



GE Industrial Control Systems

Expander Diode Source Board IS200GGXDG_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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Note Indicates an essential or important procedure, practice, condition, or statement.

Contents

Functional Description	1
Application Data	2
Indicators	2
Testpoints.....	2
I/O Connectors.....	2
Adjustable Hardware	2
Renewal/Warranty Replacement	9
How to Order a Board.....	9
Board Identification.....	9
Warranty Terms	9
Placing the Order	9
How to Replace the Board.....	10
Handling Precautions.....	10
Replacement Procedures.....	10

Functional Description

The IS200GGXDG_A Expander Diode Source Board (GGXD) provides the fiber-optic and analog feedback hardware needed between the drive's Bridge Interface Control Board (BICI) and a diode source/dynamic braking (DB) circuit. This board is located in the control cabinet.

RS-422 transceivers are used to interface the gating commands and status signals between the BICI board and GGXD board. Fiber-Optic signal interfacing is used between the GGXD board and up to four DB Integrated Gate Commutated Thyristors (IGCTs). The GGXD board receives a high frequency voltage input from the Gate Driver Power Assembly Board (GDPA). Onboard positive 5 (P5) and 12 (P12) V dc power supplies provide power for the RS-422 transceivers, fiber-optic communications, and some monitoring circuits. Seven isolated stab-on type connectors are provided for selective grounding.

The following signals are sent to the Bridge Interface Control board (BICI) from the GGXD board:

- Three current feedback signals from the source current transformers
- An opto-coupled GDPA board power supply OK signal
- An opto-coupled circuit continuity checking signal to ensure that the associated Voltage Feedback Attenuator Board (NATO) is plugged in
 - This signal is not available for an unpowered GGXD board in a non-DB application.

- An opto-coupled onboard P5 OK signal
 - This circuit is not functional in non-DB applications.
- An opto-coupled 115 V OK signal
 - The 115 V control power feeding the GDPA board is monitored.
 - This circuit is not functional in non-DB applications.

Application Data

The GGXD board includes LED indicators, testpoints, plug connectors, stab-on connectors for wire jumpers, fiber-optic connectors, and adjustable hardware. There are no fuses on the GGXD board.

Indicators

Three LED indicators display status of the GGXD board as follows: (See Figure 1 for locations.)

- DS1 - ON for P5 OK signal
- DS2 - ON for GDPA OK signal
- DS4 - ON for 115V OK signal

Testpoints

The GGXD board includes fifteen testpoints for signal monitoring. Most of these can be accessed from the board front. See Figure 1 for locations and Table 3 for descriptions.

Connectors

The GGXD board contains six 3-terminal connectors for current transformer inputs:

- Phase A Primary TB1, TB2, TB3; See Figure 1 and Table 4.
- Phase A Secondary TB4, TB5, TB6; See Figure 1 and Table 5.
- Phase B Primary TB7, TB8, TB9; See Figure 1 and Table 6.
- Phase B Secondary TB10, TB11, TB12; See Figure 1 and Table 7.
- Phase C Primary TB13, TB14, TB15; See Figure 1 and Table 8.

- Phase C Secondary TB16, TB17, TB18; See Figure 1 and Table 9.

The GGXD board contains three 2-terminal connectors for CT burden resistor inputs (user):

- TB19, TB20 - Phase A CT burden resistor inputs, See Figure 1 and Table 10.
- TB21, TB22 - Phase B CT burden resistor inputs, See Figure 1 and Table 11.
- TB23, TB24 - Phase C CT burden resistor inputs, See Figure 1 and Table 12.

The following connectors are also included on the GGXD board:

- Connector J1 (20 pin) is the input connector from the Voltage Feedback Attenuator Board (NATO). See Figure 1 and Table 13.
- Connector J2 (6 pin) is the input connector for power from the Gate Driver Power Assembly Board (GDPA). It also receives the GDPA OK signal that is displayed by DS2. See Figure 1 and Table 14.
- Connector J3 (2 pin) is the input connector for monitoring the 115 V ac control power feeding the GDPA boards. See Figure 1 and Table 15.
- Connector PSRC (50 pin) is an input/output (I/O) connector with the Bridge Interface Controller Board (BICI). See Figure 1 and Table 16.

Four duplex receive/transmit fiber-optic connectors (DB1, DB2, DB3, DB4) are included on the GGXD board for firing commands/ status feedback of the DB IGCTs. Receiver connectors are blue and the transmit connectors are gray. See Figure 1 and Table 17.

Adjustable Hardware

Berg and wire jumpers are used on the GGXD board.

Berg jumpers JP1, JP2, and JP3 are 2 pin jumpers used for burden resistor selection for the current transformers (CT). See Figure 1 for jumper location and Table 1 for the setting descriptions.

Table 1. Berg Jumpers

Jumper	Jumper Position
JP1	Jumper In: 100 Ω CT A burden Jumper Out: User burden selection for CT A
JP2	Jumper In: 100 Ω CT B burden Jumper Out: User burden selection for CT B
JP3	Jumper In: 100 Ω CT C burden Jumper Out: User burden selection for CT C

Wire jumpers are used on the isolated ground stabs, E1 through E7. These stabs provide selective grounding. See Table 2 for identification and description. The jumper settings are typically as follows:

- In normal operation E1 and E4 are jumpered together.

- E2 and E5 are jumpered together.
- Typically, E3 and E6 are not jumpered together.
- E7 is always tied to chassis.

Table 2. Wire Jumpers (Ground)

Stab #	Nomenclature	Description
E1	DCOM	Digital common
E2	LCOM	Local analog common
E3	DCOM	Digital common
E4	CHAS	Chassis
E5	CHAS	Chassis
E6	DCOMX	DCOM from control rack
E7	CHAS	Chassis

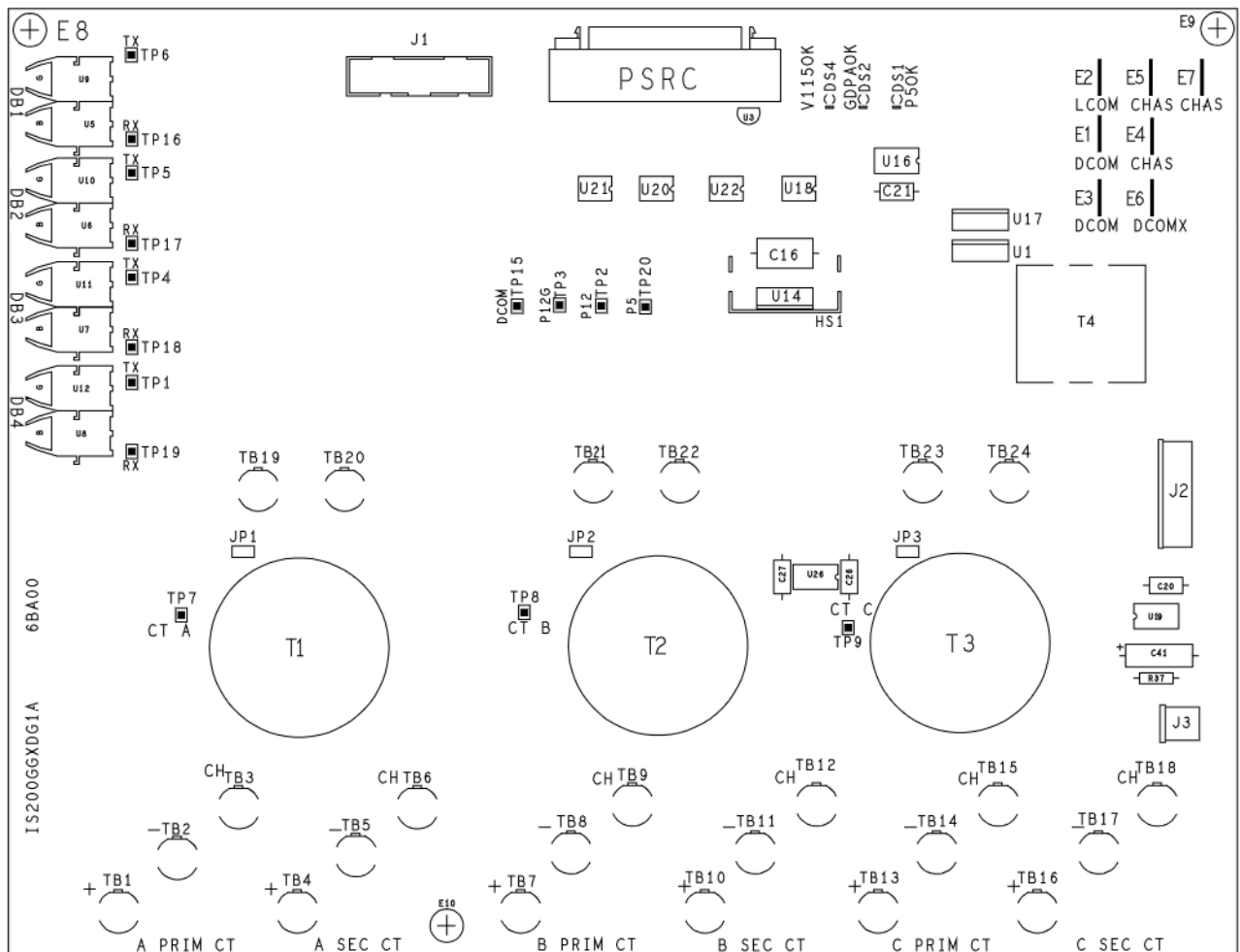


Figure 1. GGXD Board Layout

Table 3. Testpoints

Name	Nomenclature	Description
TP1	DB4-TX	DB4 Gating Command (Dynamic Brake IGCT)
TP2	P12	12 V dc
TP3	P12G	12 V dc for gating circuits (switched)
TP4	DB3-TX	DB3 gating command (Dynamic Brake IGCT)
TP5	DB2-TX	DB2 gating command (Dynamic Brake IGCT)
TP6	DB1-TX	DB1 gating command (Dynamic Brake IGCT)
TP7	CT A	Current difference between Phase A CT primary and secondary
TP8	CT B	Current difference between Phase B CT primary and secondary
TP9	CT C	Current difference between Phase C CT primary and secondary
TP15	DCOM	Signal common
TP16	DB1-RX	DB1 Status Feedback (Dynamic Brake IGCT)
TP19	DB2-RX	DB2 Status Feedback (Dynamic Brake IGCT)
TP18	DB3-RX	DB3 Status Feedback (Dynamic Brake IGCT)
TP19	DB4-RX	DB4 Status Feedback (Dynamic Brake IGCT)
TP20	P5	Positive 5 V dc

Table 4. GGXD Board Input To Phase A Current Transformer Primary Circuit

Pin No.	Nomenclature	Definition
TB1	A PRI CT (+)	Phase A primary side CT positive terminal connection
TB2	A PRI CT (–)	Phase A primary side CT negative terminal connection
TB3	CHAS	Chassis ground

Table 5. GGXD Board Input To Phase A Current Transformer Secondary Circuit

Pin No.	Nomenclature	Definition
TB4	A SEC CT (+)	Phase A secondary side CT positive terminal connection
TB5	A SEC CT (–)	Phase A secondary side CT negative terminal connection
TB6	CHAS	Chassis ground

Table 6. GGXD Board Input To Phase B Current Transformer Primary Circuit

Pin No.	Nomenclature	Definition
TB7	B PRI CT (+)	Phase B primary side CT positive terminal connection
TB8	B PRI CT (–)	Phase B primary side CT negative terminal connection
TB9	CHAS	Chassis ground

Table 7. GGXD Board Input To Phase B Current Transformer Secondary Circuit

Pin No.	Nomenclature	Definition
TB10	B SEC CT (+)	Phase B secondary side CT positive terminal connection
TB11	B SEC CT (–)	Phase B secondary side CT negative terminal connection
TB12	CHAS	Chassis ground

Table 8. GGXD Board Input To Phase C Current Transformer Primary Circuit

Pin No.	Nomenclature	Definition
TB13	C PRI CT (+)	Phase C primary side CT positive terminal connection
TB14	C PRI CT (–)	Phase C primary side CT negative terminal connection
TB15	CHAS	Chassis ground

Table 9. GGXD Board Input To Phase C Current Transformer Secondary Circuit

Pin No.	Nomenclature	Definition
TB16	C SEC CT (+)	Phase C secondary side CT positive terminal connection
TB17	C SEC CT (–)	Phase C secondary side CT negative terminal connection
TB18	CHAS	Chassis ground

Table 10. GGXD Board User Burden Resistor Input To Phase A Current Transformer

Pin No.	Definition
TB19	User burden resistor input for phase A CT
TB20	User burden resistor input for phase A CT

Table 11. GGXD Board User Burden Resistor Input To Phase B Current Transformer

Pin No.	Definition
TB21	User burden resistor input for phase B CT
TB22	User burden resistor input for phase B CT

Table 12. GGXD Board User Burden Resistor Input To Phase C Current Transformer

Pin No.	Definition
TB23	User burden resistor input for phase C CT
TB24	User burden resistor input for phase C CT

Table 13. Connector J1, GGXD Board Input From Voltage Feedback Scaling Board (NATO)

Pin No.	Nomenclature	Definition
1	LCOM	Signal common
2	NC	No connect
3	LCOM	Signal common
4	SRCVAS	Phase A voltage from attenuator
5	LCOM	Signal common
6	SRCVBS	Phase B voltage from attenuator
7	LCOM	Signal common
8	SRCVCS	Phase C voltage from attenuator
9	LCOM	Signal common
10	VDBR1S	Dynamic brake resistor positive voltage from attenuator
11	LCOM	Signal common
12	VDBR2S	Dynamic brake resistor negative voltage from attenuator
13	LCOM	Signal common
14	NATO CBL CHK	NATO board cable-in-place indication
15	LCOM	Shield
16	LCOM	Shield
17	LCOM	Shield
18	LCOM	Shield
19	LCOM	Signal common
20	NC	No connect

Table 14. Connector J2, GGXD Board Input From Gate Driver Power Assembly Board (GDPA)

Pin No.	Nomenclature	Definition
1	GDPA1 0K P	Ok signal from GDPA board (positive)
2	GDPA1 0K N	Ok signal from GDPA board (negative)
3	NC	No connect
4	HF1-1	Input power to GGXD board, 48 V ac, 27 kHz
5	NC	No connect
6	HF2-1	Input power to GGXD board, 48 V ac, 27 kHz

Table 15. Connector J3, GGXD I/O to Gate Driver Power Assembly

Pin No.	Nomenclature	Definition
1	V115V	Senses input voltage to GDPA board
2	V115R	Senses input voltage to GDPA board

Table 16. Connector PSRC, GGXD I/O With Bridge Interface Controller Board (BIC_)

Pin No.	I/O	Nomenclature	Description
1	Output	NATOCHKS	NATO board cable-in-place signal send indication, 0 = OK
2	Output	ACTP	Phase A current inbalance between CT primary and secondary
3	Output	BCTP	Phase B current inbalance between CT primary and secondary
4	Output	CCTP	Phase C current inbalance between CT primary and secondary
5	Output	SRCVAS	Phase A voltage from attenuator
6	Output	SRCVBS	Phase B voltage from attenuator
7	Output	SRCVCS	Phase C voltage from attenuator
8	Output	VDBR1S	Dynamic brake resistor positive voltage from attenuator
9	Output	VDBR2S	Dynamic brake resistor negative voltage from attenuator
10	-----	SPR1P	Spare pin
11	-----	SPR2P	Spare pin
12	Input	DB1GP	Dynamic brake (DB) IGCT #1 gate signal
13	Input	DB2GP	Dynamic brake (DB) IGCT #2 gate signal
14	Input	DB3GP	Dynamic brake (DB) IGCT #3 gate signal
15	Input	DB4GP	Dynamic brake (DB) IGCT #4 gate signal
16	Output	DB1SP	Positive RS-422TX Dynamic brake (DB) IGCT #1 gate status
17	Output	DB2SP	Positive RS-422TX Dynamic brake (DB) IGCT #2 gate status
18	Output	DB3SP	Positive RS-422TX Dynamic brake (DB) IGCT #3 gate status
19	Output	DB4SP	Positive RS-422TX Dynamic brake (DB) IGCT #4 gate status
20	Input	DCOMX	DCOM from BICI board
21	Input	DCOMX	DCOM from BICI board
22	Output	GDPA OK	GDPA power supply board OK
23	Output	CPOKS	115 V status 0 = OK
24	Output	P5 CHK	5 V power supply monitor
25	Input	BRDIDS	GGXD board identification
26	Output	NATOCHKR	NATO board cable-in-place signal receive indication, 0 = OK
27	Output	ACTN	Return for ACTP
28	Output	BCTN	Return for BCTP
29	Output	CCTN	Return for CCTP
30	Input	DCOMY	DCOM from BICI board
31	Input	DCOMY	DCOM from BICI board
32	Input	DCOMY	DCOM from BICI board
33	Input	DCOMY	DCOM from BICI board
34	Input	DCOMY	DCOM from BICI board
35	-----	SPR1N	Spare pin
36	-----	SPR2N	Spare pin

Table 16. Connector PSRC, GGXD I/O With Bridge Interface Controller Board (BIC_) – Continued

Pin No.	I/O	Nomenclature	Description
37	Input	DB1GN	Return for DB1GP
38	Input	DB2GN	Return for DB2GP
39	Input	DB3GN	Return for DB3GP
40	Input	DB4GN	Return for DB4GP
41	Output	DB1SN	Return for DB1SP
42	Output	DB2SN	Return for DB2SP
43	Output	DB3SN	Return for DB3SP
44	Output	DB4SN	Return for DB4SP
45	Input	DCOMX	DCOM from BIC_ board
46	Input	DCOMX	DCOM from BIC_ board
47	Output	GDPA OK R	GDPA board OK
48	Output	CPOK R	Return for CPOKS
49	Output	P5 CHK R	Return for P5 checks
50	Input	BRDID R	Return for BRDIDS (GGXD board identification)
51	-----	NC	No connect
52	-----	NC	No connect

Table 17. Fiber-Optic Connectors, GGXD I/O With Dynamic Braking IGCTs

Connector	I/O	Description
DB1-TX	Output	Gating command to DB1 IGCT, Light = Fire cell
DB1-RX	Input	Status feedback from DB1 IGCT, Light = IGCT OK
DB2-TX	Output	Gating command to DB2 IGCT, Light = Fire cell
DB2-RX	Input	Status feedback from DB2 IGCT, Light = IGCT OK
DB3-TX	Output	Gating command to DB3 IGCT, Light = Fire cell
DB3-RX	Input	Status feedback from DB3 IGCT, Light = IGCT OK
DB4-TX	Output	Gating command to DB4 IGCT, Light = Fire cell
DB4-RX	Input	Status feedback from DB4 IGCT, Light = IGCT OK

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 *GGXD* board is described as the *Expander Diode Source* board.

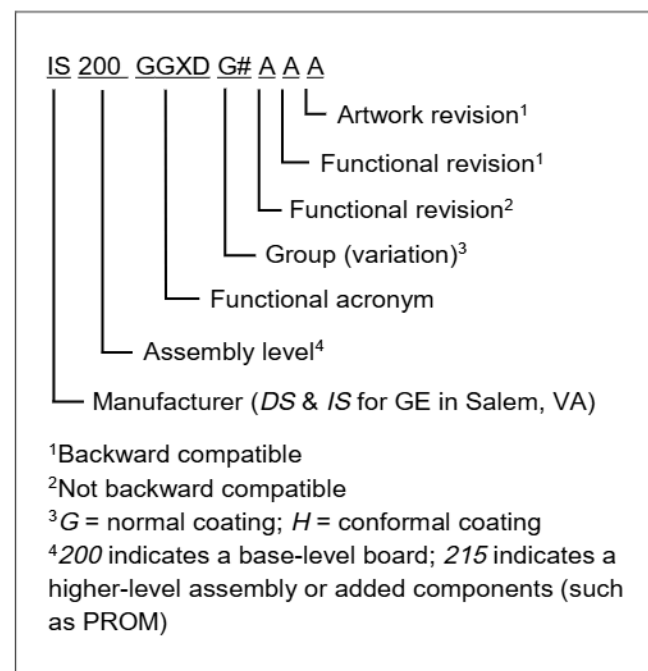


Figure 2. Board Part Number Conventions

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.

Remove the board as follows:

1. Make sure that the drive in which the board resides has been de-energized.

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 disconnect all cables from the GGXD board as follows:
 - Verify cables are labeled with the correct connector name (as marked on the board) 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.
 - For screw terminal connections, loosen the screw and remove the wire.
4. Carefully remove the board, as follows:
 - a. Take note of all the hardware settings and the orientation of the board.
 - b. Remove the 11 mounting screws.
 - Be careful with the eight plastic standoffs and the three metal standoffs with star washers.
 - As the screws are removed, catch the standoffs and star washers.
 - Remember that the star washers are paired with the metal standoffs

CAUTION

Avoid dropping any hardware into the unit. Loose material within the unit could potentially cause damage.

Install the new (replacement) board as follows:

1. Check that the hardware settings on the new board are the same as on the removed board. Adjust hardware settings if necessary.
2. Orient the new GGXD board in the same position as the removed board.

3. Install the GGXD board with 11 mounting screws on eight plastic standoffs and the three metal standoffs.
 - The star washers are to be used with the three metal standoffs.
 - Tighten the screws to hold the board securely in place.

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.

4. Reconnect all electrical connections.

Notes:



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