



P.O. BOX 11846 TUCSON, AZ 85734  
 (520) 294-3292 • FAX (520) 741-2837  
 www.iotaengineering.com



## Smart Charge Controller OWNER'S MANUAL

The **IOTA IQ-EQUALIZER** Charge Controller is designed for equalizing batteries to confidently achieve the fullest charged condition for flooded lead acid batteries and optimize life of the battery. Inserting the IOTA IQ-EQUALIZER manually forces the DLS Charger to deliver an enhanced Bulk charge for a set 120 minutes to replenish batteries quickly and completely. After the IQ-EQUALIZER completes its BULK charge stage, it drops to the FLOAT stage for an extended period to prevent over-charging of the battery. If further equalization is required after the initial 120 minutes, simply remove and re-insert the IQ-EQUALIZER to re-initialize the process. **ATTENTION:** While the IQ-EQUALIZER is designed to accommodate most flooded lead acid batteries, always refer to the manufacturer's specifications for your battery's allowable charging parameters.

**Important: Batteries must be fully charged before equalization.**  
**Equalization must be performed with no load present on the battery.**

### INSTALLATION

The IOTA IQ-EQUALIZER Charge Controller installs by simply plugging the IQ cord into the Dual Voltage jack located on the DLS\* (Refer to Figure A). The IOTA IQ-EQUALIZER circuitry is then automatically engaged. Note: the cord provided is specifically designed for use with the IOTA IQ-EQUALIZER. Do not use the IOTA IQ-EQUALIZER with any cord other than one supplied with the unit.

\*Location of the Dual Voltage Jack may vary depending on the DLS Model.

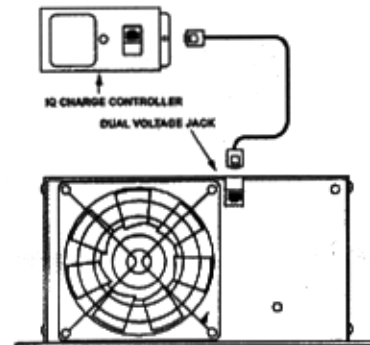


FIGURE A. IQ INSTALLATION

### OPERATION AND LED INDICATOR REFERENCE

The LED Indicator on the IQ informs the user of the DLS charging state and the battery charge status. When first activated, the IQ will read the number of cells in the battery and indicate the voltage of the battery through a number of flashes. Refer to Figure C.

**LIT/FLASHING LED** - After detecting the battery, the IQ-EQUALIZER will initiate a Bulk Charge phase. When the IQ-EQUALIZER is in the Bulk Charge mode, the green LED indicator will flash rapidly (approx. 2 flashes per second). When the Bulk Charge is complete, the IQ-EQUALIZER will begin the Float Charge phase and the LED will remain lit (no flashing). Refer to Figure B for Charge Stage descriptions. **After the Bulk Charge mode is complete (ie. the indicator is no longer flashing) remove the IQ-Equalizer.** If it is determined that further equalization is required, unplug the IQ and then re-insert into the DLS Dual Voltage Jack.

Figure B: Charge Stage Descriptions

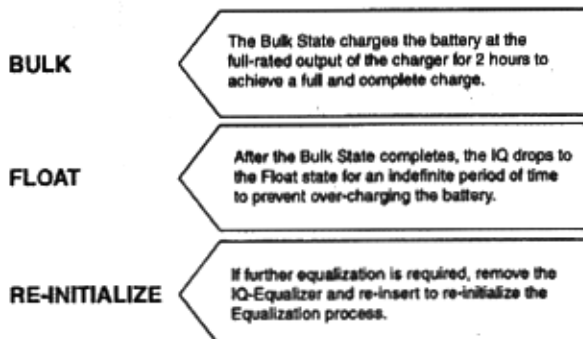


Figure C: LED Code Table

LED CODE TABLE		
CELL INDICATION		
6 FLASHES		12V Battery (6 cells)
12 FLASHES		24V Battery (12 cells)
CHARGE PHASE	LED STATUS	VOLTAGE 12-VOLT / 24-VOLT
BULK	RAPID FLASHING	15.41 / 30.82
FLOAT	ON	13.6 / 27.2

## OPERATION AND LED INDICATOR REFERENCE (cont.)

The LED indicator will remain lit or flashing when the charger is unplugged or disconnected from the AC supply (de-energized). During this time, the IQ continues to monitor the battery voltage. If the battery voltage drops below a pre-determined voltage (Refer to **Figure D** for predetermined values), the IQ will automatically initiate the smart-charging cycle once the AC input is re-connected.

*IRREGULAR FLASHING LED* - If the LED is flashing irregularly or intermittently, then the IQ has entered a **FAULT** state due to a voltage irregularity. When this occurs, the IQ must be re-set in order to resume normal operation. Refer to the **FAULT STATE** instructions below for re-setting procedures.

### CHARGING STAGE DESCRIPTIONS

**BULK STAGE** - During this state, the charger will operate either at constant current output for a set 120 minutes. After 120 minutes, the **BULK STAGE** will switch to the **FLOAT STAGE**.

**FLOAT STAGE** - This charge state holds the batteries at Constant Voltage for a period not less than 109 days to prevent over-charging of the battery. The IQ-Equalizer will not re-enter the **BULK STAGE** unless the pre-set **FLOAT** duration is elapsed. If no further equalization is required, unplug the IQ-Equalizer from the DLS. To re-enter the **BULK** stage, remove the **IQ-EQUALIZER** and re-insert into the Dual Voltage Jack of the DLS.

**FAULT STATE** - If the IQ enters a **FAULT** state, its circuitry is automatically disabled. In this state, the functionality of the IQ is completely disabled, the LED will flash irregularly, and the charger reverts to a stand-alone **FLOAT STATE** voltage. The unit will not exit this stand-alone **FLOAT STATE**, therefore the unit must be reset by following the steps below.

1. Unplug the charger from its AC source.
2. Disconnect the [+] positive cable from the battery.
3. Wait 30 seconds before reconnecting the input and output. To avoid arcing, it is recommended that the charger be connected to the AC input **FIRST** before connecting the output of the charger to the battery\*.

\*Note that the connection sequence of the input and output covered above is recommended every time an operator connects the charger to the batteries. However, as long as the charger remains connected to the battery, periodic unplugging of the AC input does not require this sequence.

Figure D: Predetermined Stage Trigger Values

PREDETERMINED VARIABLES FOR OPERATION			
Battery Voltage	BULK	FLOAT	DURATION
12V	15.41V	13.6V	120 minutes
24V	30.82V	27.2V	109 days