



GE Motors & Industrial Systems

HIGH VOLTAGE GATE INTERFACE BOARD

DS200FHVAG1A__

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 Motors & Industrial Systems.

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FUNCTIONAL DESCRIPTION

INTRODUCTION

The DS200FHVA High Voltage Gate Interface Board (FHVA) is a special purpose board that provides the necessary SCR gate interface and cell voltage monitoring functions for the LCI power converter. There is one of these boards for each SCR. The board dimensions are 3.25" high by 5" wide. Since this board is passive, no power supplies are required. It operates in an ambient temperature environment of 0 – 50 °C (32 – 122 °F) plus a 10 °C (18 °F) rise inside the cabinet. Only convection cooling is required.

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.

CIRCUIT DETAILS

This board contains circuits to:

- Provide an isolated path for gate power, from the Gate Pulse Amplifier (FGPA) board to one 77 mm SCR.
- Sense the voltage drop across the SCR and send a signal back to FGPA when this voltage is above a certain threshold.
- Light an LED mounted on the board when SCR blocking voltage is present. This LED is for visual indication of the presence of cell voltage.

These circuits are described below.

WARNING

When installed and operating on the LCI bridge, the FHVA board is at SCR potential which may be several thousand volts above ground. Do not touch the board or attempt to make measurements when this board is under power.

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.

Gate Pulse Transformer

The gate pulse transformer is a toroidal current transformer (CT) which is soldered to the board. A hole in the board permits the single turn primary wire from the DS200FGPA board to be centered in the window of the CT. This design enables the CT to withstand the electrostatic corona that surrounds power wiring.

Gate Termination Circuit

This circuit rectifies the output of the gate transformer, provides sufficient burden resistance to ensure good noise immunity, and connects to the SCR gate leads.

SCR Cell Status Circuit

The FHVA board determines whether or not the SCR is in the **OFF** mode by sensing the presence of current in the 10K ohm equalizer resistor which is connected in parallel with the SCR. If the SCR is conducting, or if it has failed, the resistor is short-circuited by the SCR and little or no current flows through the resistor. When the SCR is blocking voltage, however, equalizer current does flow, from the resistor, through a detection circuit on the FHVA board and on to the next equalizer resistor. Under normal conditions, a voltage of at least 50- volts across the SCR will cause fiber optic transmitter U1 to send an

optical signal to the FGPA board indicating that the SCR is **OFF** and is successfully blocking voltage.

Diagnostic LED

The SCR Status Circuit also provides a visual indication of the presence of blocking voltage by energizing a red LED marked **C STAT**. Light from this LED should be visible whenever bridge power is on and will dim somewhat as the SCR conduction angle is increased.

APPLICATION DATA**Resistor Protection**

If for any reason the FHVA is operated under power without an SCR gate connected to P1, pins P1-1 and P1-2 should be **shorted together**. This prevents overheating resistors R1 and R2.

CAUTION

If only one SCR (and one FHVA) is used per leg, R1 and R2 can overheat in as little as 10 – 15 seconds. For this reason, do not energize the primary of gate pulse transformer T1 without either an SCR gate or a short circuit connected to P1.

Fiber-optic Transmitter Protection

If the FHVA board is left for an hour or more without an optical fiber connected, insert a **rubber plug** in U1 to prevent dust accumulation on the lens.

CAUTION

In dusty environments, even an hour of exposure may cause noticeable pollution. A good rule of thumb is to replace the rubber plug every time the optical plug is removed.

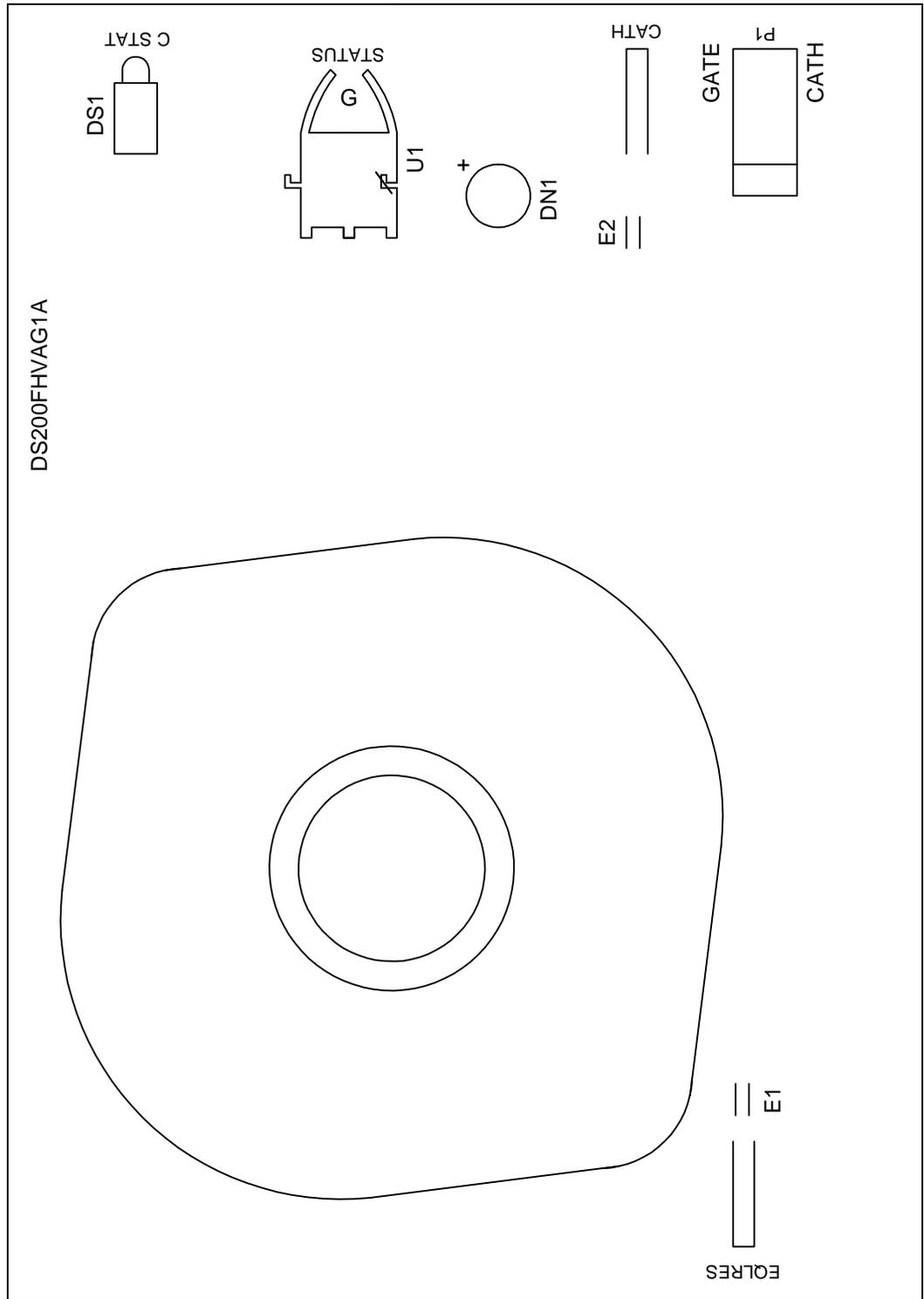


Figure 1. FHVA Board Layout Drawing

Table 1. FHVA Connections

| Name (Color) | Nomenclature | Description |
|--------------|--------------|----------------------------------------------------------------------------------------------------|
| U1 (Gray) | STATUS | Fiber-optic transmitter. Output indicates presence of voltage across SCR |
| T1 | GATE1 | Primary connection through window of T1 CT. Center in the CT window for optimum corona avoidance. |
| P1-1 | GATE | To SCR Gate. Gate Power output to SCR gate. (Normally the white conductor of a Red/White pair). |
| P1-2 | CATH | To SCR cathode. Gate Power return from SCR gate. (Normally the red conductor of a Red/White pair). |
| E1 | EQLRES | Equalizer resistor connection. (stab connector) |
| E2 | CATH | Return path of equalizer current from status circuit back to SCR. (stab connector) |

RENEWAL/WARRANTY REPLACEMENT

NOTE

All digits are important when ordering or replacing any board.

BOARD IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the FHVA is identified by part number DS200FHVAG#. Figure 2 describes each digit in the part number.

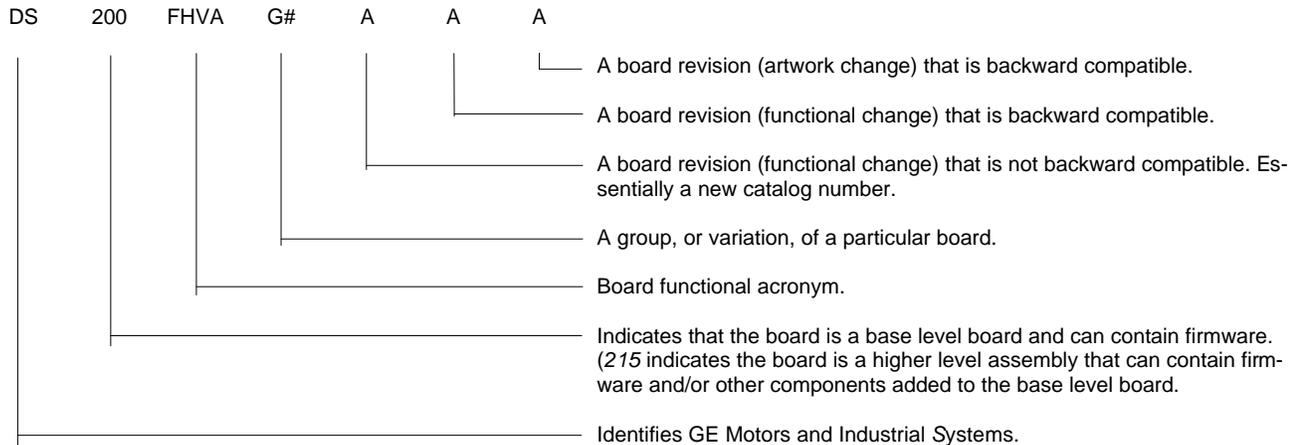


Figure 2. Sample Board Part Number, DS Series

WARRANTY TERMS

The GE Motors & Industrial 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 also be obtained separately from the nearest GE Sales Office or authorized GE Sales Representative.

WARRANTY PARTS AND SERVICE

This board has no fuses or other end-user serviceable parts. If it fails, it 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
- LCI serial number and model number
- Board number and description

PROCEDURE FOR REPLACING BOARDS

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 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 and always store boards in anti-static bags or boxes they were shipped in.

To replace an FHVA board:

1. **Turn off power.**
2. To remove the FHVA board, carefully disconnect all cables, as follows:
 - For cables with pull tabs, carefully pull the tab.
 - For fiber-optic connectors, press the latch on the mating cable connector. Pull the connector only; do not pull the fiber-optic cable.
3. Remove the standoffs that hold the board in place. Remove the lock washers.

CAUTION

Avoid dropping the lock washers into the board or unit, which could cause damage.

4. Keep the FHVA board level and carefully remove it with both hands by pulling the board straight out.
5. Install the new FHVA board, replace the standoffs and lock washers.
6. Reconnect all cables, ensuring that each connector is properly seated at both ends.

NOTE

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

Notes:



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