



# GE Industrial Control Systems

## CONTACTOR DRIVER BOARD

### DS200CDBAG1A\_\_ and DS200CDBAG1B\_\_

*These instructions do not purport to cover all details or variations in equipment, nor to provide every possible contingency to be met during installation, operation, and maintenance. If further information is desired or if particular problems arise that are not covered sufficiently for the purchaser's purpose, the matter should be referred to GE Industrial Control Systems.*

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## FUNCTIONAL DESCRIPTION

### WARNING

**This equipment contains a potential hazard of electric shock or burn. Only adequately trained persons who are thoroughly familiar with the equipment and the instructions should install or maintain this equipment.**

## INTRODUCTION

The DS200CDBA Contactor Driver Board (CDBA) interfaces the drive control to a high speed contactor. This allows fast dropout protection in the drives. The CDBA board provides power to open and close a contactor that is controlled by the DS200DCFB Power Supply Board (DCFB), DS200SDCI Dc Power Supply and Instrumentation Board (SDCI), or Feedback Acquisition and Power Supply Board (DCVA). Each CDBA board can operate one high speed contactor. Jumper JP2, on revision G1BBA to present boards, provides coordination with other CDBA boards (and their contactors) in a multibrige system so that all contactors will operate together. An LED indicates local contactor close command status when coordinated operation is selected. (See Figure 1 and Table 1.)

The CDBA board is powered from 75 – 140 V ac/dc and the input power is fused by FU1. Contactors used with the CDBA board must have coil voltages of 30 to 40 V dc.

## SAFETY SYMBOL LEGEND

### WARNING

Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in personal injury or death.

### CAUTION

Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in damage to or destruction of equipment

**NOTE** Indicates an essential or important procedure, practice, condition, or statement.

To close a contactor, the CDBA board applies 105 V dc for 250 milliseconds to force the contactor to close. The CDBA then regulates the contactor drive current at the level set by potentiometer (pot) RV1 to keep the contactor closed. This can be measured at testpoint TP3, REFA. (See Figure 1 and Tables 2 and 3.)

## CAUTION

**When replacing the CDBA board, pot RV1 on the new (replacement) board must be set to the same position as that on the board being replaced. For DS304-type contactors, failure to adjust the pot as described in the following section may cause the contactor coil to fail.**

### POT RV1 SETTING

Pot RV1 determines the amount of current that will drive the associated contactor. RV1 is typically set to regulate the contactor drive current at 1.5 amps. For DS304-type contactors, the drive current must be set at 0.75 amps. See Table 2 for RV1 settings and Table 3 for testpoint descriptions.

### BOARD GROUPS

There is only one group of the CDBA board, G1. However, the G1 board has two revision levels, G1A and G1B.

- All G1A revision boards do not have the coordinated operation feature and JP2 and LED1 are not included on the boards.
- G1BBA to present revision boards provide coordinated operation and include JP2 and LED1.

### COORDINATED OPERATION

Revision G1BBA to present CDBA boards provide for coordinated contactor operation. JP2 selects coordinated operation and LED1 provides status information when in coordinated mode. Placing JP2 in the 2.3 position allows the control inputs at 1TB-9 and 1TB-10 to operate contactors in a coordinated manner. By connecting the inputs of these associated CDBA boards in parallel, the associated contactors will operate together (coordinated) when all of the associated CDBA board's 1TB-1 and 1TB-2 inputs are enabled.

There is a normally-closed solid-state switch that is enabled when JP2 is in the 2.3 position. This switch opens when 1TB-1 and 1TB-2 are energized and allows the current input at 1TB-9 and 1TB-10 to energize the contactor. See Table 1 and Table 4.

## APPLICATION DATA

### BOARD HARDWARE

The CDBA board includes a potentiometer, two configurable jumpers, an LED indicator, three testpoints, a fuse, and wiring connectors (terminal boards and plug connectors) as part of the board. These items are described in the following paragraphs of this section.

### POTENTIOMETER (POT)

All CDBA boards include an adjustable pot for setting contactor driver current. Refer to Figure 1 for location, Table 2 for description, and the Pot RV1 Setting paragraph.

### CONFIGURABLE JUMPERS (JP)

All G1A revision CDBA boards include one configurable jumper for factory test selection. Revision G1BBA to present CDBA boards include two configurable jumpers for factory test selection and for coordinated operation selection. Refer to Figure 1 for the location of the jumpers (JP), to Table 1 for the settings for the jumpers, and the Coordinated Operation paragraph.

### LED INDICATOR

Revision G1BBA to present CDBA boards include one red LED (LED1) for coordinated operation indication. LED1 is lit when JP2 is in the 2.3 position and the signal on 1TB1 and 1TB2 is de-energized. LED1 is not lit if JP2 is in the 1.2 position. See Figure 1 for the location of the LED indicator.

### TESTPOINTS

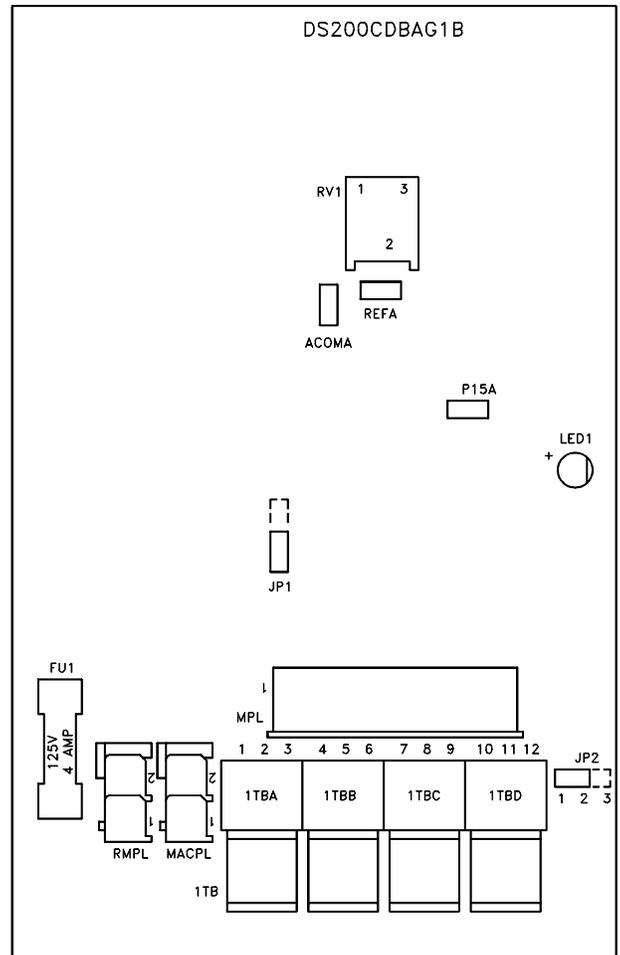
Three testpoints are present on the CDBA board to allow checking of the REFA voltage signal (determined by pot RV1), CDBA board common (ACOMA, that is different from drive common), and the board's +15 V dc power supply (referenced to ACOMA). See Figure 1 for the locations of the testpoints and Table 3 for the descriptions.

**FUSE (FU1)**

The CDBA board includes one protective fuse, FU1, on the input power to the board. FU1 is a 4 amp, 125 V, 2AG slow-blow fuse. If FU1 continually blows, the CDBA board is probably defective (and should be replaced) or the board’s associated contactor coil is shorted. See Figure 1 for the location of FU1.

**BOARD CONNECTORS**

The CDBA board receives input signals/power and sends output signals via one terminal board (that consists of four sections) and three plug connectors. See Figure 1 for a CDBA board layout diagram showing the locations of these connectors and see Tables 4 through 7 for the signal descriptions of the terminal board and connectors.



**NOTE:** Revision G1B board shown; G1A revision does not include JP2 or LED1.

Figure 1. CDBA Board Layout Diagram

Table 1. CDBA Board Jumper (JP1 and JP2) Settings

Revision	Name	Description
All	JP1	Factory test jumper JP1 position 2.3 allows the current output scaling to be lowered for factory board test purposes. If not in factory board test; JP1 must be 1.2. 1.2 Normal operation 2.3 Special setting for factory board test
BBA-Present	JP2	Provides for coordinated operation of multiple CDBA boards For coordinated operation (2.3 position), apply parallel voltage to 1TB-9 and 1TB-10. This circuit was designed for 12 circuits using 340 ohms in series with the 24 volt power supply. All 12 CDBA inputs can be connected together (coordinated) so that all contactors will pick up and drop out together. 1.2 Normal non-coordinated CDBA board operation 2.3 Coordinated operation

Table 2. CDBA Board Potentiometer (RV1) Settings

Revision	Name	Description															
All	RV1	<p>Contactactor coil current reference pot                      Pot RV1 controls the amount of current that will drive the contactactor coil, as measured using testpoints REFA and ACOMA (see NOTE below). This pot is set at the factory and varies depending on the particular contactactor to be driven. The following calibration information is for the CDBA board. Consult the factory for the proper setting if RV1 is suspected to be set incorrectly.</p> <table border="1"> <thead> <tr> <th>REFA to ACOMA Voltage (V dc)</th> <th>Coil Current (A)</th> <th>RV1 Position</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>0.60</td> <td>Fully counterclockwise</td> </tr> <tr> <td>0.12</td> <td>0.75</td> <td>-----</td> </tr> <tr> <td>0.70</td> <td>1.50</td> <td>Approximately 11 o'clock</td> </tr> <tr> <td>1.50</td> <td>2.50</td> <td>Fully clockwise</td> </tr> </tbody> </table> <p><b>NOTE: All CDBA board testpoints are referenced at CDBA common (ACOMA), that is different from drive common. Therefore, all test measurements must be performed using isolated test equipment that is suitable for measuring floating potentials.</b></p>	REFA to ACOMA Voltage (V dc)	Coil Current (A)	RV1 Position	0.00	0.60	Fully counterclockwise	0.12	0.75	-----	0.70	1.50	Approximately 11 o'clock	1.50	2.50	Fully clockwise
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0.70	1.50	Approximately 11 o'clock															
1.50	2.50	Fully clockwise															

Table 3. CDBA Board Testpoints

Testpoint	Nomenclature	Description
TP1	ACOMA	<p>Common reference point for CDBA board.  <b>NOTE: All CDBA board testpoints are referenced at CDBA common (ACOMA), that is different from drive common. Therefore, all test measurements must be performed using isolated test equipment that is suitable for measuring floating potentials.</b></p>
TP2	P15A	Testpoint for CDBA +15 V dc ( $\pm 20\%$ ) power supply referenced to ACOMA.
TP3	REFA	Testpoint for contactactor driver reference voltage (referenced to ACOMA) that sets the amount of current that will drive the contactactor. This voltage is set using pot RV1 (see Table 2). RV1 is set at the factory for the appropriate contactactor to be driven. Consult the factory if the setting is suspected to be incorrect.

Table 4. Connector 1TB,  
CDBA Board Contactor Control Connections

Revision	Pin No.	Description
All	1TB-1 1TB-2	Coil Driver Series Interlock Inputs 1TB-1 and 1TB-2 are connection points for an interlock to be wired in series with the coil driver signal from connector MACPL. (MACPL is intended for factory wiring only.)
All	1TB-3 1TB-4	Contactor Normally-Open Interlocks 1TB-3, 1TB-4 are normally-open auxiliary contacts from the MD contactor.
All	1TB-5 1TB-6	Contactor Normally-Closed Interlocks 1TB-5, 1TB-6 are normally-closed auxiliary contacts from the MD contactor.
All	1TB-7 1TB-8	Contactor Normally-Open Interlocks 1TB7, 1TB-8 are normally-open auxiliary contacts from the MD contactor.
AAA – Pres.	1TB-9 1TB-10	Contactor Normally-Closed Interlocks 1TB-9, 1TB-10 are normally-closed auxiliary contacts from the MD contactor. These normally-closed contacts are internally wired to the CDBA control circuitry, and should not be used on these revision boards.
BBA – Pres.	1TB-9 1TB-10	Contactor Normally-Closed Interlocks 1TB-9, 1TB-10 are normally-closed auxiliary contacts from the MD contactor. These normally-closed contacts are internally wired to the CDBA control circuitry, and should be used only for multibrige coordination function (JP2 = 2.3).
All	1TB-11	Input Power (CPH) Hot (or positive, +) input power for the CDBA board. 1TB-11 and 1TB-12 are electrically parallel with RMPL pins 1 and 2 respectively. RMPL is intended for factory daisy chain wiring of control power (see Table 7).
All	1TB-12	Input Power (CPN) Neutral (or negative, –) input power for the CDBA board. 1TB-11 and 1TB-12 are electrically parallel with RMPL pins 1 and 2 respectively. RMPL is intended for factory daisy chain wiring of control power (see Table 7).

Table 5. Connector MACPL,  
I/O Between CDBA Board and DCFB (or SDCI) Board

Pin No.	Description
1	MD #1 contactor control common output.
2	MD #1 contactor control 24 V dc output.
3	MD #2 contactor control common output. (Not connected on SDCI.)
4	MD #2 contactor control 24 V dc output. (Not connected on SDCI.)

Table 6. Connector MPL,  
Contactor Driver Circuit Connector (From SHVI Board\*)

Pin No.	Nomenclature	Description
MPL-1	-----	Contact driver #1 positive (+), connected to stab terminal M1.
MPL-2	-----	Contact driver #1 negative (-), connected to stab terminal B1.
MPL-3	-----	Contact driver #2 positive (+), connected to stab terminal M2.
MPL-4	-----	Contact driver #2 negative (-), connected to stab terminal B2.

\*May not be used in some applications.

Table 7. Connector RMPL,  
Contactor Driver Circuit Connectors (From SHVI Board\*)

Pin No.	Nomenclature	Description
RMPL -1	-----	Contact power positive (+).
RMPL -2	-----	Contact power negative (-).
RMPL -3	-----	Contact power positive (+).
RMPL -4	-----	Contact power negative (-).

\*May not be used in some applications.

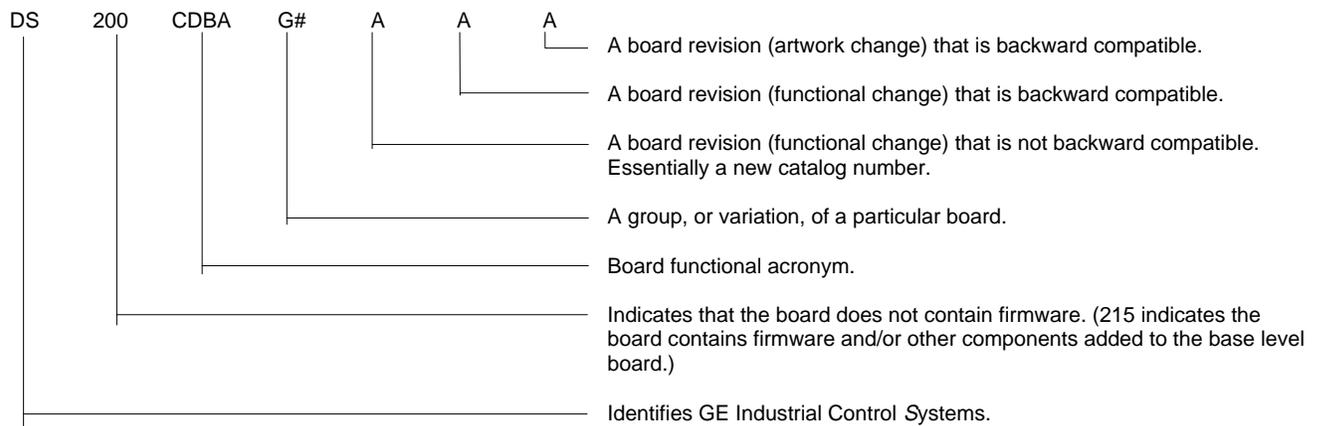


Figure 2. Sample Board Part Number, DS Series

## RENEWAL/WARRANTY REPLACEMENT

### BOARD IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the Contactor Driver Board is identified by part number DS200CDBAG#ruu. (See Figure 2 for part number breakdown.)

#### NOTE

**All digits are important when ordering or replacing any board.**

### WARRANTY TERMS

The GE Industrial Control Systems Terms and Conditions brochure details product warranty information, including the **warranty period** and **parts and service** coverage.

The brochure is included with customer documentation. It may be obtained separately from the nearest GE Sales Office or authorized GE Sales Representative.

### WARRANTY PARTS AND SERVICE

Fuse FU1 is the only end-user replaceable component on the CDBA board. If any other components on the board fail, the board needs to be replaced as a unit.

To obtain a replacement board, or service assistance, contact the nearest GE Service Office.

Please have the following information ready to exactly identify the **part** and **application**:

- GE requisition or shop order number
- Equipment serial number and model number
- Board number and description

### PROCEDURE FOR REPLACING BOARDS

#### WARNING

**Potentially lethal voltages are present on the CDBA board when powered. To prevent electric shock, turn off power to the drive, then test to verify that no power exists on the board before touching it or any connected circuits.**

#### CAUTION

**To prevent equipment damage, do not remove boards or connections, or re-insert them, while power is applied to the drive.**

**Treat all boards as static-sensitive. Use a grounding strap when changing boards or software chips, and always store boards in anti-static bags or boxes they were shipped in.**

To replace a CDBA board:

1. **Turn off all power to the drive**, then wait several minutes for all the power supply's capacitors to discharge. Test any electrical circuits before touching them to ensure the power is off.
2. Open the drive's cabinet door to access the printed wiring boards and locate the CDBA board.

#### NOTE

**Connector 1TB consists of four two-section connectors (1TBA – 1TBD). One section of the connector is mounted on the CDBA board and the other section, that contains the screw terminals, plugs into the board-mounted section. Do not disconnect the individual wires from the screw terminal section. Instead, after noting the location of each connector, use a screwdriver to carefully pry the two sections apart.**

3. Carefully disconnect all cables from the CDBA board as follows:
  - Verify cables are labeled with the correct connector name (as marked on the board) to simplify reconnection.
  - For cables with pull tabs, carefully pull the tab.
  - Pry the two sections of the 1TB connectors apart using a screwdriver.

#### NOTE

**The CDBA board is typically mounted on a bracket using standoffs. It may be necessary to first remove the bracket/board assembly from the drive to gain access to the board standoffs.**

4. Remove the four screws that secure the CDBA board to the four standoffs and remove the board.

#### NOTE

**Because of upgrades, boards of different revision levels may not contain identical hardware. However, GE Industrial Control Systems assures compatibility of its replacement boards.**

5. Verify that all pots and jumpers on the new (replacement) CDBA board are set in the exact same position as they were on the old board.
  - If a board revision has added or eliminated a configurable component, or readjustment is needed, refer to Table 1 and Table 2.

#### CAUTION

**When replacing the CDBA board, pot RV1 on the new (replacement) board must be set to the same position as that on the board being replaced. For DS304-type contactors, failure to adjust the pot as described in this instruction book may cause the contactor coil to fail.**

6. Pry apart the 1TBA through 1TBD connectors on the new CDBA board and set the screw terminal sections aside.
7. Orient the new CDBA board in the same position as the one removed and install it onto the four standoffs with the screws removed in step 4, then fully tighten the four screws.
8. Reinstall the bracket/board assembly if removed.
9. Reconnect all of the terminal board sections from the old CDBA board (with wires still connected) to the respective connector section on the new board. Ensure that each connector section is in the correct location and that it is properly seated.
10. Reconnect all cables to the CDBA board as labeled that were disconnected in step 3. Ensure that cables are properly seated at both ends, then close the drive cabinet door.

*Notes:*

*Notes:*



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