

Mt. Climie - Innovative Energies SR250C Power Supply System

Author: John M Wysocki ZL2TWS August 2011

Mt. Climie is a high elevation site north of the Capital City of Wellington, New Zealand. The altitude above sea level is 867 meters or 2845 feet.

Mt. Climie is exposed to weather from the Southern Ocean with an unobstructed view towards Antarctica. During the winter freezing conditions leave backup batteries and equipment at zero degrees for many days. Access to Mt. Climie is often difficult after a southerly snow storm.

The Amateur Radio club Branch 63 (NZART), maintaining the Mt. Climie site, had been plagued with battery faults for many years.

The radio equipment requiring backup power are a Tait T800 45 Watt 147.300 Mhz VHF FM Repeater and the new ICOM D-Star (Digital Smart Technology for Amateur radio). The digital radio repeaters are both 25 watts of RF power on the frequencies of 145.425 MHz and 438.600 MHz .

The battery problems occurred during long power outages, in some cases up to a week. Batteries on the Tait T800 would run flat due to the VHF repeater drawing 9 Amps DC on transmit. There was no alarm or low power setting during a mains failure. Batteries would run down to a low level and eventually lockup the repeater controller. Repeater trustees would need to visit with a laptop PC and restart the controller. The batteries were also being damaged due to deep discharge with consequent reduced capacity and shortened life.

Our solution was to use a **SR250C** DC backup charger made by Innovative Energies in Auckland. It is one in the range of *No-Break DC UPS* units which range in size from the 100W **SR100C** to the 750W **SR750C**.

The Mt. Climie application is a 12V system which keeps the batteries float charged at 13V8 (at 20degC) but output voltages of 24, 30, 36 and 48 are also available in the **SR No-Break DC** range.

A **SR250C12TFSL** model was purchased for the first Tait VHF system which had two parallel banks of 180Ah maintenance free batteries, giving a total of 360Ah. The **SR250C** has two alarm outputs (mains fail and battery system OK) which could be interfaced to the Tait T800. When the input mains fails, there is a 30 second delay before the mains fail relay in the **SR250C** closes a circuit that is wired to the T800 power control circuit. The power reduces from 45 watts (9 Amps DC) to 12 Watts (4 Amps DC) and reverts back when mains power is restored. This feature has extended the life of the battery bank and will keep communications going for weeks if needed.

Due to the power cycle restart issue with the Tait T800 it was the preference of Branch 63 to have an early warning alarm. This alarm is sent via a digi-talker or audio tone on the repeater transmitter indicating a critical voltage has been reached. The **SR250C** has a battery disconnect at 10V0 and alarm at 11V0 as shipped from the factory. We have found from experience that these default settings are too low for the Tait T800 system.

At the radio club's request, Innovative Energies re-adjusted these to 10V8 and 11V6 respectively. Innovative Energies also extended the battery remote temperature sensor cable to 9 metres as the batteries are located in an outside battery box.

Battery temperature sensor:

This is an excellent idea that gives the **SR250C** a ‘SMART’ control of the battery. As mentioned above, the batteries are often at 0 degC or just above zero for many days on end during the winter months.

When ambient air temperatures are this cold the **SR250C** charges at around 14V3, dropping to 13V85 at 18 degrees. The batteries are always charged to maximum capacity. With normal fixed output voltage float chargers batteries are always undercharged when operating at very low ambient temperatures.

Battery disconnect feature:

The **SR250C** has an Electronic Circuit Breaker (ECB) which protects the battery circuit against overload and also incorporates a Low Voltage Disconnect (LVD) that will disconnect the battery at 10V8 during a prolonged outage. Based on the above criteria, after a mains fail the **SR250C** sends out a signal which reduces the T800 output power to 12 Watts, then sends a ‘battery low’ alarm and finally disconnects the load to prevent battery damage.

Because this system was so successful we requested a quote for a second **SR250C** to power the D-Star digital radio system, kindly donated by ICOM New Zealand Auckland. Innovative Energies were interested to hear ICOM had given a high level of support to this new Digital Smart Technology for Amateur Radio. Innovative Energies then also donated a **SR250C** for the ICOM repeater equipment. Total current with both VHF and UHF digital repeaters is 11 amps DC.



SR250C fitted to T800 VHF repeater 147.300 MHz.

Innovative Energies **SR** models include convenient stepped feet for side mounting as seen in the pictures. This made installation very straight forward. Crimp/solder lugs are also included in the installation kit making for positive connections when using 6mm to 10mm cables. Note that the “positive” terminal is the common connection with “negative” used for the separate load and battery connections.

The following pictures show the D-Star installation. The **SR250C** is mounted behind the Duplexer seen in the lower front of the cabinet. With two Innovative Energies power supplies Branch 63 was able to standardize on battery charging equipment extending the life of the batteries.



ICOM D-Star radio equipment.



Innovative SR250C 12 TFSL

Innovative Energies are easy to contact with the on line Skype phone available. I used this a couple of times to discuss special options for the Mt. Climie installation. Innovative Energies were also able to reprogram the **SR250C** for our 10V8 low voltage disconnect, temperature sensor extension and 11V6 low battery warning alarm modifications. Quick turn around time and a very professional 24 month warranted product.

For more information check the following web sites:

<http://www.innovative.co.nz/>

<http://www.zl2vh.org.nz/resources.html>

<http://www.icom.co.nz/products/amateur/amateur.asp>

For information on how to get involved in the new D-Star Technology contact Branch 63 Upper Hutt or NZART.

<http://www.zl2vh.org.nz/>

<http://www.nzart.org.nz/>