SELECTRONIC

SINE WAVE INVERTER

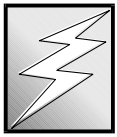
LD700-24 Operating Manual

Serial No _____ Purchase Date _____

Note - Your warranty can only be valid once your warranty card is completed and returned to Selectronic Australia

selectronic

LD700-24 Volt Owners Manual

Legend for Symbols		
		
Warnings and electrician's notes	Hints and Pointers	Examples

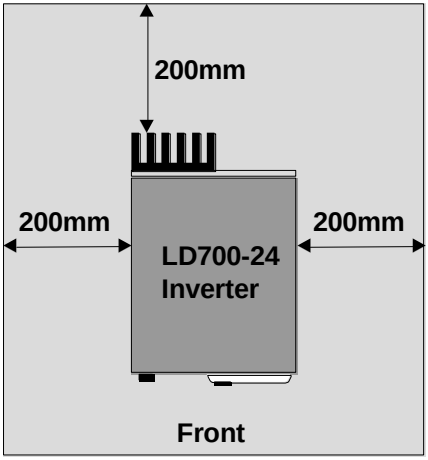
Introduction

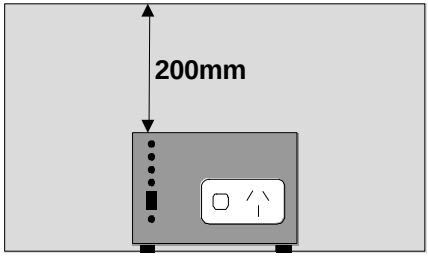
Thank you for choosing to purchase the Selectronic LD700-24 TRUE SINE WAVE inverter. Many hours of Research and Development have gone into the LD700-24 to ensure this inverter provides you with many years of reliable service

Warranty Card

It is imperative that you complete your warranty card NOW. Your LD700-24 is covered by a TWO-year warranty; this warranty is in addition to your rights under the trade practices act of your state or territory.
Returning you completed warranty card will enable us to register your warranty and avoid any possible delays should service be required. If you have any comments about our product that will not fit on the warranty card please feel free to drop us a line. Yes, constructive criticism will also be welcome.

Installation



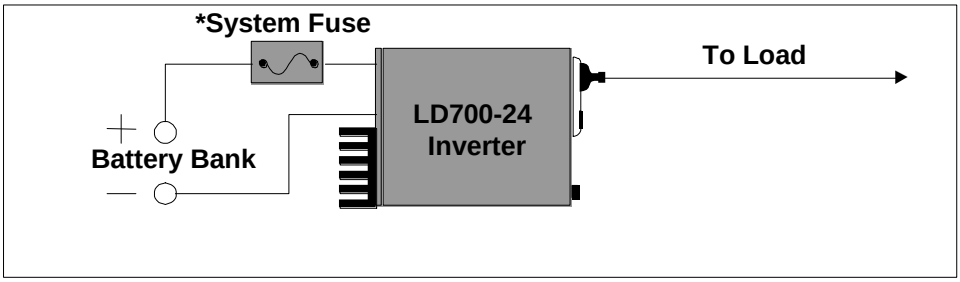


Please leave a clearance of 200mm on all sides and top of the Inverter.
The LD700-24 must be installed in a dry, cool, dust-free environment.
It is recommended that the inverter be placed as far from any radio receivers as possible.

Large amounts of DC current can be drawn by your LD700-24, *care must be taken.*

Fixed Installation

All fixed installation battery connections must be securely bolted, using stainless steel nuts and bolts. To protect the connection from corrosion smear a small amount of Vaseline or similar over the joint. Never place batteries directly onto a concrete floor, place timber or similar material beneath the batteries.



* A system fuse (of at least 35 Amps) should be placed before the battery. An HRC motor start type is recommended. (See your system designer for details).

Warning

As a matter of safety, Selectronic strongly recommend that all fixed installations be designed and installed by appropriately qualified person. The Solar Energy Industries Association in your state or territory can provide names of accredited system designers and installers.

The output voltage from an inverter is as lethal as mains electricity.

All AC wiring MUST be carried out by an accredited electrician and must conform to AS3000 and/or any relevant local standards.

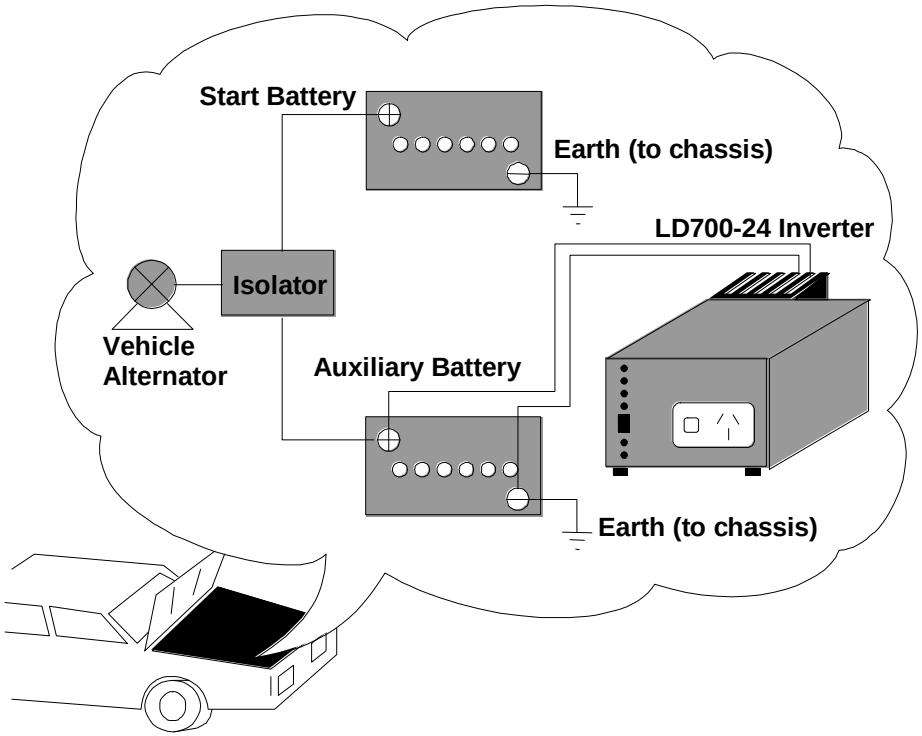
Electrician's Note

- All earth's AC and DC should be bonded
- RFI/Lightning Earth stake should be within 3m of the inverter
- The LD700-24 is suitable for connection to MEN wiring
- Any AC changeover switch must be a 'break before make' type

Portable Use

By using optional battery clips, the LD700-24 can be connected directly to a vehicle battery. When using Alligator clips ensure they have a tight grip around the battery post. Wherever possible battery connections should be bolted. If connecting the LD700-24 through a cigarette lighter socket the maximum power output of the LD700-24 will be *severely* restricted, this practice should be avoided. Check with your supplier or installer if you are unsure.

Do not use alligator clips in a moving vehicle



By incorporating an auxiliary battery in the manner above, the starting battery should remain charged for vehicle starting (see your auto electrician).

The LD700-24 has sufficient battery cable length to allow it to sit underneath the vehicle whilst in use. If the ground is wet, place the LD700-24 on a waterproof liner.

Batteries and Connections

Batteries are the key to maximum performance from your LD700-24, if a battery is too small or not fully charged it may result in de-rated performance from your LD700-24.

Battery ratings

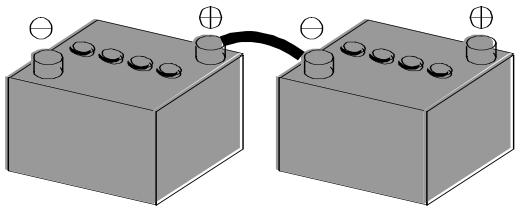
Batteries can be rated in one of two ways:

1. CCA = Cold Cranking Ability. This is the amount of power or current that a battery can deliver for a short period, typically a few seconds. This how a car battery would normally be rated.
2. Ah = Ampere Hours. This is the maximum amount of energy that can be stored in a battery; this figure will generally be stated at a particular hour rate. This is how a deep cycle or storage battery would normally be rated.

100Ah @100hr, this means that when this battery is discharged over a period of 100 hours, the battery has a capacity of 100Ah. This in theory means 1 Amp for 100 hours, although this would in practice result in a totally discharged battery that may not then recover.

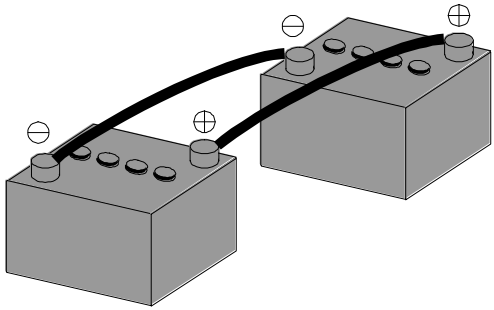
To achieve maximum performance from your LD700-24 you must have a battery capable of delivering 75 Amps for a short period whilst maintaining at least 21.0 volts. To increase the capacity of your battery you may need to join more than one battery together.

- Where batteries are joined in ***series***, add the voltage of each battery.



The capacity will equal the capacity of the smallest battery. 2 x 12 Volt 150 Ah batteries connected in series would have a total capacity of 24 Volts – 150 Ah.

Where batteries are joined in ***parallel***, add the capacities together, the voltage will remain the same as each batteries voltage.



2 x 24Volt 150 Ah batteries connected in parallel would have a capacity of 24 Volts – 300 Ah.

Only use identical batteries when joining batteries together.

How long will my battery last

To work out how long your battery will last follow this basic guide.

This guide presumes commencing with a fully charged battery.
Take the total rating of the appliance being run

1	light globe	25watts
1	20 inch TV	67watts
1	VCR	30watts
Total load		=122watts

Divide this figure (122) by 20 to know the approximate DC current draw
=6.1Amps
To convert this to Ampere hours, multiply by the number of hours used -
Say 1 hour =6.1Ah
So if we have a 150Ah battery, then with the above example we should have 150 minus 6.1 = 143.9 Ah remaining in the battery.

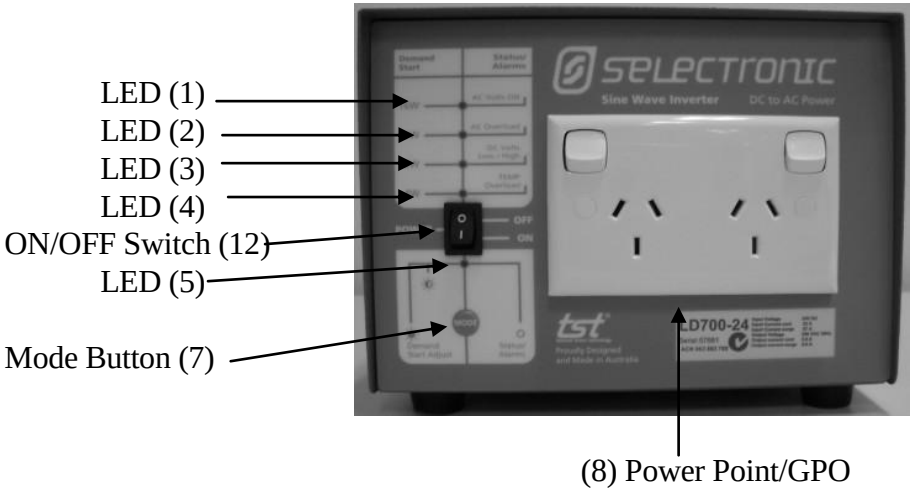
As a general guide never discharge a battery below 50%. The deeper a battery is discharged on a regular basis, the less life you can expect from the battery. The Ah rating of a battery will also be reduced if the discharge current is higher than the rated discharge current. See your battery specifications for full details.

Getting Started Quickly

If you want to get powered up quickly here are the 11 simple steps.

1. Familiarise yourself with the details in the first 6 pages on this manual.
2. Unpack the LD700-24 from the packaging.
3. Check unit for any damage that may have resulted during transport, if any damage is evident report this to your supplier immediately.
4. Make sure the LD700-24 ON/OFF switch (12) is in the off position.
5. Connect battery positive wire (red) (10) to battery positive or battery fuse.
6. Connect battery neg. wire (black) (11) to battery negative or battery fuse.
7. Plug a 230 - 240V appliance into inverter front power point (8) but do not switch on.
8. Turn ON/OFF switch (12) to ON.
9. After 3 seconds LED (1) will begin to flash. If no LEDs light, check for correct connection to battery.
10. Turn power point (8) on
11. You're away.

LD700-24 Parts Identification



Positive (Red) Battery lead (6) can be viewed from the rear.
Negative (Black) Battery Lead (7) can be viewed from the rear.

Operation

Five LEDs are provided on the front panel to indicate a number of parameters, and allow adjustment of some of these parameters.
LED (5) tells you what LED (1) – (4) is displaying as indicated on the front panel of the LD700-24. Pressing Mode Button (7) will change the information being displayed.

STATUS indicators LED (5) (green) flashing

When power is first applied LED (1) should flash.

When LED (5) (green) is OFF, this indicates the LED (1) – (4) is showing the inverters STATUS, as per written notation to the right of the LEDs. In this mode there are no adjustments to be made.

LED (1) Flashing indicated the LD700-24 is in Demand Start mode, this indicates that no power is being drawn from the inverter so it has gone to SLEEP to save power.

LED (1) Stays ON, the inverter has been commanded to provide power to the load (e.g. a light switch has been turned on) so it has gone from SLEEP mode to ON. Once the load has been removed (e.g. the light switch is turned off) the inverter will wait 10 seconds and return to SLEEP mode.

It is good practice to have your LD700-24 in SLEEP mode as often as possible. When the LD700-24 is in SLEEP mode it uses 0.03 amps from the battery, when the inverter is in the ON mode it uses at least 0.50 amps from the battery.

The amount of power required to go from SLEEP to ON is adjustable and is described on page 9.

LED (2) AC Overload should normally remain OFF. If the inverter shuts down due to too much AC load being drawn from it then LED (2) will come ON. The LD700-24 will remain in this condition for 1 minute after the AC load has been decreased to a safe level. LED (2) will flash if the inverter shuts down due to "time to shutdown".

- If the inverter remains in this condition after one minute, switch (12) should be turned OFF and then back ON.

LED (3) *DC Volts Low / High* should normally remain OFF. If the inverter shuts down because the battery volts are too high then this LED (3) will come ON. It will remain ON until normal battery volts are restored.

- If the inverter shuts down due to not enough battery volts, then LED (3) will flash.
- LED (3) will continue to flash until the battery volts have risen sufficiently. In this case, charge the battery by starting the vehicle or using a battery charger.

The low voltage point that the inverter will cut out is adjustable to suit your particular battery, see page 10 for details of this adjustment.

LED (4) *Temperature Overload* should normally remain OFF. If the inverter shuts down due to the heatsink getting too hot, then this LED (4) will come ON. If the transformer is too hot then LED (4) will FLASH. The LED will remain ON or FLASHING until the temperature has lowered to a safe level; the inverter will then come back ON.

- If this LED (4) is coming on regularly, either reduce the amount of load on the inverter or try to move the inverter to a cooler location.

Demand Start Adjust LED (5) (green) ON

It is sometimes necessary to adjust the demand start sensitivity to overcome what is called "Phantom Loads". A phantom load is a load that tricks the inverter into thinking it should be ON instead of in SLEEP mode.

The wiring of a house or a portable stereo system in standby are good examples of a phantom load. These loads serve no purpose but yet can increase battery drain by bringing the inverter ON. Hold the Mode button (7) down until LED (5) comes ON, (approximately 1 second) indicating you are ready to adjust this setting. The LD700-24 will leave the factory with a setting of 4 watts. Now press the Mode button (7) until the desired value is sought. LEDs (1) – (4) will return to Status after 20 seconds.

Demand Start Watts	LED 1	LED 2	LED 3	LED 4
4 Watts				ON
5 Watts			Slow Flash	ON
6 Watts			Medium Flash	ON
7 Watts			Fast Flash	ON
8 Watts			ON	
9 Watts		Slow Flash	ON	
10 Watts		Medium Flash	ON	
11 Watts		Fast Flash	ON	
12 Watts		ON		
13 Watts	Slow Flash	ON		
14 Watts	Medium Flash	ON		
15 Watts	Fast Flash	ON		
16 Watts	ON			
Continuous	ON	ON	ON	ON

After "continuous", the next button press "rolls back" the demand start setting to 4 Watts

Low Volts Adjust LED (5) (green) FLASHING

To avoid total discharging of your battery the LD700-24 shuts down at a pre-set low voltage. As all batteries are different, so too is the minimum voltage they should be discharged to. The LD700-24 will leave the factory with a setting of **22.0 volts**, change this setting if required.

Hold the Mode button (7) down until LED (5) is FLASHING, (approximately 2 seconds) indicating you are ready to adjust this setting. Now press the Mode button (7) until the desired value is sought. LEDs (1) – (4) will return to Status after 20 seconds.

Low Volts Cut-out	LED 1	LED 2	LED 3	LED 4
20.0 Volts				ON
20.2 Volts			Slow Flash	ON
20.4 Volts			Medium Flash	ON
20.6 Volts			Fast Flash	ON
20.8 Volts			Fastest Flash	ON
21.0 Volts			ON	
21.2 Volts		Slow Flash	ON	
21.4 Volts		Medium Flash	ON	
21.6 Volts		Fast Flash	ON	
21.8 Volts		Fastest Flash	ON	
22.0 Volts		ON		
22.2 Volts	Slow Flash	ON		
22.4 Volts	Medium Flash	ON		
22.6 Volts	Fast Flash	ON		
22.8 Volts	Fastest Flash	ON		
23.0 Volts	ON			

After “23.0 Volts”, the next button press “rolls back” the Low DC Volts Cut-out setting to “20.0 Volts”

Inverter

Periodic maintenance of your LD700-24 inverter involves little more than checking for any obstructions to the black cooling heatsink at the rear of the inverter. The heatsink must be cleared of any accumulated foreign matter that may have lodged itself between the fins since the last maintenance check, e.g. insect nests. Also verify that airflow around the inverter has not become restricted.

Batteries

1. Every week, carry out a thorough visual inspection of all battery wiring, taking particular note of the condition of inter-connections between cells. This maintenance should be carried out in conjunction with the battery manufacturers recommended maintenance.

Safety Hint	
	When working on batteries of such high capacity it is essential that you wear protective clothing, some form of eye protection and rubber-soled work boots. Please regard your batteries with a great deal of caution, and if in any doubt, entrust this work to your supplier / installer.

2. Check that the stainless steel inter-connecting bolts are tight and have no corrosion. If corrosion is evident, carefully follow the following procedure.

    - Disconnect the system battery fuse before working on the battery bank.
    - Unbolt the stainless steel bolts and nuts of any corroded connections and thoroughly clean the joint with a wire brush or file, taking extreme care not to short circuit any battery cells with any tools.
    - Re-assemble and smear a small amount of Vaseline or similar grease over the surface of the joint to slow down any future corrosion.

Once a fortnight or as directed in your battery manufacturer, check the specific gravity (SG) of each battery cell using a hydrometer, to ensure that all cells are performing correctly and are properly charged. Any serious imbalance should be reported to your system designer in case remedial action needs to be taken.

Handy Hints	
	It is very important that you become familiar with the functioning of your inverter. From a distance, it is not always easy to know what if the inverter is On or in Sleep mode. An easy way to determine this is to plug a small child's night-light (neon type) into a power point that is easily visible, or replace this power point with a safety type with a neon indicator. This will indicate the inverter's operation by flashing when the inverter is in SLEEP mode and remaining ON when the inverter is brought ON by a load.

Radio Frequency Interference

For many years, Radio Frequency Interference (RFI) has been an annoying problem for owners of Inverters. RFI in a domestic situation can cause noise on an AM radio receiver. The degree of interference can vary dramatically from site to site. Below are a few suggestions to help reduce the effects of RFI in your installation. It is not essential that you follow these guidelines, however, they will give you the best chance of reducing any RFI, particularly on AM radio.

It is recommended that the power system including the inverter be housed at least 10 metres from the home.

Ensure a good earth stake is placed as close to the inverter as possible. This earth stake should be in a moist area and should be connected to the inverter earth, see page 2 for wiring details.

Avoid running DC cables into the home, if at all possible. If this cannot be avoided, run DC and AC in separate conduits separated by as much distance as practicable. All DC wiring should also be kept as short as possible. **Connect battery negative to earth.**

AM radios should be powered from their own self-contained batteries and kept as far away as possible from AC or DC wiring within walls. Make sure that your AM radio has maximum signal strength. This will help your radio to reject any unwanted noise being produced by your inverter, regulator, controllers or DC lighting. If possible, try moving the radio around to improve the signal strength or use an external aerial. Some of today's building materials such as steel roofs and foil insulation may form a barrier to incoming radio signals. If an external aerial is required, it should be on the outside of the home, mounted as high as practicable and as far from the inverter as possible. Connection from the aerial to the radio should be via a low loss coaxial cable.

Please note the aerial must be an AM RADIO type; a TV aerial will not work.

No indicators ON when power is first applied

When first connected, if the LD700-24 shows no indicators the battery connections may be reversed. Check that the red battery wire (10) is connected to the battery positive, and the black battery wire (11) is connected to the battery negative. Remember there is a 3 second delay before power is available after switch ON.

Inverter stays ON when no appliance is being used

This can be a common problem known as a "Phantom Load", but can be easily overcome. Some appliances will need to be switched off at the power point as they may still represent a small load despite being switched off at the appliance.

Check again to make sure that there are no appliances left ON, the sequentially switch off appliances at the wall and by watching your night light (as described in Handy Hint, check to see if the LD700-24 returns to pulsing (SLEEP) mode after a 10 second delay. Once you have found the offending appliance, increase the sensitivity of the "Demand Start" (see page 11) until the inverter turns OFF. Once this is done re check that small loads will still bring the inverter ON when required.

Inverter shuts down during the middle of the day, and comes back ON late in the afternoon

This is more than likely caused by high battery volts during peak charging times from Solar Panels. Battery volts should never exceed 34 volts. If this is the case, have your Solar Regulator checked.

Product Warranty and Conditions

These warranty conditions apply to the LD range of Inverters for sales within Australia and New Zealand.

This product is warranted by the manufacturer for a period of 24 months from date of purchase to the original purchaser only.
The manufacturer will bear the cost of parts and labour to repair any faults found within the terms and period of this warranty.

Faulty product or parts must be returned to Melbourne Australia at the owner's expense for claim under warranty.No allowance is made for the cost of labour or traveling time required to disconnect or reinstall faulty parts.

Cost of freight to return parts to the customer will be paid by the manufacturer, method of freight used will be determined by the manufacturer.

Under certain circumstances the manufacturer may allow on site repairs to be carried out. This will be at the manufacturers discretion and the manufacturer is not responsible for the cost of any labour or traveling time incurred.

Unless otherwise specified to the purchaser the benefits conferred by this voluntary warranty are additional to all other conditions, warranties, guarantees, rights and remedies expressed or implied by the Trade Practices Act in your state or territory.
All installation and user conditions as set down in the instruction manual must be strictly adhered to, failure to do so may void your warranty.

This product is not to be used for Life Support equipment.

Any faults caused by lightning, water or moisture ingress, faulty installation, using the product in a manner which it is not intended, vermin infestation, improper voltage, alterations to the product which affect its reliability or performance, or faulty generator sets will not be covered under warranty.

The manufacturer shall bear no responsibility for any consequential loss, damage or expense due to any malfunction of the product or the time it is out of service

The manufacturer will not be held responsible for any misleading or incorrect information conveyed by any salesperson or installer not directly employed by the manufacturer.

If service is required please contact your installer or retailer before taking any further action.

LD700-24 Volt Specifications

Inverter Type Microprocessor control circuit with PWM full bridge power stage. True sine wave AC output

Current draw from Battery	
Condition	**Amperage**
Demand Start SLEEP mode (average)	0.03 Amps
Inverter ON, with no Load	0.25 Amps
Maximum Continuous Load (700 Watt)	32 Amps
Half hour rating (900 Watt)	≈ 42 Amps
Surge rating (2000 Watt)	≈ 87 Amps

Inverter Power Ratings @ 25^{O} C		
Condition	**Total Inverter output**	
	Wattage @ 1.0pf	**Current**
Continuous	700 Watt	2.8 Amps
Half hour rating	900 Watt	≈3.7 amps
Surge rating (5 seconds)	2000 Watt	≈ 6.9 Amps

Demand Start	
Type	Pulsing AC
Minimum Load to Start	4 watts – 16 watts user adjustable
Response Time Normal Pulse Mode	1 second maximum

Battery Voltage Range	**Voltage**
Low DC Volts Cut Out–10 second delay	20 – 23 volts user adjustable
Low DC Volts Cut In	24 volt
High DC Volts Cut Out–Instantaneous	34 volts

Miscellaneous Specifications	
Reverse Polarity Protection	Full Electronic Protection
Output Voltage Accuracy 0-350 watts	± 4% @ 12 volt input
Output Frequency	50Hz ± 0.01%
Peak Efficiency	93%
Total Harmonic Distortion	<4%
Operating Temperature Range	0°C to 50º C
Transformer Type	Toroidal
Cooling Method	Controlled fan-forced
Power Point	2 x 10 Amp Single Pole
Chassis Material	Zinc Coated Steel
Chassis Coating	Powder Coated
Size	210W x 170H x 3100mm

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