MERCURY MARINER

service bulletin

☐ WARRANTY INFORMATION ☑ SERVICE INFORMATION
☐ PARTS INFORMATION

Bulletin No. 2002-16
Jet Drive No. 2002-06

Circulate to: ☐ Sales Manager ☐ Accounting ☑ Service Manager ☑ Technician ☐ Parts Manager

Testing Alternators

Models Affected

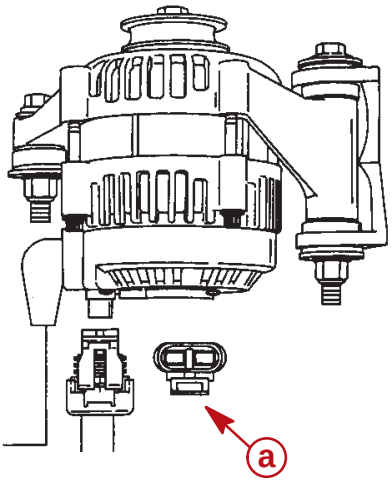
All Outboards and Jet Drive models using a design II belt driven alternator

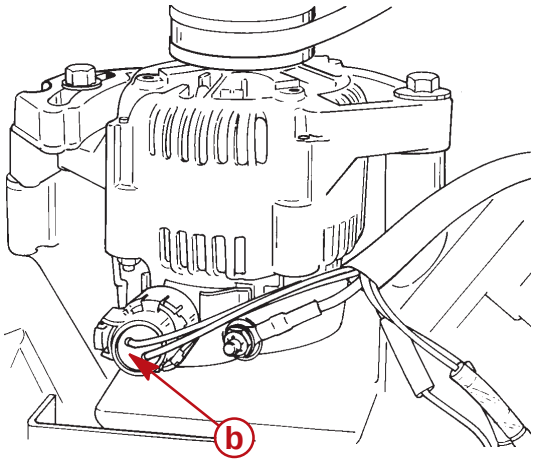
Situation

Mercury has received alternators under warranty that when tested, have been found to function properly **(NO PROBLEM FOUND).**

Design II identification

The design II alternators started in production with 2001 model year, and have been used as a service replacement part for older models. The design II can be identified by the flat electrical connector. The old design had a round electrical connector.





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Design II **Design I**

a - Flat electrical connector
b - Round electrical connector

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Electrical System Inspection

When a battery is found to be low or completely discharged there are a number of items to consider as the cause of the discharged battery other then the alternator. The following items should be checked or tested prior to testing the alternator.

1. What is the condition of the battery? Is the battery shorted, open or has it deteriorated over time?
2. Is the battery the correct size and amp rating as outlined in the service or operation manual?
3. Is the correct style battery being used? A true deep cycle battery should not be used as a cranking battery on a large outboard.
4. Has excessive accessory current draw or accessories which have accidentally been left on drawn the battery down? Continuous low speed operation along with accessory drain on the battery may cause the battery to discharge at a faster rate than a good alternator can charge the battery. Accessories should be operated on a separate battery from the engine starting/cranking battery.
5. Are all battery connections in good condition? Check that all connections are clean, tight, and free of corrosion. This includes the connection between the battery and the engine and the connections from the engine up to the alternator.
6. Are other items such as battery isolators or battery switches preventing the battery from receiving charging current?
7. If so equipped, is the fusible link (located within the alternator's main output conductor) electrically open?

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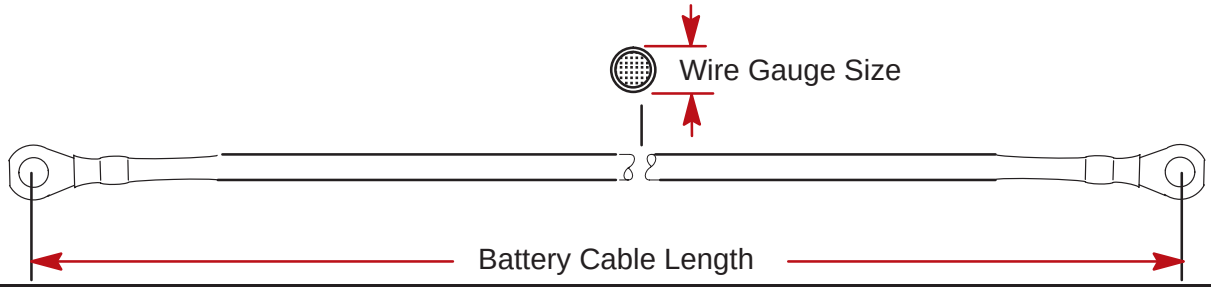
8. Are the correct battery cables being used? When batteries are moved away from the engine further than what the standard battery cable (cable shipped with the engine) can reach, the cable diameter may need to be increased. See battery cable size chart shown below.



Battery Cable Wire Gauge Size
Mercury/Mariner Outboards

Models	Battery Cable Length																
	2.4m (8 ft.)	2.7m (9 ft.)	3.0m (10ft.)	3.4m (11ft.)	3.7m (12ft.)	4.0m (13ft.)	4.3m (14ft.)	4.6m (15ft.)	4.9m (16ft.)	5.2m (17ft.)	5.5m (18ft.)	5.8m (19ft.)	6.1m (20ft.)	6.4m (21ft.)	6.7m (22ft.)	7.0m (23ft.)	7.3m (24ft.)
	Wire Gauge Size mm^2 (AWG)																
6-25 Hp	8 mm^2 (#8)*	8 mm^2 (#8)*	13 mm^2 (#6)	13 mm^2 (#6)	13 mm^2 (#6)	13 mm^2 (#6)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)
30-115 Hp	13 mm^2 (#6)*	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	52 mm^2 (#0)	52 mm^2 (#0)	52 mm^2 (#0)
125-250 HP (except DFI)			13 mm^2 (#6)*	13 mm^2 (#6)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	19 mm^2 (#4)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)
DFI Models					19 mm^2 (#4)*	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	32 mm^2 (#2)	52 mm^2 (#0)	52 mm^2 (#0)	52 mm^2 (#0)

* = Standard (original) Cable Length and wire gauge size.

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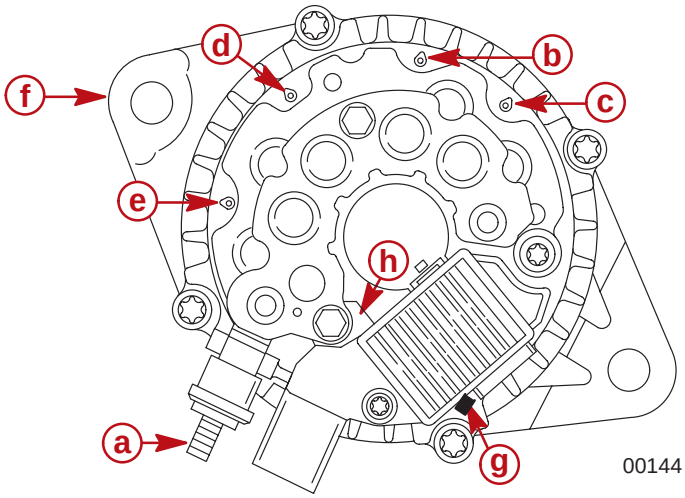
Alternator Inspection and Correction

If all of the above items have been checked/tested and confirmed not to be the cause of the discharged battery, remove the plastic cover from the bottom of the alternator and perform the following test procedures. These tests will require the use of the DMT 2000A digital multi-meter, or equivalent.

Alternator System Circuitry Test



a - Positive Output Stand
b - Neutral of Y Winding
c - A Phase of Winding
d - B Phase of Winding
e - C Phase of Winding
f - Ground
g - Field Neg. Terminal
h - Field Pos. Terminal

Checking Stator

Set Digital Multimeter to Ω

Positive Lead Node	Negative Lead Node	Ω Value
c	d	0.4 ± 0.1
c	e	0.4 ± 0.1
b	c	0.3 ± 0.1
b	d	0.3 ± 0.1
b	e	0.3 ± 0.1
b	f	1 Megohm
c	f	1 Megohm
d	f	1 Megohm
e	f	1 Megohm

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Checking Field Winding

Set Digital Multimeter to Ω

Positive Node	Negative Node	Ω Value
g	h	3.7 ± 0.2

Checking Field Controlling Mosfet

Set Digital Multimeter to  .

Positive Lead Node	Negative Lead Node	Voltage dc
g	f	Open
f	g	0.55 ± 0.2

Checking Rectifier Bridge

Set Digital Multimeter to  .

Positive Lead Node	Negative Lead Node	Voltage dc
b	a	0.5 ± 0.02
a	b	Open
f	b	0.5 ± 0.02
b	f	Open
c	a	0.5 ± 0.02
d	a	0.5 ± 0.02
e	a	0.5 ± 0.02
a	c	Open
a	d	Open
a	e	Open
f	c	0.5 ± 0.02
f	d	0.5 ± 0.02
f	e	0.5 ± 0.02
c	f	Open
d	f	Open
e	f	Open

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Checking Diode Trio

Set Digital Multimeter to  .

Positive Lead Node	Negative Lead Node	Voltage dc
c,d,e	g	0.5 ± 0.02
g	c,d,e	Open

Warranty

Any alternators that are returned for warranty and found to function properly **(NO PROBLEM FOUND)** will have the warranty denied and the parts will be returned to the dealer.

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