

## 1336 PLUS and 1336 FORCE AC Drive Series C Conversion Kit

1336 PLUS (Series A & B)

A007 - A015

B007 - B030

C007 - C020

1336 FORCE™ (Series B)

A007 - A015

B007 - B030

C007 - C020

Use these instructions to upgrade 1336 PLUS and 1336 FORCE Drives from Series A and Series B to Series C. These instructions are primarily intended for qualified Allen-Bradley service personnel responsible for troubleshooting and repairing the 1336 PLUS Adjustable Frequency AC Drive. Read and understand the following instructions, the enclosed Documentation Update, and the Troubleshooting Guide and Renewal Parts manual before removing or installing any parts.

This instruction kit contains:

- Wrist strap for ESD protection
- Series C drive nameplate update label
- Series C Precharge Module Kit
- Series C Precharge Insulator for Stand Alone Drives
- Series C Precharge Jumper for Common Bus Drives
- Series C Gate Driver/Power Supply Board Kit
- Series C DC Bus Inductor Kit
- 1336 PLUS-6.1 Troubleshooting Guide and Renewal Parts Manual - November, 1995, P/N 74001-036-01(E)

### References

These instructions reference the Troubleshooting Guide and Renewal Parts manual, Publication 1336 PLUS-6.1 - November, 1995, P/N 74001-036-01(E).

### Tools

Refer to Publication 1336 PLUS-6.1, Chapter 3 - Disassembly and Access Procedures, Tools. The same tools apply to the 1336 FORCE.

## Safety Precautions



**ATTENTION:** Some printed circuit boards and drive components may contain hazardous voltage levels. Remove and lock out power before you disconnect or reconnect wires, and before you remove or replace fuses and circuit boards. 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.

**ATTENTION:** Only personnel familiar with the 1336 PLUS Adjustable Frequency AC Drive and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

## Electrostatic Discharge Precautions



**ATTENTION:** This assembly contains parts and sub-assemblies that are sensitive to electrostatic discharge. Static control precautions are required when servicing this assembly. Component damage may result if you ignore electrostatic discharge control procedures. If you are not familiar with static control procedures, reference Allen-Bradley Publication 8000-4.5.2, Guarding Against Electrostatic Damage, or any other applicable ESD protection handbook.

Electrostatic discharge generated by static electricity can damage the complimentary metallic oxide semiconductor devices on various drive boards. It is recommended that you perform these procedures to guard against this type of damage when circuit boards are removed or installed:

- Wear a wrist type grounding strap that is grounded to the drive chassis.
- Attach the wrist strap before removing the new circuit board from the conductive packet.
- Remove boards from the drive and immediately insert them into their conductive packets.

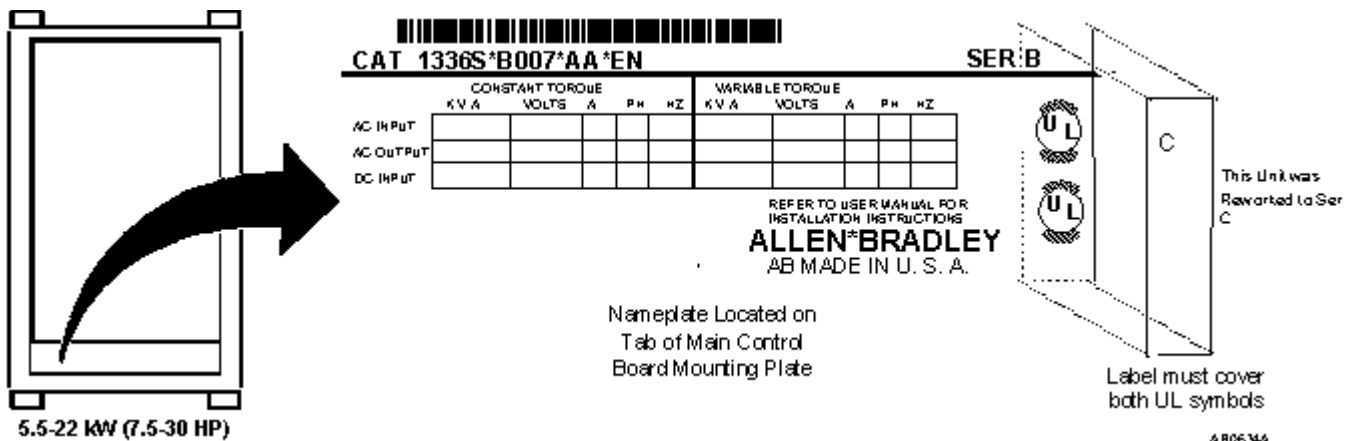
Updating the Drive Nameplate

## Conversion Procedures

The drive nameplate is located on the face of the Main Control Board Mounting Plate. The drive nameplate contains the catalog number and other important drive information. Remove the label from the enclosed envelope and apply the label to the right side of the nameplate.

**Important:** The label must cover both UL symbols.

Figure 1.1 - Drive Nameplate Location



## 1336 PLUS Parts Removal Procedure

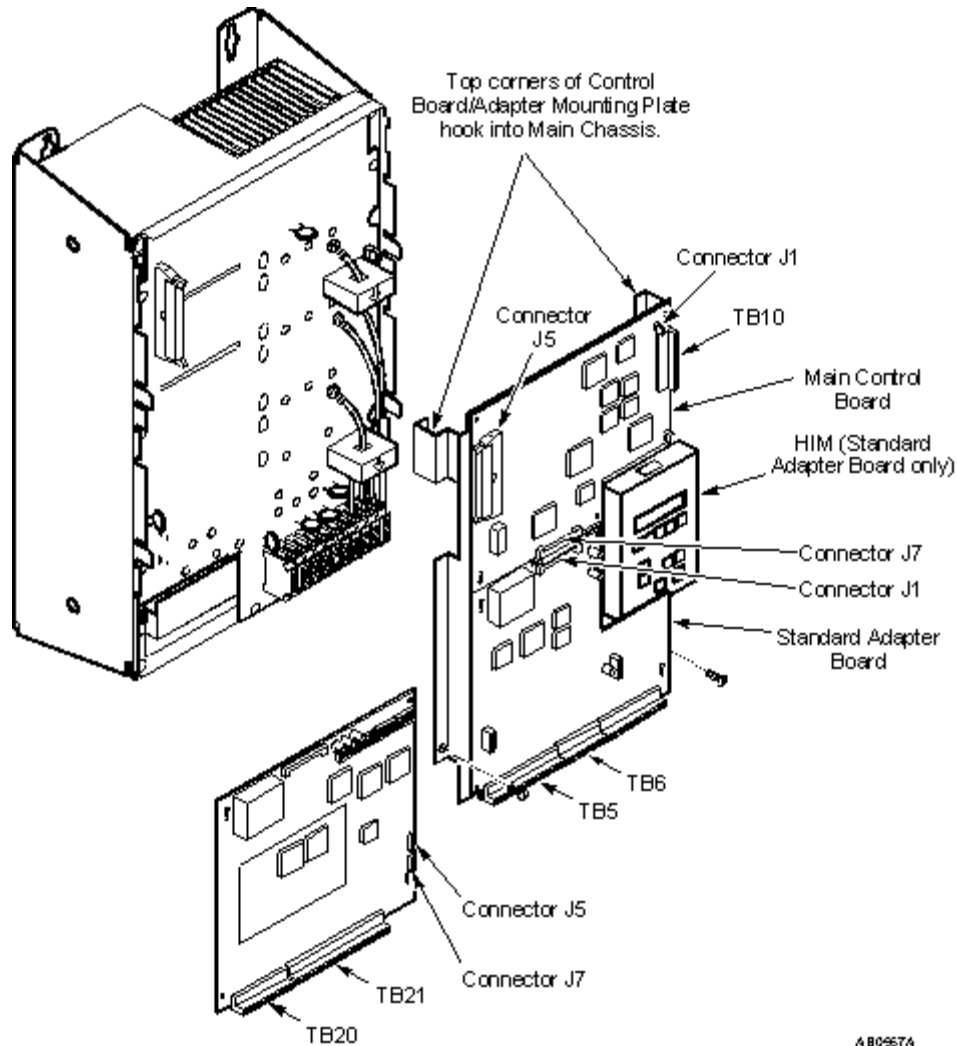
**Important:** Before you remove connections and wires from the drive components, mark the connections and wires to correspond with their component connections and terminals to prevent incorrect wiring during assembly.

1. Remove power from the Drive.
2. Remove the Enclosure cover. Refer to Chapter 3 - Disassembly and Access Procedures, Removing the Drive Enclosure.
3. Check for zero volts at TB1 Terminals +DC and -DC.
4. Check for the absence of control voltage.
5. Remove the Gate Driver/Power Supply Board. Refer to Chapter 3 - Disassembly and Access Procedures, Removing the Gate Driver/Power Supply Board.
6. Remove the Precharge Module. Refer to Chapter 5 - Part Replacement Procedures, Precharge Module.

**Important:** Use a permanent marker on the removed Precharge Module to indicate that it is not to be installed in the Series C drive.

7. Remove the DC Bus Inductor. Refer to Chapter 5 - Part Replacement Procedures, DC Bus Inductor L1.

## 1336 FORCE Parts Removal Procedure



**Figure 1.2 - 1336 Force Control Board/Adapter Mounting Plate and Connections**

**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. Remove the Enclosure cover. Refer to Publication 1336 PLUS-6.1 Troubleshooting Guide and Renewal Parts, Chapter 3 - Disassembly and Access Procedures, Removing the Drive Enclosure.
3. Check for zero volts at TB1 Terminals +DC and -DC.
4. Check for the absence of control voltage.
5. Disconnect the following from the Main Control Board:
  - J5 ribbon cable connector
  - J1 connector
  - Ground from stake-on connector TE
  - All wires from TB10
  - All wires from TB11

6. Disconnect the following from the:

**A. Standard Adapter Board:**

- All wires from TB5
- All wires from TB6
- All wires from TB7
- J9 connector
- J11 connector
- Ground stake-on connector TE
- All wiring from TB3 on the Control Interface Board

**B. PLC Comm Board:**

- TB20
- TB21
- J5 Connector
- J7 Connector

7. Loosen the two captive screws near the bottom of the Main Control Board Mounting Plate.

8. Pull the Main Control Board Mounting Plate out about two inches, then slide it downward.

9. Remove the Gate Driver Board. Refer to 1336 PLUS Troubleshooting Guide and Renewal Parts, Chapter 3 - Disassembly and Access Procedures, Removing the Gate Driver/Power Supply Board.

10. Remove the Precharge Module. Refer to 1336 PLUS Troubleshooting Guide and Renewal Parts, Chapter 5 - Part Replacement Procedures, Precharge Module.

**Important:** Use a permanent marker on the removed Precharge Module to indicate that it is not to be installed in the Series C drive.

11. Remove the DC Bus Inductor. Refer to 1336 PLUS Troubleshooting Guide and Renewal Parts, Chapter 5 - Parts Replacement Procedures, DC Bus Inductor L1.

## **Precharge Module Installation**

1. Remove power from the Drive.

2. Check for zero volts at TB1 Terminals +DC and -DC.

3. Check for the absence of control voltage.

4. Clean the surface of the heat sink using a soft, clean cloth where the old Precharge Module was installed.

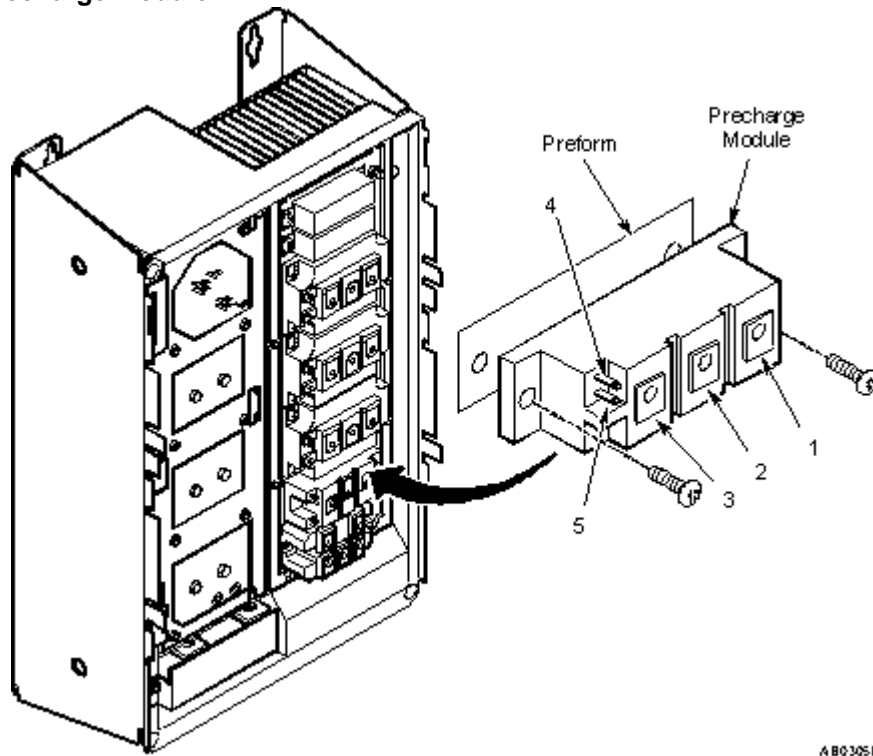
5. Replace the Preform between the Precharge Module and the heat sink.

6. Fasten the Series C Precharge Module to the heat sink using two screws. Torque to 25-31 lb-in.

7. Install the Series C DC Bus Inductor. Refer to the next section in this document.

For fastener torque specifications, refer to Table 1.C - Fastener Torque Specifications at the end of this document.

Figure 1.3 Series C Precharge Module



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## DC Bus Inductor Installation

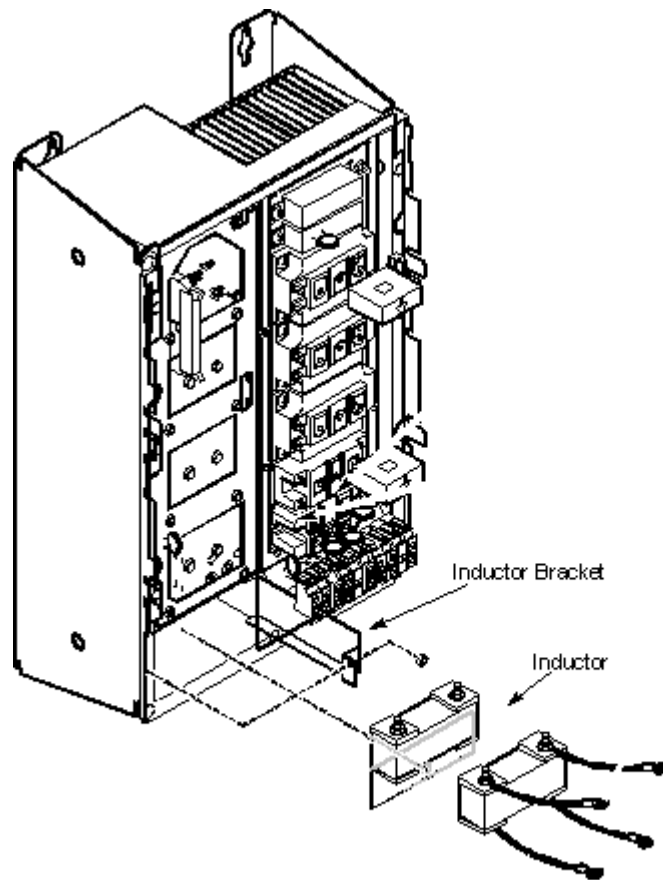
1. Lower the Series C DC Bus Inductor into the Chassis. Align the hole in the bottom inductor bracket with the peg on the Chassis.

**Important:** The DC Bus Inductor insulator may shift when the inductor is removed. Before installing the Series C inductor, check the insulator position.

2. Fasten the Inductor Bracket over the inductor.
3. Fasten the Inductor Bracket to the Chassis.
4. Install the Series C Gate Driver/Power Supply Board. Refer to the next section in this document

For fastener torque specifications, refer to Table 1.C - Fastener Torque Specifications at the end of this document.

Figure 1.4 Series C Precharge Module



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### Stand Alone Drives

1. Fold and insert the Precharge Insulator through the back of the Gate Driver/Power Supply Board. Refer to Figure 1.5 in this document.

2. Position the Series C Gate Driver/Power Supply Board in the drive.

**Important:** Stand Alone Drives do not use jumpers between terminals E29 and E19, E22 and E21, on the Series C Gate Driver/Power Supply Board.

3. Connect to the Gate Driver/Power Supply Board:

- DC Bus Inductor wires. Refer to Table 1.A, Table 1.B, Figure 1.6, and Figure 1.7.
- P13 and P14 stake-on connectors.
- E25 ground wire.
- J3 connector fan wires.
- All gate connectors to the transistor and Precharge Module stake-on connectors.

4. Insert and tighten all screws to the power components.

**Important:** The locations of terminals E1 and E26 on the Series C Gate Driver/Power Supply Board have changed.

5. Install the Main Control Board Mounting Plate and the Enclosure cover in reverse order of removal.

# Gate Driver Power Supply Board Installation



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

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For fastener torque specifications, refer to Table 1.C - Fastener Torque Specifications at the end of this document.

## Common Bus Drives

1. Position the Series C Gate Driver/Power Supply Board in the drive.

**Important:** Common Bus Drives do not use a Pre-Charge Insulator on the back of the Series C Gate Driver/Power Supply Board.

2. Position the two Pre-Charge Jumpers on the front of the Gate Driver/Power Supply Board. Refer to Figure 1.5 in this document. Place one jumper:

- Between E29 and E19.
- Between E22 and E21.

3. Connect to the Gate Driver/Power supply Board:

- DC Bus Inductor wires. Refer to Table 1.A, Table 1.B, Figure 1.6, and Figure 1.7.
- P13 and P14 stake-on connectors.
- E25 ground wire.
- J3 connector fan wires.
- All gate connectors to the transistor and Pre-Charge Module stake-on connectors.

4. Insert and tighten all screws to the power components.

**Important:** The locations of terminals E1 and E26 on the Series C Gate Driver/Power Supply Board have changed.

5. Change TB1 input power to the Drive:

- Remove the input from TB1 terminal DC- and install it on TB1 terminal L1 (R).
- Do not move the DC+ input from TB1 terminal L3 (T).

6. Install the Main Control Board Mounting Plate and the Enclosure cover in reverse order of removal.



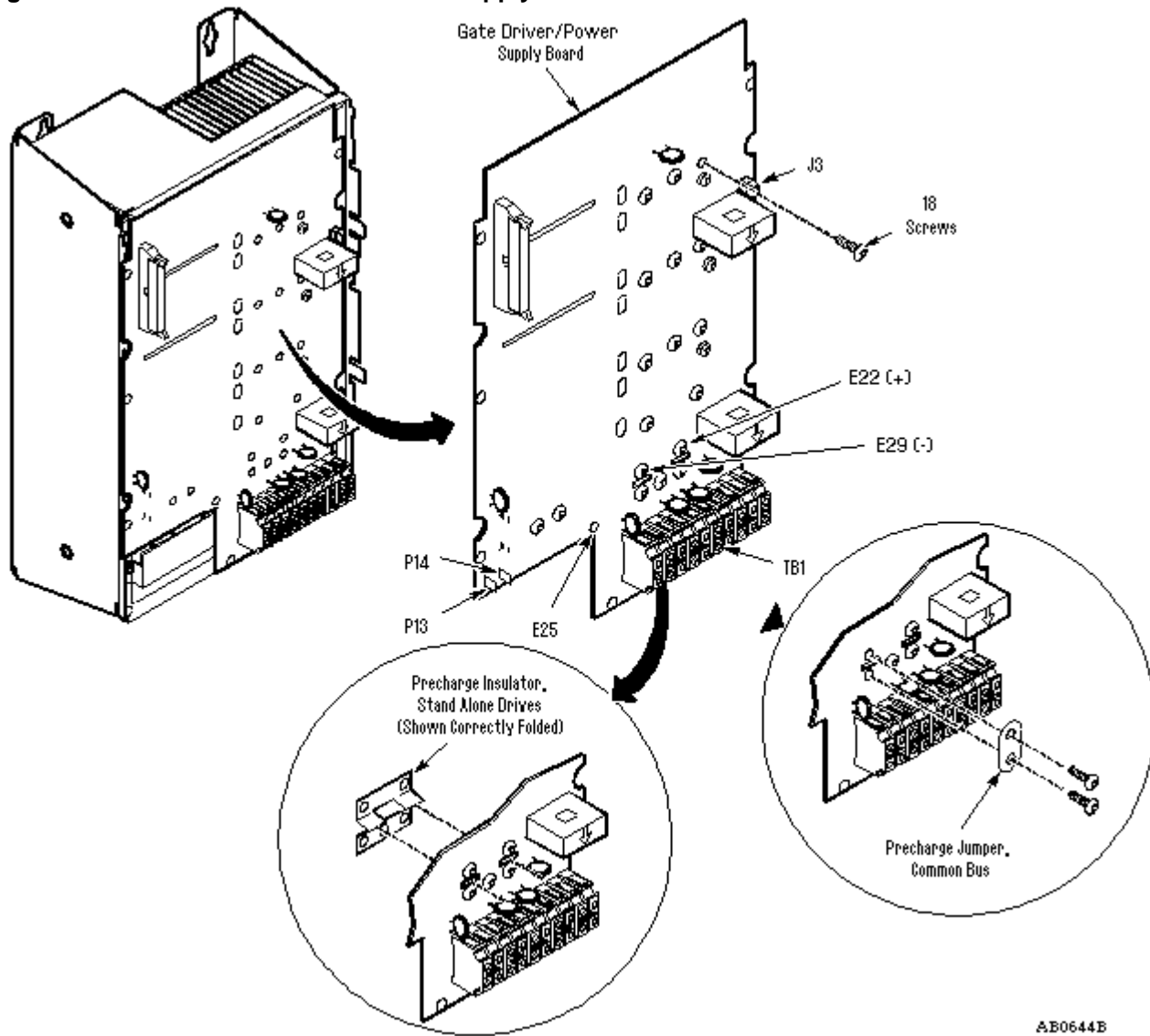
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**ATTENTION:** Replace all guards before applying power to the drive. Failure to replace guards may result in death or injury.

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For fastener torque specifications, refer to Table 1.C - Fastener Torque Specifications at the end of this document.

Figure 1.5 - Series C Gate Driver/Power Supply Board



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Figure 1.6 - DC Bus Inductor and Gate Driver/Power Supply Board, A010, A015, B020-B030, and C020 Drives

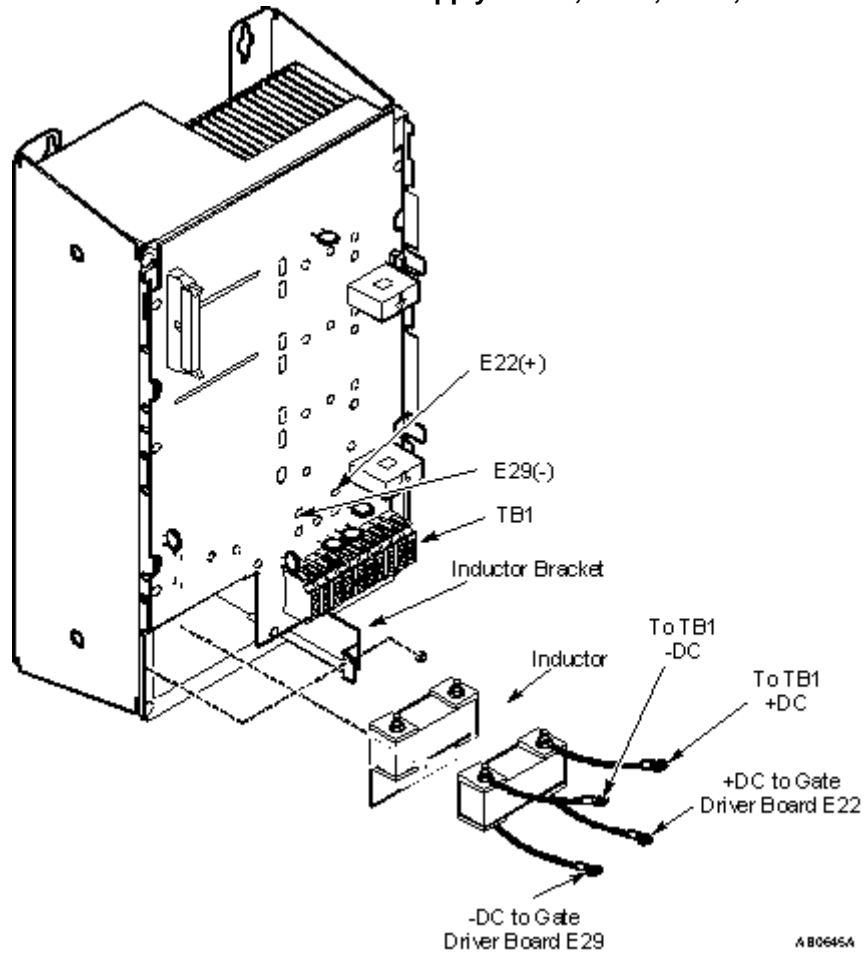


Table 1.A - Inductor Connections, A010, A015, B020-B030, and C020 Drives.

Inductor Wire Label	Gate Driver/Power Supply Board Connection	Drive Rating
TB1 +DC	TB1 Terminal +DC	A010, A015,
TB1 -DC	TB1 Terminal -DC	B020-B030, C020

Figure 1.7 - DC Bus Inductor and Gate Driver/Power Supply Board, A007, B007-B015, and C007-C015 Drives

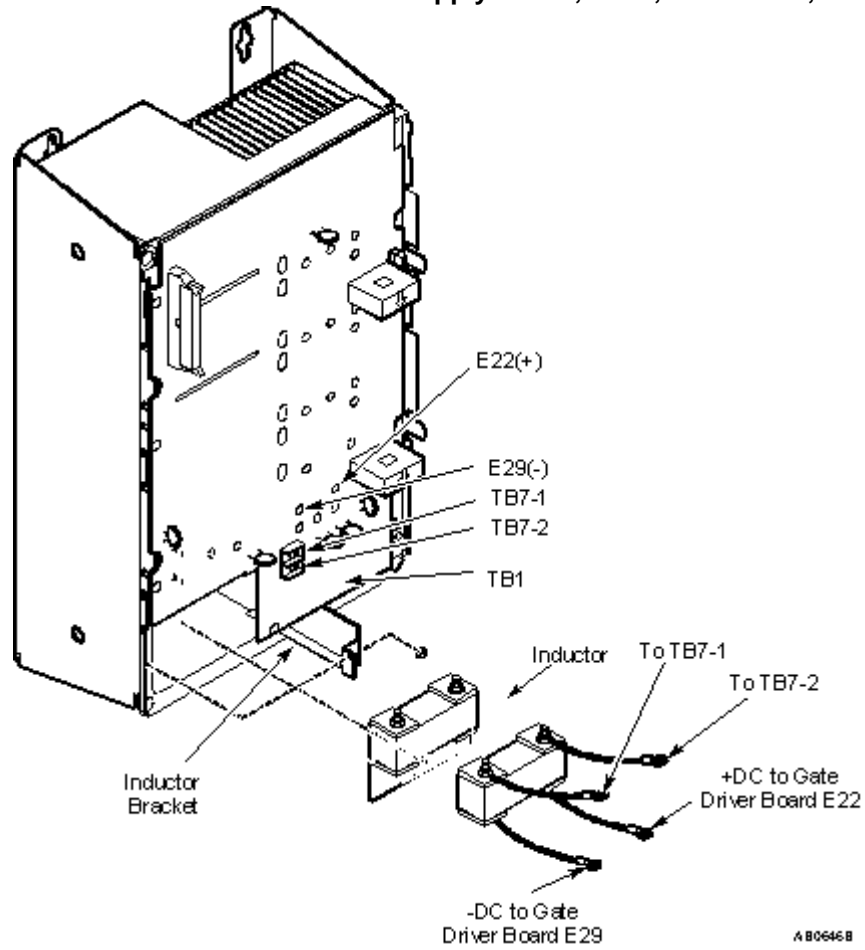


Table 1.B - Inductor Connections, A007, B000-B015, and C007-C015 Drives.

Inductor Wire Label	Gate Driver/Power Supply Board Connection	Drive Rating
TB7-1	TB7 Terminal 1	A007, B007-B015, C007-C015
TB7-2	TB1 Terminal 2	

## Torque Specifications

The following table lists torque specifications.

**Table 1.C - Fastener Torque Specifications**

Component	Fastener Application	Torque, lb-in.	Torque, N-m
Pre-Charge Module M1	Module to Heat Sink	22-30	2.5-3.4
DC Bus Inductor	Inductor to Chassis	22-30	2.5-3.4
	Inductor wires to Gate Driver Board	22-30	2.5-3.4
	Inductor wires to TB1 (A010, A015, B020-B030, and C020 Drives)	15	1.7
	Inductor wires to TB7 (A007, B000-B015, C007-C015 Drives)	15	1.7
	Board to Bus Capacitors	22-30	2.5-3.4
Gate Driver Board	Board to Pre-Charge Module M1 (M5 screw, B007-B015 Drives)	22-30	2.5-3.4
	Board to Pre-Charge Module M1 (M6 screw, B020-B030 Drives)	30-39	3.4-4.4
	Board to Bridge Rectifier BR1	22-30	2.5-3.4
Ground Jumper	Jumper to Gate Driver Board	22-30	2.5-3.4