SENLAN INVERTER

USER'S MANUAL

SB150 Variable Speed Drive

Hope Senlan Science & Technology Holding Corp., Ltd.

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Preface

Thank you for selecting Senlan SB150frequency inverter series.。SB150 is a compact inverter adopting the optimized high-performance space vector control VVVF arithmetic and featuring elegant appearance, delicate circuit design, ingenious circuit design, simple and practical functions, and reasonable menu arrangements, which supports numerous advanced functions, e.g. auto torque boost, slip compensation, oscillation suppression, tracking startup, stall prevention, precise deadband compensation, auto voltage stabilization, process identification and auto carrier frequency adjustment.， the series are suitable for most industrial control applications.

This manual provides the user with a guide on installation & wiring, parameter setting, daily maintenance, fault diagnosis and troubleshooting. The user is required to peruse the whole content of the manual carefully and be familiarized with the relevant know-how and notes on inverter safety before any attempts of installation, setting, operation and maintenance.

The technical specifications applied to this product or the content of this manual may be subject to any change without prior notifying.

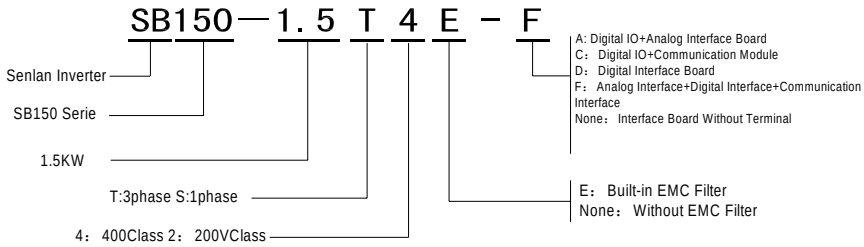
This manual is required to be kept properly until the inverter is out of its service life.

Items to Be Checked on Opening the Packing Case

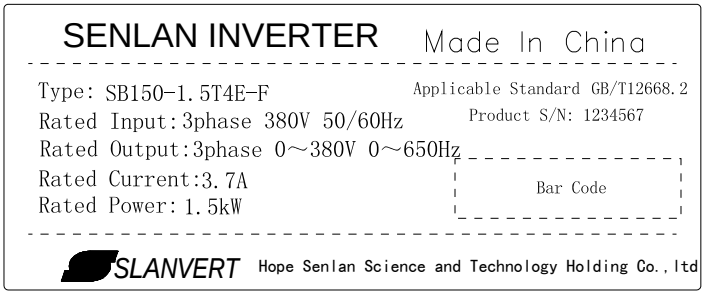
The user is required to carefully check and confirm the following items on opening the packing case. If you have any problem, don't hesitate to contact us or your supplier for a solution.

What to Confirm	How to Confirm
Is the inverter identical with the product you've ordered?	Check if the nameplate inscriptions on the side of the inverter comply with the requirements in your order
If there is any damages on the product?	Check the overall appearance of the product to see if there are any damages arising from transportation

Inverter Model Description



Inverter Nameplate Inscriptions （Instance:SB150-1.5T4E-F）



Definition of Safety ID Markings

Any safety-specific content of this manual may use the following markings for identification. The user is required to follow the instructions of the content identified with safety markings.

CAUTION: Any wrong operation or against the instructions may cause inverter damage or personal injury/fatality.

CAUTION: Any noncompliant operation may cause abnormal system operation which, in serious cases, may induce inverter damage or mechanical damage.

1. Notes on Safety

1.1. Notes on Safety

(1) Installation

- The inverter must not be installed at places with combustibles or in the vicinity of combustibles; otherwise there may cause fire.
- The inverter must not be installed in an environment exposed to flammable gases; otherwise There may cause explosion.

(2) Wiring

- Confirm that the positive/negative busbar voltage is below 36V; otherwise there may be a risk of electric shock.
- Confirm that no wiring operation is permitted unless the power supply is thoroughly disconnected; otherwise there may be an electric shock hazard.
- Do not try to connect the DC terminals (DC＋、DC－) directly with a dynamic braking resistor; otherwise there may be a fire hazard.
- The terminal voltage of the power supply must not exceed the rated voltage; otherwise there may be inverter damage.
- The grounding terminal (PE) of the inverter must be securely connected to earth (resistance to earth≤10Ω); otherwise there may be a risk of electric fire.

（3）Check before switching on the power

- Close the cover board of the inverter before turning on the power; otherwise there may be a risk of electric shock or explosion.
- Before trying to run the motor at a frequency over the rated motor frequency, conform that the motor and the mechanical devices can endure such a high speed.

（4）Precautions on power and operation

- Check to see if parameters are set appropriately before commissioning.
- Do not open the front cover while the input power is switched on, for the high voltage inside may cause electric shock.
- Do not handle the inverter with wet hands. That may lead to electric shock.
- “Power-on auto start” is enabled before shipment from the factory. When the terminal control and the run signal are valid, the inverter will start automatically once the power is turned on.
- Do not control the run and stop of the inverter by switching on and off the input power.
- Related parameters should be reset after parameter initialization.
- If the function of restart has been set (such as auto-reset or restart after momentary power failure), do not approach the motor or mechanical load while the inverter is waiting to restart.

（5）Precautions on transport and package

- Do not place more inverters than specified in the packaging box.
- Do not put any heavy object on the inverter.
- Do not open the cover board during transport.
- Do not apply any force on the keypad and the cover board while handling the inverter, otherwise there may be a risk of injury to people or damage to equipment.

（6）Disposal

- Dispose the inverter as industrial waste.
- The electrolytic capacitors inside the inverter may explode while burned.
- Plastic components of the inverter will generate toxic gases while burned.

1.2 Other precautions

(1)About motor and mechanical load

- Comparison with commercial power operation

SB150 inverter is a voltage-type PWM motor drive. Its output voltage contains some harmonics. Compared with the commercial power, it creates more loss and noise and leads to higher temperature rise of the motor.

The insulation withstands voltage of the cables and motor should be taken into account when the input voltage is high or the motor cables are long.

- Constant-torque, low-speed operation

When a common motor runs at low speed for a long time, the motor temperature will rise due to the weakening cooling effect. So if a motor is required to operate at low speed and constant torque for a long term, an inverter or the forced air cooling method must be used.

- Running above 50Hz

If you plan to run the motor over 50Hz, be aware that the vibration and noise will increase and make sure that the motor bearings and mechanical devices can withstand such a high speed.

- Lubrication of mechanical devices

While running at low speed for a long period, such mechanical devices as gearbox and gears may be damaged due to worsening lubricating effect. Before you run them, check the lubrication conditions.

- Load of regerative torque

Regerative torque often occurs while a load is hoisted, and the inverter often stops due to overvoltage protection. In this case, an appropriate braking unit should be selected and installed.

- Mechanical resonant point

Certain output frequencies of the inverter may be the mechanical resonant points. To avoid these points, place anti-vibration rubber under the base of the motor or setting the jump frequencies.

- Motor insulation check before connected to the inverter

When the motor is used for the first time or reused after it has not been used for a long period, the motor insulation must be inspected to prevent the damage to the inverter cause by the failed insulation of the motor windings. Use a 500V voltage-type megaohm meter to measure the insulation resistance, which should not be less than 5MΩ.

While performing the insulation test on the motor, be sure to disconnect the motor with the inverter, otherwise the inverter will be damaged.

Do not perform the voltage resistance test and insulation test on the control circuit, otherwise the circuit elements will be damaged.

(2) About inverter

- Capacitor or voltage-dependent resistor for improving power factor

  As the inverter output is of PWM voltage type, the capacitor or voltage-dependent resistor(for improving the power factor) installed on the output side of the inverter will lead to inverter trip or damage to components. Do remove the capacitor or the voltage-dependent resistor before using the inverter.

- Frequent start and stop

  For applications where frequent start and stop are needed, terminals are recommended for the control of the start/stop of the inverter. Using the switching device(such as contactor) on the inverter input side to start or stop the inverter frequently is prohibited. That may destroy the inverter.

- Using the inverter beyond the rated value

  It is not recommended to operate the inverter beyond the range of the allowable input voltage. If the inverter has to be used beyond the range, increase or decrease the voltage via a voltage regulator.

- Lightning protection

  With the built-in protection of overvoltage from lightning, the inverter has certain self-protection ability against the lightning strike.

- Leakage protector

  The high-speed switching operation during the running of the inverter will generate high-frequency current that sometimes causes the mis-operation of the leakage protection circuit. To address this issue, moderately lower the carrier frequency, shorten the wires or install a leakage protector.

Observe the following points while installing the leakage protector.

1) The leakage protector should be installed on the inverter input side, preferably behind the air switch(non-fuse circuit breaker).

2) The leakage protector should be one that is insensitive to higher harmonics or specially designed for the inverter(sensitivity above 30mA). If a common leakage protector is selected, its sensitivity and action time should be greater than 200mA and 0.2s, respectively.

- Derate of inverter

  a) If the ambient temperature exceeds 40℃, the inverter should be derated by 5% for every 1℃ increase, and external forced cooling should be provided.

b) If the altitude is above 1000 meters, the inverter should be derated by 1% for every 100m rise

c) .If the carrier frequency is greater than the factory setting, the inverter should be derated by 5% for every 1 kHz increase.

2 Specifications

2.1 Common specifications for SB150 series

Item		Description
Input	Rated voltage and frequency	3-phase: 220v/380V，50/60Hz
	Allowable range	Voltage: 320～420V; voltage imbalance＜3%; frequency:47～63 Hz
output	Output voltage	3-phase, 0V～input voltage, with the error less than 5%.
	Output frequency range	V/F control: 0.00～650.00Hz Vector control: 0.00～200.00Hz
performance standard	Overload capacity	150% of rated current for 1 minute
	Frequency resolution	Digital reference: 0.01Hz　Analog reference: 0.1% of max. frequency
	Output frequency precision	Analog reference: :±0.2% of max. frequency（25±10℃） Digital reference: 0.01Hz
Control terminal	Communication	Built-in RS485 port, supporting Modbus protocol
	Analog input AI	2 channels AI（also used as digital input），voltage or current type, positive or negative, with drop detection
	Analog output AO	1 channels AO，voltage or current type independent terminal to choose
	Digital input	5 channels of multi-function digital input(two of them are analog inputs)，sampling period 1ms
	Digital output	1 channel of NPN multi-function digital output，1 channels of multi-function relay output
Software function	Motor control mode	Space vector V/F control, with auto torque boost and slip compensation
	Command source	Keypad, terminal and communication. They can be switched over by terminals
	Frequency reference source	Keypad(keys and POT), communication, UP/DOWN value, AI1, AI2 and PFI. Auxiliary frequency reference can be introduced for fine tuning
	V/F curve	Linear curve and two reduced-torque curves, with manual and auto torque boost
	Dynamic braking	Built-in braking unit and external braking resistor
	DC braking	Braking time: 0.0～60.0s Braking current: 0.0～100.0% of rated current
	Accel/decel	Linear or S-curve acceleration/deceleration
	Jog	Jog frequency: 0.10～50.00Hz
	AVR	Keeps the output voltage constant automatically when the voltage of power grid fluctuates
	Auto carrier regulation	Carrier frequency is regulated automatically based on the load characteristic and ambient temperature
	Momentary power failure	Ensures uninterrupted operation by controlling the DC link voltage
	Process PID	process PID adjustor, can do 4 references, can disable terminals, and provide PID revise mode, sleep function (suit for water supply industry)
	Wobble	Ensures even winding of textiles
	Multistep frequency	7 multistep frequencies.，selected by digital input terminal.
	others	Smooth start, stall prevention, zero-speed delay, oscillation suppression, deadband compensation
Protection functions		Overcurrent, overvoltage, undervoltage, input/output phase loss, output short-circuit, overheating, motor overload, external fault, analog input

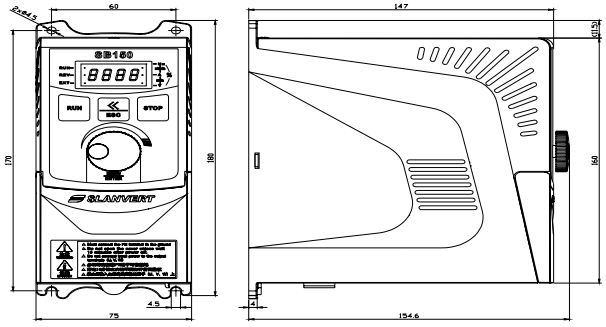
Item		Description
		disconnection, stall prevention, etc.
Options		Braking resistor、input/output reactor、EMI filter、Profibus-DP module、remote control box、LCD keypad etc.
Ambient	Service site	Altitude less than 1000 meters; indoor; no direct sunlight; free of dust, corrosive gases, inflammable gases, oil mist, water vapor, water drops, salt mist, etc.
	Temperature/humid	-10～＋40℃/20～90％RH, no condensation
	Storage temperature	-20～＋60℃
	Vibration	Less than 5.9m/s^2（0.6g）
Structure	Protection degree	IP20
	Cooling method	Forced air cooling, with fan control

2.2 Product series

SB150 inverter rated value is as follows:

Model	Rated capacity（kVA）	Rated output current（A）	Applicable motor（kW）
SB150-0.4S2	1.1	3	0.4
SB150-0.75S2	1.7	4.5	0.75
SB150-1.1S2	2.3	6.0	1.1
SB150-0.4T2	1.1	3	0.4
SB150-0.75T2	1.9	5	0.75
SB150-1.5T2	2.8	7.5	1.5
SB150-0.4T4	1.0	1.5	0.4
SB150-0.75T4	1.6	2.5	0.75
SB150-1.5T4	2.4	3.7	1.5

Outline drawings of model type SB150-0.4~SB150-1.5



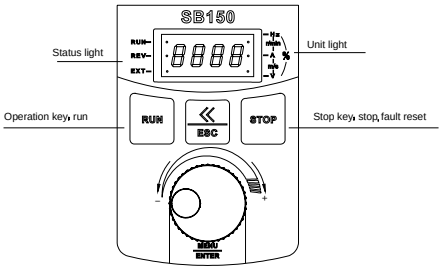
Inverter Outline Drawing

4 Operation and commissioning

4.1 Operation and display

4.1.1 Functions of keypad

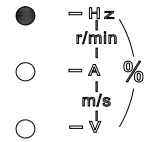
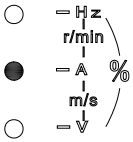
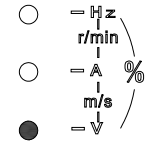
The keypad is used to set or browse parameters, control operations, display error information and so on. The appearance of the keypad is as follows.

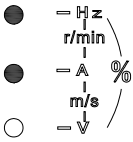
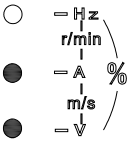
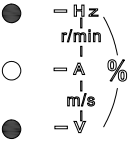


Description of keys on the keypad:

Key	Name	Function
MENU / ENTER	Menu/Enter	1、Enter each menu 2、Data storage confirmation
ESC	Shift /Exit	1、Select the data digit to be modified; switch between monitored parameters 2、Under the status of parameter modification and return to the previous menu. 3、Constantly press 3 seconds and return to the previous menu.
	Decrease number （-）Key	Inc/Dec number or data
	Increase number （+）Key	

Description of keys on the keypad:

Indicators	Unit	Indicators	Unit	Indicators	Unit
	Hz		A		V

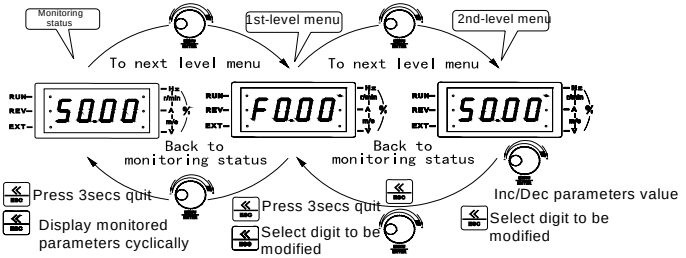
Indicators	Unit	Indicators	Unit	Indicators	Unit
	r/min		m/s		%

Meanings of three indicators status

Indicator	Status	Inverter state
RUN indicator	Off	Standby state
	On	Stable run state
	Blinking	Accelerating or decelerating state
REV indicator	Off	Both preset and current direction are forward
	ON	Both preset and current direction are reverse
	Blinking	Preset direction is inconsistent with current direction
EXT indicator	Off	Keypad control
	ON	Terminal control
	Blinking	Communication control

4.1.2 Display status and operation of keypad

The keypad of SB150 has the following display status: monitoring status(including in standby state and in run state), parameter editing status, fault display status, alarm display status, etc.



Monitoring status in standby state

Pressing  in this status cyclically displays the standby-state parameters（defined by FC-01～FC-04）

Monitoring status in run state

Pressing  in this status cyclically displays the run-state parameters(defined by FC-01～FC-07）

Parameter editing status

In monitoring status, pressing  enters the editing status, which contains second level menus: parameter group number→serial number in parameter group→parameter value. Pressing  enters the next menu and pressing  3 second, returns to the previous menu(returns to monitoring status if at the first level menu). Pressing  change the parameter group numbers, serial numbers in parameter group or parameter values. . Under the second level menu, the digit which can be edited blinks. Pressing  switches the digit to be edited to another digit, and pressing  saves the modified data and returns to the first level menu, and the next parameter is displayed.

Password check status

If there is a user password（F0-12 not equal to zero），before you can edit any parameter you enter the password check status and "————" is displayed. Input the password with  、  （"————" is displayed during input）and press  If the password is not correct, "Err" blinks. At this moment, press  returning to the password check status and press  again exiting the password check status. If there is no any keystroke within ten minutes, the password protection will take effect automatically.

Fault display status

Once the inverter detects a fault signal, the keypad enters the fault display status, and the error code blinks. The fault can be reset by inputting reset command ( key, control terminal or communication command). If the fault still exists, the error code continues to blink, during this period you can modify related parameters to eliminate the fault.

Alarm display status

When the inverter detects the alarm information, the alarm code blinks. If there are multiple alarm signals, the alarm codes display alternately. The alarm information can be temporarily hidden by pressing  or 

. The alarm signal is automatically removed if normal state is recovered. The inverter does not stop in alarm display status.

4.2 Switching on the power for the first time

Connect the wires in accordance with the technical requirements specified in section 3.4.

After checking the wiring and power supply, close the air switch of the AC power on the inverter input side. “8.8.8.8.8” will fist be displayed on the keypad of the inverter. When the contactor inside the inverter is closed normally, the display becomes the reference frequency. This shows the inverter initialization has been completed. If anything unusual occurs when the power is turned on, disconnect the air switch and check and remove the error.

4.3 Quick and optimize commissioning

SB150series inverter is controlled by keypad, the frequency setting is digital setting, refer to 3.4.1 to check the terminal function

Below is some common and necessary settings of SB150 inverter besides default setting.

1、Frequency setting channel and reference frequency: refer to page 37；

2、Command source: refer to F0-02, page40;

3、Maximum frequency, upper-limit frequency lower-limit frequency and max. output voltage : refer to F0-06, F0-07, F0-08 and F2-10, make sure F0-06≥F0-07＞F0-08.

4 Motor run direction: refer to F0-05, page38；

5、Accel/decel time: the accel/decel time should be as long as possible. Too short time will cause overcurrent or overlarge torque which damages the load, refer to page39；

6、Start and stop mode: refer to F1-04 and F1-08, page 42；

7、Motor parameters: rated power, motor pole number, rated current, rated frequency, rated speed and rated voltage. Refer to page 44。

SB150 optimize commissioning：

1、F2-00“Manual torque uprising amplitude”： If the current at the start is too large, reduce the value, refer to page 42；

2、It is recommended to boost the torque automatically in order to increase the inverter’s starting torque and its output torque at low speeds.， refer to page 42

3、Slip compensation can ease the speed drop caused by the load. It is only valid when “auto torque boost” is valid, refer to page 43；

4、Vibration damping: If the motor vibrates, increase this parameter gradually until the vibration disappears. Refer to F2-06.

5 Parameter table

Note: In the "Change" column of the table below, "O" indicates the parameter can be changed in any state, "×" indicates the parameter is only changeable in running state, while "△" indicates the parameter is read only.

F0 Basic Parameters

No.	Name	Setting range	Default	Change	page
F0-00	Digital reference frequency	0.00～650.00Hz	50.00Hz	○	37
F0-01	Main reference channel	0：F0-00digital setting　1：Communication 2：AI1　3：AI2 4：UP/DOWN value　5：Keypad POT	0	○	37
F0-02	Command source	1：Keypad 2：Terminal，STOP invalid 3：Terminal，STOP valid 4：Communication，STOP invalid 5：Communication，STOP valid	1	×	37
F0-03	Frequency holding	0: Saved upon power loss 1: Restored to F0-00 upon power loss 2: Restored to F0-00 upon power loss or stop Note: For keypad digital potentiometer, revise by or communication setting	0	○	38
F0-04	Auxiliary reference channel	0：None　1：Communication setting 2：AI1　3：AI2 4：UP/DOWN value	0	○	38
F0-05	Direction lock	0: Forward or reverse　1: Forward only 2: Reverse only	0	○	38
F0-06	Max. frequency	0.00～650.00Hz	50.00Hz	×	38
F0-07	Upper-limit frequency	0.00～650.00Hz	50.00Hz	×	38
F0-08	Lower-limit frequency	0.00～650.00Hz	0.00 Hz	×	38
F0-09	Inverter rated capacity	Min. unit：0.01kW	Depends on model	△	38
F0-10	Software version	0.00～99.99	Depends on version	△	38
F0-11	Parameter initialization	11：initialization　22：clean fault log	00	×	38
F0-12	User password	0000～9999，0000 means no password	0000	○	38

F1 Accel/decel, start, stop and jog parameters

No.	Name	Setting range	Default	Change	Page
F1-00	Accel time 1	0.1～3600.0s Acceleration time: time period over which the frequency rises by 50Hz. Deceleration time: time period over which the frequency drops by 50Hz. Inc/Dec time 2 is also be used as jog Inc/Dec time.	6.0s	○	39
F1-01	Decel time 1				
F1-02	Accel time 2				
F1-03	Decel time 2				
F1-04	Starting mode	0：Start from starting frequency 1：Start from searched speed	0	×	39
F1-05	Starting frequency	0.00～60.00Hz	0.50Hz	○	39
F1-06	Starting delay time	0.0～60.0s	0.0s	○	39
F1-07	Starting frequency duration	0.0～60.0s	0.0s	○	40
F1-08	Stop mode	0: Slowdown stop 1: Coast stop 2: Slowdown+DC braking	0	○	40
F1-09	DC braking frequency (at stop)	0.00～60.00Hz	0.50Hz	○	40
F1-10	DC braking waiting time	0.0～10.0s	0.0s	○	40
F1-11	DC braking / Zero-speed delay time	0.0～60.0s	0.0s	○	40
F1-12	DC braking current	0.0～100.0%，rated current is100%	50.0%	○	41
F1-13	Jog frequency	0.10 ～ 50.00Hz，jog use the second set Inc/Dec time.	5.00Hz	○	41
F1-14	Accel/decel mode	0: Linear 1: S-curve	0	×	41
F1-15	S-curve accel start-stage time	0.01~10.00s	0.20s	○	41
F1-16	S-curve accel end-stage time	0.01~10.00s	0.20s	○	41
F1-17	S-curve decel start-stage time	0.01~10.00s	0.20s	○	41
F1-18	S-curve decel end-stage time	0.01~10.00s	0.20s	○	41

F2 V/F control parameters

No.	Name	Setting range	Default	Change	Page
F2-00	Manual torque boost level	0.0～15.0%	Depends on model	○	42
F2-01	Manual torque boost cut-off point	0.00～650.00Hz	50.00Hz	○	42

No.	Name	Setting range	Default	Change	Page
F2-02	Auto torque boost level	0.0～100.0%	80.0%	×	42
F2-03	Slip compensation gain	0.0～300.0%	0.0%	○	43
F2-04	Slip compensation filtering time	0.1～25.0s	1.0s	×	43
F2-05	Torque boost	0: No boost 1: Manual 2: Auto 3: Maunal+auto	1	×	43
F2-06	Vibration damping	0～200	20	○	43
F2-07	AVR function	0: Inactive 1: Active 2: Active except during decel	1	×	44
F2-08	V/F curve	0：Linear 1：Reduced-torque V/F curve 1 (1.5) 2：Reduced-torque V/F curve 2 (2.0)	0	×	44
F2-09	Base frequency	1.00～650.00Hz	50.00Hz	×	44
F2-10	Max. output voltage	200V class：75～250V，default 220V 400V class：150～500V，default 380V	220V 380V	×	44

F3 Motor parameters

No.	Name	Setting range	Default	Change	Page
F3-00	Motor rated capacity	0.40～1.5kW	Depends on model	×	44
F3-01	Pole number	2～16	4	×	45
F3-02	Motor rated current	0.5～7.5A	Depends on model	×	45
F3-03	Motor rated frequency	20.00～650.00Hz	50.00Hz	×	45
F3-04	Rated rotation speed	12.5～4000（x10）r/min	Depends on model	×	45
F3-05	Motor cooling condition	0: Common motor 1: Inverter-controlled motor	0	○	45
F3-06 ～ F3-09	Reserved	—	—	—	—

F4 Digital input terminals and multistep speed

No.	Name	Setting range	Default	Change	Page
F4-00	X1/AI1 terminal	0：No signal ±1：Multistep frequency 1 ±2：Multistep frequency 2 ±3：Multistep frequency 3 ±4：Accel/decel time select ±14：3-wire stop command ±15：Internal virtual FWD terminal ±16：Internal virtual REV terminal ±17：Accel/decel disabled ±18：Run command switched to terminal or	0	×	45
F4-01	X2/AI2 terminal		5		
F4-02	X3 terminal		6		

No.	Name	Setting range	Default	Change	Page
F4-03	FWD terminal	±5：External fault input ±6：Fault reset ±7：Jog forward ±8：Jog reverse ±9：Coast stop / Operation disabled ±10：UP/DOWN increase ±11：UP/DOWN decrease ±12：UP/DOWN clear ±13：Process PID disabled keypad. ±19：Reference frequency switched to AI1 ±20：Multi-PID select 1 ±21：Multi-PID select 2 ±22：Wobble frequency injection ±23：Wobble state reset Note：Plus sign means low level is valid, while minus sign means high level is valid	15		
F4-04	REV terminal		16		
F4-05	Digital input terminal anti-jittering time	0~2000ms	10ms	○	45
F4-06	FWD/REV mode	0: 1-wire mode(start/stop) 1: 2-wire mode 1(FWD, REV) 2: 2-wire mode 2(start/stop, direction) 3: 2-wire mode 3(start, stop) 4: 4-wire mode（pulse type start/stop、direction） 5：3-wire mode 1(FWD, REV, stop) 6：3-wore mode 2(run, direction, stop)	1	×	45
F4-07	UP/DOWN regulation mode	0: Level type(terminal) 1: Pulse type(terminal) 2: Level type(keypad) 3: Pulse type(keypad)	0	○	47
F4-08	UP/DOWN speed/step	0.01～100.00，unit is%/s or %	1.00	○	48
F4-09	UP/DOWN memory select	0: Stored on power loss 1: Cleared on power loss 2: Cleared at stop and on power loss	0	○	48
F4-10	UP/DOWN upper limit	0.0～100.0%	100.0%	○	48
F4-11	UP/DOWN lower limit	－100.0～0.0%	0.0%	○	48
F4-12～F4-18	Multistep frequency 1～7	0.00～650.00Hz Note: The default values of multistep frequencies 1~ 7are their respective frequency code numbers, for example, the default value of the multistep frequency 3 is 3.00Hz.	n.00Hz (n=1～7)	○	49

F5 Digital and relay outputs

No.	Name	Setting range	Default	Change	Page
F5-00	Y1 terminal	0: Inverter ready ±1: Inverter running ±2: Frequency reach ±3: Frequency reach ±7: Restart after momentary power failure ±8: Alarm output ±9: Reverse running	1	×	49

No.	Name	Setting range	Default	Change	Page
F5-01	T1 relay output	detection signal ±4: Fault output ±5: Undervoltage lockout ±6: Fault auto-reset ±10:Process PID sleep ±11: Wobble frequency upper/lower limit ±12: Feedback exceed upper limit alarm ±13:Feedback low lower limit alarm. Note: Set minus indicates output negate	4		
F5-02	T1 terminal closing delay	0.000～65.000s	0.000s	○	49
F5-03	T1 terminal opening delay		0.000s		
F5-04	Frequency reach detection band	0.00～650.00Hz	2.50Hz	○	50
F5-05	Frequency reach detection level	0.00～650.00Hz	50.00Hz	○	50
F5-06	Frequency reach detection hysteresis	0.00～650.00Hz	1.00Hz	○	51

F6 Analog and pulse frequency terminals

No.	Name	Setting range	Default	Change	Page
F6-00	AI1 Min. input analog quantity	0.00～100.0%	0	○	51
F6-01	AI1 Max. input analog quantity		100.0%	○	51
F6-02	AI1 Min. input analog quantity corresponding set value/feedback value	0～100.00% Note: set frequency use max. frequency as reference value. PID setting/feedback use percentage of PID reference scalar.	0.00%	○	51
F6-03	AI1 Max. input analog quantity corresponding set value/feedback value		100.0%	○	51
F6-04	AI1 filtering time	0.000～10.000s	0.100s	○	51
F6-05	AI2 Min. input analog quantity	0.00～100.0%	0	○	51
F6-06	AI2 Max. input analog quantity		100.0%	○	51
F6-07	AI2 Min. input analog quantity corresponding set value/feedback value	0.00～100.00% Note: set frequency use max. frequency as reference value. PID setting/feedback use percentage of PID reference scalar.	0.00%	○	52
F6-08	AI2 Max. input analog quantity corresponding set value/feedback value		100.0%	○	52
F6-09	AI2 filtering time	0.000～10.000s	0.100s	○	52

No.	Name	Setting range	Default	Change	Page
F6-10	AO function selection	1:Operating frequency 2:Reference frequency 3: Output current 4: Output voltage 5: Output capacity 6:PID feedback value 7: PID reference value 8: AI1 9: AI2 11: UP/DOWN value 12: DC bus voltage	1	○	53
F6-11	AO type	0: 0～10V or 0～20mA 1: 2～10V or 4～20mA 2: 5V at the center	0	○	53
F6-12	AO gain	0.0～1000.0%	100.0%	○	53
F6-13	AO bias	－19.99～99.99%，10V or 20mA is 100%	0.00%	○	53

F7 Process PID parameters

No.	Name	Setting range	Default	Change	Page
F7-00	PID control select	0: PID control disabled 1: PID control enabled 2：PID corrects reference frequency	0	×	54
F7-01	PID reference channel	0：F7-04 1：AI1 2：AI2 3：AI1-AI2 4：AI1+AI2 5：UP/DOWN value 6： keypad potentiometer value 7:Communication setting	0	×	55
F7-02	feedback channel	1：AI1 2：AI2： 3：AI1-AI2 4：AI1+AI2	1	×	55
F7-03	PID reference scalar	－100.0～100.0	10.00	×	55
F7-04	PID digital reference	－100.0～100.0	5.0	○	55
F7-05	PID regulation characteristic	0: Positive 1: Negative	0	×	55
F7-06	Proportional gain	0.00～100.00	1.00	○	55
F7-07	Integral time	0.00～100.00s，0 indicates no integral	2.00s	○	55
F7-08	Differential time	0.000～10.000s	0.000s	○	55
F7-09	Sampling period	0.001～10.000s	0.010s	○	56
F7-10	PID upper limit	－100.0～100.0%(Max frequency=100%)	100.0%	○	56
F7-11	PID lower limit		0.0%	○	
F7-12	Multi-PID setpoint 1	－100.0～100.0	1.0	○	56
F7-13	Multi-PID setpoint 2		2.0	○	56
F7-14	Multi-PID setpoint 3		3.0	○	56
F7-15	Sleeping frequency	0.00～650.00Hz	40.00Hz	○	56
F7-16	Sleeping waiting time	0.0～3600.0s	60.0s	○	56

No.	Name	Setting range	Default	Change	Page
F7-17	Awaken deviation	0.00～100.00%， Note： 100.00% sleeping invalid	100.00%	○	56
F7-18	Awaken delay time	0.000～60.000s	0.500s	○	56
F7-19	Feedback exceed upper limit alarm value	50.0~200.0%	120.0%	○	57
F7-20	Feedback exceed upper limit hysteresis loop value	0.0~100.0%	10.0%	○	57
F7-21	Feedback under lower limit alarm value	0.0~100.0%	40.0%	○	57
F7-22	Feedback under lower limit hysteresis loop value	0.0~50.0%	10.0%s	○	57

F9 Wobble frequency control

No.	Name	Setting range	Default	Change	Page
F9-00	Wobble frequency injection mode	0: Disabled 1: Auto injection 2: Manual injection	0	×	57
F9-01	Wobble amplitude control	0: Center frequency=100% 1: Max. frequency=100%	0	×	58
F9-02	Preset wobble frequency	F0-08～F0-07	0.00Hz	○	58
F9-03	Preset wobble frequency waiting time	0.0～3600.0s	0.0s	○	58
F9-04	Wobble frequency amplitude	0.0～50.0%(relative to center frequency or Max. frequency)	0.0%	○	58
F9-05	Sudden jump frequency	0.0 ～ 50.0 % (actual wobble frequency amplitude=100%)	0.0%	○	58
F9-06	Sudden jump time	0～50ms	0ms	○	58
F9-07	Wobble period	0.1～1000.0s	10.0s	○	58
F9-08	Rising time	0.0～100.0%，(F9-07=100%)	50.0%	○	58
F9-09	Wobble randomness	0.0～50.0%，(F9-07=100%)	0.0%	○	58
F9-10	Wobble restart and power-off setting	0: Smooth restart 1: Restart from zero	0	×	58

Fb Protection functions and advanced settings

No.	Name	Setting range	Default	Change	Page
Fb-00	Motor overload protection value	50.0～150.0%(motor rated current=100%)	100.0%	○	60
Fb-01	Motor overload action	0: No action 1: Continue running with an alarm 2: Coast to a stop due to fault	2	×	60

No.	Name	Setting range	Default	Change	Page
Fb-02	Analog input disconnection action	0: No action 1：alarm 2：alarm，press F0-00 3：Coast to a stop, with an Er.Aco alarm	0	×	60
Fb-03	Phase lose protection	0: No action 1：only input 2：only output 3：input and output	3	×	61
Fb-04	overcurrent stall point	0.0 ～ 150.0 % (inverter rated current=100%) 0.0 shows invalid	150.0%	×	61
Fb-05	Overvoltage stall point	200V class：325～375V，default 350V 400V class：650～750V，default 700V	350V 700V	×	61
Fb-06	DC link undervoltage action	0：Coast to a stop and report the undervoltage fault(Er.dcL) 1：Coast to a stop，and restart when power up	0	×	61
Fb-07	DC link undervoltage point	200V class：185～240V，default 200V 400V class：370～480V，default 400V	200V 400V	×	61
Fb-08	Auto reset times	0～10，module protection and external fault have no reset function	0	×	62
Fb-09	Auto reset interval	1.0～30.0s	5.0s	×	62
Fb-10	Fault output during auto reset	0: No output 1: Output	0	×	62
Fb-11	Power-on auto reset	0: Disabled 1: Enabled	1	○	62
Fb-12	Built-in braking unit working threshold	200V class：310～360，default 340V 400V class：620～720V，default 680V	340V 680V	○	62
Fb-13	Carrier frequency	1.1k～16.0kHz	4.0kHz	○	63
Fb-14	Carrier frequency auto adjustment	0: Disabled 1: Enabled	1	○	63
Fb-15	Jump frequency	0.00～625.00Hz	0.00Hz	○	63
Fb-16	Jumping width	0.00～20.00Hz	0.00Hz	○	63

FC Display Settings

No.	Name	Setting range	Default	Change	Page
FC-00	Display parameter selection	0：All 1：Different from default value	0	○	63
FC-01	Monitored parameter 1(run & stop)	0～17，0～17 indicate FU-00～FU-17	1	○	63
FC-02	Monitored parameter 2(run & stop)	－1～17 －1 indicates empty，0～17 indicate FU-00～FU-17	－1	○	64
FC-03	Monitored parameter 3(run & stop)		－1	○	64
FC-04	Monitored parameter 4(run & stop)		－1	○	64

No.	Name	Setting range	Default	Change	Page
FC-05	Monitored parameter 1(run)	－1～17 －1 indicates empty，0～17 indicate FU-00～FU-17	0	○	64
FC-06	Monitored parameter 2(run)		2	○	64
FC-07	Monitored parameter 3(run)		4	○	64
FC-08	Speed display coefficient	0.001～10.000	1.000	○	64
FC-09	Line speed display coefficient	0.01～100.00	0.01	○	64

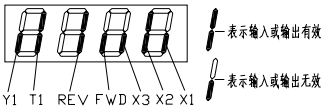
FF Communication Parameter

No.	Name	Setting range	Default	Change	Page
FF-00	Communication data format	0：8,N,1　1：8,E,1　2：8,O,1　3：8,N,2	0	×	64
FF-01	**B**aud rate selection	0：1200bps　1：2400bps　2：4800bps 3：9600bps　4：19200bps	3	×	64
FF-02	Local address	1～247，248 is master	1	×	64
FF-03	Communication overtime detection time	0.1～600.0s	10.0s	○	64
FF-04	Communication overtime action	0: No action　1: Alarm 2: Motor runs at F0-00 with alarm 3: Motor coasts to a stop due to fault	0	×	65
FF-05	Master and slave Operation procedure	0：Frequency reference value　1：PID reference value.	0	×	64
FF-06	Slave reference scale coefficient	0.01-100.00	1.00	○	65

Fn Factory parameters

FP Fault record

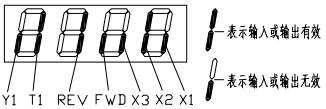
No.	Name	Description

No.	Name	Description
FP-00	Last fault type	0: No fault 1. ocb: Momentary overcurrent at start 2. ocA: Overcurrent in accel 3. ocd: Overcurrent in decel 4. ocn: Overcurrent in constant-speed run 5. ouA: Overvoltage in accel 6. oud: Overvoltage in decel 7. oun: Overvoltage in constant-speed run 8. ouE: Overvoltage in standby state 9. dcL: Undervoltage in run 10. PLI: Input phase loss 11. PLo: Output phase loss 12. FoP: Power device protection 13. oHI: Inverter overheating 14. oLI: Inverter overload 15. oLL: Motor overload 16. EEF: External fault 22. CFE: Communication error 23. ccF: Current check error 19：Aco : Analog input disconnection 20：rHo: Thermal sensitive resistor open 21：Io1 Reserved 22：Io2 Reserved
FP-01	Cumulated run time at last fault	Min. unit ： 1h
FP-02	Operating frequency at last fault	Min. unit：0.01Hz
FP-03	Reference frequency at last fault	Min. unit：0.01Hz
FP-04	Output current at last fault	Min. unit：0.1A
FP-05	Output voltage at last fault	Min. unit：0.1V
FP-06	Output capacity at last fault	Min. unit：0.1kW
FP-07	DC link voltage at last fault	Min. unit：0.1V
FP-08	Bridge temperature at last fault	Min. unit：0.1°C
FP-09	Terminal status at last fault	
FP-10	2nd last fault type	Same as FP-00
FP-11	Cumulated run time at 2nd last fault	Min. unit：1h
FP-12	Operating frequency at 2nd last fault	Min. unit：0.01Hz
FP-13	Reference frequency at 2nd last fault	Min. unit：0.01Hz
FP-14	Output current at 2nd last fault	Min. unit：0.1A
FP-15	Output voltage at 2nd last fault	Min. unit：0.1V
FP-16	Output capacity at 2nd last fault	Min. unit：0.1kW
FP-17	DC link voltage at 2nd last fault	Min. unit：0.1V
FP-18	Bridge temperature at 2nd last fault	Min. unit：0.1°C
FP-19	Terminal status at 2nd last fault	Same as FP-09
FP-20	3rd last fault type	Same as FP-00
FP-21	Cumulated run time at 3rd last fault	Min. unit：1h

No.	Name	Description
FP-22	Operating frequency at 3rd last fault	Min. unit：0.01Hz
FP-23	Reference frequency at 3rd last fault	Min. unit：0.01Hz
FP-24	Output current at 3rd last fault	Min. unit：0.1A
FP-25	Output voltage at 3rd last fault	Min. unit：0.1V
FP-26	Output capacity at 3rd last fault	Min. unit：0.1kW
FP-27	DC link voltage at 3rd last fault	Min. unit：0.1V
FP-28	Bridge temperature at 3rd last fault	Min. unit：0.1°C
FP-29	Terminal status at 3rd last fault	Same as FP-09
FP-30	4th Last fault type	Same as FP-00
FP-31	Cumulated run time at 4th last fault	Min. unit：1h
FP-32	Operating frequency at 4th last fault	Min. unit：0.01Hz
FP-33	Reference frequency at 4th last fault	Min. unit：0.01Hz
FP-34	Output current at 4th last fault	Min. unit：0.1A
FP-35	Output voltage at 4th last fault	Min. unit：0.1V
FP-36	Output capacity at 4th last fault	Min. unit：0.1kW
FP-37	DC link voltage at 4th last fault	Min. unit：0.1V
FP-38	Bridge temperature at 4th last fault	Min. unit：0.1°C
FP-39	Terminal status at 4th last fault	Same as FP-09
FP-40	5th Last fault type	Same as FP-00
FP-41	Cumulated run time at 5th last fault	Min. unit：1h
FP-42	Operating frequency at 5th last fault	Min. unit：0.01Hz
FP-43	Reference frequency at 5th last fault	Min. unit：0.01Hz
FP-44	Output current at 5th last fault	Min. unit：0.1A
FP-45	Output voltage at 5th last fault	Min. unit：0.1V
FP-46	Output capacity at 5th last fault	Min. unit：0.1kW
FP-47	DC link voltage at 5th last fault	Min. unit：0.1V
FP-48	Bridge temperature at 5th last fault	Min. unit：0.1°C
FP-49	Terminal status at 5th last fault	Same as FP-09

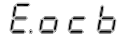
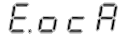
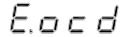
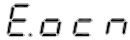
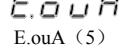
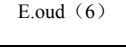
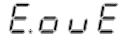
FU Data monitoring

No.	Name	Description
FU-00	Operating frequency	Motor speed frequency，Min. unit：0.01Hz
FU-01	Reference frequency	Unit indicator blinks，Min. unit：0.01Hz
FU-02	Output current	Min. unit：0.1A

No.	Name	Description
FU-03	Load current percentage	Inverter rated current=100%，Min. unit：0.1%
FU-04	Output voltage	Min. unit：0.1V
FU-05	Operating speed	Min. unit：1r/min
FU-06	Reference speed	Unit indicator blinks，Min. unit：1r/min
FU-07	DC link voltage	Min. unit：0.1V
FU-08	Output capacity	Min. unit：0.1kW
FU-09	Operating line speed	Min. unit：1m/s
FU-10	Reference line speed	Unit indicator blinks，Min. unit：1m/s
FU-11	PID feedback	Min. unit：0.1%
FU-12	PID reference	Unit indicator blinks，Min. unit：0.1%
FU-13	AI1	Min. unit：0.1%
FU-14	AI2	Min. unit：0.1%
FU-15	UP/DOWN value	Unit indicator blinks，Min. unit：0.1%
FU-16	digital input/output terminal status	
FU-17	Heat sink temperature	Min. unit：0.1°C
FU-18～FU-24		Reserved

7 Troubleshooting

7.1 Faults and remedies

Fault code	Fault type	Possible causes	Remedies
 E.ocb（1）	Overcurrent at start	Inter-phase or grounding short-circuit inside the motor or between wirings	Check the motor and wiring
		Inverting module failed	Call us
		Voltage overhigh at start	Check the setting of “torque boost”
 E.ocA（2）	Overcurrent during acceleration	Accel time too short	Increase the accel time
		V/F curve improper	Regulate V/F curve or the setting of “torque boost”
		Running motor restarts	Set the start mode as “smooth start” Restart the motor after it stops completely
		Low power grid voltage	Check the input power
		Inverter capacity too small	Use an inverter with larger capacity
 E.ocd（3）	Overcurrent during deceleration	Decel time too short	Increase the decel time
		There is potential energy load or inertial torque of the load is large	Install an external dynamic braking unit
		Inverter capacity too small	Use an inverter with larger capacity
 E.ocn（4）	Overcurrent during constant-speed operation	Sudden change of load	Reduce the sudden change of the load
		load error	Check the load
		Low power grid voltage	Check the input power
		Inverter capacity too small	Use an inverter with larger capacity
 E.ouA（5）	Overvoltage during acceleration	Input voltage abnormal	Check the input power
		Running motor restarts	Set the start mode as “smooth start” Restart the motor after it stops completely
 E.oud（6）	Overvoltage during deceleration	Decel time too short	Increase the decel time
		There is potential energy load or inertial torque of the load is large	Install an external dynamic braking unit
 E.oun（7）	Overvoltage during constant-speed operation	Input voltage abnormal	Check the input power
		Accel/decel time too short	Increase the accel/decel time
		Input voltage changes irregularly	Install an input reactor
E.ouE（8）	Overvoltage in standby state	Input voltage overhigh	Check the input power
		Error of DC bus voltage test circuit	Call us
E.dcL（9）	Undervoltage during running	Input voltage abnormal or power loss during running	Check input power and wiring
		There is heavy-load impact	Check the load
		Charging contactor failed	Check and replace it

Fault code	Fault type	Possible causes	Remedies
		Input phase loss	Input the input power and wiring
 E.PLI（10）	Input phase loss	Input power phase loss	Check the wiring
		Three input phases imbalanced	Check input voltage
		Serious oscillation of output	Adjust parameters to eliminate the oscillation
 E.PLo（11）	Output phase loss	Loss of output (U, V or W)	Check the output wiring Check the motor and cables
 E.FoP（12）	Power device protection	Output has interphase short-circuit or grounding short-circuit	Rewire
		Wiring of or components on the control board loose	Check and rewire
		Wiring of the motor or inverter too long	Add output reactor or filter
		Serious interference or failure of inverter	Call us
 E.oHI（13）	Inverter overheating	Ambient temperature overhigh	Lower the ambient temperature
		Air path blocked or the fan failed	Clean air path or replace the fan
		Load too heavy	Check the load or select an high-capacity inverter
 E.EEF（16）	External fault	External fault terminal closed	Deal with the external fault
 E.CFE（17）	Communication overtime	Improper setting of communication parameters	Check the settings of FF menu
		Serious communication interference	Check the wiring and grounding of the communication circuit
		PC does not work	Check PC and wiring
 E.oLI（14）	Inverter overload	Load too heavy	Check the load or select an high-capacity inverter
		Inverter temperature too high	Check the fan, air path and ambient temperature
		Accel time too short	Increase the accel time
		Carrier frequency too high	Lower the carrier frequency or select an inverter with a higher capacity
		Running motor restarted	Set the restart mode as “smooth restart” or “restart after motor stops”
		Input voltage too low	Check the input voltage
 E.oLL（15）	Motor overload	V/F curve improper	Correctly set the V/F curve and torque boost level
		The common motor runs with heavy load at low speed for a long time	Install a separate cooling fan or select a motor designed for inverter
		Improper setting of nameplate parameters or overload protection	Correctly set the V/F curve and torque boost level

Fault code	Fault type	Possible causes	Remedies
		Motor stalls or load changes suddenly and greatly	Correctly set F3-02、F3-05、Fb-00
		V/F curve improper	Check the load
E.ccF E.ccF（18）	Current test error	Loose wiring or components inside the inverter	Check and rewire
		failed current sensor or circuit error	Call us
E.Aco E.Aco（19）	Analog input disconnection	Wires broken or peripheral devices failed	Check external wires and peripheral devices
E.rHo E.rHo（20）	Thermal resistor open	Thermal resistor disconnected	Check the connection of thermal resistor or call us
E.Io1 E.Io1（21）	Reserved	—	—
E.Io2 E.Io2（22）	Reserved	—	—

7.2 Alarms and remedies

Alarm code	Alarm name	Description	Remedies	Alarm word Bit
A.oLL A.oLL	Motor overload	Motor thermal model detects the motor temperature rise is overhigh	Refer to above table	Bit 0
A.Aco A.Aco	Analog input disconnection	Analog input signal is lower than the drop threshold	Refer to above table	Bit 1
A.CFE A.CFE	Communication overtime	—	Refer to above table	Bit 2
A.EEP A.EEP	Parameter saving failed	—	Press STOP to clear Turn power off and retry. If the alarm appears again, call us for help.	Bit 3
A.dcL A.dcL	DC link undervoltage	DC link voltage is lower than the threshold	It is normal for this alarm information to be displayed when the power is off	Bit 4
A.PcE A.PcE	Parameter check error	Improper parameter setting	Correct parameter setting or restore factory setting. Press  to clear	Bit 5

7.3 Operation faults and remedies

Fault	Description	Possible causes	Remedies
No key-press response	One key or all keys have no response to key pressing	Poor contact of the keypad connecting wire	Check the connecting wire or call us
		Key(s) damaged	Replace the keypad
Parameter correction failed	Parameters cannot be modified	The parameters are read-only ones	Read-only parameters are unchangeable
	Parameters cannot be modified in running state	Some parameters are unchangeable during running	Modify them in standby state
Unexpected stop during running	Inverter stops automatically without receiving stop command, and the run LED is off	There is fault	Troubleshoot and reset it
		Run command channel switches over	Check the operation and run command channel status
	Inverter stops automatically without receiving stop command, and the run LED is on	Waiting for the fault auto reset	Check auto reset setting
		Reference frequency is zero	Check reference frequency
		Output frequency is too low under PID control	Check the PID reference and feedback
		Waiting for the restart after momentary power failure	—
Inverter start failed	After receiving start command, inverter fails to start, and the run LED is off	Digital input 9 "coast stop / inverter run disabled" is valid	Check terminal coast stop / inverter run disabled
		The stop key is not closed under 3-wire 1, 3-wire 2 or 2-wire 3 control mode	Check the stop key and its connection
		Run command channel error	Change the run command channel
		Inverter error	Troubleshoot

8 Maintenance and After-sale Service

DANGER

1. Only professionally trained persons can disassemble and repair the inverter and replace its parts.

2. Make sure the power supply of the inverter is cut off, the high-voltage indicator goes out and the voltage between DC＋and DC－is less than 36V before checking and repairing the inverter, otherwise there may be a risk of electric shock.

3. Do not leave any metal pieces such as screws and washers in the inverter. That many destroy the inverter or cause fire.

4. Reset related parameters after replacing the control board, otherwise the inverter may be destroyed.

8.1 Daily maintenance

Due to factors of dust, humidity, vibration, aging, etc., faults would occur over time. It is necessary to check the inverter and its working environment regularly in order to extend the lifespan of the inverter.

Check points:

1. If the working environment of the inverter meets the requirement.
2. If the operating parameters of the inverter are set within the specified ranges.
3. If there is any unusual vibration or noise.
4. If there is any unusual odor.
5. If the fans run normally.
6. If the input voltage is within the specified range and voltages of various phases are balanced.

The periodical maintenance should be performed once every three or six months according to the service conditions. Check points:

1. If the screws of control terminals are loose.
2. If the main circuit terminals have a poor contact and the copperplate connections have traces of overheating.
3. If the power and control cables are damaged.
4. If the insulated binding band for the cold-pressed terminals of the power cables comes off.
5. Remove dust on PCBs and wind path thoroughly. It's better to use a vacuum cleaner.
6. When leaving the inverter unused for a long term, check it for functioning once every two years by supplying it with electricity for at least five hours with the motor disconnected. While supplying the epower, use a voltage regulator to raise the voltage gradually to the rated value.

8.2 Replacement of parts

The inverter wearing parts primarily include the electrolytic capacitor (used for wave filtration) and the cooling fan. The service life and the service environment are closely related to maintenance conditions. The user can decide whether to change the wearing parts according to the operating time.

- Cooling fan

  Causes of damage: wear of bearings; aging of blades(average life is 30 to 40 thousand hours).

  Judging criterion: crack in blades, etc.; unusual vibration at the start.

  Caution:

  1. While replacing the fan, use the fan model designated by the factory(with identical rated voltage, current, speed and air volume).

  2. While installing the fan, be careful that the direction marked on the fan must conform to direction in which the fan supplies wind.

  3. Do not forget to install the fan guard.

- Electrolytic capacitor

  Causes of damage: high ambient temperature; frequent and sudden load change which leads to high pulsating current; aging of electrolyte.

Judging criterion: protrusion of safety valve; measurement of static capacitance; measurement of insulation resistance.

It is recommended to replace the bus electrolytic capacitor once every four or five years.

8.3 Storage of the inverter

- Avoid storing the inverter in a place with high-temperature, humidity, dust and metal powder.
- Leaving the inverter unused for a long period would lead to aging of the electrolytic capacitors. So the inverter must be supplied with electricity once every two years for at least five hours, and the input voltage raised gradually through a regulator to the rated value.

8.4 After-sale service

The warranty period is one year from the purchase date. However, the repair cost should be born by the user for the following damages even within this term.

1. Damage caused by operation not in accordance with the user's manual.
2. Damage caused by unauthorized repairs or modifications.
3. Damage caused by using the inverter beyond the standard specifications.
4. Damage caused by falling or an accident during transportation after the purchase.
5. Damage cause by fire, flood, abnormal voltage, lightning strike, etc.

In the event of any abnormality arising in operation, check and adjust the inverter as per the user's manual. In case any fault occurs, promptly contact the supplier, the local electrical engineering agent of Hope-Senlan Technologies Corporation or our headquarters. We will rectify any fault for free that arises from manufacturing

and design within the warranty period. For a rectification beyond the warranty period, we will charge the user as required at a reasonable rate.