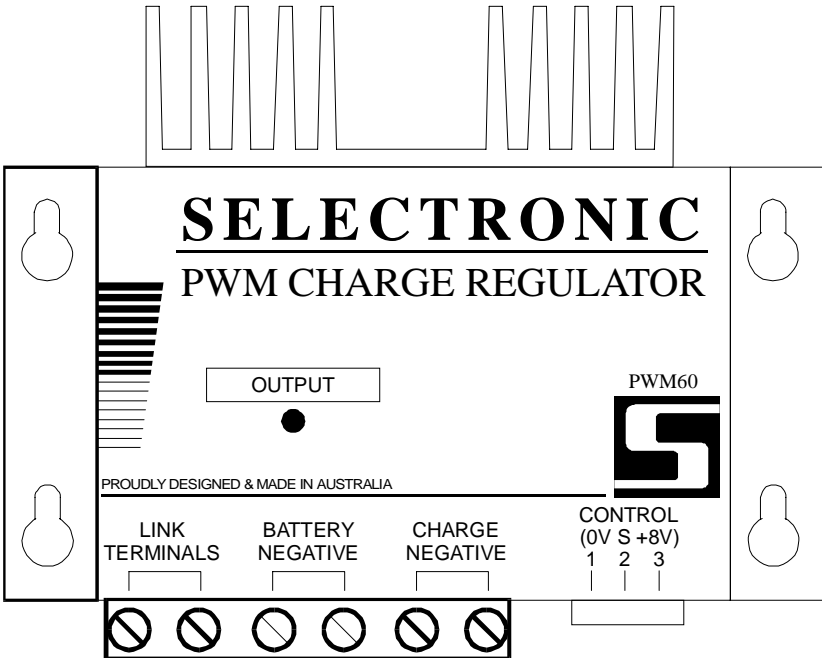


PWM60

PWM Charge Regulator



SELECTRONIC AUSTRALIA PTY LTD
www.selectronic.com.au

SELECTRONIC AUSTRALIA

PWM60 PWM CHARGE REGULATOR OWNERS MANUAL

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INTRODUCTION

Thank you for your purchase of the PWM60 Selectronic PWM Charge Regulator. Your Charge Regulator uses state-of-the-art high performance PWM control.

Many hours of development time has been invested in the Charge resulting in a product of high quality and reliability. If looked after properly, the Charge Regulator will give you many years of reliable service.

WARRANTY CARD

Before proceeding any further, it is extremely important that you complete your warranty card NOW. This will enable us to immediately register your 5 year warranty period. By accurately completing your warranty card, you will provide us with valuable information that will assist us in keeping up with your alternative energy needs. Please take a few moments to fill in the warranty card. Your efforts will be greatly appreciated.

INSTALLATION

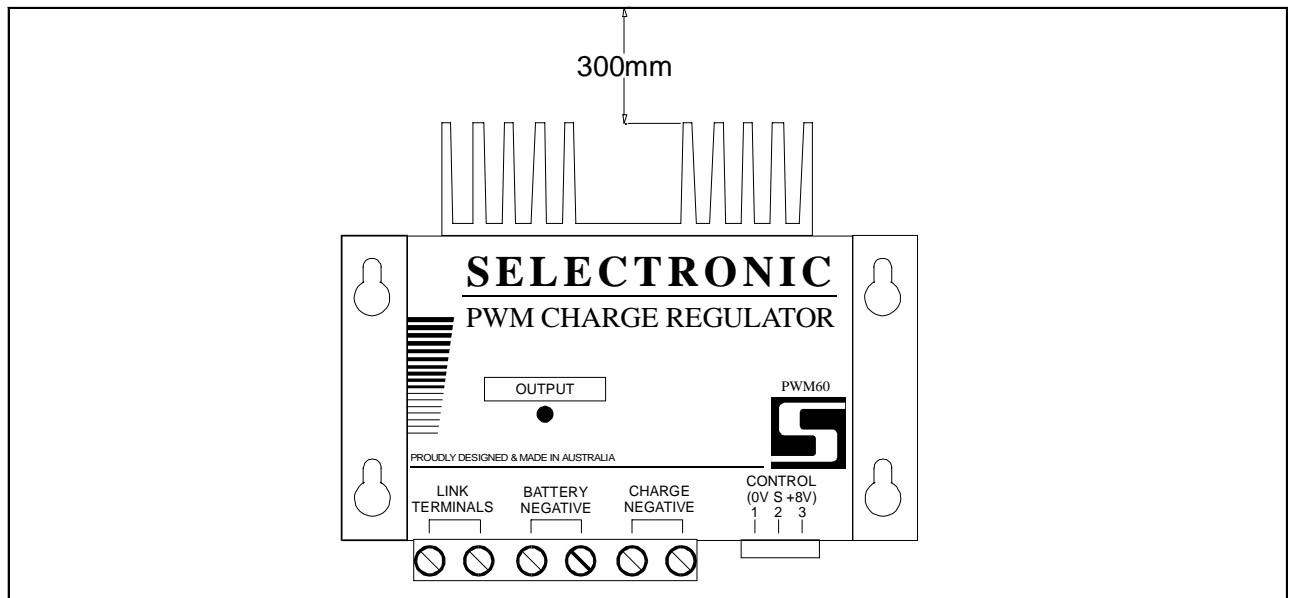
The installation of your Charge Regulator is extremely important. Failure to follow the recommended installation instructions may void your warranty. If in doubt, ask your supplier.

After unpacking, check for any damage that may have occurred during transit. If there are any signs of damage, contact your supplier immediately.

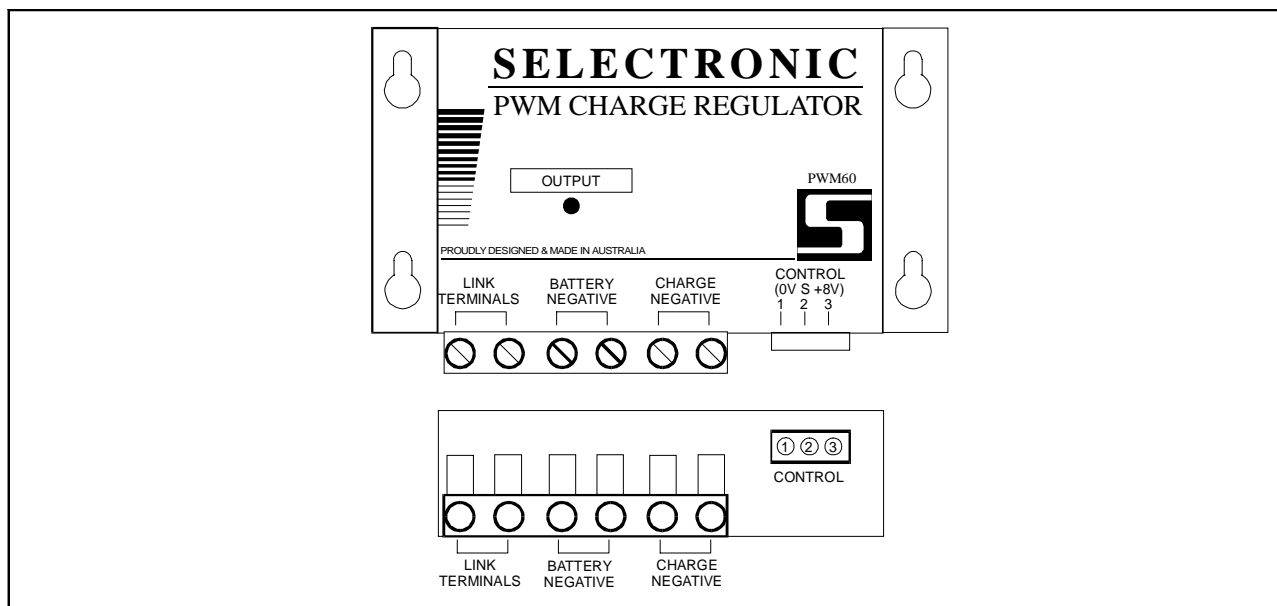
The Charge Regulator must be installed in a dry, cool, dust-free environment.

Please leave at least 300mm clearance around the heatsink on the Charge Regulator, as this will aid the natural cooling of the Charge Regulator.

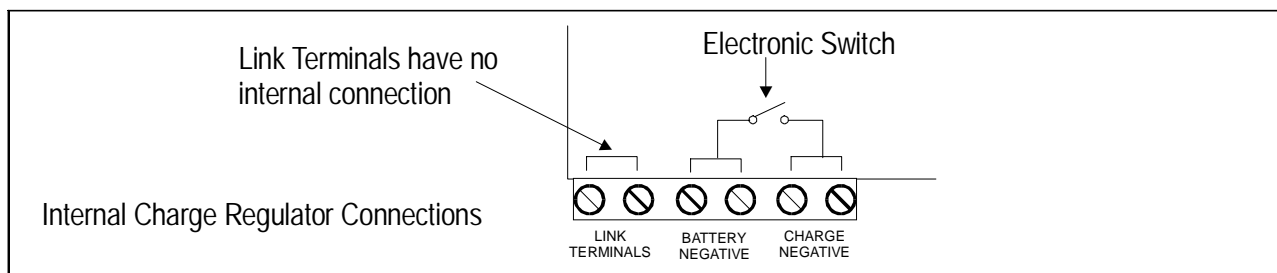
You must have a suitable DC battery bank that is maintained and operated to the battery manufacturer's recommendation.



TERMINAL CONNECTIONS



CHARGE REGULATOR INTERNAL CONNECTIONS



SYSTEM FUSE

A system fuse is an extremely important part of any power system, this fuse is designed to give one point of complete disconnect in case of a serious fault. The fuse should have a sufficient rating so as not to blow under heavy load conditions. Your inverter will normally be the biggest load in your system, if this is the case a motor start fuse equal to or slightly higher than the maximum continuous current of the inverter should be used.

If in any doubt see your supplier or installer.

OPERATION

When you first apply power, the Charge Regulator will turn on the Control LED for a few seconds.

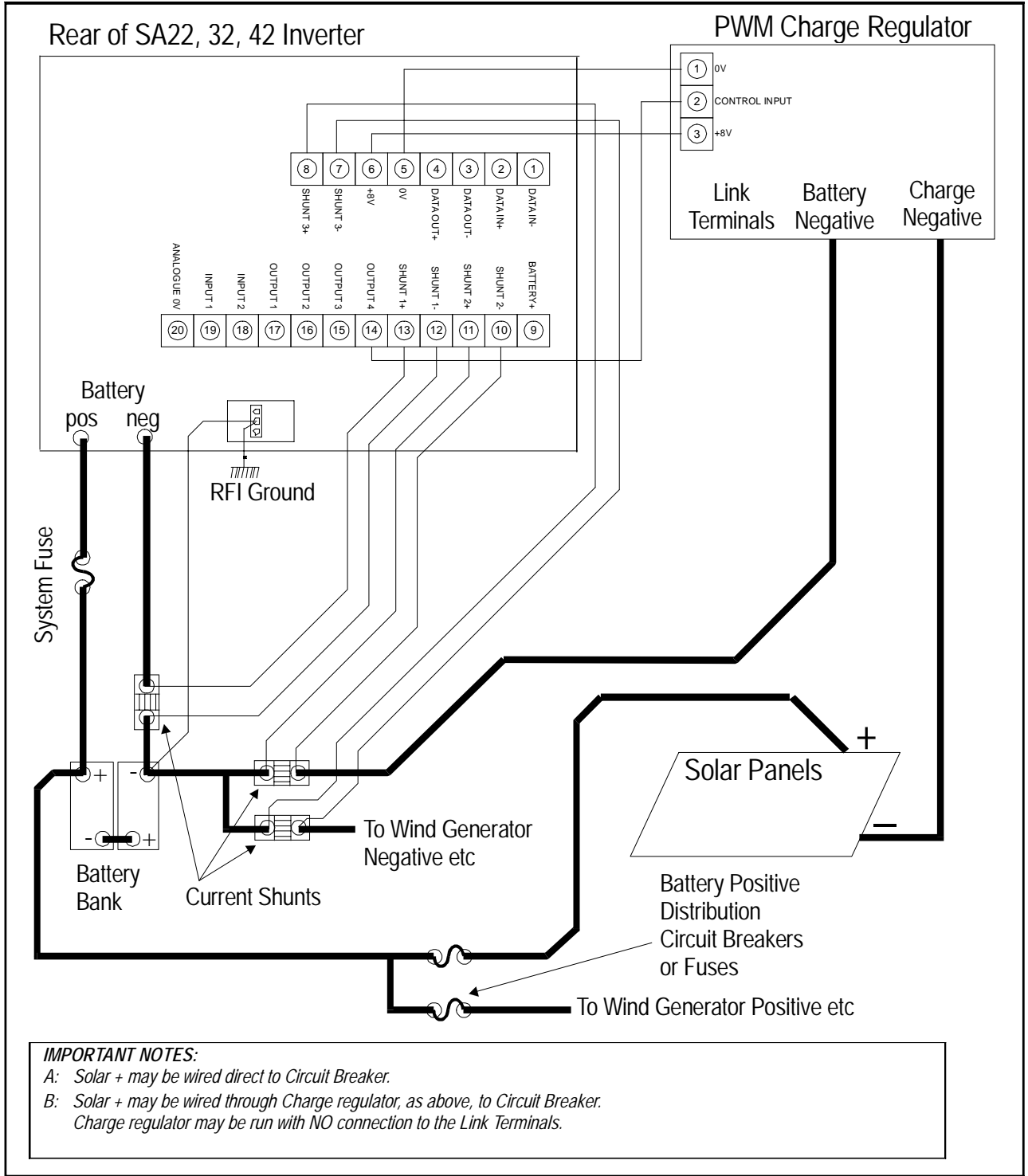
The Control LED light intensity indicates the output level of the Charge Regulator. The LED will be "bright" for full output and "off" for zero output.

The Charge Regulator is controlled by one of the four outputs of the inverter. The diagram on page 5 shows output 4 being used.

OPERATION AS A SERIES REGULATOR

The Charge Regulator may be used as a series regulator. The diagram below shows wiring connections.

Series Regulator Installation Example using Solar Panels as the Charging Source



DC WIRING CONNECTION FOR SERIES REGULATOR CONNECTION

IMPORTANT: Before making any wiring connections, check that the circuit breaker (or Fuse) in the Solar Positive Lead is in the OFF position, i.e.; LEVER DOWN (or Fuse Removed).

NOTE:
**ALL AC WIRING MUST BE CARRIED OUT BY A LICENSED ELECTRICIAN
AND MUST CONFORM TO AS3000 WIRING REGULATIONS,
OR RELEVANT STANDARDS.**

Now connect the Charge cables.

CHARGE POSITIVE (+) to BATTERY POSITIVE (+) through Circuit Breaker (or Fuse)

Note that the terminals LINK TERMINALS on the Charge Regulator are linked together internally in the Charge Regulator and may be used as a “link” terminal if required. Connection to these terminals is NOT required for operation of the Charge Regulator.

CHARGE NEGATIVE (-) to CHARGE REGULATOR (Charge Negative)

BATTERY NEGATIVE (-) to CHARGE REGULATOR (Battery Negative)

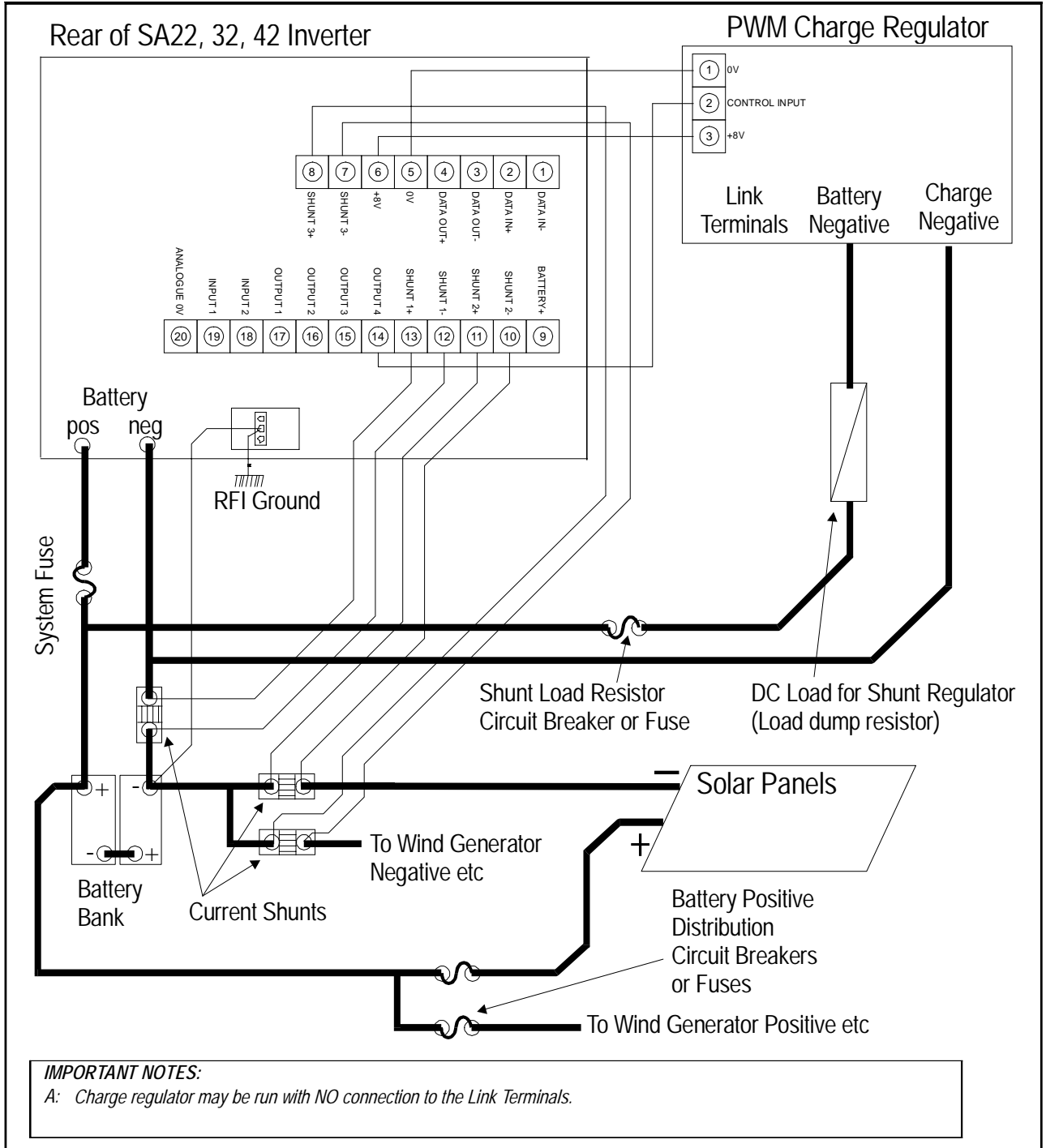
These connections should be tight. If using nuts, bolts and washers, they should be stainless steel. At this point re-check the connections before proceeding any further.

The control wiring to the inverter can now be connected as shown in the diagram above.

OPERATION AS A SHUNT REGULATOR

The Charge Regulator may be used as a shunt regulator. The diagram below shows wiring connections.

Shunt Regulator Installation Example using Solar Panels as the Charging Source



DC WIRING CONNECTION FOR SHUNT REGULATOR CONNECTION

IMPORTANT: Before making any wiring connections, check that the circuit breaker (or Fuse) in the Battery Positive Lead to the Shunt Load Resistor is in the OFF position, i.e.; LEVER DOWN (or Fuse Removed).

NOTE:
**ALL AC WIRING MUST BE CARRIED OUT BY A LICENSED ELECTRICIAN
AND MUST CONFORM TO AS3000 WIRING REGULATIONS,
OR RELEVANT STANDARDS.**

Now connect the Charge cables.

BATTERY NEGATIVE (-) to CHARGE REGULATOR (Charge Negative)

SHUNT LOAD RESISTOR to BATTERY POSITIVE (+) through Circuit Breaker (or Fuse)

Note that the terminals LINK TERMINALS on the Charge Regulator are linked together internally in the Charge Regulator and may be used as a “link” terminal if required. Connection to these terminals is NOT required for operation of the Charge Regulator.

CHARGE REGULATOR (Battery Negative) to SHUNT LOAD RESISTOR

These connections should be tight. If using nuts, bolts and washers, they should be stainless steel. At this point re-check the connections before proceeding any further.

The control wiring to the inverter can now be connected as shown in the diagram above.

INVERTER SETTINGS

Inverter Settings are the same when using the Charge Regulator in the series or shunt regulator modes.

Hold down the DISPLAY key for approx. 2 seconds while in a Readings screen.

Press the UP or DOWN key until the following screen is displayed

(Note we are using output 4 and a 12V battery system in this example).

Set:OUTPUT 4
-Select Setting-

Press DISPLAY once.

Relay type:N/O
-Set Output 4-

This message is displayed. Press UP/DOWN to set to N/O relay type. Then press DISPLAY once.

On by:REGULATOR
-Set Output 4-

This message is displayed. Press UP/DOWN to set to On by: REGULATOR. Then press DISPLAY once.

Float:13.8V
-Set Output 4-

This message is displayed. Press UP/DOWN to set FLOAT Voltage. Then press DISPLAY once.

Boost:14.6V
-Set Output 4-

This message is displayed. Press UP/DOWN to set BOOST Voltage. Then press DISPLAY once.

Equalise:15.5V
-Set Output 4-

This message is displayed. Press UP/DOWN to set EQUALISE Voltage.
Then press DISPLAY once.

EQ time:120min
-Set Output 4-

This message is displayed. Press UP/DOWN to set EQUALISE Time.
Then press DISPLAY once.

End Settings
-Set Output 4-

This message is displayed.
Press DISPLAY once to store settings.

FAULT FINDING

1. INVERTER SHUTS DOWN DURING MIDDLE OF THE DAY AND COMES BACK ON LATE AFTERNOON.

This is more than likely caused by high battery volts during peak charging times from solar panels. To overcome this, adjust the high voltage cutout of your SE22, 32 or 42 (see “Set Parameters” in the inverters operating manual); to the maximum voltage allowable. If this is still not high enough you may have a problem with either your batteries or your regulator. This could be potentially dangerous so we advise you to consult your system designer immediately.

2. CHARGE REGULATOR SHUTS DOWN DUE TO HEATSINK TOO HOT

This may occur under sustained heavy load conditions since the Charge Regulator shuts down to protect its internal components. If you believe that the load is not excessive, check around the Charge Regulator case and heatsink for obstructions to air flow as this will cause the Charge Regulator to heat up much quicker and shut down sooner than normal.

SYSTEM MAINTENANCE

To get the optimum performance from your Charge Regulator it is essential that the battery bank and the DC wiring are all in good condition. The small amount of time spent on the maintenance tasks below will maximise the reliability of your system.

CHARGE REGULATOR MAINTENANCE

Periodic maintenance of the Charge Regulator involves little more than checking for and cleaning out accumulated foreign objects between fins of the heatsink.

BATTERY MAINTENANCE

IMPORTANT:

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 installer.

1. Every week, carry out a thorough visual inspection of all battery wiring, taking particular note of the condition of inter-connections between cells.
2. Check that the stainless steel inter-connecting bolts are tight and have minimal corrosion. If corrosion is evident, carefully follow the following procedure.
 - (a) Disconnect the system battery fuse and Charge Regulator Circuit Breaker before working on the battery bank.

(b) 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.

(c) Re-assemble and smear a small amount of Vaseline or similar grease over the surface of the joint to slow down any future corrosion.

3. Every month or as directed in your battery instruction manual, measure the specific gravity (SG) of each cell using your hydrometer, to ensure that all cells are performing correctly. Any serious imbalance should be reported to your system designer in case remedial action needs to be taken.

PWM60 CHARGE REGULATOR ELECTRICAL SPECIFICATIONS

SELECTRONIC CHARGE REGULATOR SPECIFICATIONS		
ELECTRICAL		
PARAMETER	PWM60 CHARGE REGULATOR	CONDITION
Output Current @ 40 °C Ambient	60 Amps 120 Amps	Max Continuous Max Surge
Output Current @ 60 °C Ambient	45 Amps 90 Amps	Max Continuous Max Surge
Charge Source Open Circuit Voltage Input Range (Series Regulator)	12 - 88V DC (maximum 40V differential between charge source open circuit voltage and battery voltage)	Range (see note below)
Battery Voltage Range (Shunt Regulator)	12 - 24V DC Battery Bank (maximum 40V battery voltage)	Range (see note below)
Input Current from Inverter terminal 6	0.02A DC 0.025A DC	Regulator OFF – No Load Regulator ON – Full Load
Switching Topology	Single Ended PWM	
Operating Temperature Range	0 °C - 60 °C	
Conforms to standards	AS 3100 (wiring), C tick	
MECHANICAL		
Size	195mm wide x 130mm high x 50mm deep	
Weight	1kg	
Weight Packed	1.2kg	
Input Lead Length	Not applicable	
Output Wiring Method	6 way screw terminal strip	
Maximum Output Wire Size	16mm ² per terminal	
Chassis	Powder coated zinc steel (Wedgwood Blue)	
DC Isolation	None. Note that a Single Pole Circuit Breaker should be used, see page 3 (Not included)	
Warranty	5 year parts and labour (Conditions apply)	

Notes:

Through a policy of continued development, specifications are subject to change without notice.

For a series regulator connection the Charge Source Open Circuit Voltage Input Range is limited to nominal battery voltage +40VDC (a 24V battery would have a charge source open circuit voltage limit of 64V).

For a shunt regulator connection the Battery Voltage Input Range is limited to +40VDC (a 24V battery would have a maximum voltage of 31.2V during “equalisation”).

RADIO FREQUENCY INTERFERENCE

For many years, Radio Frequency Interference (RFI) has been an annoying problem for owners of Inverters. RFI in a domestic situation may produce noise or interference on a radio or TV receiver. Most of the problems with RFI in a Remote Area Power Supply (RAPS) installation involves AM radio reception.

Considerable development time has resulted in a reduction of the RFI produced by the Charge Regulator to a level that complies with C-tick requirements. Compliance to this standard means RFI is low, but how well the Charge Regulator performs in a particular installation can vary. Below are some suggestions to help reduce the effects of RFI in your installation.

It is recommended that the power system including the Charge Regulator and the inverter is housed at least 15 metres from the home.

Ensure a good earth stake is placed as close to the inverter as possible.

See “INSTALLATION” on page 3 for wiring.

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.

To further reduce the effects of RFI, it is important that your AM radio has good signal strength. This will enable your radio to reject any noise being produced by your Charge Regulator, inverter, 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 battery shed as possible. Connection from the aerial to the radio should be via a low loss coaxial cable.

PLEASE NOTE: This aerial must be an AM RADIO type; a TV aerial will not work.

If your Charge Regulator is to be installed in a Mobile Home or similar, try to keep your inverter at least 1 metre away from your radio or audio equipment. The further the better.

WARNING

THE OUTPUT VOLTAGE FROM AN INVERTER IS JUST AS LETHAL AS LANDLINE POWER.

It is therefore absolutely necessary for your safety to ensure that all Remote Area power system installations meet and comply with the relevant provisions and requirements of AS3000 wiring standards.

It is imperative that you ensure that only Electrical contractors are permitted to install any AC wiring in your system.

PRODUCT WARRANTY CONDITIONS

Selectronic Australia Pty Ltd warrants your Charge Regulator to be free from defects in materials and workmanship under normal use and service, for an initial period of five (5) years.

This warranty is applicable only from the date of original purchase. All parts will be replaced or repaired free of charge within this period. Travelling time for field service personnel is not covered under this warranty. If no authorised field service personnel are available, the unit shall be returned to one of the below mentioned service centres, this must be done at the owners cost. There will be no charge for the return of the Charge Regulator.

The provision of this warranty shall not apply if the unit has been subject to misuse, neglect, act's of God, accidental damage or has been used for a purpose for which it is not designed.

Charges to the point of purchase and the cost of any repairs resulting from damages occurring during this freighting will be borne by the owner. Any alterations or repairs by unauthorised parties will void your warranty.

To ensure fast efficient handling of any warranty claims, please complete and return your reply paid warranty card within 30 days from date of purchase.

If service is required, contact your supplier or return your Charge Regulator in its original carton with proof of purchase to any of the following service centres.

Selectronic Australia 25 Holloway Drive Bayswater Victoria 3153 Australia Ph: 03 9762 4822 Fax: 03 9762 9646	Burley TV Service 278 Edmondson Ave. Austral NSW 2171 Australia Ph: 02 9606-0279	Reid Technology Ltd 3-5 Auburn Street Takapuna North Shore City Auckland NZ Ph: 9 489-8100 Fax: 9 489-8585	RF Analysis Harness Cask Road Dorrigo NSW 2453 Australia Ph: 02 6657 8003 Fax: 02 6657 8002
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