

# SKYTRONIC

## DC TO AC POWER INVERTERS (SOFT-START)



### POWER

150W

300W

600W

### 12V

651.620 / (651.740)

651.626 / (651.746)

651.632 / (651.752)

### 24V

651.623 / (651.743)

651.629 / (651.759)

*(xxx.xxx) are French version*

Instruction Manual

Gebruiksaanwijzing

Mode d'Emploi

Gebrauchsanleitung

Brugsanvisning

<b>MODEL No.:</b>	<b>651.620 / 651.740</b>	<b>651.623 / 651.743</b>
Output power continuous	150W	
Output power surge	450W	
AC Output voltage	230V	
Regulation	±10%	
Output wave form	Modified Sine Wave	
DC input voltage	10-15V	20-30V
Low battery alarm	10.5V ±0.5V	21V ±1V
Low battery shut-down	10.0V ±0.5V	20V ±1V
Frequency	50Hz ±1%	
Efficiency	90%	
No load current draw	<0.3A	
Over temperature protection	55°C ±5°C	55°C ±5°C
DC input fuse	20Amp	10Amp
Overload protection	YES	
Short circuit protection	YES	
Dimensions (LxWxH)	165 x 91 x 58mm	
Net weight ±	0.85kgs	

<b>MODEL No.:</b>	<b>651.626 / 651.746</b>	<b>651.629 / 651.749</b>
Output power continuous	300W	
Output power surge	1000W	
AC Output voltage	230V	
Regulation	±10%	
Output wave form	Modified Sine Wave	
DC input voltage	10-15V	20-30V
Low battery alarm	10.5V ±0.5V	21V ±1V
Low battery shut-down	10.0V ±0.5V	20V ±1V
Frequency	50Hz ±1%	
Efficiency	90%	
No load current draw	<0.3A	
Over temperature protection	55°C ±5°C	55°C ±5°C
Cigarette plug fuse	15Amp	10Amp
Alligator clip fuse	35Amp	20Amp
Overload protection	YES	
Short circuit protection	YES	
Dimensions (LxWxH)	190 x 91 x 58mm	
Net weight ±	1.1kgs	

<b>MODEL No.:</b>	<b>651.632 / 651.752</b>
Output power continuous	600W
Output power surge	1800W
AC Output voltage	230V
Regulation	±10%
Output wave form	Modified Sine Wave
DC input voltage	10-15V
Low battery alarm	10.5V ±0.5V
Low battery shut-down	10.0V ±0.5V
Frequency	50Hz ±1%
Efficiency	90%
No load current draw	<0.3A
Over temperature protection	60°C ±5°C
DC Input fuse	80Amp
Overload protection	YES
Short circuit protection	YES
Dimensions (LxWxH)	242 x 91 x 58mm
Net weight ±	1.7kgs

# UK

## SKYTRONIC INVERTERS

An Inverter is an electronic device that converts low voltage DC (Direct Current) electricity from a battery or other power source to standard 240 Volts AC (Alternating Current) household power.

The Inverter converts power in two stages. The first stage is a DC to DC amplification which raises the low voltage DC at the inverter input to 290 Volts DC. The second stage is the actual inverter stage which converts the high voltage 290 Volts DC into 240 Volts AC.

The DC to DC stage uses a high frequency power conversion technique that eliminates the need for bulky transformers found in more traditional inverters. The benefit of this is a significant reduction in size and weight. The inverter stage uses advanced power MOSFET transistors in a full bridge configuration, which means that the inverter has a much stronger load handling capability.

A power inverter converts DC power into conventional AC power which can run all kinds of household products such as: kitchen appliances, microwaves, power tools, TVs, radios, computers and more. You just connect the inverter to a battery, and plug your AC devices into the inverter and you've got power on the go.

The power inverter draws its power from a 12 Volt or 24 Volt battery, or several batteries wired in parallel. The battery will need to be recharged as the inverter draws the power out of it. The battery recharges by running the automobile motor, gas generator, solar panels, or wind and not with the power inverter. During blackouts, an inverter can be used for emergency power by use with a car battery with the vehicle running and an extension cord running into the house, where you can then plug in electrical appliances.

### Using the SkyTronic 230V inverters

The SkyTronic range of inverters transform 12/24V battery voltage into 230V mains voltage, thus enabling you to use your domestic equipment everywhere you want e.g. on camping, on a boat, in your car, etc. The regulated output voltage makes the inverters suitable for use with sensitive devices such as TV sets, video and audio devices, PCs or laptops and many more.

### General features of SkyTronic inverters

- high performance at low heat production
- 50Hz stable output frequency
- regulated 230V output voltage
- protection against short circuit and overheating
- with SkyTronic battery protection system. If the battery voltage drops to 10.5V (21V for 24V batteries) the inverter emits an alarm signal. If the battery voltage drops even further, the inverter shuts off automatically. This advanced protection system avoids to over discharge the battery.

### WARNING

SkyTronic inverters supply an output voltage of 230V which is as dangerous as the domestic mains voltage! Therefore only use double-insulated devices and replace immediately leads that are in bad condition. Don't expose the inverters to humidity and place them in a well ventilated area. The inverters with an earth connector can be connected to a grounding point such as a metal part of a boat or the car chassis.

### Important!

Under full load, high current is flowing through the battery cables. Therefore it is recommended to use only the supplied cables and no extension cables in order to avoid unacceptable voltage losses. If necessary, use an extension cord in the 230V circuit to the connected unit. To comply with the legal standards, the inverter may only be used with the supplied low voltage cables. Do NOT extend them.

The connected battery must be in good condition and fully charged. After some time, it may be necessary to start the car or boat in order to recharge the battery. At that moment, the inverter must be switched OFF beforehand in order to avoid damage due to excessive battery voltage.

### On/off switch

Connect the inverter to the battery (red is positive, black is negative). Make sure that all connections are of good quality. First switch on the inverter and afterwards the unit to be powered. Switch off in reverse order.

### Thermal protection

All SkyTronic inverters are protected against thermal overload. If the temperature of the inverter rises above 55°C, the protection circuit is automatically activated and the unit is switched off. First switch off the connected unit and then the inverter. Let the units cool down before you switch them on again. Check if the cooling fan is not obstructed and make sure that there is sufficient air flow around the unit.

## TROUBLESHOOTING

If you experience problems with appliances not operating correctly when there are two or more devices connected to the same circuit, the only remedy is to disconnect one of the units to reduce the load. If the inverter overheats when the load is at the rated maximum, try running the vehicle engine while running the inverter. (REMEMBER to switch OFF the inverter when starting the engine.) This will boost the battery voltage allowing the inverter to operate more efficiently, allowing use of the inverter for longer periods of time in high load applications.

## Audio Systems

Some inexpensive portable stereo systems will emit a buzzing noise through the speakers when operated by an inverter. This is because the power supply in the stereo unit does not adequately filter the modified sine wave produced by the inverter. The only solution is to use a stereo system with a more efficient power supply.

## GENERAL SAFETY

1. Always operate the inverter from the correct power source, 12V or 24V battery ( As applicable).
2. When connecting the cables from the battery to the inverter observe the correct polarity, RED is positive ( + ) and BLACK is negative (-). REVERSING the polarity will damage the inverter and is not covered under warranty.
3. Ensure the DC input connections are secure, because a loose contact can result in excessive voltage drop and can cause overheated wires and melted insulation.
4. Locate the inverter and power source ( battery ) away from any inflammables to avoid any possible fire or explosion. NOTE. It is normal to experience sparks when connecting the positive terminal of the inverter from the battery. This is due to the current flow charging the capacitors in the inverter.
5. Where applicable, always ground the inverter before operation to avoid possible shock.
6. Check that the power consumption of the appliance to be operated is compatible with the output capacity of the inverter. Care should be taken with microwave ovens as the power quoted on the front panel is usually the heating power and not the actual power drawn. For appliances with no power rating ( W or watts) shown then the current rating ( A or Amps ) can be multiplied by 230 to give an approximate power rating.
7. The battery must be of adequate capacity (ampere-hour) to run the inverter at the power required. The maximum current ratings for the various inverter models are'

12V-150W = 14.6A	24V-150W = 7.2A
12V-300W = 33A	24V-300W = 15A
12V-600W = 68A	24V-600W = 31A

Ampere-hour (Ah) capacity is a measure of how many amperes a battery can deliver for 20 hours, e.g. a typical marine or RV battery rated @100Ah can deliver 5amps for 20hrs (5A x 20hrs = 100Ah) 150W output. This model can be connected to the car via the cigarette lighter plug. The lighter socket must be fused at 15 amps. The lighter plug of the inverter is fused and can easily be replaced by unscrewing the front of the plug 300W models. These inverters are supplied with two DC power leads. If the inverter is connected using the lighter plug the maximum load is limited to 150W. The battery lead with clips contains a replaceable fuse and suitable for loads up to 300W.
8. In the event of a continuous audible alarm or automatic shut off, immediately switch off the inverter until the problem has been identified and rectified.
9. Disconnect the inverter when not in use.
10. Do not expose the inverter to moisture or site near sources of heat and inflammable materials.

## INSTALLATION

1. Install inverter in a cool, dry and well ventilated area away from any inflammable material.
2. Ensure the DC power cables are as short as possible (<2m ) and of suitable size to handle the current required. This is to minimise any voltage drop when the inverter draws high currents. Remember solid, secure, clean connections are essential for optimum performance.
3. Grounding. Connect the chassis ground lug ( where applicable ) to earth ground or car chassis using # 8 AWG wire, preferably with green / yellow insulation.
4. Battery Type and Size. Make sure the battery has enough capacity to run the inverter at the power needed. Inverters up to 300w can be powered by normal car batteries but it is recommended to start the engine every 30 - 60 minutes and let it run for about 10minutes to recharge the battery. Remember to switch OFF the inverter. For the larger inverters or where extended operating times are required, then Deep Cycle leisure or traction type lead acid batteries are recommended as they are designed for deep discharge where they will be repeatedly discharged and recharged. When sizing your battery it is better to have extra capacity as you will have more reserve and the battery will not be discharged as deeply. To obtain sufficient battery capacity you may need to use more than one battery. Two identical batteries can be connected in parallel (+) to (+) and (-) to (-) to double the capacity.  
CAUTION: Do not connect batteries of different makes or AMP- hour (Ah) rating. Connections to battery post must be made with solid secure connectors that provide a reliable, low resistance connection. Clean terminals regularly.

## OPERATION

1. Ensure the ON / OFF switch is in the OFF position.
2. Connect the DC power cables to the input terminals on the rear panel, observing the correct polarity. Check the connections are secure.
3. Ground the inverter.
4. Connect the DC cables to the battery again observing the right polarity.
5. Plug appliance into the AC outlet socket on the front panel. The appliance should be in the OFF mode.
6. Turn on the inverter.
7. Switch ON the appliance to be operated. NOTE: If you are operating more than one device then turn them ON separately so that the inverter does not have to deliver start up loads all at the same time. Some appliances such as refrigerators, motors, pumps etc require very high start up currents to operate, therefore before attempting to power up this type of equipment make sure all connections have properly been made and the battery is fully charged.

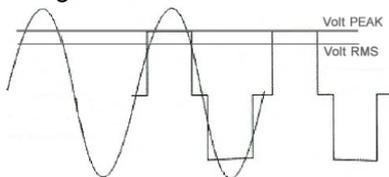
## SOFT START:

Because the unit have a soft start facility the output voltage will reach after a few seconds to avoid higher inrush currents on inductive loads. Because of this the inverter will easily start even with loads like TV and other units using transformers.

## FREQUENTLY ASKED QUESTIONS AND ANSWERS

### *Measuring AC voltages:*

The output wave of the AC inverter is a MODIFIED SINEWAVE. If you choose to measure the AC output voltage, you must use an AUTHENTIC RMS VOLT METER. Using any other type of voltage measuring device will result in an AC voltage reading that's up to 20 to 30 volts lower than the rated value. The reading will only be accurate when using an authentic RMS voltmeter.



### *Can I operate a microwave with a power inverter?*

The power rating used with microwave ovens is the "cooking power" which refers to the power being "delivered" to the food being cooked. The actual operating power requirement rating is higher than the cooking power rating (for example, a microwave with "advertised" rating of 600 watts usually corresponds to almost 1100 watts of power consumption). The actual power consumption is usually stated on the back of the microwave. If the operating power requirement cannot be found on the back of the microwave, check the owner's manual or contact the manufacturer.

### *What battery do I need to run my inverter ?*

Batteries are the heart of an inverter-powered electrical system, storing power for use on demand. The most basic way to draw electrical power from a battery is direct current (DC) at the nominal voltage of the battery. Your car radio, for example, uses 12 volts DC (12Vdc), the same voltage as your car battery. Many off-grid electrical systems (those not powered by electricity from a utility company) use 12-volt DC power to run simple loads such as lights. (Any consumption of electrical power is called a load.) Such systems are commonly referred to as low-voltage DC systems. Powered by a 12-volt DC system, you can enjoy the benefits of electric lights, entertainment systems, laptop computers, and other devices that can be operated off a car battery. However, you can't run power tools, kitchen appliances, or office machines, without the help of some device that generates "household" electricity.

An ideal way to run these devices is from a DC power sources such as vehicle batteries using an inverter.

An inverter is a device that converts battery power (DC) into alternating current (AC) of a higher voltage. DC-to-AC inverters have been around for a long time. Energy loss in this conversion process at first was very high: the average efficiency of early inverters hovered around 60%. In other words, you would have to draw 100 watts of battery power to run a 60-watt bulb.

A new way to build inverters was introduced in the early 1980s. These fully solid state inverters boosted efficiency to 90%.

The key to SkyTronic reliability is the elegance of our design. We use a sophisticated Field Effect Transistor (FET) circuitry to convert the batteries' DC voltage (usually 12 or 24 Vdc) into AC. The resulting low voltage AC is then transformed into a higher voltage, usually 120 or 220 Vac. All of the power shaping - conversion to AC - and waveform shaping takes place on the low voltage side of the transformer.

One note of caution: Batteries only have a limited power storage capacity. To avoid draining a battery and thus avoid the possibility of damaging it, you need to calculate and monitor the electrical consumption of your device.

If you are using a 150W or 300W SkyTronic Inverter, a standard 12v vehicle (50/75A) battery is ideal, as the inverter only draws a small amount of power. It comes with a vehicle cigarette lighter connection as standard, so you can use it in your car while you're on the move, or you can attach it directly to the battery, all the necessary leads are included.

For larger SkyTronic Inverters, we recommend a deep cycle lead/acid battery as the need for recharging is more important and prolongs the battery's life. This type of battery is commonly found in caravans, motor homes, Recreational Vehicles and boats.

*How much power does the Inverter take from the battery ?*

This obviously depends on the load connected to the inverter and the following is a basic calculation only.

Divide the load of the device connected to the SkyTronic Inverter by 10 (12V) or by 20 (24V).

For example: For a 400W appliance connected to a 12V inverter/battery, the power used would be 400 divided by 10 = 40A.