iBOS®
INTELLIGENT BATTERY ORGANIZING SYSTEM

Installation Manual
iBOS® Lite
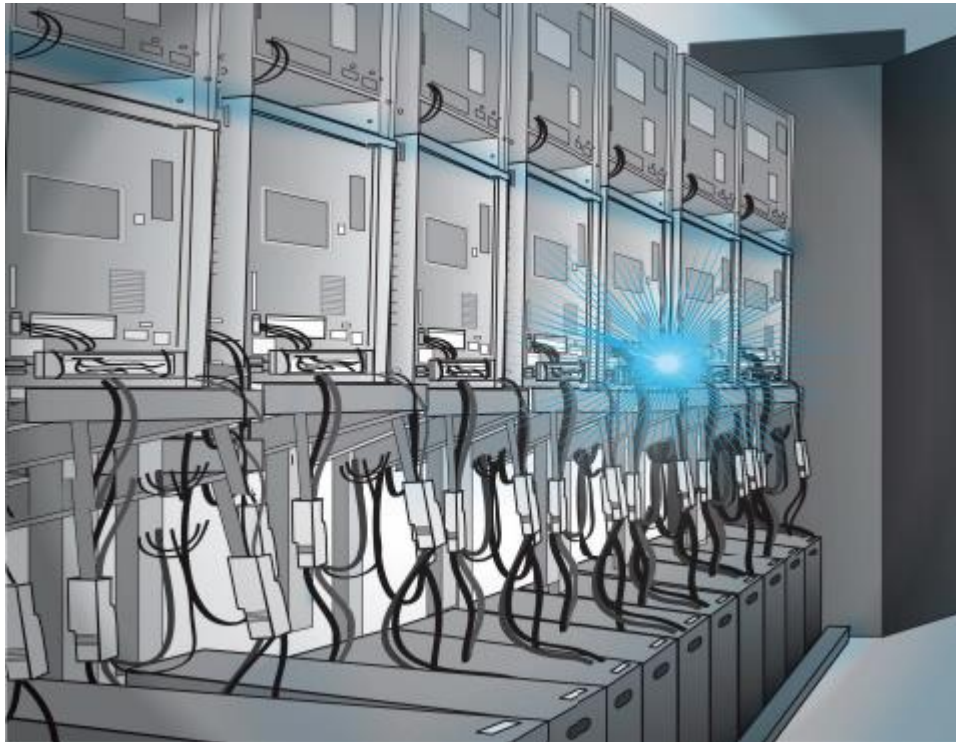
Updated October 2019
Version 1.4

Philadelphia Scientific®
industrial battery innovation

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iBOS® Plus 6 Series

1. Introduction

1.1 System Overview

This manual will give you all the information you need to install the iBOS® Lite battery room management system. Once installed, this system will help create a smooth running battery room. Before getting into all the details of installation, a quick overview of how the system works may be helpful.

iBOS® Lite saves money in your warehouse or DC by eliminating waste and increasing productivity. Changing batteries on an electric forklift truck can be a confusing, time consuming process that, when done incorrectly, leads to shortened battery run times and battery life. iBOS® Lite provides a simple, cost-effective solution that takes the guesswork out of choosing the proper battery. The proper battery is the one that is fully charged and the most cooled down. You find it by following the blue light. iBOS® Lite manages up to 50 chargers for each battery type and uses easy-to see pick lights to provide clear direction on which charged battery to select.

The system saves money in three ways:

1. Faster battery changes.
2. Less frequent battery changes.
3. Longer lasting batteries, reducing the frequency of battery purchases.

1.2 Organization of this Manual

This manual has been divided into sections for each of the stages of an installation project:

- Section 2 – System components

- Section 3 – Pre-Installation

- Section 4 – Installation

- Section 5 – Operation and Sentinel™ Status

- Section 6 – Final Inspection and Testing

- Section 7 – Troubleshooting

- Appendix A – Instructional Placards

1.3 Contact Information

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2. System Components

iBOS® Lite Controller
 	
BOS-CB6300
 	
Includes:
  1. Operational Placard
  2. 25ft (7.6m) cable w/coupler (2 sets)
  3. Controller
  4. AC Adapter w/International plugs
     (100-240 VAC 50/60Hz)	

iBOS® Sentinel™
 	
BOS-SU6003
 	
Includes:
  1. Cable Ties (6)
  2. Sentinel™
  3. 7ft. (2.1m) cable	

Optional:
 	
Extension Cable with Coupler
 	
BOS-143
 	
  1. 25ft (7.6m) cable
  2. Coupler	

3. Pre-Installation

Description: The iBOS® Lite is a system of Sentinels™ daisy chained to a Controller that manages one pool of up to 50 chargers. A pool is group of the same battery type. iBOS® Lite Sentinels™ are not voltage specific and are powered by the Controller. The pool voltage is determined by the Controller. There is a jumper on the Controller that sets the pool voltage.

Required items:
- iBOS® Lite Controller Kit
- 1 Sentinel™ per charger in that pool.
- 100-240 VAC 50/60 Hz power source for Controller

Optional items:
- Extension cable for gaps greater than 7' (2.1 m). (Two are included with the Controller Kit)
- Wire snips to trim cable ties.

Prep:
- Determine where to mount each Sentinel™. Take into consideration that it should be located in a place where the user can easily identify the battery to be picked.
- Determine where to mount the Controller and the distance to power source (100-240 VAC 50/60 Hz). The Controller must be located at the beginning of the daisy chain.
- Determine best route of cable from charger to charger considering customer location and work practices.

Refer to the Quick Start Guide included with the product.

4. Installation

4.1 Controller

- Open Controller slot end cap and **set jumper to correct pool voltage**. The default is auto mode. (On current models, the auto mode defaults to 24V. If the pool is other than 24V, set the jumper to the correct pool voltage.)
- With power off, slide the yellow jumper off and place it back onto the Controller board in the desired pool voltage location (position 1=12V, 2=24V, 3=36V, 4=48V, 5=72V, 6=80V) ensuring both pins are inserted and the jumper is fully seated. We'll confirm the setting by counting the number of blue flashes on power up.
- Insert cable from the first Sentinel™ through the Controller end cap and insert into its communication socket.
- Insert power supply cable also through the end cap and plug into the receptacle on the Controller board.
- Before mounting, hold the Controller where you can see through the side window, then plug in the power.

4.2 Voltage Confirmation Check

Upon initial power up, the Controller will test all 3 LED's by illuminating them, then momentary pause and begin to flash the blue LED by itself 0-6 times. The number of flashes indicates the voltage setting for the Controller. For example, if you see 2 blue flashes the Controller is set for a 24V pool.

4.3 Sentinel™ Install

- Open a Sentinel™ on the slotted side by removing the slotted black end cap.
- Connect the cable provided
    - o Push the cable from the Controller through the concave end cap by squeezing the short ends to help open the gap.
    - o Click the cable end **into *either of the* communication sockets,** tab down, and ensure it clicks in securely.
    - o Take the cable from the next Sentinel™ and do the same as above into the remaining socket.
    - o Slide the wires through slotted black end cap and replace the cap on the Sentinel™ enclosure – you are now ready to mount the Sentinel™.

4.4 Mounting Sentinel™

- Included with each Sentinel™ are cable ties that can be used to mount the Sentinel™ and secure the excess cable.
- Ensure the Sentinel™ front (LED Component Side) is facing out and visible to the user.
- During the installation, it is a good idea to also secure the cable with the Sentinel™ to provide a strain relief on the data cable.

4.5 Connect Sentinel™ Flexi-Tap to Charger DC Cable:

- The black Flexi-Taps have two sharp spikes protected by flexible tubing. Remove the tubing when ready to install the Flexi-Taps.
- Connect one Flexi-Tap to a positive cable and one Flexi-Tap to a negative cable. Keeping the pin centered on the cable, push the cable fully to the bottom of the recess of the Flexi-Tap allowing the pins to completely penetrate the insulation and the DC charger cable.

- o   Flexi-Taps are not polarity sensitive.
  - o   Be very careful to not bend the pins during installation.
- Secure each Flexi-Tap connection with a cable tie.
- Finally, secure all wires using good wire management techniques.
- Trim all excess from the cable ties.

Repeat installation for all chargers continuing to connect each Sentinel™ to the next in a daisy chain format.

An **Operational Placard** is included and should be posted in a high visibility area in the battery room or on the central charger to help users understand the LED flash patterns.

5. Operation and Sentinel™ Status

5.1 Operation

Once the system is completely installed, one Sentinel™ will turn bright blue and have a slow momentary flash. This indicates the "Battery to be picked". It will have the longest cool down time since completing charge. If no batteries have completed charge, then no blue light will be present.

5.2 Sentinel™ Status

5.2.1 Green LED – Communication status

- Off – No power
- Solid – Sentinel™ is communicating properly with Controller.
- Flashing Slow – Sentinel™ has not received its assigned battery voltage.
- Flashing Fast – Sentinel™ is not registered with the Controller, yet.

5.2.2 Amber LED – Charging status

- Off – No battery connected.
- Solid – Battery is connected.
- Flashing Slow – Battery is connected but charger has not started yet. Starts flashing in 5 minutes.
- Flashing Fast – Sentinel™ has not seen a battery in 7 days.

5.2.3 Blue LED – Termination status

- Off – Battery is not at the top of the queue.
- Bright with Momentary Flashing – This is the correct battery to pick.

5.2.4 Red LED – Bad communication cable

- Solid – Power wires reversed in the data cable.

6. Final Inspection and Testing

Task	Status
All Sentinels™ have a solid green LED.	☐
All Sentinels™ that are connected to a battery have a solid amber LED.	☐
Flexi-Taps are secured by cable ties.	☐
Wires are secured.	☐
Cable ties are trimmed.	☐

7. Troubleshooting
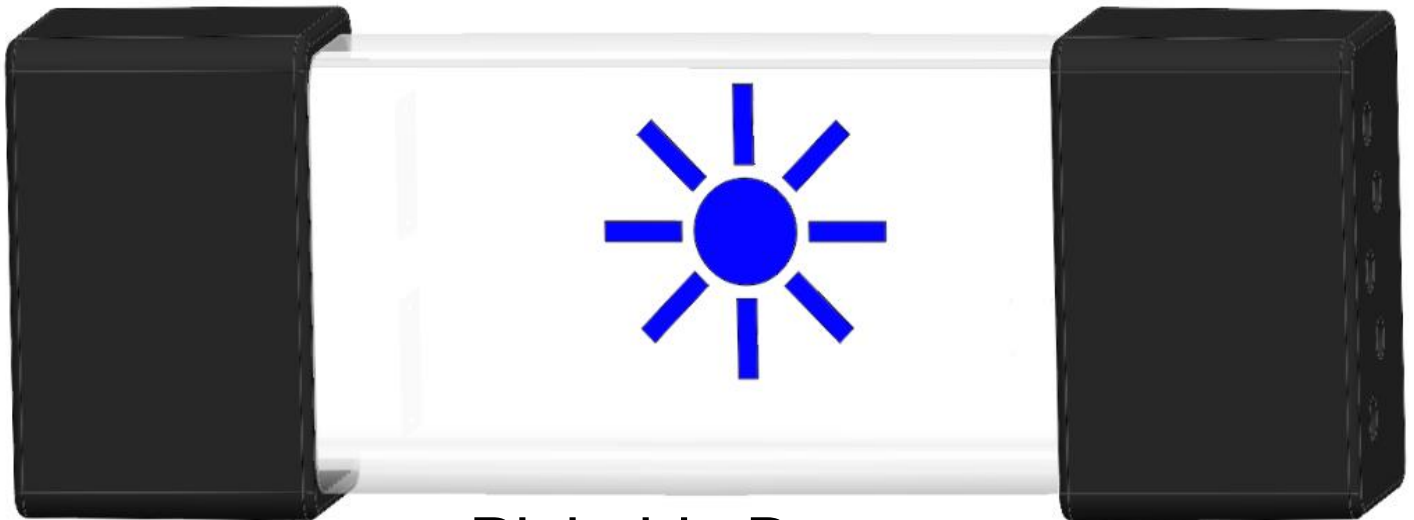
Green LED does not turn on.	• Confirm that the Controller is plugged into its power source. • Confirm that the breaker is on for the receptacle. • Confirm that the first Sentinel™ is connected to the Controller via the provided cable. • If only a portion of the pool does not have the Green LED illuminated, find the first Sentinel™ that has the Green LED turned off. o Check the cable between the Sentinel™ with the Green LED on and the one with the Green LED off.
Amber LED does not turn on.	• Walk down the pool and stop the charger before disconnecting the battery. • Reconnect the battery and observe the amber LED on the Sentinel™. It should light when the battery is connected. • If the amber LED does not turn on, recheck the Flexi-Tap connections to ensure good connections have been established with the pins penetrating into the DC charger cables.
No Blue LED on in the system.	• There are no fully charged batteries. • There may have been a momentary power outage. If so, a Blue LED should appear in one hour.
Red LED is on.	• The communication cable is bad.

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7. Troubleshooting

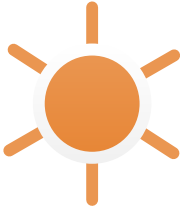|	
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Instructional Placard for Operators:

English/Spanish

Operating Instructions

Instrucciones de Operación

Pick this Battery
Tomar esta Batería

Battery connected
Batería conectada

Check Charger
Chequear el Cargador

Slow Flash- Charger didn't start after 5 min
Flash Lento- Cargador no funcionó despues de 5 min
Fast Flash- Charger has not seen battery in 7 days
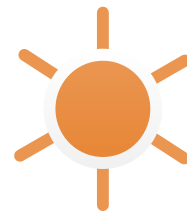Flash Rápido – Cargador sin batería por 7 días

Operating Instructions
Instructions d'Utilisation
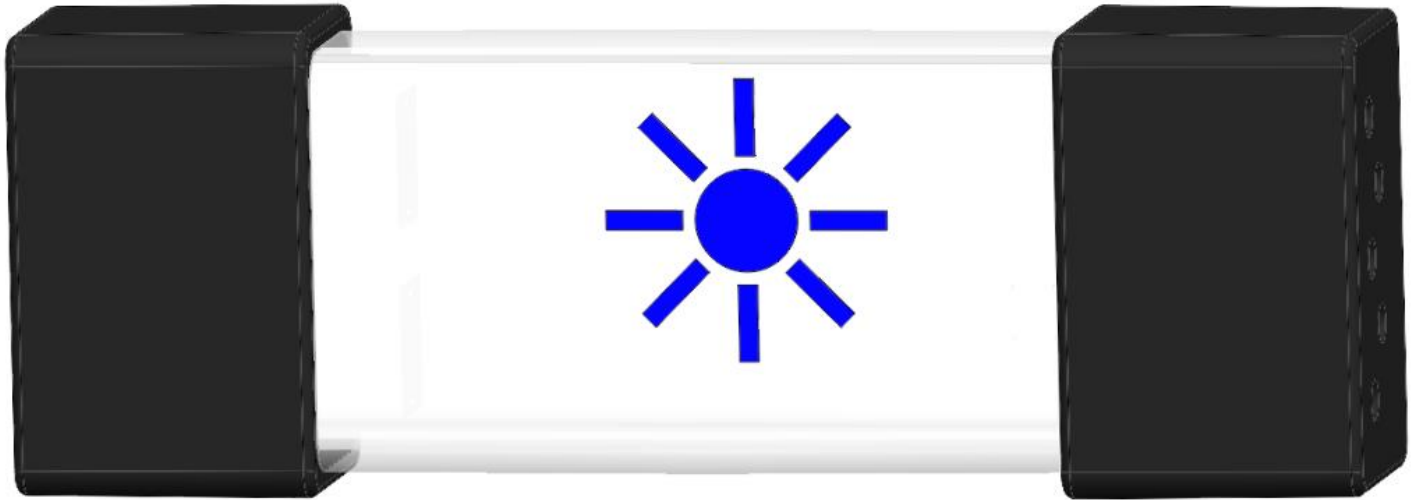
Selecione esta Bateria
Prenez cette Batterie

Bateria conectada
Batterie connectée

Verifique o Carregador
Vérifier le Chargeur

Flash Lento- Carregador não funcionou depois de 5 min
Flash Lent - Chargeur n'a pas démarré après 5 min
Flash Rápido - Carregador não conectou a nenhuma bateria depois de 7 dias
Flash Rapide - Chargeur non connecté à une batterie depuis 7 jours