Toshiba G3-Series Profibus Manual

HIGH PERFORMANCE TRANSISTOR INVERTER
TRUE TORQUE CONTROL DRIVE SERIES

TOSHIBA

TOSVERT-130
TRANSISTOR INVERTER

PROFIBUS-DP COMMUNICATIONS INTERFACE

December, 1998
ICC #10160-001

Introduction

Thank you for purchasing the “Profibus-DP Communications Interface” for the Toshiba TOSVERT-130 G3 High-Performance Transistor Inverter. Before using the Profibus-DP interface, please be sure to thoroughly read the instructions and precautions contained in this manual. In addition, please make sure that this instruction manual is delivered to the end user of the inverter unit into which the Profibus-DP interface kit is installed, and keep this instruction manual in a safe place for future reference or inverter inspection.

This instruction manual describes the device specifications, wiring methods, maintenance procedures, supported functions and usage methods for the Profibus-DP communications interface.

Usage Precautions

Operating Environment

- Please use the interface only when the ambient temperature of the inverter unit into which the interface is installed is within the following specified temperature limits:
  Operation: -10 ~ +40°C (+14 ~ +104°F)
  Storage: -25 ~ +65°C (-13 ~ +149°F)
- Avoid installation locations that may be subjected to large shocks or vibrations.
- Avoid installation locations that may be subjected to rapid changes in temperature or humidity.

Installation • Wiring

- Do not touch charged parts such as the terminal block while the inverter's CHARGE lamp is lit. A charge will still be present in the inverter unit's internal electrolytic capacitors, and therefore touching these areas may result in an electrical shock. Always turn all inverter input power supplies OFF, and wait at least 5 minutes after the CHARGE lamp has gone out before connecting communication cables or motor wiring.
- When installing the interface board into the inverter and making wiring connections, make certain that no clippings or wiring leads that could cause device failure fall into the inverter or onto electronic components.
- Proper ground connections are vital for both safety and signal reliability reasons. For proper grounding procedures, please refer to the section in this manual pertaining to grounding (section 3).
- Route the communication cables separate from the inverter input/output power wiring.
- To avoid the possibility of electric shock due to leakage currents, always ground the inverter unit's E/GND terminal and the motor. To avoid misoperation, do not connect the Profibus interface board's shield terminal to either of the above-mentioned grounds or any other power ground.

Other Precautions

- The inverter's EEPROM has a life span of 10,000 write cycles. Do not write to the same parameter register more than 10,000 times.
- Do not touch or insert a rod or any other item into the inverter while power is applied, as this may lead to electrical shock or inverter damage.
- Commission the disposal of the interface board to a specialist.
- Do not assign the same address to more than one inverter in the same network.
- Individual slave addresses can be set from 0 ~ 125. Addresses 126 and above are invalid, and will cause the inverter to trip "OPTION PCB ERROR".
- When the inverter's control power supply is turned on, the inverter performs initialization functions for approximately 2 seconds, during which communications capabilities are disabled. Communications capabilities will also be disabled for approximately 2 seconds after momentary control power supply outages or inverter resets.

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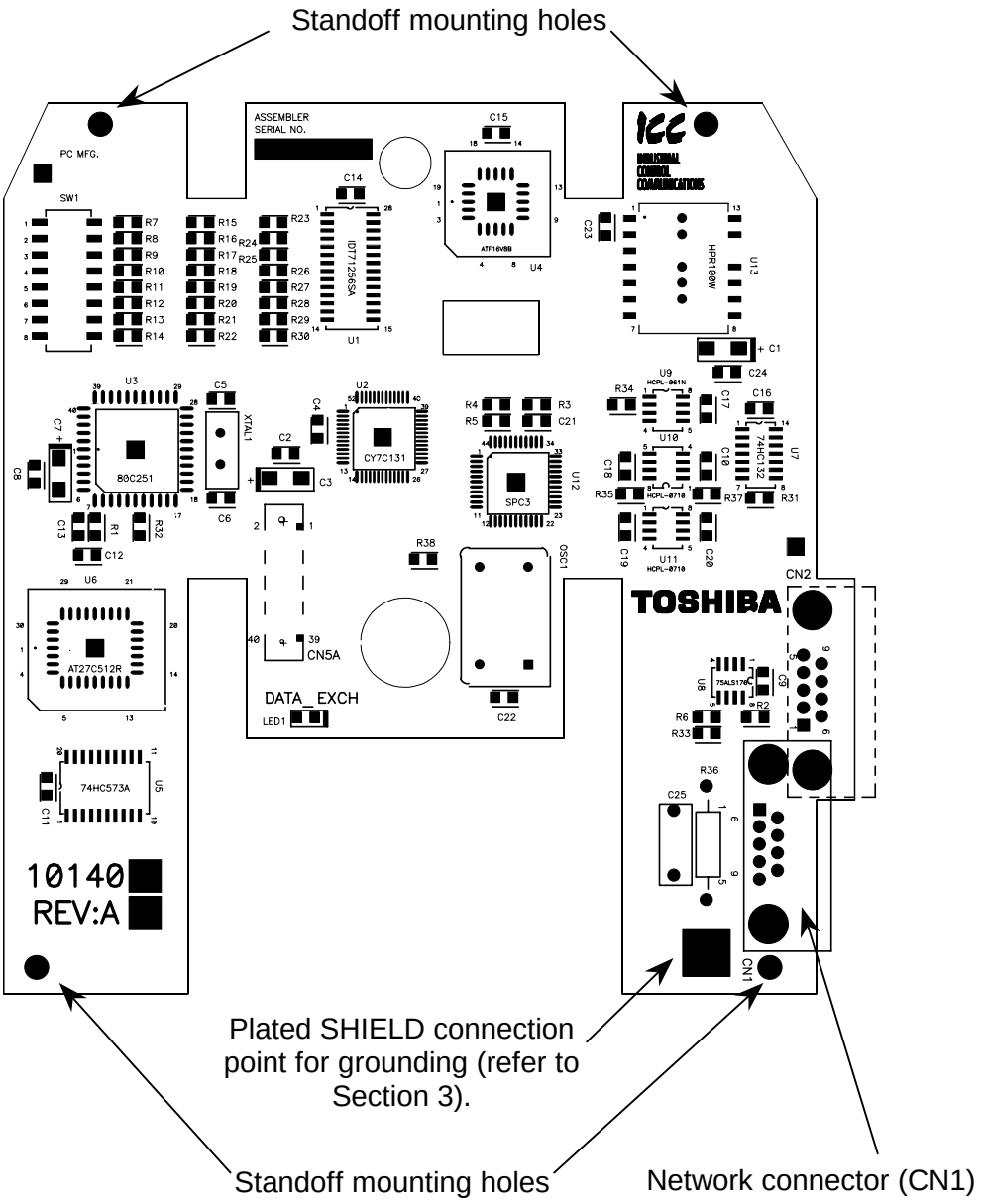


2. Interface Board Installation / Removal

The Profibus Communications Option ROM enclosed with the Profibus kit is compatible only with G3 inverters with V120 or later main software. An error will occur if the option ROM is installed in an inverter with pre-V120 main software. The main software version number is printed on the CPU package (IC1) on the control board. Additionally, this version number can be read from inverter memory by displaying the parameter CPU VERSION in GROUP:UTILITY PARAMETERS. If you are unsure of the software version of your inverter, please contact Toshiba International Corporation for more information.

The Profibus option ROM version number is printed on the label attached to the ROM. The option ROM version number can also be read from the inverter's memory and displayed on the LCD panel after initialization by displaying the parameter ROM VERSION in GROUP:UTILITY PARAMETERS. The option ROM version number replaces the standard ROM version number after installation/initialization.

 **IMPORTANT NOTE:** The option ROM included with the Profibus interface kit is for installation into G3 230V/460V units only. Do not install the option ROM into any other inverter unit (such as H3, E3, or G3 600V units). All inverter units other than the G3 230V/460V series are shipped from the factory with full communications capability, and installation of the option ROM may cause incorrect operation or inverter damage.

Please note that due to internal mechanical clearances, not all Profibus connectors can be used on all inverter units. Ensure that the Profibus connector that you plan on using does not come into contact with any of the drive's internal components, circuit boards or brackets. Toshiba has determined that connectors such as the ERNI 103648 (non-terminated) and 103649 (terminated) will work for all installations. If you have difficulty locating a connector which will work properly in your unit, please contact Toshiba International Corporation for assistance.

Additionally, certain drive models require a modified panel support bracket to allow installation of the Profibus interface. Specifically, all G3 460v 10HP through 50HP and 230v 7.5HP through 25HP units require a modified panel support bracket. To obtain this support bracket, contact your local distributor or Toshiba International Corporation.

2.1 Before Installation

All parameters will be automatically reset to the factory default values after the option ROM is installed in the inverter. If it is desired to retain the current parameter settings, the user should access the user-changed parameter group to display and record all the parameters and setting values that have been changed from factory defaults. Even if the current settings are saved to non-volatile memory by setting the STANDARD SETTING MODE SELECTION parameter in GROUP:UTILITY PARAMETERS to 5*, they will be erased from memory during initialization of the option ROM.

- *Setting the standard mode selection parameter will be referred to in this manual as performing a **TYPE X RESET**, where X is the parameter setting value.*

2.2 Installation Procedure

Installation of the TOSHIBA Profibus option ROM and interface board into a TOSVERT-130 G3 inverter should only be performed by a qualified technician familiar with the maintenance and operation of the G3. To install the option ROM and interface board, complete the following steps:

1. Record the option ROM version number located on the label of the option ROM in the following box. The option ROM version is the number immediately following the "V" on the ROM label. For example, if the label indicates "V6402", the option ROM version is 6402. This version number will be used later in the installation process. Option ROM version = [ ].

   Record the standard ROM version number prior to option ROM installation. The standard ROM version can be read from parameter `ROM VERSION` in `GROUP:UTILITY PARAMETERS`.
   Standard ROM version = [ ].

2. **CAUTION!** Verify that all input power sources to the inverter have been turned OFF and are locked and tagged out.

3. **DANGER!** Wait at least 5 minutes for the inverter's electrolytic capacitors to discharge before proceeding to step 4. **Do not touch any internal parts with power applied to the inverter, or for at least 5 minutes after power to the inverter has been removed. A hazard exists temporarily for electrical shock even if the source power has been removed.**

4. Remove the inverter's cover (open the door on units with hinged doors). Verify that the CHARGE LED has gone out before continuing the installation process.

5. Loosen the 4 screws attaching the G3's operation panel support bracket to the control board support bracket, and then remove the operation panel and support bracket as a unit (refer to Figure 1).

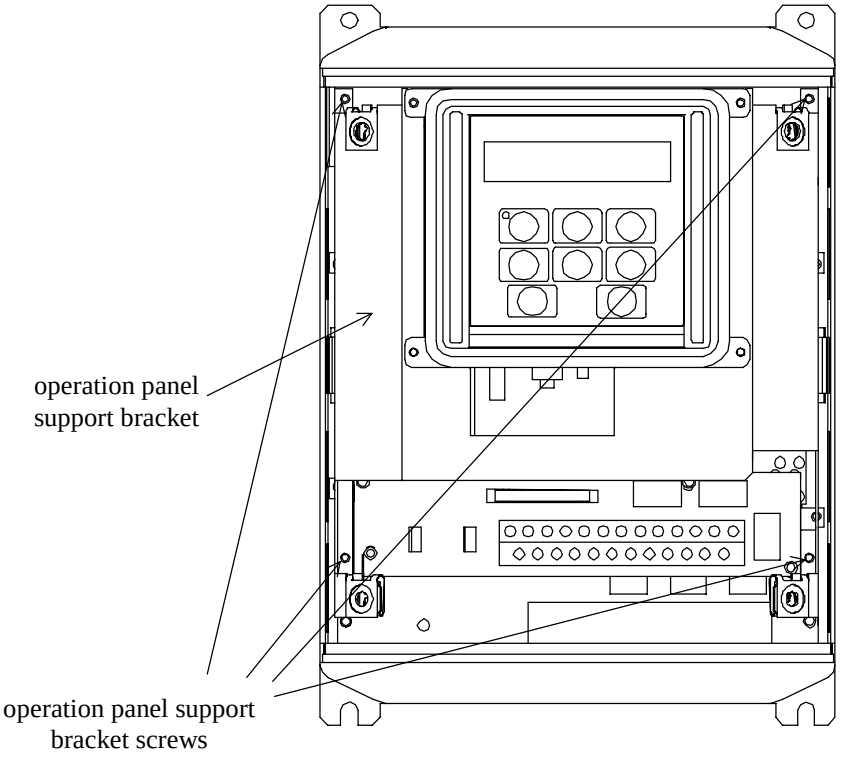


Figure 1: *G3 with front cover removed*

6. **CAUTION!** The option ROM PCB assembly and interface board are static-sensitive devices. Standard electrostatic-sensitive component handling precautions should be observed. Locate the option ROM connector, labeled CN41, on the lower-left side of the control PCB. Line up the connector on the back of the option ROM PCB with CN41. Install the option ROM by pressing gently but firmly on the option ROM PCB until a slight “click” is felt. Verify that the option ROM PCB is seated properly and firmly in CN41. If the option ROM connector does not appear to be mating with CN41 properly, verify that the ROM is oriented properly and that there are no obstructions in either connector.
7. Install the 4 nylon standoffs into the holes provided in the control board support bracket (refer to Figure 2).

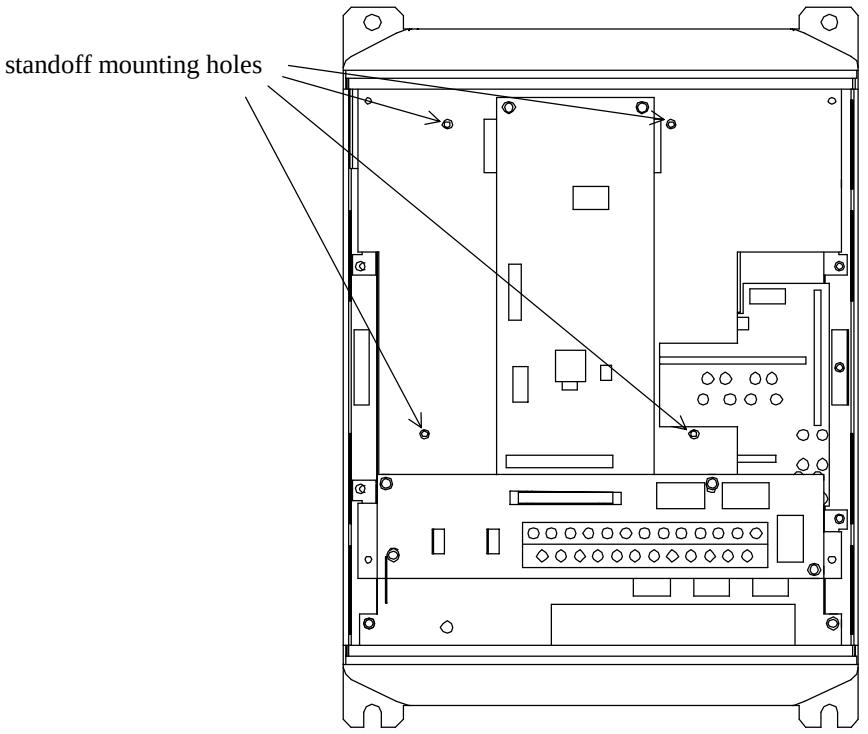


Figure 2: *G3 with front cover and operation panel support bracket removed*

8. Install the Profibus network cable through the access holes at the bottom of the inverter and route the cable in order to make connections to the interface board connector (CN1). Take care to not route the cable near any sharp edges or in positions where it may be pinched.
9. Connect the Profibus cable to the interface board connector (CN1). If a ground cable is going to be used, attach the ground cable to the plated hole near CN1 on the lower-right portion of the Profibus board (refer to section 3).

CAUTION! Extremely high voltages exist in the area near the Profibus interface board and connector. Ensure that no stray wires come into contact with any internal inverter components. Also ensure that the communications cable is not routed in such a manner that it may come into contact with high-voltage inverter components, or inverter components that may heat up during operation and damage the cable insulation.

10. Install the interface board into the inverter by carefully aligning the 4 nylon standoffs with the 4 mounting holes provided in the interface board. Ensure that connector CN5A on the back side of the interface board is aligned with connector CN5 on the front side of the control board.
11. Press the interface board firmly onto the standoffs and connector CN5 until the standoff retaining tabs lock. Ensure that CN5 and CN5A are thoroughly interlocked.
12. Carefully re-install the operation panel and support bracket and tighten the 4 screws that attach the operation panel support bracket to the control board support bracket. Once installed, take a moment to verify that all interface board and network components have sufficient clearance from other drive components.

13. If a ground cable is being used, connect the ground cable to the selected ground point.
14. Reinstall the inverter's cover (close and latch the door on units with hinged doors).

 **DANGER!**  **Do not operate the unit with the cover off / cabinet door open.**

15. Turn all power sources to the inverter unit ON, and verify that the inverter functions properly. If the inverter unit does not appear to power up, or does not function properly, immediately turn power OFF. **Repeat steps 2 ~ 4 to remove all power from the inverter.** Then, verify all connections. Contact Toshiba International Corporation for assistance if the problem persists.
16. To perform final verification that the option ROM is installed properly, display the value of the `ROM VERSION` parameter in `GROUP:UTILITY PARAMETERS`. This number should match the option ROM version number that was recorded in step 1. If this parameter value does not match the option ROM version number recorded in step 1, **repeat steps 2 ~ 4 to remove all power from the inverter,** then re-verify that the option ROM is installed properly. If the option ROM appears to be installed properly, but the version numbers still do not match, contact Toshiba International Corporation for further assistance.

2.3 Removal

Removal of the Profibus interface board from a TOSVERT-130 G3 inverter should only be performed by a qualified technician familiar with the maintenance and operation of the G3. In order to protect the interface board connector's reliability, do not repeatedly connect and disconnect the interface. Use the following procedure if it becomes necessary to remove the Profibus interface board from the inverter.

CAUTION! Do not remove the interface board while power is applied to the inverter. Removing the interface board with power applied may damage the inverter.

2.3.1 Before Removal

The inverter will display an error message if the option ROM becomes dislodged or is removed from its socket. The inverter must be reset to clear this error. Therefore, all parameters will be automatically reset to the factory default values after an option ROM has been removed from the inverter. If it is desired to retain the current parameter settings, the user should access the user-changed parameter group to display and record all the parameters and setting values that have been changed from factory defaults. Even if the current settings are saved using the TYPE 5 RESET function, they will be erased from memory during the re-initialization of the inverter after the option ROM has been removed.

2.3.2 Removal Procedure

1. **CAUTION!** Verify that all input power sources to the inverter have been turned OFF and are locked and tagged out.
2. **DANGER!** Wait at least 5 minutes for the inverter's electrolytic capacitors to discharge before proceeding to step 3. **Do not touch any internal parts with power applied to the inverter, or for at least 5 minutes after power to the inverter has been removed. A hazard exists temporarily for electrical shock even if the source power has been removed.**
3. Remove the inverter's cover (open the door on units with hinged doors). Verify that the CHARGE LED has gone out before continuing the removal process.
4. Loosen the 4 screws attaching the operation panel support bracket to the control board support bracket and remove the operation panel and support bracket as a unit (refer to Figure 3).

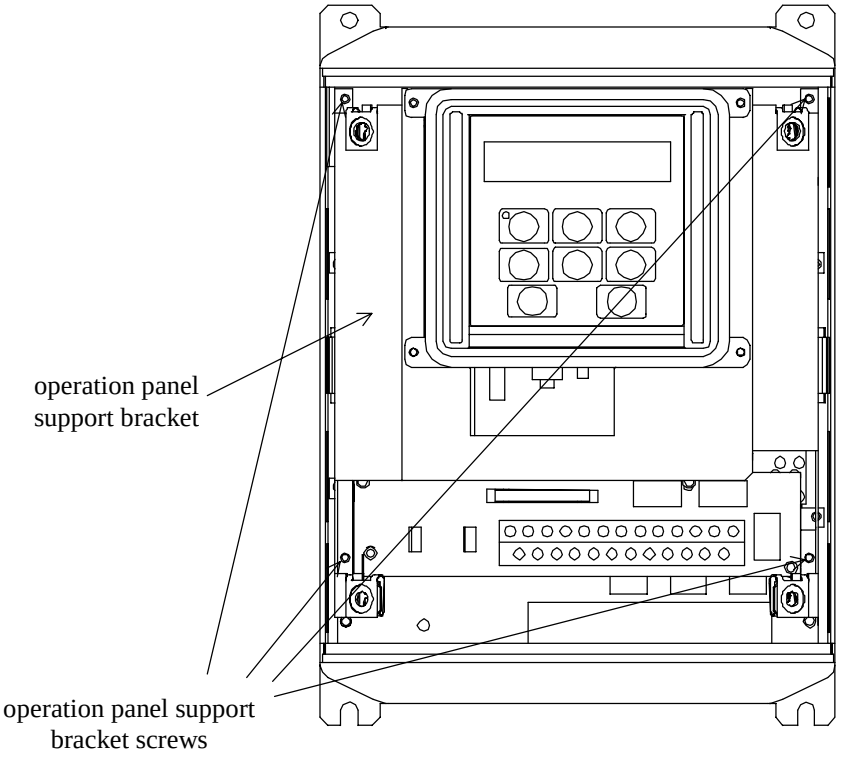


Figure 3: *G3 with front cover removed*

5. **CAUTION!** The option ROM PCB and Profibus interface board are static-sensitive devices. Standard electrostatic-sensitive component handling precautions should be observed. Release the 4 corners of the interface board from the standoffs by pressing down on the standoff locking tabs with a small flat-headed screwdriver. Be careful to not apply any abnormal stress to the interface board while performing this, as this may damage the interface board or control board connectors.
6. Remove the interface board from the inverter.
7. Disconnect the communications cable from the interface board connector (CN1), and pull the cable out through the access holes at the bottom of the inverter.
8. Locate the option ROM in the option ROM connector, labeled CN41, on the lower-left side of the control PCB. Gently work the option ROM PCB up and down while pulling on it until the ROM releases from the control PCB option ROM connector.

   IMPORTANT NOTE: Do not remove the option ROM on inverter units that were received from the factory with option ROMs pre-installed. Units that are shipped from the factory with option ROMs pre-installed (H3 and 600V G3 units, for example) require these ROMs for correct operation, and removal of the option ROM may cause incorrect operation or inverter damage. If you are in doubt about the requirement of an option ROM in your inverter unit, contact Toshiba International Corporation for assistance.
9. Carefully re-install the operation panel and support bracket and tighten the 4 screws that attach the operation panel support bracket to the control board support bracket.

10. Reinstall the inverter's cover (close and latch the door on units with hinged doors).

 **DANGER!**  **Do not operate unit with the cover off / cabinet door open.**

11. Turn all power sources to the inverter unit ON, and verify that the inverter functions properly. If the inverter unit does not appear to power up, or does not function properly, immediately turn power OFF. **Repeat steps 1 ~ 3 to remove all power from the inverter.** Then, verify all connections. Contact Toshiba International Corporation for assistance if the problem persists.

12. To re-initialize the inverter after the ROM has been removed, perform a TYPE 3 reset. After the initialization sequence, display the value of the `ROM VERSION` parameter in `GROUP:UTILITY PARAMETERS`. This number should match the standard ROM version number that was recorded prior to option ROM installation. If this parameter value does not match the value recorded earlier, contact Toshiba International Corporation for further assistance.

3. Grounding

Grounding is of particular importance for reliable, stable operation. Communication system characteristics may vary from system to system, depending on the system environment and grounding method used. The Profibus interface card is provided with a plated SHIELD connection point by CN1, on the lower right-hand side of the board. This SHIELD connection point is directly connected to the metallic housing of the DB9 connector, which should then be connected to the shield of the Profibus network cable through the Profibus connector. To ground the network cable shield, therefore, connect a wire with lug terminal to this SHIELD point, and then connect the other end of the wire to an appropriate ground. For specific details and requirements regarding protective grounding and the Profibus network, refer to the Profibus Standard (DIN 19245, part 1).

Please be sure to consider the following points for making proper ground connections:

Grounding method checkpoints

1. Make all ground connections such that no ground current flows through the inverter case.
2. Ensure that all grounds are connected to points that are at the same potential as inverter grounds.
3. Do not connect the Profibus interface board's SHIELD connection point to a power ground or any other potential noise-producing ground connection (such as the inverter's E/GND terminal).
4. Do not make connections to unstable grounds (paint-coated screw heads, grounds that are subjected to inductive noise, etc.)

4. Equipment Specifications

Item	Specification
Operating Environment	Indoors, less than 1000m above sea level, do not expose to direct sunlight or corrosive / explosive gasses.
Operating Temperature	-10 ~ +40°C (+14 ~ +104°F)
Storage Temperature	-25°C ~ +65°C (-13 ~ +149°F)
Relative Humidity	20% ~ 90% (without condensation)
Vibration	5.9m/s^2 {0.6G} or less (10 ~ 55Hz)
Grounding	According to DIN 19245, part 1
Cooling Method	Self-cooled

5. Maintenance And Inspection

Preventive maintenance and inspection is required to maintain the Profibus communication interface in its optimal condition, and to ensure a long operational lifetime. Depending on usage and operating conditions, perform a periodic inspection once every three to six months. Before starting inspections, always turn off all power supplies to the inverter unit, and wait at least five minutes after the inverter's "CHARGE" lamp has gone out.


DANGER!

Do not touch any internal parts with power applied to the inverter, or for at least 5 minutes after power to the inverter has been removed. A hazard exists temporarily for electrical shock even if the source power has been removed.

Inspection Points

- Check that the network connector screws are not loose. Tighten if necessary.
- Check that there are no defects in any attached grounding wire terminal crimp points. Visually check that the crimp points are not scarred by overheating.
- Visually check the wiring and cables for damage.
- Clean off any accumulated dust and dirt. Place special emphasis on cleaning the ventilation ports of the inverter and all installed PCBs. Always keep these areas clean, as adherence of dust and dirt can cause premature component failure.
- If use of the inverter unit is discontinued for extended periods of time, turn the power on at least once every two years and confirm that the unit still functions properly.
- Do not perform hi-pot tests on the inverter or Profibus interface board, as they may damage the unit's internal components.

Please pay close attention to all periodic inspection points and maintain a good operating environment.

6. Storage And Warranty

6.1 Storage

Observe the following points when the Profibus interface board is not used immediately after purchase or when it is not used for an extended period of time.

- Avoid storing the interface board in places that are hot or humid, or that contain large quantities of dust or metallic dust. Store the interface board in a well-ventilated location.
- When not using the Profibus interface board for an extended period of time, turn the power on at least once every two years and confirm that it still functions properly.

6.2 Warranty

The Profibus communications interface kit is covered under warranty for a period of 12 months from the date of installation, but not to exceed 18 months from the date of shipment from the factory. For further warranty or service information, please contact Toshiba International Corporation.

7. G3 Parameter Settings

Profibus interface board communications are enabled by setting parameter COMMUNICATION SELECTION in GROUP:COMMUNICATION SETTING PARAMETERS to 2 (Profibus, Modbus, DeviceNet). None of the Tosline-F10 communication parameter settings apply when using the Profibus interface. For more information on methods for changing parameter settings, refer to the TOSHIBA G3 Operation Manual.

The following is a list of the parameter settings that are required during setup to enable Profibus communications:

Parameter	Group	Required Value
BLIND FUNCTION SELECTION	GROUP:UTILITY PARAMETERS	1
COMMUNICATIONS PARMS BLIND	GROUP:UTILITY PARAMETERS	1
COMMUNICATION SELECTION	GROUP:COMMUNICATION SETTING PARAMETERS	2
INVERTER ID NUMBER	GROUP:COMMUNICATION SETTING PARAMETERS	any value other than 126 ~ 255.

Note: Although the INVERTER ID NUMBER parameter can be set from 0 to 255, the allowable Profibus slave addresses range only from 0 to 125. Therefore, if this parameter is set to a value from 126 to 255, the Profibus interface card will trip "OPTION PCB ERROR" upon initialization. To correct this error, set the INVERTER ID NUMBER parameter to a value from 0 to 125.

To implement any parameter changes in GROUP:COMMUNICATION SETTING PARAMETERS, the drive must be reset after making the changes.

If the drive into which a Profibus communications interface board is installed trips "OPTION PCB ERROR" for any reason during initialization or operation (for example, if it becomes loose from its mounting connections), it is incapable of being reset via the Profibus network. When this trip condition occurs, therefore, the drive can only be reset locally via the panel or control terminal block.

If drive control (frequency command input, RUN/STOP, etc.) is to be performed via the Profibus network, the following inverter parameters must also be set as shown:

Parameter	Group	Required Value
COMMAND MODE SELECTION	GROUP:UTILITY PARAMETERS	3
FREQUENCY MODE SELECTION	GROUP:UTILITY PARAMETERS	3

Of course, input data can always be monitored from the network regardless of the settings of COMMAND MODE SELECTION and FREQUENCY MODE SELECTION. Also note that if the COMMAND MODE SELECTION or FREQUENCY MODE SELECTION parameters are changed while the drive is running, the change will not take effect until the next time the drive is stopped.

8. Feature Summary

The Toshiba Profibus-DP interface provides a wide array of network data access and drive control features. Combined with the flexible configuration and high-speed data transfer capabilities of the Profibus network, this allows powerful networked control and monitoring systems to be designed. Some of the main features provided in the G3 Profibus-DP interface which allow for this control and configurability are briefly described here:

Protocol

Profibus DP (Decentralized Periphery). The interface can also co-exist simultaneously on networks using Profibus-FMS.

Network Baud Rates

Supports all Profibus baud rates from 9.6kbaud to 12Mbaud. The network baud rate is automatically detected and continuously monitored during operation; no parameter settings are necessary.

Global Control Functions

- Freeze mode: Input (monitor) data values are held constant at the drive until the next “freeze” command or an “unfreeze” command is received. Used primarily for synchronized monitoring of multiple Profibus nodes.
- Sync mode: Output (control) data values are held constant at the drive until the next “sync” command or an “unsync” command is received. Used primarily for synchronized control of multiple Profibus nodes.
- Clear Data: All output (control) data values are cleared to “0”.

Address Change Functions

Set_slave_address function supported – allows modification of the drive’s `INVERTER ID NUMBER` parameter. The `INVERTER ID NUMBER` parameter can also be changed while in the DATA_EXCHANGE state by accessing parameter register 204 (hex). Refer to sections 10 and 11 of this document for more information on accessing parameter registers.

Network Watchdog

A network watchdog function is always operating within the interface – in the event of a disconnection from the network or loss of the network master, the interface will automatically stop the drive for safety (note that either the `COMMAND MODE SELECTION` or `FREQUENCY MODE SELECTION` parameter must be set to 3 (network control) in order for the drive to stop when a watchdog time-out occurs).

Indicators

1 green LED is provided to indicate when the interface has achieved the DATA_EXCHANGE state with the network master. This serves as a convenient indicator that the master and drive are configured properly and are exchanging data.

Isolation

The network interface portion of the Profibus-DP board is fully optically-isolated for optimal noise-immunity characteristics.

Network Connector

The network interface is a standard DB9 connector with the following signals provided:

Pin Number	Function	In/Out
3	Profibus network “B” (positive) data line	In/out
4	RTS signal – direction control for fiber optic network interface	Out
5	DGND – power supply ground internally connected to the interface board’s isolated ground	-
6	VP – power supply +5v internally connected to the interface board’s isolated P5.	-
8	Profibus network “A” (negative) data line	In/out
1, 2, 7, 9	No connection	-

In addition to the above signals, the metallic housing of the DB9 connector is connected to the shield section of the interface board. The shield section contains a plated connection point where a ground wire can be attached to connect the network cable shield to ground. Refer to section 3 of this document for more information related to grounding.

Input/Output Data

The interface’s cyclic data sizes are fixed at 8 bytes of output (control) data configured as 4 words, and 16 bytes of input (status) data configured as 7 words and 2 bytes. For detailed explanations of the format and usage of this data, refer to sections 9 and 10 of this document.

9. Exchanged Data Structures

9.1 Output (Control) Data Format

The output data structure from the network master to the G3 Profibus interface card is comprised of 8 bytes structured as 4 words:

Offset	Data	Explanation
0	Command word high byte	Bit-level drive control command word (refer to Table 1 : Command Word Format)
1	Command word low byte	
2	Frequency command high byte	Drive's frequency command
3	Frequency command low byte	
4	Parameter number / action high byte	Parameter action bits and upper 4 bits of the parameter register number. Refer to section 10 for a detailed explanation of this data word
5	Parameter number low byte	
6	Parameter data to write high byte	During parameter register writes, this word contains the data to write. Refer to section 10 for a detailed explanation of this data word
7	Parameter data to write low byte	

The data contained in the frequency command word must be the desired frequency command multiplied by 100, and then converted to hexadecimal. In other words, if a frequency command of 55.34Hz is desired, then 55.34 x 100 = 5534, which converted to hexadecimal is 0x159E. The frequency command high byte (offset 2) must therefore contain 0x15, and the frequency command low byte (offset 3) must contain 0x9E.

In this way, the G3's allowable frequency command range of 0.00Hz ~ 400.00Hz equates to network values of 0x0000 ~ 0x9C40.

Regardless of the frequency command value sent via the Profibus network to the drive, the actual operating frequency of the drive will still be limited locally by the `LOWER LIMIT FREQUENCY`, `UPPER LIMIT FREQUENCY`, and `MAXIMUM OUTPUT FREQUENCY` parameter settings.

Table 1 : Command Word Format

	Bit	Function	Setting
Low Byte	0	RUN command	0: Stop 1: Run
	1	STOP Command (has priority over RUN command)	0: run enabled 1: stop
	2	Forward / reverse run selection	0: reverse 1: forward
	3	Acc/dec #1 / #2 selection	0: Acc / dec #1 1: Acc / dec #2
	4	Reserved	Value is ignored
	5	Reserved	
	6	Reserved	
	7	Jog mode selection	0: Normal (acc/dec mode) 1: Jog mode
High Byte	8	Feedback control	0: Feedback valid 1: Feedback invalid
	9	Compulsory DC injection braking mode	0:No compulsory DC injection braking 1:Compulsory DC injection below DC INJECTION START FREQUENCY
	A	Fundamental parameter switching	0: V/F #1 1: V/F #2
	B	Gate block (coast stop) command	0: Normal 1: Gate block
	C	Emergency off command	0: Does nothing 1: Emergency off
	D	Reset command (trip clear)	0: Does nothing 1: Reset when tripped
	E	Reserved	Value is ignored
	F	Reserved	

9.2 Input (Status) Data Format

The input data structure from the G3 Profibus interface card to the network master is comprised of 16 bytes structured as 7 words and 2 independent bytes:

Offset	Data	Explanation
0	Status word high byte	Bit-level drive status word (refer to Table 2 : Status Word Format)
1	Status word low byte	
2	Output frequency high byte	Drive's current operating frequency
3	Output frequency low byte	
4	IV input terminal value high byte	Continuously reports the value of the drive's IV analog input terminal. 0 ~ 100% terminal input corresponds to data values of 0x0000 ~ 0xFFFF
5	IV input terminal value low byte	
6	RR input terminal value high byte	Continuously reports the value of the drive's RR analog input terminal. 0 ~ 100% terminal input corresponds to data values of 0x0000 ~ 0xFFFF
7	RR input terminal value low byte	
8	Input terminal monitor high byte	Bit-level status word of drive's digital input terminals (refer to Table 3 : Input Terminal Monitor Word Format)
9	Input terminal monitor low byte	
10	Drive output current monitor	0x00 ~ 0xFF corresponds to 0 ~ 255% drive rated load current
11	Drive output voltage monitor	0x00 ~ 0xFF corresponds to 0 ~ 255% drive rated output voltage
12	Parameter number / action high byte	Parameter action bits and upper 4 bits of the parameter register number. Refer to section 10 for a detailed explanation of this data word
13	Parameter number low byte	
14	Parameter data response high byte	During parameter register reads, this word contains the requested data response. Refer to section 10 for a detailed explanation of this data word
15	Parameter data response low byte	

In order to determine the drive's actual output frequency, the data contained in the output frequency word (offsets 2 and 3) must first be converted from hexadecimal to decimal, and then divided by 100. For example, if the output frequency high byte is 0x12 and the output frequency low byte is 0x34, then 0x1234 converted to decimal is 4660. Dividing this number by 100, the actual operating frequency of 46.60Hz is obtained.

In this way, network data values of 0x0000 ~ 0x9C40 correspond to the G3's actual allowable output frequency range of 0.00Hz ~ 400.00Hz.

Table 2 : Status Word Format

	Bit	Function	Value
Low Byte	0	Run / stop status	0: Stopped 1: Running
	1	Run enable status	0: Run enabled 1: Stopped
	2	Forward / reverse status	0: Reverse 1: Forward
	3	Accel / decel #1 / #2 selection status	0: Accel / decel #1 1: Accel / decel #2
	4	Reserved	Always "0"
	5	Fault status	0: Faulted 1: Not Faulted
	6	Reserved	Always "0"
	7	Jog mode status	0: Normal (accel/decel mode) 1: Jog mode
High Byte	8	Feedback enable status	0: Feedback invalid 1: Feedback valid
	9	Compulsory DC injection braking mode	0: DC injection braking inactive 1: DC injection braking active
	A	Fundamental parameter switching	0: V/F #1 1: V/F #2
	B	Coast stop command status	0: Normal 1: Coast to stop
	C	Emergency off command	0: Normal 1: Emergency off
	D	Reserved	Always "0"
	E	Main Circuit Undervoltage	0: Normal 1: Undervoltage
	F	Reserved	Always "0"

Table 3 : Input Terminal Monitor Word Format

	Bit	Terminal	Value
Low Byte	0	F	0: Terminal – CC open 1: Terminal – CC shorted
	1	R	0: Terminal – CC open 1: Terminal – CC shorted
	2	S1	0: Terminal – CC open 1: Terminal – CC shorted
	3	S2	0: Terminal – CC open 1: Terminal – CC shorted
	4	S3	0: Terminal – CC open 1: Terminal – CC shorted
	5	S4	0: Terminal – CC open 1: Terminal – CC shorted
	6	S5 (option)	0: Terminal – CC open 1: Terminal – CC shorted
	7	S6 (option)	0: Terminal – CC open 1: Terminal – CC shorted
High Byte	8	Reserved	Always 0
	9	Reserved	
	A	Reserved	
	B	Reserved	
	C	Reserved	
	D	S7 (option)	0: Terminal – CC open 1: Terminal – CC shorted
	E	RES	0: Terminal – CC open 1: Terminal – CC shorted
	F	ST	0: Terminal – CC open 1: Terminal – CC shorted

9.3 Diagnostics

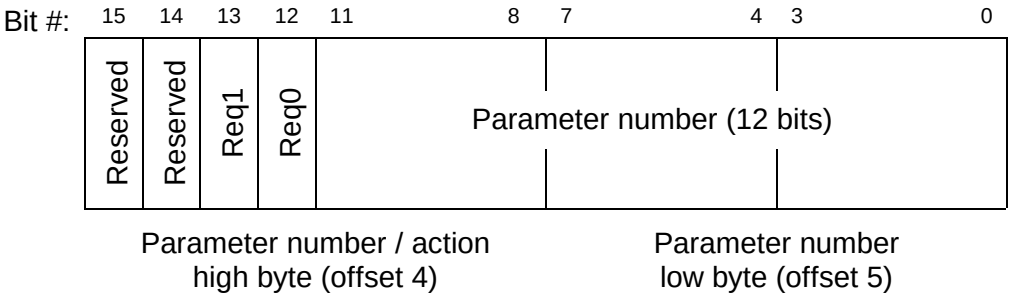
When the drive trips, 1 byte of high-priority user diagnostics is supplied to the master. The value of the diagnostics byte is the drive's fault code. Refer to section 11.3 for a list of drive fault codes.

10. Parameter Register Access

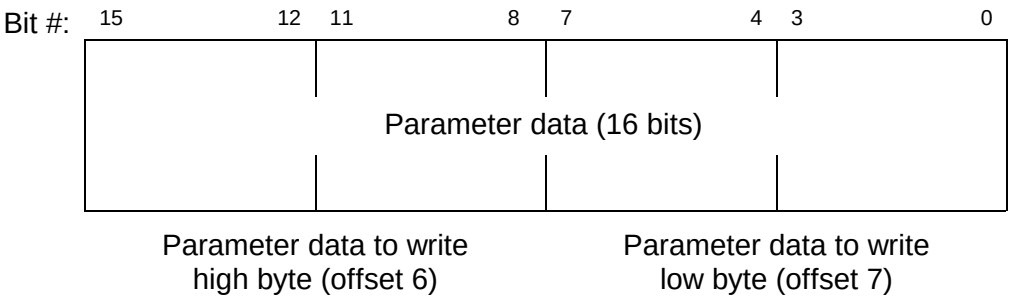
10.1 Parameter Number / Action Output Words

To access inverter parameters, 2 output words are provided in the output data structure. The structure of these 2 output words is as follows:

Parameter number / action word



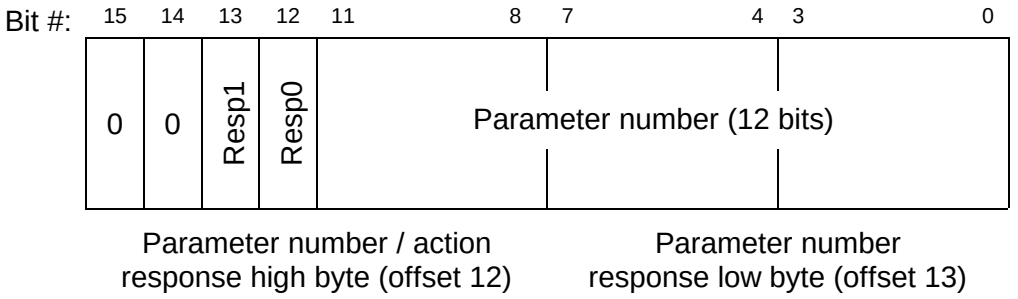
Parameter data write word



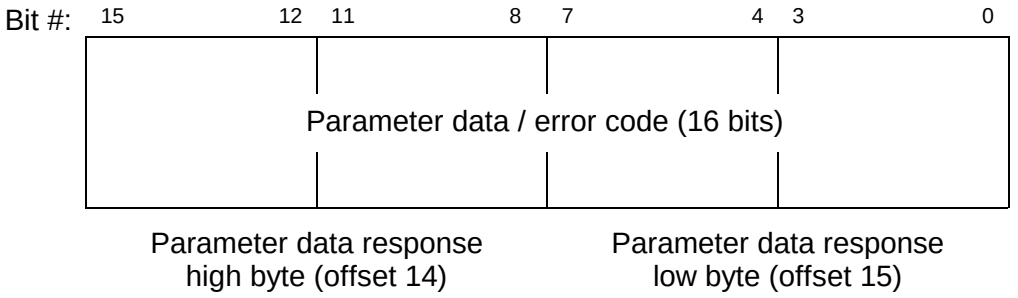
10.2 Parameter Number / Action Input Words

The response by the G3 interface card to parameter read and write requests is placed in 2 input words of the input data structure. The structure of these 2 input words is as follows:

Parameter number / action response word



Parameter data / error code response word



10.3 Parameter Access Procedure

In order to read from a parameter or write to a parameter, 2 control bits are provided. These bits, labeled Req1 and Req0 in the Parameter number / action word, can have the following values:

Req1	Req0	Meaning
0	0	No action (idle state)
0	1	Parameter read
1	0	Parameter write
1	1	Reserved: do not use

Similarly, when the drive responds to a parameter read or write request, 2 status bits are provided. These bits, labeled Resp1 and Resp0 in the Parameter number / action response word, can have the following values:

Resp1	Resp0	Meaning
0	0	No action (idle state acknowledge)
0	1	Parameter read success acknowledge
1	0	Parameter write success acknowledge
1	1	Error indication

Performing a parameter read or write action from the Profibus master involves the following process:

1. Send a “no action” code (Req1=0 and Req0=0). Every parameter access must begin from the idle state. Once this state is sent, the Profibus master must then wait for the G3 Profibus interface card to respond with an idle state acknowledge (Resp1=0 and Resp0=0).
2. If the action is to be a data write, set the parameter data in the parameter data write word. If the action is to be a data read, the parameter data write word value is irrelevant.
3. Set the parameter register number (12 bits) and action code (Req1 and Req0). For a list of parameter register numbers, refer to section 11.
4. Once the G3 Profibus interface receives the read or write request, it will begin processing it. Typically, the drive will require from 20ms to 40ms to complete each parameter access request (read or write).
5. Once the drive has completed the request, it will place its response in the parameter number / action response word and data / error code response word:
   - If the request was a read, and the read was performed successfully, this will be indicated to the master by Resp1:Resp0 changing from 0:0 to 0:1. The parameter number response (12 bits) will equal the accessed parameter number, and the resulting data read will be placed in the data / error code response word.
   - If the request was a write, and the write was performed successfully, this will be indicated to the master by Resp1:Resp0 changing from 0:0 to 1:0. The parameter number response (12 bits) will equal the accessed parameter number, and the data written to the drive will be reflected in the data / error code response word.

- If an error occurred during the read or write request, this will be indicated to the master by Resp1:Resp0 changing from 0:0 to 1:1. The parameter number response (12 bits) will equal the parameter number that the master was attempting to access, and an error code reflecting the failure cause will be placed in the data / error code response word. For a list of possible error codes, refer to section 10.4.

6. In order to perform another parameter read or write, the master must once again send a “no action” code (Req1=0 and Req0=0), and the drive must once again respond with an idle state acknowledge (Resp1=0 and Resp0=0) before the next read or write action can take place. Until a “no action” code is sent to the drive, the drive will ignore all data in the Parameter number / action word and Parameter write data word. Also, as long as the master sends the “no action” code, the drive will loop-back in the parameter number / action response word and parameter data / error code response word whatever data is sent to it in the corresponding output words.

10.4 Register Access Error Codes

When a parameter read or write error occurs, one of the following error codes will be returned in the Parameter data response word (offsets 14 and 15 of the input data structure):

Error Code	Meaning
0x0001	cannot execute
0x0002	data error (written data value outside of valid range)
0x0003	invalid register
0x0004	attempt to write to a read-only register
0x0005	attempt to read from a write-only register
0x0006	other / unclassified error

11. Parameter Registers

How To Use This Section:

This section contains tables which describe all of the parameter registers accessible from the Profibus network. The descriptions for the columns in the listed tables are as follows:

Register .....The register number used to access the parameter.

Bit .....This column only applies to read-only registers (section 11.1). If the register is comprised of a collection of individual bit-oriented status items (for example, register 0D), this column will indicate which bit(s) in the word-sized register the corresponding parameter described in the *Function* column uses (bit 0 = LSB, bit F = MSB). If the parameter uses the whole register, "word" will appear in this column, indicating the parameter consumes the entire register (this does not mean, however, that all register bits are used: refer to the explanation for *Mask* below). All read/write registers (section 11.2) have word-size data. Other possible values in this column are "low byte" (bits 0 ~ 7) and "high byte" (bits 8 ~ F).

Function.....Describes the function accessed through this parameter register.

Bank .....0 = RAM (volatile), 1 = EEPROM (nonvolatile), 0/1 = RAM & EEPROM, 2, 3 and 6 = code space (read-only). **IMPORTANT:** the inverter's EEPROM has a life span of 10,000 write cycles. Do not write to a read/write holding register whose bank is listed as 1 or 0/1 more than 10,000 times.

Mask .....The data bits within a register that are not covered by the hexadecimal mask (for example, bits 8 ~ F if the mask is 00FF) will always be returned as 0 during data reads and will be ignored during data writes. For example, if a hexadecimal value of AB98 is sent to a register whose mask is 00FF, the actual value written to the register's corresponding parameter will be 0098. As this is not considered an error, no exception response will be generated if this type of extraneous data condition occurs.

Adjustment Range ...Indicates valid data settings in real terms (Hz, ON/OFF, etc.)

Multiplier .....Indicates scaling factor used to convert *Adjustment Range* data into integer values. The equation used for this conversion is:

Actual Holding Register Data = Real Data ÷ *Multiplier*

For example, if 60.00Hz `MAXIMUM OUTPUT FREQUENCY` were desired, register 26 must be set to [60.00 ÷ 0.01] = 6000 decimal (= 1770 hex).

Example Table Excerpt:

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
26	MAXIMUM OUTPUT FREQUENCY (*)	0 / 1	FFFF	0BB8 ~ 9C40 (30.00~400.00)	0.01
27	BASE FREQUENCY #1	0 / 1	FFFF	09C4 ~ 9C40 (25.00~400.00)	0.01
28	BASE FREQUENCY VOLTAGE SELECT (*)	0 / 1	0030	0000: Input voltage level (0) 0020: Automatic setting (1) 0030: Stationary setting (2)	—
29	MAXIMUM OUTPUT VOLTAGE #1	0 / 1	FFFF	0000 ~ 0258 (0 ~ 600)	1
2A	REVERSE OPERATION DISABLE SELECT	0 / 1	0020	0000: Reverse allowed (0) 0020: Reverse not allowed (1)	—

Other Programming Register Notes:

- All register numbers indicated are in hexadecimal notation (for example, 29 hex = 41 decimal). Occasionally, hexadecimal notation in this document may also take the form of a number beginning with “0x”.
- Throughout this document, the abbreviations "LL", "UL", and "Fmax" will stand for LOWER LIMIT FREQUENCY, UPPER LIMIT FREQUENCY, and MAXIMUM OUTPUT FREQUENCY, respectively.
- Reading from or writing to registers marked as "Reserved" will generate an “invalid register” error (error code 0x0003)
- Certain parameter registers cannot be written to while the inverter is running. These registers will be indicated by the character (*). If an attempt is made to write to these registers while the inverter is running, a “cannot execute” error (error code 0x0001) will be generated.
- The parameter register data for all read/write registers with *Bank* information listed as 0/1 will be retrieved from bank 0 (RAM) during reads and will be written to both banks 0 and 1 (RAM and EEPROM) during writes.
- All parameters in GROUP:COMMUNICATION SETTING PARAMETERS (section 11.2.10) are retrieved by the drive from non-volatile memory upon inverter initialization only. When any of these registers are modified, therefore, the drive must be reset for the changed values to take effect.
- If the COMMAND MODE SELECTION or FREQUENCY MODE SELECTION parameters are changed while the drive is running, the change will not take effect until the next time the drive is stopped.

11.1 Read-Only Registers

Register	Bit	Function	Bank	Mask	Adjustment Range	Multiplier
01 ~ 09	word	Reserved	—	—	—	—
0A	word	RX terminal analog input value	0	FFFF	0000 ~ 7FFF (-100% ~ 0%) 7FFF ~ FFFF (0% ~ 100%)	1
0B	word	Frequency command monitor	0	FFFF	0000 ~ 9C40 (0.00 ~ 400.00 Hz)	0.01
0C	word	Input voltage monitor*(Note 1)*	0	FFFF	0 ~ 255%	0.1
0D	word	Output terminal status monitor	0	00FF	Refer to Table 4 (page 32)	—
0E	word	Inverter Status 1	0	FFFF	Refer to Table 5 (page 32)	—
0F	word	Inverter Status 2	0	00FF	Refer to Table 6 (page 32)	—
10	word	Present trip	0	00FF	Refer to section 11.3 for fault codes	—
11	high byte	4th Past trip (most recent)	0	7F00		—
	low byte	3rd past trip		007F		
12	high byte	2nd past trip	0	7F00		—
	low byte	1st past trip (oldest)		007F		
13	word	Pre-compensation output frequency	0	FFFF	0000 ~ 9C40 (0.00 ~ 400.00 Hz)	0.01
14	word	Post-compensation output frequency	0	FFFF	0000 ~ 9C40 (0.00 ~ 400.00 Hz)	0.01
15	word	Torque current monitor	0	FFFF	*(Note 2)*	0.01
16	word	Excitation current monitor	0	00FF	00 ~ FF (0 ~ 255%)	1
17	word	PID feedback value	0	FFFF	*(Note 2)*	0.02
18	word	Motor overload ratio	0	FFFF	0 ~ 65535	100/65535
19	word	Inverter overload ratio	0	FFFF	0 ~ 65535	100/65535
1A	word	DBR overload ratio	0	FFFF	0 ~ 65535	100/65535
1B	word	Input power (%)	0	FFFF	0 ~ 6553.5	0.1
1C	word	Input power (kW)	0	FFFF	*(Note 3)*	
1D	word	Output power (%)	0	FFFF	*(Note 2)*	0.1
1E	word	Output power (kW)	0	FFFF	*(Note 2, Note 3)*	
1F, 20	word	Reserved	—	—	—	—
21	word	Input / output power units	0	0008	0000: 0.01kW 0008: 0.1kW	—
22	word	Command mode status	0	0003	0000: terminal 0001: panel 0002: option 0003: RS232C	—
23	word	Frequency mode selection status	0	000C	0000: terminal 0004: panel 0008: option 000C: RS232C	—
24	low byte	Profibus interface card software revision	—	—	—	—
	high byte	Profibus interface card software version				
25	word	Output current (amps)	—	FFFF	0.0 ~ 6553.5 A	0.1

(**Note 1**) These monitor voltage units are not affected by the setting of `VOLTAGE UNITS SELECTION` in `GROUP:UTILITY PARAMETERS`; they are always in units of %.

(**Note 2**) These registers use signed data (data values larger than 7FFFH are negative). If the register data is 8000H or larger, the actual value can be obtained by: **actual value = - [FFFFH - (register data) + 1]**.

(**Note 3**) If the input / output power units data is 0, the monitored data is in 0.01kW units, and the multiplier is 0.01. If the input / output power units data is 1, the monitored data is in 0.1kW units, and the multiplier is 0.1. These values are automatically set according to the inverter's capacity.

Table 4: Output Terminal Status Monitor (register 0D)

Lower Byte	Bit	Output Terminal	0	1	Single-Bit Read Mask
	bit 0	unused (always 0)	—	—	—
	bit 1	unused (always 0)	—	—	—
	bit 2	FAN	OFF	ON	0004
	bit 3	FL	FLB-FLC shorted	FLA-FLC shorted	0008
	bit 4	MS relay	OFF	ON	0010
	bit 5	OUT (option)	OUTB-OUTC shorted	OUTA-OUTC shorted	0020
	bit 6	RCH	RCHA-RCHC open	RCHA-RCHC shorted	0040
	bit 7	LOW	LOWA-LOWC open	LOWA-LOWC shorted	0080

Table 5: Inverter Status 1 (register 0E)

Lower Byte	Bit	Inverter Status	0	1	Single-Bit Read Mask
	bit 0	running (acc/dec)	—	running	0001
	bit 1	unused (always 0)	—	—	—
	bit 2	forward / reverse	reverse	forward	0004
	bit 3	acc/dec #1/#2	acc/dec #1	acc/dec #2	0008
	bit 4	for inverter use	—	—	—
	bit 5	for inverter use	—	—	—
	bit 6	for inverter use	—	—	—
	bit 7	jog/normal mode	normal (acc/dec)	jog mode	0080

Upper Byte	Bit	Inverter Status	0	1	Single-Bit Read Mask
	bit 0	feedback ON/OFF	OFF	feedback active	0001
	bit 1	DC inj. braking	OFF	DC inj. braking active	0002
	bit 2	V/F #1/#2	V/F #1	V/F #2	0004
	bit 3	coasting	not coasting	coasting	0008
	bit 4	emergency off	not in emergency off	in emergency off	0010
	bit 5	for inverter use	—	—	—
	bit 6	for inverter use	—	—	—
	bit 7	for inverter use	—	—	—

Table 6 : Inverter Status 2 (register 0F)

Upper Byte	Bit	Inverter Status	0	1	Single-Bit Read Mask
	bit 0	accelerating	not accelerating	accelerating	0001
	bit 1	decelerating	not decelerating	decelerating	0002
	bit 2	for inverter use	—	—	—
	bit 3	retry	not retrying	retrying	0008
	bit 4	running (including DC injection braking)	stopped	running	0010
	bit 5	for inverter use	—	—	—
	bit 6	for inverter use	—	—	—
	bit 7	tripped	not tripped	tripped	0080

11.2 Read/Write Registers

11.2.1 GROUP:FUNDAMENTAL PARAMETERS #1

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
26	MAXIMUM OUTPUT FREQUENCY (*)	0 / 1	FFFF	0BB8 ~ 9C40 (30.00~400.00)	0.01
27	BASE FREQUENCY #1	0 / 1	FFFF	09C4 ~ 9C40 (25.00~400.00)	0.01
28	BASE FREQUENCY VOLTAGE SELECT (*)	0 / 1	0030	0000: Input voltage level (0) 0020: Automatic setting (1) 0030: Stationary setting (2)	—
29	MAXIMUM OUTPUT VOLTAGE #1	0 / 1	FFFF	0000 ~ 0258 (0 ~ 600)	1
2A	REVERSE OPERATION DISABLE SELECT	0 / 1	0020	0000: Reverse allowed (0) 0020: Reverse not allowed (1)	—
2B	UPPER LIMIT FREQUENCY	0 / 1	FFFF	0000 ~ Fmax	0.01
2C	LOWER LIMIT FREQUENCY	0 / 1	FFFF	0000 ~ UL, Fmax	0.01
2D	VOLTS PER HERTZ PATTERN (*)	0 / 1	000F	0000: Constant torque (1) 0001: Variable torque (2) 0002: Auto. torque boost (3) 0006: #3 w/ auto. energy savings (4) 000A: Vector control (5) 000E: #5 w/ auto. energy savings (6)	—
2E	1, 2 VOLTAGE BOOST #1	0 / 1	FFFF	0000 ~ 012C (0.0 ~ 30.0)	0.1
2F	ACCELERATION TIME #1	0 / 1	FFFF	0001 ~ EA60 (0.01~ 600.00) 0001 ~ EA60 (0.1~ 6000.0)	0.01 0.1
30	DECELERATION TIME #1	0 / 1	FFFF	0001 ~ EA60 (0.01~ 600.00) 0001 ~ EA60 (0.1~ 6000.0)	0.01 0.1
31	ACC/DEC PATTERN #1 SELECTION	0 / 1	0030	0000: Linear (0) 0010: Self-adjusting (1) 0020: S-Pattern #1 (2) 0030: S-Pattern #2 (3)	—
32	ACCEL/DECEL PATTERN ADJUST LOW	0 / 1	00FF	0003 ~ 00FD (0 ~ 50) (Note 1)	1
33	ACCEL/DECEL PATTERN ADJUST HIGH	0 / 1	00FF	0003 ~ 00FD (0 ~ 50) (Note 1)	1

Note 1: Register data = (desired setting x 5 + 3), converted to hexadecimal

11.2.2 GROUP:FUNDAMENTAL PARAMETERS #2

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
34	BASE FREQUENCY #2	0 / 1	FFFF	09C4 ~ 9C40 (25.00 ~ 400.00)	0.01
35	MAXIMUM OUTPUT VOLTAGE #2	0 / 1	FFFF	0000 ~ 0258 (0 ~ 600)	1
36	VOLTAGE BOOST #2	0 / 1	FFFF	0000 ~ 012C (0.0 ~ 30.0)	0.1
37	ELECTRONIC THERMAL PROTECT LVL #2	0 / 1	00FF	000A ~ 0064 (10 ~ 100)	1
38	STALL PROTECTION SELECTION #2	0 / 1	0040	0000: ON (0) 0040: OFF (1)	—
39	0 | STALL PROTECTION LEVEL #2	0 / 1	00FF	000A ~ 00D7 (10 ~ 215)	1
3A	ACCELERATION TIME #2	0 / 1	FFFF	0001 ~ EA60 (0.1~ 6000.0) 0001 ~ EA60 (0.01~ 600.00)	0.1 0.01
3B	DECELERATION TIME #2	0 / 1	FFFF	0001 ~ EA60 (0.1~ 6000.0) 0001 ~ EA60 (0.01~ 600.00)	0.1 0.01
3C	ACC/DEC PATTERN #2 SELECTION	0 / 1	0030	0000: Linear (0) 0010: Self-adjusting (1) 0020: S-Pattern #1 (2) 0030: S-Pattern #2 (3)	—
3D	ACC/DEC #1/#2 SWITCH FREQUENCY	0 / 1	FFFF	0000 ~ Fmax	0.01

11.2.3 GROUP:PANEL CONTROL PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
3E	DIRECTION SELECTION (FORWARD/REV)	0 / 1	0004	0000: Reverse (0) 0004: Forward (1)	—
3F	STOP PATTERN SELECTION	0 / 1	0040	0000: Decelerated stop (0) 0040: Coast stop (1)	—
40	FUNDAMENTAL PARAM SWITCHING	0 / 1	0004	0000: V/F #1 (1) 0004: V/F #2 (2)	—
41	ACCEL/DECEL #1/#2 SELECTION	0 / 1	0008	0000: Acc / dec #1 (1) 0008: Acc / dec #2 (2)	—
42	PANEL RESET SELECTION	0 / 1	0030	0000: All possible (0) 0010: OL only (1) 0020: OL, OC only (2)	—
43	PANEL FEEDBACK CONTROL	0 / 1	0001	0000: Feedback valid (0) 0001: Feedback invalid (1)	—

11.2.4 GROUP:TERMINAL SELECTION PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
44	INPUT TERMINAL SELECTION	0 / 1	0001	0000: Standard functions (0) 0001: Individual selections (1)	—
45	1 "R" INPUT TERMINAL FUNCTION	0 / 1	FFFF	0000 ~ FFFF (0 ~ 54) Refer to Table 7 (page 37)	—
46	"S1" INPUT TERMINAL FUNCTION				
47	"S2" INPUT TERMINAL FUNCTION				
48	"S3" INPUT TERMINAL FUNCTION				
49	"S4" INPUT TERMINAL FUNCTION				
4A	"F" INPUT TERMINAL FUNCTION				
4B	"RES" INPUT TERMINAL FUNCTION				
4C	"ST" INPUT TERMINAL FUNCTION				
4D	"S5" INPUT TERMINAL FUNCTION				
4E	"S6" INPUT TERMINAL FUNCTION				
4F	"S7" INPUT TERMINAL FUNCTION				
50	POTENTIAL TERMINAL FUNCTION				
51	R,S1-S7 TERMINAL RESPONSE TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
52	F INPUT TERMINAL RESPONSE TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
53	RES INPUT TERMINAL RESPONSE TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
54	ST INPUT TERMINAL RESPONSE TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
55	"RCH" CONTACTS FUNCTION	0 / 1	FFFF	0 ~ FFFF (0 ~ 63) Refer to Table 8 (page 38)	—
56	"RCH" CONTACTS DELAY TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
57	"RCH" CONTACTS HOLD TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
58	"LOW" CONTACTS FUNCTION	0 / 1	FFFF	0 ~ FFFF (0 ~ 63) Refer to Table 8 (page 38)	—
59	"LOW" CONTACTS DELAY TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
5A	"LOW" CONTACTS HOLD TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
5B	"FL" CONTACTS FUNCTION	0 / 1	FFFF	0 ~ FFFF (0 ~ 63) Refer to Table 8 (page 38)	—
5C	"FL" CONTACTS DELAY TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
5D	"FL" CONTACTS HOLD TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
5E	"OUT" CONTACTS FUNCTION	0 / 1	FFFF	0 ~ FFFF (0 ~ 63) Refer to Table 8 (page 38)	—
5F	"OUT" CONTACTS DELAY TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
60	"OUT" CONTACTS HOLD TIME	0 / 1	00FF	0001 ~ 0064 (1 ~ 100)	1
61	LOW SPEED SIGNAL OUTPUT FREQ	0 / 1	FFFF	0 ~ Fmax	0.01
62	ACC/DEC COMPLETE DETECT BAND	0 / 1	FFFF	0 ~ Fmax	0.01
63	SPEED REACH MAXIMUM FREQUENCY	0 / 1	FFFF	0 ~ Fmax	0.01
64	SPEED REACH MINIMUM FREQUENCY	0 / 1	FFFF	0 ~ Fmax	0.01
65	COMMERCIAL POWER/INV SWITCHING OUTPUT	0 / 1	00C0	0000: OFF (0) 0040: Auto switch on trip (1) 0080: At COMMERCIAL POWER/INV SWITCH FREQ (2) 00C0: Both (1) and (2) (3)	—
66	2, 3 COMMERCIAL POWER/INV SWITCH FREQ	0 / 1	FFFF	0 ~ Fmax	0.01
67	"FP" OUTPUT TERMINAL PULSE FREQUENCY	0 / 1	0003	0000: 48f (0) 0001: 96f (1) 0002: 360f (2)	—
68	RR INPUT SPECIAL FUNCTION SELECT	0 / 1	00E0	0000: Standard (0) 0040: Fmax (1) 0080: TACC/TDEC mult. (2) 00C0: VB mult. Factor (3) 0020: CL mult. Factor (4)	—

Table 7: Input Terminal Selections

Setting Value	Data (Hex)	Function	Setting Value	Data (Hex)	Function
0	10C8	R (reverse run)	28	04AF	Binary bit #6
1	011C	SS1 (preset speed selection)	29	08AF	Binary bit #7
2	021C	SS2 (preset speed selection)	30	10AF	Binary bit #8
3	041C	SS3 (preset speed selection)	31	20AF	Binary bit #9
4	081C	SS4 (preset speed selection)	32	40AF	Binary bit #10
5	20C8	F (forward run)	33	04CE	No effect
6	201B	RES (fault reset)	34	01C7	UP/DOWN frequency setting (UP)
7	C0C9	ST (gate ON/OFF)	35	02C7	UP/DOWN frequency setting (DOWN)
8	0CC8	JOG selection	36	04C7	UP/DOWN frequency clear
9	081A	Acc/dec #1/#2 selection	37	08C7	PUSH-type RUN key
10	101B	Emergency off	38	10C7	PUSH-type STOP key
11	021B	DC injection braking ON/OFF	39	02B9	No effect
12	041B	Fundamental parameter switching (V/F #2)	40	C0C8	Forward/reverse run selection
13	011B	Feedback control ON/OFF	41	20C7	RUN
14	10CE	Pattern run selection #1	42	30C9	Binary data write
15	20CE	Pattern run selection #2	43	0198	[LOCAL/REMOTE] key
16	40CE	Pattern run selection #3	44	0298	[MON] key
17	80CE	Pattern run selection #4	45	0498	[PRG] key
18	02CE	Pattern run continue signal	46	0898	[UP] (▲) key
19	01CE	Pattern run step trigger signal	47	1098	[DOWN] (▼) key
20	0AC9	JOG forward run	48	2098	[READ/WRITE] key
21	06C9	JOG reverse run	49	4098	[RUN] key
22	10AE	Binary bit #0	50	8098	[STOP/CLEAR] key
23	20AE	Binary bit #1	51	08CE	Commercial power / inverter switching signal
24	40AE	Binary bit #2	52	40C7	Reserved for option use
25	80AE	Binary bit #3	53	10CB	RR frequency switching input
26	01AF	Binary bit #4	54	20CB	IV frequency switching input
27	02AF	Binary bit #5			

Note: In order for binary bit #0 ~ #10 (setting values 22 ~ 32) and UP/DOWN frequency setting (setting values 34 & 35) inputs to be valid, parameter `FREQUENCY PRIORITY SELECTION #1` or `FREQUENCY PRIORITY SELECTION #2` in `GROUP:FREQUENCY SETTING PARAMETERS` must be set to 5 (BIN (binary setting or UP/DOWN setting)).

Table 8: Output Terminal Selections (RCH, LOW, FL, OUT relay contacts)

Setting Value	Data (Hex)	Function	Setting Value	Data (Hex)	Function
0	0000	Lower limit frequency	32	C5B7	Executing emergency off
1	0100	/Lower limit frequency	33	CDB7	/Executing emergency off
2	0200	Upper limit frequency	34	B5BB	Executing retry
3	0300	/Upper limit frequency	35	BDBB	/Executing retry
4	0400	Low speed signal	36	D5CF	Pattern run switching output
5	0500	/Low speed signal	37	DDCF	/Pattern run switching output
6	0600	Accel/decel complete	38	D5D8	PID deviation limit
7	0700	/Accel/decel complete	39	DDD8	/PID deviation limit
8	0800	Selected speed reach signal	40	C5BB	Run/stop
9	0900	/Selected speed reach signal	41	CDBB	/Run/stop
10	0A00	Fault	42	1400	Severe fault (armature short, load-end short, open phase, output error, earth fault)
11	0B00	/Fault	43	1500	/Severe fault (armature short, load-end short, open phase, output error, earth fault)
12	0C00	Fault other than earth fault or load-end overcurrent	44	1600	Non-severe fault (overload, overcurrent, overvoltage)
13	0D00	/Fault other than earth fault or load-end overcurrent	45	1700	/Non-severe fault (overload, overcurrent, overvoltage)
14	95B5	Overcurrent pre-alarm	46	E5D8	Commercial power / inverter switching output #1
15	9DB5	/Overcurrent pre-alarm	47	EDD8	/Commercial power / inverter switching output #1
16	85C5	Inverter overload pre-alarm	48	F5D8	Commercial power / inverter switching output #2
17	8DC5	/Inverter overload pre-alarm	49	FDD8	/Commercial power / inverter switching output #2
18	95C5	Motor overload pre-alarm	50	85C0	Fan ON/OFF
19	9DC5	/Motor overload pre-alarm	51	8DC0	/Fan ON/OFF
20	D5C5	Overheat pre-alarm	52	F5B6	Executing JOG
21	DDC5	/Overheat pre-alarm	53	FDB6	/Executing JOG
22	A5B4	Overvoltage pre-alarm	54	1800	Local/remote operation
23	ADB4	/Overvoltage pre-alarm	55	1900	/Local/remote operation
24	E5B4	Undervoltage alarm	56	A5D1	Cumulative timer alarm
25	EDB4	/Undervoltage alarm	57	ADD1	/Cumulative timer alarm
26	85B5	Undercurrent alarm	58	1A00	Communication error alarm
27	8DB5	/Undercurrent alarm	59	1B00	/Communication error alarm
28	85D1	Overtorque alarm	60	A5B6	F/R
29	8DD1	/Overtorque alarm	61	ADB6	/F/R
30	E5BB	Braking resistor OL pre-alarm	62	1E00	Run preparation complete
31	EDBB	/Braking resistor OL pre-alarm	63	1F00	/Run preparation complete

11.2.5 GROUP:SPECIAL CONTROL PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
69	START-UP FREQUENCY	0 / 1	FFFF	0000 ~ 03E8 (0.00 ~ 10.00)	0.01
6A ~ 6F	Reserved	—	—	—	—
70	END FREQUENCY	0 / 1	FFFF	0000 ~ 0BB8 (0.00 ~ 30.00)	0.01
71	RUN FREQUENCY	0 / 1	FFFF	0000 ~ Fmax	0.01
72	RUN FREQUENCY HYSTERESIS	0 / 1	FFFF	0000 ~ 0BB8 (0.00 ~ 30.00)	0.01
73	ENABLE JUMP FREQUENCIES	0 / 1	0080	0000: Function OFF (0) 0080: Function ON (1)	—
74	1 JUMP FREQUENCY #1	0 / 1	FFFF	0000 ~ Fmax	0.01
75	JUMP FREQUENCY #1 BANDWIDTH	0 / 1	FFFF	0000 ~ 0BB8 (0.00 ~ 30.00)	0.01
76	JUMP FREQUENCY #2	0 / 1	FFFF	0000 ~ Fmax	0.01
77	JUMP FREQUENCY #2 BANDWIDTH	0 / 1	FFFF	0000 ~ 0BB8 (0.00 ~ 30.00)	0.01
78	JUMP FREQUENCY #3	0 / 1	FFFF	0000 ~ Fmax	0.01
79	JUMP FREQUENCY #3 BANDWIDTH	0 / 1	FFFF	0000 ~ 0BB8 (0.00 ~ 30.00)	0.01
7A ~ 7F	Reserved	—	—	—	—
80	PWM CARRIER FREQUENCY (Note 1)	0 / 1	00FF	0005 ~ 0064 (0.5 ~ 10.0)	0.1

Note 1: Actual adjustment range depends on inverter rating.

11.2.6 GROUP:FREQUENCY SETTING PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
81	FREQUENCY PRIORITY SELECTION #1	0 / 1	0007	0001: RR (1) 0002: IV (2) 0003: RX (3) 0004: PG (4) 0005: BIN (5)	—
82	FREQUENCY PRIORITY SELECTION #2	0 / 1	0038	0008: RR (1) 0010: IV (2) 0018: RX (3) 0020: PG (4) 0028: BIN (5)	—
83	ANALOG INPUT FILTER	0 / 1	0003	0000: No filter (0) 0001: Small filter (1) 0002: Medium filter (2) 0003: Large filter (3)	—
84	RR TERMINAL STANDARD OR ADJUSTABLE	0 / 1	0002	0000: Standard (0) 0002: Adjustable (1)	—
85	1 RR REFERENCE SETTING POINT #1	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
86	RR REF POINT #1 FREQUENCY	0 / 1	FFFF	0000 ~ Fmax	0.01
87	RR REFERENCE SETTING POINT #2	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
88	RR REF POINT #2 FREQUENCY	0 / 1	FFFF	0000 ~ Fmax	0.01
89	IV TERMINAL STANDARD OR ADJUSTABLE	0 / 1	0004	0000: Standard (0) 0004: Adjustable (1)	—
8A	1 IV REFERENCE SETTING POINT #1	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
8B	IV REF POINT #1 FREQUENCY	0 / 1	FFFF	0000 ~ Fmax	0.01
8C	IV REFERENCE SETTING POINT #2	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
8D	IV REF POINT #2 FREQUENCY	0 / 1	FFFF	0000 ~ Fmax	0.01
8E	RX TERMINAL STANDARD OR ADJUSTABLE	0 / 1	0008	0000: Standard (0) 0008: Adjustable (1)	—
8F	1 RX REFERENCE SETTING POINT #1	0 / 1	00FF	009C ~ 00FF, 0000 ~ 0064 (-100 ~ -1, 0 ~ 100)	1
90	RX REF POINT #1 FREQUENCY	0 / 1	FFFF	-Fmax ~ Fmax	0.02
91	RX REFERENCE SETTING POINT #2	0 / 1	00FF	009C ~ 00FF, 0000 ~ 0064 (-100 ~ -1, 0 ~ 100)	1
92	RX REF POINT #2 FREQUENCY	0 / 1	FFFF	-Fmax ~ Fmax	0.02
93	PG TERMINAL STANDARD OR ADJUSTABLE	0 / 1	0010	0000: Standard (0) 0010: Adjustable (1)	—
94	1 PG REFERENCE SETTING POINT #1	0 / 1	00FF	009C ~ 00FF, 0000 ~ 0064 (-100 ~ -1, 0 ~ 100)	1
95	PG REF POINT #1 FREQUENCY	0 / 1	FFFF	-Fmax ~ Fmax	0.02
96	PG REFERENCE SETTING POINT #2	0 / 1	00FF	009C ~ 00FF, 0000 ~ 0064 (-100 ~ -1, 0 ~ 100)	1
97	PG REF POINT #2 FREQUENCY	0 / 1	FFFF	-Fmax ~ Fmax	0.02

Register	Function / Title		Bank	Mask	Adjustment Range	Multiplier
98	BINARY INPUT STD OR ADJUSTABLE		0 / 1	0001	0000: Standard (0) 0001: Adjustable (1)	—
99	1	BINARY REF SETTING POINT #1	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
9A		BINARY REF POINT #1 FREQUENCY	0 / 1	FFFF	-Fmax ~ Fmax	0.02
9B		BINARY REF SETTING POINT #2	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
9C		BINARY REF POINT #2 FREQUENCY	0 / 1	FFFF	-Fmax ~ Fmax	0.02
9D	JOG RUN FREQUENCY		0 / 1	FFFF	0000 ~ 07D0 (0.00 ~ 20.00)	0.01
9E	Other than 0	JOG STOP METHOD	0 / 1	00C0	0000: Decelerated stop (0) 0040: Coast stop (1) 0080: DC injection stop (2)	—
9F	PRESET SPEED SELECTION		0 / 1	000F	0000 ~ 000F (0 ~ 15)	1
A0 ~ FF	Reserved		—	—	—	—
100	Other than 0	PRESET SPEED MODE ACTIVATION	0 / 1	0004	0000: Deactivated (0) 0004: Activated (1)	—
101		PRESET SPEED #1 FREQUENCY	1	FFFF	LL ~ UL	0.01
102		PRESET SPEED #1 OPERATING MODE	1	040C	0004: (0) 0000: (1) 000C: (2) 0008: (3) 0404: (4) 0400: (5) 040C: (6) 0408: (7)	1
103	2 or higher	PRESET SPEED #2 FREQUENCY	1	FFFF	LL ~ UL	0.01
104		PRESET SPEED #2 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
105	3 or higher	PRESET SPEED #3 FREQUENCY	1	FFFF	LL ~ UL	0.01
106		PRESET SPEED #3 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
107	4 or higher	PRESET SPEED #4 FREQUENCY	1	FFFF	LL ~ UL	0.01
108		PRESET SPEED #4 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
109	5 or higher	PRESET SPEED #5 FREQUENCY	1	FFFF	LL ~ UL	0.01
10A		PRESET SPEED #5 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
10B	6 or higher	PRESET SPEED #6 FREQUENCY	1	FFFF	LL ~ UL	0.01
10C		PRESET SPEED #6 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
10D	7 or higher	PRESET SPEED #7 FREQUENCY	1	FFFF	LL ~ UL	0.01
10E		PRESET SPEED #7 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1

Register	Function / Title		Bank	Mask	Adjustment Range	Multiplier
10F	8 or higher	PRESET SPEED #8 FREQUENCY	1	FFFF	LL ~ UL	0.01
110		PRESET SPEED #8 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
111	9 or higher	PRESET SPEED #9 FREQUENCY	1	FFFF	LL ~ UL	0.01
112		PRESET SPEED #9 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
113	10 or higher	PRESET SPEED #10 FREQUENCY	1	FFFF	LL ~ UL	0.01
114		PRESET SPEED #10 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
115	11 or higher	PRESET SPEED #11 FREQUENCY	1	FFFF	LL ~ UL	0.01
116		PRESET SPEED #11 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
117	12 or higher	PRESET SPEED #12 FREQUENCY	1	FFFF	LL ~ UL	0.01
118		PRESET SPEED #12 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
119	13 or higher	PRESET SPEED #13 FREQUENCY	1	FFFF	LL ~ UL	0.01
11A		PRESET SPEED #13 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
11B	14 or higher	PRESET SPEED #14 FREQUENCY	1	FFFF	LL ~ UL	0.01
11C		PRESET SPEED #14 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1
11D	15	PRESET SPEED #15 FREQUENCY	1	FFFF	LL ~ UL	0.01
11E		PRESET SPEED #15 OPERATING MODE	1	040C	Same as PRESET SPEED #1 OPERATING MODE	1

11.2.7 GROUP:PROTECTION FUNCTION PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
11F	DYNAMIC BRAKING SELECTION	0 / 1	0003	0000: no dynamic braking (0) 0001: with dynamic braking, no DBR overload trip (1) 0003: with dynamic braking and DBR overload trip (2)	—
120	2 BRAKING RESISTOR VALUE	0 / 1	FFFF	000A ~ 2710 (1.0 ~ 1000)	0.1
121	BRAKING RESISTOR POWER RATING	0 / 1	FFFF	0001 ~ EA60 (0.01 ~ 600.00)	0.01
122	OVERVOLTAGE STALL PROTECTION	0 / 1	0004	0000: ON (0) 0004: OFF (1)	—
123	DC INJECTION START FREQUENCY	0 / 1	FFFF	0000 ~ 2EE0 (0.00 ~ 120.00)	0.01
124	Other than 0 DC INJECTION CURRENT MAGNITUDE	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
125	DC INJECTION TIME	0 / 1	00FF	0000 ~ 0064 (0.0 ~ 10.0)	0.1
126	FWD/REV DC INJECTION PRIORITY CTRL	0 / 1	0040	0000: OFF (0) 0040: ON (1)	—
127	MOTOR SHAFT STATIONARY CTRL	0 / 1	0080	0000: OFF (0) 0080: ON (1)	—
128	EMERGENCY OFF MODE SELECTION	0 / 1	0030	0000: Coast stop (0) 0010: Decelerated stop (1) 0020: DC injection stop (2)	—
129	2 EMERGENCY OFF DC INJECTION TIME	0 / 1	00FF	0000 ~ 0064 (0.0 ~ 10.0)	0.1
12A	NUMBER OF RETRY ATTEMPTS	0 / 1	00FF	0000 ~ 000A (0 ~ 10)	1
12B	Other than 0 TIME BETWEEN RETRY ATTEMPTS	0 / 1	00FF	0000 ~ 0064 (0.0 ~ 10.0)	0.1
12C	REGENERATION POWER RIDE-THROUGH	0 / 1	0008	0000: OFF (0) 0008: ON (1)	—
12D	1 REGENERATION RIDE-THROUGH TIME	0 / 1	00FF	0000 ~ 00FA (0.0 ~ 25.0)	0.1
12E	AUTO-RESTART (MOTOR SPEED SEARCH)	0 / 1	0018	0000: OFF (0) 0008: On power failure (1) 0010: On ST make/break (2) 0018: Both (1) and (2) (3)	—
12F	ELECTRONIC THERMAL PROTECT LVL #1	0 / 1	00FF	000A ~ 0064 (10 ~ 100)	1
130	OVERLOAD REDUCTION START FREQ	0 / 1	FFFF	0000 ~ 0BB8 (0.00 ~ 30.00)	0.01
131	MOTOR 150% OVERLOAD TIME LIMIT	0 / 1	00FF	0001 ~ 00F0 (10 ~ 2400)	10
132	OVERLOAD SELECTION	0 / 1	0030	0000: with motor overload trip, without soft-stall (0) 0010: with motor overload trip and soft-stall (1) 0020: without soft-stall or motor overload trip (2) 0030: with soft-stall, without motor overload trip (3)	—
133	STALL PROTECTION ENABLE	0 / 1	0040	0000: ON (0) 0040: OFF (1)	—
134	0 STALL PROTECTION CURRENT LEVEL	0 / 1	00FF	000A ~ 00D7 (10 ~ 215)	1

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
135	UNDERVOLTAGE TRIP SELECTION	0 / 1	0080	0000: Trip disabled (0) 0080: Trip (during run) (1)	—
136	UNDERVOLTAGE DETECT TIME	0 / 1	FFFF	0000 ~ 03E8 (0.00 ~ 10.00)	0.01
137	LOW CURRENT DETECT SELECTION	0 / 1	0008	0000: Trip disabled (0) 0008: Trip on detection (1)	—
138	LOW CURRENT DETECT LEVEL	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
139	LOW CURRENT DETECTION TIME	0 / 1	00FF	0000 ~ 00FF (0 ~ 255)	1
140	OUTPUT SHORT-CIRCUIT DETECTION SELECT	0 / 1	0003	0000: Standard motor (0) 0001: High-speed motor (1) 0002: Positioning use (standard motor) (2) 0003: Positioning use (high-speed motor) (3)	—
141	OVERTORQUE TRIP SELECTION	0 / 1	0040	0000: Trip disabled (0) 0040: Trip enabled (1)	—
142	OVERTORQUE TRIP LEVEL	0 / 1	00FF	0000 ~ 00C8 (0 ~ 200)	1
143	FAULT TRIP EEPROM SAVE ENABLE	0 / 1	0002	0000: Data cleared when powered OFF (0) 0002: Data retained when powered OFF (1)	—
144	COOLING FAN CONTROL SELECTION	0 / 1	0004	0000: Automatic (temperature detection) (0) 0004: Always ON (1)	—
145	CUMULATIVE RUN TIMER ALARM SETTING	0 / 1	FFFF	0000 ~ C34B (0.00 ~ 999.90)	0.02

11.2.8 GROUP:PATTERN RUN CONTROL PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
146	PATTERN RUN SELECTION	0 / 1	0008	0000: OFF (0) 0008: ON (1)	—
147	1 PATTERN RUN CONTINUE MODE	0 / 1	0001	0000: reset on stop (0) 0001: switch when done (1)	—
148	PATTERN GROUP #1 SPEED #0	1	00FF	0000: Skip (0) 0001 ~ 000F: Speeds 1 ~ 15	1
149	PATTERN GROUP #1 SPEED #1				
150	PATTERN GROUP #1 SPEED #2				
151	PATTERN GROUP #1 SPEED #3				
152	PATTERN GROUP #1 SPEED #4				
153	PATTERN GROUP #1 SPEED #5				
154	PATTERN GROUP #1 SPEED #6				
155	PATTERN GROUP #1 SPEED #7				
156	PATTERN GROUP #1 NUMBER OF CYCLES	0 / 1	00FF	0001 ~ 00FF: 1 ~ 255	1
157	PATTERN GROUP #2 SPEED #0	1	00FF	0000: Skip (0) 0001 ~ 000F: Speeds 1 ~ 15	1
158	PATTERN GROUP #2 SPEED #1				
159	PATTERN GROUP #2 SPEED #2				
15A	PATTERN GROUP #2 SPEED #3				
15B	PATTERN GROUP #2 SPEED #4				
15C	PATTERN GROUP #2 SPEED #5				
15D	PATTERN GROUP #2 SPEED #6				
15E	PATTERN GROUP #2 SPEED #7				
15F	PATTERN GROUP #2 NUMBER OF CYCLES	0 / 1	00FF	0001 ~ 00FF: 1 ~ 255	1
160	PATTERN GROUP #3 SPEED #0	1	00FF	0000: Skip (0) 0001 ~ 000F: Speeds 1 ~ 15	1
161	PATTERN GROUP #3 SPEED #1				
162	PATTERN GROUP #3 SPEED #2				
163	PATTERN GROUP #3 SPEED #3				
164	PATTERN GROUP #3 SPEED #4				
165	PATTERN GROUP #3 SPEED #5				
166	PATTERN GROUP #3 SPEED #6				
167	PATTERN GROUP #3 SPEED #7				
168	PATTERN GROUP #3 NUMBER OF CYCLES	0 / 1	00FF	0001 ~ 00FF: 1 ~ 255	1

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
169	PATTERN GROUP #4 SPEED #0	1	00FF	0000: Skip (0) 0001 ~ 000F: Speeds 1 ~ 15	1
16A	PATTERN GROUP #4 SPEED #1				
16B	PATTERN GROUP #4 SPEED #2				
16C	PATTERN GROUP #4 SPEED #3				
16D	PATTERN GROUP #4 SPEED #4				
16E	PATTERN GROUP #4 SPEED #5				
16F	PATTERN GROUP #4 SPEED #6				
170	PATTERN GROUP #4 SPEED #7				
171	PATTERN GROUP #4 NUMBER OF CYCLES	0 / 1	00FF	0001 ~ 00FF: 1 ~ 255	1
172	SPEED #1 CONTINUE MODE	1	00FF	0000: Count in seconds from time of activation (0) 0001: Count in minutes from time of activation (1) 0002: Count in seconds from speed reach (2) 0003: Count in minutes from speed reach (3) 0004: Non-stop (continue until STOP command) (4) 0005: Continue until next step command (5)	—
173	< 4 SPEED #1 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
174	SPEED #2 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
175	< 4 SPEED #2 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
176	SPEED #3 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
177	< 4 SPEED #3 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
178	SPEED #4 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
179	< 4 SPEED #4 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
17A	SPEED #5 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
17B	< 4 SPEED #5 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
17C	SPEED #6 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
17D	< 4 SPEED #6 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
17E	SPEED #7 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
17F	< 4 SPEED #7 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
180	SPEED #8 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
181	< 4 SPEED #8 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
182	SPEED #9 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
183	< 4 SPEED #9 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
184	SPEED #10 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
185	< 4 SPEED #10 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
186	SPEED #11 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
187	< 4 SPEED #11 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
188	SPEED #12 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
189	< 4 SPEED #12 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
18A	SPEED #13 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
18B	< 4 SPEED #13 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
18C	SPEED #14 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
18D	< 4 SPEED #14 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1
18E	SPEED #15 CONTINUE MODE	1	00FF	Same as SPEED #1 CONTINUE MODE	—
18F	< 4 SPEED #15 DRIVE TIME	1	FFFF	0000 ~ 1F40 (0 ~ 8000)	1

11.2.9 GROUP:FEEDBACK CONTROL PARAMETERS

Register	Function / Title		Bank	Mask	Adjustment Range	Multiplier
190	FEEDBACK CONTROL SELECTION		0 / 1	0060	0020: No feedback (0) 0040: PID control (1) 0060: Speed feedback (2)	—
191	1, 2	FEEDBACK INPUT SIGNAL SELECTION	0 / 1	001C	0004: RR input (1) 0008: IV input (2) 000C: RX input (3) 0010: PG feedback (4) 0014: RS232C input (5) 0018: Communication/12-bit binary interface board (6) 001C: BIN input (7)	—
192		PROPORTIONAL GAIN	0 / 1	00FF	0001 ~ 00FF (0.01 ~ 2.55)	0.01
193		INTEGRAL GAIN	0 / 1	FFFF	0001 ~ 8CA0 (0.01 ~ 360.00)	0.01
194		ANTI-HUNTING GAIN	0 / 1	00FF	0000 ~ 00FF (0.0 ~ 25.5)	0.1
195		LAG TIME CONSTANT	0 / 1	00FF	0000 ~ 00FF (0 ~ 255)	1
196		PID LOWER LIMIT FREQUENCY	0 / 1	FFFF	0 ~ Fmax	0.01
197	PID DEVIATION LIMIT SELECTION		0 / 1	0080	0000: No PID deviation limit (0) 0080: PID deviation limited (1)	—
198	1	PID DEVIATION UPPER LIMIT	0 / 1	00FF	0000 ~ 0032 (0 ~ 50)	1
199		PID DEVIATION LOWER LIMIT	0 / 1	00FF	0000 ~ 0032 (0 ~ 50)	1
19A	PG INPUT: NUMBER OF PULSES		0 / 1	FFFF	0001 ~ 270F (1 ~ 9999)	1
19B	PG INPUT: NUMBER OF PHASES		0 / 1	0001	0000: Single-phase input (1) 0001: Two-phase input (2)	—
19C	DROOPING CONTROL ENABLE		0 / 1	0002	0000: OFF (0) 0002: ON (1)	—
19D	1	DROOPING CONTROL AMOUNT	0 / 1	00FF	0000 ~ 0064 (0 ~ 10.0)	0.1
19E	OVERRIDE CONTROL SELECTION		0 / 1	0007	0000: OFF (0) 0001: FCRR (1) 0002: FCIV (2) 0003: FCRX (3) 0004: FCPG (4) 0005: FCPNL (5) 0006: FCOPT (6) 0007: FCMLT (7)	—
19F	7	OVERRIDE MULTIPLIER INPUT SELECTION	0 / 1	0038	0000: Reference (0) 0008: KRR (1) 0010: KIV (2) 0018: KRX (3) 0020: KBIN (4)	—
1A0		OVERRIDE CHANGE MULTIPLIER	0 / 1	FFFF	FC18 ~ 03E8 (-100.0 ~ 100.0)	0.1
1A1 ~ 1CF	Reserved		—	—	—	—

11.2.10 GROUP:COMMUNICATION SETTING PARAMETERS

Register	Function / Title		Bank	Mask	Adjustment Range	Multiplier
1D0 ~ 200	Reserved		—	—	—	—
201	RS232 BAUD RATE		1	0018	0000: 2400 baud (0) 0008: 4800 baud (1) 0010: 9600 baud (2)	—
202	NUMBER OF DATA BITS		1	0040	0000: 7 bits (0) 0040: 8 bits (1)	—
.203	PARITY SETTING		1	0080	0000: Even parity (0) 0080: Odd parity (1)	—
204	INVERTER ID NUMBER		1	00FF	0000 ~ 00FF (0 ~ 255) ***Note 1***	1
205	COMMUNICATION SELECTION		1	0007	0000: OFF (0) 0001: RS485 (1) 0002: Profibus, Modbus, DNet (2) 0003: TOSLINE S-20 (3) 0004: 12 bit binary input (4) 0005: 3-digit BCD (0.1Hz) (5) 0006: 3-digit BCD (1Hz) (6)	—
206	1	MASTER/SLAVE SELECTION	1	0018	0000: Slave (0) 0008: Master (frequency command) (1) 0010: Master (output frequency) (2)	—
207		RS485 BAUD RATE	1	0004	0000: Normal mode (0) 0004: High-speed mode (1)	—
208	2	TOSLINE-F10 COMMAND INPUT	1	0003	0000: OFF (0) 0001: Frequency command (1) 0002: Command input (2) 0003: Both (1) and (2) (3)	—
209		TOSLINE-F10 MONITOR OUTPUT	1	003C	0000: (0) 0020: (8) 0004: (1) 0024: (9) 0008: (2) 0028: (10) 000C: (3) 002C: (11) 0010: (4) 0030: (12) 0014: (5) 0034: (13) 0018: (6) 0038: (14) 001C: (7) 003C: (15)	—
20A		TOSLINE-F10 COMM ERROR MODE	1	0080	0000: Data cleared (0) 0080: Data retained (1)	—
20B	3	TOSLINE-S20 RECEIVE ADDRESS	1	FFFF	0000 ~ 03FF (0 ~ 1023)	1
20C		TOSLINE-S20 TRANSMIT ADDRESS	1	FFFF	0000 ~ 03FF (0 ~ 1023)	1
20D		TOSLINE-S20 COMMAND INPUT	1	001F	0000 ~ 001F (0 ~ 31)	1
20E		TOSLINE-S20 MONITOR OUTPUT	1	001F	0000 ~ 001F (0 ~ 31)	1
20F		TOSLINE-S20 FREQ REF ADDR SELECT	1	0001	0000: Disable (0) 0001: Enable (1)	1
210		1 TOSLINE-S20 FREQ REFERENCE ADDR	1	FFFF	0000 ~ 03FF (0 ~ 1023)	1

Note 1: Although the INVERTER ID NUMBER parameter can be set from 0 to 255, the allowable Profibus slave addresses range only from 0 to 125. Therefore, if this parameter is set to a value from 126 to 255, the Profibus interface card will trip “OPTION PCB ERROR” upon initialization.

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
211	TOSLINE-S20 COMM ERROR MODE	1	0002	0000: Data cleared (0) 0002: Data retained (1)	1
212	TOSLINE-S20 COMM OPTION RESET	1	0004	0000: No effect (0) 0004: Reset (1)	1
213	RS485/12-BIT BINARY BIAS,GAIN	0 / 1	0020	0000: OFF (0) 0020: ON (1)	—
214	1 RS485/12-BIT BINARY POINT #1	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
215	RS485/12-BIT BINARY PT. #1 FREQ	0 / 1	FFFF	0000 ~ Fmax (0 ~ Fmax)	0.01
216	RS485/12-BIT BINARY POINT #2	0 / 1	00FF	0000 ~ 0064 (0 ~ 100)	1
217	RS485/12-BIT BINARY PT. #2 FREQ	0 / 1	FFFF	0000 ~ Fmax (0 ~ Fmax)	0.01

11.2.11 GROUP:AM/FM TERMINAL ADJUSTMENT PARAMS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
218	FM TERMINAL FUNCTION SELECTION	0 / 1	FFFF	1194: Pre-comp ref. frequency (0) 6686: Post-comp output freq. (1) 1500: Frequency setting (2) 2576: Output current (3) 2689: DC voltage (4) 5668: Output voltage (5) 3684: Torque current (6) 2688: Excitation current (7) 7506: PID feedback value (8) 0584: Motor overload ratio (9) 0586: Inverter overload ratio (10) 0588: DBR overload ratio (11) 835C: Input power (12) 835E: Output power (13) A000: Fixed output (14) 2304: Peak output current (15) 8302: Peak input voltage (16)	—
219	FREQUENCY METER ADJUSTMENT	0 / 1	FFFF	0000 ~ FFFF	1
21A	AM TERMINAL FUNCTION SELECTION	0 / 1	FFFF	Same as FM TERMINAL FUNCTION SELECTION	—
21B	CURRENT METER ADJUSTMENT	0 / 1	FFFF	0000 ~ FFFF	1

11.2.12 GROUP:UTILITY PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
21C	INDUSTRIAL APPLICATIONS (previous setting monitor for read use only)	0 / 1	00FF	0000: Std. Shpmt. setting (0) 0001: Pump application (1) 0002: Fan application (2) 0003: Conveyor application (3) 0004: Hoist application (4) 0005: Textiles application (5) 0006: Machine tools appl. (6)	—
21D	INDUSTRIAL APPLICATIONS (for write use) (*)	0 / 1	00FF	0000: Does nothing (0) 0011: Pump application (1) 0012: Fan application (2) 0013: Conveyor application (3) 0014: Hoist application (4) 0015: Textiles application (5) 0016: Machine tools appl. (6)	—
21E	STANDARD SETTING MODE SELECTION (*)	0 / 1	00FF	0000: Does nothing (0) 0001: 50Hz std. Settings (1) 0002: 60Hz std. Settings (2) 0003: Factory settings (3) 0004: Trip clear (4) 0005: Save user-set param. (5) 0006: TYPE 5 reset (6) 0007: Initialize typeform (7)	—
21F	COMMAND MODE SELECTION	0 / 1	0007	0000: Only RS232C valid (0) 0001: Terminal input valid (1) 0002: Panel input valid (2) 0003: Communication interface input valid (3) 0004: local/remote valid (4)	—
220	FREQUENCY MODE SELECTION	0 / 1	0038	0000: Only RS232C valid (0) 0008: Terminal input valid (1) 0010: Panel input valid (2) 0018: Communication/12-bit binary interface input valid (3) 0020: local/remote valid (4)	—
221	PANEL OPERATION MODE SELECTION	0 / 1	00FB	0000 ~ 003F (0 ~ 63) (except 0004, 0008, 000C....)	1
222	PASS NUMBER	0 / 1	00FF	0000 ~ 0063 (0 ~ 99)	1
223	CPU VERSION	2	FFFF	(Monitor only)	—
224	ROM VERSION	3 or 6	FFFF	(Monitor only)	—
225	EEPROM VERSION	1	FFFF	(Monitor only)	—
226	INVERTER TYPEFORM	0	00FF	Refer to Table 9 (page 54)	—
227	STATUS MONITOR #1 DISPLAY SELECT	0 / 1	FFFF	0001 ~ 0010 (1 ~ 16)	1
228	STATUS MONITOR #2 DISPLAY SELECT	0 / 1	FFFF	0001 ~ 0010 (1 ~ 16)	1
229	STATUS MONITOR #3 DISPLAY SELECT	0 / 1	FFFF	0001 ~ 0010 (1 ~ 16)	1
22A	STATUS MONITOR #4 DISPLAY SELECT	0 / 1	FFFF	0001 ~ 0010 (1 ~ 16)	1
22B	FREQUENCY UNITS SCALE FACTOR	0 / 1	FFFF	0000 ~ 4E20 (0.00 ~ 200.00)	0.01
22C	FREQUENCY DISPLAY RESOLUTION	0 / 1	0003	0000: 1Hz (0) 0001: 0.1Hz (1) 0002: 0.01Hz (2)	—

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
22D	ACC/DEC TIME UNITS SELECTION	0 / 1	0004	0000: 0.1 sec. (0) 0004: 0.01 sec. (1)	—
22E	CURRENT UNITS SELECTION	0 / 1	0008	0000: % (0) 0008: A (1)	—
22F	VOLTAGE UNITS SELECTION	0 / 1	0010	0000: % (0) 0010: V (1)	—
230	BLIND FUNCTION SELECTION	0 / 1	0001	0000: Blind (0) 0001: Selective unblinding (1)	—
231	1 FUNDAMENTAL PARAMS #2 BLIND	0 / 1	0040	0000: Blind (0) 0040: Unblind (1)	—
232	PANEL CONTROL PARAMS BLIND	0 / 1	0080	0000: Blind (0) 0080: Unblind (1)	—
233	TERMINAL SELECTION PARAMS BLIND	0 / 1	0001	0000: Blind (0) 0001: Unblind (1)	—
234	SPECIAL CONTROL PARAMS BLIND	0 / 1	0002	0000: Blind (0) 0002: Unblind (1)	—
235	FREQUENCY SETTING PARAMS BLIND	0 / 1	0004	0000: Blind (0) 0004: Unblind (1)	—
236	PROTECTION FUNCTION PARAMS BLIND	0 / 1	0008	0000: Blind (0) 0008: Unblind (1)	—
237	PATTERN RUN CONTROL PARAMS BLIND	0 / 1	0010	0000: Blind (0) 0010: Unblind (1)	—
238	FEEDBACK CONTROL PARAMS BLIND	0 / 1	0020	0000: Blind (0) 0020: Unblind (1)	—
239	COMMUNICATION PARAMS BLIND	0 / 1	0040	0000: Blind (0) 0040: Unblind (1)	—
23A	INDUSTRIAL APPL:PUMP PARAMS BLIND	0 / 1	0080	0000: Blind (0) 0080: Unblind (1)	—
23B	INDUSTRIAL APPL:FAN PARAMS BLIND	0 / 1	0001	0000: Blind (0) 0001: Unblind (1)	—
23C	INDUSTRIAL APPL: CONVEYOR BLIND	0 / 1	0002	0000: Blind (0) 0002: Unblind (1)	—
23D	INDUSTRIAL APPL: HOIST BLIND	0 / 1	0004	0000: Blind (0) 0004: Unblind (1)	—
23E	INDUSTRIAL APPL: TEXTILES BLIND	0 / 1	0008	0000: Blind (0) 0008: Unblind (1)	—
23F	INDUST APPL:MACHINE TOOLS BLIND	0 / 1	0010	0000: Blind (0) 0010: Unblind (1)	—
240	AM/FM ADJUSTMENT PARAMS BLIND	0 / 1	0001	0000: Blind (0) 0001: Unblind (1)	—
241	MOTOR PARAMETERS BLIND	0 / 1	0004	0000: Blind (0) 0004: Unblind (1)	—

11.2.13 GROUP:MOTOR RATING PARAMETERS

Register	Function / Title	Bank	Mask	Adjustment Range	Multiplier
242	NUMBER OF MOTOR POLES	0 / 1	00FF	0001: (2) 0002: (4) 0003: (6) 0004: (8) 0005: (10) 0006: (12) 0007: (14) 0008: (16)	2
243	MOTOR RATED CAPACITY	0 / 1	FFFF	0001 ~ 270F (0.1 ~ 999.9)	0.1
244	MOTOR TYPE	0 / 1	0030	0000:Toshiba EQPIII motor (0) 0010:Toshiba STD motor (1) 0020:Other (2)	—
245	2 MOTOR RATED VOLTAGE (230 / 460v units)	0 / 1	00FF	0012 ~ 0078 (90 ~ 600)	5
246	(575v units)			001A ~ 00AC (130 ~ 860)	
247	MOTOR RATED FREQUENCY	0 / 1	00FF	0000 ~ 00C8 (0 ~ 400)	2
248	MOTOR RATED RPM	0 / 1	FFFF	0000 ~ 270F (0 ~ 9999)	1
249	AUTO-TUNING ENABLE	0	0008	0000: Auto-tuning disabled (0) 0008: Auto-tuning enabled (1)	—
24A	LOAD MOMENT OF INERTIA	0 / 1	00C0	0000: Small (0) 0040: Medium (1) 0080: Large (2) 00C0: Very large (3)	—

Table 9: Inverter Typeform Codes

230v Class	
Inverter Model	**Typeform Data (Hex)**
G3-2010	××21
G3-2015	××22
G3-2025	××23
G3-2035	××24
G3-2055	××25
G3-2080	××26
G3-2110	××27
G3-2160	××28
G3-2220	××29
G3-2270	××2A
G3-2330	××2B
G3-2400	××2C

460v Class	
Inverter Model	**Typeform Data (Hex)**
G3-4015	××42
G3-4025	××43
G3-4035	××44
G3-4055	××45
G3-4080	××46
G3-4110	××47
G3-4160	××48
G3-4220	××49
G3-4270	××4A
G3-4330	××4B
G3-4400	××4C
G3-4500	××4D
G3-4600	××4E
G3-4750	××4F
G3-410K	××50
G3-412K	××51
G3-415K	××52
G3-420K	××53
G3-425K	××54
G3-430K	××55

600v Class	
Inverter Model	**Typeform Data (Hex)**
G3-6060	××65
G3-6120	××67
G3-6160	××68
G3-6220	××69
G3-6270	××6A
G3-6330	××6B
G3-6400	××6C
G3-6500	××6D
G3-6600	××6E
G3-6750	××6F
G3-610K	××70
G3-612K	××71
G3-615K	××72
G3-620K	××73

Note: Due to the continual capacity expansion of the Toshiba adjustable speed drive family, newly-released drive models may have typeform data which is not documented in this table. If you encounter this situation, please contact Toshiba International Corporation for verification of your model's typeform data.

11.3 Inverter Fault Codes

LCD Display Message	Data (Hex)	Explanation
NO ERROR	××00	No error has been recorded since the last inverter reset or trip clear
OVERCURRENT (ACCEL) (PRESS CLEAR)	××01	Overcurrent during acceleration
OVERCURRENT (DECEL) (PRESS CLEAR)	××02	Overcurrent during deceleration
OVERCURRENT (RUN) (PRESS CLEAR)	××03	Overcurrent during constant-speed run
LOAD-END OVERCURRENT (PRESS CLEAR)	××04	Load-end overcurrent detected at start-up (output terminals, motor wiring etc.)
U-PHASE SHORT CKT (PRESS CLEAR)	××05	U-phase armature short circuit
V-PHASE SHORT CKT (PRESS CLEAR)	××06	V-phase armature short circuit
W-PHASE SHORT CKT (PRESS CLEAR)	××07	W-phase armature short circuit
LOST INPUT PHASE (PRESS CLEAR)	××08	Lost input phase (option)
LOST OUTPUT PHASE (PRESS CLEAR)	××09	Lost output phase (option)
OVERVOLTAGE (ACCEL) (PRESS CLEAR)	××0A	Overvoltage during acceleration
OVERVOLTAGE (DECEL) (PRESS CLEAR)	××0B	Overvoltage during deceleration
OVERVOLTAGE (RUN) (PRESS CLEAR)	××0C	Overvoltage during constant-speed run
INVERTER OVERLOAD (PRESS CLEAR)	××0D	Inverter overload
MOTOR OVERLOAD (PRESS CLEAR)	××0E	Motor overload
DBR OVERLOAD TRIP (PRESS CLEAR)	××0F	Dynamic braking resistor overload
OVERHEAT TRIP (PRESS CLEAR)	××10	Inverter overheat
EMERGENCY OFF (PRESS CLEAR)	××11	Emergency off
EEPROM WRITE FAILURE (PRESS CLEAR)	××12	EEPROM failure during write
EEPROM READ FAILURE (PRESS CLEAR)	××13	EEPROM failure during initial read
—	××14	Unused
RAM ERROR (PRESS CLEAR)	××15	RAM error
ROM ERROR (PRESS CLEAR)	××16	ROM error
CPU ERROR (PRESS CLEAR)	××17	CPU error
COMMUNICATION ERROR (PRESS CLEAR)	××18	RS232C timer time-out
GATE ARRAY FAULT (PRESS CLEAR)	××19	Gate array error

LCD Display Message	Data (Hex)	Explanation
CURRENT DETECT ERROR (PRESS CLEAR)	××1A	Output current detection circuit error
OPTION PCB ERROR (PRESS CLEAR)	××1B	Option PCB error
OPTION ROM ERROR	××1C	Option ROM error
LOW CURRENT TRIP (PRESS CLEAR)	××1D	Low current
UNDERVOLTAGE TRIP (PRESS CLEAR)	××1E	Main circuit undervoltage
—	××1F	Unused
OVERTORQUE TRIP (PRESS CLEAR)	××20	Overtorque
EARTH FAULT (SOFT) (PRESS CLEAR)	××21	Earth fault (software)
EARTH FAULT (HARD) (PRESS CLEAR)	××22	Earth fault (hardware)
OPEN FUSE TRIP (PRESS CLEAR)	××23	Open fuse
DBR OVERCURRENT TRIP (PRESS CLEAR)	××24	Dynamic braking resistor overcurrent
DC OVERCURRENT (ACC) (PRESS CLEAR)	××25	Overcurrent in DC section during acceleration
DC OVERCURRENT (DEC) (PRESS CLEAR)	××26	Overcurrent in DC section during deceleration
DC OVERCURRENT (RUN) (PRESS CLEAR)	××27	Overcurrent in DC section during constant-speed run
AUTO-TUNING ERROR (PRESS CLEAR)	××28	Auto-tuning error
INV TYPEFORM ERROR (PRESS READ/WRITE)	××29	Inverter typeform error

12. GSD File

The following is a copy of the G3 Profibus interface card's GSD file, which is used for network commissioning and administration. An electronic version of this file can be downloaded via the internet from http://www.iccdesigns.com.

```
;=============================================================
;     GSD File for Toshiba 3-series adjustable speed drive  ;
;                                                           ;
;     Toshiba International Corporation                     ;
;     13131 W. Little York Rd.                              ;
;     Houston, TX  77041                                    ;
;     (713) 466-0277                                        ;
;                                                           ;
;     INV3-PROFIBUS                                         ;
;     File name: ICC087B.GSD                                ;
;=============================================================
;     Rev. 1      11.30.98    DH    Initial file entry      ;
;=============================================================
;
#Profibus_DP
; Unit Definition List:
GSD_Revision            = 1
Vendor_Name             = "TOSHIBA"
Model_Name              = "G3/VFA5 Inverter Interface"
Revision                = "Rev. 1"
Ident_Number            = 0x087B
Protocol_Ident          = 0
Station_Type            = 0
FMS_supp                = 0
Hardware_Release        = "Rev. A"
Software_Release        = "Ver. 1.0"
;
9.6_supp                = 1
19.2_supp               = 1
93.75_supp              = 1
187.5_supp              = 1
500_supp                = 1
1.5M_supp               = 1
3M_supp                 = 1
6M_supp                 = 1
12M_supp                = 1
;
MaxTsdr_9.6             = 60
MaxTsdr_19.2            = 60
MaxTsdr_93.75           = 60
MaxTsdr_187.5           = 60
MaxTsdr_500             = 100
MaxTsdr_1.5M            = 150
MaxTsdr_3M              = 250
MaxTsdr_6M              = 450
MaxTsdr_12M             = 800
;
Redundancy              = 0
Repeater_Ctrl_Sig       = 2
;
; Slave Specification:
24V_Pins                = 0
;
Implementation_Type     = "SPC3"
Freeze_Mode_supp        = 1
```

```
Sync_Mode_supp          = 1
Auto_Baud_supp          = 1
Set_Slave_Add_supp      = 1
Min_Slave_Intervall     = 1
;
Modular_Station         = 0
Max_Module              = 1
Max_Input_Len           = 16
Max_Output_Len          = 8
Max_Data_Len            = 24
;
; Module Definition:
Max_Diag_Data_Len       = 8
Slave_Family            = 0
OrderNumber             = "INV3-PROFIBUS"
Module = "Toshiba ASD:5w2b2w In, 2w2w Out" 0x54,0x11,0xD1,0x61,0xE1
EndModule
```

13. Notes

TOSHIBA

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INDUSTRIAL CONTROL COMMUNICATIONS

MEMBER OF PROFIBUS INTERNATIONAL