SENS
STORED ENERGY SYSTEMS

APPLICATION NOTE NUMBER 10
INITIAL COMMISSIONING CHARGE FOR NICKEL CADMIUM BATTERIES USING NRG CHARGER

Introduction

Some nickel cadmium (NiCd) batteries require a high voltage commissioning charge upon installation. Some battery manufacturers, for instance, recommend a commissioning charge of 1.55 volts per cell for 48 hours or 1.65 volts per cell for 24 hours. This required voltage is higher than the normal "boost charge" voltage of the NRG charger, and must be maintained regardless of current demand. This application note describes how to manually set the NRG charger to achieve the high voltages required for NiCd commissioning, how to override the NRG's automatic release from boost charge voltage, and how to readjust the charger back to factory settings once commissioning is complete.

Determining the Required Commissioning Voltage and Method

The table below describes recommended commissioning voltages for various NiCd battery sizes, and the method required to achieve the required voltage. Refer to the battery manufacturer for specific commissioning charge requirements.

Number of Cells	Commissioning Voltage at 1.55 VPC	Commissioning Method at 1.55 VPC	Commissioning Voltage at 1.65 VPC	Commissioning Method at 1.65 VPC
9	13.95	A	14.85	B
10	15.50	C	16.50	*
18	27.90	A	29.70	B
19	29.45	B	31.35	C
20	31.00	C	33.00	*

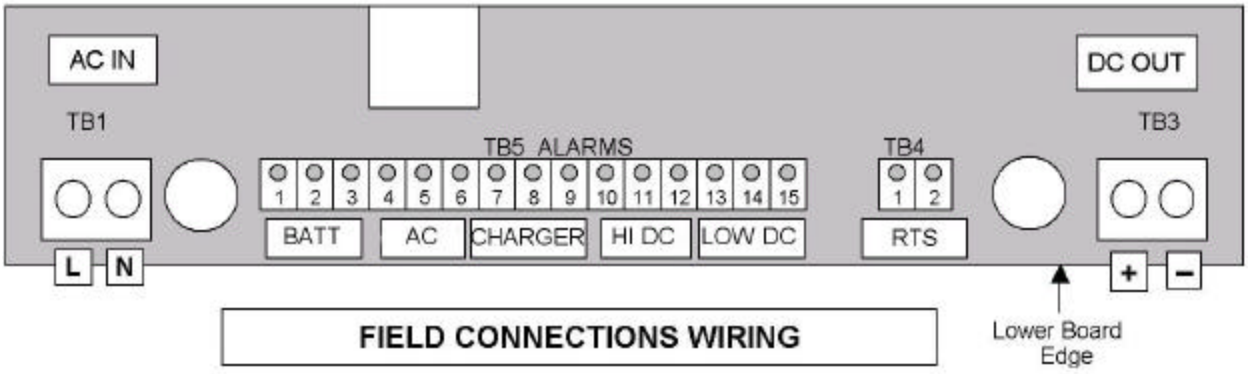
* This voltage is not achievable; use a lower commissioning voltage.

The table below lists output voltages achievable by the different commissioning methods available, and can be used to determine the correct method if the desired commissioning voltage is not found in the table above. Actual results experienced for Methods B and C may vary slightly due to part tolerances.

	High Float Output Voltage (Boost disabled- Method A)	Normal Boost Output Voltage (no adjustment to pot- Method B)	Adjusted Boost Output Voltage (maximum adjustment to pot- Method C)
FLOAT V SELECT jumper in 14.00/28.00	14.00/28.00	14.70/29.40	15.11/31.00

Note: Remove one leg of the thermistor (shipped with the charger) from pin 1 or 2 of TB4 (see Figure 1) during commissioning to ensure that the output voltage is independent of the charger's internal temperature. Replace the thermistor once commissioning is complete.

Figure 1



Method A: High Float Setting with Boost Disabled

Tools required: none

To commission 9- or 18-cell NiCd batteries at 1.55 volts per cell you only need to move the FLOAT V SELECT output voltage jumper (on JP1) to a higher position. There is no need to force the charger into BOOST as described below. Merely place the FLOAT V SELECT jumper in the 14.00/28.00 jumper position (as indicated by the yellow box in Figure 2) for the necessary commissioning time, and place the BOOST jumper into the OFF position to prevent overcharging. Once commissioning is complete, place the FLOAT V SELECT jumper back down to the 12.60/25.20 jumper position, and place the BOOST jumper into the NORM position, for normal operation. Be sure to replace the thermistor as described in the note above.

Method B: Forcing Charger Into Boost Mode

Tools required: miniature clip lead

For proper 10-, 19- or 20-cell NiCd battery commissioning at 1.55 volts per cell, or to commission 9-, 18- or 19-cell NiCd batteries at 1.65 volts per cell, it is necessary to force the charger to remain in BOOST mode, regardless of the battery's current acceptance. To do so, first ensure the FLOAT V SELECT output voltage jumper from JP1 is in the 14.00/28.00 position (as indicated by the yellow box in Figure 2). Remove the BOOST jumper from the NORM position and jumper/connect pin 17 to pin 20 on JP1 (as indicated by yellow circles in Figure 2). This takes a miniature clip lead because the jumper plug won't reach between these pins. This will force the charger into Boost no matter what current is being drawn. The charger will continue to output Boost voltage until the jumper is removed. Be careful not to overcharge the batteries! Once commissioning is complete, remove the miniature clip lead and return the BOOST jumper to the NORM position. Be sure to replace the thermistor as described in the note above.

Method C: Forcing a High Output Voltage

Tools required: miniature clip lead, pot adjustment tool

If forcing the charger into Boost does not increase the output voltage enough (such as for 10- or 20-cell NiCd batteries at 1.55 volts per cell, or for 19-cell NiCd batteries at 1.65 volts per cell) the charger can be adjusted for a higher output. Ensure the FLOAT V SELECT output voltage jumper from JP1 is in the 14.00/28.00 position (as indicated by the yellow box in Figure 2). Remove the protective blue dot from the potentiometer marked 24v (see arrow in Figure 2). Using a potentiometer adjustment tool turn the pot completely clockwise to ensure maximum output voltage. Force the charger into Boost mode as described in Method B above.

Once commissioning is complete, place the BOOST jumper in the OFF position. Ensure the FLOAT V SELECT output voltage jumper is in the 14.00/28.00 position (as indicated by the yellow box in Figure 2). Connect an external voltmeter to the output of the charger. Slowly turn the previously adjusted potentiometer counter-clockwise until the output voltage is correct (14.00/28.00V- pot should be at approximately 50%). Ensure the FLOAT V

SELECT jumper is in the correct position according to the manufacturer's recommended 25ºC float voltage. Place the BOOST jumper in the NORM position to resume normal Float/Boost operation.

Due to the surface charge on the battery it may be difficult to measure the correct output voltage. It is best to either apply a small load (approximately 1A) to the battery while adjusting the pot, or to monitor the charger's output voltage over time to be sure it is set appropriately. Once the proper float voltage is re-established, be sure to replace the thermistor as described in the note above.

Figure 2- Close-Up of NRG Jumpers and Potentiometers