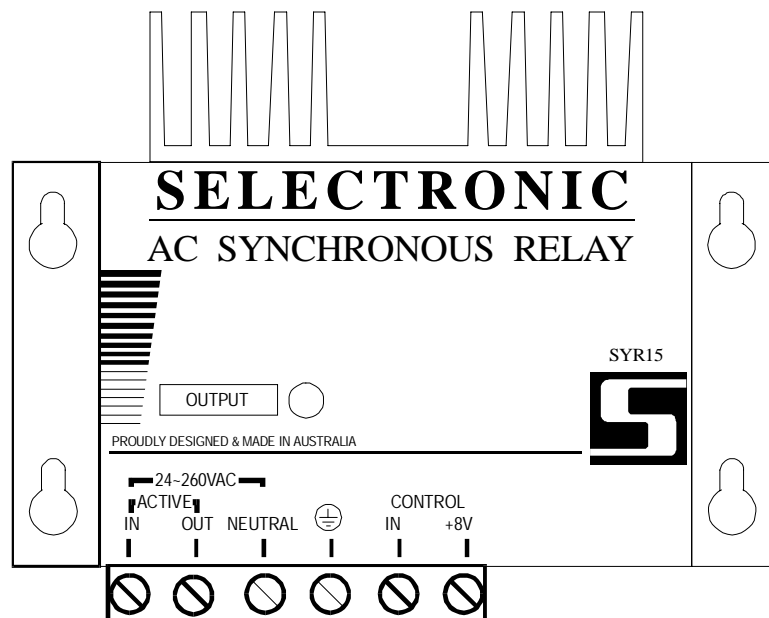


SYR15

Synchronous Relay



SELECTRONIC AUSTRALIA PTY LTD

www.selectronic.com.au

IMPORTANT NOTE:

THE SYNCHRONOUS RELAY IS AN ELECTRONIC DEVICE. EVEN WHEN THE SYNCHRONOUS RELAY IS “OFF” THERE IS THE POSSIBILITY OF A SMALL LEAKAGE CURRENT ON THE “LOAD” OUTPUT TERMINAL.

THE SYNCHRONOUS RELAY DOES NOT PROVIDE ELECTRICAL ISOLATION TO THE LOAD.

BEFORE ANY WIRING IS CONNECTED TO THE SYNCHRONOUS RELAY OR THE INVERTER, OR IF THE LOAD NEEDS TO BE CONNECTED OR DISCONNECTED, THE 240VAC POWER SHOULD BE MECHANICALLY ISOLATED.

SELECTION RECOMMEND THAT AN ISOLATING SWITCH OR CIRCUIT BREAKER BE INSTALLED ON THE 240VAC INPUT SUPPLY TO THE SYNCHRONOUS RELAY FOR ISOLATION OF THE SYNCHRONOUS RELAY, AND THAT THE INVERTER BE TURNED OFF DURING CONNECTION OF ANY WIRING.

SELECTRONIC AUSTRALIA

SYR15 SYNCHRONOUS RELAY OWNERS MANUAL

Contents:	Page
<i>INTRODUCTION</i>	3
<i>WARRANTY CARD</i>	3
<i>OPERATION</i>	3
<i>INSTALLATION</i>	3
<i>CONNECTION OF AC WIRING</i>	5
<i>TERMINAL CONNECTIONS</i>	5
<i>SYNCHRONOUS RELAY INTERNAL CONNECTIONS</i>	5
<i>OPERATION AS A RELAY</i>	5
<i>OPERATION AS A SHUNT REGULATOR</i>	6
<i>INVERTER SETTINGS (for use as a shunt regulator)</i>	6
<i>FAULT FINDING</i>	7
<i>SYSTEM MAINTENANCE</i>	7
<i>SYNCHRONOUS RELAY MAINTENANCE</i>	7
<i>BATTERY MAINTENANCE</i>	8
<i>SYR15 SYNCHRONOUS RELAY ELECTRICAL SPECIFICATIONS</i>	8
<i>MECHANICAL</i>	8
<i>RADIO FREQUENCY INTERFERENCE</i>	9
<i>WARNING</i>	11
<i>PRODUCT WARRANTY CONDITIONS</i>	11

INTRODUCTION

Thank you for your purchase of the SYR15 Selectronic Synchronous Relay.

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

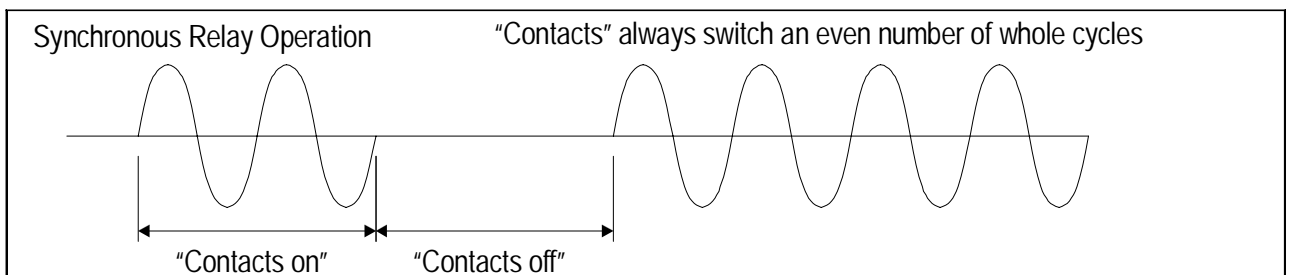
WARRANTY CARD

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.

OPERATION

The Selectronic Synchronous Relay can be used to switch a wide variety of 240VAC loads such as pumps or motors, and can be also used as a wind turbine shunt regulator. It switches at mains zero crossing and always switches an even multiple of complete mains cycles to avoid saturation of loads such as transformers or motors. The current rating of the "contacts" is 15A. A 240VAC Neon indicator on the front panel of the Synchronous Relay indicates "contacts on".

The Selectronic Synchronous Relay may be used when switching loads such as motors, or where the relay switches often, to replace mechanical relays that are prone to fail in these applications.



INSTALLATION

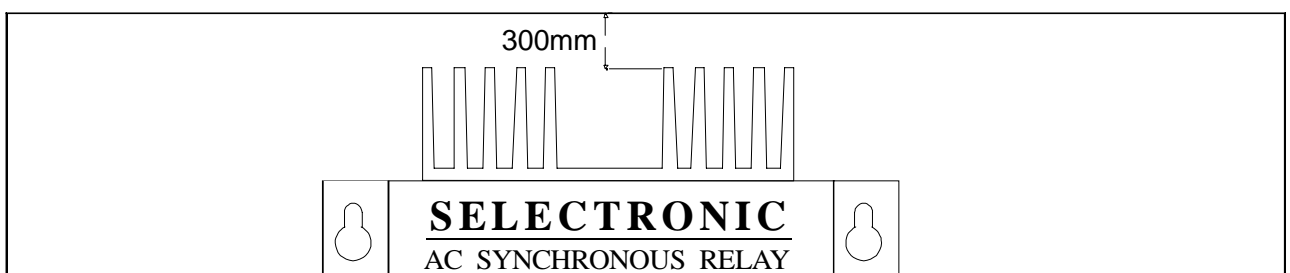
The installation of your Synchronous Relay is extremely important. Failure to follow the recommended installation instructions may void your warranty. If in doubt, ask your supplier.

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

The Synchronous Relay must be installed in a dry, cool, dust-free environment.

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

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

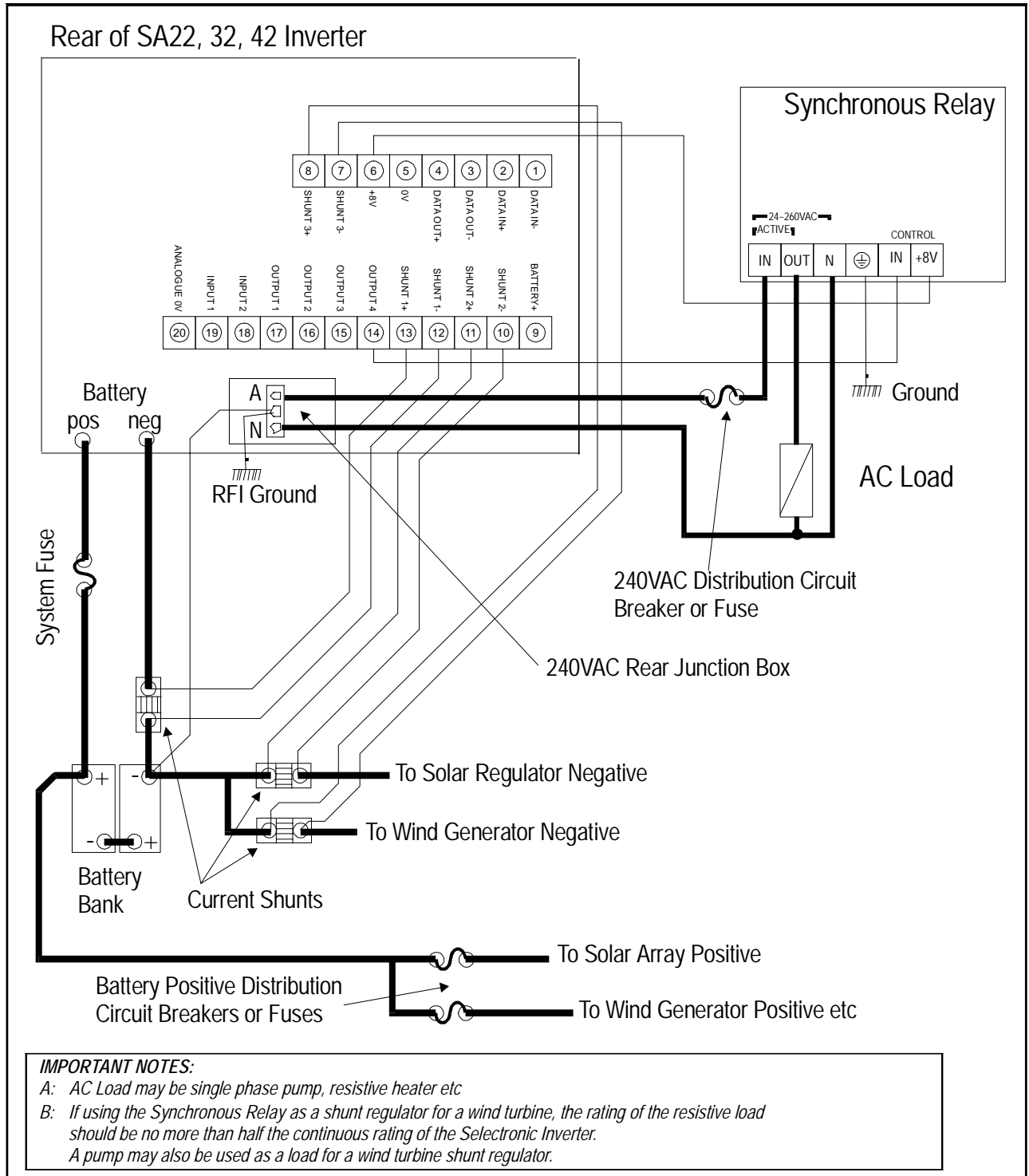


Installation Example

*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.



CONNECTION OF AC WIRING

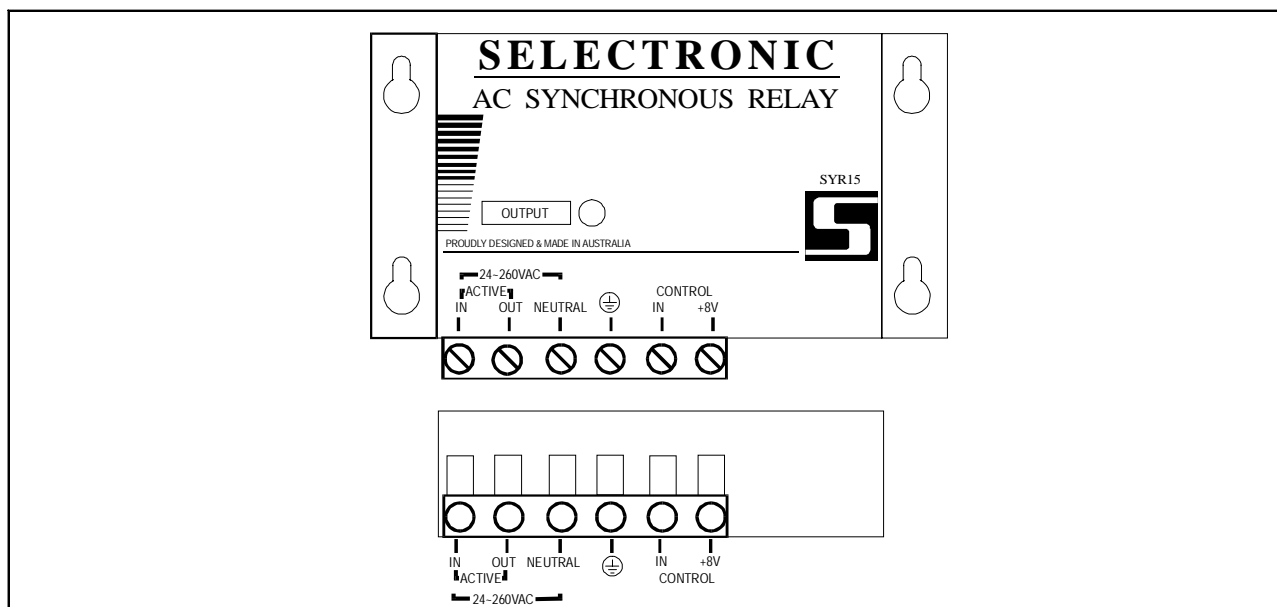
IMPORTANT: Before making any wiring connections, check that the circuit breaker (or Fuse) in the Charge Positive Lead is in the OFF position, i.e.; LEVER DOWN (or Fuse Removed).

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

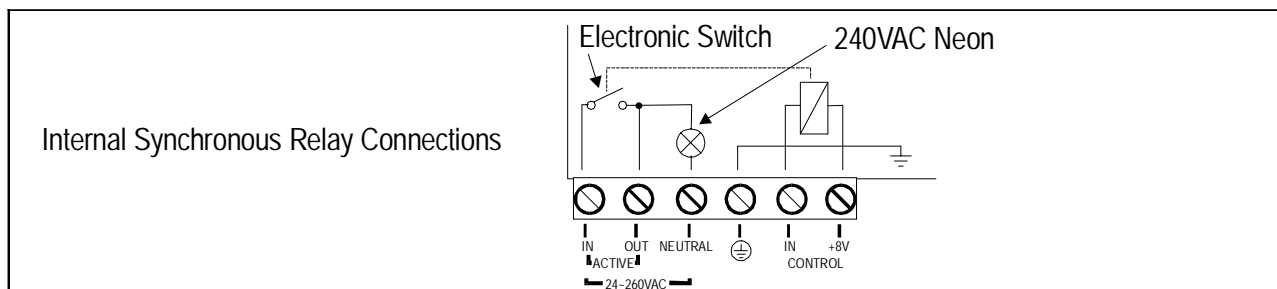
Now connect the AC cables as shown in the diagram above.

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

TERMINAL CONNECTIONS



SYNCHRONOUS RELAY INTERNAL CONNECTIONS



OPERATION AS A RELAY

The Synchronous Relay is controlled by one of the four outputs of the inverter. The diagram on page 3 shows output 4 being used. It may be operated as an electronic relay to replace mechanical relays, especially with loads such as motors which have a high inrush current (where contacts are prone to burning out), or where the relay must switch often and may fail prematurely.

With Motor loads we recommend that the OFF DELAY be set to 5 minutes. This is to avoid starting the motor too many times in quick succession, which may lead to a reduction in the life of the motor.

The maximum motor load that may be connected is 5A (running current).

OPERATION AS A SHUNT REGULATOR

The Synchronous Relay is controlled by one of the four outputs of the inverter. The diagram on page 3 shows output 4 being used.

If operating the Synchronous Relay as a shunt regulator, an AC load is used to draw current from the battery through the Inverter AC output, so that the wind turbine or the solar array does not overcharge the battery bank. Any additional household load will also add to this, and the Inverter will automatically control the Synchronous Relay.

Other loads such as pumps may also be used, so that the pump will only be on when there is sufficient surplus energy from a wind turbine or solar array. In this way the surplus energy is used to pump water instead of being wasted as heat in a load dump resistor. With Motor loads we recommend that the OFF DELAY be set to 5 minutes. This is to avoid starting the motor too many times in quick succession, which may lead to a reduction in the life of the motor. The maximum motor load that may be connected is 5A (running current).

The control output from the Inverter should be set to turn on when the battery voltage exceeds the float voltage by approximately 0.2V and turn off at 1V below the float voltage

IMPORTANT:

The kW rating of the AC load should be less than half the continuous rating of the Inverter. The kW rating of the charging source should be less than the 90% of the load kW rating.

For example an SE32 has a continuous output rating of 2.4kW. The load for shunt regulator use should be 1.2kW. The wind or solar charging source should less than 1.1kW.

With resistive loads the on & off delay times should be set to 0 minutes. For pump or motor loads the on & off delay times should be set to 5 minutes to minimise rapid on & off cycling of the motor or pump.

INVERTER SETTINGS (for use as a shunt regulator)

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 a 12V battery and output 4 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:CHARGE
-Set Output 4-

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

On at: HI level
-Set Output 4-

This message is displayed. Press UP/DOWN to set On at: HI level.
Then press DISPLAY once.

Turn on at:14.8V
-Set Output 4-

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

On delay: 0mins
-Set Output 4-

This message is displayed. Press UP/DOWN to set Delay time (normally 0).
For pump or motor loads set to 1 minute.
Then press DISPLAY once.

<p>On @: 101% charge -Set Output 4-</p>	<p>This message is displayed. Press UP/DOWN to set 101% charge. Then press DISPLAY once.</p>
<p>Lockout 4: NO -Set Output 4-</p>	<p>This message is displayed. Press UP/DOWN to set Lockout: NO. Press DISPLAY once to store settings.</p>
<p>Off by: CHARGE -Set Output 4-</p>	<p>This message is displayed. Press UP/DOWN to set to Off by: CHARGE. Press DISPLAY once to store settings.</p>
<p>Off at: LO level -Set Output 4-</p>	<p>This message is displayed. Press UP/DOWN to set Off at: LO level. Press DISPLAY once to store settings.</p>
<p>Turn off at: 14.6V -Set Output 4-</p>	<p>This message is displayed. Press UP/DOWN to set Voltage Press DISPLAY once to store settings.</p>
<p>Off delay: 0mins -Set Output 4-</p>	<p>This message is displayed. Press UP/DOWN to set Delay time (normally 0). For pump or motor loads set to 5 minutes. Then press DISPLAY once.</p>
<p>Off @: 50%charge -Set Output 4-</p>	<p>This message is displayed. Press UP/DOWN to set 50% charge. Press DISPLAY once to store settings.</p>
<p>End Settings -Set Output 4-</p>	<p>This message is displayed. Press DISPLAY once to store settings.</p>

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 or with the shunt regulator load being too small. This could be potentially dangerous so we advise you to consult your system designer immediately.

2. NEON INDICATOR “OUTPUT” DOES NOT LIGHT.

The Neon indicator is a 240VAC type. Operation at AC voltage levels of less than 160VAC may cause the neon indicator to be dim, or not on at all.

SYSTEM MAINTENANCE

To get the optimum performance from your Synchronous Relay 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.

SYNCHRONOUS RELAY MAINTENANCE

Periodic maintenance of the Synchronous Relay 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.

SYR15 SYNCHRONOUS RELAY ELECTRICAL SPECIFICATIONS

SELECTRONIC SYNCHRONOUS RELAY SPECIFICATIONS		
ELECTRICAL		
PARAMETER	SYR15 SYNCHRONOUS RELAY	CONDITION
Output Current @ 40 °C Ambient	15 Amps (5 Amps motor running current) 350 Amps	Max Continuous Max Surge 10ms
Output Current @ 60 °C Ambient	10 Amps (3.5 Amps motor running current) 350 Amps	Max Continuous Max Surge 10ms
Input Current from Inverter Output Terminal	0mA DC 5mA DC	Relay OFF – No Load Relay ON – Full Load
Switching Topology	Mains zero crossing, full cycle control	
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	2.5me	
Wiring Method	6 way screw terminal strip	
Maximum Output Wire Size	16mm ² per terminal	
Chassis	Powder coated zinc steel (Wedgwood Blue)	
AC Isolation	2500V. 10 ¹⁰ ohm 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.

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 Synchronous Relay to a level which complies with C-tick requirements. Compliance to this standard means RFI is low, but how well the Synchronous Relay 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 Synchronous Relay 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 Synchronous Relay, 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 Synchronous Relay 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.

IMPORTANT NOTE:

THE SYNCHRONOUS RELAY IS AN ELECTRONIC DEVICE. EVEN WHEN THE SYNCHRONOUS RELAY IS “OFF” THERE IS THE POSSIBILITY OF A SMALL LEAKAGE CURRENT ON THE “LOAD” OUTPUT TERMINAL.

THE SYNCHRONOUS RELAY DOES NOT PROVIDE ELECTRICAL ISOLATION TO THE LOAD.

BEFORE ANY WIRING IS CONNECTED TO THE SYNCHRONOUS RELAY OR THE INVERTER, OR IF THE LOAD NEEDS TO BE CONNECTED OR DISCONNECTED, THE 240VAC POWER SHOULD BE MECHANICALLY ISOLATED.

SELECTION RECOMMEND THAT AN ISOLATING SWITCH OR CIRCUIT BREAKER BE INSTALLED ON THE 240VAC INPUT SUPPLY TO THE SYNCHRONOUS RELAY FOR ISOLATION OF THE SYNCHRONOUS RELAY, AND THAT THE INVERTER BE TURNED OFF DURING CONNECTION OF ANY WIRING.

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 Synchronous Relay 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 Synchronous Relay.

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 Synchronous Relay 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