



# **ANALYTIC SYSTEMS**

Power Conversion Solutions

## **INSTALLATION & OPERATION MANUAL**

### **IBI SERIES IDEAL BATTERY ISOLATOR**





# **DC SOURCE BATTERY CHARGER**

## **IMPORTANT SAFETY INSTRUCTIONS**

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**SAVE THESE INSTRUCTIONS** — This manual contains important safety and operating instructions for the battery charger.

### **BATTERY CHARGER PRECAUTIONS**

1. Do not expose the battery charger to rain or snow unless it is a sealed model.
2. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
3. Do not disassemble the battery charger; return it to the manufacturer or an authorized service center when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire. Voltages as high as 350 volts may be present inside the charger any time it is connected to a power source, even if it is switched off.
4. To reduce risk of electric shock, unplug the battery charger from the power source before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
5. Never place battery charger directly above battery; gases from battery will corrode and damage battery charger.
6. Never allow battery acid to drip on to the battery charger.

### **BATTERY SAFETY**

1. **WARNING — RISK OF EXPLOSIVE GASES**
  - i. **WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE SERVICING EQUIPMENT IN THE VICINITY OF THE BATTERY, YOU READ THIS USER GUIDE AND FOLLOW THE INSTRUCTIONS EXACTLY.**
  - ii. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review the cautionary marking on these products.
2. **PERSONAL PRECAUTIONS**
  - i. Someone should be within range of your voice or close enough to come to your aid when you work near a battery.
  - ii. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
  - iii. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.



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- iv. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10
  - v. NEVER smoke or allow a spark or flame in the vicinity of a battery.
  - vi. Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit the battery or other electrical part that may cause a fire or explosion.
  - vii. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to melt metal, causing a severe burn.
  - viii. NEVER charge a frozen battery.
  - ix. If it is necessary to remove a battery from service, always remove grounded terminal from battery first. Make sure all accessories connected to the battery are off, to prevent an arc when reconnecting the new battery.
  - x. Be sure area around battery is well ventilated.
  - xi. Clean the battery terminals. Be careful to keep corrosion from coming in contact with eyes.
  - xii. Study all the battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge

### **Medical Equipment Notice**

Analytic Systems does not recommend the use of their products in life support applications where failure or malfunction of this product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. Analytic Systems does not recommend the use of any of its products in direct patient care. Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps as well as any other devices designated as "critical" by the U.S. FDA



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## Introduction

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Analytic Systems introduces the updated IBI2/3 series of battery isolators, allowing you to charge 2 bank and 3 bank battery systems all from a single alternator. Ideal for automotive, naval or trucking purposes, the IBI also isolates the battery banks using Analytic Systems' Ideal Diode technology preventing a discharged bank from draining a charged one.

Ideal Diode technology uses MOSFET transistors and control circuitry in place of the diode used in traditional battery isolators. By doing so, the IBI is able to operate with a fraction of voltage drop found in diode-based battery isolators. At its maximum rated current of 280A the voltage drop is a miniscule 16mV; essentially zero at low currents. This way, all the power of your alternator is applied to the batteries ensuring a full recharge every time.

Always innovating, the new redesign of the IBI contains two new features: A Grounding LED, a green LED indicator which quickly shows you if the IBI has been correctly grounded and the Ignition Connection, a quick connect which applies voltage on the alternator if necessary to begin charging.

The IBI is available in two models, the IBI2 for 2 battery banks and the IBI3 for 3 battery banks. The IBI1, a custom high-current single battery bank isolator is also available on order.

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## Box Contents

The box you have received should contain the following:

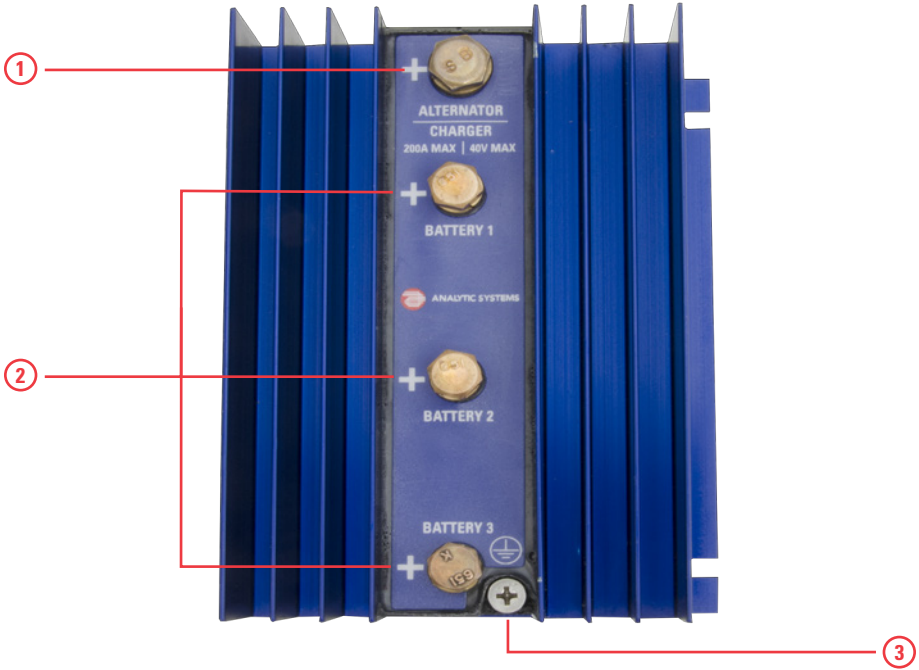
- One IBI Ideal Battery Isolator
- One TE Connective AMP Connectors Quick Connect Female
- This Manual
- One Warranty Card

*If anything is missing or damaged please contact your dealer or Analytic Systems for a replacement*



## Main Parts

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Pictured: IB13 Top Panel

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### Top Panel

1. **Alternator Positive Connection:** 5/16"-18 Silicon-Bronze Hex Bolt
  2. **Battery Positive Connection(s):** 1/4"-20 Silicon-Bronze Hex Bolt (On the IB12 model, there are two connections instead of the three pictured.)
  3. **Ground Point:** #10-32 Stainless Steel Phillips Screw
  4. **Ignition Connection:** TE Connective AMP Connectors Quick Connect Male 3-520107-2
  5. **Grounding LED:** 3mm LED Green Clear
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# Operation

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## Mounting

Mount the unit in a convenient location between your alternator and battery banks, this location should be clear and unobstructed for running cables between the three.

If mounting on a metal surface, the ground potential of the surface should be the same as the battery negative. On a steel or aluminum boat this may not be the case for electrolysis prevention. In this case, mount the IBI on a plywood board or other non-conductive material. Then mount that non-conductive material to the vessel.

Make sure the screws mounting the IBI to the non-conductive material do not protrude through the bottom of the material.

### **DANGER**

Do not turn on the alternator until all connections are secure. The IBI is designed to isolate high-current inputs, improper connection can lead to electric shock or fire.

## Input Connection

The input connection connects the alternator to the battery isolator. To set up this connection:

1. Remove the existing wire from the alternator. Cover the lug with electrical tape or shrink tubing and carefully move it aside. Secure it with a tie wrap.
2. Prepare a cable with a 5/16" ID lug on one end of the cable (End A). On the other end, attach a lug suitable for connection with your alternator (End B)
3. Connect the End A of the cable to the **Alternator Positive Connection**. Connect End B of the cable to your alternator.



## **Output Connection**

The output connection connects the battery isolator to the battery banks. To set up this connection:

*For each battery bank:*

1. Prepare a cable with a 1/4" lug on one end (End A) . On the other end, attach a connector suitable for the positive terminal of the battery bank (End B)
2. Connect End A to the **Battery Positive Connection**.
3. Connect End B to the positive terminal of the battery bank.
4. Connect the negative terminal of the battery bank to the ground.

## **Ground Connection**

The IBI uses a ground reference to operate its control circuitry which it reads through the Ground Connection. To set up this connection:

1. Prepare an AWG18 wire with a #10 lug on one end.
  2. Connect this end of the wire to **Ground Point**.
  3. Connect the other end of the wire to the battery negative terminal or directly the engine block. If the ground is properly connected, the **Grounding LED** will be illuminated.
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## **Ignition (IGN) Connection**

The Ignition (IGN) Connection is an optional connection. If you read a normal charging current from your alternator to the battery banks after setting up the IBI then you do not need to use this connection.

If there is no charging current after installing the IBI, you may need to set up the Ignition Connection. Some alternators need to 'see' the battery voltage in order to begin charging. The IBI applies battery voltage to the alternator through a diode isolation circuit using this connection. To set up this connection:

1. Prepare an AWG18 gauge wire with a common 1/4" female quick connect on one end.
  2. Connect this end of the wire to the Ignition (IGN) Connection.
  3. Connect the other end of the wire the ignition switch of your vehicle. You may alternatively connect this end to any other point that is live with battery voltage only when the ignition is ON.
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# Specifications

Input Specifications	IBI2-40-200	IBI2H-40-280	IBI3-40-200
Input Voltage	10-40 VDC for 12, 24, 28 or 32V Battery Systems		
Input Current	0-200A (Cont.)	0-280A (Cont.)	0-200A (Cont.)
Battery Banks	2		3

Mechanical	
Length	6.0in/ 15.2cm
Width	4.8in/ 12.2cm
Height	2.6in/ 6.6cm
Clearance	1.0in / 2.5cm all around
Weight	2.0lb/ 0.9kg
Material	Marine Grade Aluminum
Finish	Black, Blue or Red Anodize/Epoxy Potting
Connections	Alternator: 5/16"-18 Silicon Bronze Hex Bolt Battery Positive: 1/4"-20 Silicon Bronze Hex Bolt. Ground Connection: #10-32 Stainless Steel Phillips Screw Ignition Connection: 3-520107-2 Quick Connect Male
Fasteners	Silicon-Bronze

Environmental and Safety	
Temperature Rise	<40 °C@ 280A Continuous
Water and Dust Protection	Sealed unit
Isolation	None - Heat sink is bonded to Battery Negative
Warranty	Three years parts and labor
Safety	Built to meet CSA 22.2.107.1 & UL458