Tech Tips

October 2017 Edition

Hello Idle Free Technician,

This month we will cover the battery separator.

Battery Separator

The battery separator separates the truck's battery bank from the Idle Free AGM battery bank. It is rated at 200 DC Amps and is controlled by its attached circuit board. The battery separator connects the truck batteries to the eAPU batteries when the truck's batteries reach 13.2 VDC. When the separator closes, the truck's alternator charges both battery banks. If the alternator fails to keep the combined battery voltage above 12.8 VDC, the battery separator will open (separate the battery banks). The separator closes when either battery bank reaches 13.2 VDC. The Idle Free AC to DC power converter (shore power charger) is connected to the eAPU side of the battery separator via the UBB. This means whenever the Idle Free AC to DC power converter (shore power charger) is plugged into shore power, the AC to DC power inverter supplies DC power to the AGM batteries. When the DC power from the AC to DC power converter raises, and exceeds 13.2 VDC on the Idle Free battery bank, the battery separator will close and send power to the truck's battery bank via the battery separator. If the combined battery bank voltage drops below 12.8 VDC, the battery separator will open the connection between the two battery banks.

Common Issues

The life expediency of the battery separator is dependent on:

- Size of the alternator – 25 additional AMPs of alternator capacity per each AGM battery in your APU (In most cases, a 270 AMP alternator will suffice)
- Condition of the batteries connected to it
- Battery cable connection quality.

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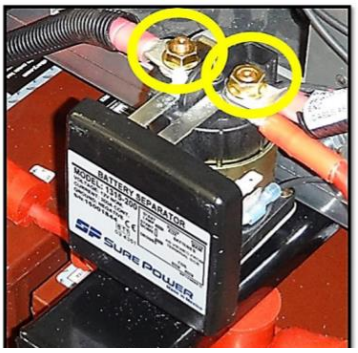
Service

1. Clean battery cables connections
2. Tighten battery cable connections
3. Protect battery cable connections with battery corrosion protection spray
4. Clean, tighten and protect circuit board ground wire (bottom terminal)



Testing the Separator

Check for DC voltage on the truck battery post on the top of the battery separator. Use the ground terminal on the battery separator for the meter's ground lead. This voltage is the truck's starter battery voltage. If the truck's engine is running this voltage should be alternator output voltage, >12.7VDC. If no voltage is present, check for DC voltage on the GREEN male connector on the DC input side of the APU, (previous page). If alternator voltage is present (>12.7 VDC), clamp the AMP meter around the cable connecting to the truck battery post. The DC AMPs should be proportional the DC voltage, high AMPs = low volts. If no amperage is read on the meter, the battery separator is not closed or is not connected to the AGM battery bank. The truck's voltage must be higher than 13.2 VDC to activate the circuit board that will close the battery separator when the truck's battery voltage rises to 13.2 VDC or higher. If the battery separator is working:

1. The voltage on both top posts will be the same

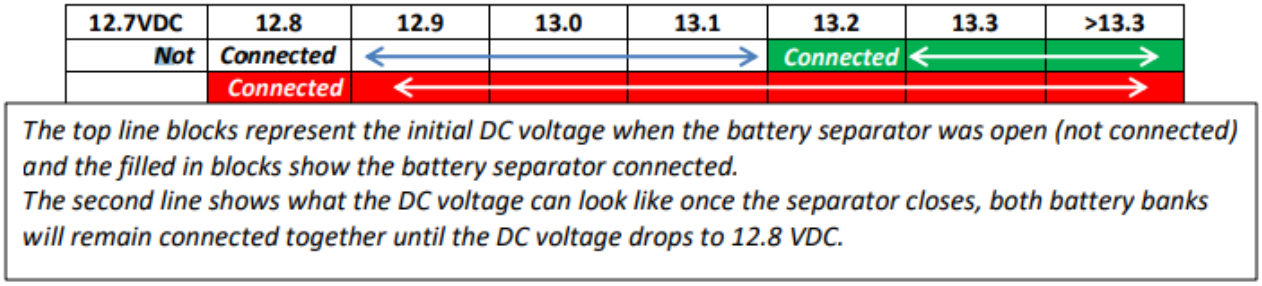
2. The amperage read on the clamp meter will be the same on the truck battery cables as the amperage reading on the AGM battery cable

3. The voltage and amperage will be proportional to each other; an amperage reading of 100 AMPS DC will mean a low alternator DC voltage, 13.0 VDC.

The battery separator will operate (close) based on a voltage rise from either the truck's battery bank or the AGM battery bank. The Idle Free AC to DC power converter (shore power, RF104) is connected to the AGM battery side of the battery separator. When shore power is being used, the AGM side of the battery separator will control the closing of the battery separator. If the battery separator is not functioning when either of the top posts has >13.2VDC, remove the ground wire from the ground terminal (battery separator terminal) and place the negative probe from your volt meter into this terminal end of the ground wire. Check for DC voltage on either battery post to confirm that a ground is present on the ground terminal harness. This test will ensure the wire is bringing a ground to the battery separator's circuit board. If a ground is present on the ground terminal wire, suspect a bad battery separator.

Proper diagnostic work needs to be done prior to replacing the battery separator. The battery separator may be working if the battery voltage is below 13.2 VDC but above 12.8 VDC. The battery separator will close its contacts

when either of its battery posts rises above 13.2 VDC. The battery separator will remain closed until the contacts drop to 12.8 VDC. The top line blocks represent the initial DC voltage when the battery separator was open (not connected) and the filled in blocks show the battery separator connected. The second line shows what the DC voltage can look like once the separator closes, both battery banks will remain connected together until the DC voltage drops to 12.8 V



The top line blocks represent the initial DC voltage when the battery separator was open (not connected) and the filled in blocks show the battery separator connected.
The second line shows what the DC voltage can look like once the separator closes, both battery banks will remain connected together until the DC voltage drops to 12.8 VDC.

Common Problems

If the battery separator is connected for only a few seconds and then disconnects, a problem exists in the truck's charge circuit. When the battery separator continues to close and then open, the battery separator is closing at 13.2 VDC however the combined battery voltage (both battery banks) drops to below 12.8 VDC and the separator opens. This condition can be caused by: 1. Bad starter battery 2. Loose cable connections 3. Alternator too small 4. Either battery bank deeply discharged If one of the battery banks has a DC voltage of 11.5 VDC or less, it is recommended to test the batteries in this bank individually. It is common to find the truck's battery bank contains a bad starter battery. A bad truck starter battery will not allow the Idle Free AGM batteries to properly charge. Replace defective truck starter batteries. Loose or un-connected battery cables will not enable AGM battery charging.

For technical support call (920) 206-9333 or email us at techsupport@idlefreesystems.com