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## 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 Equalization charge for a set 120 minutes to replenish batteries quickly and completely. After the IQ-EQUALIZER completes its equalization 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.**

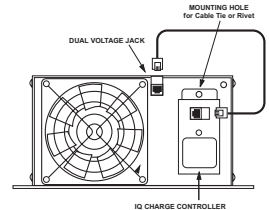
**Important: Batteries must be fully charged before equalization.**

**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. Secure the IQ unit to the side of the DLS with a cable tie or by using a rivet (not provided) in the available mounting hole. 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 an Equalization Charge phase. When the IQ-EQUALIZER is in the Equalize mode, the LED indicator will flash RED rapidly (approx. 2 flashes per second). When the Equalization mode is complete, the IQ-EQUALIZER will begin the Float Charge phase and the LED will remain lit GREEN (no flashing). Refer to **Figure B** for Charge Stage descriptions. **After the Equalization 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

<b>EQUALIZE</b>	The Equalization State charges the battery at the full-rated output of the charger for 2 hours to achieve a full and complete charge.
<b>FLOAT</b>	After the Equalization State completes, the IQ drops to the Float state for an indefinite period of time to prevent over-charging the battery.
<b>RE-INITIALIZE</b>	If further equalization is required, remove the IQ-Equalizer and re-insert to re-initialize the Equalization process.

Figure C: LED Code Table

LED CODE TABLE		
CELL INDICATION		
6 FLASHES	12V Battery (6 cells)	
12 FLASHES	24V Battery (12 cells)	
24 FLASHES	48V Battery* (24 cells)	
CHARGE PHASE	LED STATUS	VOLTAGE 12V / 24V / 48V*
EQUALIZATION	FLASHING RED	15.41 / 30.82 / 61.64
FLOAT	SOLID GREEN	13.6 / 27.2 / 54.4

\*Note: IQ devices are not UL certified for 48V applications

**\*Manufacturer's Note:** New versions of the IQ EQUALIZER use a three-color LED indicator. For previous versions of the IQ EQUALIZER, the LED indicator will flash GREEN during the Equalization stage. New three-color LED IQ models can be recognized by the white appearance of the LED indicator while OFF (original IQ LED indicators will appear green when OFF.)

**ATTENTION:** Original versions of the IQ EQUALIZER (Green-only LED indicator) are not suitable for use with DLS 54V chargers.

## OPERATION AND LED INDICATOR REFERENCE (cont.)

**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. Reset the IQ-Equalizer by unplugging then re-inserting the module in the Dual Voltage Jack.

## CHARGING STAGE DESCRIPTIONS

**EQUALIZATION STAGE** - During this state, the charger will operate for a set 120 minutes. After 120 minutes, the EQUALIZATION STAGE will switch to the FLOAT STAGE.

**FLOAT STAGE** - This charge state indicates that EQUALIZATION is complete. Disconnect the IQ-EQUALIZER and reconnect the load. To re-enter the EQUALIZATION 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	EQUALIZATION	FLOAT
12V	15.41V	13.6V
24V	30.82V	27.2V
48V*	61.64V	54.4V
DURATION	120 minutes	109 days

\*NOTE: IQ Devices are not UL Certified for use in 48VDC applications.