



Application Notes for *No-BreakTMDC* Battery Condition Test Function (BCT)

(Applies to models: SR100i)

1. The **BCT** is an additional feature of the *No-BreakTMDC* system that supports the user in determining the condition of the back-up batteries. If implemented correctly it will provide an early warning for batteries showing age related problems. There are, however, limitations as described below.
2. The **BCT** function (if enabled) reduces the voltage of the power supply and allows the battery to power the load. During the **BCT** an additional relay changes state to indicate that the **BCT** is in progress. This relay may be used to switch in additional load (eg. external load resistors) to provide a quicker and/or more meaningful test for the battery (see para. 7 below).
3. If the system detects that the battery terminal voltage has fallen below a set value the **BATT SYS OK** alarm will be activated and the **BATT SYS OK** LED on the front panel will flash to indicate a fault condition also the Status message will change to indicate that the test failed. The battery 'OK / FAILURE' threshold is usually set to 2.03V/cell (i.e. 48.8V for a 48V nominal system) but can be set to other values to suit the specific battery types and installation requirements. Once a battery failure condition is detected the power supply unit will immediately abort the test and revert to mains input power. The **BATT SYS OK** LED will continue to flash and the **BATT SYS OK** relay will stay latched (de-energized state) until both the mains power input and the battery are disconnected briefly or the system passes the next **BCT** successfully. With the ability to start a BCT remotely it is possible to clear this alarm state by briefly starting another BCT and remotely aborting it.
4. The frequency and the duration of the **BCT** may be specified by the customer. The requested times will be set during the manufacturing process and are currently not user adjustable. See para. 8 below for a typical recommended setting.
5. To prevent a **BCT** with partially discharged batteries a mains-fail can reset the internal **BCT** interval timer. The criteria for resetting the interval timer is that if a mains-fail exceeds a

specified time (default setting = 5minutes) and that there are fewer than 2 days to the next scheduled **BCT**. The resetting of the interval timer delays the **BCT** by the interval time.

6. To improve the reliability of the **BCT** results, we recommend that sufficient load be applied to the battery during the test. If any additional loading is not applied directly to the battery connection but via the **No-Break™DC** system then there is an upper limit of this loading. The Innovative Energies **No-Break™DC** system has a built-in electronic over-current protection in the battery circuit. This limit allows the battery to supply up to 1.5 times the rated current of the power supply unit continuously. If the battery current exceeds this value the internal electronic circuit breaker (ELCB) will open and disconnect the battery from the load.
7. A **BCT** performed at 2 monthly intervals with a battery loaded at $C_{20}/4$ amps (where C_{20} is the 20 hour discharge rating) applied for 10minutes would provide some good indication. For example, a load of 4.5A may be applied to a battery rated at a $C_{20} = 18Ah$.
8. Care must be taken that the cabling to the battery is of adequate capacity to minimize voltage drops which are a cause of false alarms (battery reported as fail while still OK) when using the **BCT** function. As an example with a 4.5A load and a 2metre length of 1.5mm² cable to the battery a drop of ~220mV should be expected. It may be necessary to use separate wiring for additional battery loading.
9. In situations where the system load current fluctuates significantly the result of a **BCT** can become meaningless as the rate of discharge is unknown. Only additional (constant) loading to the battery during the **BCT** can improve this situation.
10. The Innovative Energies **No-Break™DC** system is available as standard with temperature compensated battery charging (indicated by a suffix 'T' in the model code. However the battery 'OK / FAILURE' threshold is not temperature compensated and the temperature dependency of the battery terminal voltage and capacity during a **BCT** needs to be taken into account.
11. The **BCT** should be used in conjunction with other maintenance checks in determining whether the battery system will operate in the event of a power failure. It should not be relied on as a definitive test as every battery has slightly different design and hence operating characteristics.

12. With the ability to start/stop/enable/disable a BCT it is possible to disable the scheduled BCT and only do a manual (remotely initiated) BCT at suitable times.

13. Nearly all parameters and settings including the 'OK/FAILURE' threshold and the values for all timing events are held in non-volatile memory. Currently these are set during the manufacturing process. Innovative Energies is currently looking into issues relating to granting users access to reassign certain values.