



GEI-100460A

Exciter Backplane IS200EBKPG_A_ _

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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 or condition that, if not strictly observed, could result in damage to or destruction of equipment.

Note Indicates an essential or important procedure or statement.

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Functional Description

The IS200EBKP Exciter Back Plane (EBKP) is used in the EX2100™ Excitation Control. It is part of the control module and provides the backplane for the control boards, and the connectors for the I/O terminal board cables. EBKP has three sections for the controllers M1, M2, and C. Each section has its own independent power supply. Sections M1 and M2 both have the ACLA or ACLE, DSPX, EISB, EMIO, and ESEL boards. Section C has the DSPX, EISB, and EMIO. The EBKP board is mounted in a rack holding the control boards, with two cooling fans at the top.

The upper part of the backplane contains 24 DIN connectors as part of the backplane. The lower part of the backplane contains 27 D-SUB connectors, three circular DIN connectors, three 12-pin power supply plugs, three fan power plugs, and 30 Testpoints. Labels on the connectors in the following figure refer to the boards and devices to which the cables are connected.

Application Data

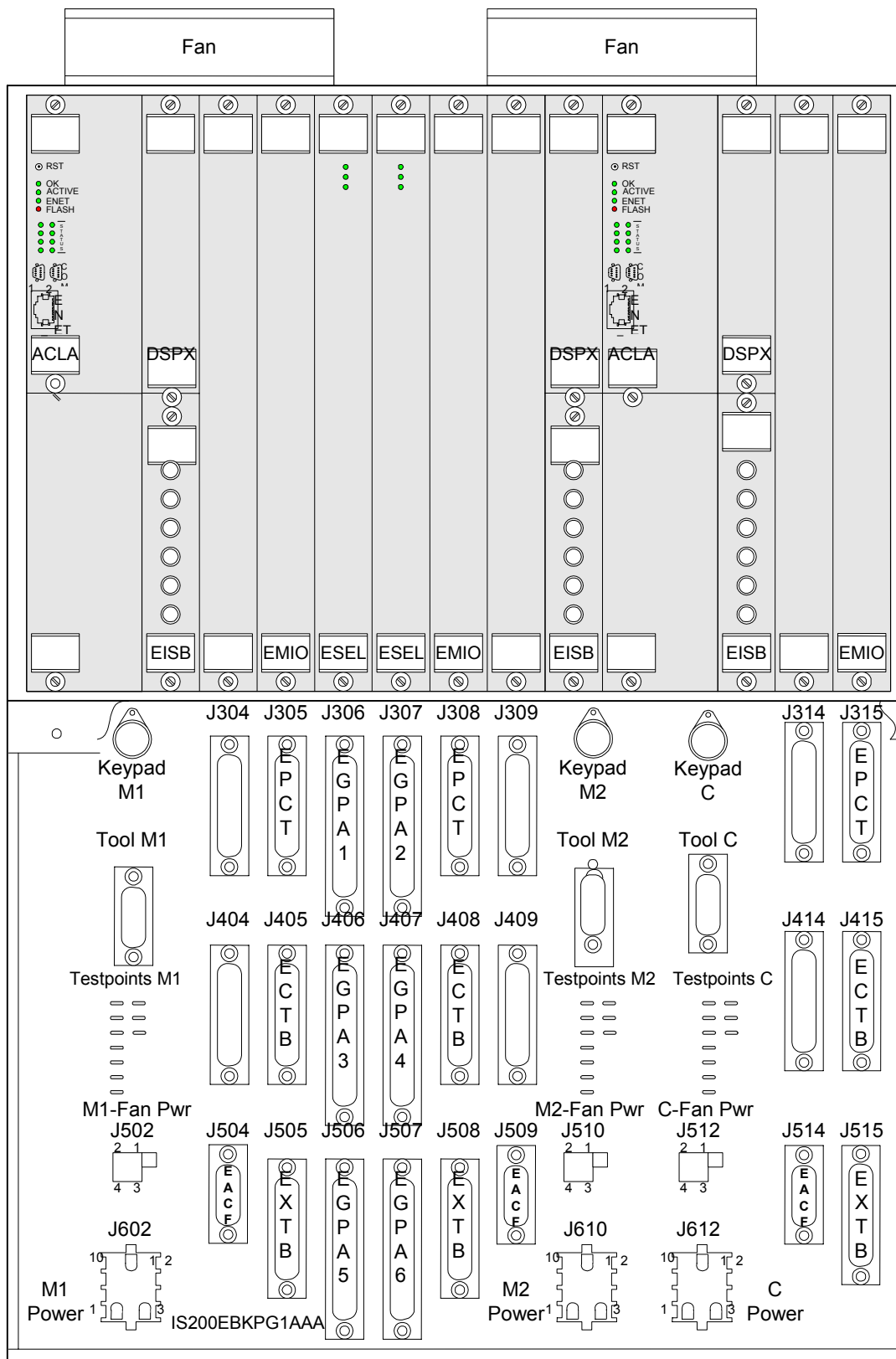
The EBKP board has no LEDs, fuses, or adjustable hardware. The board has testpoints for signal diagnostic purposes. The testpoints provide signal access to diagnostic analog-to-digital converters and to digital-to-analog converters.

Terminal Board Connectors

Pin descriptions and cable destinations for each of the termination board connectors are given in the following sections.

EGPA Exciter Gate Pulse Amplifier Connector

There are six connectors for the up to six EGPA or EHPA boards, which can be driven by the ESEL board. These are at J306, J307, J406, J407, J506, and J507 for PCMs (bridges) 1 through 6 respectively. The group number of the ESEL board determines how many of these connectors are driven.



Control Module with EBKP Exciter Backplane and Rack (Boards Inserted)

J306 Connector Pin Descriptions, (Cable to EGPA J1)

Pin No.	Description
1	Gate 1 driver positive (to GT1P on EGPA)
2	Gate 2 driver positive (to GT2P on EGPA)
3	Gate 3 driver positive (to GT3P on EGPA)
4	Gate 4 driver positive (to GT4P on EGPA)
5	Gate5 driver positive (to GT5P on EGPA)
6	Gate 6 driver positive (to GT6P on EGPA)
7	Conduction sensor Phase A, positive, to M1
8	Conduction sensor Phase B, positive, to M1
9	Conduction sensor Phase C, positive, to M1
10	Alarm signal, positive, to M1
11	Trip signal, (Fault), positive, to M1
12	Ground
13	Conduction sensor Phase A, positive, to M2
14	Conduction sensor Phase B, positive, to M2
15	Conduction sensor Phase C, positive, to M2
16	Alarm signal, positive, to M2
17	Trip signal, (Fault), positive, to M2
18	Ground
19	Not connected
20	Gate 1 driver negative (to GT1N on EGPA)
21	Gate 2 driver negative (to GT2N on EGPA)
22	Gate 3 driver negative (to GT3N on EGPA)
23	Gate 4 driver negative (to GT4N on EGPA)
24	Gate5 driver negative (to GT5N on EGPA)
25	Gate 6 driver negative (to GT6N on EGPA)
26	Conduction sensor Phase A, negative, to M1
27	Conduction sensor Phase B, negative, to M1
28	Conduction sensor Phase C, negative, to M1
29	Alarm signal, negative, to M1
30	Trip signal, (Fault), negative, to M1
31	Ground
32	Conduction sensor Phase A, negative, to M2
33	Conduction sensor Phase B, negative, to M2
34	Conduction sensor Phase C, negative, to M2
35	Alarm signal, negative, to M2

- | | |
|----|---------------------------------------|
| 36 | Trip signal, (Fault), negative, to M2 |
| 37 | Ground |

ECTB Exciter Contact Terminal Board Connector

The ECTB provides the interface between the EMIO and customer relay contacts. All three connectors at J405, J408, and J415 carry similar signals.

J405 Connector Pin Descriptions, (Cable to ECTB J405)

Pin No.	Description
1	Auxiliary contact input 1
2	Auxiliary contact input 2
3	Auxiliary contact input 3
4	Auxiliary contact input 4
5	Auxiliary contact Input 5
6	Auxiliary contact input 6
7	Contact input 86G positive
8	Contact input 86G negative
9	Single-ended contact input 52G
10	Relay 1 driver command from EMIO
11	Relay 1 status feedback to EMIO
12, 13	+24 V dc power from EMIO (P24M1)
14	Trip 2 status feedback to EMIO
15	Trip 2 driver command from EMIO
16	Trip 1 status feedback to EMIO
17	Trip 1 driver command from EMIO
18	Relay 4 status feedback to EMIO
19	Relay 4 driver command from EMIO
20	Relay 3 status feedback to EMIO
21	Relay 3 driver command from EMIO
22	Relay 2 status feedback to EMIO
23	Relay 2 driver command from EMIO
24, 25	24 V dc power return

EXTB Exciter Terminal Board Connector

The EXTB or EXHS provides the interface between the EMIO and the pilot relays (refer to the following table). The backplane connectors are located at J505, J508, and J515. Connector J515 for the C controller has all the following signals except the de-excitation and crowbar signals.

J505 Connector Pin Descriptions, (Cable to EXTB J505)

Pin No.	Description
1, 2	Not connected
3	Crowbar A Return signal
4	Not connected
5	De-excitation Return signal
6	Feedback of K41 coil current status
7	Not connected
8	Feedback of K53A coil current status
9, 10	Not connected
11	Driver for K53B coil
12, 13	24 V dc from EMIO
14	Contact input from 53B
15	Contact input from 41
16	Contact input from 53A
17	Crowbar feedback from EXDE board A
18	De-excitation feedback A
19	K41T status feedback to M1
20	K53B status feedback to M1
21	Driver for K41 coil
22	Driver for K41T coil
23	Driver for K53A coil
24, 25	PCOM on EMIO

EPCT Exciter PT/CT Terminal Board Connector

The EPCT provides the interface between the EMIO and the PTs and CTs. All three connectors at J305, J308, and J315 carry similar signals.

J305 Connector Pin Descriptions (Cable to EPCT J305)

Pin No.	Description
1	Current phase A input low
2	Current phase A input high
3	Current phase C input low
4	Current phase C input high
5	Voltage input 1 Phase A negative
6	Voltage input 1 Phase A positive
7	Voltage input 1 Phase B negative
8 – 13	Not connected
14	Analog input positive
15	Analog input negative
16	Voltage input 2 Phase B positive
17	Voltage input 2 Phase B negative
18	Voltage input 2 Phase A positive
19	Voltage input 2 Phase A negative
20	Voltage input 1 Phase B positive
21 – 25	Not connected

EACF Exciter AC Feedback Board Connector

The EACF provides the interface between the EMIO and the air core CT and flux coil inputs. All three 9-pin connectors at J504, J509, and J514 carry similar signals.

EACF Board J504 Connector Pin Descriptions (Cable to EACF J504)

Pin No.	Description
1	Air core current transformer signal 1, negative, to EMIO
2	Air core current transformer signal 2, negative, to EMIO
3	Power potential transformer signal 1, negative, to EMIO
4	Power potential transformer signal 2, negative, to EMIO
5	Not connected
6	Air core current transformer signal 1, positive, to EMIO
7	Air core current transformer signal 2, positive, to EMIO
8	Power potential transformer signal 1, positive, to EMIO
9	Power potential transformer signal 2, positive, to EMIO

Power and Peripheral Connectors

There are three connectors on the backplane for each of the three keypads, three external RS232C tool computers, three power supply cables, and three cooling fans (only two fans are used).

Keypad Connector

The keypad connector supports the bezel-mounted keypad on the cabinet door. These 8-pin circular connectors are located at J303A, J310A, and J313A to support controllers M1, M2, and C.

Keypad J303A Connector Pin Descriptions (Cable to Keypad)

Pin No.	Description
1	24 V dc power supply to keypad on door
2	Keypad RS-232C TX signal from EISB
3	Keypad RS-232C RX signal to EISB
4 – 6	Keypad Power Return (Power Common)
7	24 V dc power supply to keypad on door
8	Keypad RS-232C RTS signal from EISB

Tool Connector

The tool connector supports RS-232C communication between an external computer and the DSPX board. These signals pass through the EISB board. The 9-pin connectors are located at J303B, J310B, and J313B to support controllers M1, M2, and C.

Tool J303B Connector Pin Descriptions (Cable to Computer)

Pin No.	Description
1	Not connected
2	Tool isolated RS-232C TX signal from EISB
3	Tool isolated RS-232C RX signal to EISB
4	Not connected
5	Isolated common from EISB to tool
6, 7	Not connected
8	Tool isolated RS-232C RTS signal from EISB
9	Not connected

Power Connector

The three power connectors for all the boards in M1, M2, and C are located at J602T, J610, and J612. The cables come from the three EPSM power supplies in the exciter power backplane.

Power J602 Connector Pin Descriptions (Cable to EPBP)

Pin No.	Description
1	Analog Common
2	24 V dc power common
3	24 V dc power common
4	-15 V dc supply
5	Digital common
6	+24 V dc supply
7	Analog common
8	+5 V dc supply
9	+24 V dc supply
10	+15 V dc supply
11	+5 V dc supply
12	Digital common

Fan Power

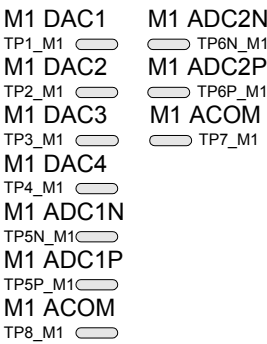
Three mini-mate-n-lock connectors provide power to the fans in sections M1, M2, and C. These 4-pin connectors are located at J502, J510, and J512.

Fan Power J502 Connector Pin Descriptions

Pin No.	Description
1	+24 V dc supply
2	24 V dc power common
3	24 V dc power common
4	Not connected

Testpoints and Signal Conditioner Outputs

Three groups of seven testpoints are provided, one group for each of M1, M2, and C. The following figure shows one typical group of seven, two of which are differential, for controller M1. The toolbox is used to configure these testpoints for diagnostic purposes. Refer to the following table for description.



EBKP Testpoints (Group for M1)

EBKP Board Testpoint Descriptions (M1 Section)

Testpoint	Name	Description
TP1_M1	M1 DAC1	Digital-to-analog converter #1, output from EMIO
TP2_M1	M1 DAC2	Digital-to-analog converter #2, output from EMIO
TP3_M1	M1 DAC3	Digital-to-analog converter #3, output from EMIO
TP4_M1	M1 DAC4	Digital-to-analog converter #4, output from EMIO
TP5N_M1	M1 ADC1N	Negative differential analog Input, to EMIO analog-to-digital converter #1
TP5P_M1	M1 ADC1P	Positive differential analog input, to EMIO analog-to-digital converter #1
TP6N_M1	M1 ADC2N	Negative differential analog input, to EMIO analog-to-digital converter #2
TP6P_M1	M1 ADC2P	Positive differential analog input, to EMIO analog-to-digital converter #2
TP7_M1	M1ACOM	Analog common
TP8_M1	M1ACOM	Analog common

On Rev C and later boards, the four DAC outputs from M1 and from C arek available at connectors J604 and J614. These outputs can be connected to DIN rail-mounted analog output isolation modules for metering and monitoring applications.

Signal Conditioner J604/J614 Connector Pin Descriptions

Pin No.	Description
1	Analog common for DAC1 signal
2	Analog common for DAC2 signal
3	Analog common for DAC3 signal
4	Analog common for DAC4 signal
5,6	+24 power supply to signal conditioners (max load 0.2A per pin)
7,8	Common return for +24V supply to signal conditioners
9	Digital-to-analog converter #1 (DAC1) output to signal conditioner
10	DAC2 output to signal conditioner
11	DAC3 output to signal conditioner
12	DAC4 output to signal conditioner

Board Replacement

Handling Precautions



Caution

To prevent component damage caused by static electricity, treat all boards with static sensitive handling techniques. Wear a wrist grounding strap when handling boards or components, but only after boards or components have been removed from potentially energized equipment and are at a normally grounded workstation.

Printed wiring boards may contain static-sensitive components. Therefore, GE ships all replacement boards in antistatic bags.

Use the following guidelines when handling boards:

- Store boards in antistatic bags or boxes.
- Use a grounding strap when handling boards or board components (per previous *Caution* criteria).

Replacement Procedures

EBKP is mounted in the control rack with cooling fans. It is recommended that the customer stocks a complete control rack with EBKP and fans, or just the EBKP board.



Warning

To prevent electric shock, turn off power to the exciter, 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.

Refer to the Installation and Startup Guide, GEH-6631, for complete de-energizing procedures and follow all local practices of lock-out/tag-out.

➤ To replace the board

1. Make sure that the exciter in which the board resides has been de-energized.
2. Open the exciter control cabinet door, and test any electrical circuits **before touching them** to ensure that power is off.
3. Verify all cables are labelled with the correct connector name, as marked on the board, to simplify reconnection.
4. Disconnect all cables from the bottom part of the backplane, the fiber-optic cables from EISB, and the Ethernet cable from ACLx.

**Warning**

Avoid dropping any mounting hardware into the equipment as this could cause equipment damage or personal injury when power is reapplied.

5. Remove all the boards from the top part of the backplane. The DSPX and EISB board are also joined together.
 6. Remove the rack mounting screws and pull the entire rack out of the cabinet.
 7. Insert the replacement rack containing a new backplane, and replace the mounting screws, and tighten.
-

Note If only the EBKP is stocked, this must be mounted in the old rack before installation.

8. Replace all the control boards in the correct slots and tighten the mounting screws.
9. Reconnect all the cables to the correct connectors on the backplane and tighten.
10. Reconnect the Ethernet cable to the ACLx, the fiber-optic cables to the EISB, and reconnect the fan power plugs.
11. Close the exciter control cabinet door.

Renewal/Warranty Information

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

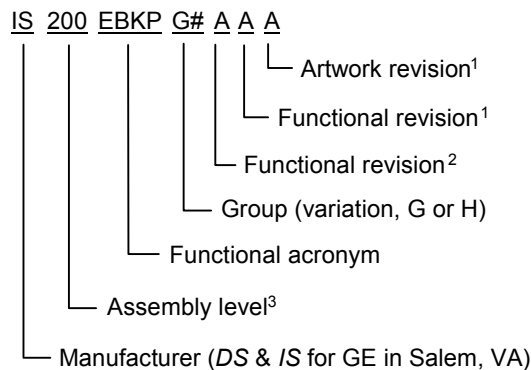
- How to accurately identify the part
- If the part is under warranty
- How to place the order

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. The following figure explains the structure of the part number.

The board's functional acronym, shown below, is normally based on the **board description**, or name. For example, EBKP is described as the *Exciter Backplane*.



¹Backward compatible

²Not backward compatible

³200 indicates a base-level board; 215 indicates a higher-level assembly or added components (such as PROM)

Board Part Number Conventions

This identifies the EBKP. If the control rack is required, this must be ordered using a different number.

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

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

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

GE Energy
Product Service Engineering
1501 Roanoke Blvd.
Salem, VA 24153-6492 USA

Phone: 1 888 GE4 SERV (888 434 7378, United States)
+ 1 540 378 3280 (International)

Fax: + 1 540 387 8606 (All)

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
- Exciter serial number
- Exciter Material List (ML) number

Note All digits are important when ordering or replacing any board. The factory may substitute later versions of replacement boards based on availability and design enhancements. However, GE Energy ensures backward compatibility of replacement boards.



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