



# GE Industrial Control Systems

## Gate Driver Power Supply Board IS200IGPAG\_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.

### Contents

<b>Functional Description</b> .....	1
<b>Application Data</b> .....	4
I/O Definitions .....	4
LED Indicators .....	4
Testpoints.....	4
Fuses .....	5
<b>Renewal/Warranty Replacement</b> .....	7
How to Order a Board.....	7
How to Replace the Board.....	8

### Functional Description

The IS200IGPAG\_A Gate Driver Power Supply board (IGPA) furnishes the needed dc gate driver power for each Integrated Gate Commutated Thyristor (IGCT). The IGPA board is mounted directly on the IGCT. There is one IGPA board per IGCT.

There are two groups of IGPA boards:

- **Group 1** boards have two power supplies incorporated on each board.
- **Group 2** boards have only one power supply.

See Figure 1 for the functional diagram, Figure 2 for the connection diagram, and Figures 3 and 4 for the IGPA layout diagrams.

The functions of the IGPA board are described in three categories.

- General
- Positive Supply
- Negative Supply

The general category defines the power and switching of the IGPA board. The positive and negative supply includes the output and control of the power supply board. See Tables 1, 2, and 3.

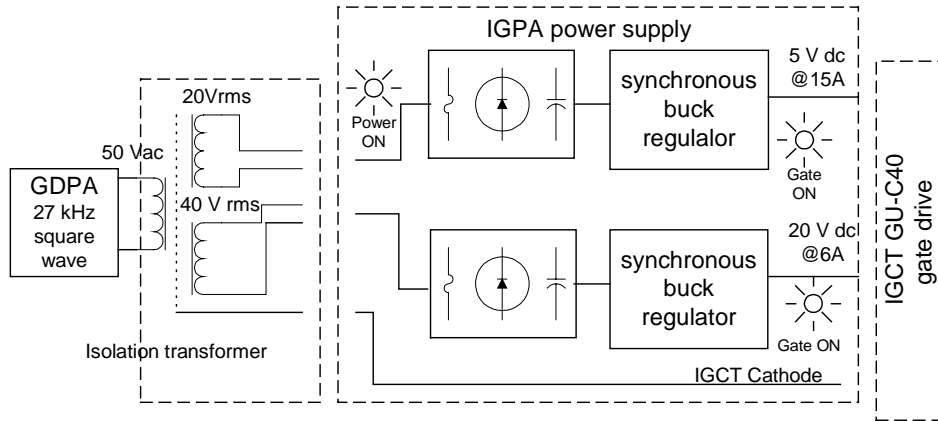
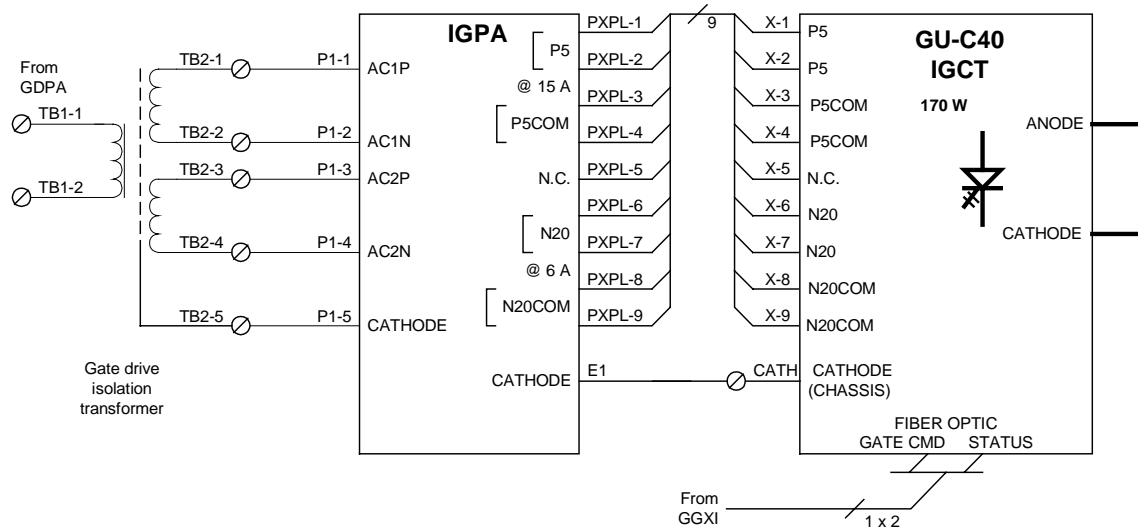


Figure 1. IGPA Functional Diagram



P1 is a 5 pin, 6 A, 20 V ac

PXPL to GU-C40 harness: 9-pin , 9 conductors, 4 A rms, 20 Vdc

Figure 2. IGPA Connection Diagram

Table 1. General Specifications

Requirement	Specification
Input Power (to external isolation transformer)	50 V ac square wave ( $\pm 1\%$ ), 27 kHz ( $\pm 1\%$ ) from power supply board
Input Fuses	6 A and 7 A
Power Dissipation	10 W (estimated) This board will function correctly with 80 LFPM airflow.
Switching Frequency	95 kHz
Common Mode Current	$I = c * 6 \text{ kV}/\mu\text{s}$ where c is isolation transformer capacitance

Table 2. Positive Supply Specifications

Requirement	Specification
Control Method	Current mode with outer voltage loop
Output Voltage	5 V dc ( $\pm 0.25$ )
Output Current	15 A dc steady-state
Current Limit	18 A dc
Soft Start	200 milliseconds
Energy Storage (regulating)	1.0 milliseconds minimum

Table 3. Negative Supply Specifications

Requirement	Specification
Control Method	Current mode with outer voltage loop
Output Voltage	20 V dc ( $\pm 0.8$ )
Output Current	6 A dc
Current Limit	8 A dc
Soft Start	20 milliseconds
Energy Storage (regulating)	1.0 milliseconds minimum

## Application Data

### WARNING

This board is floating at cathode potential (3300-6600 V ac) of the IGCT and cannot be touched or probed when the bridge is energized.

The IGPA board includes, LED indicators, testpoints, and I/O connectors.

### I/O Definitions

I/O for the IGPA board includes the 5-pin power supply input (P1) and the 9-pin power supply output (PXPL) connectors. See Tables 4 and 5 for the pin and signal descriptions.

Table 4. Power Supply Inputs (P1)

Pin	Signal
1	AC1P (+20 V ac, 27 kHz)
2	AC1N (+20 V ac return)
3	AC2P (40 V ac, 27 kHz)
4	AC2N (40 V ac return)
5	Cathode (external isolation transformer shield)

Table 5. Power Supply Outputs (PXPL)

Pin	Signal
1	P5 (5 V turn on supply)
2	P5 (5 V turn on supply)
3	P5COM (5 V return)
4	P5COM (5 V return)
5	Not connected
6	N20 (-20 V turn off supply)
7	N20 (-20 V turn off supply)
8	N20COM (-20 V return)
9	N20COM (-20 V return)

## Indicators

The eight LEDs provide indication of gating and voltage status. LEDs 1, 2, 5, and 6 provide gating signal indication. LEDs 3, 4, 7, and 8 provide voltage presence indications. See Table 6 for LED indicator descriptions.

Table 6. LED Indicators

LED	Signal
DS1	Gating (green LED turns ON when 5 V dc output current is > 4 A.)
DS2	Gating (yellow LED turns ON when 5 V dc output current is > 4 A.)
DS3	5 V dc ON
DS4	5 V dc ON
DS5	Gating (LED turns ON when 20 V dc output current is > 2 A.)
DS6	Gating (LED turns ON when 20 V dc output current is > 2 A.)
DS7	20 V dc ON
DS8	20 V dc ON

## Testpoints

There are eight testpoints included on the IGPA board. See Table 7 for the testpoint descriptions.

### WARNING

With the drive operating, these testpoints can float at bridge potential.

Table 7. Testpoints

Test-point	Description
TP1	Signal common for positive supply
TP2	Average current feedback for positive supply
TP3	Power common for positive supply
TP4	Inductor input voltage for positive supply

Table 7. Testpoints (Continued)

Test-point	Description
TP5	Average current feedback for negative supply
TP6	Signal common for negative supply
TP7	Power common for negative supply
TP8	Inductor input voltage for negative supply

**Fuses**

Two fuses, FU1 and FU2, are provided for circuit protection for 20 and 40 V rms sq. wave, respectively. See Table 8 for description.

Table 8. Fuses

Fuse	Description
FU1	7 A, 250 V, .25x1, 3AG, AGC, Fast
FU2	6 A, 250 V, .25x1, 3AG, AGC, Fast

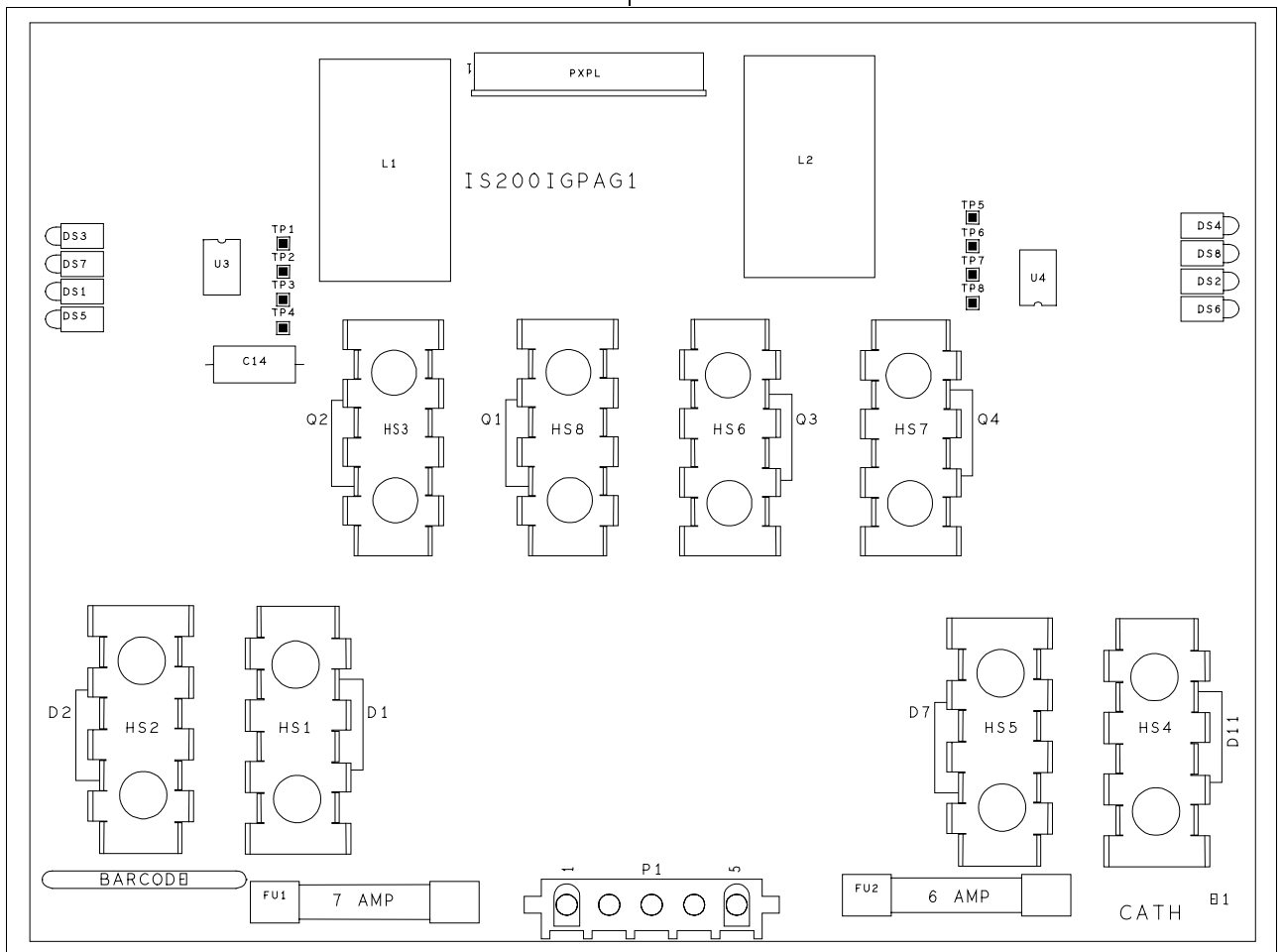


Figure 3. IGPA Board Layout, Group 1

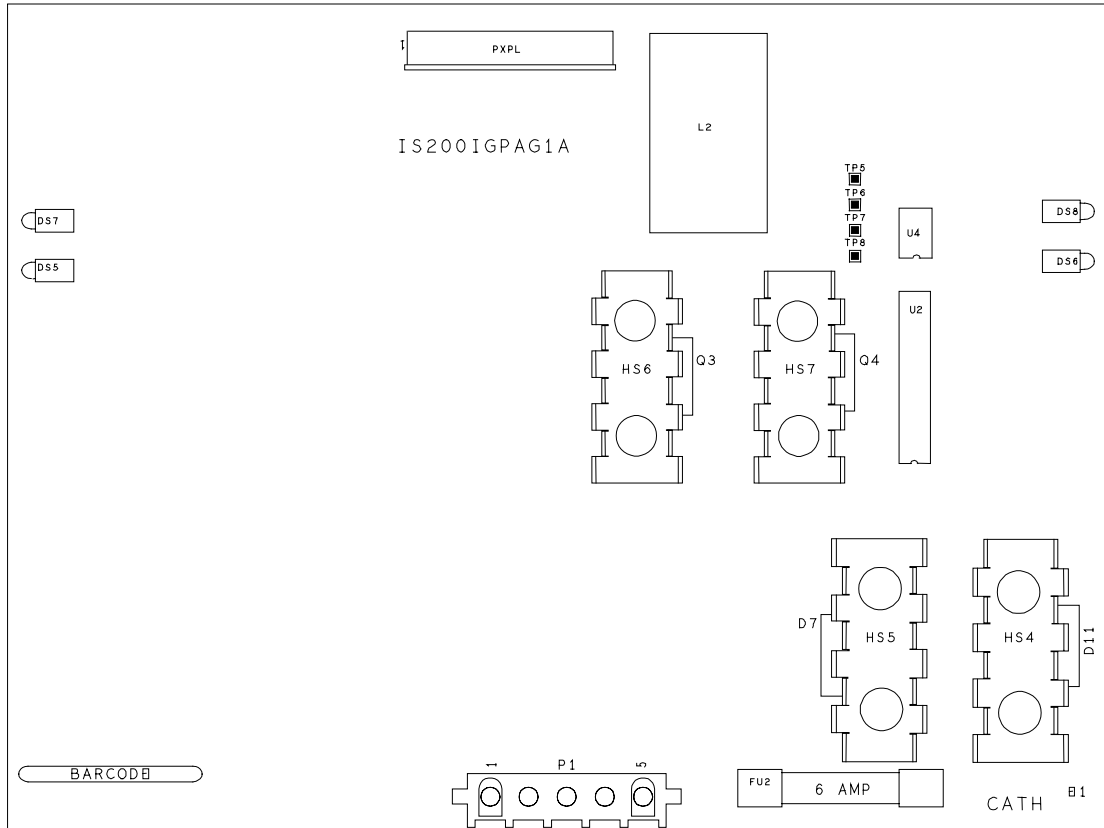


Figure 4. IGPA Board Layout, Group 2

## 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 5 explains the structure of the part number.

The board's functional acronym, shown in Figure 5, normally is based on the **board description**, or name. For example, the *IGPA* board is described as the *Gate Driver Power Supply* board.

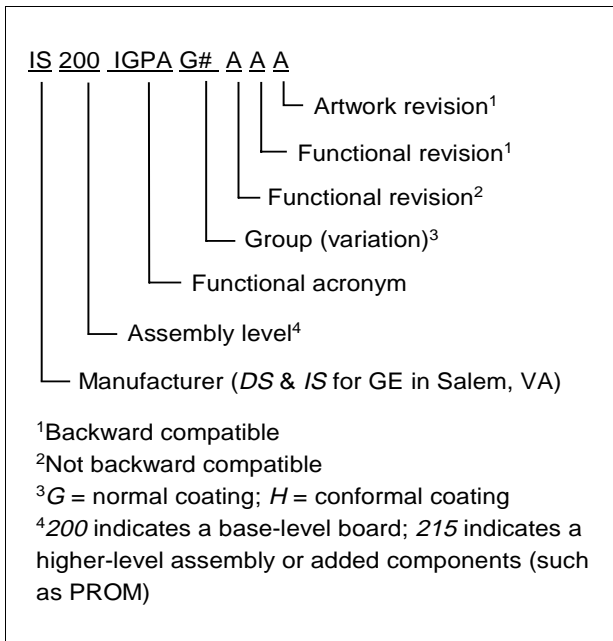


Figure 5. Board Part Number Conventions

### 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.

Remove the board as follows:

1. Make sure that the drive where the board 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. Carefully remove the board as follows:
  - a. Disconnect all electrical connections.
  - b. Loosen the six screws with a ratchet and socket/screwdriver.
  - c. As the screws are removed, catch the standoffs and star washers. *Remember that the star washers are paired with the metal standoffs.*
  - d. Remove the board.

Install the new (replacement) board as follows:

1. Install the replacement board with the 6 screws, standoffs and star washers.
2. Tighten the screws to hold the board securely in place. The metal standoff star washer must bite into the metal surface, not the plastic board.

#### CAUTION

**Be sure the star washers are seated against the metal surface with the metal standoffs, not with the plastic standoffs. The metal standoffs and star washers make a protective circuit, shunting accidental high voltage to ground.**

3. Re-connect all the electrical connections and close drive cabinet door.



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