Product Advisory

Item No.	Product Feature	Document	Number	Refer to Page
1	Dip Switch Introduction	Quick Ref. Guide	M0006586 NB661X	14

Advisory - The following description is to be inserted on Quick Reference Guide page 14.

Symbol	Description	Notes	
SR/SK	The SW configures the driver's intelligent inputs for sinking or sourcing type circuit	SR	Sourcing type circuit
		SK	Sinking type circuit (factory default)
485/OPE	The SW configures the driver's RS-485 serial port.	485	Using Modbus-RTU (RS-485)
		OPE	Using optional digital operator (factory default)
TM/PRG	The SW configures the driver's output for Standard type motor or Standard type motor.	TM	Using Standard type motor
		PRG	Using Highspeed type motor

M0006819
NBM661X

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SANMOTION G

Quick Reference Guide

single / three phase input 200V class

SANYO DENKI CO.,LTD.
Manual No. M0006586 July 2004
NB661X July 2004

⚠Cautions

Failure to observe any of the precautions indicated on the right-hand side may cause a light to medium-degree injury or property damage. It may even lead to a serious disaster. Be sure to observe all of the precautions.

⚠Cautions

- Please be sure to read the instruction manual before using the product.
- If the product is to be used with medical equipment or any other
- device that involves human life, please notify us in advance and take appropriate safety measures.
- If the product is to be used with a device that is of strategic public importance, please notify us in advance.
- The product must not be used in an environment subject to vibration, such as in a vehicle or on a ship.
- Please do not attempt to modify or customize the equipment.

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Safety Messages

Be sure to read the GH1 Driver Manual and follow its Cautions and Warnings for the initial product installation. This Quick Reference Guide is intended for reference use by experienced users in servicing existing installations.

Warning - Indicates a potentially hazardous situation that, if not avoided, can result in serious injury or death.

Caution - Indicates a potentially hazardous situation that, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the Caution may, if not avoided, lead to serious results. Important safety measures are described in Caution (as well as Warning), so be sure to observe them.

General Precautions - Read These First!

Caution - This equipment should be installed, adjusted, and serviced by qualified electrical maintenance personnel familiar with the construction and operation of the equipment and the hazards involved. Failure to observe this precaution could result in bodily injury.

Caution - The user is responsible for ensuring that all driven machinery, drive train mechanism not supplied by SANYO DENKI Co., Ltd., and process line material are capable of safe operation at an applied frequency of 150% of the maximum selected frequency range to the AC motor. Failure to do so can result in destruction of equipment and injury to personnel should a single-point failure occur.

Caution - For equipment protection, install a ground leakage type breaker with a fast response circuit capable of handling large currents. The ground fault protection circuit is not designed to protect against personal injury.

Caution - Hazard of electrical shock. Disconnect incoming power before working on this control.

Caution - Wait at least five (5) minutes after turning OFF the input power supply before performing maintenance or an inspection. Otherwise, there is the danger of electric shock.

Caution - These instructions should be read and clearly understood before working on GH1 series equipment.

Caution - Proper grounds, disconnecting devices and other safety devices and their location are the responsibility of the user and are not provided by SANYO DENKI Co., Ltd.

Caution - Be sure to connect a motor thermal disconnect switch or overload device to the GH1 series driver to assure that the driver will shut down in the event of an overload or an overheated motor.

Caution - Dangerous voltage exists until power light is OFF. Wait at least five (5) minutes after input power is disconnected before performing maintenance.

Caution - This equipment has high leakage current and must be permanently (fixed) hard-wired to earth ground via two independent cables.

Caution - Be sure to install the unit on flame-resistant material such as a steel plate. Otherwise, there is the danger of fire.

Caution - Be sure not to place any flammable materials near the driver. Otherwise, there is the danger of fire.

Caution - Be sure not to let the foreign matter enter vent openings in the driver housing, such as wire clippings, spatter from welding, metal shavings, dust, etc. Otherwise, there is the danger of fire.

Caution - Be sure to install the driver in a place that can bear the weight according to the specifications. Otherwise, it may fall and cause injury to personnel.

Caution - Be sure to install the unit on a perpendicular wall that is not subject to vibration. Otherwise, it may fall and cause injury to personnel.

Caution - Be sure not to install or operate a driver that is damaged or has missing parts. Otherwise, it may cause injury to personnel.

Caution - Be sure to install the driver in a well-ventilated room that does not have direct exposure to sunlight, a tendency for high temperature, high humidity or dew condensation, high levels of dust, corrosive gas, explosive gas, inflammable gas, grinding-fluid mist, salt damage, etc. Otherwise, there is the danger of fire.

Caution - Be sure to ground the unit. Otherwise, there is a danger of electric shock and/or fire.

Caution - Wiring work shall be carried out only by qualified personnel. Otherwise, there is a danger of electric shock and/or fire.

Caution - Implement wiring after checking that the power supply is OFF. Otherwise, you may incur electric shock and/or fire.

Warning - Make sure the input power to the driver is OFF. If the drive has been powered, leave it OFF for five minutes before continuing.

Caution - Fasten the screws with the specified fastening torque. Check for any loosening of screws. Otherwise, there is the danger of fire.

Caution - Be sure that the input voltage matches the driver specifications.

Caution - Be sure not to connect an AC power supply to the output terminals. Otherwise, there is the possibility of damage to the driver and the danger of injury and/or fire.

Caution - Be sure to install a fuse in each phase of the main power supply to the driver. Otherwise, there is the danger of fire.

Caution - The heat sink fins will have a high temperature. Be careful not to touch them. Otherwise, there is the danger of getting burned.

Caution - The operation of the driver can be easily changed from low speed to high speed. Be sure to check the capability and limitations of the motor and machine before operating the driver. Otherwise, there is the danger of injury.

Warning - While the driver is energized, be sure not to touch the driver terminals even when the motor is stopped. Otherwise, there is the danger of electric shock.

Warning - If the Retry Mode is selected, the motor may suddenly restart after a trip stop. Be sure to stop the driver before approaching the machine (be sure to design the machine so that safety for personnel is secure even if it restarts.) Otherwise, it may cause injury to personnel.

Warning - If the power supply is cut OFF for a short period of time, the driver may restart operation after the power supply recovers if the Run command is active. If a restart may pose danger to personnel, so be sure to use a lock-out circuit so that it will not restart after power recovery. Otherwise, it may cause injury to personnel.

Warning - The Stop Key is effective only when the Stop function is enabled. Be sure to enable the Stop Key separately from the emergency stop. Otherwise, it may cause injury to personnel.

Warning - During a trip event, if the alarm reset is applied and the Run command is present, the driver will automatically restart. Be sure to apply the alarm reset only after verifying the Run command is OFF. Otherwise, it may cause injury to personnel.

Warning - When the Stop key function is disabled, pressing the Stop key does not stop the driver, nor will it reset a trip alarm.

Warning - After the Reset command is given and the alarm reset occurs, the motor will restart suddenly if the Run command is already active. Be sure to set the alarm reset after verifying that the Run command is OFF to prevent injury to personnel.

Warning - Never modify the unit. Otherwise, there is a danger of electric shock and/or injury.

Caution - Do not attach or remove wiring or connectors when power is applied. Also, do not check signals during operation.

Caution - Be sure to connect the grounding terminal to earth ground.

Caution - Do not stop operation by switching OFF electromagnetic contactors on the primary or secondary sides of the driver.

Caution - In all the illustrations in this manual, covers and safety devices are occasionally removed to describe the details. While operating the product, make sure that the covers and safety devices are placed as they were specified originally and operate it according to the instruction manual.

UL® Cautions, Warnings, and Instructions

Wiring Warnings for Electrical Practices

The Cautions, Warnings, and instructions in this section summarize the procedures necessary to ensure a driver installation complies with Underwriters Laboratories® guidelines.

WARNING- "Use 60/75°C Cu wire only" or equivalent.

WARNING - "Open Type Equipment."

WARNING - "Suitable for use on a circuit capable of delivering not more than 5,000 RMS symmetrical amperes, 240 V maximum."

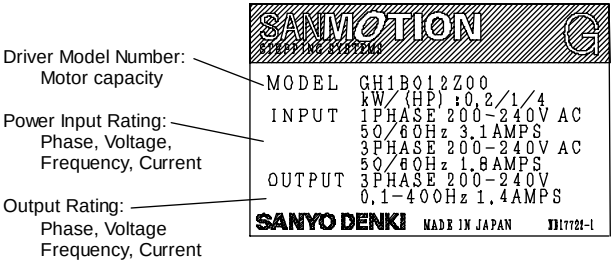
WARNING - "Install device in pollution degree 2 environment."

Manual

The manual number is as follows. When you do not have the adequate, request our sales department.

Japanese	M0006580
English	M0006581

Driver Specification Label



Environment

The environment condition of driver is as follows. For details, see each manual.

Operating ambient temperature	Storage temperature	Humidity	Altitude	Vibration
-10 to 55˚C	-20 to 65˚C	20 to 90%RH	1000 meters or less above see level	0.6G or less

Short circuit Fuse / Breaker marking

Fuse

The driver is not equipped with fuses. Make sure to install a UL approved fast-blown fuse in the input section of the power supply.

Breaker

Maximum power supply capacity of driver is 0.5kVA. (200V AC input)

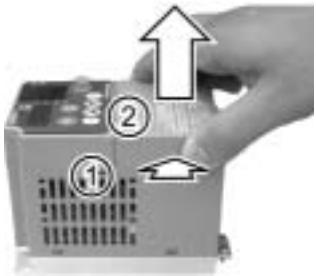
Over load characteristics

See Motor Data Sheet, Specifications in the manual.

Housing Cover Removal

When opening the front housing cover, please follow these steps in sequence.

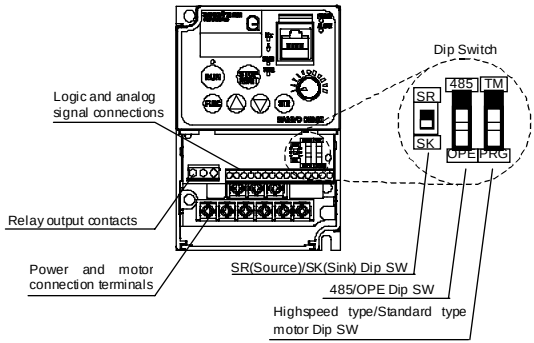
1. Press inward on the side of housing cover to be locking tab free.



2. Tilt upward housing cover to be both locking tabs are free.

NOTE: **DO NOT** force the cover open; it's possible to break tabs.

Inside of Front Housing Cover



Power Circuit Terminals

Driver models : GH1B012Z00

Jumper

	PD/+1	P/+	N/—		
R/L1	S/L2	T/L3	U/T1	V/T2	W/T3

Chassis Ground

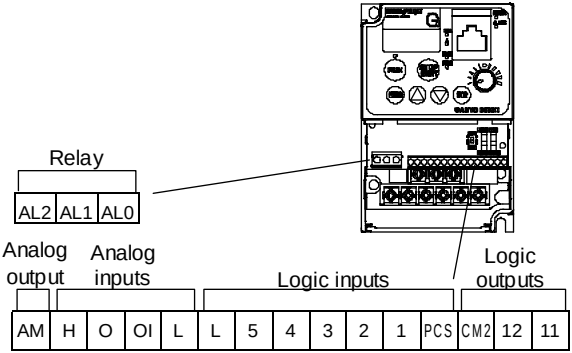
Terminal Dimensions and Torque Spec

Terminal	Screw size	Tightening torque
Power Circuit	M3.5	0.8N.m(max. 0.9N.m)
Control circuit	M2	0.2N.m(max. 0.25N.m)
Relay	M2.5	0.5N.m(max. 0.6N.m)
Earth	M4	1.2N.m(max. 1.3N.m)

Wire size

Wiring Size Range (AWG)
16

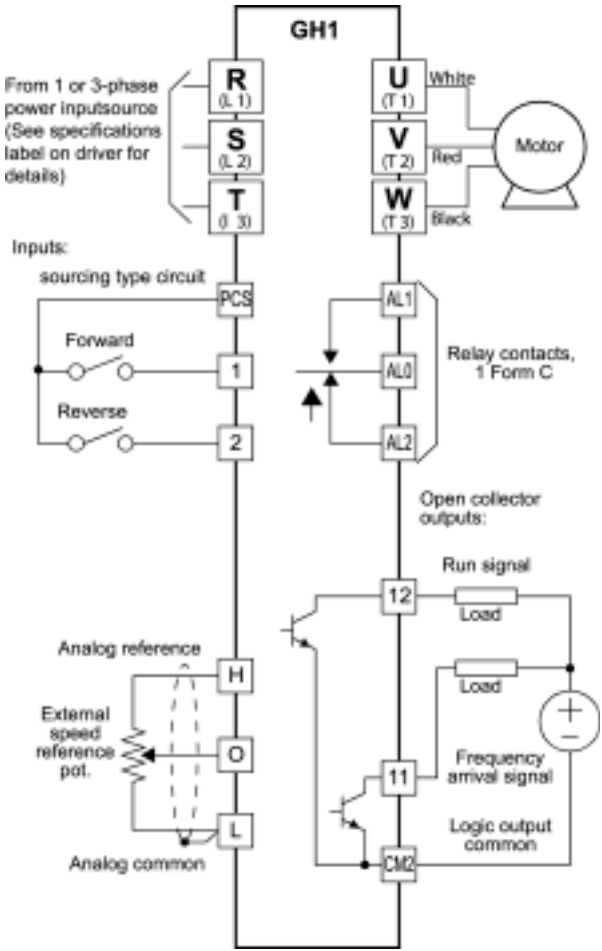
Control Circuit Terminals



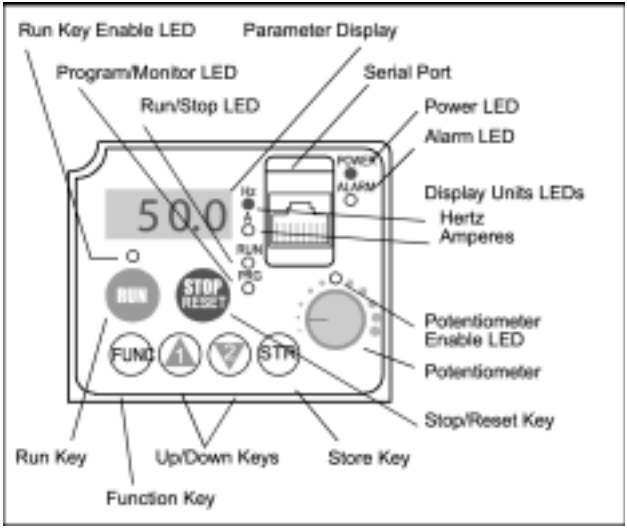
Terminal Name	Description	Ratings and Notes
PCS	+24V for logic inputs	Source : 24VDC, 100 mA max. Sink : 24VDC, 30mA max.
1,2,3, 4,5	Intelligent (programmable) discrete logic inputs	27VDC max. (use PCS or an external supply referenced to terminal L), 4.7k Ω input impedance
L(right)	GND for logic inputs	Sum of input 1 to 5 currents (return)
11,12	Discrete logic outputs	50 mA max. ON current, 27 VDC max. OFF voltage
CM2	Common for logic outputs	-
AM	Analog voltage output	0 to 10VDC
L(left)	Common for analog inputs	Sum of OI, O, AM and H currents (return)
OI	Analog input, current	4 to 19.6 mA range, 20 mA nominal
O	Analog input, voltage	0 to 9.6 VDC range, 10VDC nominal, 12VDC max., input impedance 10 k Ω
H	+10V analog reference	10VDC nominal, 10 mA max.
AL0	Relay common contact	Contact rating Max resistive load = 250VAC, 2.0A; 30VDC 3.0A Max inductive load = 250VAC, 0.2A; 30VDC 0.6A Minimum load = 5VDC 100mA, 100VAC 10mA
AL1	Relay contact, normally closed during RUN	
AL2	Relay contact, normally open during RUN	

Basic Wiring Diagram

The following wiring diagram shows the power and motor connections for basic operation. The optional signal input wiring supports external Fwd and Rev Run command, and a speed potentiometer.



Driver Keypad Operation



Run/Stop LED - ON when the driver output is ON and the motor is developing torque, and OFF when the driver output is OFF (Stop Mode).

Program/Monitor LED - ON when the driver is ready for parameter editing (Program Mode). It is OFF when the parameter display is monitoring data (Monitor Mode).

Run Key Enable LED - ON when the driver is ready to respond to the Run key, OFF when the Run key is disabled.

Run Key - Press this key to run the motor (the Run Enable LED must be ON first). Parameter F004, Keypad Run Key Routing, determines whether the Run key generates a Run FWD or Run REV command.

Stop/Reset Key - Press this key to stop the motor when it is running (uses the programmed deceleration rate). This key will also reset an alarm which has tripped.

Potentiometer - Allows an operator to directly set the motor speed when the potentiometer is enabled for output frequency control.

Potentiometer Enable LED - ON when the potentiometer is enabled for value entry.

Parameter Display - A 4-digit, 7-segment display for parameters and function codes.

Display Units: Hertz/Amperes - One of these LEDs will be ON to indicate the units associated with the parameter display.

Power LED - ON when the power input to the driver is ON.

Alarm LED - ON when the driver in Trip Mode.

Function Key - This key is used to navigate through the lists of parameters and functions for setting and monitoring parameter values.

Up/Down Keys - Use these keys alternately to move up or down the lists of parameter and functions shown in the display, and to increment/decrement values.

Store Key - When the unit is in Program Mode and the operator has edited a parameter value, press the Store key to write the new value to the EEPROM.

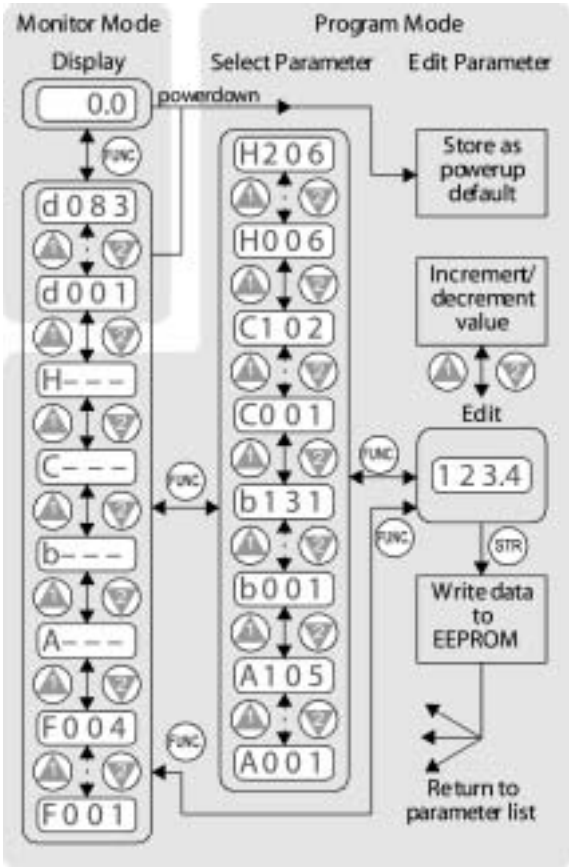
Dip Switch Introduction

Symbol	Description	Notes
SR/SK	The SW configures the driver's intelligent inputs for sinking or sourcing type circuit.	SR: Sourcing type circuit SK(factory default): Sinking type circuit
485/OPE	The SW configures the driver's RS-485 serial port.	485: Using Modbus OPE(factory default): Using optional digital operator
TM/PRG	The SW configures the driver's output for Standard type motor or Standard type motor.	TM: Using Highspeed type motor PRG: Using Standard type motor

Note: Be sure to use correct "TM/PRG" switch position for using motor type.

Highspeed type motor: 103MXXXX-30XX
Standard type motor: 103MXXXX-25XX
'X': Variable suffices

Keypad Navigation Map



Powerup Test

The Powerup Test procedure uses minimal parameter settings to run the motor. The procedure describes two alternative methods for commanding the driver: *via the driver keypad, or via the logic terminals.*

Check power input and motor output wiring (see page 7 diagram).
If using logic terminals for testing in sourcing type circuit, verify correct wiring on [PCS],[FW], [H], [O], and [L] (bottom row) per the diagram on page 7.
Reverse [RV] input wiring (defaults to terminal [2]) is optional.
Be sure to use correct "TM/PRG" switch position for using motor type.

Step	Description	Via Keypad	Via Logic Terminals
1	Set speed command source setting	A001 = 00 (keypad pot.)	A001 = 01, [H-O-L] input
2	Set Run FW command source	A002 = 02 (Run key)	A002 = 01, [FW] input
3	Set Run FWD command source	-	C001 = 00, [FW] input
4	Set Run REV command source	-	C002 = 01, [RV] input
5	Set keypad display to monitor freq.	Access d001, press Func. key, display will show 0.0	
6	Perform safety check	Disconnect load from motor	
		Turn keypad pot. to MIN position	Ensure voltage on [O]-[L] terminals = 0V
7	Run Forward command	Press Run key	Turn ON the [FW] terminal
8	Increase speed	Rotate keypad pot. CW dir.	Increase voltage at [O]
9	Decrease speed	Rotate keypad pot. CCW dir.	Decrease voltage at [O]
10	Stop motor	Press Stop key	Turn OFF the [FW] terminal
11	Run Reverse command (optional)	-	Turn ON the [RV] terminal
12	Stop motor	-	Turn OFF the [RV] terminal

Error Codes

The GH1 series drivers will trip on over-current, over-voltage, and under-voltage to protect the driver. The motor output turns OFF, allowing the motor to free-run to a stop. Press the Stop/Reset key to reset the driver and clear the error.

Basic Error Codes

Error Code	Name	Probable Cause(s)
E01	Over current event while at constant speed	• Driver output was short-circuited • Motor shaft is locked
E02	Over current event during deceleration	• Load is too heavy
E03	Over current event during acceleration	• A dual-voltage motor is wired incorrectly Note: The GH1 will over current trip at nominally 200% of rated current
E04	Over current event for other conditions	• DC braking power (A054) set too high • Current transformer / noise error
E05	Overload protection	• Motor overload is detected by the electronic thermal function
E07	Over voltage protection	• DC bus voltage exceeds a threshold, due to regenerative energy from motor
E08	EEPROM error	• Built-in EEPROM memory experienced noise, high temperature, etc.
E09	Under-voltage error	• DC bus voltage decreased enough to cause a control circuit fault
E11 E22	CPU error	• Built-in CPU had internal error
E12	External trip	• [EXT] input signal detected
E13	USP (Unattended Start Protection)	• When (USP) was enabled, an error occurred when power was applied while a Run signal was present
E14	Ground fault	• A ground fault was detected between the driver output and the motor. This feature protects the driver, and does not protect humans.
E15	Input over-voltage	• Input voltage was higher than the specified value, 100 sec. after powerup
E21	Driver thermal trip	• Driver internal temperature is above the threshold
E30	Driver error	• Driver internal error, electrical noise at CPU-to-drive circuit interface.
E35	Thermistor	• Thermistor input, [THM] and [L], is over the temp. threshold
----	Under-voltage (brown-out) with output shutoff	• Low input voltage caused the driver to turn OFF the motor output and try to restart. If unsuccessful, a trip occurs.

Error Trip Conditions

Use function code d081 to access the error trip conditions for the current error as shown in the table below. Use the Up and Down arrow keys to scroll through the trip condition parameters.

Step	Display
1. Access D081	d081
2. Press Function Key	If no error: – – – –
	If error exists: Exx
3. Press Up/Dwn key (if error exists) 	Output frequency at trip point: 10.0 Motor current at trip point: 1.0 DC bus voltage at trip point: 189 Cumulative Run time house at trip point: 15 Cumulative power-ON hours at trip point: 18

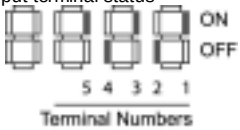
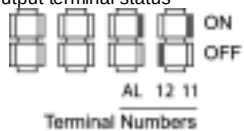
Restoring Factory Default Settings

Action	Display	Function/Parameter
Press FUNC, ▲ or ▼ as needed	b- - -	"b" Group selected
Press FUNC	b001	First "b" Group parameter
Press / hold ▲ until…	b084	Initialization function selected
Press FUNC	00	0 = disable initialization, clear trip history only
Press ▲	01	1 = enable initialization
Press STR	b084	Initialization now enabled to restore all defaults
Press/hold FUNC, ▲, ▼ and STR keys. Do not release yet.	b084	First part of key sequence
When your country code appears in the display, release all the keys.	JP	JP shown during initialization
Initialization is complete.	d001	Function code for output frequency monitor shown

Note: After initializing the driver, use the Powerup Test on page 11 to get the motor running again.

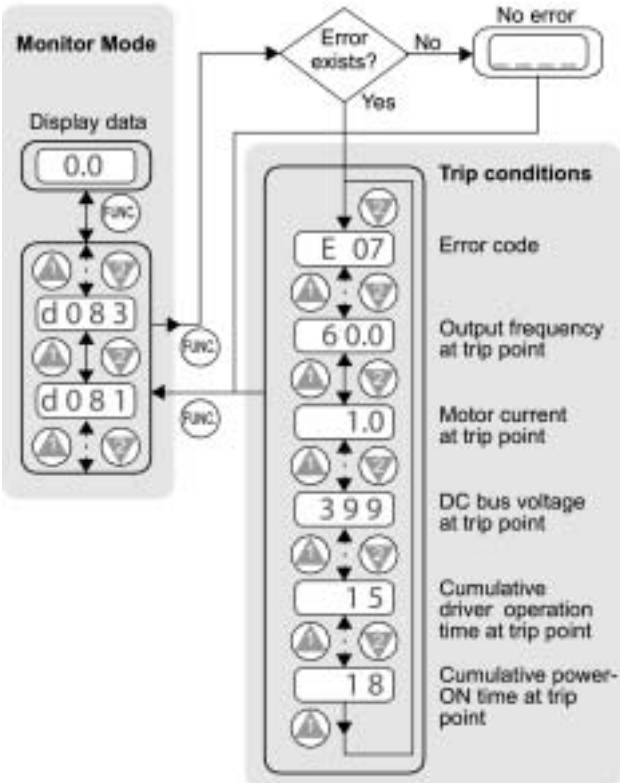
Parameter Tables

"d" Group: Monitoring Functions

Func. Code	Name / Description	Units
d001	Output frequency monitor	Hz
d002	Output current monitor	A
d003	Rotation direction monitor 	-
d004	Process variable (PV), PID feedback monitor	%
d005	Intelligent input terminal status 	-
d006	Intelligent output terminal status 	-
d007	Scaled output frequency monitor (output frequency x b086 scale factor)	User-define
d013	Output voltage monitor	V
d016	Cumulative operation RUN time monitor	hours
d017	Cumulative power-on time monitor	hours

Trip History and Driver Status

Func. Code	Name / Description	Units
d080	Trip Counter	times
d081	Trip monitor 1 (most recent trip n)	-
d082	Trip monitor 2 (most recent trip n-1)	-
d083	Trip monitor 3 (most recent trip n-2)	-



Parameter tables for user-settable functions follow these conventions:

Some parameters specify an option code. Where applicable, the options codes will be in a bulleted list in the Name/Description column.

Some parameters cannot be edited during Run Mode, and certain Software Lock settings (b031) can prohibit all edits. If in doubt, place the driver in Stop Mode or consult the driver manual for details.

"F" Group: Main Profile Parameters

Func. Code	Name / Description	Default Value	Set Value
F001	Output frequency setting	0.0	
F002	Acceleration (1) time setting for Highspeed type motor	10.00	
F202	Acceleration (1) time setting for Standard type motor	10.00	
F003	Deceleration (1) time setting for Highspeed type motor	10.00	
F203	Deceleration (1) time setting for Standard type motor	10.00	
F004	Keypad Run key routing 00 : Forward 01 : Reverse	00	

"A" Group: Standard Functions

Func. Code	Name / Description	Default Value	Set Value
A001	Frequency source setting 00 : Keypad potentiometer 01 : Control terminal 02 : Function F001 setting 03 : ModBus network input	00	
A002	Run command source setting 01 : Input terminal FW or RV (assignable) 02 : Run key on keypad, or digital operator 03 : ModBus network input	02	
A003	Base frequency setting for Highspeed type motor	140	
A203	Base frequency setting for Standard type motor	50	
A004	Maximum frequency setting for Highspeed type motor	140	
A204	Maximum frequency setting for Standard type motor	60	

Func. Code	Name / Description	Default Value	Set Value
A005	[AT] selection 00 : Select between [O] and [OI] at [AT] 01 : [O]+[OI] ([AT] input is ignored) 02 : Select between [O] and keypad pot 03 : Select between [OI] and keypad pot	00	
A011	Pot/O-L input active range start frequency	0.0	
A012	Pot/O-L input active range end frequency	0.0	
A013	Pot/O-L input active range start voltage	0.	
A014	Pot/O-L input active range end voltage	100.	
A015	Pot/ O-L input start frequency enable 00 : Use A011 starting value 01 : Use 0 Hz	01	
A016	External frequency filter time constant	8	
A020	Multi-speed frequency setting for Highspeed type motor	0.0	
A220	Multi-speed frequency setting for Standard type motor	0.0	
A021 A022 A023 A024 A025 A026 A027 A028 A029 A030 A031 A032 A033 A034 A035	Multi-speed frequency settings (for both motors)	5.0 10.0 15.0 20.0 30.0 40.0 50.0 60.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
A038	Jog frequency setting	1.00	
A039	Jog stop mode 00 : Free-run stop, jogging disabled during motor run 01 : Controlled deceleration, jogging disabled during motor run 02 : DC braking to stop, jogging disabled during motor run	00	

Func. Code	Name / Description	Default Value	Set Value
A042	Manual torque boost value for Highspeed type motor	0.0	
A242	Manual torque boost value for Standard type motor	0.0	
A043	Manual torque boost frequency adjustment for Highspeed type motor	100.0	
A243	Manual torque boost frequency adjustment for Standard type motor	100.0	
A045	V/f gain setting	100.	
A049	Manual torque boost start value for Highspeed type motor	25.0	
A249	Manual torque boost start value for Standard type motor	30.0	
A051	DC braking enable 00 : Disable 01 : Enable	00	
A052	DC braking frequency setting	0.5	
A053	DC braking wait time	0.0	
A054	DC braking force during deceleration	0.	
A055	DC braking time for deceleration	0.0	
A056	DC braking / edge or level detection for [DB] input	01	
A061	Frequency upper limit setting for Highspeed type motor	0.0	
A261	Frequency upper limit setting for Standard type motor	0.0	
A062	Frequency lower limit setting for Highspeed type motor	0.0	
A262	Frequency lower limit setting for Standard type motor	0.0	
A063 A065 A067	Jump (center) frequency setting	0.0	
A064 A066 A068	Jump (hysteresis) frequency width setting	0.5	

Func. Code	Name / Description	Default Value	Set Value
A071	PID Enable 00 : PID operation OFF 01 : PID operation ON	00	
A072	PID proportional gain	1.0	
A073	PID integral time constant	1.0	
A074	PID derivative time constant	0.0	
A075	PID scale conversion	1.00	
A076	PID source setting 00 : [OI] terminal (current input) 01 : [O] terminal (voltage input)	00	
A081	AVR function select 00 : AVR enabled 01 : AVR disabled 02 : AVR enabled except during decele	02	
A082	AVR voltage select	200	
A092	Acceleration (2) time setting for Highspeed type motor	15.00	
A292	Acceleration (2) time setting for Standard type motor	15.00	
A093	Deceleration (2) time setting for Highspeed type motor	15.00	
A293	Deceleration (2) time setting for Standard type motor	15.00	
A094	Select method to switch to Acc2/Dec2 profile for Highspeed type motor 00 : 2CH input from terminal 01 : transition frequency	00	
A294	Select method to switch to Acc2/Dec2 profile for Standard type motor 00 : 2CH input from terminal 01 : transition frequency	00	
A095	Acc1 to Acc2 frequency transition point for Highspeed type motor	0.0	
A295	Acc1 to Acc2 frequency transition point for Standard type motor	0.0	
A096	Dec1 to Dec2 frequency transition point for Highspeed type motor	0.0	
A296	Dec1 to Dec2 frequency transition point for Standard type motor	0.0	
A097	Acceleration curve selection 00 : Linear 01 : S-curve	00	
A098	Deceleration curve selection 00 : Linear 01 : S-curve	00	

Func. Code	Name / Description	Default Value	Set Value
A101	[OI]-[L] input active range start frequency	0.0	
A102	[OI]-[L] input active range end frequency	0.0	
A103	[OI]-[L] input active range start current	0.	
A104	[OI]-[L] input active range end current	100.	
A105	[OI]-[L] input start frequency enable	01	

"b" Group: Fine-tuning Functions

Func. Code	Name / Description	Default Value	Set Value
b001	Selection of automatic restart mode 00 : Alarm output after trip, automatic restart disabled 01 : Restart at 0Hz 02 : Resume operation after frequency matching 03 : Resume previous freq. after freq. matching, then decelerate to stop and display trip info	00	
b002	Allowable under-voltage power failure time	1.0	
b003	Retry wait time before motor restart	1.0	
b004	Instantaneous power failure / under-voltage trip alarm enable 00 : Disable 01 : Enable	00	
b005	Number of restarts on power failure / under-voltage trip event 00 : Restart 16 times 01 : Always restart	00	
b012	Level of electronic thermal setting for High-speed type motor	1.4	
b212	Level of electronic thermal setting for Standard type motor	1.4	
b021	Overload restriction operation mode 00 : Disabled 01 : Enabled for accel and constant speed 02 : Enabled for constant speed only	01	
b022	Overload restriction setting	2.1	
b023	Deceleration rate at overload restriction	1.0	

Func. Code	Name / Description	Default Value	Set Value
b031	Software lock mode selection 00 : Low-level access, [SFT] blocks edits 01 : Low-level access, [SFT] blocks edits (except F001 and Multi-speed parameters) 02 : No access to edits 03 : No access to edits except F001 and Multi-speed parameters	01	
b032	Reactive current seting	100	
b080	[AM] analog signal gain	100	
b082	Start frequency adjustment	0.5	
b083	Carrier frequency setting	5.0	
b084	Initialization mode (parameters or trip history) 00 : Trip history clear 01 : Parameter initialization 02 : Trip history clear and Parameter initialization	00	
b086	Frequency scaling conversion factor	1.0	
b087	STOP key enable 00 : Enable 01 : Disable	00	
b088	Restart mode after FRS 00 : Restart from 0Hz 01 : Restart from frequency detected from actual speed of motor	00	
b089	Monitor display select for networked driver, 7 options: 01 : Output frequency monitor 02 : Output current monitor 03 : Rotation direction monitor 04 : Process variable (PV), PID feedback monitor 05 : Intelligent input terminal status 06 : Intelligent output terminal status 07 : Scaled output frequency monitor	01	
b091	Stop mode selection 00 : DEC (decelerate and stop) 01 : FRS (free-run to stop)	00	
b130	Over-voltage LADSTOP enable 00 : Disable 01 : Enable	00	
b131	Over-voltage LADSTOP Level setting level of Over-Voltage LADSTOP	380	

"C" Group: Intelligent Terminal Functions

Func. Code	Name / Description		Default Value	Set Value
C001	Terminal [1] function	Twenty-six option codes available (see page 25)	00	
C002	Terminal [2] function		01	
C003	Terminal [3] function		02	
C004	Terminal [4] function		03	
C005	Terminal [5] function		18	
C011	Terminal [1] active state	00 : Normally open [NO] 01 : Normally closed [NC]	00	
C012	Terminal [2] active state		00	
C013	Terminal [3] active state		00	
C014	Terminal [4] active state		00	
C015	Terminal [5] active state		00	
C021	Terminal [11] function	Seven option codes available (see page 26)	01	
C022	Terminal [12] function		00	
C026	Terminal [AL] function		05	
C028	[AM] signal selection	Two option codes available (see page 26)	00	
C031	Terminal [11] active state	00 : Normally open [NO] 01 : Normally closed [NC]	00	
C032	Terminal [12] active state		00	
C036	Terminal [AL] active state		01	
C041	Overload level setting		1.4	
C042	Frequency arrival setting for accel		0.0	
C043	Arrival frequency setting for decel		0.0	
C044	PID deviation level setting		3.0	
C071	Communication speed selection 04 : 4800 bps 05 : 9600 bps 06 : 19200 bps		04	
C072	Node allocation		1.	
C074	Communication parity selection 00 : No parity 01 : Even parity 02 : Odd parity		00	
C075	Communication stop bit selection		1.	
C078	Communication wait time		0.	

Func. Code	Name / Description	Default Value	Set Value
C081	O input span calibration	100.0	
C082	OI input span calibration	100.0	
C086	[AM] terminal offset tuning	0.0	
C091	Debug mode enable (Do not edit)	00	
C101	Up/Down memory mode selection 00 : Clear last frequency (return to default frequency F001) 01 : Keep last frequency adjusted by UP/DWN	00	
C102	Reset selection 00 : Cancel trip state at input signal ON transition, stops driver if in Run Mode 01 : Cancel trip state at signal OFF transition, stops driver if in Run Mode 02 : Cancel trip state at input signal ON transition, no effect if in Run Mode	00	

"H" Group: Motor Constants Functions

Func. Code	Name / Description	Default Value	Set Value
H006	Motor stabilization constant for Highspeed type Motor	100	
H206	Motor stabilization constant for Standard type motor	100	

Intelligent Input Terminal Listing

Symbol	Code	Input Terminal Name
FW	00	Forward Run/Stop
RV	01	Reverse Run/Stop
CF1	02	Multi-speed select, Bit 0 (LSB)
CF2	03	Multi-speed select, Bit 1
CF3	04	Multi-speed select, Bit 2
CF4	05	Multi-speed select, Bit 3 (MSB)
JG	06	Jogging
DB	07	External DC braking
2CH	09	2-stage accel and dec
FRS	11	Free-run stop
EXT	12	External trip
USP	13	Unattended start protection
SFT	15	Software lock
AT	16	Analog input voltage/current sel.
RS	18	Reset Driver
PTC	19	PTC thermistor thermal protection
STA	20	Start (3-wire interface)
STP	21	Stop (3-wire interface)
F/R	22	FWD, REV (3-wire interface)
PID	23	PID disable
PIDC	24	PID Reset
UP	27	Remote control Up func.
DWN	28	Remote control Down func.
UDC	29	Remote control data clearing
OPE	31	Operator control
-	255	no function

Intelligent Output Terminal Listing

Symbol	Code	Input Terminal Name
RUN	00	Run signal
FA1	01	Freq. arrival type 1 - constant speed
FA2	02	Freq. arrival type 2 - over-frequency
OL	03	Overload advance notice signal
OD	04	Output deviation for PID control
AL	05	Alarm signal
Dc	06	Analog input disconnect detect

Analog Input Configuration

The following table shows the parameter settings and [AT] state required to select various analog input sources.

A005	[AT]	External Frequency Command Input
00	OFF	[O]
	ON	[OI]
01	(ignored)	Sum(O+OI)
02	OFF	[O]
	ON	Keypad potentiometer
03	OFF	[OI]
	ON	Keypad potentiometer

Analog Output Function Listing

The following table shows the functions available for assignment to the analog output terminal via terminal [AM], option set by C028:

Option Code	Function Name	Description	Corresponding Signal Range
00	Analog freq. monitor	Actual motor speed	0 to max. freq. (Hz)
01	Analog current output monitor	Motor current (% of max. rated output current)	0 to 200%