GE Industrial Control Systems

PCCA POWER CONNECT CARD

DS200PCCAG1A_ _ thru DS200PCCAG10A_ _

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.

CONTENTS

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.

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 DS200PCCA Power Connect Card (PCCA) provides an interface between the drive's control circuitry and the SCR power bridge.

The PCCA board uses pulse transformers to provide gate drive to the SCR bridge. For low-to-medium horsepower controllers, the PCCA board also includes snubber circuits to control spikes across the ac lines, dc bus, and gate drivers. For higher horsepower controllers, some or all of the snubber circuits are omitted from the PCCA board, and are located elsewhere in the system.

BOARD GROUPS

The PCCA board has ten group numbers. The group number used in a system is determined by the system voltage, frame size, and whether the system uses regenerative or non-regenerative power conversion. Table 1 summarizes the applications of the various PCCA board group numbers.

The armature voltage scaling depends on which PCCA board group number is used:

- **G1, G7, G9** – Regenerative, 240 – 630 volts
- **G2, G8, G10** – Non-regenerative, 240 – 700 volts

The PCCA board has four wire jumpers, designated JP1, JP2, WP3, and WP4 that select system voltage and determine snubber capacitor connections.

APPLICATION DATA

BOARD HARDWARE

The PCCA board includes configurable jumpers and wiring plug connectors (there are no LEDs, fuses, testpoints, or switches) as part of the board. These items are described in the following paragraphs of this section.

CONFIGURABLE JUMPERS (JP and WP)

The PCCA board has four wire jumpers, designated JP1, JP2, WP3, and WP4.

Jumpers JP1 and JP2 must be connected to the appropriate stab terminals P3 through P10, as determined by the card group number and system voltage. Jumpers WP3 and WP4 are used to connect stab terminals P2A to P2B, and P1A to P1B, respectively. These jumpers are used to select whether the PCCA snubber capacitors are connected to the same point on the power bridge as the voltage feedback channel.

Figure 1 shows the layout of the PCCA board, including the locations of the stab terminals. Table 2 lists and defines the placement of the wire jumpers for various PCCA board group numbers and system voltages.

BOARD CONNECTORS

The PCCA board sends forward and reverse gate pulse signals to the SCR bridge via twelve plug connectors, 1RPL – 6RPL and 1FPL – 6FPL, and communicates with the power supply board via one additional plug connector, 5PL. See Figure 1 for an PCCA board layout diagram showing the locations of these connectors and see Tables 4 and 5 for the signal descriptions of the connectors.

Table 1. PCCA Power Connect Card Group Applications

Board Group	G1, G2	G3, G4	G5, G6	G7, G8	G9, G10
Snubbers	Ac & dc	Dc only	None & no attenuation string	Ac & dc	Dc only
Frames	C, G	Not Used	J, K, M	C, G	J, M
Power Supply Board	DCFB	N/A	DCFB	SDCI	SDCI
Ac Volts	≤600 V rms	N/A	≤1500 V rms	≤600 V rms	≤600 V rms
Fuses	Line	N/A	Leg	Line	Leg
Reactors	Line	N/A	Leg	Line	Leg
Bus Transformer	Separate or common	N/A	Separate or common	Separate or common	Separate or common

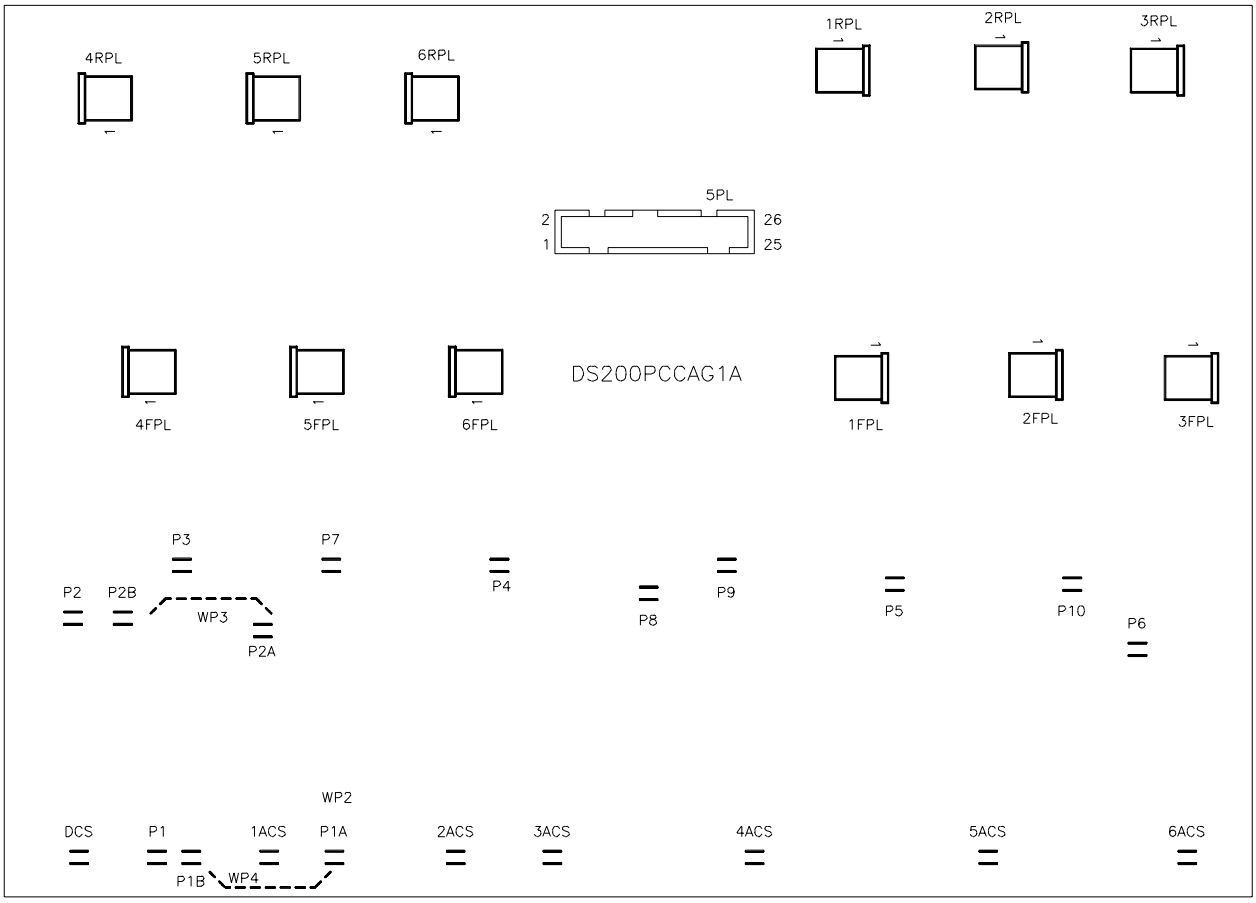

Figure 1. PCCA Card Layout Diagram

Table 2. PCCA Card Adjustable Hardware

Revision	Name	Description and Setting
All	JP1	**Groups 1, 7, 9 only** Used in conjunction with JP2 for these group boards to select dc armature voltage range (see JP2, Groups 1, 7, 9) **Pos. Voltage** 3.8 240 V dc; Also connect JP2 P6–P9 3.4 290 V dc; Also connect JP2 P5–P6 7.8 500 V dc; Also connect JP2 P9–P10 4.7 550 V dc; Also connect JP2 P5–P10 3.7 370 V dc; Also connect JP2 P6–P10 4.8 580 V dc; Also connect JP2 P5–P9 0 630 V dc; Leave all P3–P10 open
All	JP2	**Groups 1, 7, 9 only** Used in conjunction with JP1 for these group boards to select dc armature voltage range (see JP1, Groups 1, 7, 9) **Pos. Voltage** 6.9 240 V dc; Also connect JP1 P3–P8 5.6 290 V dc; Also connect JP1 P3–P4 10.9 500 V dc; Also connect JP1 P7–P8 10.5 550 V dc; Also connect JP1 P4–P7 10.6 370 V dc; Also connect JP1 P3–P7 5.9 580 V dc; Also connect JP1 P4–P8 0 630 V dc; Leave all P3–P10 open

Table 2. PCCA Card Adjustable Hardware — Continued

Revision	Name	Description
All	JP1	**Groups 2, 8, 10 only** Used in conjunction with JP2 for these group boards to select dc armature voltage range (see JP2, Groups 2, 8, 10) **Pos. Voltage** 3.8 240 V dc; Also connect JP2 P6–P9 3.4 350 V dc; Also connect JP2 P5–P6 7.8 390 V dc; Also connect JP2 P9–P10 4.7 500 V dc; Also connect JP2 P5–P10 3.7 550 V dc; Also connect JP2 P6–P10 4.8 595 V dc; Also connect JP2 P5–P9 0 700 V dc; Leave all P3–P10 open
All	JP2	**Groups 2, 8, 10 only** Used in conjunction with JP1 for these group boards to select dc armature voltage range (see JP1, Groups 2, 8, 10) **Pos. Voltage** 6.9 240 V dc; Also connect JP1 P3–P8 5.6 350 V dc; Also connect JP1 P3–P4 10.9 390 V dc; Also connect JP1 P7–P8 10.5 500 V dc; Also connect JP1 P4–P7 10.6 550 V dc; Also connect JP1 P3–P7 5.9 595 V dc; Also connect JP1 P4–P8 0 700 V dc; Leave all P3–P10 open
AAA–AAZ	JP1	**Group 5 only** Used in conjunction with JP2 for these revision and group boards to select dc armature voltage range (see JP2, Group 5, revision AAA–AAZ) **Pos. Voltage** 3.8 240 V dc; Also connect JP2 P6–P9 3.4 290 V dc; Also connect JP2 P5–P6 7.8 500 V dc; Also connect JP2 P9–P10 4.7 550 V dc; Also connect JP2 P5–P10 3.7 370 V dc; Also connect JP2 P6–P10 4.8 580 V dc; Also connect JP2 P5–P9 0 630 V dc; Leave all P3–P10 open
AAA–AAZ	JP2	**Group 5 only** Used in conjunction with JP1 for these revision and group boards to select dc armature voltage range (see JP1, Group 5, revision AAA–AAZ) **Pos. Voltage** 6.9 240 V dc; Also connect JP1 P3–P8 5.6 290 V dc; Also connect JP1 P3–P4 10.9 500 V dc; Also connect JP1 P7–P8 10.5 550 V dc; Also connect JP1 P4–P7 10.6 370 V dc; Also connect JP1 P3–P7 5.9 580 V dc; Also connect JP1 P4–P8 0 630 V dc; Leave all P3–P10 open
ABA–Pres	JP1, JP2	**Group 5 only** Jumpers deleted. Voltage attenuator strings and jumpers no longer used on Group 5 boards.

Table 2. PCCA Card Adjustable Hardware — Continued

Revision	Name	Description
AAA–AAZ	JP1	**Group 6 only** Used in conjunction with JP2 for these revision and group boards to select dc armature voltage range (see JP2, Group 6, revision AAA–AAZ) **Pos. Voltage** 3.8 240 V dc; Also connect JP2 P6–P9 3.4 350 V dc; Also connect JP2 P5–P6 7.8 390 V dc; Also connect JP2 P9–P10 4.7 500 V dc; Also connect JP2 P5–P10 3.7 550 V dc; Also connect JP2 P6–P10 4.8 595 V dc; Also connect JP2 P5–P9 0 700 V dc; Leave all P3–P10 open
AAA–AAZ	JP2	**Group 6 only** Used in conjunction with JP1 for these revision and group boards to select dc armature voltage range (see JP1, Group 6, revision AAA–AAZ) **Pos. Voltage** 6.9 240 V dc; Also connect JP1 P3–P8 5.6 350 V dc; Also connect JP1 P3–P4 10.9 390 V dc; Also connect JP1 P7–P8 10.5 500 V dc; Also connect JP1 P4–P7 10.6 550 V dc; Also connect JP1 P3–P7 5.9 595 V dc; Also connect JP1 P4–P8 0 700 V dc; Leave all P3–P10 open
ABA–Pres	JP1, JP2	**Group 6 only** Jumpers deleted. Voltage attenuator strings and jumpers no longer used on Group 6 boards.
All	WP3	**Groups 1, 2, 7–10 only** Separate/tie board snubbers and VFBK to same/different point(s) WP3 and WP4 are wire jumpers on the PCCA board that are connected between stab terminals P2A–P2B and P1A–P1B, respectively. If these jumpers are present, the card snubber capacitors are attached to the same point on the bridge as the voltage feedback channel. WP3 & WP4 may be removed if the card snubbers and voltage feedback channel need to be connected to different bridge points. Jumper IN Connect snubbers & voltage feedback channel to same point Jumper OUT Separate snubbers & voltage feedback channel
All	WP4	**Groups 1, 2, 7–10 only** Separate/tie card snubbers and VFBK to same/different point(s) Jumper IN Connect snubbers & voltage feedback channel to same point Jumper OUT Separate snubbers & voltage feedback channel

Table 3. PCCA Card Stab Terminal Connections

Stab	Card Group No.	Description
P1	**G1, 2, 7 – 10**	Positive dc bus.
P1A, P1B	**G1, 2, 7 – 10**	Positive dc bus voltage feedback. When wire jumper WJ3 is connected between these terminals, the card snubber capacitors are connected to the same point on the bridge as the voltage feedback channel (see Table 2).
P2	**G1, 2, 7 – 10**	Negative dc bus.
P2A, P2B	**G1, 2, 7 – 10**	Positive dc bus voltage feedback. When wire jumper WJ4 is connected between these terminals, the card snubber capacitors are connected to the same point on the bridge as the voltage feedback channel (see Table 2).
P3 – P10	**G1, 2, 7 – 10**	Voltage feedback scaling resistor connections (see Table 2).
DCS	**G1, 2, 7 – 10**	To dc snubber circuit.
1ACS – 6ACS	**G1, 2, 7, 8**	To ac snubber circuits.

Table 4. Connectors 1FPL Through 6FPL and 1RPL Through 6RPL*, Output from PCCA Card to SCR Bridge*

Connector	Pin No.	Description
1FPL – 6FPL	_FPL-1	Forward gate pulse to corresponding SCR (red wire).
	_FPL-2	Forward gate pulse to corresponding SCR (white wire).
1RPL – 6RPL*	_RPL-1	Reverse gate pulse to corresponding SCR (red wire).
	_RPL-2	Reverse gate pulse to corresponding SCR (white wire).

* Reversing bridges only.

Table 5. Connector 5PL, I/O Between DCFB Board and PCCA Card

Pin No.	Nomenclature	Description
5PL-1	A6F	Drives cell 6F gate pulse transformer
5PL-2	P24	+24 volt output
5PL-3	A5F	Drives cell 5F gate pulse transformer
5PL-4	P24	+24 volt output
5PL-5	A4F	Drives cell 4F gate pulse transformer
5PL-6	P24	+24 volt output
5PL-7	A3F	Drives cell 3F gate pulse transformer
5PL-8	P24	+24 volt output

Table 5. Connector 5PL,
I/O Between DCFB Board and PCCA Card — Continued

Pin No.	Nomenclature	Description
5PL-9	A2F	Drives cell 2F gate pulse transformer
5PL-10	P24	+24 volt output
5PL-11	A1F	Drives cell 1F gate pulse transformer
5PL-12	P24	+24 volt output
5PL-13	A1R*	Drives cell 1R gate pulse transformer
5PL-14	P24	+24 volt output
5PL-15	A2R*	Drives cell 2R gate pulse transformer
5PL-16	P24	+24 volt output
5PL-17	A3R*	Drives cell 3R gate pulse transformer
5PL-18	P24	+24 volt output
5PL-19	A4R*	Drives cell 4R gate pulse transformer
5PL-20	P24	+24 volt output
5PL-21	A5R*	Drives cell 5R gate pulse transformer
5PL-22	P24	+24 volt output
5PL-23	A6R*	Drives cell 6R gate pulse transformer
5PL-24	P24	+24 volt output
5PL-25	DCN	Test attenuation (negative)
5PL-26	DCP	Test attenuation (positive)

* Reversing bridges only.

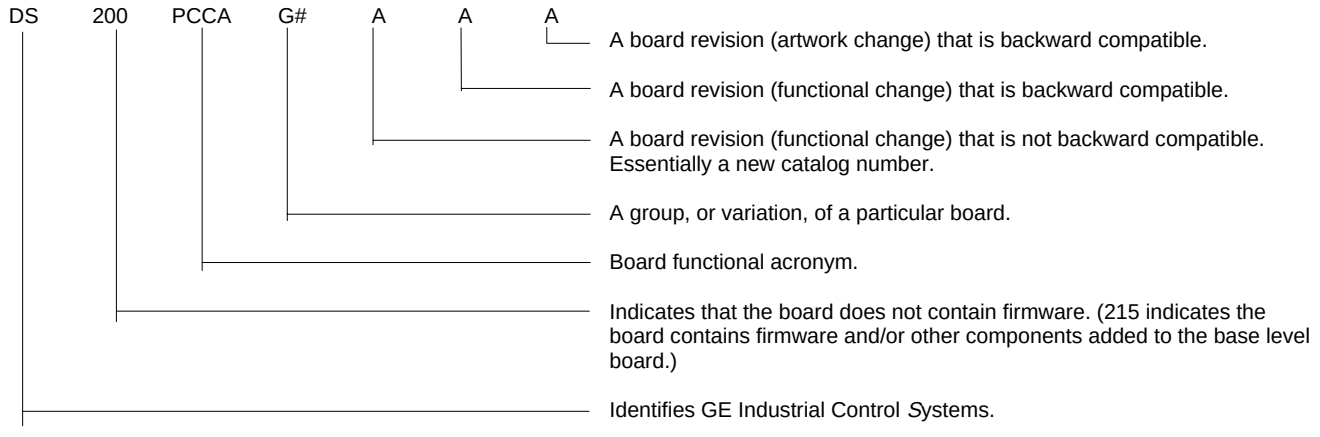

Figure 2. Sample Board Part Number, DS Series

RENEWAL/WARRANTY REPLACEMENT

BOARD IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the Power Connect Card is identified by part number DS200PCCAG#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

There are no end-user replaceable components on the PCCA board. If any 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 PCCA 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 PCCA board:

1. **Turn off all power to the drive**, then wait several minutes for all the capacitors to discharge. Test any electrical circuits before touching them to ensure the power is off.

2. Open the equipment's cabinet door to access the printed wiring boards.
   - This exposes the drive control card, which faces the front (in the front board carrier).
   - The PCCA board is mounted on the back of the board carrier behind the drive control (the power supply board is mounted on the front).

3. Pull the lock tabs located on either side of the board rack, then lift the front board carrier (with the drive control card) and tilt it forward and down.

4. Lift the second board carrier (with the power supply board) and tilt it forward and down to access the PCCA board.

5. Carefully disconnect all cables from the PCCA board as follows:
   - For ribbon cables, grasp on each side of the cable connector that mates with the board connector and gently pull the cable connector free.
   - For a cable with a pull tab, carefully pull the tab.

5. Push back on the six plastic snaps (holders) to release the PCCA board from the board carrier.

6. Verify that all jumpers on the new (replacement) PCCA board are placed in the same position as they were on the old board.
   - If a board revision has added or eliminated a configurable component, or re-adjustment is needed, refer to Table 2 and/or Table 3.

NOTE

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

7. Orient the new PCCA board in the same position as the one removed and install it onto the board carrier.
   - Make sure all six plastic snaps (holders) snap back into position to secure the board.
8. Reconnect all cables to the PCCA board as labeled and ensure that cables are properly seated at both ends.
9. Swing the second board carrier with the new PCCA board and power supply board back up into position.
10. Swing the front board carrier back up into position, slide the lock tab(s) on the side of the board rack back into the locking position, then close the drive cabinet door.

Notes:

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