GE Industrial Control Systems

High Frequency Ac/Fan Power Supply Board IS200HFPAG_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.

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.

Contents

Functional Description

The IS200HFPA High Frequency Ac/Fan Power Supply Board (HFPA) receives ac or dc input voltage and converts it into the following output voltages:

- 48 V ac (G1)/52 V ac (G2) squarewave
- 48 V dc (G1)/52 V dc (G2)
- Isolated 17.7 V ac (G1)/19.1 V ac (G2) squarewave used to power circuitry isolated from high voltage.

Total output loading for HFPA G1 or G2 boards should not exceed 90 VA.

The HFPA board includes four stab-on connectors for voltage input and eight plug connectors for voltage outputs. Two LEDs provide status of voltage outputs. Four fuses are also provided for circuitry protection.

Voltage Inputs

Power supply input is received from an isolated 230 V ac winding on stab-on terminals ACF1 and ACF2 or from the drive's main dc power supply (dc link) on stab-on terminals DCF1 and DCF2 (230 – 1000 V dc). See Figure 1 for stab-on terminal locations and Table 2 for stab-on terminal descriptions.

Voltage Conversion

The conversion of the high voltage dc to the lower voltages uses a current and voltage limited buck regulator that is designed to operate with input voltages between 230 and 1000 V dc. The buck regulator chops down the dc link voltage into a non-isolated intermediate voltage of approximately 118 V dc referenced to the positive dc link terminal. Control voltage for the regulator is initially supplied by a low current resistive path and sustained by the scaled and rectified flyback voltage developed in a bias winding that is coupled to the regulator series inductor. (This bias winding voltage is also used as a feedback to regulate the 118 V ac.)

Voltage Outputs

A self oscillating power supply inverter is used to convert the 118 V dc to an ac squarewave voltage feeding the primary of a transformer. One of the secondary windings develops the 48/52 V ac output. This 48/52 V ac is also full wave rectified and filtered to provide a 48/52 V dc output. A second output winding provides the unrectified isolated 17.7/19.1 V ac squarewave output. Output current is limited by fusing and restricting the buck regulator switch current to a maximum of 1.5 amps. Voltage outputs from the HFPA board are accessed at eight plug connectors, DPPL1, DPPL2, HFPL1, HFPL2, FAPL1, FAPL2, FRPL and FRPL1. See Figure 1 for connector locations and Tables 2, 3, 4, and 5 for connector pin descriptions.

Table 1. HFPA Board Specifications

Ac Input	
Range	Isolated 230 V ac
Frequency	50 – 60 Hz
Dc Input	
Range	230 – 1000 V dc
G1 Output Voltages	
48 V ac	25 kHz Squarewave, ±5%
17.7 V ac	25 kHz Squarewave, ±5%
48 V dc	Unregulated Fan Voltage
G2 Output Voltages	
52 V ac	25 kHz Squarewave, ±5%
19.1 V ac	25 kHz Squarewave, ±5%
52 V dc	Unregulated Fan Voltage
Output Loading	90 VA Maximum

Application Data

The HFPA board contains connectors, LED indicators, and fuses as part of the board. There are no configurable hardware items as part of the board. Refer to Figure 1 for an HFPA board layout diagram that shows the location of major board components.

Connectors

230 V ac power supply input is connected on stab-on terminals ACF1 and ACF2. Dc power supply input is connected on stab-on terminals DCF1 and DCF2. See Table 1 for stab-on terminal descriptions.

Voltage outputs from the HFPA board are at eight plug connectors, DPPL1, DPPL2, HFPL1, HFPL2, FAPL1, FAPL2, FRPL and FRPL1. See Tables 3, 4, 5, and 6 for connector pin descriptions.

- Table 3 DPPL1 and DPPL2 Connectors
- Table 4 HFPL1 and HFPL2 Connectors
- Table 5 FAPL1 and FAPL2 Connectors
- Table 6 FRPL and FRPL1 Connectors

LED Indicators

There are two LED indicators on the HFPA board, DS1 (17 V OK) and DS2 (48 V OK).

- DS1 is ON when the 17.7/19.1 V ac output is OK; if DS1 is off, check that fuse FU4 is not blown.
- DS2 is ON when the 48/52 V ac and dc output is OK; if DS2 is off, check that fuse FU1 is not blown.

Fuses

Four protective fuses are provided on the HFPA board, FU1, FU2, FU3, and FU4. See Figure 1 for fuse locations and Table 7 for fuse ratings and descriptions.

WARNING

To prevent electric shock, turn off power to the board, then test to verify that no power exists in the board before changing fuses.

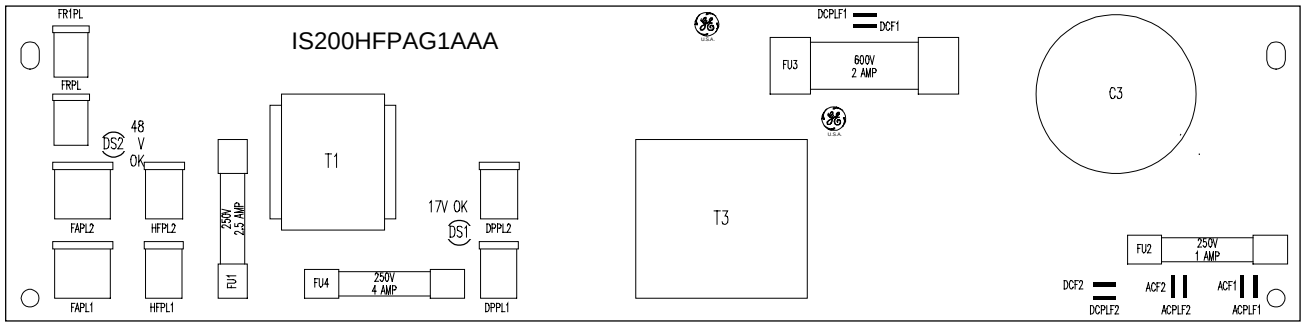

Figure 1. HFPA Board Layout Diagram (G1 Shown)

Table 2. Input Power Connections (Stab-On)

Connector	Description
ACF1	Isolated 230 V ac input
ACF2	Isolated 230 V ac input
DCF1	Positive (+) input from dc link
DCF2	Negative (–) input from dc link

Table 3. DPPL1 and DPPL2 17.7/19.1 V Ac Output Power Connectors

Pin #	Signal	Description
1	SQV17	17.7 V ac (G1), 19.1 V ac (G2)
2	SQV17F	17.7 V ac fused (G1), 19.1 V ac fused (G2)

Table 4. HFPL1 and HFPL2 48/52 V Ac Output Power Connectors

Pin #	Signal	Description
1	SQV48	48 V ac (G1), 52 V ac (G2)
2	SQV48F	48 V ac fused (G1), 52 V ac fused (G2)

Table 5. FAPL1 and FAPL2 48/52 V Dc Fan Power Connectors

Pin #	Signal	Description
1	COM48	48 V dc common (G1), 52 V dc common (G2)
2	FREF	Fan reference
3	P48	Positive (+) 48 V dc (G1), Positive (+) 52 V dc (G2),

Table 6. FRPL and FRPL1 Fan Reference Distribution Connectors

Pin #	Signal	Description
1	COM48	48 V dc and fan reference common (G1) 52 V dc and fan reference common (G2)
2	FREF	Fan reference

Table 7. HFPA Board Fuses

Fuse	Rating	Description
FU1	250 V, 2.5 A	Protection for 48 V ac/dc power output (G1) Protection for 52 V ac/dc power output (G2)
FU2	250 V, 1.0 A	Protection on 230 V ac power input
FU3	600 V, 2.0 A	Protection on 230 – 1000 V dc power input
FU4	250 V, 4.0 A	Protection for 17.7 V ac fused power output (G1) Protection for 19.1 V ac fused power output (G2)

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 2 explains the structure of the part number.

The board's functional acronym, shown in Figure 2, normally is based on the **board description**, or name. For example, the *HFPA* board is described as the *High Frequency Ac/Fan Power Supply* board.

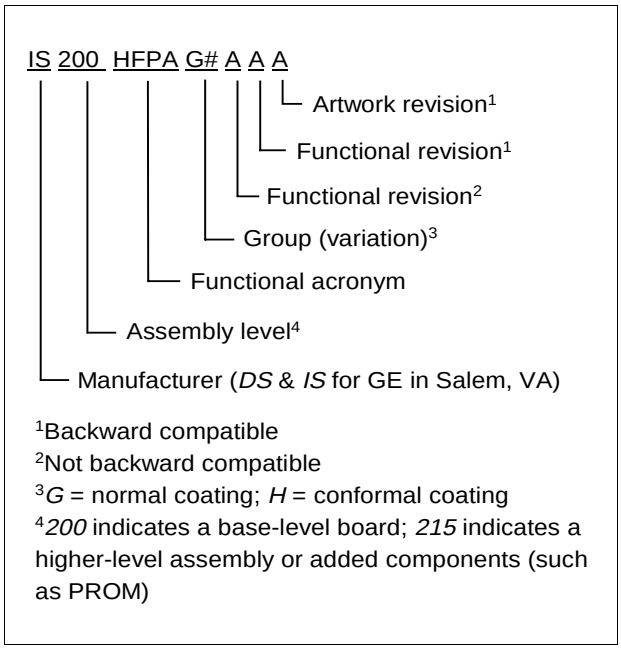

Figure 2. Board Part Number Conventions

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

Parts 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. 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 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.

Replacement 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.

CAUTION

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

Note

Because the HFPA is a multi-purpose board, it may be mounted in different cabinets of the drive. However, the HFPA board is typically located near a board rack or a fan enclosure and mounted in a plastic carrier.

Replace the HFPA board as follows:

1. **Turn off the 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 applicable drive cabinet door to access the HFPA board.
3. Locate the HFPA board and carefully disconnect all cables from the board as follows:
   - Verify cables are labeled with the correct connector name (as marked on the card) to simplify reconnection.
   - For ribbon cables, grasp each side of the cable connector that mates with the board connector and gently pull the cable connector loose.
   - For cables with pull tabs, carefully pull the tab.
4. Remove the two screws that hold the HFPA board in the plastic board carrier, and remove the board.
5. Orient the new HFPA board in the same position as the one removed and install it into the board carrier with the two screws removed in step 4.
6. Reconnect all cables to HFPA board as labeled and ensure that cables are properly seated at both ends.
7. Verify that all four fuses are present and good, then close the drive cabinet doors.

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