

Hellroaring BIC-95150B and BIC-95300B

LED Diagnostics

No regular battery isolator or combiner provides diagnostic information to the user.

The **Hellroaring** **BIC-75150A and BIC-75300A** Battery Isolator-Combiners were the first to offer this feature! The current versions, the **BIC-95150B** and **BIC-95300B** continue this feature!

Note: LED operation for the BIC-95300B is identical to the BIC-95150B.

Unlike your alternator warning indicator or voltmeter, the Hellroaring BIC-95xxx LED indicator provides valuable information as to the state of your battery/charging system even when the engine is off. In fact, right after you switch off your vehicle is a good time to monitor your batteries. But your regular vehicle's instruments don't! When you understand how the Hellroaring BIC-95xxx LED works, it will provide valuable insight and even diagnostics of your dual battery/charging system.

How it works:

The sense input is a voltage sensing type. When the voltage, at the sense input (terminal A on the BIC-95150B, or terminal B on the BIC-95300B), rises above the typical no load voltage for a 12 volt battery (about 13.4V), the BIC-95xxx switches ON and the LED is illuminated. When the voltage drops below a point just above the typical no load voltage for a 12 Volt battery (about 13.2V), the BIC-95xxx switches OFF and the LED extinguishes. (We believe this is the ideal level for most applications. However, you can adjust the voltage switching levels by using external resistors in the sense line.) A battery voltage will only rise above this point when charge current is available or in extremely cold conditions when fully charged. When a battery is fully charged, it may ***temporarily*** retain a voltage above this level due to surface charge. This is normal and with an understanding of these characteristics, the indications can provide valuable diagnostics information.

A good battery that is fully charged will retain this surface charge for 5 minutes or more. On the other hand, a good battery, that is not fully charged, will not retain this surface charge voltage but for a few seconds. The Hellroaring Battery Isolator/Combiners are sensitive to this surface charge which provides valuable information about your battery/charging system.

For example: if you start your vehicle, the LED will illuminate if your alternator is charging. If you immediately turn off the engine, the LED will quickly go out. This is because there was not enough time allowed to replenish the charge and build up a surface charge. If you were to drive that vehicle for 10 to 15 minutes before turning off the engine, the LED will remain ON for a few minutes until the surface charge dissipates. This is a good indication that your batteries are fully charged! If the LED always goes out quickly, this is an indicator that your batteries are not getting the charge they need.

Batteries are slowly **damaged** when this happens! As you have probably experienced, battery terminals and cables will tend to corrode over time and build up excessive resistance (without any warning.) If this resistance is in your

charge circuit, the battery will receive inadequate charge current even when your alternator output is indicating normal! This is a problem because you probably won't find out until your battery just doesn't have enough power to crank your engine! Not only do you have the inconvenience of a no start, you have reduced the life of your battery because it went a long time in an undercharged condition and became sulfated. With the Hellroaring Battery Isolator/Combiner BIC-95xxx LED indicator, you can recognize this condition early; long before your battery is damaged.

The following are typical indications (with the sense connected directly to the BIC-95xxx "Main" terminal) that you may encounter along with the expected cause of the indication.

LED Indication	Conditions	Cause
ON	Steady, Engine Running	Normal Operating Condition
ON	Steady, Engine recently shut off	Batteries in good condition, fully charged
OFF	Minutes after Engine Off	Normal condition - Both batteries state of charge are near equal, or auxiliary stronger than main
ON	Long time after Engine Off	Both batteries are in excellent condition (little or no load) - cold weather, or the Remote switch may be ON. Check this!
OFF	Extinguishes Quickly after Engine OFF	One or the other battery is not fully charged, or significant load is still on, or hot conditions. Check your connections if this condition occurs often.
Flashes ON/Off	Engine recently shut Off	Indicates that Auxiliary battery is not fully charged or there is an auxiliary load ON and the Main battery still has a surface charge. Flashing will stop when surface charge has dissipated.
Flashes ON/Off	Engine Running	Indicates that excessive resistance exists from the alternator or there is excessive auxiliary load. Reduce auxiliary load, or Clean the connections, or, for long wire runs, consider larger gauge wire, or use the Remote Sense capability.
OFF	Engine Running	Alternator Output is inadequate, or main load is beyond alternator capability, or the Remote Switch is in the OFF position.
OFF	Engine Off	Normal Condition
Intermittent OFF/ON	Engine Running	Intermittent loads exceeding your alternator output capability.

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Last modified: 07-25-2025