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## 3000 Series Zeus Pod—Black MerCathode Controller (with LED) Troubleshooting Guide

### Models Affected

Models Covered	Serial Number
Zeus 3000 Series KH model pods	0M971693 and above

### Scope

Worldwide

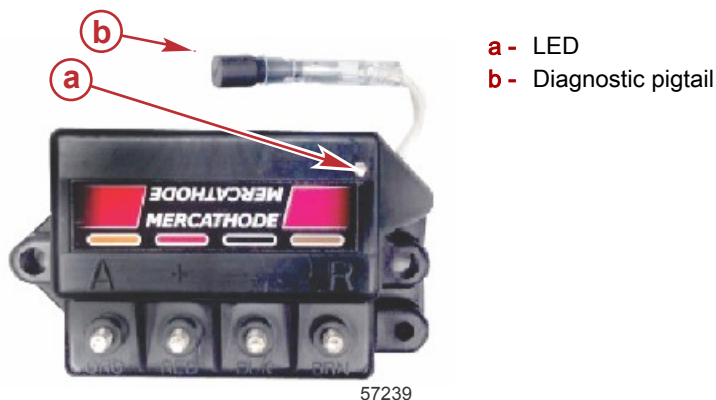
### Part Number

Qty.	Description	Part Number
1	Black (Gen III) MerCathode Controller	8M0100517

### Situation

The black (Gen III) MerCathode controller (with red label) contains an LED and pigtail for checking system functionality. It is factory installed on all KH model Zeus pods with the serial number 0M971693 and above.

This black controller replaces the red controller, and eliminates the electric current that may be slightly felt by a person in the water near the MerCathode anode.



The diagnostic pigtail provides an indicator of reference electrode voltage being measured in the water. If a fault condition exists that causes the controller to reset, a specific voltage level is provided on the monitor output lead that provides more information than the LED sequence does. To measure this voltage, place a multimeter between the pigtail and the "-" terminal on the controller while it is in operation, taking care not to short the "-" to "+" terminals. Allow two seconds after placing the multimeter as indicated to allow the voltage reading to stabilize.

**NOTE:** Do not measure the reference electrode voltage directly between the "R" terminal to the "-" terminal, as this reading will not be accurate.

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The following chart describes the light functionality, and provides troubleshooting steps for the various LED conditions:

MerCathode LED	Fault Condition	Possible Causes	Summary of Fault Correction Possibilities
Solid green	No fault; the controller is working properly. The hull voltage is between 0.86 and 1.04 V.	N/A	No action necessary. This is normal LED indication for a properly functioning MerCathode system.
1 flash per 4 seconds	<ol style="list-style-type: none"> <li>The reference voltage is outside of the normal expected range (below 0.86 or above 1.04 VDC).</li> <li>The system is stabilizing. Monitor the system for further change.</li> <li>The voltage reading from the controller monitor output lead (pigtail) will provide the voltage that is present at the reference electrode.</li> </ol>	<p>If the reference voltage is low:</p> <ol style="list-style-type: none"> <li>Loss of continuity between the pod and the ground point.</li> <li>MerCathode reference electrode or anode is painted over.</li> <li>Poor connection at the "R" and "A" controller terminal.</li> <li>There is stagnant water near the reference electrode, which may affect the proper reading of the electron field. Monitor the drive for corrosion issues.</li> <li>There is moving water near the reference electrode, which may affect the reading because the electron field is disrupted by the flow. Monitor the drive for corrosion issues.</li> <li>Sacrificial anodes are consumed more than 50%.</li> </ol> <p>If the reference voltage is high:</p> <ol style="list-style-type: none"> <li>Stray current present.</li> <li>Poor connection at the "R" controller terminal.</li> </ol>	<p>Reference voltage low:</p> <ol style="list-style-type: none"> <li>Voltage below the 0.86 V reading may be common, depending on water conditions or vessel location. Monitor over time. If necessary, additional transom-mounted sacrificial anodes may be required.</li> <li>Check continuity connections between trim tab and midsection plate.</li> <li>Check continuity connections between pod and vessel.</li> <li>Verify that antifouling paint is not on the anode or reference electrode.</li> <li>Measure the hull voltage with the service probe and compare it to the controller reading.</li> <li>Replace sacrificial anodes if more than 50% consumed.</li> <li>Consult Mercury Technical Service if further review is necessary.</li> </ol> <p>Reference voltage high:</p> <ol style="list-style-type: none"> <li>Disconnect shore power and other electrical components one at a time and verify if reading decreases.</li> <li>Check connection at the "R" terminal.</li> <li>Measure hull potential with service probe and compare with controller reading.</li> <li>Consult Mercury Technical Service if further review is necessary.</li> </ol>

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MerCathode LED	Fault Condition	Possible Causes	Summary of Fault Correction Possibilities
2 flashes per second	<ul style="list-style-type: none"> <li>• Shorted or open reference electrode or anode</li> <li>• High internal controller temperature</li> <li>• Reference voltage exceeds 1.4 VDC</li> </ul> <p>Voltage reading from controller monitor output lead (pigtail) to "-" terminal indications:  <b>IMPORTANT: Once the meter leads are connected to the pigtail and "-" terminal, the reading needs at least two seconds to transition from the reference voltage to one of the following.</b></p> <ul style="list-style-type: none"> <li>• 0.2 VDC: Controller over-temperature shut down</li> <li>• 0.4 VDC: Open anode circuit</li> <li>• 0.6 VDC: Anode circuit shorted (to ground)</li> <li>• 0.8 VDC: Open reference electrode circuit</li> <li>• 1.0 VDC: Reference electrode circuit shorted (to ground)</li> <li>• 1.2 VDC: Over-voltage condition on reference electrode</li> </ul>	<ul style="list-style-type: none"> <li>• Reference electrode wires are pinched or cut, or the electrode is damaged</li> <li>• Anode wires are pinched or cut, or the anode assembly is damaged</li> <li>• The temperature limit of the controller is exceeded</li> </ul>	<ul style="list-style-type: none"> <li>• Identify where the MerCathode wires may be compromised. Replace the anode or reference electrode assembly if necessary.</li> <li>• The controller may have shut down due to a temperature greater than 105 °C (221 °F). Wait for the controller to cool, and see if it turns back on.</li> <li>• If no other issues are found, replace the controller.</li> </ul>
No flash	The green light is not on.	<ul style="list-style-type: none"> <li>• The boat is out of water or dry docked.</li> <li>• Both anode and reference electrode circuits are open.</li> <li>• There is no power to the controller.</li> </ul>	<ul style="list-style-type: none"> <li>• If the boat is out of the water, it is normal for the LED to be off.</li> <li>• If the boat is in the water, then identify the open circuit issue with both the anode and electrode assembly. Replace if necessary.</li> <li>• Check the battery voltage. It must be 9 VDC or higher.</li> <li>• Check the 5-amp fuse in the wire harness to the controller.</li> </ul>

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