



GE Industrial Control Systems

Control Power Flash Protect Board IS200CPFP#A_ _

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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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.

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Functional Description

The IS200CPFP Control Power Flash Protect board (CPFP) is a 48 V ac, protective power distributor and monitor for the medium voltage Innovation Series™ ac drive. The board provides three functions:

- Protects the 48 V ac power bus, distributing isolated control power to bridge interface boards
- Monitors the status of the input line fuses
- Monitors insulation failure of source power cables

The CPFP typically mounts on an insulated panel inside the high power section of the drive. It contains two 3-pin input and seven 3-pin output connectors for control power distribution.

Refer to the drive documentation for the specific location and application of this board within the drive.

Power Bus Protection

Figure 1 provides a diagram of the circuits described below.

I/O Isolation and Distribution

The CPFP receives input from the drive's 48 V ac, 27 kHz control power supply. An onboard high voltage transformer (T8) serves as a protective barrier between the input and output, providing 8000 V rms dielectric isolation. The transformer secondary feeds the output circuits, which are fuse-protected with shields tied to chassis ground. Additionally, the CPFP's seven output power connectors (see Tables 3 and 4) include surge protectors across the terminals.

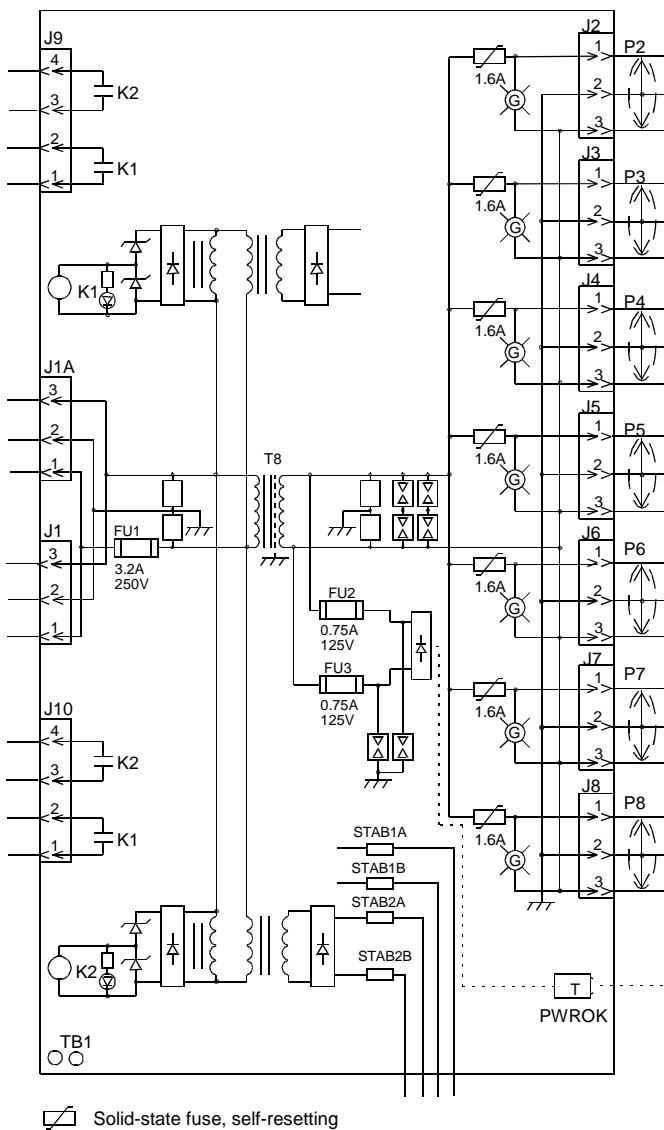


Figure 1. Functional Diagram of CPFP Board

Input Line Fuse

The CPFP’s 3.2 A, time delay fuse (FU1; see *Application Data*) connects across the two HF1 input lines. It opens with any of the following three conditions:

- Within 20 seconds from a sustained current of 6.2 A
- An internal or secondary short of the onboard transformer
- Extended-duration, high-differential pulse applied to the CPFP output

Onboard resistors keep the transformer primary at chassis ground potential if FU1 opens.

Output Line Fuses

The CPFP’s seven output circuits connect in series with self-resetting fuses. These trip at 2.0 A. The board continues to supply control power to non-shorted outputs. A green LED at each of the output connectors is on when voltage is present.

Source Power Fuse Monitor

(Refer to Figure 1.) The CPFP includes two identical circuits to monitor fuse faults in the drive’s source cabinet: one for **line power fuse** status, the other for **line filter** fuse status.

The circuits receive input via onboard stabs (see Table 3) from fuse status switches on the drive. Input is to an isolation transformer. The transformer secondary closes two normally open relay contacts and drives a normally on LED.

When a fuse fails, the input to the associated CPFP circuit causes its relay contact to open and the LED to turn off. Contact status is output on connectors J9 and J10 (see Table 3).

Power Insulation Monitor

(Refer to Figure 1.) The CPFP monitors the integrity of the input power line insulation. This circuit connects to 48 V ac from the T8 transformer secondary and through fuses FU2 and FU3. The power input drives the PWR OK light, which is also a fiber-optic connector (see Figure 2). The drive reads the status of this light transmitted through a fiber-optic cable.

Two spark gap arrestors on the circuit provide an alternate path to chassis ground. If a bridge interface board’s insulation fails or the cable contacts an exposed high-voltage surface, the arrestors conduct. This blows the fuses, which removes input to the PWR OK light and turns it off. The drive senses this change through the fiber-optic output.

Application Data

Indicators

The CPFP includes 10 LEDs to indicate board status, as defined in Table 1. Figure 2 shows the location of these components.

Table 1. Onboard Indicators

Name	Description
DS12	Green LED, fuse string 1. <i>Off</i> when power fuse failure detected on source bridge.
DS13	Green LED, fuse string 2. <i>Off</i> when line filter fuse failure detected on source bridge.
J2 ON – J8 ON	Green LEDs, one of each output connector (J2 – J8) circuit. <i>On</i> indicates that 48 V ac is available on the connector.
PWR OK	Red LED (gray fiber-optic transmitter). Turns <i>off</i> with an insulation failure, the absence of input power, or when input fuse FU1 blows.

Testpoints

The CPCP includes testpoints for measuring incoming power, as defined in Table 2.

Table 2. Testpoints

Test-point	Signal Name	Signal Description
TP1	HF1	48 V ac input on connectors J1 and J1A, pin 1.
TP2	HF2	48 V ac input on connectors J1 and J1A, pin 3.
TP3	CHAS1	Chassis ground, tied to connectors J1 and J1A, pin 2.

I/O Connectors

The CPFP contains the following I/O connectors:

- Nine 3-pin connectors for 48 V ac **power I/O**:
J1 and J1A for input from the power supply
J2 – J8 for output to bridge interface boards
- Two 4-pin connectors for relay output, J9 and J10
- Four stabs for input from fuse detector switches
- One screw terminal for chassis ground

Table 3 defines the connector pin assignments.

Table 3. Connector Pin Assignments

Connector	Pin No.	Signal Name	Signal Description
J1 & J1A	1	HF1	48 V ac, high frequency input line 1 from power supply.
	2	HFSH	High frequency input shield, tied to chassis ground.
	3	HF2	48 V ac, high frequency input line 2 from power supply.
J2 – J8	1	HF1HV ₁	48 V ac, 27 kHz, high frequency line 1 high voltage output.
	2	HFSHHV	Shield, tied to chassis ground.
	3	HF2HV ₁	48 V ac, 27 kHz, high frequency line 2 high voltage output.
J9 & J10	1	1NOA ₂	Fuse status, normally open relay contact output. Closed when fuse status is okay. J9 for fuse string detection circuits 1 and 2 to drive no. 1. J10 for fuse string detection circuits 1 and 2 to drive no. 2.
	2	1NOB ₂	
	3	2NOA ₂	
	4	2NOB ₂	
STAB1A	–	E1	Status input A to fuse detection circuit 1.
STAB1B	–	E2	Status input B to fuse detection circuit 1.
STAB2A	–	E3	Status input A to fuse detection circuit 2.
STAB2B	–	E4	Status input B to fuse detection circuit 2.
TB1	–	CHAS	Screw terminal connection, must be tied to chassis ground.

¹Signal name as follows: 1 for J2 (for example, HF1HV1), 2 for J3, 3 for J4, 4 for J5, 5 for J6, 6 for J7, and 7 for J8.

²Signal name as follows: *Blank* for J9 and *X* for J10 (for example, 1NOA and 1NOAX).

Fuses

Fuse FU1 is the only replaceable fuse on the CPFP board. If this fuse blows, input power is cut off to the board circuitry and all onboard LEDs go off.

Replace FU1 with an AGC 3.2 A, 250 V slow blow fuse.

Fuses FU2 and FU3 are not replaceable. If either of these blows, the PWR OK light turns off, indicating an insulation failure on the 48 V ac input power lines.

With this failure, the cause must be determined and fixed, then the board replaced (refer to *Renewal/Warranty Replacement*).

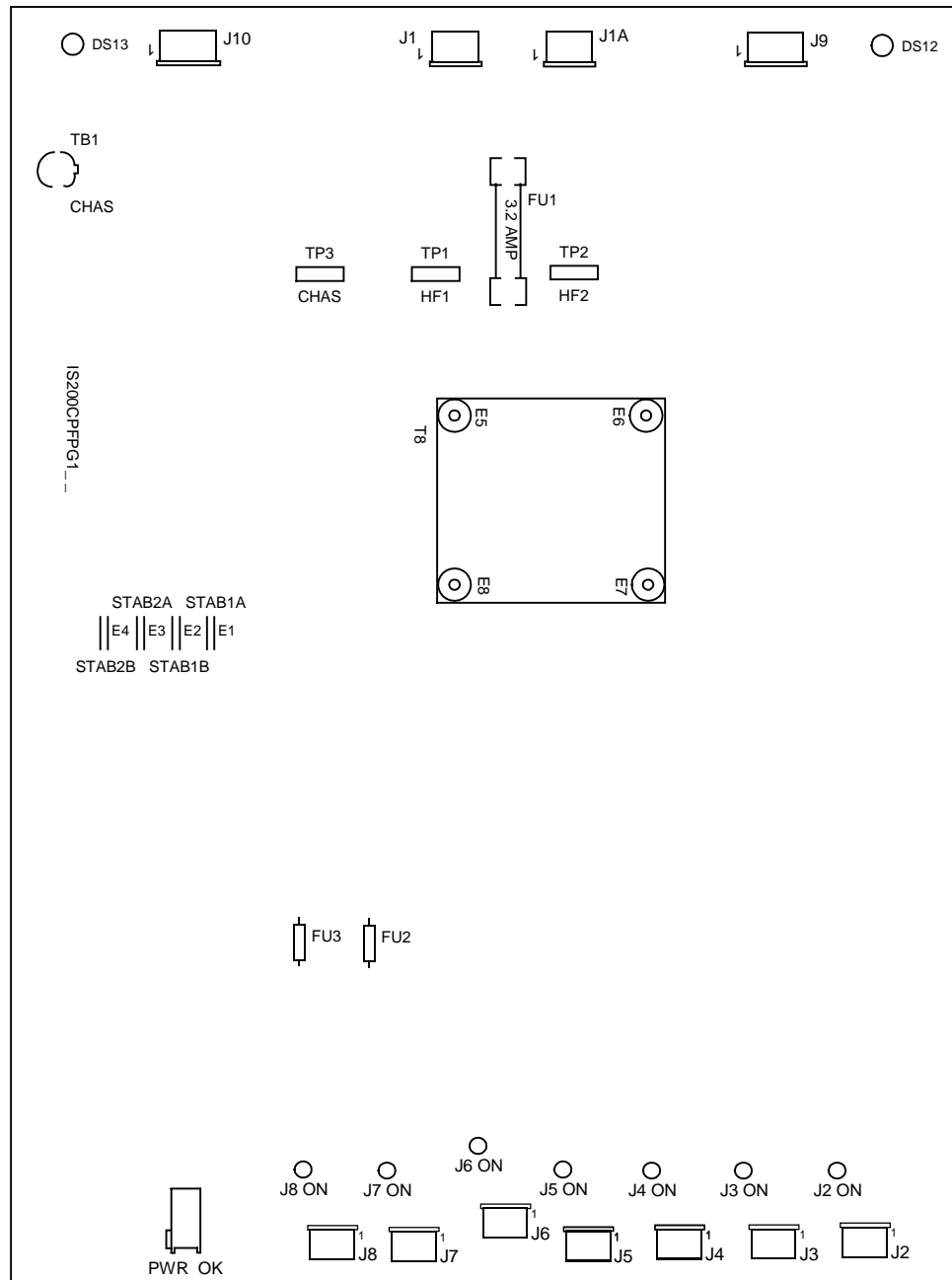


Figure 2. CPFP Board Layout

Renewal/Warranty Replacement

How to Order a Board

When ordering a replacement board for a GE drive, you need to know:

- How to accurately identify the part
- If the part is under warranty
- How to place the order

This information helps ensure that GE can process the order accurately and as soon as possible.

Board Identification

A printed wiring board is identified by an alphanumeric **part (catalog) number** located near its edge. Figure 3 explains the structure of the part number.

The board's functional acronym, shown in Figure 3, normally is based on the **board description**, or name. For example, the *CPFP* board is described as the *Control Power Flash Protection* board.

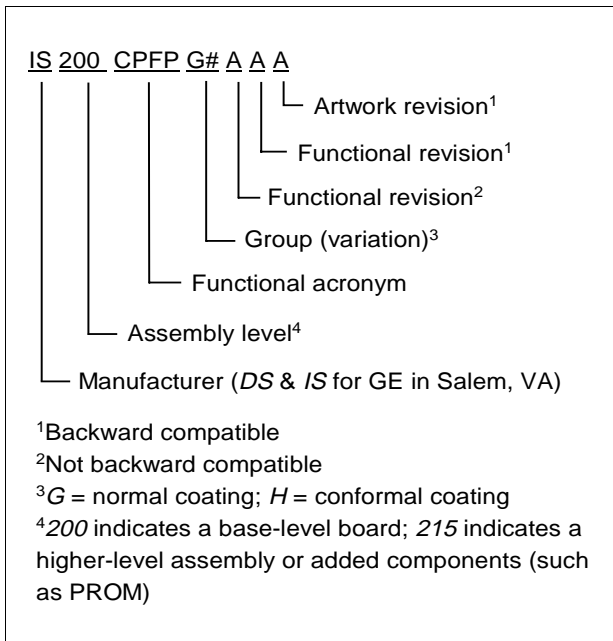


Figure 3. Board Part Number Conventions

Warranty Terms

The *GE Terms and Conditions* brochure details product warranty information, including **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.

Placing the Order

Boards still under **warranty** may be obtained directly from the factory:

GE Industrial Control Systems
 Product Service Engineering
 1501 Roanoke Blvd.

Salem, VA 24153-6492 USA

Phone: + 1 540 387 7595

Fax: + 1 540 387 8606

("+" indicates the international access code required when calling from outside of the USA.)

Renewals (spares or those not under warranty) should be ordered by contacting the nearest GE Sales or Service Office.

When ordering a warranty or renewal replacement board, be sure to include:

- Complete part number and description
- Drive serial number
- Drive Material List (ML) number

Note

All digits are important when ordering or replacing any board.

The factory may substitute later versions of boards based on availability and design enhancements. However, GE Industrial Control Systems ensures backward compatibility of replacement boards.

How to Replace the Board

Handling Precautions

CAUTION

To prevent equipment damage, do not remove, insert, or adjust board connections while power is applied to the equipment.

To prevent component damage caused by static electricity, treat all boards with static sensitive handling techniques.

Printed wiring boards may contain static-sensitive components. Therefore, GE ships all replacement boards in antistatic bags. Use the following guidelines when handling boards:

1. Store boards in antistatic bags or boxes.
2. Use a grounding strap when handling boards or board components.

Removal Procedures

WARNING

To prevent electric shock, turn off power to the board, then test to verify that no power exists in the board before touching it or any connected circuits.

1. Make sure that the drive in which the CPFP resides has been deenergized.
2. Open the drive's cabinet door. Using equipment designed for high voltages, test any electrical circuits **before touching them** to ensure that power is off.

3. Cables should be labeled with the connector name as marked on the board. If not, label them. (This simplifies installation.)
4. Carefully disconnect all cables, as follows:

CAUTION

To prevent damage to cable and wire connections, hold only the connector, *not* the cable, when pulling them.

- For a cable with a pull tab, carefully pull the tab.
 - For a screw terminal connector, loosen the screw at the top of each terminal and gently pull each wire free.
 - For the fiber-optic connector, press and hold the latch on the cable connector while pulling.
5. The CPFP is mounted on plastic standoffs, which snap through the board's mounting holes to secure the board. Remove the board by squeezing the top of the standoff with pliers, then pulling the board off each one as it is squeezed.

Installation Procedures

Install the new CPFP board, as follows:

1. Place the board onto the standoffs in the same orientation as the board that was removed.
2. Gently push the standoffs through the boards' mounting holes until all holders snap into position.
3. Reconnect all cables to CPFP as labeled. Make sure that cables are properly seated at both ends.



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