RG45 cable must be used.

Switching on the appliance

To switch the device on and off, press the on / off button on the front of the device or the button on the RP03 remote control.

Activating / deactivating standby

To activate or deactivate standby, press the on / off button on the front of the device or the button on the remote RP03 remote for 3 seconds until the middle LED (orange) lights up (continuous operation active) or extinguishes (standby active).

Status Display

The three LEDs on the front of the unit or the RP03 connected to the remote control, indicate the status, operating modes, and faults.

Status

The green LED indicates the current operating state.

Statut	Green LED	Description
1		Switched off
2		Operational
3		In standby

Operating Modes

The yellow LED indicates the operating mode.

Mode	Yellow LED	Description
1		Standby-mode
2		Continuous operation mode

Error display

The red LED indicates faults.

Error	Red LED	Description
0		Without Error
1		Over- / Under voltage
2		Over temperature
3		System fault / fuse defective / overcurrent
4		Short circuit / overload

Troubleshooting

Error	Triggered by	Resetting by
1	Delayed: Voltage lower than 11.8V / 23.6V Or higher than 15.5V / 31.0V Immediately: Voltage lower than 10.5 V / 21.0 V	Voltage higher than 13.1V / 26.2V or lower than 14.5 V / 29.0 V Voltage higher than 13.1V / 26.2V
2	If the temperature is too high at the heat sink.	f the heat sink is below a minimum temperature.
3	If too much current or a faulty fuse has been detected.	Check the load, the polarity and switch the inverter off and then on again. If the fuse is defective, contact IBS.
4	Short circuit at output or too long load with high power.	Check the load and switch the inverter off and then on again.

Power display

The US80 and US160 have an output power indicator. The number of luminous LEDs indicates the current output power.

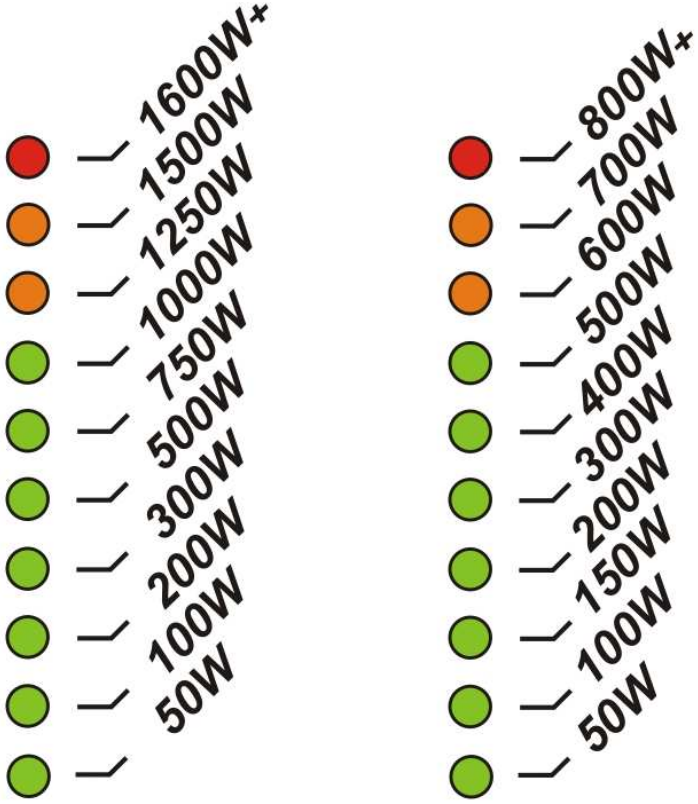


Abb. 9 Power display US160 (left) and US80 (right)

Assembly

Housing dimensions

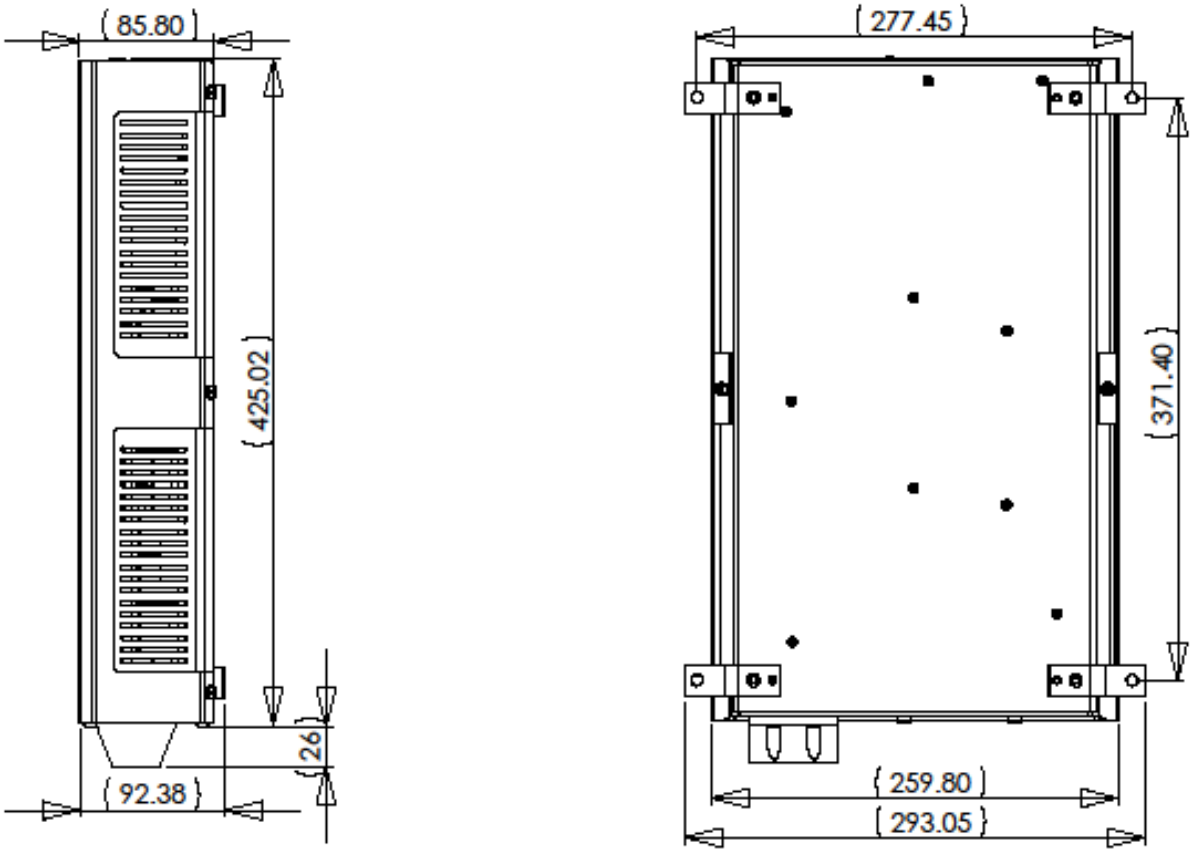


Abb. 10 US160 Housing dimensions

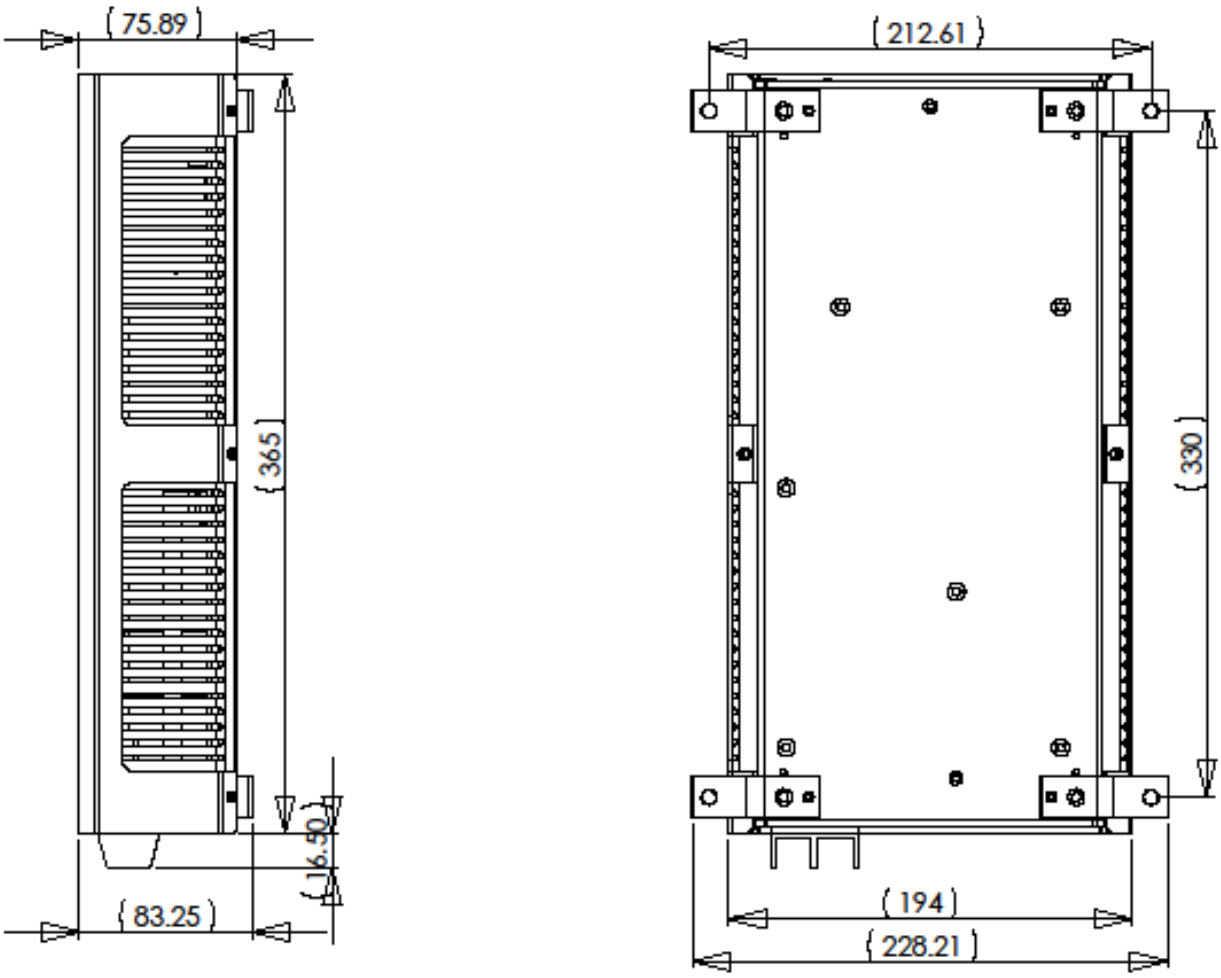


Abb. 11 US80 Housing dimensions

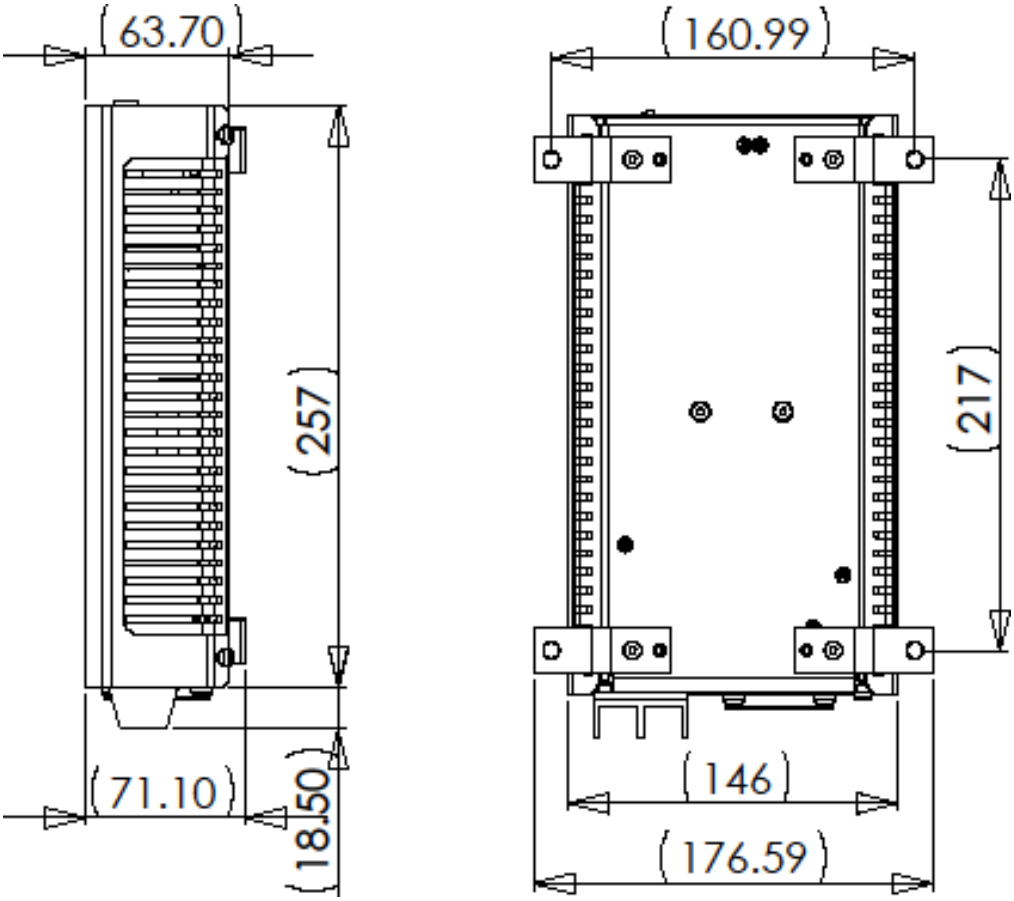


Abb. 12 US40 Housing dimensions

Attaching the mounting feet

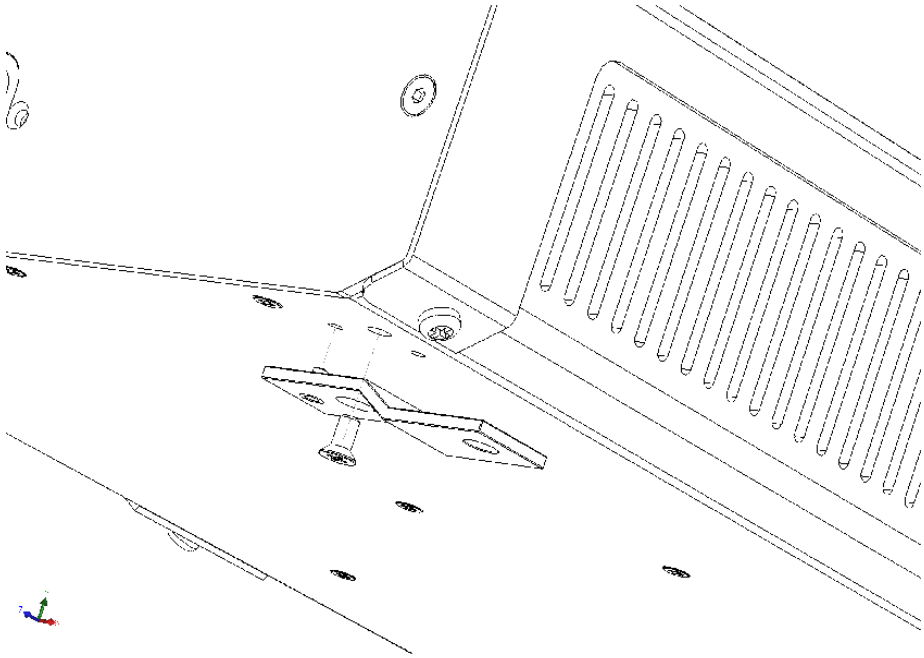


Abb. 13 Horizontal alignment of mounting feet

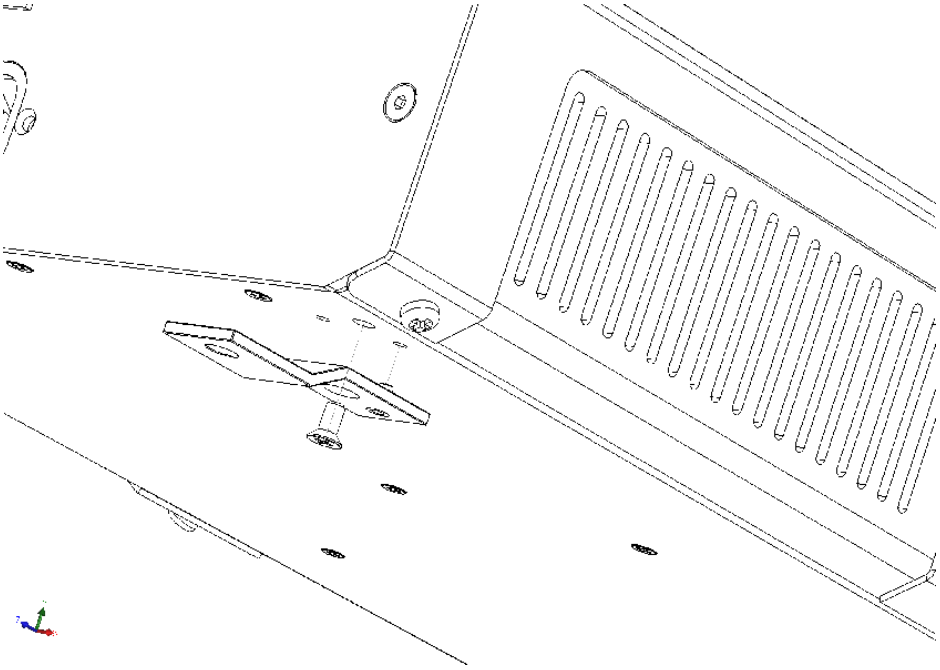


Abb. 14 Vertical alignment of mounting feet

Screw the mounting feet to the intended positions using the screws supplied. Only the included screws may be used. The tightening torque is 1.1 Nm.

Fitting

- Mount the unit with the mounting feet on a surface. Mounting is possible on a surface, on a sidewall or upside down.
- The ventilation slots and the fan must not be obstructed, so that the warm air, which is generated during operation, can escape unimpeded. Do not install in a small enclosed space, ensure air circulation.
- Ensure that no objects, dust or dirt can enter the interior of the unit through the ventilation slots or fan.
- Avoid any contact with water, moisture or rain. Humidity: 0-95%, non-condensing.

Please note

In order to guarantee the perfect operation of your IBS Ultra Sine inverter, please note the following points:

1. Inverter and battery voltage must be the same. Operation of a 12V device at 24V leads to destruction of the inverter.
2. The battery must be charged. If an inverter is operated with high power, the battery can be discharged quickly. If the battery voltage is too low, the inverter switches off and can only be switched on again after charging the battery.
3. High continuous load in case of insufficient cooling can lead to an emergency shutdown. The fan supports cooling depending on current and temperature.
4. Observe the same safety regulations as when using the 230V public network. When using the inverters, an additional fuse of 150A (12V) / 80A (24V) is recommended directly at the battery connection or circuit breaker (automatic fuse).

Specifications

Technical specifications

	US40		US80		US160	
	12V	24V	12V	24V	12V	24V
Input voltage	10.5V – 15.5V	21.0V – 31.0V	10.5V – 15.5V	21.0V – 31.0V	10.5V – 15.5V	21.0V – 31.0V
Rated capacity	400 W		800 W		1600 W	
Short-term performance	1000 W		2200 W		4500 W	
Output voltage	230V / 50Hz					
Print quality	IPC3					
Temperature range	- 20 °C bis + 40 °C					
Standby consumption	<0.5 W					
Standby void detection	> 15 W – 30 W		> 15 W – 30 W		> 15 W – 30 W	
Weight	1.7 kg		3.6 kg		5.5 kg	
Efficiency	90 / 93 %		90 / 93 %		90 / 93 %	

Accessoires

RP03	Remote Control
US-TS	Transferswitch for automatic landline / US switching

Notes

Instructions for the electrical supply

When connecting

a) Before connecting the caravan system to the electrical power supply, check that:
   1) the power supply, which is available at the power supply at the caravan site, for the electrical installation and the equipment of the caravan, is suitable for voltage, frequency and current rating;
   2) the cables / lines and the connections are suitable, and
   3) the main switch of the caravan is in the off position.

b) Check the cables / wires, plugs and connections for damage.
c) Plug the plug of the flexible cable into the electrical socket provided on the power supply at the caravan site.
d) Turn on the main switch on the caravan.
e) Check the function of the residual current device (RCDs [FI]) installed in the caravan by pressing the test buttons and switch it on again.

Remark 1:
The flexible supply line of the caravan should be completely unwound to avoid damage caused by overheating.

Remark 2:
In case of doubt, or if the supply is not available or is faulty after the above-mentioned procedure has been carried out, contact the caravan site operator.

When terminating the connection
Turn off the car's main switch and remove the cable. First at the power supply at the caravan site and then, if available, at the caravan port.

Recurring test
The electrical system of the caravan should preferably be inspected no less than every three years, and if the caravan is frequently used, annually by a competent electrician who should write a report on the condition.

CE

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