GE Motors & Industrial Systems

BASIC DRIVE TERMINAL BOARD

DS200STBAG1_ _

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.

CONTENTS

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.

FUNCTIONAL DESCRIPTION

INTRODUCTION

The DS200STBA Basic Drive Terminal Board (STBA) contains customer connection points for most signal-level I/O. The STBA also includes many of the customizing jumpers required in the system, and some passive interface circuits.

The STBA board provides a similar set of I/O functions and features as the 531X305NTB Drive Terminal Board (NTB/3TB), 531X307LTB LAN I/O Terminal Board (LTB), and DS200RTBA Relay Terminal Board (RTBA). The STBA is an alternative to these three boards for drives that require only basic I/O functions.

The STBA board's STBA connector contains 66 terminal board points in two rows of screw-type terminals used for customer connections. The STBA board also provides the following features and functions:

- Regulated +5 V dc and ± 15 V dc, unregulated ± 24 V dc, and 120 V ac power supply terminal board points.
- Differential A-quad-B encoder interface, jumper-selectable to operate with 5 V or 15 V encoders.
- RS-232C serial link for use with the ST2000 Toolkit (see GEH-5860 for information) , Drive Configurator LynxOS Version (see GEH-6203 for information), or ST1000 Drive Configurator.

- Seven relays, each with a contact rating of 120 V, 0.5 A. Two of these relays are controlled by a 24 V dc signal from the drive control card. One relay is controlled by a 115 V ac input. The other four relays can be configured via hardware jumpers to be controlled by either 115 V ac inputs or by 24 V dc software-controlled outputs.

- Four high-resolution analog input channels **to** the drive control board, and four 8-bit, ± 10 V analog output channels **from** the drive control board.

- Input channels for various control signals to the drive control board, including special-purpose digital inputs, such as RESET, and eight general-purpose control inputs (up to ± 24 V dc).

APPLICATION DATA

JUMPERS

The STBA board includes Berg-type jumpers used for manufacturing test and customer options. Figure 1 shows the layout of the STBA, including the locations of the jumpers. Table 1 lists and defines these items.

TESTPOINTS

Table 2 defines STBA onboard testpoints. (STBA board revisions ABB and above do not contain testpoints.)

INPUT/OUTPUT (I/O)

The STBA board connects to the drive control board using plugs 6PL and 8PL; to the dc power supply and instrumentation board using plug 4PL; and to the customer/system using RS-232C connector COMPL and terminal board points.

The STBA board's terminal block connector contains 66 terminal board points in two rows of screw-type terminals. The terminals are numbered sequentially, with odd numbers in the top row and even numbers in the bottom row. The terminal board points provide the interfaces described in the following sections.

See the master document for the drive the STBA board serves for additional information on connecting STBA I/O points. Tables 3 – 8 define the I/O points for the STBA board.

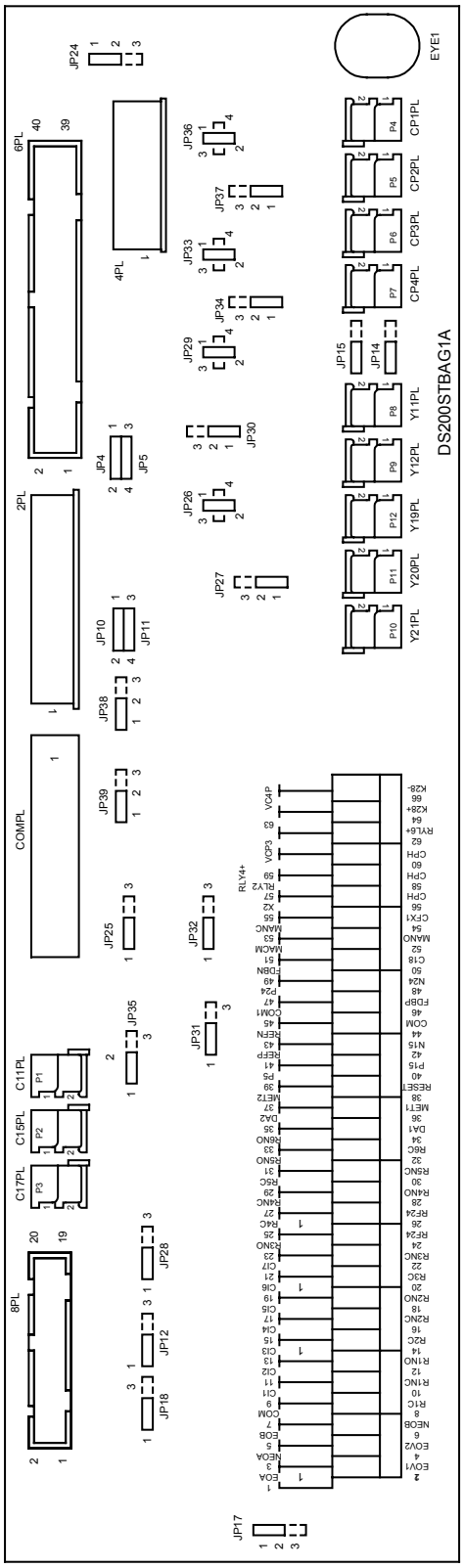


Figure 1. STBA Board Layout

Power Supplies

The STBA board provides the following power outputs for external use:

- Regulated +5 V dc and ±15 V dc, each with a current capacity of 250 mA.
- Unregulated ±24 V dc, each with a current capacity of 500 mA
- 120 V ac, with a current capacity of 0.4 A

Hardware jumpers are used to balance encoder loads among the +5 and ±15 V dc supplies.

Encoder Interface

The STBA board includes a differential A-quad-B encoder interface that can be connected to the system. Jumpers are used to configure the interface for 5 V or 15 V encoders.

RS-232C Interface

Connector COMPL provides an RS-232C serial link for use with the Drive Configuration Tools.

Configurable Control Inputs

The STBA board provides eight configurable control inputs (CI1 through CI8), which enable the customer to interface to discrete (24 V dc) signals. These inputs have a 27 kΩ input impedance and 2 ms noise filtering.

Typically, inputs CI2, CI3, CI4, and CI6 monitor the status of relays K2, K3, K4, and K6. Jumpers JP28, JP31, JP35, and JP38, however, can connect these inputs to customer input terminals to monitor external signals (see Table 1). Control inputs CI1, CI5, CI7, and CI8 are available at the STBA terminal board for customer wiring.

Relay Controls

The STBA board provides seven relays, each with a contact rating of 120 V, 0.5 A. Two of these relays are controlled by 24 V dc internally; one relay is controlled by a 115 V ac input.

The other four relays can be configured using hardware jumpers to be controlled via 115 V ac inputs or via 24 V dc software-controlled outputs. One set of contacts for each of these relays can be directed through a jumper to a digital control input.

Table 1. Jumpers

Name	Description
JP4	Swap RS-232C RxD and TxD data lines, COMPL pins 2 and 3 (see also JP5). Note that many PCs can be configured to either the DCE or DTE mode, and many cables are wired with pins 2 and 3 interchanged. If communication is not established with JP4 and JP5 in the default position, the alternate position may be necessary. 1.2 DCE mode for PC/term interface. Drive transmits on pin 3. 1.3 DTE mode for modem interface. Drive transmits on pin 2.
JP5	Swap RS-232C Rxd and TxD data lines, COMPL pins 2 and 3 (see also JP4). 3.4 DCE mode for PC/term interface. Drive transmits on pin 3. 2.4 DTE mode for modem interface. Drive transmits on pin 2.
JP10	RF24 polarity for digital control inputs (see also JP11). In the negative logic position, control inputs CI1-CI8 must be pulled down to generate a TRUE boolean logic input variable. EE.1.4 must be set consistent with this jumper. 1.2 RF24 = -24 V (negative logic) 1.3 RF24 = +24 V (positive logic)
JP11	RF24 polarity for digital control inputs (see also JP10). 3.4 RF24 = -24 V (negative logic) 2.4 RF24 = +24 V (positive logic)

Table 1. Jumpers – Continued

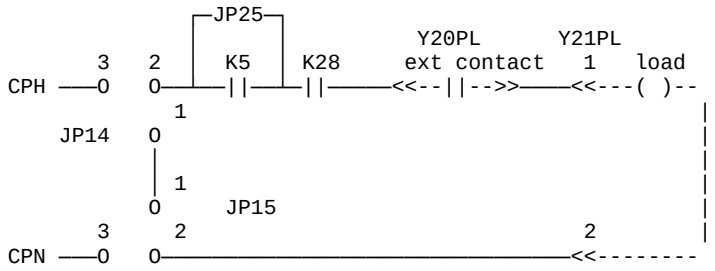
Name	Description
JP12	Voltage to encoder supply (E0V1, E0V2). 1.2 E0V1 = +15 V dc 2.3 E0V1 = +5 V dc
JP14	Connects CPH power to panel control circuit A generic control circuit formed with Y19PL, Y20PL, Y21PL, K5 (SW control) and K28 (hard-wired control) contacts. The circuit is jumper configured to be dry or powered.  JP14 MUST be in the same position as JP15 to complete the circuit. 1.2 Circuit unpowered 2.3 CPH powering circuit
JP15	Connects CPN (CPH return) to panel device control circuit (see JP14) 1.2 Circuit unpowered 2.3 CPN in circuit
JP17	Encoder 0 optically isolated receiver voltage drive level (E0A). 1.2 15 V dc 2.3 5 V dc
JP18	Encoder 0 optically isolated receiver voltage drive level (E0B). 1.2 15 V dc 2.3 5 V dc
JP24	Enable 4-20 mA current loop input to the feedback VCO (FDBP, FDBN). When the current loop mode is enabled (2.3), a 500-ohm burden resistor is inserted, yielding 10 volts at 20 mA. 1.2 Voltage input mode, scaled via software 2.3 Current loop input mode

Table 1. Jumpers – Continued

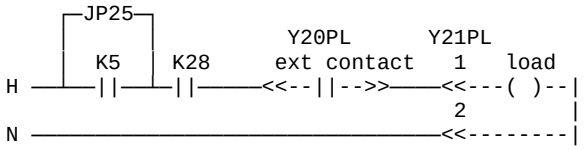
Name	Description
JP25	K5 interlock in device control circuit A K5 contact is in the generic control circuit formed with Y19PL, Y20PL, and Y21PL. The circuit is jumper configured to be dry or powered (see JP14 & JP15). This circuit is a series string of K5 (SW control) and K28 (hard-wired control) contacts. JP25 in position 2.3 bypasses K5 control, and K28 control is bypassed by jumpering pins 1 & 2 of Y19PL. Y21PL is the output pair, and Y20PL is a conector input for additional external interlocking into the circuit.  1.2 K5 in circuit 2.3 K5 contact bypassed
JP26	K2 coil control from 115 V ac input. Jumpers JP26 and JP27 must both be in position 1.2 to operate K2 as a 115 V ac input. If software controlled, JP26 must be in position 3.4 and JP27 MUST be in position 2.3. Other combinations will result in drive misoperation. 1.2 K2 coil from 115 V ac source; JP27 must be 1.2 3.4 K2 coil from software (24 V dc); JP27 must be 2.3
JP27	K2 coil control from 115 V ac input. (see JP26) 1.2 K2 coil from 115 V ac source; JP26 must be 1.2 2.3 K2 coil from software (24 V dc); JP26 must be 3.4
JP28	Jumper K2 contact (status) to CI2 1.2 K2 contact to CI2 2.3 CI2 connected to STBA terminal board point 11
JP29	K3 coil control from 115 V ac input (see JP30). Jumpers JP29 and JP30 must both be in position 1.2 to operate relay K3 as a 115 V ac input. If software controlled, JP29 must be in position 3.4 and JP30 MUST be in position 2.3. Other combinations will result in drive misoperation. 1.2 K3 coil from 115 V ac source; JP30 must be 1.2 3.4 K3 coil from software (24 V dc); JP30 must be 2.3
JP30	K3 coil control from 115 V ac input (see JP29). 1.2 K3 coil from 115 V ac source; JP29 must be 1.2 2.3 K3 coil from software (24 V dc); JP29 must be 3.4
JP31	Jumper K3 contact (status) to CI3 (see JP32). Jumpers JP31 and JP32 must be in same position for circuits to operate properly. 1.2 K3 connected to CI3 2.3 K3 contact connected to STBA terminal board point 23
JP32	Wire K3 contact to RF24 (see JP31). Jumpers JP31 and JP32 must be in same position for circuits to operate properly. 1.2 K3 contact connected to RF24 2.3 K3 contact connected to STBA terminal board point 20
JP33	K4 coil control from 115 V ac input. Jumpers JP33 and JP34 must both be in position 1.2 to operate K3 as a 115 V ac input. If software controlled, JP33 must be in position 3.4 and JP34 in position 2.3. Other combinations will result in drive misoperation. 1.2 K4 coil from 115 V ac source; JP34 must be 1.2 3.4 K4 coil from software (24 V dc); JP34 must be 2.3

Table 1. Jumpers – Continued

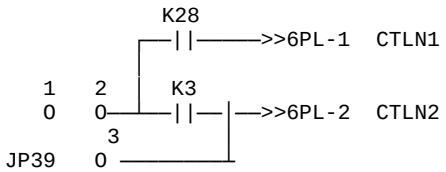
Name	Description
JP34	JP34 K4 coil control from 115 V ac input (see JP33). 1.2 K4 coil from 115 V ac source; JP33 must be 1.2 2.3 K4 coil from software (24 V dc); JP33 must be 3.4
JP35	Jumper K4 contact (status) to CI4. 1.2 K4 contact to CI4 2.3 CI4 connected to STBA terminal board point 15
JP36	K6 coil control from 115 V ac input (see JP37). Jumpers JP36 and JP37 must both be in position 1.2 to operate K3 as a 115 V ac input. If software controlled, JP36 must be in position 3.4 and JP37 MUST be in position 2.3. Other combinations will result in drive misoperation. 1.2 K6 coil from 115 V ac source; JP37 must be 1.2 3.4 K6 coil from software (24 V dc); JP37 must be 2.3
JP37	K6 coil control from 115 V ac input (see JP36). 1.2 K6 coil from 115 V ac source; JP36 must be 1.2 2.3 K6 coil from software (24 V dc); JP36 must be 3.4
JP38	Jumper K6 contact (status) to CI6. 1.2 CI6 connected to contact K6 2.3 CI6 connected to STBA terminal board point 19
JP39	K3 contact in series with relay K28 for CTLN1 and CTLN2. 1.2 K3 contact in CTLN1 and CTLN2 string with relay K28 2.3 K3 interlock to CTLN bypassed 

Table 2. Testpoints (only through Rev. AAZ)

Name	Description
DA1	±10 V dc analog output from drive control board 8-bit D/A converter, same as STBA pin 34.DAC1 and DAC2 (8-bit resolution on drive control boardG3 boards and 12-bit on drive control boardG1 boards), and MET1 and MET2 (8-bit resolution), are outputs from D/A converters. These outputs can source ±10 V dc at no load or ±8 V dc at a 10 mA load (200 ohm series impedance). Any drive variable can be steered to these D/A outputs and can be scaled to set what value corresponds to a 10-volt output. If the variable attains a magnitude greater than this value, the D/A output is clamped to ±10 volts rather than rolling over. DAC1 and DAC2, intended for diagnostics and system applications, are updated every 1.4 milliseconds. MET1 and MET2, intended primarily for meter driver functions, are updated every 2.8 milliseconds.
DA2	±10 V dc analog output from drive control board 8-bit D/A converter, same as STBA pin 35.
MET1	±10 V dc analog output from drive control board 8-bit D/A converter, same as STBA pin 36.
MET2	±10 V dc analog output from drive control board 8-bit D/A converter, same as STBA pin 37.
COM	0 volt common reference point for test signals, same as STBA pin 44.

* STBA board testpoints are not present on board revision ABB and above.

Table 3. Connector 2PL, Power Inputs from the dc power supply and instrumentation board

Pin No.	Nomenclature	Description
1	P24	+24 V dc, ±20%
2	N24	–24 V dc, ±20%,
3	COM	Drive common ground
4, 5	P5	+5 V dc, ±5%
6	COM	Drive common ground
7	P15	+15 V dc, ±5%
8	N15	–15 V dc, ±5%
9	-----	Not connected

Table 4. Connector 4PL, Input From the dc power supply and instrumentation board

Pin No.	STBA Terminal	Nomenclature	Description
1	51	MACM	Form C common contact from the MA pilot relay (K2)
2	52	MANO	Form C normally open contact from the MA pilot relay (k2)
3	53	MANC	Form C normally closed contact from the MA pilot relay (k2)
4	54	CFX1	115 V ac output (fused side)
5	55	X2	115 V ac output (unfused side)

Table 5. Connector COPL, RS-232C I/O Between STBA Board and User Interface

Pin No.	Nomenclature	Description
1 – 25	-----	This board includes an RS-232C connection only for use as a serial link with the Drive Configuration Tools. This software package is a diagnostic and configuration program used during installation, tuneup, and trouble-shooting. GE Motors and Industrial Systems does not intend for this communications link to be used for any other person.

NOTE

Although the RS-232C interface should work correctly with all 25 pins of COMPL connected, using the minimum possible interface avoids incompatibility and noise problems.

Table 6. I/O Connector 6PL, with Drive Control Board

Pin No.	STBA Terminal	Nomenclature	Direction	Description
1	—	CTLN1	Output	Control on input 1. CTLN1 and CTLN2 form part of the circuit that picks up the MA contactor pilot relay and must be connected together for the drive to run. They provide both a place to connect external interlocks and provide a fail-safe (microprocessor independent) way to stop the drive.
2	—	CTLN2	Input	See CTLN1.
3	—	LBIAS	Input	±24 V dc bias for digital inputs from STBA (for + or – logic).
4 – 8	—	———	N/A	Not connected.
9	—	MSRF	Output	Software control input to coil of relay K6 (configured using jumpers JP36 and JP37).
10	—	R01	Input	Software control input to coil of relay K1.
11	—	R02	Output	Software control input to coil of relay K2 (configured using jumpers JP26 and JP27).
12	—	R03	Output	Software control input to coil of relay K3 (configured using jumpers JP29 and JP30).
13	—	R04	Output	Software control input to coil of relay K4 (configured using jumpers JP33 and JP34).
14	—	R05	Input	Software control input to coil of relay K5.
15 – 17	—	———	N/A	Not connected.
18	63	VC3NB	Output	Inverting differential analog input to drive control card auxiliary VCO #3.
19	61	VC3PB	Output	Non-inverting differential analog input to drive control auxiliary VCO #3.
20 – 23	—	———	N/A	Not connected.
24	34	DA1	Input	Output from 12-bit D/A converter. Can source ±10 V dc at no load or ±8 V dc at a 10 mA load (200 Ω series impedance). Any drive variable can be sent to this output and can be scaled to set the value corresponding to 10 V dc output. If the variable attains a magnitude greater than this value, the output is clamped to ±10 V, rather than rolling over. (For diagnostics and system applications.)
25	35	DA2	Input	Same as DA1 (pin 24).
26	36	MET1	Input	Output from 8-bit D/A converter. Can source ±10 V dc at no load or ±8 V dc at a 10 mA load (200 Ω series impedance). Any drive variable can be sent to this output and can be scaled to set the value corresponding to 10 V dc output. (Provided for meter driver functions.)

Table 6. I/O Connector 6PL, with Drive Control Board – Continued

Pin No.	STBA Terminal	Nomenclature	Direction	Description
27	37	MET2	Input	Same as MET1 (pin 26).
28, 29	—	———	N/A	Not connected.
30	38	RESET	Input	Hard reset input to the drive. Connecting RESET to +5 to +24 V dc resets all processors in the exciter. Leaving RESET open or connecting to COM allows exciter operation. The drive control board provides a 20 ms noise filter on this input.
31	—	TDB	Output	RS-232C channel transmitted from DCP.
32	—	RDB	Output	RS-232C channel received by the DCP.
33, 34	—	———	N/A	Not connected.
35	63	VC4NB	Output	Inverting differential analog input to drive control card auxiliary VCO #4.
36	65	VC4PB	Output	Non-inverting differential analog input to drive control card auxiliary VCO #4.
37	43	RFNB	Input	Differential analog input from STBA to reference VCO, negative line.
38	41	RFPB	Input	Same as pin 37, but positive line.
39	49	FBNB	Input	Differential analog input from STBA to feedback VCO, negative line (configured using jumper JP24).
40	46	FBPB	Input	Same as pin 39, but negative line.

Table 7. Connector 8PL, I/O with Drive Control Board

Pin No.	STBA Terminal	Nomenclature	Direction	Description
1 – 5	—	———	N/A	Not connected.
6	1	E0AB	Input	Encoder interface Channel A non-inverted differential input.
7	3	/E0AB (NE0AB)	Input	Encoder interface Channel A inverted differential input.
8	5	E0BB	Input	Encoder interface Channel B non-inverted differential input.
9	7	/E0BB (NE0BB)	Input	Encoder interface Channel B inverted differential input.
10, 11	—	———	N/A	Not connected

Table 7. Connector 8PL, I/O with Drive Control Board

Pin No.	STBA Terminal	Nomenclature	Direction	Description
12	26	RF24	Output	Voltage reference for the digital control inputs.
13	9	CI1	Output	CI1 - CI8 are general-purpose control inputs, ± 24 V dc maximum, with 27 kW input impedance and a 2 ms hardware filter. Each input is automatically sampled 45 times per second by default. Beginning with DP revision 2.24, CI1 - CI8 may be sampled faster, at 90 to 720 times per second by scheduling a foreground block, BLK.372, CIINS, at the appropriate rate. CI1 is also accessible through CI1PL. CI1PL is a 2-position plug, with pin 1 as RF24, and pin 2 as CI1. The connector is mainly for factory use, where CI1 is wired as a status input (feedback) of a local panel-mounted device.
14	11*	CI2	Output	See CI1 (8PL-13). CI2 is jumper configurable to be accessible to STBA-11 by placing JP28 in the 2.3 position. By placing JP28 in the 1.2 position, CI2 is directly driven by relay K2, and IS NOT accessible to STBA-11.
15	13	CI3	Input	See CI1 (8PL-13). CI3 is jumper configurable to be accessible ONLY to STBA-13 by placing JP31 in the 2.3 position. By placing JP32 in the 1.2 position and JP31 in the 1.2 position, CI3 (and STBA-13) is directly driven by relay K3.
16	15*	CI4	Output	See CI1 (8PL-13). CI4 is jumper configurable to be accessible to STBA-15 by placing JP35 in the 2.3 position. By placing JP35 in the 1.2 position, CI4 is directly driven by relay K4, and IS NOT accessible to STBA-15.
17	17	CI5	Output	See CI1 (pin 13). CI5 is also accessible through CI5PL. CI5PL is a 2-position plug, with pin 1 as RF24, and pin 2 as CI5.
18	19*	CI6	Output	See CI1 (pin 13). CI6 is jumper configurable to be accessible to STBA-19 by placing JP38 in the 2.3 position. By placing JP.38 in the 1.2 position, CI6 is directly driven by relay K6, and IS NOT accessible to STBA-19.
19	21	CI7	Output	See CI1 (pin 13). CI7 is also accessible through CI7PL. CI7PL is a 2-position plug, with pin 1 as RF24, and pin 2 as CI7.
20	50	CI8	Output	See CI1 (pin 13).

* If configured using appropriate hardware jumper as described in Description column.

Table 8. Input / Output (I/O) Connector STBA

Pin No.	Nomenclature	Direction	Description
1	E0A	Output	Encoder channel A non-inverted differential input.
2	E0V1	Input	Positive side of power supply with balun choke for encoder E0A/E0B. Either +5 V dc or +15 V dc, per jumper JP12.
3	NE0A	Output	Encoder channel A inverted differential input.
4	E0V2	Output	Return for E0V1, basically at COM potential.
5	E0B	Output	Encoder channel B non-inverted differential input.
6	NE0B	Output	Encoder channel B inverted differential input.
7	COM	Output	0 volt common reference for all drive I/O, same as STBA-44.
8	R1C	Output	Relay #1 common contact.
9	CI1	Input	General-purpose control input. CI1-CI8 are general-purpose control inputs, ±24 V dc maximum, with 27 kΩ input impedance and a 2 ms hardware filter. Each is automatically sampled 45 times per second by default. Beginning with DP revision 2.24, CI1-CI8 may be sampled faster, at 90 to 720 times per second by scheduling a foreground block, BLK.372, CIINS, at the appropriate rate. CI1 is also accessible through CI1PL. CI1PL is a 2-position plug, with pin 1 being RF24, and pin 2 being CI1. The connector is mainly for factory use, where CI1 is wired as a status input (feedback) of a local panel-mounted device.
10	R1NC	Output	Relay #1 normally closed contact.
11	CI2	Output	General-purpose control input. CI1-CI8 are general-purpose control inputs, ±24 V dc maximum, with 27 kΩ input impedance and a 2 ms hardware filter. Each is automatically sampled 45 times per second by default. Beginning with DP revision 2.24, CI1-CI8 may be sampled faster, at 90 to 720 times per second by scheduling a foreground block, BLK.372, CIINS, at the appropriate rate. CI2 is jumper configurable to be accessible to STBA-11 by placing JP28 in the 2.3 position. By placing JP28 in the 1.2 position , CI2 is directly driven by relay K2, and IS NOT accessible to STBA-11.
12	R1NO	Output	Relay #1 normally open contact.
13	CI3	Input	General-purpose control input. CI1-CI8 are general-purpose control inputs, ±24 V dc maximum, with 27 kΩ input impedance and a 2 ms hardware filter. Each is automatically sampled 45 times per second by default. Beginning with DP revision 2.24, CI1-CI8 may be sampled faster, at 90 to 720 times per second by scheduling a foreground block, BLK.372, CIINS, at the appropriate rate. CI3 is jumper configurable to be accessible to STBA-13 by placing JP31 in the 2.3 position. By placing JP32 in the 1.2 position and JP31 in the 1.2 position, CI3 is directly driven by relay K3.

Table 8. Input / Output (I/O) Connector STBA – Continued

Pin No.	Nomenclature	Direction	Description
14	R2C	Output	Relay #2 common contact. These relay contacts are rated for 120 V ac, 0.5 A maximum. EEPROM parameters allow this relay to be driven by any bit of any variable in the drive control board's Drive Control Processor WITH THE PROPER JUMPER CONFIGURATION (see JP26 and JP27). This relay can also be configured to be driven from a dry external contact, powered from STBA 115 V ac. The other K2 contact can be jumper configured to go to CI2, a 24 V dc configurable input. This gives the relay the ability to be a software-configured output OR a 115 V ac input to a CI, but not both. (See EE.218 and following for software). When software-driven, relay status is updated 45 times per second. Beginning with DP revision 2.24, blocks RLYAL (373) and RLAYN (374), allow any or all of these relays to be updated 90 to 720 times per second. These relays have a typical mechanical delay of 3 to 4 ms.
15	CI4	Output	General-purpose control input. CI1-CI8 are general-purpose control inputs, ±24 V dc maximum, with 27 kΩ input impedance and a 2 ms hardware filter. Each is automatically sampled 45 times per second by default. Beginning with DP revision 2.24, CI1-CI8 may be sampled faster, at 90 to 720 times per second by scheduling a foreground block, BLK.372, CIINS, at the appropriate rate. CI4 is jumper configurable to be accessible to STBA-15 by placing JP35 in the 2.3 position. By placing JP.35 in the 1.2 position , CI4 is directly driven by relay K4, and IS NOT accessible to STBA-15.
16	R2NC	Output	Relay #2 normally closed contact.
17	CI5	Input	General-purpose control input.
18	R2NO	Output	Relay #2 normally open contact.
19	CI6	Output	General-purpose control input. CI1-CI8 are general-purpose control inputs, ±24 V dc maximum, with 27 kΩ input impedance and a 2 ms hardware filter. Each is automatically sampled 45 times per second by default. Beginning with DP revision 2.24, CI1-CI8 may be sampled faster, at 90 to 720 times per second by scheduling a foreground block, BLK.372, CIINS, at the appropriate rate. CI6 is jumper configurable to be accessible to STBA-19 by placing JP38 in the 2.3 position. By placing JP38 in the 1.2 position , CI6 is directly driven by relay K6, and IS NOT accessible to STBA-19.

Table 8. Input / Output (I/O) Connector STBA – Continued

Pin No.	Nomenclature	Direction	Description
20	R3C	Input	Relay #3 common contact. These relay contacts are rated for 120 V ac, 0.5 A maximum. EEPROM parameters allow this relay to be driven by any bit of any variable in the drive control board's Drive Control Processor WITH THE PROPER JUMPER CONFIGURATION (see JP29 and JP30). This relay can also be configured to be driven from dry external contacts (wired to Y11PL & Y12PL), powered from STBA 115 V ac (CPH & CPN). The other K3 contact is wired in series with a K28 contact and wired to internal points CTLN1 and CTLN2. CTLN1 and CTLN2 form part of the circuit for picking up the MA contactor pilot relay, and must be connected together to allow the drive to run. They provide a hard-wired, microprocessor-independent, means of stopping the drive. This gives the K3 relay the ability to be a software-configured output OR a 115 V ac hard-wired relay that can stop the drive on loss of contact closure in the contact string, and loss of CPT power (CPT undervoltage detection). JP39 bypasses K3 interlock control to CTLN1 and CTLN2. JP31 and JP32 configure a K3 contact to be used as a relay output, or to feed to CI3 for K3 status (software-programmable action on status). (See EE.220 and following for software). When software-driven, the relay status is updated 45 times per second. Beginning with DP revision 2.24, blocks RLYAL (373) and RLAYN (374) allow any or all of these relays to be updated 90 to 720 times per second. These relays have a typical mechanical delay of 3 to 4 ms.
21	CI7	Input	General-purpose control input.
22	R3NC	Output	Relay #3 normally closed contact.
23	R3NO	Input	Relay #3 normally open contact.
24	RF24	Input	Voltage reference for the digital control inputs. Defaulted to –24 V dc but may be changed to +24 V dc via JP10 and JP11. Each digital control Input is considered active when it is connected to RF24 and inactive when it is left open. Loading on RF24 must be included in the total ±24 volt load.

Table 8. Input / Output (I/O) Connector STBA – Continued

Pin No.	Nomenclature	Direction	Description
25	R4C	Output	Relay #4 common contact. These relay contacts are rated for 120 V ac, 0.5 A maximum. EEPROM parameters allow this relay to be driven by any bit of any variable in the drive control board's Drive Control Processor WITH THE PROPER JUMPER CONFIGURATION (see JP33 and JP34). This relay can also be configured to be driven from a dry external contact, powered from STBA 115 V ac. The other K4 contact can be jumper configured to go to CI4, a 24 V dc configurable input. This gives the relay the ability to be a software-configured output OR a 115 V ac input to CI4, but not both. (See EE.222 and following for software). When software-driven, relay status is updated 45 times per second. Beginning with DP revision 2.24, blocks RLYAL (373) and RLAYN (374) allow any or all of these relays to be updated 90 to 720 times per second. These relays have a typical mechanical delay of 3 to 4 ms.
26	RF24	Input	Voltage reference for the digital control inputs.
27	R4NC	Output	Relay #4 normally closed contact.
28	R4NO	Output	Relay #4 normally open contact.
29	R5C	Output	Relay #5 common contact. These relay contacts are rated for 120 V ac, 0.5 A maximum. EEPROM parameters allow this relay to be driven by any bit of any variable in the drive control board's Drive Control Processor. (See EE.224 and following for software). By default, the relay is updated 45 times per second. Beginning with DP revision 2.24, blocks RLYAL (373) and RLAYN (374) allow any or all of these relays to be updated 90 to 720 times per second. These relays have a typical mechanical delay of 3 to 4 ms. A K5 contact is in the generic control circuit formed with Y19PL, Y20PL, and Y21PL. The circuit is jumper configured to be dry or powered (see JP14 and JP15). This circuit is a series string of K5 (software control) and K28 (hard-wired control) contacts. JP25 bypasses K5 control, and K28 control is bypassed by jumpering pins 1 and 2 of Y19PL. Y21PL is the output pair, and Y20PL is a connector input for additional external interlocking into the circuit.
30	R5NC	Output	Relay #5 normally closed contact.
31	R5NO	Output	Relay #5 normally open contact.

Table 8. Input / Output (I/O) Connector STBA – Continued

Pin No.	Nomenclature	Direction	Description
32	R6C	Output	Relay #6 common contact. These relay contacts are rated for 120 V ac, 0.5 A maximum. EEPROM parameters allow this relay to be driven by any bit of any variable in the drive control board's Drive Control Processor WITH THE PROPER JUMPER CONFIGURATION (see JP36 and JP37). This relay can also be configured to be driven from a dry external contact, powered from STBA 115 V ac. The other K6 contact can be jumper configured to go to CI6, a 24 V dc configurable input. This gives the relay the ability to be a software-configured output OR a 115 V ac input to CI6, but not both. (See EE.214 and following for software). When software-driven, relay status is updated 45 times per second. Beginning with DP revision 2.24, blocks RLYAL (373) and RLAYN (374) allow any or all of these relays to be updated 90 to 720 times per second. These relays have a typical mechanical delay of 3 to 4 ms.
33	R6NO	Output	Relay #6 normally open contact.
34	DA1	Output	±10 V dc analog output from 12-bit D/A converter. DAC1 and DAC2 (12-bit resolution), and MET1 and MET2 (8-bit resolution), are outputs from D/A converters and can source ±10 V dc at no load or ±8 V dc at a 10 mA load (200 Ω series impedance). Any drive variable can be steered to these D/A outputs and can be scaled to set what value corresponds to a 10-volt output. If the variable attains a magnitude greater than this value, the D-A output is clamped to ±10 V dc rather than rolling over. DAC1 and DAC2, intended for diagnostics and system applications, are updated every 1.4 ms. MET1 and MET2, intended primarily for meter driver functions, are updated every 2.8 ms.
35	DA2	Output	±10 V dc analog output from 12-bit D/A converter (see STBA-34).
36	MET1	Output	±10 V dc analog output from 8-bit D/A converter (see STBA-34).
37	MET2	Output	±10 V dc analog output from 8-bit D/A converter (see STBA-34).
38	RESET	Output	Hard reset input to the drive.
39	P5	Output	+5 V dc source, ±10%, 250 mA (including load on E0V1 and E1V1).
40	P15	Output	+15 V dc source, ±10%, 250 mA (including load on E0V1 and E1V1).

Table 8. Input / Output (I/O) Connector STBA – Continued

Pin No.	Nomenclature	Direction	Description
41	REFP	Output	Non-inverting differential analog reference input. Analog reference input. This circuit uses a VCO similar to the one used by FDBP and FDBN. Input impedance is at least 60 kΩ ohms, with less than 1 ms of filtering. If this circuit is not needed for the drive current reference, the digitalization of this input is available for other functions requiring high resolution.
42	N15	Output	–15 V dc source, ±10%, 250 mA (including load on E1V1).
43	REFN	Output	Inverting differential analog reference input.
44	COM	Output	0 volt common reference for all drive I/O, same as STBA-45. COM should be used for signal-level returns only.
45	COM	Output	0 volt common reference for all drive I/O, same as STBA-44.
46	FDBP	Output	Non inverting differential analog tach input. Analog ±10 V input. This signal is digitized by a voltage-controlled oscillator (VCO) on the drive control board which yields a resolution of at least 14 bits over a sampling interval of at least 65 ms. Because of the VCO integrator, note that long-term resolution is much higher than attainable with an A/D converter due to discrete sampling aliasing. Input impedance of this circuit is at least 40 kΩ, with less than 1.5 ms of filtering.
47	P24	Output	+24 V dc source, ±25%, unregulated, 500 mA (including RF24 load).
48	N24	Output	–24 V dc source, ±25%, unregulated, 500 mA (including RF24 load).
49	FDBN	Output	Inverting differential analog tach input.
50	CI8	Input	General-purpose control input. CI1-CI8 are general-purpose control inputs, ±24 V dc maximum, with 27 kΩ input impedance and a 2 ms hardware filter. Each is automatically sampled 45 times per second by default. Beginning with DP revision 2.24, CI1-CI8 may be sampled faster, at 90 to 720 times per second by scheduling a foreground block, BLK.372, CIINS, at the appropriate rate.
51	MACM	Output	Form C common contact from MA pilot relay. These contacts are auxiliary contacts from the relay used to pilot the MA contactor. Ratings are 125 V ac, 2 A.
52	MANO	Output	MA auxiliary form C normally open contact.
53	MANC	Output	MA auxiliary form "C" normally closed contact.
54	CFX1	Output	120 V ac source from drive, ±15%, fused at 500 mA.
55	X2	Output	Return for CFX1 120 V ac loads (CFX1 and X2 isolated from COM).

Table 8. Input / Output (I/O) Connector STBA – Continued

Pin No.	Nomenclature	Direction	Description
56	CPH	Output	Control Power Hot side. CPH is the control power supplied from a power source external to STBA, typically 115 V ac from a drive CPT. It is supplied to TB points to be used as a power feed when a K relay is configured to be used as a 115 V ac input, with relay status configured to go to a CI. This circuit has only enough amperage rating to power the K relay coil.
57	RLY2+	Output	K2 , 115 V ac input. When K2 is configured as a 115 V ac input, (see JP26 and JP27), its intended use is as a 115 V ac pilot relay, with a contact feeding CI2. A dry contact status, as from a motor overtemp switch, for instance, can be directly wired to STBA, using STBA-56 as the power feed, and STBA-57 as the return wire. Also see STBA-14.
58	CPH	Input	Control Power Hot side (see STBA-56).
59	RLY4+	Input	K4 , 115 V ac input. When K4 is configured as a 115 V ac input, (see JP33 and JP34), its intended use is as a 115 V ac pilot relay, with a contact feeding CI4. A dry contact status, as from a motor overtemp switch, for instance, can be directly wired to STBA, using STBA-58 as the power feed, and STBA-59 as the return wire. Also see STBA-25.
60	CPH	Input	Control Power Hot side (see STBA-56).
61	VC3P	Input	Non-inverting differential analog input for auxiliary VCO #3.
62	RLY6+	Input	K6 , 115 V ac input. When K6 is configured as a 115 V ac input (see JP36 and JP37), its intended use is as a 115 V ac pilot relay, with a contact feeding CI6. A dry contact status, as from another drive's /FAULT contact, for instance, can be directly wired to STBA, using STBA-60 as the power feed, and STBA-62 as the return wire. Also see STBA-32.
63	VCCM	Input	Common inverting differential analog input for auxiliary VCOs #3 & #4.
64	K28+	Input	K28, 115 V ac input. This relay coil is isolated, that is, it can be driven from any 115 V ac source. The K28 contact is internally connected to internal points CTLN1 and CTLN2. CTLN1 and CTLN2 form part of the circuit for picking up the MA contactor pilot relay, and must be connected together to allow the drive to run. They provide a hard-wired, microprocessor-independent means of stopping the drive. For any drive to run, K28 must be picked up (powered). Also check to see if K3 is jumpered in series with K28 contact to CTLN1 and CTLN2. See STBA-20.
65	VC4P	Input	Non-inverting differential analog input for auxiliary VCO #4.
66	K28–	Input	K28, 115 V ac input.

Table 9. Connectors For factory use only

Connector	Description
CP1PL-CP4PL	Factory 115 V ac source for panel power
CI1PL	Factory use
CI5PL	Factory use
CI7PL	Factory use
Y11PL, Y12PL	Used in factory interlock circuits
Y19PL-Y21PL	Used in factory brake control circuits

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 STBA is identified by part number DS200STBAG#. Figure describes each digit in the part number.

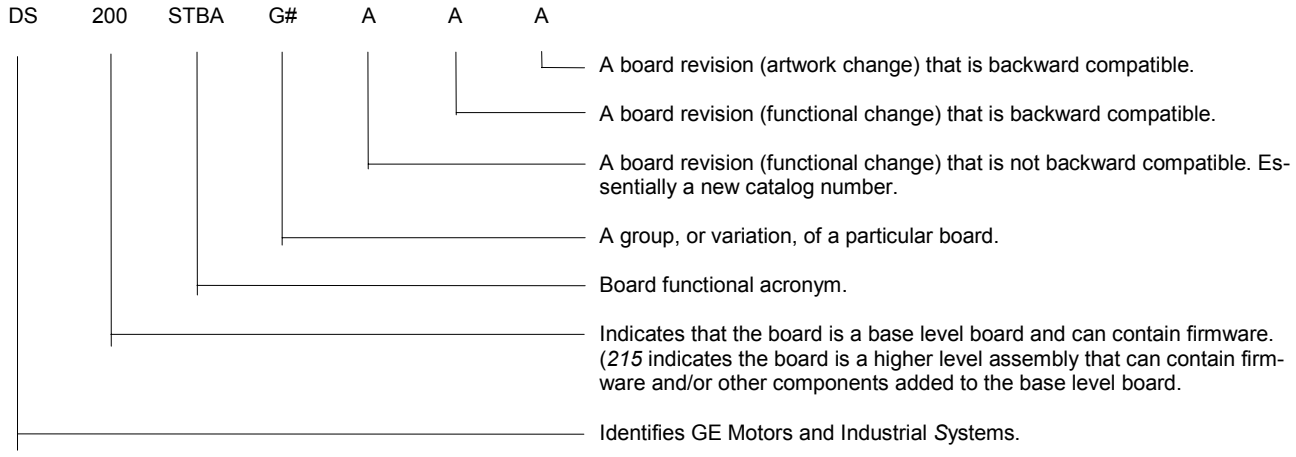


Figure 2. Sample Board Part Number, DS Series

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 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

- Drive 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 STBA board:

1. Turn off power.
2. To remove the STBA board, carefully disconnect all cables, as follows:
   - For ribbon cables, place one hand on each side of the cable connector that mates with the board-connector. Gently pull the cable connector with both hands.
   - For cables with pull tabs, carefully pull the tab.
   - For a terminal board connector, loosen the screw at the top of each terminal. Gently pull each wire free.
   - Wiring to connectors CPxPL,YxxPL,CIxPL are removed by depressing the connector latch and gently pulling the connector.
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 STBA board level and carefully remove it with both hands by pulling the board straight out
5. Any jumpers in connector sockets must be removed and transfered to the new board in the same location.
6. Install the new STBA board, replace the standoffs and lock washers.
7. 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:

GE Motors & Industrial Systems

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