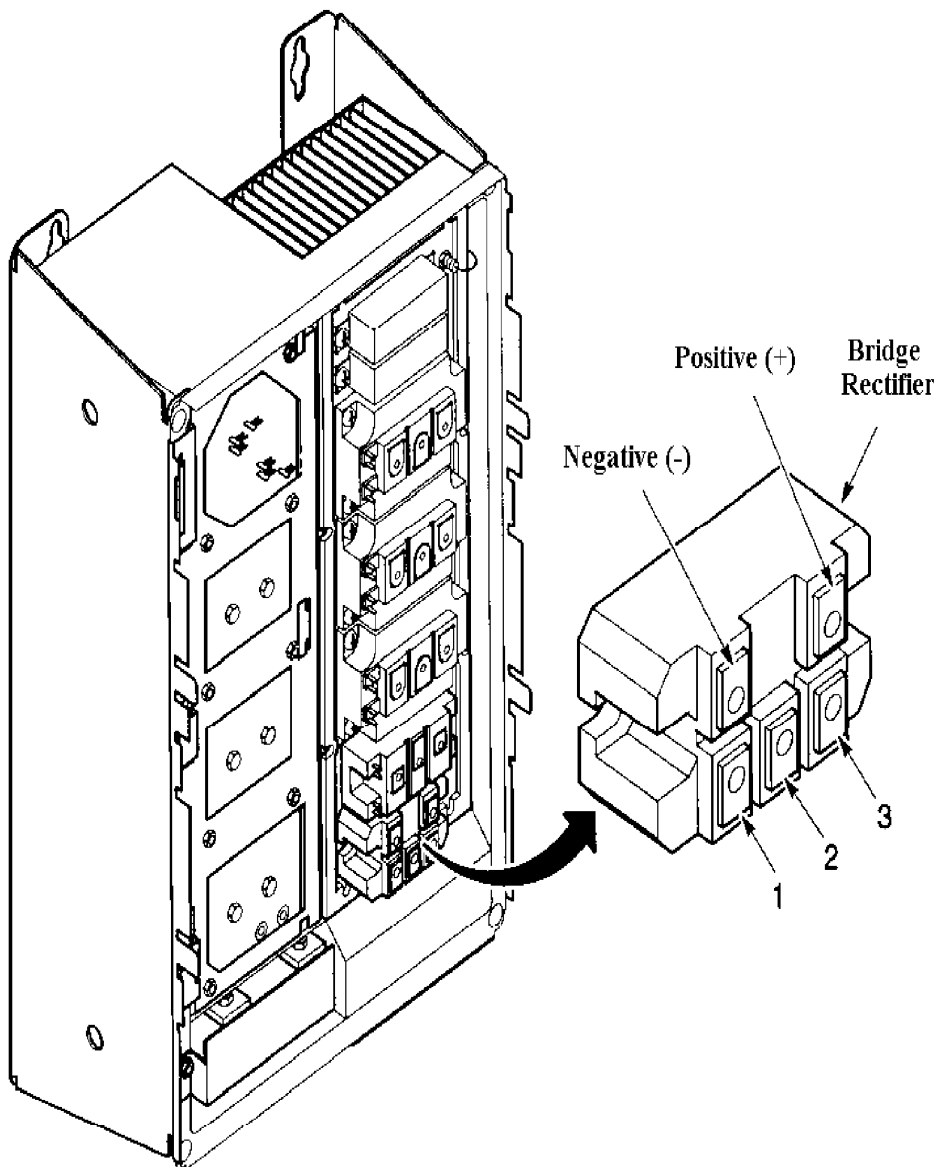


1336 PLUS COMPONENT TESTS

Test 1 Testing Bridge Rectifier - BR1

Bridge Rectifier BR1 is located on the bottom right of the heat sink.

Bridge Rectifier Test



ATTENTION: Disconnect and lock out power from the drive before disassembling the drive. Failure to disconnect power may result in death or serious injury. Verify bus voltage by measuring the voltage between +DC and -DC on Terminal Block TB1. Do not attempt to service the drive until the bus voltage has discharged to zero volts.

IMPORTANT: Before you remove connections and wires from the drive components, mark the connections and wires to correspond with their component connections and terminals to prevent incorrect wiring during assembly.

1. Remove power from the drive.
2. Check for zero volts at TB1 terminals +DC and -DC.
3. Remove the Main Control Board and Gate Driver Board.
4. Set your meter to test diodes.
5. The following table shows meter connections and ideal meter readings for those connections. Refer to the former illustration for meter connection locations.

Bridge Rectifier BR1 Test

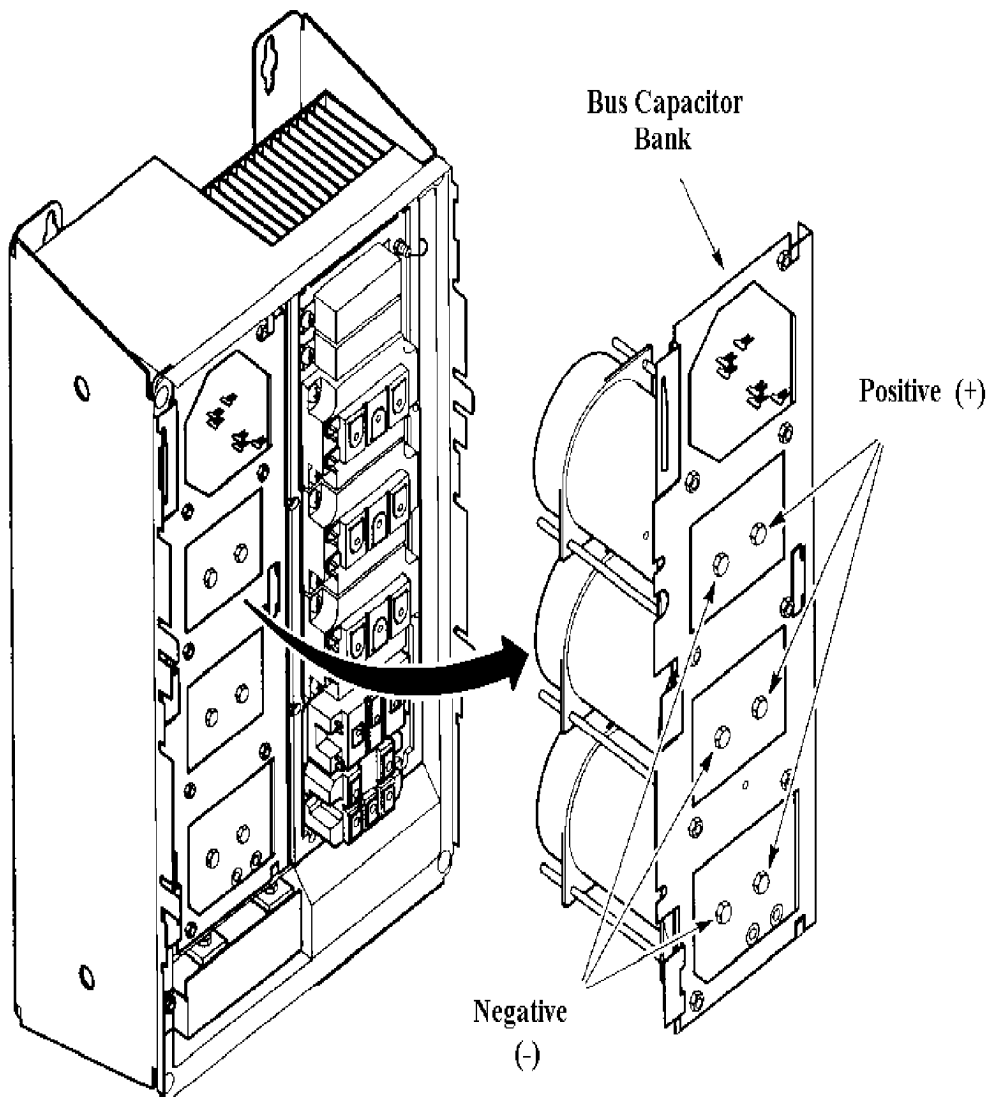
<u>Meter (+) Lead</u>	<u>Meter (-) Lead</u>	<u>Nominal Meter Reading</u>
1	+	0.43
2	+	0.43
3	+	0.43
+	1	Infinite
+	2	Infinite
+	3	Infinite
-	1	0.43
-	2	0.43
-	3	0.43
1	-	Infinite
2	-	Infinite
3	-	Infinite

6. Replace BR1 if any readings are not as shown above.
 - a. Clean all surfaces between the rectifier and the heat sink using a soft, clean cloth.
 - b. Replace the Preform between the rectifier and the chassis.
 - c. Apply 25-31 lb-in. or 2.8-3.5 N-m torque to the mounting screws.
7. If the rectifier shorted, check:
 - a. Transistor Modules for possible damage.
 - b. MOV1 for an open/shorted condition.
8. Replace and secure the Gate Driver Board and Main Control Board.

Test 2 Testing the Bus Capacitors

The Bus Capacitors are located on the left side of the Main Chassis.

Bus Capacitor Test



ATTENTION: Disconnect and lock out power from the drive before disassembling the drive. to disconnect power may result in death or serious injury. Verify bus voltage by measuring the voltage between +DC and -DC on Terminal Block TB1. Do not attempt to service the drive until the bus voltage has discharged to zero volts.

IMPORTANT: Before you remove connections and wires from the drive components, mark the connections and wires to correspond with their component connections and terminals to prevent incorrect wiring during assembly.

1. Remove power from the drive.
2. Check for zero volts at TB1 terminals +DC and -DC.
3. Remove the Main Control Board and Gate Driver Board.
4. Set your meter to test voltage.
5. Connect the negative lead of your meter to the (–) DC Bus terminal on TB1 and the positive lead to the (+) DC Bus terminal. Refer to the following tables and former illustration for meter-to-capacitor lead connections, voltages, and capacitor terminal locations.

ATTENTION: Servicing energized industrial control equipment can be hazardous. Electrical shock, burns, or unintentional actuation of controlled industrial equipment may cause death or serious injury. Follow the safety-related practices of NFPA 70E, Electrical Safety for Employee Workplaces, when working on or near energized equipment. Do not work alone on energized equipment.

6. Apply power **AFTER** the meter is connected, otherwise your meter will read zero volts. Expand readings for all input voltage ratings.

B007-B020 and C007-C020 Bus Capacitor Group Test

Drive Rating	Input Volts	Meter (+) Lead	Meter (-) Lead	Meter Reading
B	380	+Bus	-Bus	535V DC +/-10%
	415	+Bus	-Bus	580V DC +/-10%
	480	+Bus	-Bus	650V DC +/-10%
C	500	+Bus	-Bus	700V DC +/-10%
	575	+Bus	-Bus	800V DC +/-10%
	600	+Bus	-Bus	850V DC +/-10%

B025-B030 and C025-C030 Bus Capacitor Group Test

Drive Rating	Input Volts	Meter (+) Lead	Meter (-) Lead	Meter Reading
B	380	+Bus	-Bus	535V DC +/-10%
	415	+Bus	-Bus	580V DC +/-10%
	480	+Bus	-Bus	650V DC +/-10%
C	500	+Bus	-Bus	700V DC +/-10%
	575	+Bus	-Bus	800V DC +/-10%
	600	+Bus	-Bus	850V DC +/-10%

7. If the voltage is out of tolerance, check the following:

- An open condition at Bridge Rectifier BR1.
- A voltage drop due to Inductor L1 resistance.

- A voltage drop between Bridge Rectifier BR1 and the bus capacitors due to loose or resistive wires or connections
- Precharge Circuit problems.

8. If the above check did not reveal a problem, replace capacitors and balancing resistors. The balancing resistors are located on the top right of the heat sink.

9. Torque the nuts on the capacitor assembly to 22-30 lb-in, or 2.5-3.4 N-m.

10. Replace and secure the Gate Driver Board and Main Control Board.

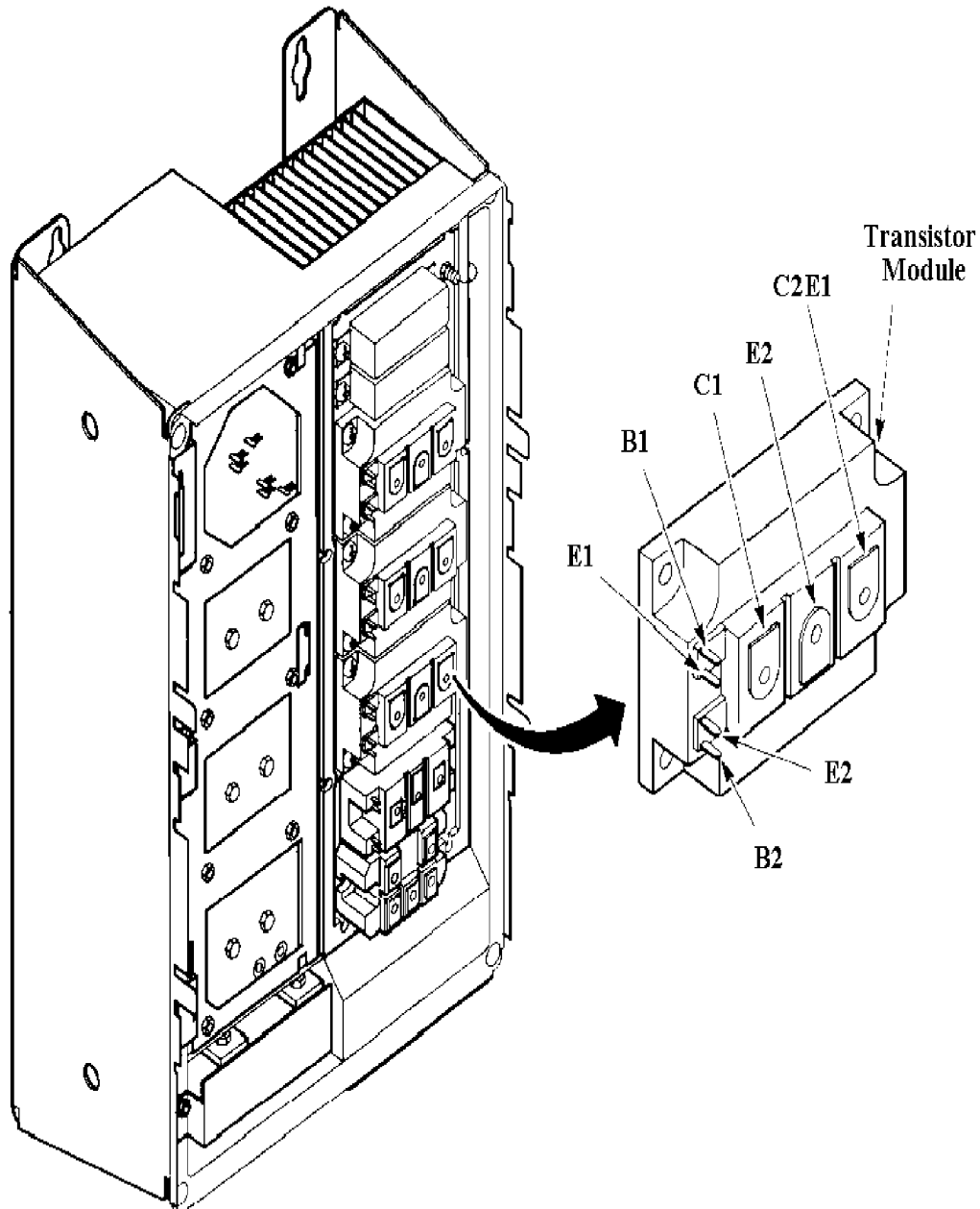
ATTENTION: Replace all guards before applying power to the drive. Failure to replace guards may result in death or serious injury.

Test 3

Testing Transistor Modules Q1, Q2, and Q3

Transistor Modules Q1, Q2, and Q3 are located near the center of the heat sink.

Transistor Module Test



ATTENTION: Disconnect and lock out power from the drive before disassembling the drive. Failure to disconnect power may result in death or serious injury. Verify bus voltage by measuring the voltage between +DC and -DC on Terminal Block TB1 . Do not attempt to service the drive until the bus voltage has discharged to zero volts.

IMPORTANT: Before you remove connections and wires from the drive components, mark the connections and wires to correspond with their component connections and terminals to prevent incorrect wiring during assembly.

1. Remove power from the drive.
2. Check for zero volts at TB1 terminals +DC and -DC before proceeding.
3. Remove the Main Control Board and Gate Driver Board.
4. Set your meter to test diodes.
- 5 The following tables show meter connections and ideal meter readings for those connections. Refer to the former illustration for meter connection locations.

B007-B010 and C007-C010 Q1, Q2, and Q3 Test

<u>Meter (+) Lead</u>	<u>Meter (-) Lead</u>	<u>Nominal Meter Reading</u>
C2E1	E2	Infinite
E2	C2E1	0.36
C1	C2E1	Infinite
C2E1	C1	0.36
B1	E1	0.3
B2	E2	0.3

B015 and C015 Q1,Q2, and Q3 Test

<u>Meter (+) Lead</u>	<u>Meter (-) Lead</u>	<u>Nominal Meter Reading</u>
C2E1	E2	Infinite
E2	C2E1	0.36
C1	C2E1	Infinite
C2E1	C1	0.36
B1	E1	0.3
B2	E2	0.3

B020-B030 and C020-C030 Q1, Q2, and Q3 Test

<u>Meter (+) Lead</u>	<u>Meter(-) Lead</u>	<u>Nominal Meter Reading</u>	<u>Maximum Meter Reading</u>
C2E1	E2	Infinite/O.L.	--
E2	C2E1	0.34	0.6
C1	C2E1	Infinite/O.L.	--
C2E1	C1	0.34	0.6
B1	E1	0.16	0.6
B2	E2	0.16	0.6

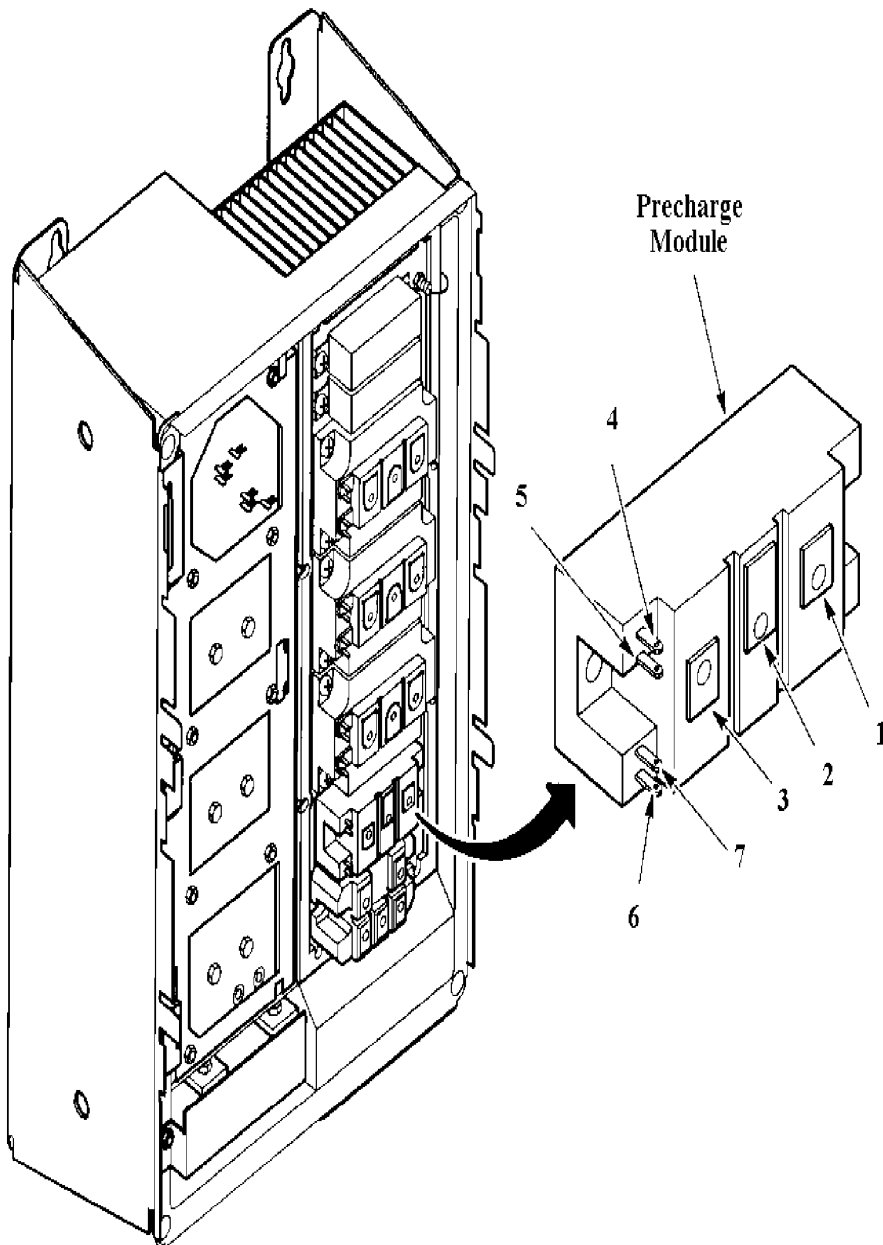
NOTE: Typical malfunction is shorted in both directions.

6. If your readings do not match the table readings, replace Transistor Module Q1, Q2, or Q3.
 - a Clean all surfaces between the transistor and the heat sink using a soft, clean cloth.
 - b. Replace the Preform between the transistor and the heat sink.
 - c. Torque all screws to 25-31 lb-in. or 2.8-3.5 N-m.
7. If a Transistor Module is replaced, replace the Precharge Module. Refer to Test 4 - Testing the Precharge Module. You must also test the Gate Driver Board. Refer to Test 5 - Testing the Gate Driver Board.
8. Replace and secure the Gate Driver Board and Main Control Board.

Test 4 Testing the Precharge Module

The Precharge Module is located near the bottom of the heat sink. If one or more Transistor Modules has been replaced, you must replace the Precharge Module.

Precharge Module Test



ATTENTION: Disconnect and lock out power from the drive before disassembling the drive. Failure to disconnect power may result in death or serious injury. Verify bus voltage by measuring the voltage between +DC and -DC on Terminal Block TB1. Do not attempt to service the drive until the bus voltage has discharged to zero volts.

IMPORTANT: Before you remove connections and wires from the drive components, mark the connections and wires to correspond with their component connections and terminals to prevent incorrect wiring during assembly.

1. Remove power from the drive.
2. Check for zero volts at TB1 terminals +DC and -DC before proceeding.
3. Remove the Main Control Board and Gate Driver Board.
4. Set your meter to test diodes.
5. Test the module. The following table shows meter connections at the module and ideal meter readings for those connections. Refer to the former illustration for meter connection locations.

Precharge Module Test

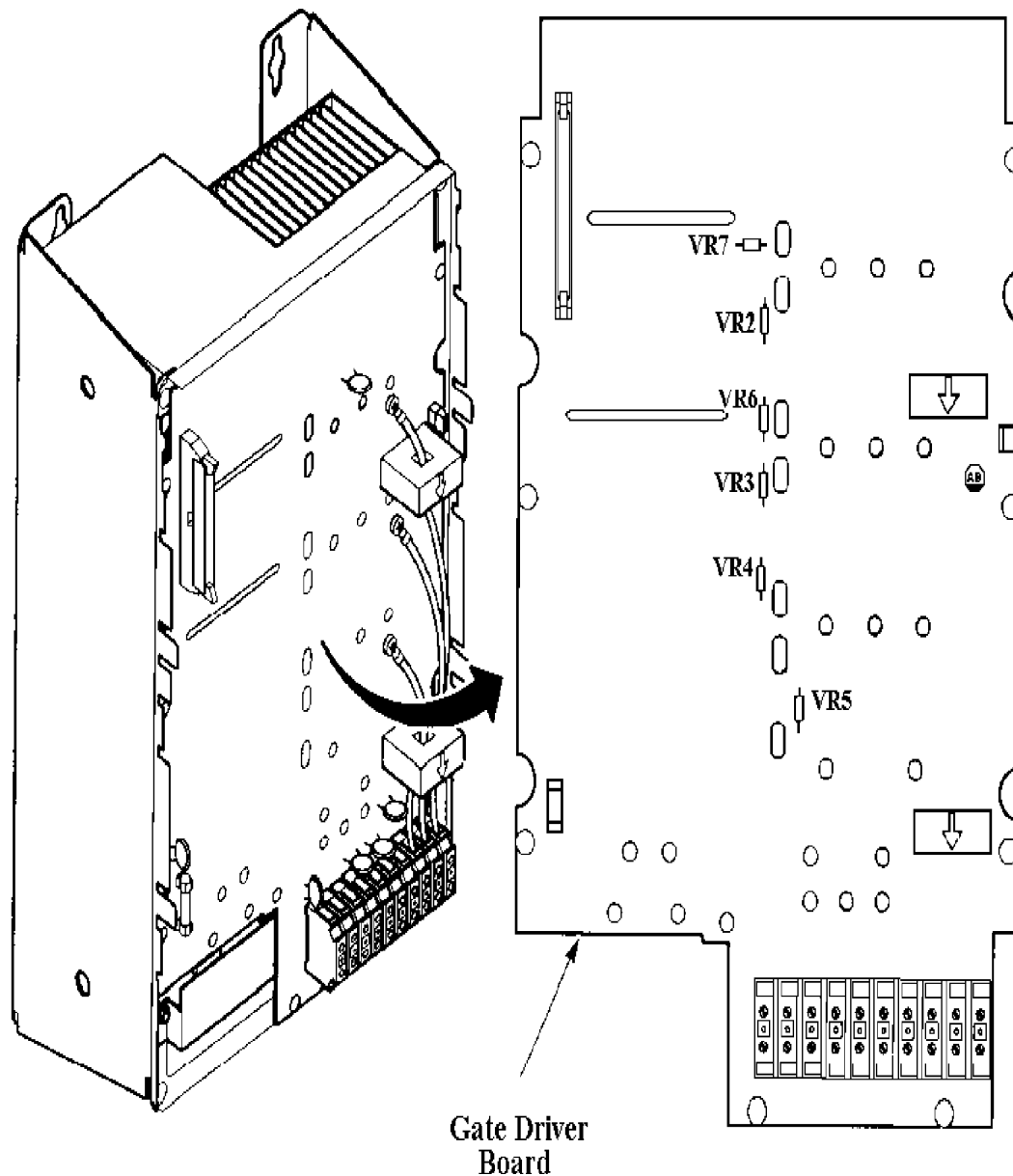
Meter (+) Lead	Meter (-) Lead	Nominal Meter Reading
1	3	0.35
3	1	Infinite
4	5	Infinite
5	4	Infinite

6. If your readings do not match the table readings, replace the Precharge Module.
 - a. Clean all surfaces between Precharge Module and the heat sink using a soft, clean cloth.
 - b. Replace the Preform between the module and the Main Chassis.
 - c. Torque all the screws to 25-31 lb-in. or 2.8-3.5 N-m.
7. Replace and secure the Gate Driver Board and Main Control Board.

Test 5 Testing the Gate Driver Board

The Gate Driver Board is located between the Main Control Board and the Main Chassis. If one or more Transistor Modules Q1, Q2, or Q3 has been replaced, you must test the Gate Driver Board.

Gate Driver Board Test



ATTENTION: Disconnect and lock out power from the drive before disassembling the drive. Failure to disconnect power may result in death or serious injury. Verify bus voltage by measuring the voltage between +DC and -DC on Terminal Block TB1. Do not attempt to service the drive until the bus voltage has discharged to zero volts.

IMPORTANT: Before you remove connections and wires from the drive components, mark the connections and wires to correspond with their component connections and terminals to prevent incorrect wiring during assembly.

1. Remove power from the drive.
2. Check for zero volts at TB1 terminals +DC and -DC before proceeding.
3. Remove the Main Control Board.
4. Unplug the connectors from the Gate Driver Board.
5. Set you meter to test resistance.
6. Check Fuse F1, located on the lower left side of the Gate Driver Board, for continuity. Replace the fuse if it shows an open condition
7. Set your meter to test diodes.
8. Test VR2 through VR7. The following table shows meter connections at the components and ideal meter readings for those connections Refer to the former illustration for meter connection locations.

Gate Driver Board Test

Component	Meter (+) Lead	Meter (-) Lead	Nominal Meter Reading
VR2	+	-	1.2
	-	+	2.5
VR3	+	-	1.2
	-	+	2.5
VR4	+	-	1.2
	-	+	2.5
VRS	+	-	1.2
	-	+	2.5
VR6	+	-	1.2
	-	+	2.5
VR7	+	-	1.2
	-	+	2.5

NOTE: Typical malfunction is shorted in both directions.

9. If your readings do not match the table readings, replace the Gate Driver Board.