CHZIRI®

ZVF300H Vector Inverter

User's Manual

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ZIRI ELECTRICAL TECHNOLOGY CO.,LTD.

Foreword

- Thank you very much for your purchase of ZVF300H series inverter.
- This manual introduces the installation, operation, function setting, trouble shooting and etc. of the inverter ZVF300H series.
- Incorrect installation or use may result in damage orother accidents. Do read all instructions in detail before installing or operating.
- Please forward this manual to the end user, and keep it hand for quick reference.If there are any doubts or questions, please contact the technical service center of Our Company.

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Chapter 1 Safety Instructions

1.1 Safety Symbols and Definitions

The safety instructions described in this manual are very important. To avoid any error that may result in damage to equipment, injury to personnel or loss of property, do read and clearly understand all of the safety symbols, symbol definitions and be sure to observe the indicated safety instructions below.

Safety Symbols	Symbol Definitions
 HAZARD	This symbol indicates hazardous HIGH VOLTAGE. Any incorrect operation may result in serious damage to the equipment or death to personnel.
 WARNING	This symbol indicates that any incorrect operation can result in damage to the equipment or minor to moderate injury to personnel.
 CAUTION	This symbol calls your attention to follow the instructions while in operation or in use.
 TIP	This symbol calls attention to some useful messages for the user.
 FORBIDDEN	This symbol indicates anything forbidden to do.
 COMPULSORY	This symbol indicates something must do.

1.2 Application Range

- This inverter is applicable to general industrial purpose three phase AC asynchronic electric motor.

- This inverter can not be used in the equipment that may result in threat or injury to personnel due to inverter trouble or error, such as nuclear power control equipment, aviation equipment, transportation equipment, life supporting system, safety equipment, weapon system and etc. Please consult Ziri Company before using it for special purposes.
- This product is made under strict quality control and supervision. But when used in some key equipment, protective measures should be taken to avoid further extension of accident due to inverter trouble.

1.3 Installation Ambient

- Be sure to install the inverter in a well-ventilated indoor location. To get the best cooling effect, it is recommended to fix the inverter vertically, and extra ventilation devices are needed when installed horizontally.
- Be sure that the ambient temperature is between -10℃~45℃. If the temperature is higher than 40℃, please remove the upper cover. If the temperature is higher than 50℃, forced heat radiation or derating is needed from the external. It is recommended not to use the inverter in such a high temperature. Otherwise, it may greatly reduce the service life of the inverter.
- The ambient humidity is required to be lower than 90% without dew condensation.
- The inverter shall be installed in a place where the vibration is less than 0.5G. Otherwise, it may fall and cause damage to the equipment. It is also noteworthy that the inverter could not bear any sudden bump.
- The inverter should be kept away from electromagnetic interference (EMI), flammable and explosive ambient.

WARNING

- Be sure to install the inverter on metallic materials (i.e., metal). Otherwise, there is the danger of fire.
- Be sure not to let the foreign matter enter the inverter, such as wire clippings, spatter from welding, metal (zinc or ferrous) meshavings and etc. Otherwise, there is the danger of getting burned due to short circuit.

1.4 Cautions for Installing

HAZARD

- Do not operate electrical equipment with wet hands.
- Do not operate wiring unless the power supply is completely off.
- Do not open the front cover or perform wiring while the inverter is powered ON. Otherwise, there is the danger of electric shock.
- Do wait at least 10 minutes after the power is disconnected before performing the work of wiring or inspection. Otherwise, there is the danger of electric shock.

HAZARD

- Do not install or operate if the inverter is damaged or has parts missing to prevent injury to personnel or loss of property.
- The main loop terminal should be tightly connected to the cable. Otherwise, the inverter may be damaged due to loose contact.
- The ground terminal must be reliably and properly grounded to ensure security. To avoid common ground impedance, multipiece inverters should be grounded at one shared point, as shown in the Figure 1-1.

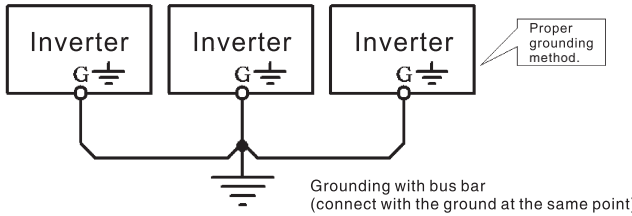


Figure 1-1

FORBIDDEN

- DO NOT connect control terminals (except terminals marked"TA", "TB" and "TC") to AC 220V power supply, which may cause damage to the inverter.
- DO NOT connect AC power supply to the output terminals marked "U", "V" and "W". Otherwise, it may cause damage to the inverter, as shown in the Figure 1-2.

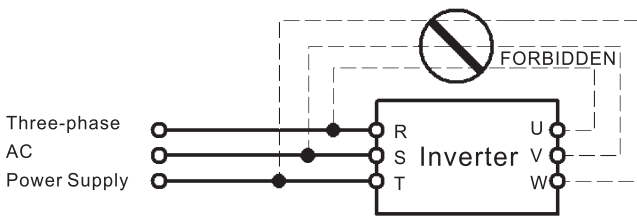


Figure 1-2

COMPULSORY

- DO install a no-fuse circuit breaker or leakage protective circuit breaker in the side of inverter input power supply to prevent expanding of accident due to an inverter problem.

- It is not advisable to install an electromagnetic contactor in the side of output power supply, because the operation of open and close to the contactor when the motor is running may cause damage to the inverter arising from over-voltage produced during this process. But it is still necessary to install a contactor if one of the following three points occurs:
  1.The system of frequency converting governor used to control energy saving usually works at a rated rotation speed. To run the governor economically, there is a must to remove the inverter.
  2.The inverter participates in some import procedure and cannot stop operating for a long period of time. To realize free shift in various control systems and improve the reliability of these systems, there is a must to install a contactor.
  3.When an inverter controls several motors, there is a must to install a contactor.
  Caution: DO NOT operate the contactor if there is output of the inverter.

1.5 Cautions for Operation

- Do not operate electrical equipment with wet hands.
- An inverter stored for a year or longer should be given power up test before use so that the main circuit filter capacitor could be recovered.When the inverter is in the state of powerup, it is necessary to raise the voltage gradually to the rated value with a voltage regulator. Generally, the charging time should be controlled within 1~2 hours. Otherwise, there is the danger of electric shock or exposure.
- Do not touch the inner side of the inverter while the power is ON, not put any foreign matter, i.e., rod or other matter inside the inverter. Otherwise, it may result in serious damage to the equipment or death to personnel.
- Do not open the front cover while the inverter is powered ON. Otherwise, there is the danger of electric shock.
- Be careful to select the Restart Mode. Otherwise, there is the danger of personnal death.

WARNING

- If the inverter runs at a frequency higher than 50Hz, DO confirm it is within the speed range acceptable by your motor bearing and mechanical device. Otherwise, there is the danger of damage to the motor.
- It is not suitable to run the reduction box, gear and other mechanism that need lubricating at low speed for a long period. Otherwise, it may reduce the service life of these equipment or even damage the equipment.
- A general motor should be derated before use due to less effective of heat dissipation when it runs at a low frequency. If it is a constant torque load, then a forced method or a special variable frequency motor should be used to release heat.
- Do cut off the power supply of an inverter set aside for a long time to avoid foreign matter or other things enter in it which may cause damage to the inverter or even lead to fire.
- The output voltage of inverter is PWM impulse wave. DO NOT install a capacitor or surge current sink (i.e., a varistor) in the inverter output port. Otherwise, there is the danger of fault tripping of the inverter or damage to its power elements. DO remove such kind of things if already installed. See the Figure 1-3 below.

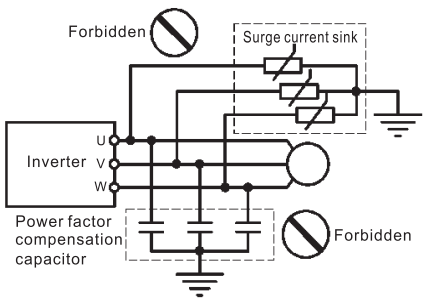


Figure 1-3

CAUTION

- Motor insulation should be checked before the inverter is used for the first use or reused after a long-term idle. Be sure the insulation resistance measured is no lower than 5MΩ.
- If the inverter is used beyond the range of allowable working voltage, then an extra step-up or step-down voltage transformer shall be configured.
- Due to thin air in a place where the altitude is higher than 1,000m, the heat dissipation of inverter will be less effective. Hence derating should be done before use. In general, when the height rises by 1,000m, the rated voltage of the inverter shall reduce by 10%. Refer to the Figure 1-4 for details of the derating

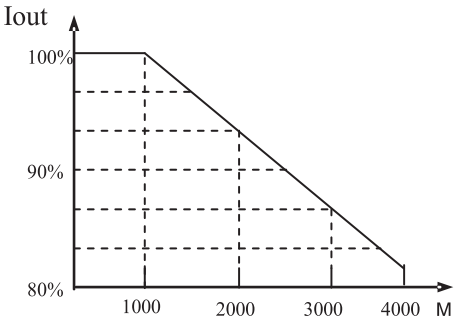


Figure 1-4 Diagram of Inverter Derating Curve

FORBIDDEN

- DO NOT touch the radiator or charging resistor of the inverter with hand(s). Otherwise, there is the possibility of getting scaled.
- DO NOT proceed direct start-stop operation frequently with a contactor or any other switch devices in the inverter input side. As large charging current exists in the main circuit of the inverter, frequent power-on/off may produce cumulative effect resulting in heat fatigue of inverter components and great reduction of service life of the inverter. See the detail in the Figure 1-5.

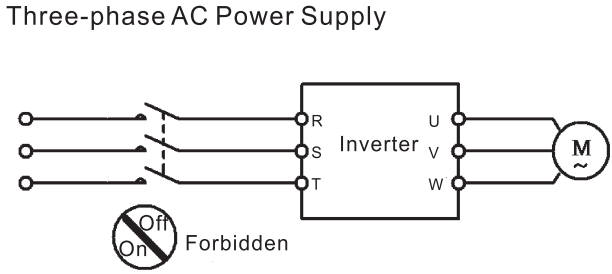


Figure 1-5. Three phase AC Power supply

COMPULSORY

- In case abnormalities occur, such as smoke, off odor, strange sound, DO cut off the power supply immediately, overhaul the equipment or turn to the agent for help via phone call.

1.6 Cautions for Disposing

WARNING

- Exposure may happen when the electrolytic capacitor (ELCC) of the inverter burns. Be careful to cope with it.
  The plastic parts on the operator panel will give off toxic gas when getting burned. Be careful to cope with it.

CAUTION

- Dispose damaged inverter as industrial waste.

Chapter 2 Introduction to the Product

2.1 Inspection upon Arrival

The inverter have excellent quality assurance system .Please through strict test before shipment .and made a crash ,shock or other package treatment . But we can not rule out the inverter subject to strong shock or extruded during transportation .Please check and confirm the products as follow when open the package .

① Check whether the case of inverter is deformed or damaged .or the components are damaged or drop off.

② Check the label of the inverter are matched with the product that you ordered .

③ Check weather the items of packing list are complete .

2.2 Demonstration of the Model

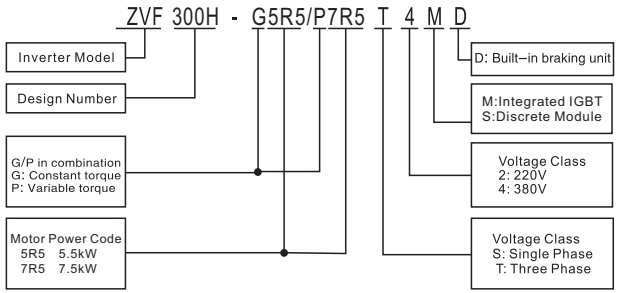


Figure2–1 Inverter Model Demonstration

2.3 Specifications Label

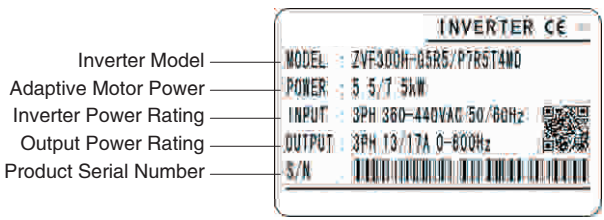


Figure 2–2 Inverter Specifications Label

2.4 Outside Drawing & Structure

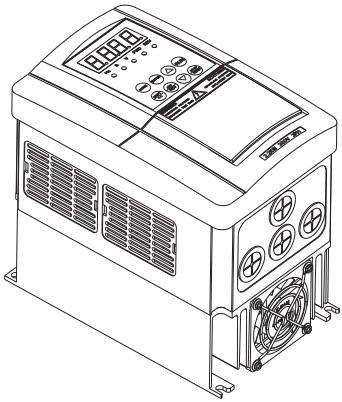


Figure 2–3 Model A Outside Drawing

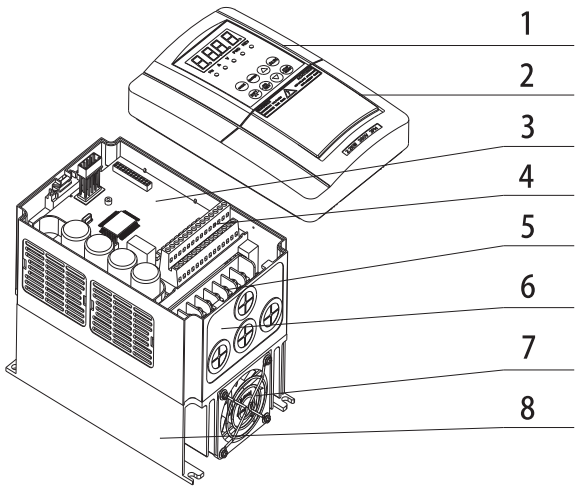


Figure 2–4 Model A Structural Representation

1. Operation Panel 2. Upper Cover 3. Control Board 4. External Control Terminal 5. Power Terminal 6. Lower Casing 7. Fan 8. Base

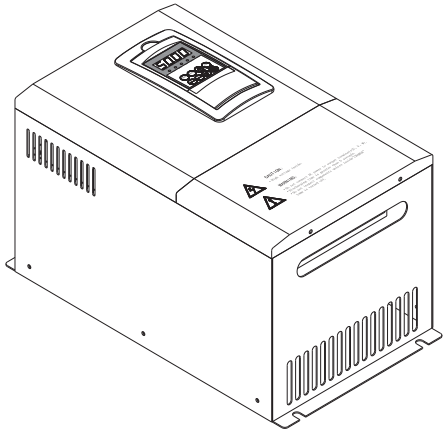


Figure 2–5 Model B Outside Drawing

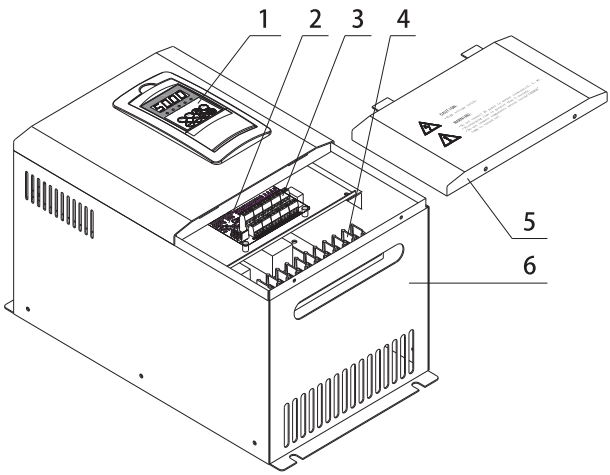


Figure 2–6 Model B Structural Representation

1. Operation Panel 2. Control Board 3. External Control Terminal 4. Power Terminal 5. Lower Cover 6. Casing

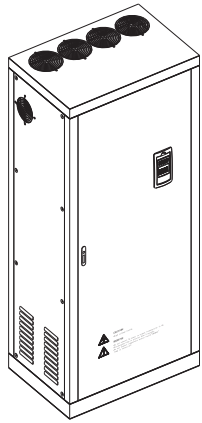


Figure 2–7 Model C Outside Drawing

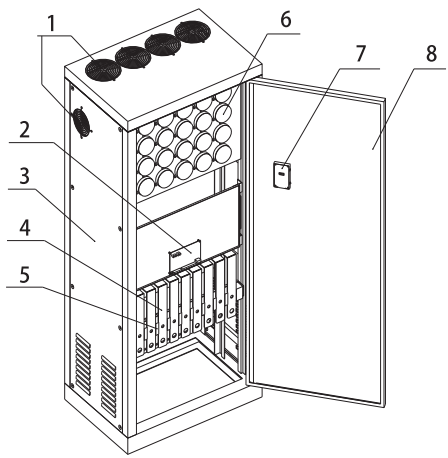


Figure 2–8 Model C Structural Representation

1.Fan 2. Control Board 3. Cabinet Body 4. Wiring Copper Bar 5.Power Terminal 6. Electrolytic Capacitor (ELCC) 7. Operation Panel 8.The door of cabinet

2.5 Models and Specifications

Table 2-1 Inverter Models and Specifications

Inverter Model (G: Constant torque load) (P: Variable torque load)	Input Voltage (V)	Rated Output Current (A)	Adaptive Motor Power(kW)
ZVF300H-G0R4T2/S2	200-240	2.4	0.4
ZVF300H-G0R7T2/S2	200-240	4.5	0.75
ZVF300H-G1R5T2/S2	200-240	7.0	1.5
ZVF300H-G2R2T2/S2	200-240	10.0	2.2
ZVF300H-G3R7T2/S2	200-240	16.0	3.7
ZVF300H-G5R5T2	200-240	20	5.5
ZVF300H-G7R5T2	200-240	30	7.5
ZVF300H-G011T2	200-240	42	11
ZVF300H-G015T2	200-240	55	15
ZVF300H-G018T2	200-240	70	18.5
ZVF300H-G022T2	200-240	80	22
ZVF300H-G030T2	200-240	110	30
ZVF300H-G037T2	200-240	130	37
ZVF300H-G045T2	200-240	160	45
ZVF300H-G055T2	200-240	200	55
ZVF300H-G075T2	200-240	270	75
ZVF300H-G090T2	200-240	320	90
ZVF300H-G110T2	200-240	380	110
ZVF300H-G0R7T4	360-440	2.5	0.75
ZVF300H-G1R5T4	360-440	3.7	1.5
ZVF300H-G2R2T4	360-440	5.0	2.2
ZVF300H-G3R7/R5R5T4	360-440	9.0/13	3.7/5.5
ZVF300H-G5R5/P7R5T4	360-440	13/17	5.5/7.5

Inverter Model （G：Constant torque load） （P：Variable torque load）	Input Voltage (V)	Rated Output Current (A)	Adaptive Motor Power(kW)
ZVF300H-G7R5/P011T4	360-440	17/25	7.5/11
ZVF300H-G011/P015T4	360-440	25/32	11/15
ZVF300H-G015/P018T4	360-440	32/37	15/18.5
ZVF300H-G018/P022T4	360-440	37/45	18.5/22
ZVF300H-G022/P030T4	360-440	45/60	22/30
ZVF300H-G030/P037T4	360-440	60/75	30/37
ZVF300H-G037/P045T4	360-440	75/90	37/45
ZVF300H-G045/P055T4	360-440	90/110	45/55
ZVF300H-G055/P075T4	360-440	110/150	55/75
ZVF300H-G075/P090T4	360-440	150/176	75/90
ZVF300H-G090/P110T4	360-440	176/210	90/110
ZVF300H-G110/P132T4	360-440	210/253	110/132
ZVF300H-G132/P160T4	360-440	253/300	132/160
ZVF300H-G160/P185T4	360-440	300/340	160/185
ZVF300H-G185/P200T4	360-440	340/380	185/200
ZVF300H-G200/P220T4	360-440	380/420	200/220
ZVF300H-G220/P250T4	360-440	420/470	220/250
ZVF300H-G250/P280T4	360-440	470/520	250/280
ZVF300H-G280/P315T4	360-440	520/600	280/315
ZVF300H-G315/P350T4	360-440	600/640	315/350
ZVF300H-G350/P400T4	360-440	640/690	350/400
ZVF300H-G400/P450T4	360-440	690/790	400/450
ZVF300H-G450/P500T4	360-440	790/860	450/500
ZVF300H-G500/P560T4	360-440	860/950	500/560
ZVF300H-G560/P630T4	360-440	950/1100	560/630
ZVF300H-G630T4	360-440	1100	630

2.6 Technical Indications

Table 2–2 Description Summary for Technical indications

Item		Item Description
Input	Rated voltage& Frequency	Single /Three phase 200-240VAC. Three phase 360-440VAC.50Hz/60Hz
	Allowable Voltage range	Voltage fluctuate range：±10% Voltage unbalance rate：<3%； Frequency fluctuation：≤±5%
Output	Rated voltage	three phase 0 ~ input AC voltage
	Frequency	0.00～600.00Hz
Overload capacity		Type G：150% 1minute，180% 1 second，200% transient protection Type P：120% 1minute，150% 1 second，180% transient protection
Control Function	Modulation mode	Optimal space voltage vector PWM modulation
	Control mode	Sensorless vector control (SVC), V/F control, Torque control
	Frequency accuracy	Digital setting：:Max. Frequency × ±0.01% Analog setting：Max. Frequency × ±0.2%
	Frequency resolution	Digital setting :0.01Hz; Analog setting :Max. Frequency x0.1%.
	Starting frequency	0.00～50.00Hz
	Torque lift	Automatic torque lift: To lift the torque automatically according to the output current. Manual torque lift, Range: 0.1—30.0%
	Slip compensation	Setting range：0～150%，The inverter output frequency can be auto–regulated within this range according to the motor load, so as to reduce the speed variation of the motor due to load fluctuation.
	Acceleration/deceleration time	Minutes/Seconds can be selected as time unit. 0.1～3600 can be set in sequence.
	Carrier frequency	1.0～15.0KHz
	Jog function	Jog frequency range：0.01～600.00Hz，Jog acceleration /deceleration time 0.1～3600.0 can be set.
	V/F curve	1：linear curve；2：quadratic；3：user defined V/F curve

Item		Item Description
Control Function	Automatic energy–saving operation	Auto optimize V/F curve according to the load changes to realize the energy saving operation .
	Auto voltage regulation (AVR)	When the network voltage changes, it can regulate PWM output automatically to maintain constant voltage.
	Built-in PID	This can form a convenient closed–loop control system (CLCS)and is applicable to pressure control, flow control and other process control .
Operation Function	Operating command	Operator panel control ,external terminal control and COM control
	Frequency setting	Keypad potentiometer setting , operation panel ▲▼ setting, external terminal UP/DOWN setting, analog voltage signal or external potentiometer setting , analog current signal setting. terminal combination setting ,485 COM setting and so on.
	Input Signal	Forward/Reverse signal、multi–speed signal 、fault signal 、reset signal etc.
	Output signal	Programmable relay、open collector output 、Fault signal output.
	Multi-function analog and digital output terminal	This can realize the output of frequency current and other physical quantity by output 0–10V or 0–20mA DC signal and 0–10KHz digital signal output.
Braking function	Dynamic braking	With an external braking resistor, the maximum braking torque may reach 100%.
	DC Braking	This can be selected when the motor starts or stops with the action frequency of 0–600Hz,action current level of 0–150% and actuation time of 0–50sec., which can be set in sequence
Other Function		Skip frequency、Jog function、Counter 、Rotation speed tracking、Momentary Power loss restart 、Frequency upper/lower limiting、Acceleration/ Deceleration mode can be adjusted 、Frequency meter and Voltmeter output 、Multi–speed/ program running 、Two wire mode/ three wire mode control 、Wobble frequency control、Multi–function terminal selection 、Fault auto reset、RS485 serial communication .
Protection Function		Input phase loss protection、Over current protection 、Overload protection、Over voltage protection 、Under voltage protection、Over heat protection ect.

Item		Item Description
LED display		Can display the real time running status of the inverter , monitor parameter .function parameter and fault code and other information of the inverter.
Matching parts		Braking assembly, remote keypads and wire connection, communication panel .
Ambient	Place to be used	Indoor location free from direct exposure to sun light, high humidity or dew condensation, high levels of dust, corrosive gas, explosive gas, inflammable gas, oil mist, salt and etc
	Altitude	Below 1000 M
	Ambient Temperature	–10℃ to+45℃(Bare Machine: –10℃ to+45℃)
	Humidity	20%–90% RH withoutdew condensation
	Vibration	<0.5G
	Storage temperature	–20℃ ~ +60℃
Structure	Protection class	IP20
	Cooling mode	Forced air cooling
	Installation	Wall mounted or floor–type actuator

Chapter 3 Inverter Installation and Wiring

3.1 Inverter Mounting and Installing

3.1.1 Use the inverter in the following environmental conditions:

- Altitude: Maximum 1000m above sea level
- Ambient Temperature: –10℃~+45℃[Bare Machine: –10℃~+50℃]
- Humidity: 20~90% RH (Non–condensing)
- Ambient: Indoor places free from direct exposure to sunlight, dust, corrosive gas, flammable gas, oil mist, steam, drip and salt
- Vibration: < 0.5G

3.1.2 Installation Space and Direction

To get better cooling effect and for the convenience of maintenance, the inverter shall be installed vertically with enough space left (ref er to the figure 3–1). When two or more inverters are fixed in the same cabinet, it is recommended to fix them in parallel and horizontally to reduce heat produced by them (refer to the figure 3–2).When there is a must to fix them vertically, please fix an insulating board between them so that the heat produced by the lower one could not have direct influence on the upper one (refer to the figure 3–3)

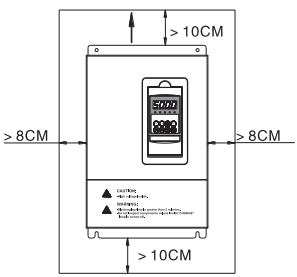


Figure 3–1
Installation Space

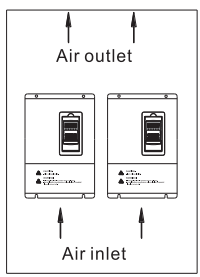


Figure 3–2
Multi–piece
Parallel Installation

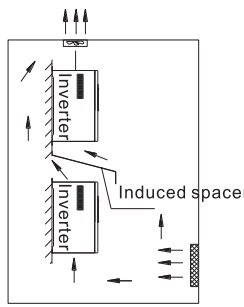


Figure 3–3
Multi–piece
Vertical Installation

3.2 Inverter Spare Parts Installing and Dismantling

3.2.1 Dismantle the upper cover.

1. Dismantle the upper cover of the inverter Model A.

Put the finger to press the heave of the upper side of the inverter .(as shown in Figure3–4where the arrow points), pull 30–50mm after the upper cover loosen (as shown in Figure3–5), and upwards lift , then you can open the inverter 's upper cover .

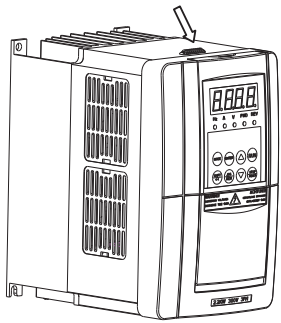


Fig. 3-4 Dismantling the upper cover of the inverter Model A

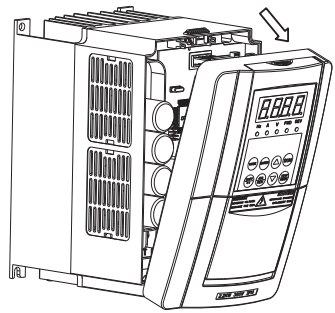


Fig. 3-5 Dismantling the upper cover of the inverter Model A

2. Dismantle the upper cover of the inverter Model B.

Screw off the two screws of the lower parts of the inverter with a screwdriver. (as shown in Figure3–6 where the arrow points). pull down the lower cover by 10–20mm . (as shown in Figure3–7), and upwards lift , you can open the inverter 's lower cover .

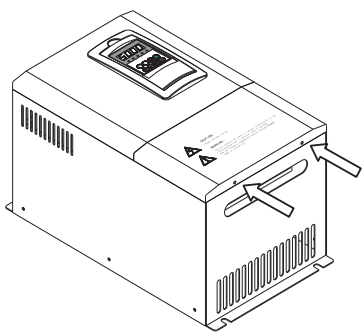


Fig. 3-6 Dismantling the upper cover of the inverter Model B

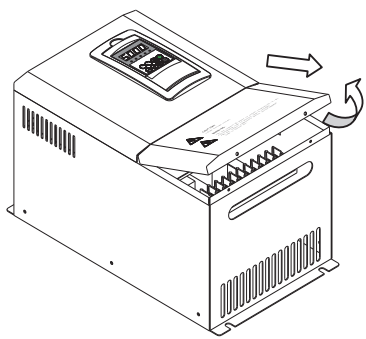


Fig. 3-7 Dismantling the upper cover of the inverter Model B

3.2.2 Remote control keypads and wiring connection

1、Model A keypads and wiring connection installation

Step 1. Hand down and press down the notch of the upper side of the keypads .and buckle up. pull down the wire between the keypad and control board . Then remove the keypad. (as shown in Figure 3–8)

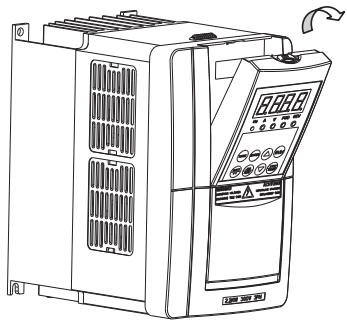


Fig. 3-8 Mounting Demonstration of the operator panel and connecting wire of the inverter Model A

Step 2. Plug the connection wire on the interface board provided in the optional spare parts . install at the keypad's position . (as shown in Figure 3–9)

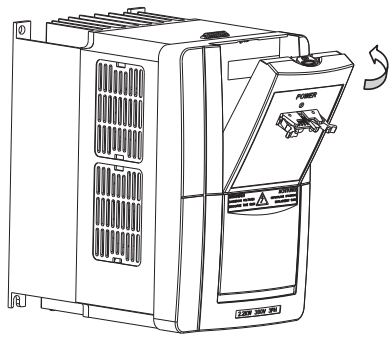


Fig. 3-9 Mounting Demonstration of the operator panel and connecting wire of the inverter Model A

Step 3. Insert the optional cable with the grounding side into the slot of interface board . (as shown in Figure 3–10).

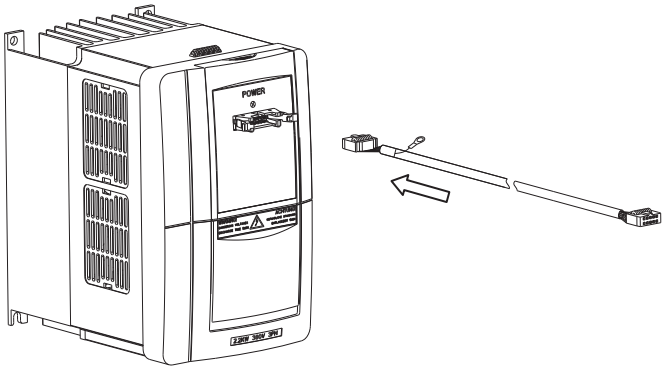


Fig. 3-10 Mounting Diagram for the operator panel and connecting wire of the inverter Model A

Step 4. Put the dismantled keypad into the installation frame ,Fix and fasten it. Put the other side cable insert into the keypad .(as shown in Figure 3–11).

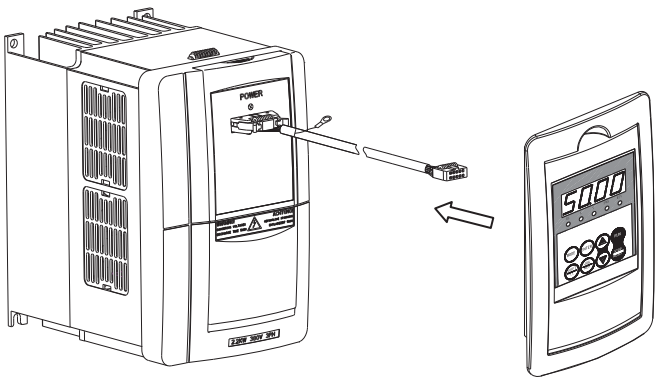


Fig. 3-11 Mounting Diagram for the operator panel and connecting wire of the inverter Model A

2. Installation of the operator panel and connecting wire of the inverter Model B

Step 1. Hand down in the notch of the upper of the keypads . press down and buckle up. Then remove the keypad . (as shown in Figure 3–12).

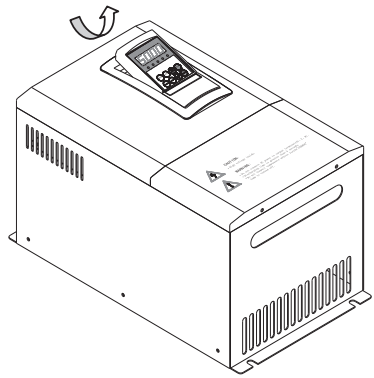


Fig. 3-12 Mounting Diagram for the operator panel and connecting wire of the inverter Model B

Step 2. Connect well the cable between the control board and keypad .plug well the optional interface provided and install the interface board at the position of keypad .

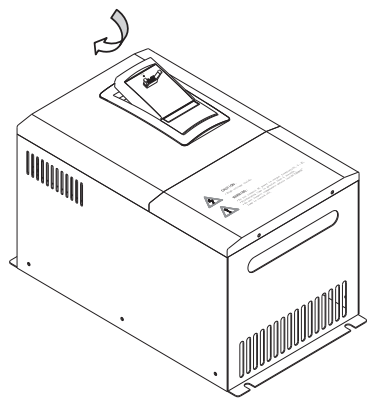


Fig. 3-13 Mounting Diagram for the operator panel and connecting wire of the inverter Model B

Step3. Insert the connection cable with the grounding side into the slot of the interface board . (as shown in Figure 3–14).

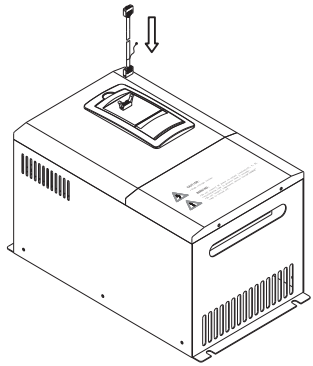


Fig. 3-14 Mounting Diagram for the operator panel and connecting wire of the inverter Model B

Step 4. Put the dismantled keypad into the installation frame ,Fix and fasten it . Put the other side cable insert into the plug of the keypad .(as shown in Figure 3–15).

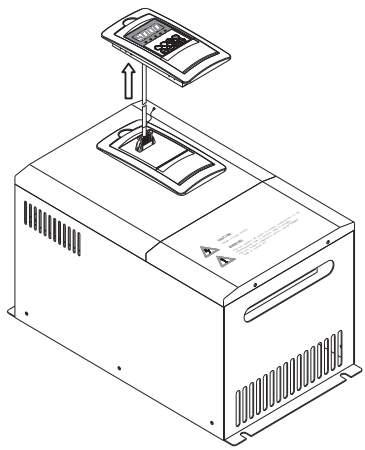


Fig. 3-15 Mounting Diagram for the operator panel and connecting wire of the inverter Model B

3.3 Inverter Wiring

3.3.1 Basic Wiring Diagram for inverter

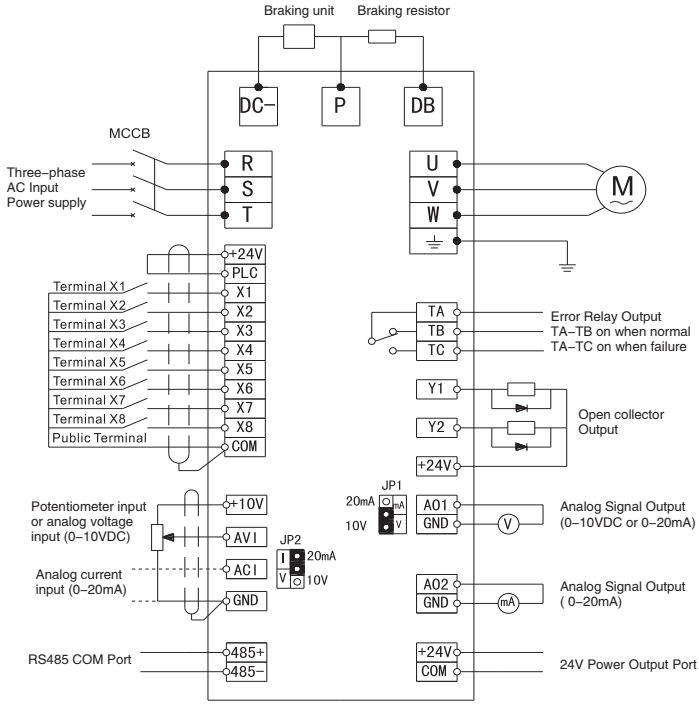


Fig.3–16 Basic wiring diagram

Applicable to model:

ZVF300H-G0R4S2～3R7S2 ZVF300H–G0R4T2～055T2

ZVF300H–G0R7T4～132T4 ZVF300H–P4R0T4～160T4

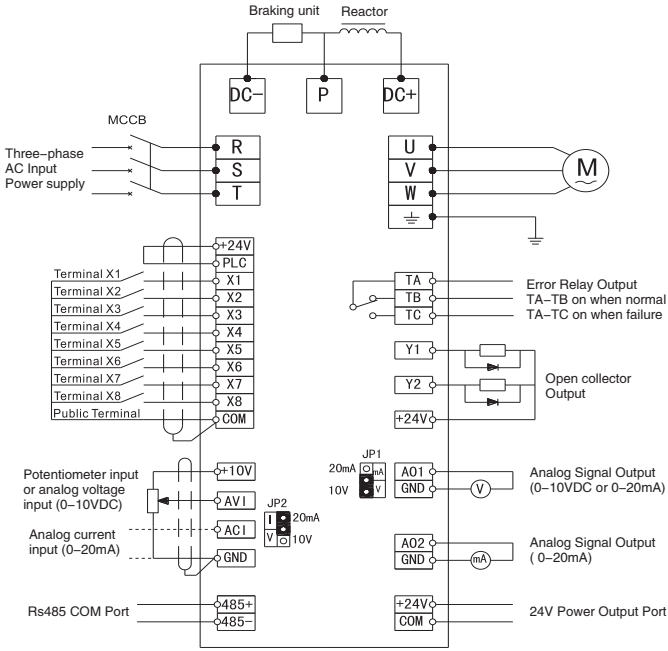


Fig. 3-17 Basic wiring diagram

Applicable to model：

ZVF300H–G075T2～110T2

ZVF300H–G160T4～630T4 ZVF300H–P185T4～630T4

TIP

The jumper wire JP2 is used to switch between analog input ACI and current.

The jumper wire JP1 is used to switch between the analog output AO1 and current.

3.3.2. Caution for Wiring

- Wait at least 10 minutes after power OFF before opening the front cover of the inverter.
- Verify the charge indicator lamp is OFF before proceeding the work, and be sure that the voltage value of the main loop terminal P and DC- is less than 36VDC.
- The internal wiring of the inverter should be operated only by authorized qualified personnel.

- Verify the rated input voltage of the inverter is matched with AC power supply. Otherwise, there is the possibility of damage to the inverter.
- Install in order and only operate wiring after finishing main parts installation. Otherwise, there is an electric shock or damage to the inverter.
- Do not perform over-voltage withstand to the inverter, for this had been done properly before EX-factory.
- Be sure to install a non-fuse circuit breaker in the input power supply side of the inverter to prevent expanding of accident due to an inverter problem, which may cause damage to the distribution equipment or lead to fire.
- Be sure to connect the ground terminal and the motor casing to the ground wire which must be copper core. The diameter of the copper core should conform to the relevant national standard. The ground resistance should be less than 10Ω.

- When the open-ended output terminal of the collector connects to any inductive load, i.e., the relay coil, do insert a diode at each end of the load in parallel.
- The control wire in the inverter or the control cabinet should be at least 100mm away from the power cable. DO NOT put them in the same metallic channel. If the signal wire and the power cable need to intersect, they should intersect at an angle of 90°.
- The control wire must adopt STP (shielded twisted pair wire); the shielded layer must connect to the terminal GND; and the power wire is recommended to use metallic shielded cable

- The unavoidable strong electromagnetic interference of the inverter may have bad influence on all the electrical equipment and meters in the same environment.
- To reduce interference, the output cable of the inverter can be inserted in the metal pipe connecting to the ground or in the metallic shielded cable, and connect the metallic shielded layer to the ground.
- In addition, a magnetic loop put on the output cable is also effective to reduce interference.

- Input power R, S, T no phase difference . you can connect any phase .
- when the motor rotation direction is different from the requirement direction after the inverter is running. As long as you can connect exchange two wires of the output three wire of the motor .
- If the inverter add the leakage circuit breaker as leakage fault protection . In order to avoid leakage circuit breaker malfunction. Please choose the current of circuit breaker at 200mA above . the action time is 0.1 seconds and above that would be better .

3.3.3 Instruction on Main Circuit Terminals

1. The main circuit terminals are shown as in the figure 3–18~3–23.

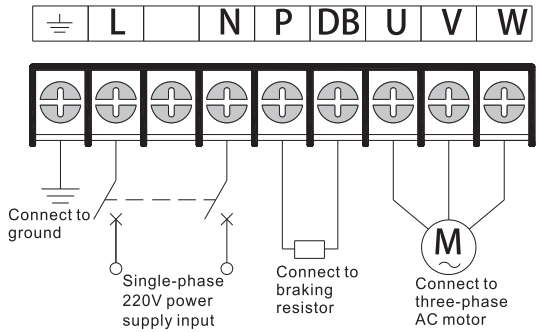


Fig.3-18 Diagram 1 for Main Circuit Terminals

Applicable to model : ZVF300H–G0R4S2 ~ 2R2S2

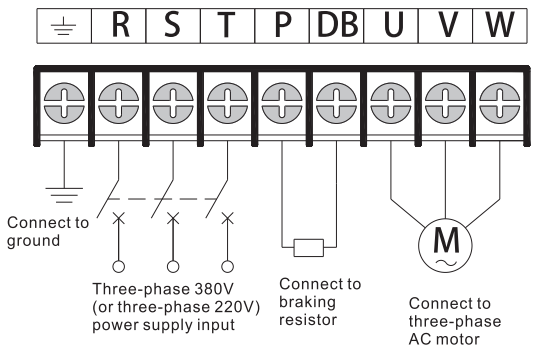


Fig.3-19 Diagram 2 for Main Circuit Terminals

Applicable to model：

ZVF300H-G0R4T2～3R7T2

ZVF300H-G0R7T4～7R5T4　ZVF300H-P4R0T4～011T4

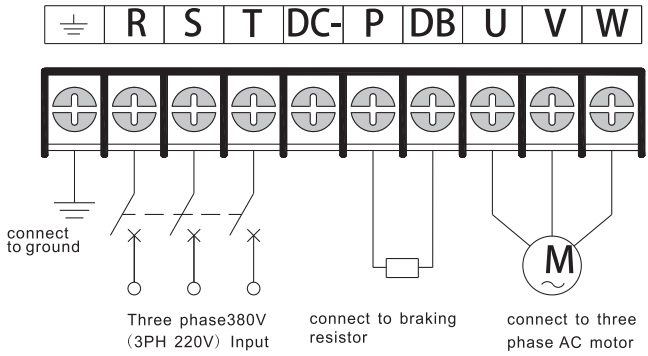


Fig.3-20 Diagram 3 for Main Circuit Terminals

Applicable to model：ZVF300H-G5R5T2～7R5T2
ZVF300H–G011T4～015T4 ZVF300H–P015T4～018T4

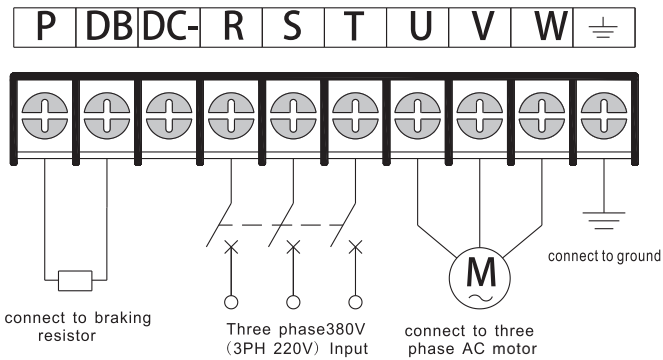


Fig.3–21 Diagram 4 for Main Circuit Terminals

Applicable to model：ZVF300H-G011T2
ZVF300H-G018T4～022T4 ZVF300H–P022T4～030T4

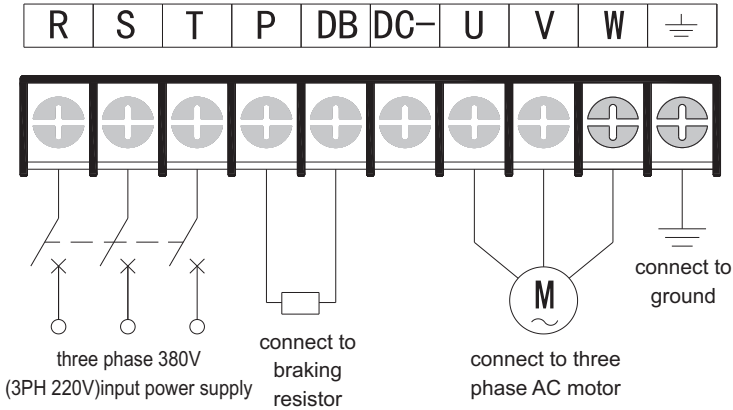


Fig.3-22 Diagram 5 for Main Circuit Terminals

Applicable to model：ZVF300H-G015T2～055T2
ZVF300H-G030T4～132T4，ZVF300H-P037T4～160T4

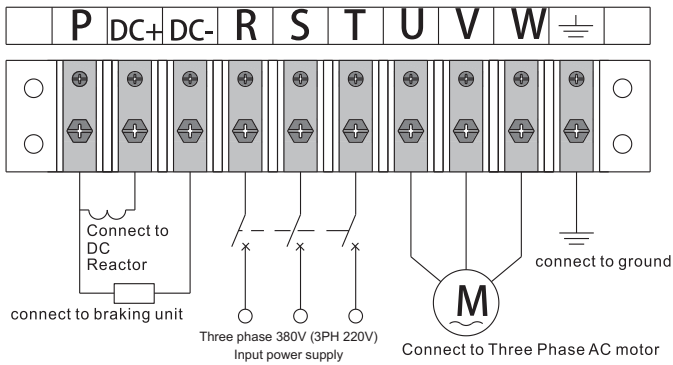


Fig.3-23 Diagram 6 for Main Circuit Terminals

Applicable to model：ZVF300H-G075T2～110T2
ZVF300H-G160T4～630T4，ZVF300H-P185T4～630T4

2.Function Description on Main Circuit Terminals

Table3–1 Function Description on main loop terminals

Terminal Symbols	Function Description
R、S、T	Power input terminal . connect with three phase 380V or 220 V ac input power supply.
L、N	Power input terminal . connect with 220 V ac input power supply.
U、V、W	Inverter output terminal, connect with three phase ac motor .
P、DB	External braking resistor terminals .connecting with both ends of the external braking resistor.
P、DC-	External braking unit terminals; terminal P connects with the positive end of the braking unit and DC– connects to the negative end.
P、DC+	External DC reactor terminal, connect to both ends of the DC reactor
⏚G	Ground terminal connecting to the ground

- G011T2, G022T4 and the smaller power inverters are equipped with a built-in braking unit. When an external braking resistor is required, an external braking resistor can be connected between P and DB terminals; G015～G037T2 and G030～G75T4 inverters are optional to install built-in braking unit, After installation, an external braking resistor can be connected between terminal P and DB; G045T2, G090T4 and bigger power inverters have no built-in braking unit, so there is no DB terminal. If you need to install the braking torque, please connect external braking assembly between P and DC -(including braking unit and braking resistor) .
- G022T2～G110T2, G045T4～P350T4 are wall-mounted installation.without a built -in DC reactor. For models with terminals P and DC+ , you can add a DC reactor between P and DC+ when needed. When adding connections, remove the short circuit ring first, then connect the reactor.
- G160T2,G280T4/P315T4 and the bigger power inverters are cabinet installation, built-in DC reactor.

3.3.4 Description on Control Circuit Terminals

1 Control circuit terminals are shown in the Fig. 3–24 and 3–25

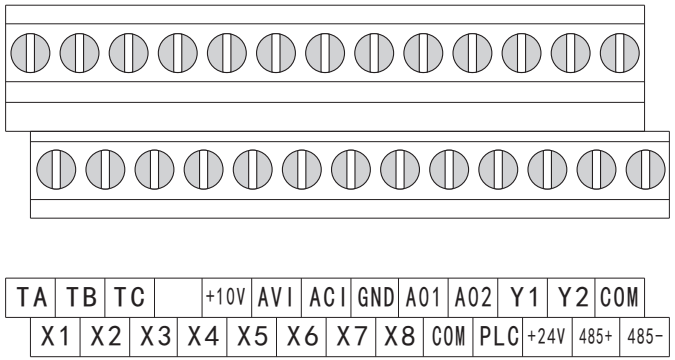


Fig.3-24 Control Circuit Terminals (1)

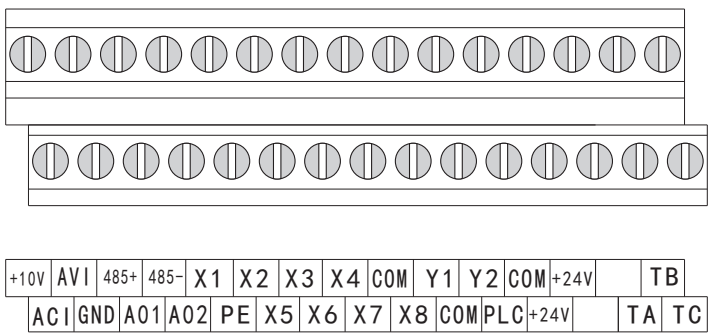


Fig.3-25 Control Circuit Terminals (2)

2 Description on Control Circuit Terminals

Table 3–2 Function Description on Control Circuit Terminals

Types	Terminal Symbols	Function Description	Electrical Specifications
Public port	COM	Digital signal public terminal	
Multi-function Input Terminal	X1	Valid only when there is a short circuit between Xn (n=1, 2, 3, 4,5, 6,7,8) and COM. The functions can be set by the parameter F5.00~F5.07separately.	INPUT, 0~24 power level, low level valid,5mA
	X2		
	X3		
	X4		
	X5		
	X6		
	X7		
	X8		
Public port for Multi-function Input Terminal	PLC	Digital signal public port selection terminal	
Multi-function output Terminal	Y1	Multi-function open collector output is defined as on-off output terminal, whose function is set by the parameter F6.00~F6.01 with reference of COM.	OUTPUT, Maximum Current I ≤ 50mA
	Y2		
Others	PE	Ground Terminal	

Types	Terminal Symbols	Function Description	Electrical Specifications
Public port	GND	Analog signal public terminal	
Analog Input terminal	+10V	External analog preset power supply ,connecting GND ,AVI terminal with potentiometer. The frequency can be set as required.	Input .10VDC voltage
	AVI	Analog voltage Singal input, with reference of GND	Input .0-10VDC voltage
	ACI	Analog current Singal input, with reference of GND	Input .0—20mA DC current
Analog Output terminal	AO1	Programmable analog output with reference of GND.	OUTPUT,0–10v DC voltage OUTPUT 0–20mA DC Current
	AO2		OUTPUT 0–20mA DC Current
Power Port	+24V	24VDC power output (control power supply)	24VDC–100mA
Programmable output terminal	TA	Relay contact output. when normal, TA–TB turns on and TA–TC turns off. when there is action ,TA–TB turns off and TA–TC turns on, This function is set by F6.02.	Contact rated value ： NO:240VAC–3A NC:240VAC–1A
	TB		
	TC		
Communication Terminal	485+	Communication signal positive	
	485–	Communication signal negative	

3.4 Wiring Diagram for Inverter Systems

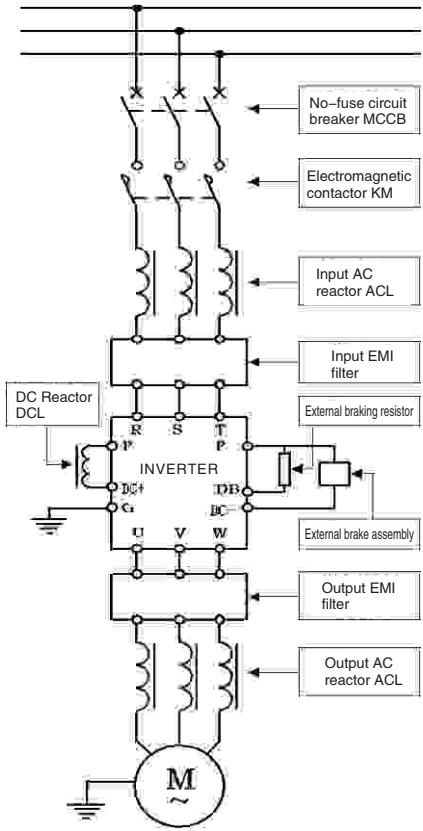


Fig. 3.26. Inverter system wiring

TIP

- The circuit breaker has the function of over-current protection, which can avoid extension of external equipment failure. Do pay attention to the capacity of circuit breaker when installing. Refer to Table 3-3 to select the circuit breaker.
- The magnetic contactor is used to disconnect from the main power supply in case of inverter failure, and prevent restarting after power-off or inverter failure.
- The input AC reactor can reduce influence arising from unbalance of three-phase AC power supply, improve the power factor of the inverter input side and reduce damage to the inverter when it is connected to large capacity motor which may result in damage to the rectifier circuit. It is necessary to configure an AC reactor when any of the following occurred:

① The power supply unbalance exceeds 3%.

② The power capacity is 500KVA at least and it is more than 10 times as the inverter capacity.

③ The power factor is used to compensate the connection or disconnection of the capacity, and sudden fluctuation of network voltage caused by other reasons.

- It is recommended to install a reactor with derating voltage of 3%.
- The input and output EMI filters are used to minimize the magnetic or radio frequency interference (RFI) produced by the network or the inverter.
- The brake assembly is used to consume the energy fed back by some heavy potential energy or inertia load to the inverter, so as to avoid inverter tripping arising from over-tension pumping voltage while giving a quick shutdown to the inverter.
- The output AC reactor can filter out with effect the higher harmonic components in the inverter output current and reduce the electromagnetic interference (EMI) due to ultraharmonics.
- Also, it can improve current waveform, decrease noise and temperature rise of a running motor and enhance the stability of motor running. To avoid influence of leakage current due to distributed capacity of the cable.

Table 3-3 Capacity of Break Switch & Section Area of Wire

Inverter Model	Brake Switch Capacity (A)	Main Circuit (mm^2)		Control Wire (mm^2)
		Input Wire	Output Wire	
ZVF300H-G0R4T2/S2	6/16	2.5	2.5	0.75
ZVF300H-G0R7T2/S2	10/20	2.5	2.5	0.75
ZVF300H-G1R5T2/S2	10/20	2.5	2.5	0.75
ZVF300H-G2R2T2/S2	16/32	4	4	0.75
ZVF300H-G3R7T2/S2	25	4	4	0.75
ZVF300H-G5R5T2	32	6	6	0.75
ZVF300H-G7R5T2	50	6	6	0.75
ZVF300H-G011T2	63	10	10	0.75
ZVF300H-G015T2	80	16	16	0.75
ZVF300H-G018T2	100	25	25	0.75
ZVF300H-G022T2	125	25	25	0.75
ZVF300H-G030T2	160	35	35	0.75
ZVF300H-G037T2	200	50	50	0.75
ZVF300H-G045T2	225	70	70	0.75
ZVF300H-G055T2	315	95	95	0.75
ZVF300H-G075T2	400	120	120	0.75
ZVF300H-G090T2	500	150	150	0.75
ZVF300H-G110T2	500	185	185	0.75
ZVF300H-G0R7T4	6	2.5	2.5	0.75
ZVF300H-G1R5T4	6	2.5	2.5	0.75
ZVF300H-G2R2T4	10	2.5	2.5	0.75
ZVF300H-G3R7/P5R5T4	16	4	4	0.75
ZVF300H-G5R5/P5R5T4	20	4	4	0.75
ZVF300H-G7R5/P7R5T4	25	6	6	0.75

Inverter Model	Brake Switch Capacity (A)	Main Circuit (mm^2)		Control Wire (mm^2)
		Input Wire	Output Wire	
ZVF300H-G011/P011T4	40	6	6	0.75
ZVF300H-G015/P015T4	50	10	10	0.75
ZVF300H-G018/P018T4	63	10	10	0.75
ZVF300H-G022/P022T4	80	16	16	0.75
ZVF300H-G030/P030T4	80	16	16	0.75
ZVF300H-G037/P037T4	100	25	25	0.75
ZVF300H-G045/P045T4	125	25	25	0.75
ZVF300H-G055/P055T4	160	35	35	0.75
ZVF300H-G075/P075T4	225	50	50	0.75
ZVF300H-G090/P090T4	250	70	70	0.75
ZVF300H-G110/P110T4	315	95	95	0.75
ZVF300H-G132/P132T4	400	120	120	0.75
ZVF300H-G160/P160T4	400	150	150	0.75
ZVF300H-G185/P185T4	500	150	150	0.75
ZVF300H-G200/P200T4	500	185	185	0.75
ZVF300H-G220/P220T4	630	95×2	95×2	0.75
ZVF300H-G250/P250T4	630	120×2	120×2	0.75
ZVF300H-G280/P280T4	700	150×2	150×2	0.75
ZVF300H-G315/P315T4	800	150×2	150×2	0.75
ZVF300H-G350/P350T4	800	185×2	185×2	0.75
ZVF300H-G400/P400T4	1000	185×2	185×2	0.75
ZVF300H-G450/P450T4	1000	185×2	185×2	0.75
ZVF300H-G500/P500T4	1250	185×3	185×3	0.75
ZVF300H-G560/P560T4	1250	185×3	185×3	0.75
ZVF300H-G630/P630T4	1600	185×3	185×3	0.75

Chapter 4 Operation panel and its Operation

4.1 Operation Panel and Description

ZVF300H Series inverter have the following keypad . Please see Figure 4–1.

4.1.1 Keypad Diagram

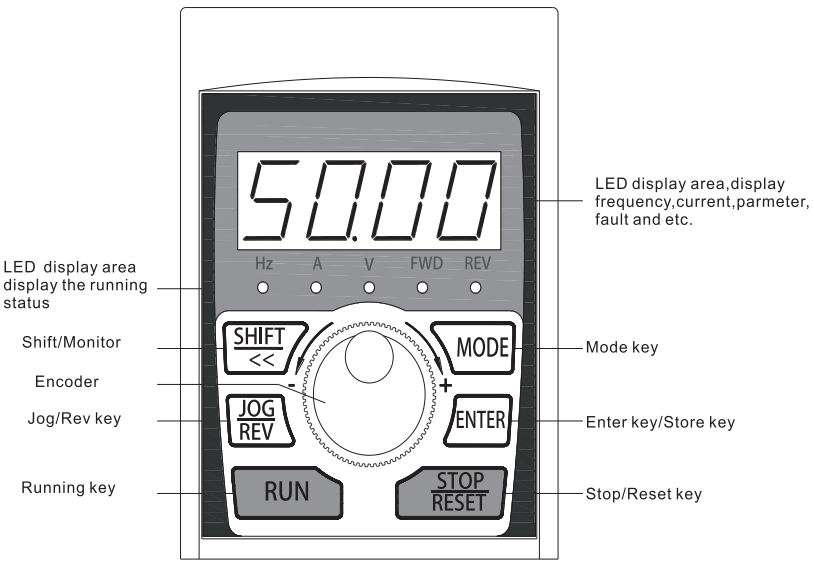


Fig.4–1:E–300 operation panel

Applicable to Model: ZVF300H Series

4.1.2 Function Description on Keys

RUN

Run key. When the operating instruction is to select operator panel control (F0.01=0), press this key and the inverter begins to run.

STOP RESET

Stop/Reset key. When the operating instruction is select operation panel control (F0.01=0), the inverter is in normal running. Press this key to stop running. When the inverter is in the state of failure alarming, press this key to clear the failure and return to the normal status.

MODE

Mode shifting key press this key to make the inverter enter into switch between the monitor parameter mode and function parameter mode .

ENTER

Enter/Store key. Press this key to confirm the current status of the inverter or save the current parameter value.

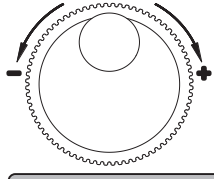
JOG REV

Jog/Reverse key. Press this key to realize jog or reserve function, and decide jog or reverse function by selecting the parameter F7.03. The factory setting is jog function.

SHIFT

Shift/Monitor key. When a data needs modifying, press this key to select the modifier bit of the data. In the status of monitoring, press this key to display the status parameter.

UP : press this key or turn the encode by clockwise .data or parameter code will go up. hold on it or turn the encoder continuously . it can increase the speed of up modify .



DOWN: press this key or turn the encode by anticlockwise .data or parameter code will go down. hold on it or turn the encoder continuously . it can increase the speed of down modify .

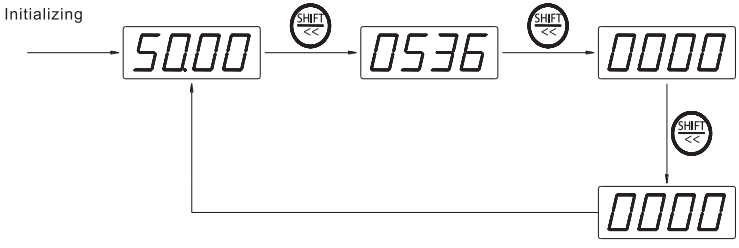
4.1.3 Function Description on Operator Panel Indicator Lights

Table 4–1 LED Status Description

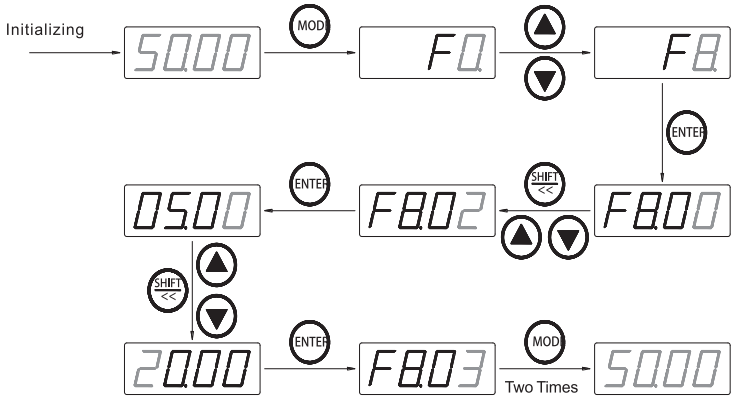
Display Status	Function Description
● Hz	When this indicator light is switched ON, LED displays frequency data
● A	When this indicator light is switched ON, LED displays current data
● V	When this indicator light is switched ON, LED displays voltage data
● FWD	When this indicator light is switched ON, the inverter is in the state of forward running
● REV	When the indicator lights is switched ON, the inverter is in the state of reverse running
●●Hz&A	These two indicators are light on at the same time . The rotation speed will be displayed .
●●A&V	These two indicators are light on at the same time. The percentage will be displayed .

4.1.4 Use of operation panel

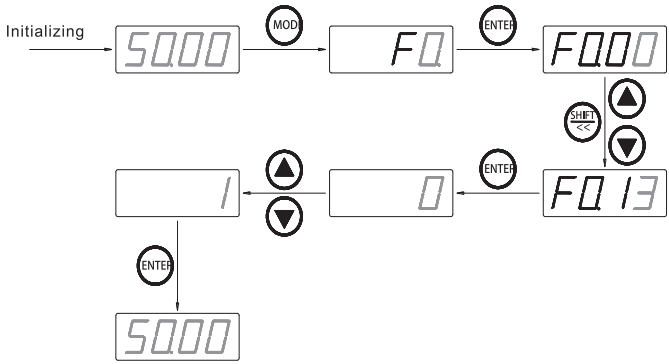
① Monitoring status parameters switch



② Modification of function parameter value (Modify the parameter value of F8.02 JOG frequency value from 5.00hz to 20.00 Hz)



③ Parameter initializing(restore to the factory default setting)



TIP

0 Indicates the digital tube is flickering
0 Indicates the digital tube is not flickering

Chapter 5 Inverter Use

5.1 Trial Operation

5.1.1 Check before trial operation

The following steps should be inspected and confirmed before the trial operation of the inverter:

- Be sure the application ambient and installation for the inverter is in accordance with the requirements specified in Clause 3.1.
- Be sure the main circuit is correctly wired. The input power supply of the inverter must be connected to the terminal R, S and T. The output terminal U, V and W must be connected to the motor.
- Be sure the ground terminal is good grounded.
- Be sure all the switches and terminals are in proper state of off or shutdown.
- Be sure there is no short circuit or short to ground of all the terminals and electrified parts.
- Be sure all the terminals, connectors and screws are tightly fastened.
- Be sure the motor has no other loads.

5.1.2 Trial Operation

Try this step only after careful inspection as mentioned in the clause 5.1.1. While in trial operation,it is suggested that the motor without load to avoid damage to this mechanical equipment arising from incorrect operation. During trial operation, if the operating instruction is F0.01, then the RUN/STOP key control (factory default setting) of the operator panel must be selected. The trial operation steps must be followed as shown in the table 5–1 below.

Table 5–1 Trial Operation Steps

Order	Operation	Description
1	Switch on, inverter energized	When energized, the inverter is in the state of readiness and LED displays 50.00Hz and flashing
2	Press ▲/▼till LED displays 5.00Hz.	Set the frequency to 5.00Hz. This step can be left out if the displayed frequency is already 5.00Hz when energized.
3	Press RUN key	Motor begins rotating, the frequency displayed on the inverter LED raises from 0.00Hz to 5.00Hz

Order	Operation	Description
4	Keep a close eye on the following points： ① If there is any abnormal vibration or noise when the motor runs ② If there is any tripping or other abnormality of the inverter ③ If the motor runs in the correct direction ④ If the value for rotation speed and frequency is correct	If there is any anomaly or tripping, stop running immediately and cut off the power supply. Please refer to Chapter 7, find the trouble causes, then proceed trial operation again after troubleshooting. If the motor runs in the wrong direction, change tarbitrary two-phase connection of the output terminal U, V or W. Go to the next step if everything is normal.
5	Press ▲continuously till LED displays 50.00Hz	The motor accelerates rotating and the displayed frequency rises from 5.00Hz to 50.00Hz. Go to the next step if everything is normal.
6	Press▼continuously till LED displays 0.00Hz	The motor decelerates rotating and the displayed frequency falls from 50.00Hz to 0.00 Hz. Go to the next step if everything is normal.。
7	Press STOP	The inverter stops outputting, the motor stops running and the trial operation ends. If everything is normal, please repeat the operation for several times.

5.1.3 Cautions for Operation

All the inverter functions are determined by set parameters. The parameters of inverter ZVF300H series consist of the function codes F0~Fd see the detail in Chapter 6 of this manual. The displayed parameter value of each function code is the factory default value of the inverter before EX factory, which can be modified by the user according to his needs. It is noteworthy that a user shall change the relative function parameters when he amends a parameter because some of the parameters are inter–related. It is not recommended to modify the set parameter value if there is no special requirement, for the factory default setting has been done properly. Otherwise, this may cause damage to the inverter or equipment due to error parameter.

In case there is an error alternation of the parameter, please initialize the parameter with reference to the operation method in the clause 4.1.4 ③ Parameter Initializing Restoring Factory Default Settings .

5.2 Operation Examples

This manual provides the following examples for users' reference on the use of inverter.

5.2.1 Eg.1: Run or stop the inverter with operation panel, and feed the frequency by using the Up and Down key of the keypad.

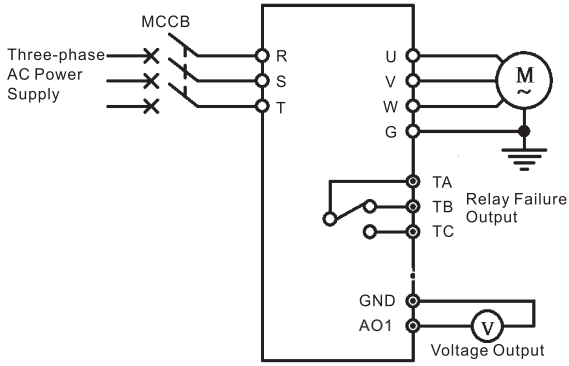


Fig. 5–1 Wiring Diagram

- F0.01 –Running channel source selection. F0.01=0 –keypad control .
- F0.03– Main frequency channel source selection . F0.03=0– UP/DOWN key
- Run or stop the inverter with RUN 、 STOP RESET on the operation panel .
- Adjust the speed with Up and Down on the operation Panel.

5.2.2 Eg.2: Run or stop the inverter with external terminals, and feed the frequency with external potentiometer.

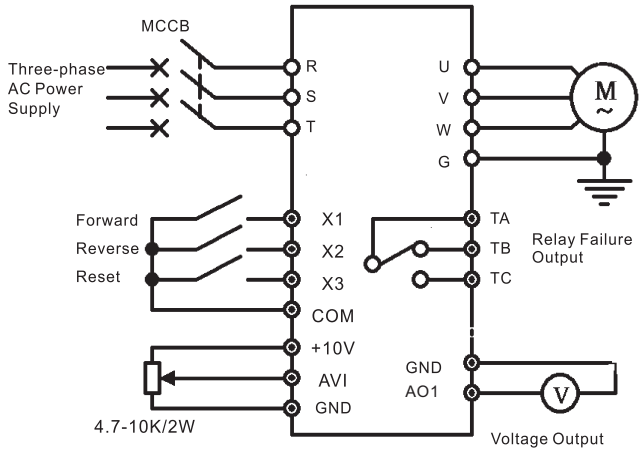


Fig. 5–2 Wiring Diagram

- F0.01 –Running channel source selection. F0.01=1–external terminal control .
- F0.03– Main frequency channel source selection .
  F0.03=01– External voltage or external potentiometer setting .
- F5.00– Input terminal X1 function selection . F5.00=1 – Forward running
- F5.01– Input terminal X2 function selection. F5.01=2 –Reverse running.
- F5.02– Input terminal X3 function selection. F5.02=7= External reset input .
- X1–COM switch on . The motor run forward .
  X2–COM switch on . The motor run reverse .
  X1 X2–COM both switch on or switch off at the same time. The inverter will stop .
  The fault alert X3–COM switch on . the fault reset .
- The speed control by the regulating value of "AVI" . (controlled by 4.7–10K/2W potentiometer control .)

5.2.3 Eg3. Run or stop the inverter with external terminal .Multi–stage running

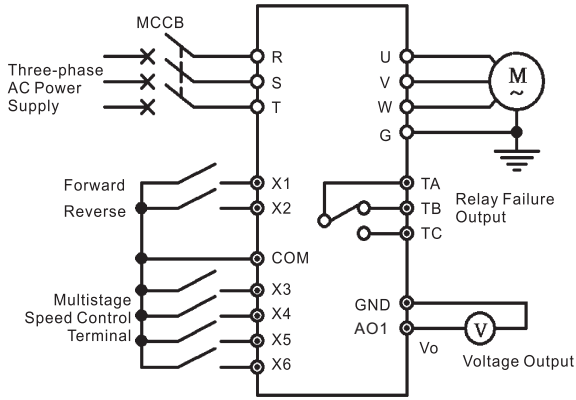


Fig. 5–3 Wiring Diagram

- F0.01 –Running channel source selection. F0.01=1–external terminal control .
- F5.00– Input terminal X1 function selection . F5.00=1 – Forward running
- F5.01– Input terminal X2 function selection. F5.01=2 –Reverse running.
- F5.02~F5.05–X3–X6 multi–function selection. the setting value 12,13,14,15–Multi stage speed .
- FA.00~FA.15 – Multi–stage speed frequency setting. There have 15 stages frequency . and use the factory value.
- X1–COM switch on . The motor run forward .
  X2–COM switch on . The motor run reverse .
  X1 X2–COM both switch on or switch off at the same time .The inverter will stop .
- There have an arbitrary terminal or Multi terminals and COM switch on (15 groups),The inverter will run under the multistage speed frequency selected from X3–X6.

5.2.4 Eg.4: Run and stop the inverter with the external terminal , feed the frequency with external potentiometer . Multiple motors run in parallel .

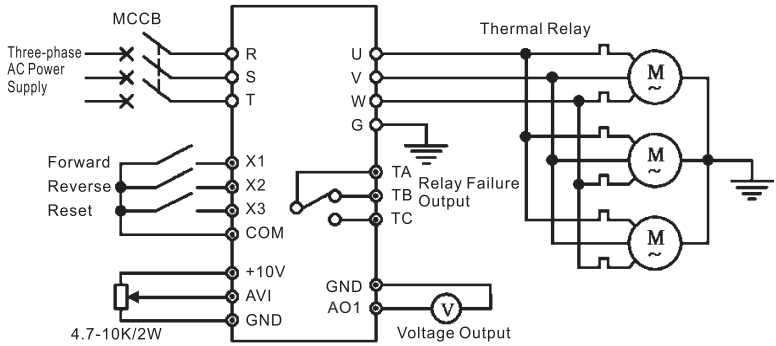


Fig. 5–4 Wiring Diagram

- F0.01 –Running channel source selection. F0.01=1–external terminal control .
- F0.03– Main frequency channel source selection.
  F0.03=01– External voltage or external potentiometer setting .
- F5.00– Input terminal X1 function selection . F5.00=1 – Forward running
- F5.01– Input terminal X2 function selection. F5.01=2 –Reverse running.
- F5.02– Input terminal X3 function selection. F5.02=7= External reset input .
- X1–COM switch on . The motor run forward .
  X2–COM switch on . The motor run reverse .
  X1 X2–COM both switch on or switch off at the same time.The inverter will stop.
  The fault alert X3–COM switch on . the fault reset .
- The speed control by the regulating value of "AVI" .(controlled by 4.7–10K/2W potentiometer control .)
- Each motor will use the thermal relay to do overload protection . The total power of all motors are less than the rated power of inverter .

5.2.5 Eg.5 Inverter use for PID control Pressure Water supply control .

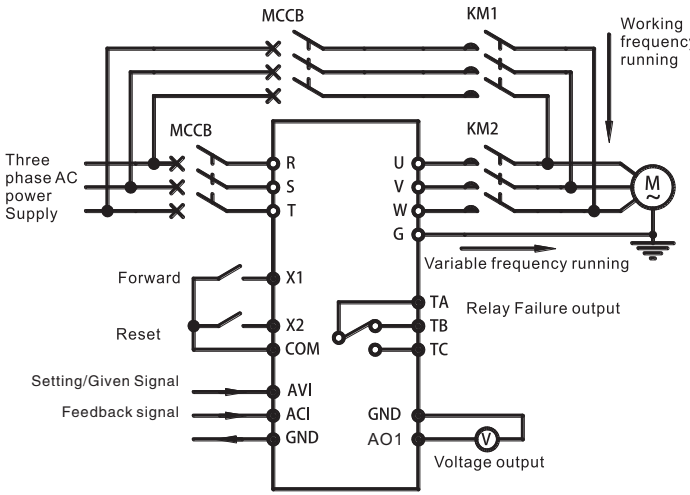


Fig.5–5 Wiring diagram

- F0.01– Running channel source selection .F0.01=1–External terminal control.
- F0.03–Main frequency channel source selection. F0.03=5–PID Control.
- F5.00–Input terminal X1 function selection .F5.00=1–Forward Running.
- F5.01– Input terminal X2 function selection .F5.01=7–External reset input.
- F9.00–PIDpreset source selection .F9.00=1–Select external voltage or potentiometer setting.
- F9.02—PID Feedback value source selection. F9.02=1–Select external current feedback.
- F9.03–PID output characteristic selection.F9.03=0–Select positive feedback.
- F9.04—Proportional gain Kp: Set according to the actual request.
- F9.05—Integral time Ti. Set according to the actual request.

- F9.06—Differential time Td. Set according to the actual request.
- F9.07–Sampling cycle T: No need to change.
- F9.08–Bias limit .Set according to the actual request.
- F9.11— feedback gain :Set according to actual request.
- F9.12—Awakening threshold width. Set according to the actual request.
- F9.13—Awakening Threshold detection time . Set according to the actual request.
- F9.14—Sleep Frequency.Set according to the actual request.
- F9.15—Sleep Frequency Detection Time.Set according to ghe actual request.
- F9.16–The range of gauge: Set according to the actual request.

When use the PID function . In order to meet the control demands. Customers can modify the parameter according to the actual request .

The contactor KM1, KM2 are shifting from working frequency to variable frequency .Must be designed in interlocked manner . It is forbidden to close the two contactors at the same time . Otherwise . the inverter will be permanent damaged .

Chapter 6 Detailed function description

6.1 Function Parameters

- The marked "√ " Indicate the setting value of parameter can be modified no matter when the inverter is shut down or running.
- The marked "X" indicates the setting value of parameter can be modified only when the inverter is shut down , and can not be modified when the inverter is running .
- The marked " _" indicates the parameter can be display the parameter can be displayed only and can not be modified .

6.1.1 F0 Group Basic function

Code	Name	Setting Range	Min.Unit	Factory setting	Running Modification
F0.00	Speed control mode	0：NO PG vector control 1：V/F control 2：Torque control （NO PG Vector Control） 3.Reserve 4.PG vector control	1	1	×
F0.01	Running command channel	0：Keyboad command channel 1：Terminal command channel 2:Communication command channel	1	0	×

6.1.1 F0 Group Basic function(Continued)

Code	Name	Setting Range	Min.Unit	Factory setting	Running Modification
F0.02	Keyboard and terminal UP/Down setting	0：Valid , save the parameters when the inverter is powered off 1：Valid .the value can not be saved when the inverter is powered off 2：UP/DOWN setting is invalid 3：Valid during running ,clear when the inverter stops . 4.Valid when F0.03=0.	1	0	√
F0.03	Frequency command selection	0: Keyboard or encoder setting 1: AVI 2: ACI 3: AVI+ ACI 4: keyboard potentiometer setting 5: Water supply PID control setting 6: Remote communication setting 7: External pulse setting 8: AVI(host)±ACI(assit) combination setting 9: Keyboard(host)±ACI(assit) combination setting . 10: Communication(Host) ±ACI (assit)combination setting . 11: Combination 12: Common PID control setting	1	0	√
F0.04	Maximum output frequency .	10.00～600.00Hz	0.01Hz	50.00Hz	×
F0.05	Upper limit frequency	F0.06～F0.04（Max. Frequency）	0.01Hz	50.00Hz	√
F0.06	Lower limit frequency	0.00～F0.05 （Running frequency upper limit）	0.01Hz	0.00Hz	√

6.1.1 F0 Group Basic function(Continued)

Code	Name	Setting Range	Min.Unit	Factory setting	Running Modification
F0.07	keypad setting frequency	0.00～F0.04（Max. Frequency）	0.01Hz	50.00Hz	√
F0.08	Acceleration time 1	0.1～3600.0s	0.1s	Depend on the model	√
F0.09	Deceleration time 1	0.1～3600.0s	0.1s	Depend on the model	√
F0.10	Running direction selection	0：Forward (the default running direction) 1：Reverse 2：Forbid reverse	1	0	×
F0.11	Carrier frequency	1.0～15.0kHz	0.1kHz	Depend on the model	√
F0.12	Motor parameters autotuning	0：No action 1：Rotation autotuning 2：Static autotuning	1	0	×
F0.13	Restore parameters	0: No action 1: Restore the default value Restore all parameters FO-Fd to factory setting except F2 group 2: Clear fault records Inverter clear all fault records. 3 Restore the default value to380V/60Hz. 4: Restore the default value to 440V /50Hz. 5: Restore the default value to 440V /60Hz.	1	0	×
F0.14	AVR Fcuntion	0：Disable 1：Enable all the time 2:Disabled during deceleration	1	0	√

6.1.1 F0 Group Basic function(Continued)

Code	Name	Setting Range	Min.Unit	Factory setting	Running Modification
F0.15	Combination channel setting	LED Unit's Place: Operand 1 LED Decade: Operand 2 LED Hundreds place: Operand 3 Thousands place： Reserved 0:Keypad Potentiometer 1:Keypad or Encoder 2.Reseve 3:Communication 4:AVI 5:ACI 6: External pulse setting 7: Multi-speed stage	1	- 000	√
F0.16	Combination algorithm Setting	LED Unit's Place: Algorithm 1 LED Decade: Algorithm 2 LED Hundreds 、 Thousands place： Reserved. 0：Addition 1：Subtraction 2：The absolute value (Subtraction) 3：Maximized 4: Minimized 5: No calculation If operand is 3.	1	- - 0 0	√
F0.17	Parameter Locked	0: Invalid 1: Valid	1	0	×
F0.18	Acc/Dec Mode Selection	0:Linear 1:S Curve	1	0	×
F0.19	Temperature alarm switch	0: Invalid 1: Valid	0	0	√
F0.20	Alarm temperature value				

6.1.2 F1 Group start and stop control

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F1.00	Start Mode	0：Start directly 1：DC braking and start 2：Speed tracking starting	1	0	×
F1.01	Direct starting frequency	0.00～50.00Hz	0.01Hz	1.50Hz	√
F1.02	Starting frequency maintain time	0.0～50.0s	0.1s	0.0s	√
F1.03	DC braking current before start	0.0～150.0%	0.1%	0.0%	√
F1.04	DC braking time before start	0.0～50.0s	0.1s	0.0s	√
F1.05	Stop mode	0：Ramp to stop 1：Coast/Free stop 2: Deceleration stop +Free stop	1	0	√
F1.06	Starting frequency of DC braking at stopping	0.00～F0.04（Max.frequency）	0.01Hz	0.00Hz	√
F1.07	Braking wait time at stopping	0.0～50.0s	0.1s	0.0s	√

6.1.2 F1 Group start and stop control(Continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F1.08	DC braking current at stopping	0.0～150.0%	0.1%	0.0%	√
F1.09	DC braking time at stopping	0.0～50.0s	0.1s	0.0s	√
F1.10	Dead time of FWD/REV	0.0～3600.0s	0.1s	0.0s	√
F1.11	Terminal running protection selection when power on	0：Command invalid when powered on 1：Command valid when powered on	1	0	√
F1.12	Input/Output terminal polarity selection	0x000～0x7FF	1	0x000	√
F1.13	Power off Restart Mode Selection	1.Disabled 2.Regular Start 3.Start with rotary tracing	1	0	×
F1.14	Power Cut Restart Wait Time	0.0-20.0S	0.1	0.5S	×

6.1.3 F2 Group Motor parameters

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F2.00	Inverter Type	0：G Type 1：P Type	1	Depend on model	×
F2.01	Motor rated power	0.4～700.0kW	0.1kW	Depend on model	×
F2.02	Motor rated frequency	0.01～600.00Hz	0.01Hz	50.00Hz	×
F2.03	Motor rated rotate speed	0～36000rpm	1rpm	Depend on model	×
F2.04	Motor rated voltage	0～460V	1V	Depend on model	×
F2.05	Motor rated current	0.1～2000.0A	0.1A	Depend on model	×
F2.06	Motor stator resistance	0.001～65.535Ω	0.001Ω	Depend on model	√
F2.07	Motor rotor resistance	0.001～65.535Ω	0.001Ω	Depend on model	√
F2.08	Motor leackage inductance	0.1～6553.5mH	0.1mH	Depend on model	√
F2.09	Motor mutual inductace	0.1～6553.5mH	0.1mH	Depend on model	√
F2.10	Motor Current without load	0.01～655.35A	0.01A	Depend on model	√

6.1.4 F3 Group Vector control

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F3.00	Proportional gain 1 of speed loop	0～10000	1	15	√
F3.01	Integration time 1 of speed loop	0.01～100.00s	0.01s	2.00s	√
F3.02	Low switching point frequency	0.00～F3.05	0.01Hz	5.00Hz	√
F3.03	Proportional gain 2 of speed loop	0～10000	1	10	√
F3.04	Integration time 2 of speed loop	0.01～100.00s	0.01s	3.00s	√
F3.05	High switching point frequency	F3.02～F0.04（Max. Frequency）	0.01Hz	10.00Hz	√
F3.06	Slip compensation rate of VC	50～200%	1%	100%	√
F3.07	Torque upper-limit setting	0.0～200.0%（Inverter rated current）	0.1%	150.0%	√
F3.08	Torque dynamic friction coefficient	0.000～1.000	0.001	0.125	√
F3.09	Empty load current compensation coefficients	0.000～9.999	0.001	0.800	√
F3.10	Torque static friction coefficient	0.00-10.00	0.001	2.00	√

6.1.5 F4 Group V/F Control

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F4.00	V/F Curve Setting	0: Linear V/F Curve 1:Square V/F Curve 2:User Setting V/F Curve 3.1.25power V/F Curve 4.1.7 power V/F Curve 5. 3 power V/F Curve 6. 4 power V/F Curve	1	0	×
F4.01	Torque Boost	0.0%：(auto) 0.1～30.0%	0.1%	0.0%	√
F4.02	Torque boost cutoff	0.0～50.0% （Relative to the rated motor frequency）	0.1%	20.0%	×
F4.03	V/F Slip compensation limit	0.0～100.0%	0.1%	0.0%	√
F4.04	Auto energy saving selection	0：Disable 1：Enabled	1	0	×
F4.05	Reserved				–
F4.06	V/F Frequency Value F1	0-F4.08	0.01Hz	12.5Hz	√
F4.07	V/F Voltage Value V1	0-F4.09	0.01%	25.00%	√
F4.08	V/F Frequency Value F2	F4.06-F4.10	0.01Hz	25.00Hz	√
F4.09	V/F Voltage Value V2	F4.07-F4.11	0.01%	50.00%	√
F4.10	V/F Frequency Value F3	F4.08-F0.05	0.01Hz	37.50Hz	√
F4.11	V/F Voltage Value V3	F4.09-100.00%	0.01%	75.00%	√
F4.12	Low voltage protection selection	0：Enabled 1：Disable	1	0	√

6.1.6 F5 Group Input terminal

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F5.00	X1 terminal function selection	0：No function 1：Forward running 2：Reverse running 3：3-Wire running control 4：Jog forward control 5：Jog reverse control 6：Coast to stop 7：Reset fault; 8：External fault input 9：Frequency UP command（UP） 10：Frequency DOWN command(DOWN） 11：Clear frequency UP/DOWN 12：Multi-step speed terminal 1 13：Multi-step speed terminal2 14：Multi-step speed terminal 3 15：Multi-step speed terminal 4 16：Acceleration and deceleration time selection 17：PID control pause 18：Traverse frequency pause (stop at the current frequency) 19：Traverse frequency reset (return to the centre frequency). 20：Acceleration and deceleration prohibition 21：Disable torque control 22：Clear frequency acc.and dec. settings 23：DC braking when stopping 24：External pulse input 25： Frequency switch to ACI 26: Frequency switch to AVI 27:Reserved 28: Coast to stop control 29: Running command switch to terminal 30:PLC reset 31: PLC input 32: Count input 33. Frequency switch to the combination 34: Count clear	1	1	×
F5.01	X2 terminal function selection		1	2	×
F5.02	X3 terminal function selection		1	7	×
F5.03	X4 terminal function selection		1	0	×
F5.04	X5 terminal function selection		1	0	×
F5.05	X6 terminal function selection		1	0	×
F5.06	X7 terminal function selection		1	0	×
F5.07	X8 terminal function selection		1	0	×

6.1.6 F5 Group Input terminal(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F5.08	ON/OFF filter times	1～100	1	5	√
F5.09	Terminal control running mode	0：2-wire control mode 1 1：2-wire control mode 2 2：3-wire control mode 1 3：3-wire control mode 2	1	0	×
F5.10	UP/DOWN terminal change speed rate	0.01～50.00Hz/s	0.01Hz/s	0.50Hz/s	√
F5.11	AVI lower limit	0.00～10.00V	0.01V	0.00V	√
F5.12	AVI lower limit corresponding setting	-100.0～100.0%	0.1%	0.0%	√
F5.13	AVI upper limit	0.00～10.00V	0.01V	10.00V	√
F5.14	AVI upper limit corresponding setting	-100.0～100.0%	0.1%	100.0%	√
F5.15	AVI input filter time	0.00～10.00s	0.01s	0.10s	√
F5.16	ACI lower limit	0.00～10.00V	0.01V	0.00V	√
F5.17	ACI lower limit corresponding setting	-100.0～100.0%	0.1%	0.0%	√

6.1.6 F5 Group Input terminal(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F5.18	ACI upper limit	0.00～10.00V	0.01V	10.00V	√
F5.19	ACI upper limit corresponding setting	–100.0～100.0%	0.1%	100.0%	√
F5.20	ACI input filter time	0.00～10.00s	0.01s	0.10s	√
F5.21	Frequency of free stop	0.00~F0.05	0.01Hz	30.00Hz	√
F5.22	pulse input lower limit	0.0～20.0kHz	0.1kHz	0.0kHz	√
F5.23	pulse input lower limit corresponding setting	–100.0～100.0%	0.1%	0.0%	√
F5.24	pulse input upper limit	0.0～20.0kHz	0.1kHz	10.0kHz	√
F5.25	pulse input upper limit corresponding setting	–100.0～100.0%	0.1%	100.0%	√
F5.26	Center voltage hysteresis loop width	0.00～10.00V	0.01V	0.15V	√
F5.27	Cooling Fan control	0:Auto operation : The fan will run when the inverter starts . and will stop when the inverter stops. 1:The cooling fan is running when the inverter energized on .	1	0	×

6.1.7 F6 Group Output terminal

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F6.00	Y1 output selection	0:No output 1：Forward running 2：Reverse running 3：Fault output 4：Frequency level detection FDT output 5：frequency reached 6：Zero speed running 7：Upper limit frequency reached 8：Lower limit frequency reached 9:Running 10: PLC stage completed 11:PLC cycle completed 12: Overload Pre-alarm 13: Specified count value reached 14:Setting count value reached 15: Ready for operation 16:Under load output	1	1	√
F6.01	Y2 output selection			2	√
F6.02	Relay output selection			3	√
F6.03	AO1 output selection	0：Running frequency 1：Setting frequency 2：Motor speed 3：Output current 4：Output Voltage 5：Output power 6：Output torque 7：Analog AVI input 8：Analog ACI input 9～14：Reserved	1	0	√
F6.04	AO1 output lower limit	0.0～100.0%	0.1%	0.0%	√

6.1.7 F6 Group Output terminal(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F6.05	The lower limit corresponding to the AO1 output	0.00～10.00V	0.01V	0.00V	√
F6.06	AO1 output upper limit	0.0～100.0%	0.1%	100.0%	√
F6.07	The upper limit corresponding to the AO1 output	0.00～10.00V	0.01V	10.00V	√
F6.08	AO2 output selection	0～14（same as F6.03）	0	0	√
F6.09	AO2 output lower limit	0.0～100.0%	0.1%	0.0%	√
F6.10	The lower limit corresponding to the AO2 output	0.00～20.00mA	0.1kHz	0.0kHz	√
F6.11	AO2 output upper limit	0.0～100.0%	0.1%	100.0%	√
F6.12	The upper limit corresponding to the AO2 output	0.00～20.00mA	0.1kHz	10.0kHz	√
F6.13	Y1 delay conduction time	0.1～3600.0s	0.1s	0.0s	√
F6.14	Y1 delay shut off time	0.1～3600.0s	0.1s	0.0s	√

6.1.7 F6 Group Output terminal(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F6.15	Y2 delay conduction time	0.1～3600.0s	0.1s	0.0s	√
F6.16	Y2 delay shut off time	0.1～3600.0s	0.1s	0.0s	√
F6.17	Relay delay closing time	0.1～3600.0s	0.1s	0.0s	√
F6.18	Relay delay disconnect time	0.1～3600.0s	0.1s	0.0s	√
F6.19	Set the count value	0～9999	1	0	√
F6.20	Specified the count value	0～F6.19	1	0	√
F6.21	The count coefficient	0.01～99.99	0.01	1.00	√
F6.22	Counter working mode selection	LED Unit's Place：Clear mode 0：Auto 1：Manual LED Decade：Count mode 0：Up counter 1：Down counter LED Hundreds 、 Thousand place Reserved	1	--00	√

6.1.8 F7 Group Human-machine interface

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F7.00	The user password	0～65535	1	0	√
F7.01	The initial selection when Power on	LED Unit's Place、 Decade: Running status display options 0x00-0x1F LED hundred's place、 Thousand place: Stop status display options 0x00-0x0c	1	0x0000	-
F7.02	Parameter Copy	0:Invalid 1:The parameters will download from the control board to the deypad. 2:The parameters will download from the keypad to the control board (Includes motor parameters) 3:Reserve 4:The parameters will download from the keypad to the control board. (Without motor parameters).			-
F7.03	REV/JOG function selection	0：Jog operation 1：FWD/REV switching 2：Clear UP/DOWN setting 3:Reverse Running 4:Fast search	1	0	×
F7.04	STOP/RESET key stop function selection	0：Valid when keypad control 1：Valid when keypad or terminal control 2：Valid when keypad or communication control 3：Always valid	1	0	√
F7.05	Gauge Range Decimal Place	0-3	1	2	√

6.1.8 F7 Group Human-machine interface(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F7.06	Running state display parameter selection 1	0~0xFFFF BIT0：Running frequency BIT1：Setting frequency BIT2：DC bus voltage BIT3：Output voltage BIT4：Output current BIT5：running rotation speed BIT6：output power BIT7：output torque BIT8：PID setting BIT9：PID feedback BIT10：Input terminal state BIT11：Output terminal state BIT12：Analog AVI Setting BIT13：Analog ACI Setting BIT14：The current step of multi-step BIT15：Torque setting value	1	0x00FF	√
F7.07	Running state display parameter selection 2	0-0X3 BIT0：Count value BIT1：Linkage proportion coefficient BIT2：PLC average speed BIT3：The Current speed of PLC. BIT4：The current running remaining time of PLC .	1	0x0	√
F7.08	Stop state display parameter selection	1~0x1FFF BIT0: setting frequency BIT1: DC bus voltage BIT2: Input terminal state BIT3: Output terminal state BIT4: PID setting value BIT5: PID feedback value BIT6: Analog AVI value BIT7: Analog ACI value BIT8: The current step of multi-step BIT9: Torque setting value BIT10: Input AC voltage BIT11: Count Value BIT12: Linkage proportion coefficien BIT13: PLC average speed BIT14: The Current speed of PLC BIT15: The current running remaining time of PLC .	1	0x40F	√

6.1.8 F7 Group Human-machine interface(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F7.09	IGBT module temperature	0～100.0℃	0.1℃		–
F7.10	Software version	0.00～99.9	1.00		–
F7.11	Accumulated running time	0～65535h	1h	0	–
F7.12	Runtime password setting	0～65535	1	0	×
F7.13	Runtime setting	0～65535h	1h	0	×
F7.14	The previous two fault type	0～29 0：No fault （nonE） 1:over current when acceleration （ocA） 2：over current when decleration （ocd） 3：over-current when constant speed running （ocn） 4：Over –voltage when when acceleration（ovA） 5：over-voltage when decleration （ovd） 6：Over-voltage when constant running （ovn） 7：over-voltage when stopping （ovS） 8：DC bus under voltage （Lv）			–

6.1.8 F7 Group Human-machine interface(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F7.15	The previous fault type	9：Input phase failure （LP） 10：Output short circuit（SC） 11：inverter overheat （OH1） 12：Motor overload（OL1） 13：Inverter overload （OL2） 14：External fault （EF） 15：RS485 communication fault CE-1） 16：Reserved 14：External fault （EF） 15：RS485 communication fault （CE-1） 16：Reserved 17：Current detection fault（ItE） 18：keypad communication fault（CE-4） 19：Autotuning falut （tE） 20：EEPROM fault （EEP） 21：PID feedback fault （PIDE） 22～24：Recerved 25：dCE 26～27：Reserved 28：Output phase failure （SPO） 29：Reserved			–
F7.16	The current fault type				–
F7.17	The current fault running frequency	0.00～600.00Hz	0.01Hz		–
F7.18	The current fault output current	0.1～3000.0A	0.1A		–
F7.19	The current fault DC bus voltage	0～1000V	1V		–
F7.20	The current fault temperature	0-100.00℃	0.1℃		–
F7.21	The current fault input terminal state	0～0xFFFF	1	0	–
F7.22	The current fault output terminal state	0～0xFFFF	1	0	–

6.1.9 F8 Group-Enhanced function

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F8.00	Acceleration time 2	0.1～3600.0s	0.1s	Depend on the model	√
F8.01	Deceleration time 2	0.1～3600.0s	0.1s	Depend on the model	√
F8.02	Jog running frequency	0.00～F0.04（Max.frequency）	0.01Hz	5.00Hz	√
F8.03	Jog acceleration time	0.1～3600.0s	0.1s	Depend on the model	√
F8.04	Jog deceleration time	0.1～3600.0s	0.1s	Depend on the model	√
F8.05	Skip frequency	0.00～F0.04（Mex.frequency）	0.01Hz	0.00Hz	√
F8.06	Skip frequency bandwidth	0. 00～F0.04（Max.frequency）	0.01Hz	0.00Hz	√
F8.07	Traverse amplitude	0.0～100.0% （Relative to the setting frequency）	0.1%	0.0%	√
F8.08	Jitter frequency bandwidth	0.0～50.0% (Relative to the traverse amplitude)	0.1%	0.0%	√
F8.09	Rise time of traverse	0.1～3600.0s	0.1s	5.0s	√
F8.10	Fall time of traverse	0.1～3600.0s	0.1s	5.0s	√
F8.11	Fault auto reset times	0～9999	0	0	√
F8.12	Fault reset interval time	0.1～100.0s	0.1s	1.0s	√
F8.13	FDT Level	0.00～ F0.04(Max.frequency)	0.01Hz	50.00Hz	√
F8.14	FDT lag	0.0～100.0%（FDT level ）	0.1%	5.0%	√
F8.15	Frequency arrival detecting range	0.0～100.0%（Max.frequency）	0.1%	0.0%	√

6.1.9 F8 Group-Enhanced function(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F8.16	Energy braking threshold voltage	380V Series： 115.0～140.0% （Stardard DC bus voltage）	0.1%	125.0%	√
		220V Series： 115.0～140.0% （Stardard DC bus voltage）	0.1%	115.0%	√
F8.17	Coefficient of rotation speed	0.1～999.9% Actual mechanical speed=120* output frequency *F8.17/Number of poles of motor .	0.1%	100.0%	√
F8.18	Enery braking output starting value	0-100%	1%	0%	√
F8.19	Over load/Under load pre-alarm protection selection	LED bit.overload pre-alarm detection selection 0: No detection 1: Running Detection 2:Constant speed detection LED ten digit. overload pre-alarm action selection 0: No alarm, continue running 1: OL3 alarm, stop running. LED Hundred digit.under load pre-alarm detection selection 0: No detection 1: Under load when Running Detection 2: Under load when Constant speed detection LED Thousand digit .under load pre-alarm action selection 0:No Alarm . Continue running 1: UL4 Alarm .stop running .	1	00	√
F8.20	Overload pre-alram level	0.0～150.0%	0.1%	130.0%	√
F8.21	Overload detection time	0.0～6500.0s	0.1s	5.0s	√
F8.22	The decrease rate of drop control frequency	0.00～15.00%	0.01%	0.00%	√
F8.23	ENA Mode and Fan control	Units digit: 0: ENA OFF. 1: ENA ON Decade: 0: Fan start working 1:Fan couldn't work below 0 ℃	00	00	√
F8.24	The proportional gain of ENA frequency increases	0～100	0.00	0.10	√
F8.25	ENA Integration time	0.01～100	0.01	0.10	√

6.1.10 F9 Group PID control

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F9.00	PID given source selection	0：Keypad（set by F9.01） 1：Analog chanel AVI given 2：Analog chanel ACI given 3：Remote communication given 4：Multi-step speed given 5:keyboard direct given	1	0	√
F9.01	Keyboard preset PID given	0.0～F9.16	0.01MPa	0.00MPa	√
F9.02	PID feedback source selection	0：Analog channel AVI feedback 1：Analog channel ACI feedback 2：AVI+ACI feedback 3:Remote communication feedback	1	0	√
F9.03	PID output characteristics selection	0：PID output is positive 1：PID output is negative	1	0	√
F9.04	Proportional gain K（Kp）	0.00～100.00	0.01	1.00	√
F9.05	Integral time Ti（Ti）	0.01～100.00s	0.1s	0.10s	√
F9.06	Differential time Td（Td）	0.00～100.00s	0.1s	0.00s	√
F9.07	Sample cycle T（T）	0.01～100.00s	0.1s	0.10s	√
F9.08	PID control bias limit	0.0～100.0%	0.1%	0.0%	√

6.1.10 F9 Group PID control(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
F9.09	Feedback lost detecting value	0.0～100.0%	0.1%	0.0%	√
F9.10	Feedback lost detecting time	0.0～3600.0s	0.1s	1.0s	√
F9.11	Feedback gain	0～200%	0.1%	100%	√
F9.12	Awakening threshold range	0.0～F9.16	0.01 MPa	0.50 MPa	√
F9.13	Awakening threshold detection time	0.00～360.00s	0.01s	1.00s	√
F9.14	Sleep Frequency	0.00～F0.04 (Maximum output frequency)	0.01	30.00Hz	√
F9.15	Sleep Frequency Detection Time	0.0～360.00s	0.01S	1.00S	√
F9.16	The gauge range	0.00–20.00MPa	0.01 MPa	20.00MPa	√
F9.17	PID preset frequency	0.00～F0.05 （Running frequency upper limit）	0.01Hz	0.00Hz	√
F9.18	Preset frequency maintain time	0.00～360.00s	0.01s	0.00s	√

6.1.11 FA Multi- step speed control

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FA.00	PLC Mode	LED Unit's Place ： PLC running mode selection 0：invalid 1：single circulation 2：continuous circulation 3：single circulation keep the final value . LED Decade;PLC input selection 0：automatic control 1：Terminal Control LED Hundreds place : PLC breakpoints recovery options 0：Restart from the first stage frequency. 1：Restart from running frequency . which is saved before the sunning is breaking . 2：Restart from setting frequency when running is break. PLC Thousands place: PLC power failure save selection. 0：Non-save after power off 1：save after power off	1	0000	√
FA.01	Multi-step speed 1	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.02	Multi-step speed 2	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.03	Multi-step speed 3	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.04	Multi-step speed 4	F0.06-F0.04	0.01Hz	0.00Hz	√

6.1.11 FA Multi- step speed control(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FA.05	Multi-step speed 5	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.06	Multi-step speed 6	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.07	Multi-step speed 7	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.08	Multi-step speed 8	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.09	Multi-step speed 9	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.10	Multi-step speed 10	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.11	Multi-step speed 11	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.12	Multi-step speed 12	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.13	Multi-step speed 13	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.14	Multi-step speed 14	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.15	Multi-step speed 15	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.16	Multi-step speed 16	F0.06-F0.04	0.01Hz	0.00Hz	√
FA.17	Unit of PLC Running time	0:Second(s) 1: Minute(min)	1	0	√

6.1.11 FA Multi- step speed control(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FA.18	Curve selection	0: Mode 1 :Linear Operation 1: Mode 2(No wait time) Gradual Operation	1	0	√
FA.19	Multi-speed direction source selection	0：External Control 1: Control itself	1	0	√
FA.20	PLC Accel/Decel Time 1	0.01～3600.0s	0.1S	20.0S	√
FA.21	PLC Accel/Decel Time 2	0.01～3600.0s	0.1S	20.0S	√
FA.22	PLC Accel/Decel Time 3	0.01～3600.0s	0.1S	20.0S	√
FA.23	PLC Accel/Decel Time 4	0.01～3600.0s	0.1S	20.0S	√
FA.24	PLC Accel/Decel Time 5	0.01～3600.0s	0.1S	20.0S	√
FA.25	PLC Accel/Decel Time 6	0.01～3600.0s	0.1S	20.0S	√
FA.26	PLC Accel/Decel Time 7	0.01～3600.0s	0.1S	20.0S	√
FA.27	PLC Accel/Decel Time 8	0.01～3600.0s	0.1S	20.0S	√
FA.28	Acceleration Selection 1	Unit's Place: Multi-Speed 1 FA.20-FA.27. Decade ： Multi-Speed 2 FA.20-FA.27 Hundreds place: Multi-Speed 3 FA.20-FA.27 Thousands place：Multi–Speed 4 FA.20–FA.27	1	0x1111	√

6.1.11 FA Multi- step speed control(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FA.29	Acceleration Selection 2	Unit's Place : Multi-Speed 5 FA.20-FA.27 Decade : Multi-Speed 6 FA.20-FA.27 Hundreds place : Multi-Speed 7 FA.20-FA.27 Thousands place ： Multi-Speed 8 FA.20-FA.27)	1	0x1111	√
FA.30	Acceleration Selection 3	Unit's Place : Multi-Speed 9 FA.20-FA.27 Decade: Multi-Speed10 FA.20-FA.27 Hundreds place : Multi-Speed 11 FA.20-FA.27 Thousands place ： Multi-Speed 12 FA.20-FA.27	1	0x1111	√
FA.31	Acceleration Selection 4	Unit's Place : Multi-Speed 13 FA.20-FA.27 Decade: Multi-Speed 14 FA.20-FA.27 Hundreds place : Multi-Speed 15 FA.20-FA.27 Thousands place ： Multi-Speed 16 FA.20-FA.27	1	0x1111	√
FA.32	Deceleration Selection 1	Unit's Place : Multi-Speed 1 FA.20-FA.27 Decade: Multi-Speed 2 FA.20-FA.27 Hundreds place : Multi-Speed 3 FA.20-FA.27 Thousands place ： Multi-Speed4 FA.20-FA.27	1	0x1111	√

6.1.11 FA Multi- step speed control(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FA.33	Deceleration Selection 2	Unit's Place : Multi-Speed 5 FA.20-FA.27 Decade: Multi-Speed 6 FA.20-FA.27 Hundreds place : Multi-Speed 7 FA.20-FA.27 Thousands place ： Multi-Speed 8 FA.20-FA.27	1	0x1111	√
FA.34	Deceleration Selection 3	Unit's Place : Multi-Speed 9 FA.20-FA.27 Decade: Multi-Speed 10 FA.20-FA.27 Hundreds place : Multi-Speed 11 FA.20-FA.27 Thousands place ： Multi-Speed12 FA.20-FA.27	1	0x1111	√
FA.35	Deceleration Selection 4	Unit's Place : Multi-Speed 13 FA.20-FA.27 Decade: Multi-Speed 14 FA.20-FA.27 Hundreds place : Multi-Speed 15 FA.20-FA.27 Thousands place ： Multi-Speed 16 FA.20-FA.27	1	0x1111	√
FA.36	Direction Selection 1	Unit's Place : Multi-Speed 1 (0-1) 0:Forward 1:Reverse Decade: Multi-Speed 2 (0-1) 0:Forward 1:Reverse Hundreds place: Multi-Speed 3 (0-1) 0:Forward 1:Reverse Thousands place: Multi-Speed 4 (0-1) 0:Forward 1:Reverse	1	0x0000	√

6.1.11 FA Multi- step speed control(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FA.37	Direction Selection 2	Unit's Place : Multi-Speed 5 (0-1) 0:Forward 1:Reverse Decade:: Multi-Speed 6 (0-1) 0:Forward 1:Reverse Hundreds place: Multi-Speed 7 (0-1) 0:Forward 1:Reverse Thousands place: Multi-Speed 8 (0-1) 0:Forward 1:Reverse	1	0x0000	√
FA.38	Direction Selection 3	Unit's Place : Multi-Speed 9 (0-1) 0:Forward 1:Reverse Decade:: Multi-Speed 10 (0-1) 0:Forward 1:Reverse Hundreds place: Multi-Speed 11 (0-1) 0:Forward 1:Reverse Thousands place: Multi-Speed 12 (0-1) 0:Forward 1:Reverse	1	0x0000	√
FA.39	Direction Selection 4	Unit's Place : Multi-Speed 13 (0-1) 0:Forward 1:Reverse Decade:: Multi-Speed 14 (0-1) 0:Forward 1:Reverse Hundreds place: Multi-Speed 15 (0-1) 0:Forward 1:Reverse Thousands place: Multi-Speed 16 (0-1) 0:Forward 1:Reverse	1	0x0000	√
FA.40	PLC Running Time 1	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.41	PLC Running Time 2	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.42	PLC Running Time 3	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√

6.1.11 FA Multi- step speed control(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FA.43	PLC Running Time 4	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.44	PLC Running Time 5	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.45	PLC Running Time 6	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.46	PLC Running Time 7	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.47	PLC Running Time 8	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.48	PLC Running Time 9	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.49	PLC Running Time 10	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.50	PLC Running Time 11	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.51	PLC Running Time 12	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.52	PLC Running Time 13	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.53	PLC Running Time 14	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.54	PLC Running Time 15	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√
FA.55	PLC Running Time 16	0.0-6553.5 S(Min)	0.1S (min)	0.0S (Min)	√

6.1.12 Fb Protection function

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
Fb.00	Motor overload protection	0：Disable. 1：normal motor （with low speed compensation） 2：variable frequency motor (without low speed compensation)	1	2	×
Fb.01	Motor overload protection current	20.0～120.0% （Motor rated current）	0.1%	100.0%	√
Fb.02	Momentary power drop frequency point	70.0～110.0% （Standard bus voltage ）	0.1%	80.0%	√
Fb.03	Momentary power drop frequency rate of decline	0.00～F0.04 （Max.frequency）	0.01Hz	0.00Hz	√
Fb.04	Over-voltage stall protection	0：Disable 1：Enable	1	1	√
Fb.05	Over-voltage stall protection voltage	110～150%（380V Series ） 110～150%（220V Series ）	1%	120%	√
Fb.06	Auto limiting current threshold	20～200%	1%	G Series:160% P Series:130%	√
Fb.07	Frequency decrease rate when current limiting	0.00～100.00Hz/s	0.01Hz/s	10.00Hz/s	√
Fb.08	Input phase loss protection selection	0：Invalid 1：software detect is valid 2：hardware detect is valid	1	Depends on the model	√
Fb.09	Under load protection current	0-150.0	0.1%	0.0%	√
Fb.10	Under load protection Time	5.0-6500.0s	0.1S	5.0s	√

6.1.13 Fc Group communication parameters

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FC.00	Local address	1～247，0 is broadcast address	1	1	√
FC.01	aud rate selection	0：1200bps　3：9600bps 1：2400bps　4：19200bps 2：4800bps　5：38400bps	1	4	√
FC.02	Data bit check setting	0：No parity（N，8，1）for RTU 1：Even parity（E，8，1）for RTU 2：Odd parity（O，8，1）for RTU 3：No parity（N，8，2）for RTU 4：Even parity（E，8，2）for RTU 5：Odd parity（O，8，2）for RTU 6：No parity（N，7，1）for ASCII 7：Even parity（E，7，1）for ASCII 8：Odd parity（O，7，1）for ASCII 9：No parity（N，7，2）for ASCII 10：Even parity（E，7，2）for ASCII 11：Odd parity（O，7，2）for ASCII 12：No parity（N，8，1）for ASCII 13：Even parity（E，8，1）for ASCII 14：Odd parity（O，8，1）for ASCII 15：No parity（N，8，2）for ASCII 16：Even parity（E，8，2）for ASCII 17：Odd parity（O，8，2）for ASCII	1	1	√
FC.03	Communication answer delay time	0～200ms	1ms	5ms	√
FC.04	Communication timeout fault time	0.0（Odd parity），0.1～200.0s	0.1s	0.0s	√

6.1.13 Fc Group communication parameters(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
FC.05	Communication error action	0：Alarm and coast to stop 1：Do not alarm and keep running 2：Do not alarm and stop at the stopping method(only for communication control mode) 3：Do not alarm and stop at the stopping method (for all communication control modes)	1	1	√
FC.06	Response action	0：Response to reading and writing 1：No response to writing	1	0	√
FC.07	Communication parameters address mode	0：group mode 1：Sequential mode	1	0	√
FC.08	Linkage proportion coefficient	0.01～10.00	0.01	1.00	√
FC.09	Linkage proportion source selection	0：Keypad or Encoder Setting（FC.08） 1：Annlog AVI setting 2：Annlog ACI setting 3：Multi-stage setting 4：Keyboard or encoder direct setting	1	0	√

6.1.14 Fd Group Supplementary function

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
Fd.00	Low-frequency threshold of restraining oscillation	0～500	1	5	√
Fd.01	High-frequency threshold of restraining oscillation	0～500	1	5	√
Fd.02	Amplitude of restraining oscillation	0～100	1	10	√
Fd.03	Threshold high-low frequency of restraining oscillation	0.00～F0.04（Max.frequency）	0.01Hz	12.50Hz	√
Fd.04	Restrain oscillation	0：Enable 1：Diable	1	1	√
Fd.05	PWM Selection	0：PWM mode 1 1：PWM mode 2 2：PWM mode 3	1	0	×
Fd.06	Torque setting mode selection	0：Keypad setting torque (corresponding to Fd.07) 1：1: Analog AVI setting torque (100% compared to 2 times of inverter rated current) 2：2: Analog ACI setting torque (same as 1) 3：3: Analog AVI + ACI setting torque (same） 4：multi-stage torque setting (same 1) 5：Remote communication setting torque .(same as 1)	1	0	√

6.1.14 Fd Group Supplementary function(continued)

Code	Name	Factory setting	Min.Unit	Factory setting	Running Modification
Fd.07	Keypad torque setting	-200.0～200.0% （the rated current of inverter）	0.1%	50.0%	√
Fd.08	Upper limit frequency source selection	0：Keypad setting upper limit frequency（F0.05） 1：Analog AVI setting upper limit frequency (100% corresponds to the maximum frequency) 2：Analog ACI setting upper limit frequency (same as 1） 3：Multi-step setting of upper limit frequency(same as 1) 4：Remote communication setting upper limit frequency (same as1)	1	0	√
Fd.09	Auto current limiting selection	0：Enabled when constant speed 1：Disabled when constant speed	1	0	√
Fd.10	Lower limit frequency running mode	0：lower limit frequency running 1：zero frequency running and DC braking .	1	0	×
Fd.11	Zero-frequency running braking current	0.0～150.0%	0.1%	0.0%	√

6.2 Detailed function description

F0 Group-Basic function

F0.00 Speed control mode	
Setting Range: 0～3	Factory setting : 1

This function is used to select the control mode of the inverter.

0: NO PG vector control

Sensorless vector control(SVC).It means open-loop vector contro, applied to occasions without PG,high-performance general-purpose , an inverter can drive a motor .

1: V/F Control

It's suitable for the application with low accuracy control ,low frequency torque . an inverter can drive multi motors .

2: Torque control

It is suitable for the pplication with low accruracy torque control .Sunch as wired -drawing ect .the speed of motor is determined by the load .the speed of ACC/DEC has nothing to do with the ACC/DEC time .

3: PG Vector Control

The inverter have speed sensor vector control (VC). Suitable for high-performance adjusting the speed occasion with installing encoder PG , one inverter can only drive one motor.

- When F0.01=0 is selected . the motor parameters have to be auto-tuning before first running . In order to get the correct motor parameters . Please make sure the lable of the motor match with the motor parameters of the inverter .Otherwise it will result-in auto-tuning couldn't accomplish or get the wrong results . When it couldn't get the parameters/lable of the motor.It is suggested the user use V/F control.
- When F0.0=1 is selected . Should set the related parameters (F3 Group). To assure the excellent steady dynamic performance.
- Inverter can drive only one motor when F0.00 is set to 0. and the inverter and the capacity class of the motor couldn't be big . Otherwise it will result in the control performance reduce or couldn't work normally .

F0.01 Run command channel	
Setting Range:0～2	Factory setting: 0

This function is used to set the inverter receive the control mode which forward, reverse, jog and stop ect control command.

0: Keyboad command channel

To control the inverter start and stop by the key RUN、STOP、REV/JOG On the keypad.

1: Terminal command channel

To control the inverter start and stop by external control terminal Xn—COM on and off .

2: Communication command channel

To control the inverter start and stop by RS485 serial port.

F0.02 Keyboard and terminal UP/Down setting	
Setting range:0～3	Factory setting : 0

The frequency can be set by ▲/▼ or encoder on the keypad and terminal UP/DOWN.This setting method have the highest and it can be combined with setting channel .It is used to adjust the output frequency during the commission of the control system .

0：Valid , save the parameters when the inverter is power off .

The frequency command can be set and the value can be saved after the inverter is powered off and it will combinate with the current frequency when it is repowered on .

1：Valid ,the value can not be saved when the inverter is powered off.

The frequency command can be set but the value can not be saved after the inverter is powered off .

2：UP/DOWN setting is valid .

3：valid during running ,the frequency setting value will be clear automatically when the inverter stops .

- When the factory setting is restored ,the value of keypad and UP/DOWN will be cleared .

F0.03 Frequency command selection	
Setting range :0～12	Factory setting : 0

This function is used to select the frequency command channel of inverter .

0：Keypad or encoder setting

Modify the value of F0.07 to set the running frequency by the keypad.

And can change the running frequency by the key or encoder on the keypad and terminal UP/DOWN when the inverter is running . The revised frequency value can saved to F0.07 after power off . If you want the frequency can not saved. Upi am set the parameter F0.02.

1： AVI analog setting

The running frequency can be set by the external voltage input terminal AVI. Please refer to F5.11～F5.15。

2：ACI analog setting

The running frequency can be set by the external current or voltage input terminal ACI.Please refer to F5.16～F5.20。

3：AVI*ACI

Two group analog participate in arithmetic:AVI(the upper limit corresponding frequency)*ACI(he upper limit corresponding coefficient).

4：Potentiometer

This parameter is valid when the keypad with potentiometer.

5: PID control setting 12.Common PID control setting

The inverter mode is PID control when this parameter is selected .It's necessary to set F9 group "PID control group". The inverter running frequency is the frequency value after PIF control . and PID given source, Feedback source and so on, Please refer to F9 Group "PID function" introduction .

6: Remote communication setting

The running frequency is set by RS485 communication port .

7: External pulse setting

The running frequency is set by terminal X8 input pulse signal .For more details . Please refer to F5.21~F5.25。

8: AVI(host)±ACI(assit)setting

9: Keyboard(host) ±ACI(assit)setting

10: Communication (host) ±ACI(assit)setting

AVI 、keyboard 、commicanition are the main frequency input . linear plus the main frequency when the analog ACI is the centre value and above, linear minus the main frequency when the analog ACI is the centre value and below . when the main frequency is o .and the output frequency is 0.

11: Combination Setting

The running frequency is set by combination. The combination mode confirmed by F0.15-F0.16.

- When the frequency given mode is selected to 7.should to use terminal X8.Other terminal is invalid.

F0.04 Maximum output frequency .
Setting Range:10.00～600.00Hz Factory Setting:50.00 Hz

Set the maximum output frequency of inverter .It's thefoundation of frequency settings .and also the basis of speed acceleration and deceleration .Please pay attention to it.

F0.05 Upper limit frequency Setting range:F0.06～F0.04	Factory Setting :50.00Hz
F0.06 Lower limit frequency Setting range:0.00～F0.05	Factory Setting:0.00Hz

The upper frequency limit is the inverter allowable working the maximum output frequency . The value should not exceed the the maximum output frequency.

The lower frequency limit is the inverter allowable working the minimum output frequency . The lower limiting frequency is working when the setting frequency is lower than the lower frequency limit .

The value should not exceed the the maximum output frequency.

the maximum output frequency ⩾ the upper frequency limit ⩾ the lower frequency limit .

F0.07 keypad setting frequency Setting range:0.00Hz～F0.04	Factory setting :50.00Hz

When the frequency setting mode F0.03=0 is selected . the parameter is the initial value of inverter setting frequency .

F0.08 Acceleration time 1 Setting range:0.1～3600.0s	Factory setting: Depend on the model
F0.09 Deceleration time 1 Setting range:0.1～3600.0s	Factory setting: Depend on the model

The acceleration time is the time of accelerating from 0Hz to Maximum frequency.

The deceleration time is the time of decelerating from maximum frequency to 0Hz. Please refer to the Figure6-1.

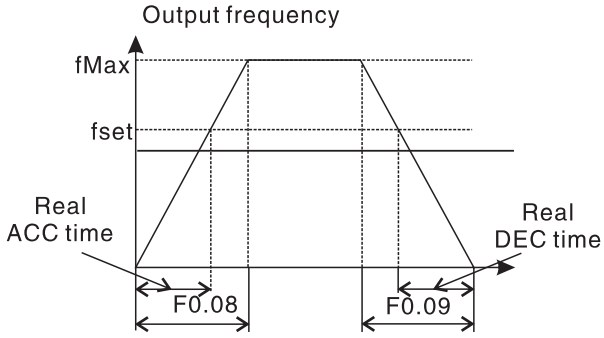


Figure 6-1 Acceleration and deceleration time

F0.10 Running direction selection	
Setting range:0～2	Factory setting: 0

To change the running direction of the motor.

0：Forward(the default running direction)

1：Reverse

2：Forbid reverse

F0.11 Carrier frequency	
Setting range:1.0～15.0kHz	Factory setting: Depend on the model

This function is used to set the carrier frequency of the inverter output PWM wave. shoud adjust correctly . the maximum value of the carrier frequency depend on power. the value of carrier frequency and electromagnetic noise,leakage current and heat dissipation as shown in Figure6-2.

Carrier frequency	electromagnetic noise	leakage current	heat dissipation	Interference
1.0KHz	Big	Small	Small	Small
↕	↕	↕	↕	↕
15.0 KHz	Small	Big	Big	Big

220V Series	380V Series	Setting Range of Carrier Frequency
0.4-3.7kW	0.75-7.5kW	1.0-15.0kHz

Figure 6-2 Carrier Frequency

CAUTION

- The advantage of high carrier frequency : ideal current waveform ,little current harmonic wave and motor noise .
- The disadvantage of high carrier frequency L increasing the switch loss .inceasing the inverter termperature and the impact to the output catacity .the inverter needs to derate on high carrier frequency .at the time ,the leakage and electrical magnetic interference will increase .
- Applying low carrtier frequency is contrary to the above. too low carrier frequency will cause unstable running , torque decreasing and surge.

F0.12 Motor parameters autotuning
Setting range:0～2 Factory setting: 0

0：No action : Forbidding autotuning .

1：Rotation autotuning

Do not coonect any load to the motor when performing autotuning and ensure the motor is in static state. Input the nameplate parameters of motor (（F2.01～F2.05）) correctly before performing autotuning . Otherwise the parameter detected by autotuning will be incorrect .

Set the proper acceleration and deceleration time （F0.08、F0.09）according to the motor inertia before performing autotuning . Otherwise it may cause over-current and over-voltage fault during autotuning .

Set F0.12 to 1 then press ENTER to start the autotuning . the LED will display and flicker .Press RUN to start the autotuning . LED will display TUN0. And the motor begin to run after displaying TUN1.When the parameter autotuning is finished and will dipaly " END ".Finally return to the stop state . when " TUN " is flicker,you can press MODE to exit out the autotuning status .

You can press STOP/RESETto stop the parameter autotuning operation during autotuning .

2：Static autotuning

If it is difficult to disconnect the load .static autotuning is recommended . enter the correct motor nameplate parameters of motor (（F2.01～F2.05）) correctly before performing autotuning.the resistance of stator and rotor and leakage inductance of motor will be tested after autotunign . But mutual inductance and current without load will not be able to measure .users can input the corresponding value according to your experience .

This parameters is valid when vector control F0.00=0 and the keypad control running mode F0.01=0.are selected

F0.13 Restore parameters	
Setting range: 0～5	Factory setting: 0

0：No action

1：Restore the default value to 380V/50Hz

Restore all parameters F0～Fd to factory setting except F2 group.

2：Clear fault records

Inverter clear all fault records.

3：Restore the default value to 380V/60Hz.

4：Restore the default value to 440V/50Hz.

5：Restore the default value to 440V/60Hz.

F0.14 AVR Fcuntion	
Setting range: 0～2	Factory setting : 0

0：Disable

1：Enable all the time

2：Disabled during deceleration

AVR(Auto voltage regulation) function is to adjust PWM to stable the output of inverter when the input voltage and rated input voltage have deviation .

This function is disable when the output command voltage is bigger than input power voltage . If AVR is function is disable ,the deceleration time will be short but the current will be big . if AVR is enable all the time .the motor working stable .the deceleration time will be long but the current will be small .

F0.15 Combination channel setting	
Setting range: -000～-777	Factory Setting: 0

The parameter is used to setting the frequency given chanel .

LED Unit's Place: Operand 1

0:Keypad Potentiometer	4:AVI
1:Keypad or Encoder	5:ACI
2.Reseve	6: External Pulse Setting
3:Communication	7: Multi-speed stage

LED Decade: Operand 2

0:Keypad Potentiometer 4:AVI

1:Keypad or Encoder 5:ACI

2:Reseve 6: External Pulse Setting

3:Communication 7: Multi-speed stage

LED Hundreds place: Operand 3

0:Keypad Potentiometer 4:AVI

1:Keypad or Encoder 5:ACI

2:Reseve 6: External Pulse Setting

3:Communication 7: Multi-speed stage

Thousands place: **Reserved**

F0.16 Combination algorithm Setting	
Range:00～54	Factory Setting : 00

The parameter is used to set the combination frequency given algorithm.

LED unit's place digit: Algorithm 1

0. Addition

1. Subtraction

2. Absolute value (subtraction)

3. Take the maximum value

4. Take the minimum value

LED decade digit: Algorithm 2

0. Addition

1. Subtraction

2. Absolute value (subtraction)

3. Take the maximum value

4. Take the minimum value

5. Operand 3 does not participate in algorithm

LED Hundreds 、Thousands place： Reserved.

F0.15、F0.16 will be valid only when F0.03=11 ， The Parameter's algorithm formula is shown below:(Operand 1) Algorithm 1 (Operand 2) Algorithm 2 (Operand 3)

If the decade digit of F0.16 is set to 5, the operand 3 will anticipate in algorithm composed of two figures (Operand 1 and Operand 2).

Eg.1 If F0.15=534 and F0.16=10, then the algorithm pairs will be:

| (AVI + Communication) -ACI |

Eg 2: F0.15=460, F0.16=21 then the algorithm pairs will be:

| (Keyboard–terminal pulse setting)–AVI |

- Algorithm rule 1: In any case, the algorithm procedure is always like this: operation figure 1 and operation figure 2 participate in algorithm 1 and get the result 1, then put result 1 and operation figure 3 into algorithm 2 and get the final result. If the algorithm result of previous two figures is a negative number,then the default result of the system will be "0".
- Algorithm rule 2: If the general algorithm result is a negative number and algorithm 2 is not an absolute one, then the default result of the system will be "0".

F0.17 Parameter locked	
Setting Range :0～1	Factory Setting : 0

The parameter is used to modify permission for setting paramters . Specific set as follows:

0: All parameters are allowed to be rewritten, but some parameters can not be modified when the inverter is running .

1: In addition to the digital frequency setting and this parameter,other parameters prohibited rewritten.

F0.18 Acceleration and deceleration mode selection	
Setting Range :0～1	Factory Setting: 0

0：Linear Accel/Decel.

The Output frequency increase or decreases with a constant rate .

1：S-Curve Accel/Decel

To reduce the noise and vibration of the mechanical system,It can slowly change the output frequency at the initial and ending segments of Accel/Decel.as shown in Fig.6-3.

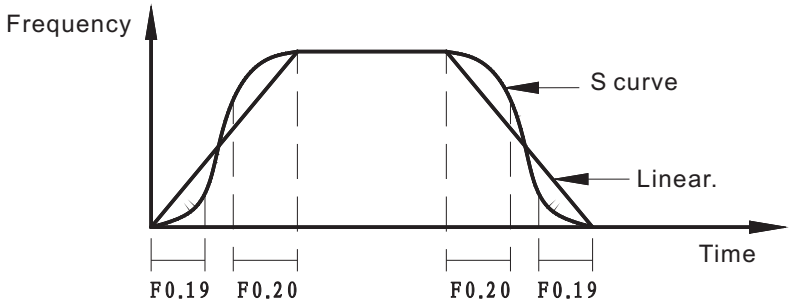


Fig.6-3 Accel/Decel Curve.

F0.19 Temperature alarm switch	
Setting Range :0-1	Factory Setting :0
F0.20 Alarm temperature value	
Setting Range:0-85℃	Factory Setting:80

S curve initial segment as shown in Fig.6-3. The slope of the output frequency increases process

S curve end segement as shown in Fig.6-3. The slope of the output frequency decrease process.

A combination of the above parameters, especially for transmission, handling and other load start and stop the process.

F1 Group- Start and stop control

F1.00 Start Mode	
Setting range: 0～2	Factory setting: 0

0：Start directly

Start the motor at the starting frequency determined by F1.01.

1：DC braking and start

DC braking at first (Refer to the parameters F1.03 and F1.04).then start the motor at the starting frequency .It is sutiable for the motor which have small inertia load and may reverse rotation when start .

2：Speed tracking starting

Can track the rotation and direction of the the motor . Then starting at the tracking speed . running to the setting frequency by acceleration and deceleration time .

F1.01 Direct starting frequency	
Setting range:0.00～50.00Hz	Factory setting:1.50Hz
F1.02 Starting frequency maintain time	
Setting range:0.0～50.0s	Factory setting:0.0s

The inverter will start at the starting frequency ,As shown in Figure 6-4.In order to ensure enough starting torque .you should set the reasonable starting frequency .

The starting frequency maintain time indicate the starting frequency maintain time when the inverter start . As show in Figure 6-4.

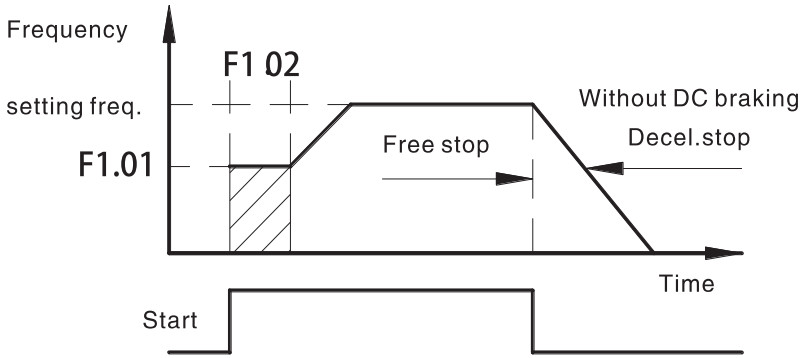


Figure 6-4 Start and stop frequency output curve

F1.03 DC braking current before start. Setting range:0.0～150.0% Factory setting:0.0 %
F1.04 DC braking time before start Setting range:0.0～50.0s Factory setting:0.0s

DC braking current before start: The inverter start at DC starting . the braking current percentage .

DC braking time before start: the output DC braking current duration time during the inverter starts . this function is invalid when the DC braking time is 0.0s.

TIP

- DC braking current and braking time should be consider the load . the current couldn't be too high .Otherwise the current will trip .It's no suitable to use the DC braking mode and F1.00=1 is valid.

F1.05 Stop mode	
Setting range :0～1	Factory setting: 0

0：Ramp to stop

When the stop command takes affect. The inverter decreases the output frequency according to the selected acceleration/deceleration time till stop.

1：Coast/Free stop

When the stop command takes affect,the inverter blocks the output immediately. the motor coasts to stop by its mechanical inertia .

F1.06 Starting frequency of DC braking at stopping	
Setting range:0.00～F0.04	Factory setting:0.00Hz
F1.07 Braking wait time at stopping	
Setting range: 0.0～50.0s	Factory setting:0.0s
F1.08 DC braking current at stopping	
Setting range: 0.0～150.0%	Factory setting:0.0%
F1.09 DC braking time at stopping	
Setting range: 0.0～50.0s	Factory setting:0.0s

F1.06 The frequency of DC braking starting when the inverter is decelerating to stop .

F1.07 The inverter close output for an interval and then braking befor DC braking .

F1.08 The percentage of rated current of inverter. The bigger the DC braking current .the greater the braking torque .

F1.09 The maintain time for DC braking at stopping .

TIP

- The current of DC braking at stopping set too high .The inverter is easy to trip . Please set the current from small to bigger .
- There is no DC braking when the DC braking time at stopping set to 0.0S.

F1.10 Dead time of FWD/REV	
Setting range:0.0～3600.0s	Factory setting:0.0s

Set the interval time at 0.0Hz in the transition between forward and reverse .It is shown as following figure 6-5.

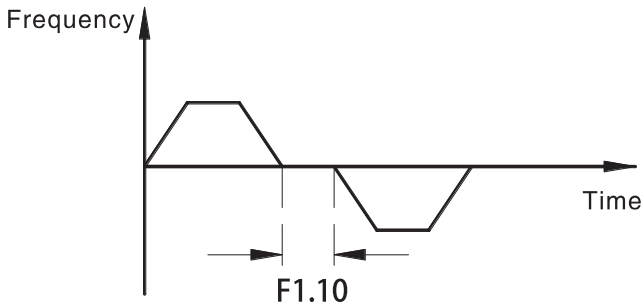


Fig 6-5 FWD/REV dead time

F1.11 Terminal running protection selection when poweron	
Setting range:0～1	Factory setting: 0

In the terminal command mode , when the inverter powered on. The system will automatically detect the status of terminal .

0：Command invalid when powered on .

Although detected effective commandof terminal in process of powered on . the inverter will not run .the system is running is the protection state until withdrawal of the terminal operation command .and then enable the terminal.inverter will run .

1：Command valid when powered on

That is to say when the inverter is in the process of powered on . If detected the effective operation the command of terminal . waiting for the complection of initialization. the system will automatically start the inverter .

- The user select this function with caruton . Otherwise may lead to serious consequences .

F1.12 Input/Output terminal selection	
Setting range:0x000～0x7FF	Factory setting :0x000

This function code defines the positive and negative logic of terminals.

Positive logic 0: Valid when connecting SI with corresponding common terminal and invalid when dis connecting these terminal .

Negative logic 1: Invalid when connecting SI with corresponding common terminal and valid when disconnecting these terminals.

If you request X1~X4 is positive logic, X5～X8 is negative logic ,Y1,Y2 is positive logic,RY is negative logic . The setting are as follows :

The logic state of X4-X1 is 0000,and the corresponding hex is 0. The unit digit of LED is displayed to 0. the logic state of X8-X5 is 1111. and the corresponding hex is F. the logic state of RY ,Y1,Y2 is 100. and the corresponding hex is 4. The tens digit of LED is The function code of F1.12 is 4F0.As shown in Figure 6-6.

Hundred's place			Decade Place				Unit's place			
0	0	0	0	0	0	0	0	0	0	0
RY	Y2	Y1	X8	X7	X6	X5	X4	X3	X2	X1

Figure 6-6 Terminal slection setting diagram

F1.13 Power off Restart Mode Selection
Setting range:1-3 Factory setting 0

F1.14 Power Cut Restart Wait Time
Setting range: 0.0-20.0S Factory setting : 0.5S

F2 Group- Motor parameters

F2.00 Inverter Type
Setting range:0～1 Factory setting: 0

0：G Type

Applicable to constant torque load

1：P Type

Applicable to variable torque load (i.e. fans pumps).

- The users can set this group parameters to change the inverter type . To realize G/P integration function. It only has G model for 220V inverter .

F2.01 Motor rated power
Settig range:0.4～700.kW Factory setting: depend on model

F2.02 Motor rated frequency Settig range:0.01-600.00Hz	Factory setting:50.00Hz
F2.03 Motor rated speed Settig range :0～36000rpm	Factory setting: depend on model
F2.04 Motor rated voltage Settig range:0～460V	Factory setting: depend on model
F2.05 Motor rated current Settig range:0.1～2000.0A	Factory setting: depend on model

In order to achieve superior performance .Please set these parameters according to motor nameplate .and then perform auto-tuning .

The power performance of inverter should match the motor .If the bias is too big. The control performances of inverter will be deteriorated distinctly .

- Reset the motor rated power(F2.01) can initialize F2.06～F2.10 automatically .

F2.06 Motor stator resistance Setting range:0.001～65.535Ω	Factory setting: depend on model
F2.07 Motor rotor resistance Setting range :0.001～65.535Ω	Factory setting: depend on model
F2.08 Motor leackage inductance Setting range :0.01～655.35mH	Factory setting: depend on model
F2.09 Motor mutual inductace Setting range :0.01～655.35mH	Factory setting: depend on model

F2.10 Current without load	
Setting range :0.01～655.35A	Factory setting: depend on model

The above parameters is the necessary parameters for vector control .

The value of F2.06~F2.10 will be sutomatically updated after auto tuning .

Do not change these parameters arbitrarily .otherwise it may deteriotate the control performance of inverter .

F3 Group-Vector control

F3.00 proportional gain 1 of speed loop	
Setting range:0～10000	Factory setting:15
F3.01 Integration time 1 of speed loop	
Setting range:0.01～100.00s	Factory setting:2.00s
F3.02 Low switching point frequency	
Setting range:0.00～F3.05	Factory setting:5.00Hz
F3.03 proportional gain 2 of speed loop	
Setting range:0～10000	Factory setting:10
F3.04 Integration time 2 of speed loop	
Setting range:0.01～100.00s	Factory setting:3.00s
F3.05 High switching point frequency	
Setting range:F3.02～F0.04	Factory setting:15.00Hz

The above parameter are only valid for vector control mode . invalid in V/F control mode .If the frequency is leass than low swithching point frequency (F3.02). we can adopt PI parameter F3.00 and F3.01.If the frequency is more than high switching point frequency 2(F3.05).we can adopt PI parameter F3.00 and F3.04. The PI parameters will be get from the linear change of the two group parameters. As shown in Figure 6-7.

By setting the ratio the speed regulator factors and integration time .you can adjust the speed of dynamic response characteristics of vector control .Increase the proportional gain .reducing the integtation time can speed up the daynamics of the corresponding ring .But the proportional gain is too large or too small intergtation time are easily lead to system oscillation .overshoot is too large . Proportional gain is too small can easily cause the system to steady–state oscillation . and the speed of static difference may exist .

PI speed loop parameters and the inertia motor system are closely related .

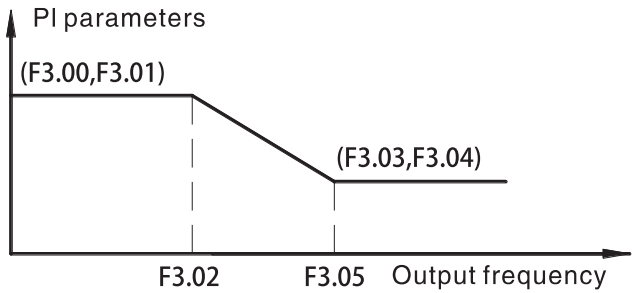


Figure 6-7 PI parameter diagram

F3.06 Slip compensation rate of VC	
Setting range:50～200%	Factory setting:100%

The parameter is used to adjust the slip frequency of vector control and improve the accuracy of speed control .Properly adjust this parameter can effectively restrain the stativ speed bias .

F3.07 Torque upper-limit setting	
Setting range:0.0～200.0%	Factory setting:150%

Set 100% correspomds to the rated output current of the inverter .

F3.08 Torque dynamic friction coefficient Setting range:0.000～1.000	Factory setting:0.125
F3.09 Empty load current compensation coefficients Setting range:0.000～9.999	Factory setting:0.800
F3.10 Torque static friction coefficient Setting range:0.00-10.00	Factory setting:2.00

Torque dynamic friction coefficient is used to adjust the operation of the motor torque value;

Torque static friction coefficient is used to adjust the torque value of the motor not in operation.

F4 V/F Control Group

F4.00 V/F Curve setting Setting range::0～6	Factory setting: 0

This group parameter is valid when the inverter in V/F mode(F0.00=1).

0: Linear Curve .It is applicable for normal constant torque load .

1:Square V/F curve . It is applicable for variable torque load .such as blower , pump and so on .Please refer to following figure 6-8 .

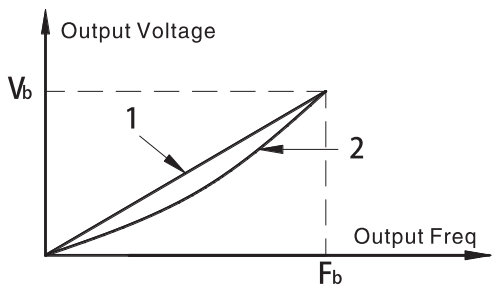


Figure 6-8 V/F curve

2:User-defined Setting V/F Curve

When delecting this mode .just set the expected V/F curve through F4.06-F4.11. As shown in Fig.6-10.

3.1.25 Power V/F Curve

4.1.7 power V/F Curve

5. 3 power V/F Curve

6. 4 power V/F Curve

Peameters values 3-6 aply to torque-dropped loadsp such as fans and water pumps.See Fig.6-9

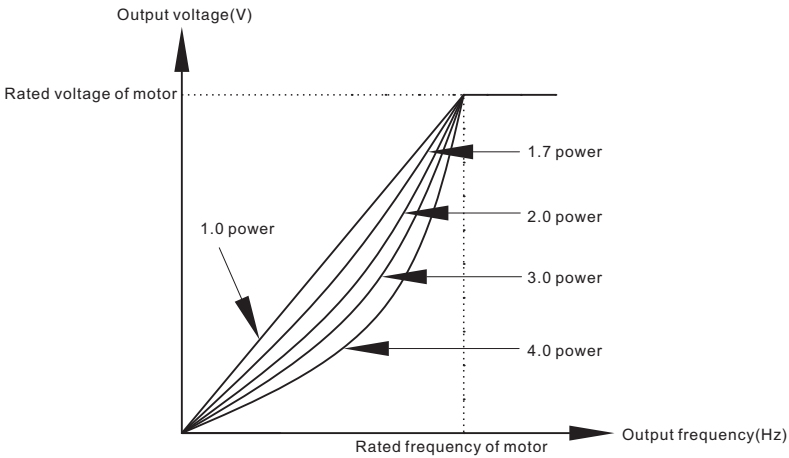


Figure 6-9 V/F curve

F4.01 Torque Boost	
Setting range: 0.0～30.0%	Factory setting: 2%

F4.02 Torque boost cutoff	
Setting range : 0.0～50.0%	Factory setting : 20%

Torque boost will take effect when output frequency is less than cut-off frequency of torque boost (F4.02).The boosting V/F curve as shown in 6-9(1).Torque boost can improve the torque performance of V/F control at low speed . when the torque boost setting is 0.0% , the inverter will boost the output torque accoding to the load automatically .

Torque boost cutoff:The torque boost is effective below this frequency point . and the torque boost is invalid higher than this frequency point .

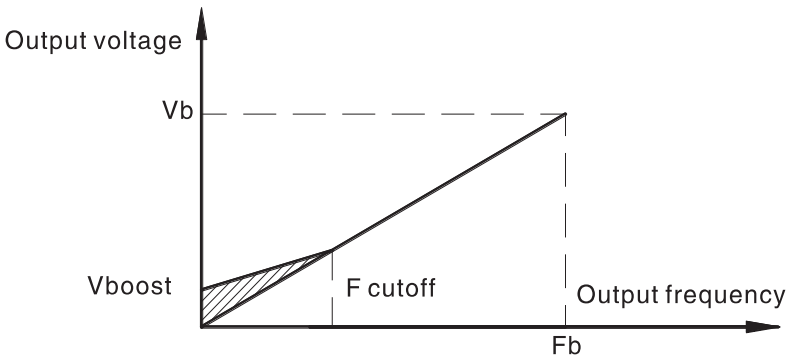


Figure 6-9(1) Manual torque boost diagram

CAUTION

- If the torque boost too high . It will appear the inverter over current protection . and will lead to the motor couldn't start normally . At this time It is reasonable to lower setting value .

- If the torque boost too high . It will appear the inverter over current protection . and will lead to the motor couldn't start normally . At this time It is reasonable tolf the motor working at low frequency for long time .The heat dissipation will become bad .At this time .if the torque boosting value set too high and Intensified this phenomenon. Finally the motor may burnt. Make sure take the motor external forced cooling mode or derating. Keep in mind !

F4.03 V/F Slip compensation limit	
Setting range : 0.0～100.0%	Factory setting : 0.0%

The motor's slip changes with the load torque .which resulit in variance of motor speed .the inverter'soutput frequency can be adjusted automatically through slip compensation according to the load torque , Therefore the change of speed due to the load change can be reduced ,the value of compensated slip is dependent on the motor's rated slip which can be calculated as F4.03=(fb-n*p/60)/ fb.

Where fb is motor rated frequency (F2.02), n is motor rated speed (F2.03) and P is poles pairs of motor .

F4.04 Auto energy saving selection	
Setting range: 0～1	Factory setting : 0

When F4.04 is set to be 1. Where there is light load .It will reduce the inverter output voltage and saves energy .

0：Disable

1：Enabled

CAUTION

- This function is applicable for fan and pump and other load.
- Auto energy saving running is invliad during acceleration and deceleration running .

F4.05 Reserved

F4.06 V/F Frequency Value F1 Setting range: 0.00～F4.08	Factory setting: 12.50Hz
F4.07 V/F Voltage Value V1 Setting range: 0.00～F4.09	Factory setting:25.00%
F4.08 V/F Frequency Value F2 Setting range: F4.06～F4.10	Factory setting:25.00Hz
F4.09 V/F Voltage Value V2 Setting range: F4.07～F4.11	Factory setting:50%
F4.10 V/F Frequency Value F3 Setting range: F4.08～F0.05	Factory setting:37.50Hz
F4.11 V/F Voltage Value V3 Setting range: F4.09～100.00%	Factory setting:75.00%

The parameters are used to set the user needs flexible V / F curve. As shown in Figure 6-10

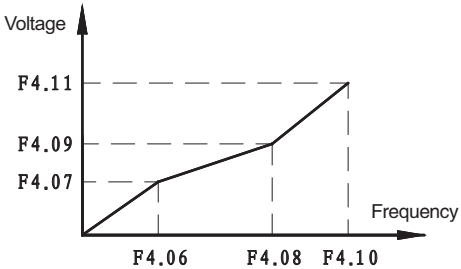


Fig.6-10 V/F User-defined Curve Setting

F4.12 Low voltage protection selection	
Setting range :0-1	Factory setting:0

0：Enabled

1：Disable

F5 Group-Input terminals

F5.00 X1 input terminal selection	
Setting range:0～34	Factory setting: 1
F5.01 X2 input terminal selection	
Setting range:0～34	Factory setting: 2
F5.02 X3 input terminal selection	
Setting range:0～34	Factory setting: 7
F5.03 X4 input terminal selection	
Setting range:0～34	Factory setting: 0
F5.04 X5 input terminal selection	
Setting range:0～34	Factory setting: 0
F5.05 X6 input terminal selection	
Setting range:0～34	Factory setting: 0
F5.06 X7 input terminal selection	
Setting range:0～34	Factory setting: 0
F5.07 X8 input terminal selection	
Setting range:0～34	Factory setting: 0

External input terminal X1~X8 are Multi-function input terminal . you can select the function X1~X8 by setting the value F5.00-F5.07. The specific setting value and description are as follows:

0：No function

1：Forward running

2: Reverse running

The inverter running command is given by the above terminal when the running command channel is terminal control .

3：3-Wire control

Please refer to the description of P5.09.

4：Jog forward control

5: Jog reverse control

Frequency acceleration and deceleration of jog running .Please refer to description of F8.02~8.04.

6： Coast to stop

The inverter blocks the output immediately .the motor coasts to stop by its mechanical inertia .

7：Reset fault

Fault resets through terminal when the inverter is fault alarming . the function is same to the STOP key on your keyboard .

8：External fault input

When an external fault signal sent to the inverter ,the inverter alarm external fault(EF) and stop .

9：Frequency up command

10: Frequency DOWN command

11: Clear frequency UP/DOWN

The above three function to use the external terminal to modify the given frequency . UP is the increment command .DOWN is the decrement command .

Frequency UP/DOWN clearance is to clear the setting value through UP/DOWN .the given frequency to return to a given frequency by the frequency command channel.

12：Multi-step speed terminal 1

13: Multi-step speed terminal 2

14: Multi-step speed terminal 3

15: Multi-step speed terminal 4

16 steps speed control can be realized by the combination of these four terminal . The external terminals of the implementation of speed control must comply with the running command can run. The speed of the terminal control the step speed .as shown in Table 6-1.

Table 6–1 Multi–step speed selection

Multi-step speed terminal 4	Multi-step speed terminal 3	Multi-step speed terminal 2	Multi-step speed terminal1	Multi-step speed selection
OFF	OFF	OFF	OFF	1st step of multi-step speed.The running frequency set by FA.01.
OFF	OFF	OFF	ON	2nd step of multi-step speed.The running frequency set by FA.02.
OFF	OFF	ON	OFF	3rd step of multi-step speed.The running frequency set by FA.03.

Table 6–1 Multi–step speed selection

Multi-step speed terminal 4	Multi-step speed terminal 3	Multi-step speed terminal 2	Multi-step speed terminal1	Multi-step speed selection
OFF	OFF	ON	ON	4th step of multi-step speed.The running frequency set by FA.04.
OFF	ON	OFF	OFF	5th step of multi-step speed.The running frequency set by FA.05.
OFF	ON	OFF	ON	6th step of multi-step speed.The running frequency set by FA.06.
OFF	ON	ON	OFF	7th step of multi-step speed.The running frequency set by FA.07.
OFF	ON	ON	ON	8th step of multi-step speed.The running frequency set by FA.08.
ON	OFF	OFF	OFF	9th step of multi-step speed.The running frequency set by FA.09.

Table 6–1 Multi–step speed selection

Multi-step speed terminal 4	Multi-step speed terminal 3	Multi-step speed terminal 2	Multi-step speed terminal1	Multi-step speed selection
ON	OFF	OFF	ON	10th step of multi-step speed.The running frequency set by FA.10.
ON	OFF	ON	OFF	11th step of multi-step speed.The running frequency set by FA.11.
ON	OFF	ON	ON	12th step of multi-step speed.The running frequency set by FA.12.
ON	ON	OFF	OFF	13th step of multi-step speed.The running frequency set by FA.13.
ON	ON	OFF	ON	14th step of multi-step speed.The running frequency set by FA.14.
ON	ON	ON	OFF	15th step of multi-step speed.The running frequency set by FA.15.

Table 6–1 Multi–step speed selection

Multi-step speed terminal 4	Multi-step speed terminal 3	Multi-step speed terminal 2	Multi-step speed terminal1	Multi-step speed selection
ON	ON	ON	ON	16 th step of multi-step speed.The running frequency set by FA.16.

Note: ON stand for COM port connection . OFF stand for COM port disconnect .

16：Acceleration and deceleration time selection

Select two kinds of acc.and dec. time through the combinations of the number of this two terminals.

Table 6-2 Acceleration and deceleration time selection

Accel.and decal. time selection	Acceleration and deceleration time
OFF	Acceleration and deceleration time 1
ON	Acceleration and deceleration time 2

17：PID control pause

The inverter will keep the current frequency output unchanged when PID is invalid .

18：Traverse frequency pause

Inverter keeps output frequency unchanged .If this terminal is disable. Inverter will continue traverse frequency operation from the current frequency.

19：Traverse frequency reset

The setting frequency of the inverter will return to the centre frequency .

20：Acceleration and deceleration prohibition

Ensure the inverter keeo away from the external signal (except the stopping command) and maintain the current output frequency .

21：Disable torque control

The inverter will work shifting from torque control to speed control mode .

22：Clear frequency acc.and dec. settings

When the terminal closed. The frequency set by UP/DOWN can be cleared. Frequency returns to the frequency given by command chanel . After the terminal discoonect the frequency returns to the value which is set by UP/Down settings.

23：DC braking when stopping

During the process of decelerating to stop .when this terminal is on ,the inverter will be in the state of DC braking promptly .Braking state is determined by F1.07~F1.09.

24：External pulse input

For receiving an external pulse signal as the frequency giving (only X8 multi-function terminal can set this feature).

25：Frequency switch to ACI

26:Frequency switch to AVI

The frequency command forced to switch to ACI (AVI) when the terminal closed . and will restor the previous given mode when the terminal disconnected .

27：Reseved

28：Coast to stop control

The parameter is used to coast to stop for external terminal control mode . the inverter will coast to stop when the terminal closed .

29：Commnad switch to terminal

The running command channel forced switched to terminal running commnad channel when the terminal is valid . it will restore previous running command channel after the terminal disconnected .

30：PLC reset

When selecting PLC function . whether automatically input or terminal manual input .Closing the terminal will clear the internal memory of PLC status infromation . Disconnect the terminal .PLC restart .

31：PLC input

When PLC input model is terminal valid . the terminal is valid and PLC running valid .

32：Count input

For receiving an external pulse signal as the count value.

33：Frequency switch to the combination

The terminal is valid, the frequency given channel forced to switch to combination channel, then restore the original frequency given channel after disconnecting the terminal.

34：Count clear

When set this function , this terminal and COM terminal switch on, the counter value becomes zero.

- Item 24 is only valid for multi-functional port X8. The maximum frequency of input pulse is 20KHz, the amplitude for low voltage is 0V, high voltage is 18 ~ 26V.

F5.08 ON/OFF filter time
Setting range: 1～100 Factory setting:5

This parameters is used to set filter strength of terminals(X1~X8). When the interference is heavy .the user should increase this value to prevent malfunction .

F5.09 Terminal control running mode
Setting Range:0~3 Factory Setting :0.

This parameter defines four different control modes that control the inverter operation through external terminal .

0：2-wire control mode 1

1：2-wire control mode 2

X1 setting : Forward running X2:Reverse running

As shown in table 6-3 and table 6-11

Table 6-3 2-wire controlmode running command

Switch state		2-wire control mode 1	2-wire control mode 2
K2	K1	Running command 1	Running command 2
OFF	OFF	STOP	STOP
ON	OFF	REVERSE	STOP
OFF	ON	FORWARD	FORWARD
ON	ON	STOP	REVERSE

Note: connection is ON .disconnect is OFF.

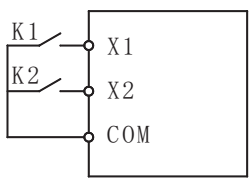


Fig.6-11 2-wire control diagram

2：3-wire control mode 1

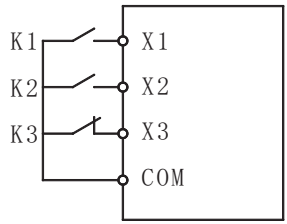


Fig.6-12 3-wire control mode diagram

3：3-wire control mode 2

3-Wire control shown in 6-10.X1 set the Forward running .X2 is reverse running . X3 is 3-wire running control terminal .

3-wire control mode 1	3-wire control mode 2
K1----- running switch	K1----- Forward
K2----- Forward and Reverse shifting	K2----- Reverse
K3-----Stop	K3----- Stop

F5.10 UP/DOWN terminal change speed rate	
Setting range:0.01～50.00Hz/s	Factory setting:0.50Hz/s

Terminal UP/DWON regulates the incremental rate of setting frequency .

F5.11 AVI lower limit	
Setting range:0.00～10.00V	Factory setting:0.00V
F5.12 AVI lower limit corresponding setting	
Setting range:-100.0～100.0%	Factory setting:0.0%
F5.13 AVI upper limit	
Setting range:0.00～10.00V	Factory setting:10.00V

F5.14 AVI upper limit corresponding setting Setting range:-100.0～100.0%	Factory setting:100.0%
F5.15 AVIinput filter time Setting range:0.00～10.00s	Factory setting: 0.10s
F5.16 ACI lower limit Setting range:0.00～10.00V	Factory setting:0.00V
F5.17 ACI lower limit corresponding setting Setting range:-100.0～100.0%	Factory setting:0.0%
F5.18 ACI upper limit Setting range:0.00～10.00V	Factory setting:10.00V
F5.19 ACI upper limit corresponding setting Setting range :-100.0～100.0%	Factory setting:100.0%
F5.20 ACI input filter time Setting range:0.00～10.00s	Factory setting:0.10s
F5.21 Maximum pulse input Setting range:0.0～20.0kHz	Factory setting:20.0kHz
F5.22 pulse input lower limit Setting range:0.0～20.0kHz	Factory setting:0.0kHz
F5.23 pulse input lower limit corresponding setting Setting range:-100.0～100.0%	Factory setting:0.0%
F5.24 pulse input upper limit Setting range:0.0～20.0kHz	Factory setting:20.0kHz
F5.25 pulse input upper limit corresponding setting Setting range:-100.0～100.0%	Factory setting:100.0%

The above function code determine the relationship between analog (pulse)input and analog (pulse) input corresponding setting. When the analog input voltage exceeds the range between lowerlimit and upper limit . it will be regarded as the upper limit or lower limit .

For different applications . the corresponding value of100.0% analog setting is different . For details. Please refer to description of each application .as shown in Figure 6-13.

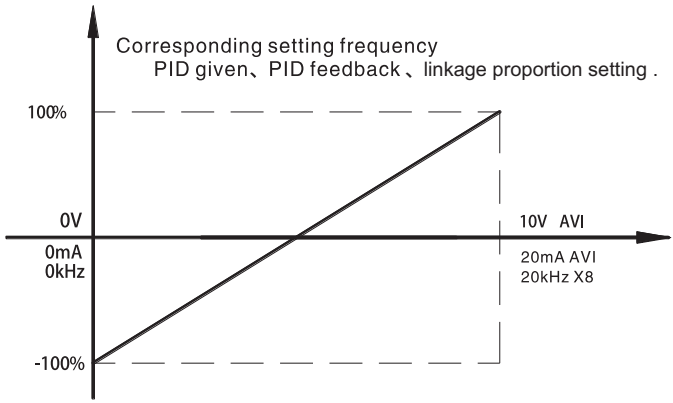


Figure 6-13 Analog given and setting

F5.26 Center voltage hysteresis loop width	
Setting Range:0.00～10.00V	Factory Setting:0.15V

The paramter is used to adjust the center voltage hysteresis value when F0.03 =8. and will not make calculations withine this range .

F5.27 Cooling Fan control	
Setting Range:0～1	Factory Setting :0

0:Auto operation : The fan will run when the inverter starts . and will stop when the inverter stops.

1:The cooling fan is running when the inverter energized on .

F6 Group-Output terminals

F6.00 Y1 output selection Setting range:0～15	Factory setting: 1
F6.01 Y2 output selection Setting range:0～15	Factory setting: 2
F6.02 Relay output selection Setting range:0～16	Factory setting: 3

This group parameters defines the content represented by the open collector output terminals Y1, Y2, and relay.

0：No output

1：Forward running : Inverter runs forward.has output frequency .Output ON signal at this time .

2：Reverse tunning : Inverter runs reverse.has output frequency .Output ON signal at this time .

3： Fault output : ON: inverter is in fault state .

4：Frequency level detection FDT arrival: Please refer to functional code F8.13.F8.14 for detailed description.

5：frequency reached Please refer to description of P8.15.

6：Zero speed running ON: The running frequency of inverter is Zero.

7：Upper limit frequency reached ON: Running frequency reaches the value of upper limit frequency.

8：Lower frequency limit reached ON: Running frequency reaches to the value of lower limit frequency .

9:Running

When the inverter is running .ON signal will be output .

10: PLC stage completed

Upon the completion of current step of simple PLC running .ON signal with the width of 200ms will be output .

11:PLC cycle completed

Upon the completion of a cycle of simple PLC running .ON signal with the width of 200ms will be output .

12: Overload Pre-alarm

When the inverter output current exceeds overload warning level, An low level active signal will be output after setting the alarm delay time .

13: Specified count value reached

Refer to the fuction of F6.19.F6.20.

14: Setting count value reached

Refer to the fuction of F6.19.F6.20.

15:Ready for operation

16:Under load output

F6.03 AO1 output selection Setting range:0～14	Factory setting: 0
F6.08 AO2 output selection Setting range:0～14	Factory setting: 0

This function is used to select the analog output of the AO1 and the digital output of the AO2 output signal. As shown in Table 6-4.

Table 6-4 analog AO1 and digital AO2 output signal

Setting	Fuction	Range
0	Running frequency	0～Maximum frequency
1	Setting frequency	0～Maximum frequency
2	Motor speed	0～2 xrated synchronous speed of motor
3	Output current	0～2 x inverter rated current
4	Output Voltage	0～1.5 x inverter rated voltage
5	Output power	0～2 x rated power
6	Output torque	0～2 x Motor rated current
7	Analog AVI input	0～10V
8	Analog ACI input	0～10V/0～20mA
9～10	Reserved	Reserved

F6.04 AO1 output lower limit Setting range:0.0～100.0%	Factory setting:0.0%
F6.05 The lower limit corresponding to the AO1 output Setting range:0.00～10.00V	Factory setting:0.00V
F6.06 AO1 output upper limit Setting range:0.0～100.0%	Factory setting:100.0%
F6.07 The upper limit corresponding to the AO1 output Setting range:0.00～10.00V	Factory setting:10.00V
F6.09 AO2 output lower limit Setting range:0.0～100.0%	Factory setting:0.0%

F6.10 The lower limit corresponding to the AO2 output	
Setting range:0.00~20.00mA	Factory setting:4.00mA
F6.11 AO2 output upper limiting	
Setting range:0.0～100.0%	Factory setting:100.0%

F6.12 The upper limit corresponding to the AO2 output	
Setting range:0.00~20.00mA	Factory setting:20.00mA

The above function code defines the corresponding relationship between the output value and the analog output. When the output value exceeds the maximum output or minimum output range of the set , it will be calculated as the upper limit output or the lower limit output. When the analog output is current output, 1mA current is equivalent to 0.5V voltage. In different applications, the analog output corresponding to 100% of the output value is different. For details, please refer to the description of each application .

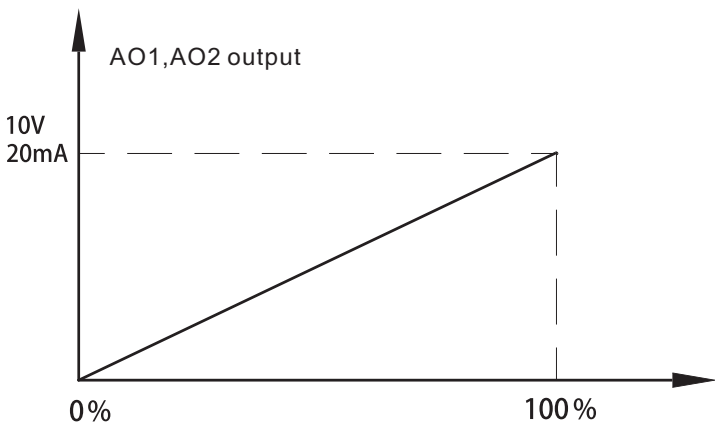


Figure 6-14 The relationship between given value and analog output

F6.13 Y1 delay conduction time Setting Range :0.1～3600.0s	Factory Setting: 0.0s
F6.14 Y1 delay shut off time Setting Range:0.1～3600.0s	Factory Setting: 0.0s
F6.15 Y2 delay conduction time Setting Range:0.1～3600.0s	Factory Setting: 0.0s
F6.16 Y2 delay shut off time Setting Range:0.1～3600.0s	Factory Setting: 0.0s

The parameter is used to control the Y1, Y2 conduction and turn-off delay time.

F6.17 Relay delay closing time Setting Range:0.1～3600.0s	Factory Setting: 0.0s
F6.18 Relay delay disconnect time Setting Range:0.1～3600.0s	Factory Setting: 0.0s

The parameter is used to control the output relay closing and disconnect delay time.

F6.19 Set the count value Setting Range:0～9999	Factory Setting: 0
F6.20 Specified the count value Setting Range:0～F6.19	Factory Setting: 0

F6.21 The count coefficient Setting Range:0.01～99.99	Factory Setting: 1.00

The parameter specifies thw count working of the counter, counter pulse input from the external terminal X8. When the counter counting external pluse value reaches

the value of parameters F6.19.the corresponding multi-function output terminal (Setting counting value reached). Output signal will be with a width of the effective period of 200ms, and the counter is cleared.

When the count value of the counter reaches a predetermined value of F6.20, the corresponding multi-function output terminal (designated count value) output valid signal. If you continue to count exceeds the parameters F6.19 and set value when the counter is cleared, the output valid signal will undone.

As shown in Figure 6-15: Y1 is set to couter value reached . Y2 is set to specify count value reached, F6.19 is set to 8, F6.20 set to 5.

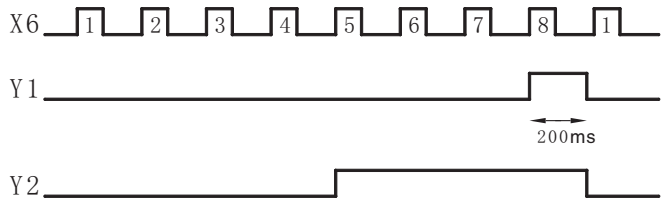


Fig.6-15 Counter set value and specified value reached schemati

F6.22 Counter working mode selection	
Setting Range:00～11	Factory Setting : 00

The parameter specifies the counter working mode and clear mode.

LED Unit's Place：clear mode

0：Auto

1：Manual

LED Decade：Count mode

0：Up counter

1：Down counter

LED Hundreds 、Thousand place Reserved

F7 Group-Human-machine interface

F7.00 The user password	
Setting range: 0～65535	Factory setting :0

The password protection function will be valid when set to be any nonzero data .

When F7.00 is set to be 0000, the user's password set before will be cleared and the password protection gunction will be disable .

After the password has been set and becomes valid .the user can not access menu if the user's password is not correct .Only when a correct the user's password is input, the user can see and modify the parameters .Please keep the user's password in mind .

The password will be valid in 1 mintue after retreat the function code edition state . Press MODE to enter into the function code edition state after the password takes effect . 0.0.0.0." will be displayed .the operator should input correct password .

F7.01 The initial selection when Power on	
Setting Range :0x0000～0x0C1F	Factory Setting :0x0000

The function code determines the displayed content when the inverter is power on ,The units of LED, decade bits are used to set the running status display selection; hundreds and thousands of LED are used to set the stop status display selection. The initial content display can only select a project, data format is hexadecimal.

Specific display content corresponding to parameter value refer to F7.06-F7.08. For examole: The running state and stop state will dispaly the inital count value and input AC voltage . the setting is 0x0A10 .the count value is 16th bit .so hexadecimal is 10. the input ac voltage is the 10 bit .so the hex is 0A.

F7.02 Parameter copy	
Setting range : 0～4	Factory setting : 0

The parameter determines the method of parameter copy .

0：No operation

1：All parameters will be uploaded to keyboard . the functions parameters are copied to the keyboard.

2：All parameters will be download to the machine . the parameters of the keyboard are copied to the machine.(Except F2 group.)

3：Reseved

4：The keyboard function parameters are download to the machine . the parameters of the keboard are copied to the machine .(all).

F7.03 REV/JOG function selection	
Setting ragne : 0～4	Factory setting : 0

This function is used to set the REV/JOG keys on the operation panel.

0：Jog operation

1：FWD/REV switching

2： Clear UP/DOWN setting

3:Reverse Running

4: Fast query : is used to query for the modification parameters.

F7.04 STOP/RESET key stop function selection	
Setting range: 0～3	Factory setting : 0

The function code defines the STOP/RESET stop function selection .

0：Valid when keypad control

1： Valid when keypad or terminal control

2：Valid when keypad or communication control

3：Always valid

The reset function of STOP/RESET Is always valid .

F7.05 Gauge Range Decimal Place Setting range：0～3	Factory setting：2
F7.06 Running state display parameter selection 1 Setting range :0～0xFFFF	Factory setting :0x00FF
F7.07 Running state display parameter selection 2 Setting Range :0～0x3	Factory setting :0x0

The parameters will display the function code when the inverter is running .

which is a 16-bit binary number, if Bit is 1, the corresponding parameters can be running through the SHIFT / "key to view. If Bit is 0 .then the corresponding parameters will not be displayed. Set the function code F7.06 .change a binary number to a hexadecimal number, enter the function code. the conent are as follows :

Table 6-5 The display content correspomding to running

F7.06	BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8	F7.07	BIT5	BIT4	BIT3
	Torque setting value	The current step of multi-step	Analog ACI Value	Analog AVI Value	The output terminal state	The input terminal state	PID feedback value	PID setting value		Reserved	PLC current running remaining time	PLC Current speed
	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0		BIT2	BIT1	BIT0
	Output torque	Output power	Running torque	Output current	Output voltage	DC bus voltage	Setting frequency	Running frequency		PLC average speed	Output torque	Count Value

F7.08 Stop state display parameter selection
Setting range :0～0x7FF Factory setting:0x40F

The setting of this function code is the same as that of F7.06. when the inverters are in the stopping state . the displaying of the parameter is determined by the function code.

Table 6-6 The display content correspomding to stop

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
The current running remaining time of PLC	The Current speed of PLC	PLC average speed	Linkage Proportion Coefficient	Count value	AC input voltage	Torque setting value	The current step of multi-step
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Analog ACI value	Analog AVI value	PID feedback value	PID setting value	Output terminal state	Input terminal state	DC bus voltage	Setting frequency

F7.09 IGBT module temperature Setting range: 0.0～100.0℃	Factory Setting:- - - -
F7.10 Software version Setting range: 0.00～9.99	Factory Setting:- - - -
F7.11 Accumulated running time Setting range: 0～65535	Factory Setting:- - - -
F7.12 Reserved	
F7.13 Reserved	
F7.14 The previous two fault type Setting range:0～29	Factory Setting:- - - -
F7.15 The previous fault type Setting range:0～29	Factory Setting:- - - -
F7.16 The current fault type Setting range:0～29	Factory Setting:- - - -
F7.17 The current fault running frequency Setting range:0.00～600.00Hz	Factory Setting:- - - -
F7.18 The current fault output current Setting range:0.1～2000.0A	Factory Setting:- - - -
F7.19 The current fault DC bus voltage Setting range:0～1000V	Factory Setting:- - - -
F7.20 The current fault temperature Setting Range: 0.0～100.0℃	Factory Setting:- - - -
F7.21 The current fault input terminal state Setting range:0～0xFFFF	Factory Setting:- - - -
F7.22 The current fault output terminal state Setting range:0～0xFFFF	Factory Setting:- - - -

The state of current fault input terminal is displayed as decimal figures.Display the state of all digital input terminals at the latest fault . The order is :

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
X8	X7	X6	X5	X4	X3	X2	X1

Current input terminal is ON and the corresponding bit is 0. The state of the digital input terminal at fault can be known through this value .

The state of current fault output terminal is displayed as decimal figures .Display the state of all digital output terminals at the latest fault . The order is :

BIT2	BIT1	BIT0
RY	Y2	Y1

Current output terminal is ON and the corresponding bit is 1.If current output terminal is OFF and the corresponding bit is 0.the state of the digital input terminal at fault can be known through this value .

F8 Group-Enhanced function

F8.00 Acceleration time 2 Setting range : 0.1～3600.0s	Factory setting:Depends on model
F8.01 Deceleration time 2 Setting range : 0.1～3600.0s	Factory setting: Depends on model

Please refer to the instructions of F0.08 and F0.09 for detailed information .

Acc/Dec time 1 and 2 can be switched through multi-function digital input terminals . Please refer to F5 Group for details information.

For details ,Please refer to description of F0.08 and F0.09.

F8.02 Jog frequency Setting range:0.00～F0.04	Factory setting:5.00Hz
F8.03 Jog acceleration time Setting range:0.1～3600.0s	Factory setting:Depend on model
F8.04 Jog deceleration time Setting range:0.1～3600.0s	Factory setting:Depend on model

The meaning and factory setting of F8.02-f8.04 are shown as Figure 6-16.

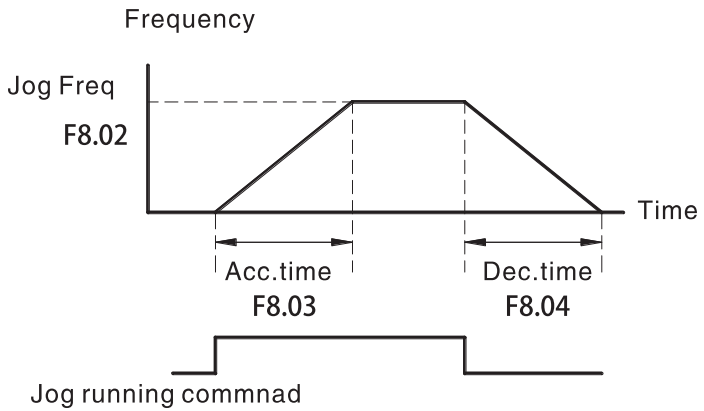


Figure 6-16 Jog running frequency and Acc./Dec. time

TIP

- Jog running : The starting mode F1.00 set 0 and stop mode F1.05 set to 0 to stop.
- The operation panel, the control terminal and the serial port can be jog control.
- In different kinds of operation conditions .Press the jog key . Jog frequency running is priority to progress .

F8.05 Skip frequency	
Setting range :0.00～F0.04	Factory setting :0.00Hz
F8.06 Skip frequency bandwidth	
Setting range :0.00～F0.04	Factory setting :0.00Hz

The settings of F8.05 -F8.06 is mainly to keep the inverter awya from the mechanical resonance with the load , you can set a skip frequency point. When the skip frequency point is set to 0, the skip frequency is invalid .

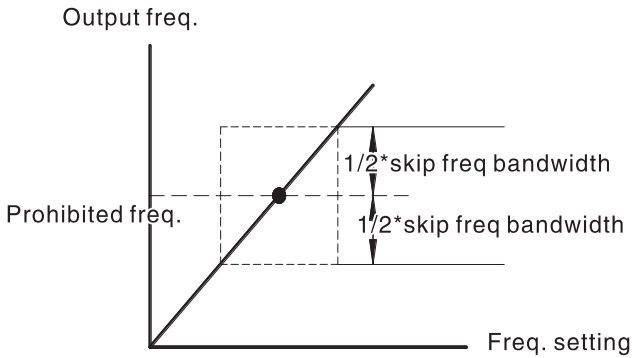


Figure 6-17 Skip frequency setting

TIP

In the process of acceleration, deceleration operation .the dive can not jump the skip frequency .

F8.07 Traverse amplitude	
Setting range :0.0～100.0%	Factory setting :0.0%
F8.08 Jitter frequency	
Setting range :0.0～50.0%	Factory setting:0.0%

F8.09 Rise time of traverse Setting range :0.1～3600.0s	Factory setting:5.0s
F8.10 Fall time of traverse Setting range:0.1～3600.0s	Factory setting:5.0s

Traverse operation is widely used in textile and chemincal fiber industry . The typical application is hown in the following figure .

Traverse function means the output frequency of the inverter wobbles with reference frequency as the centre . The track of the output frequency is shown as Figure 6-18. The traverse bandwidth is set by F8.07. when F8.07 is set to 0. The traverse bandwidth is o and has no action .

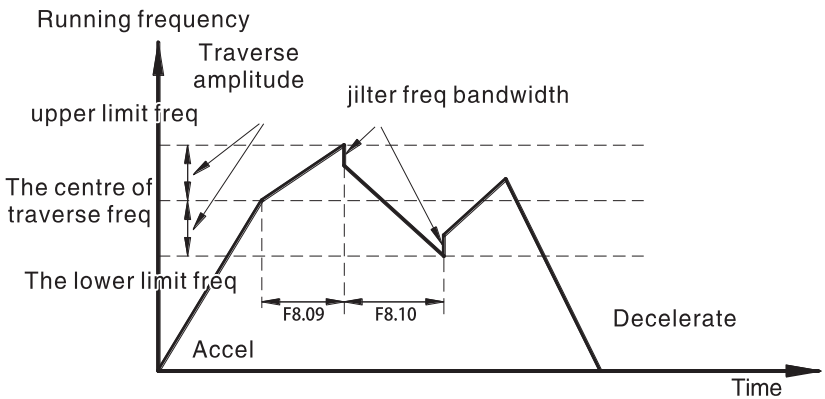


Figure6-18 Traverse operation diagram

Traverse amplitude: Traverse operation frequency is on the subject of upper , lower frequency constraints.

Traverse amplitude (AW)= center frequency (CF)*F8.07

Jitter frequency = traverse amplitude(AW)*F8.08

Rise time of traverse: Indicates the time rising from the lowest traverse frequency to the highest traverse frequency .

Fall time of traverse: Indicates the time falling from the highest traverse frequency to the lowest traverse frequency.

F8.11 Fault auto reset times	
Setting range :0～9999	Factory setting :0
F8.12 Fault reset interval time	
Setting range:0.1～100.0s	Factory setting:1.0s

Auto reset times: when the inverter selects auto reset times . This parameter is used to set the times of auto reset .But if the inverter reset continuously for more than the set time .the inverter will stop for fault and the user has to deal with the problem by hands.

Reset interval: This parameter selects the interval time from fault accurring to auto reset .

F8.13 FDT Level	
Setting range:0.00Hz～F0.04	Factory setting :50.00Hz
F8.14 FDT lag	
Setting range :0.0～100.0%	Factory setting:5.0%

This group of parameters used to set the frequency detection level , when the output frequency is increased by more than than FDT settings. The output open collector signal (lower level), when the ouput frequency drops to the FDT lift the level . The output is invalid signals (high resistance). Shown in Figure 6-19.

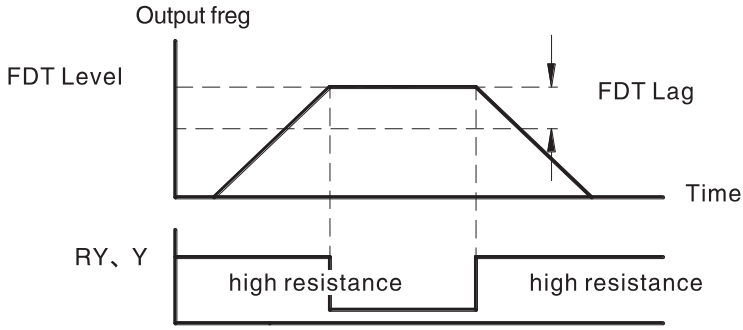


Figure 6-19 DFT level diagram

F8.15 Frequency arrival detecting range	
Setting range :0.0～100.0%	Factory setting :0.0%

When the output frequency is within the positive and negative deteacting range of the setting frequency . The selected output terminal is valid output signal (low level), As shown in Figure 6-20.

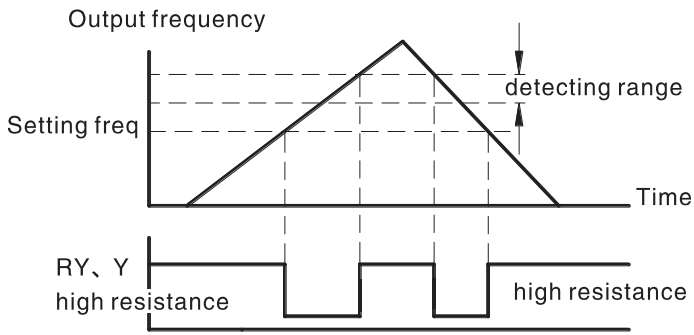


Figure 6-20 Frequency arriving detecting diagram

F8.16 Energy Brake threshold voltage	
Setting range :115.0～140.0%	Factory setting :125.0%

The function code is used to set the original bus voltage of the energy braking (380V series is 530V, 220V series is 310V).Adjust the value properly can be brake the load effectively .

F8.17 Coefficient of rotation speed	
Setting range :0.1～999.9%	Factory setting :100.0%

This parameter is used to calibrate the bias between actual mechanical speed and rotation speed .the formula is as below:

Actual mechanical speed=120*output frequency *F8.17/Number of poles of motor .

F8.18 Enery braking output starting value	
Setting Range :0～100%	Factory setting: 0%

control enery braking output proportional to of starting value .If it set to 50%, The parameter will vary between 50%-100%.

F8.19 Inverter Overload /Underload pre-alarm selection	
Setting Range:00～12	Factory setting: 00

Select state overload pre-alarm dection of the inverter

LED bit. Overload pre-alarm detection selection

0: No detection

1: Running Detection

2:Constant speed detection

LED ten digit. overload pre-alarm action selection

0: No alarm, continue running

1: OL3 alarm, stop running.

LED Hundred digit. Under load pre-alarm detection selection

0: No detection

1: Under load when Running Detection

2: Under load when Constant speed detection

LED Thousand digit .under load pre-alarm action selection

0:No Alarm . Continue running

1: UL4 Alarm .Stop running .

F8.20 Overload pre-alram level	
Setting Range :0.0～150.0%	Factory setting: 130.0%
F8.21 Overload detection time	
Setting Range： 0.0～6500.0s	Factory setting： 5.0s

Overload pre-alarm level defines the current threshold of overload pre-alarm action . the setting range is relative to the percentage of rated current .The general overload pre-alarm level should be set lower than the overload protection level.

When the output current reaches the overload pre-alarm level, and its continued level exceeds to setting's overload pre-alarm action time .overload pre-alarm will be action.shown in Figure 6-21.

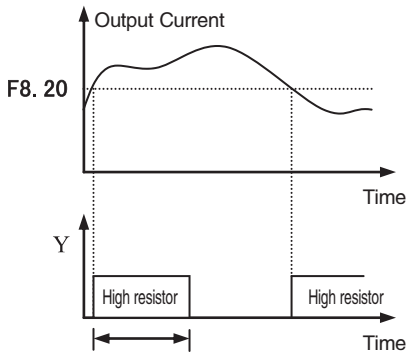


Fig.6-21 Overload pre-alarm schematic

F8.22 The decrease rate of droop control frequency	
Setting Range :0.00～15.00%	Factory Setting : 0.00%

the inverter output frequency will vary with load . mainly used to drive the power balance of the same load for multi-motor .

F9 Group-PID control

PID control is a common used method in process control.such as flow ,pressure and temperature control .the principle is firstly detect the biad between preset value and feedback value .then calculate output frequency of inverter accoding to proportional gain .integral and differential time .Please refer to following figure 6-22.

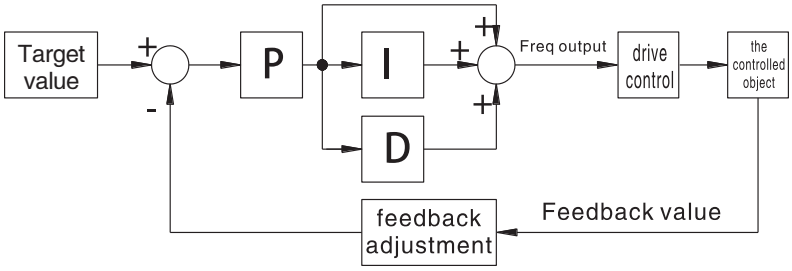


Figure 6-22 PID control diagram

F9.00 PID given source selection	
Setting range :0～5	Factory setting :0

0：Keypad（F9.01）

1：Analog chanel AVI given

2：Analog chanel ACI given

3：Remote communication given

4：Multi-step speed given

5: keyboard direct given

When frequency source select PID , F0.03 set to 5.F9 group function will be effect . This parameter determines the goal of the process PID given channel. the setting target of process PID is relative value . 100% preset value is corresponding to 100% of feedback value . the system will operate according to the relative value (0 to 100%).

TIP Multi-step given can set the parameters of FA group .

F9.01 Keyboard preset PID given	
Seting range :0.00～F9.16	Factory setting :0.00M Pa

Select F9.00 = 0, the target source is the keyboard given . This parameter is the reference value as the amount of feedback.

F9.02 PID feedback source selection	
Setting range :0～3	Factory setting :0

0：Analog channel AVI feedback

1：Analog channel ACI feedback

2：AVI+ACI feedback

3: Remote communication feedback

These parameters are used to select PID feedback channel .

- Preset source and feedback source must not be same . Otherwise given and feedback will be the same .the difference is 0. PID will not work .

F9.03 PID output characteristics selection	
Setting range :0～1	Factory setting :0

0：PID output is positive. When the feedback value is greater than the preset value .Output frequency will be decreased .such as tension control in winding application .

1：PID output is negative . when the feedback value is greater than the preset value .Output frequency will be increased .such as tension control in unwindling application .

F9.04 Proportional gain Kp	
Setting range :0.00～100.00	Factory setting :1.00

Proportional gain Kp determines the adjusting strength of the PID adjustor .the large the value of P .the stronger the adjusting strength is .

F9.05 Integral time Ti	
Setting range:0.01～100.00s	Factory setting:0.10s

The Integral time Ti determines the ratio between the output frequency change speed and deviation. Integral role is the output value will integrate according to the deviation , to eliminate the deviation of feedback value and given value . Integration time is too large, the response is slow, slow response to external disturbances. The integration time is smaller, faster response speed, but too small and easy to cause oscillation.

F9.06 Differential time Td	
Setting range:0.01～100.00s	Factory setting :0.00s

Differential time Td: when the error between the feedback and the reference . a proportional adjustment will be output.The adjustment only depends on the direction and value of the error change other than the error itself .The derivation adjustment controls the change of feedback signal according to the changing trend when it fluctuates. Because the derivation may enlarge the interference to the shystem ,especially the frequency-changing interference .Please use it carefully .

F9.07 Sample cycle T	
Setting range:0.01～100.00s	Factory setting:0.10s

Sample cycle T refers to the sampling cycle of feedback value. The PI regulator calculates once in each samling cycle .the bigger thpe sampling cycle .the slower the response is .

F9.08 Bias limit	
Setting range:0.0～100.00%	Factory setting:0.0%

Bias limit defines the maximum bias between the feedback and the preset . PID stops operation when the bias is within this range . Setting this parameter correctly is helpful to improve the system output accuracy and stability .

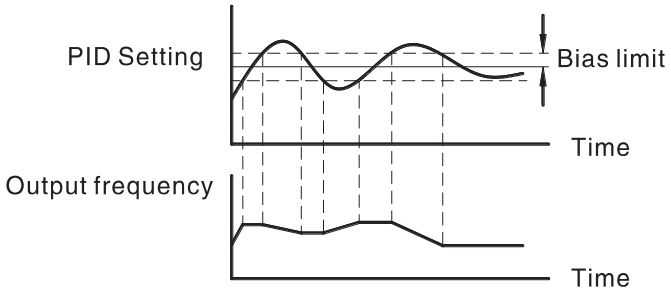


Figure 6-23 Bias limit action diagram

F9.09 Feedback lost detecting value	
Setting range:0.0～100.0%	Factory setting :0.0%
F9.10 Feedback lost detecting time	
Setting range: 0.0～3600.0s	Factory setting: 1.0s

Feedback lost detecting value is relative to 100% .The system will detect the feedback pf PID all the time .when the feedback value is below or equal to the feedback offline detection value .the system will begin to count the detecting time . when the time exceeds the feedback offline detection time .the system will report PIDE.

F9.11 Feedback gain	
Setting range:0～200.0%	Factory setting:100%

When the feedback value is not same as the actual target value . this parameter can be used to adjust the feedback signal .

F9.12 Awakening threshold range Setting range:0.00～F9.16	Factory setting:0.50 MPa
F9.13 Awakening threshold detection time Setting range:0.00～360.00s	Factory setting:1.00s
F9.14 Sleep Frequency Setting range：0.00～F0.04	Factory setting：.30.00Hz
F9.15 Sleep Frequency Detection Time Setting range:0.00～360.00s	Factory setting:1.00s

F9.12 is the water supply system of the pressure threshold from sleep into the working state . when the pressure of the pipe network is less than the set value,Inverter pass delay waiting of F9.13, the frequency of water supply system automatically transferred to the working state from hibernation.

F9.14 refers to the lowest operating frequency of PID system from working state to sleeping state.

When the feedback value is greater than or equal to the set value, and the inverter PID system has adjusted the output frequency to the sleep frequency operation, the inverter pass delay waiting of F9.15 and enters into a sleep state (zero speed operation) waiting for awake .See Figure 6-24.

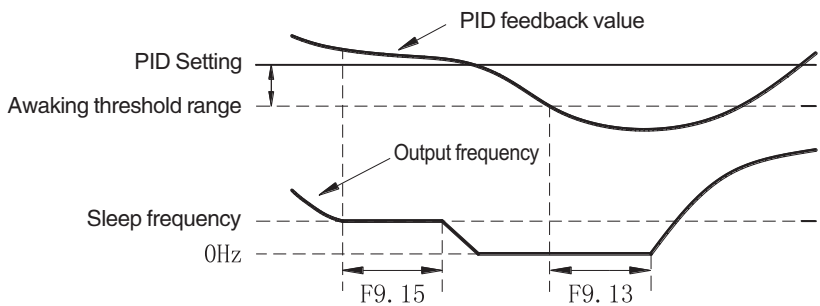


Figure 6-24 Sleep and Awake function diagram

F9.16 The gauge range	
Setting Range :0.00～20.00MPa	Factory Setting: 20.00MPa

The parameter is used to set the gauge range .

F9.17 PID preset frequency	
Setting Range :0.00～F0.05	Factory Setting:0.00Hz
F9.18 Preset frequency maintain time	
Setting Range:0.00～360.00s	Factory Setting:0.00s

This parameter is used to set the PID running frequency and time before running.

FA Group –Multi- step speed control

FA.00 PLC Mode	
Setting Range:0000～1111	Factory Setting :0000

LED Unit's Place ： PLC running mode selection

0：invalid

1：single circulation

2：continuous circulation

3：single circulation keep the final value .

LED Decade;PLC input selection

0：Automatic control

1：Terminal Control

LED Hundreds place :

PLC breakpoints recovery options

0：Restart from the first stage frequency.

1：Restart from running frequency .which is saved before the sunning is breaking .

2：Restart from setting frequency when running is break.

PLC Thousands place:

PLC power failure save selection.

0：Non-save after power off

1：save after power off

Detailed functions of the operating mode

1：Simple PLC

Simple PLC is the inverter can automationcally stop after multi-step speed running completed a cycle . the inverter will be given running command and then start . If the running time for a certain stage is 0. The inverter will skipped the stage into the next stage . As shown in Figure 6-25.

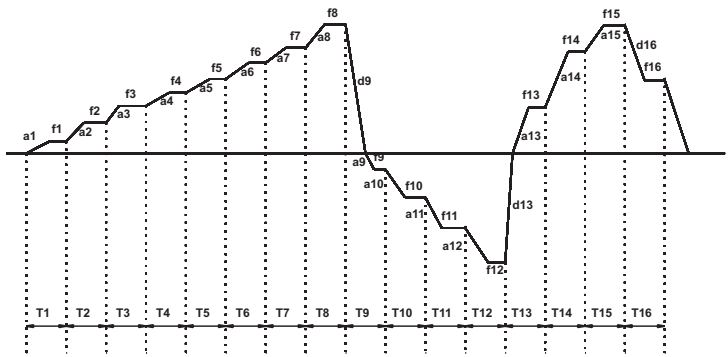


Fig.6-25 PLC / multi-speed single cycle running

f1～f16 are the running frequency for Stage 1–Stage16

T1～T16 are running time for Stage 1–Stage16.

a1～a15 are acceleration time for Stage 1–Stage15.

d1、d9 、 d13 and d16 are deceleration time for Stage 1、9、13、16.

2：Continuous Cycle

The inverter multi-step running repeatedly cycle, the inverter will stop unless stop command given, shown in Figure 6-26

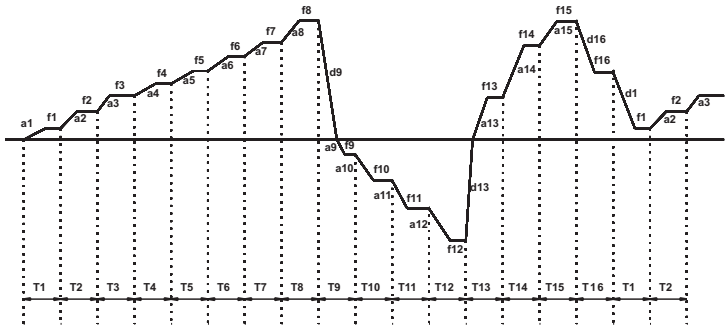


Fig.6-26 PLC / multi-speed continuous cycle running

3：Keep the final value after a single cycle

The inverter complete a single cycle . set the setting frequency and direction running accoding to the last running time setting for multi-stage speed is not 0. as shown Fig6-27.

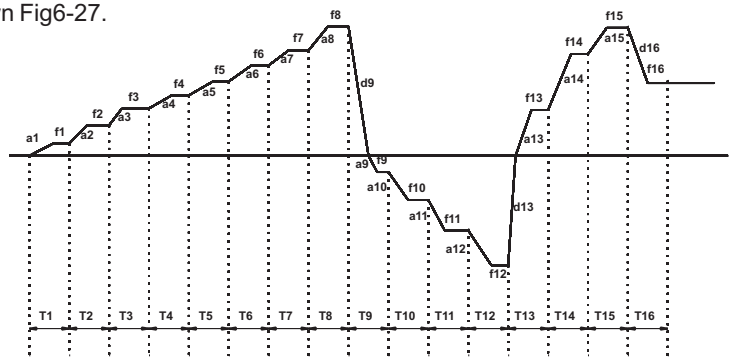


Fig.6-27 PLC / multi-speed keep the final value after a single cycle running

FA.01 Multi-step speed 1 Setting range: F0.06-F0.04	Factory setting:0.00Hz
FA.02 Multi-step speed 2 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.03 Multi-step speed 3 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.04 Multi-step speed 4 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.05 Multi-step speed 5 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.06 Multi-step speed 6 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.07 Multi-step speed 7 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.08 Multi-step speed 8 Setting range: F0.06-F0.04	Factory setting : 0.00Hz
FA.09 Multi-step speed 9 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.10 Multi-step speed 10 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.11 Multi-step speed 11 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.12 Multi-step speed 12 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.13 Multi-step speed 13 Setting range: F0.06-F0.04	Factory setting: 0.00Hz

FA.14 Multi-step speed 14 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.15 Multi-step speed 15 Setting range: F0.06-F0.04	Factory setting: 0.00Hz
FA.16 Multi-step speed 16 Setting range: F0.06-F0.04	Factory setting: 0.00Hz

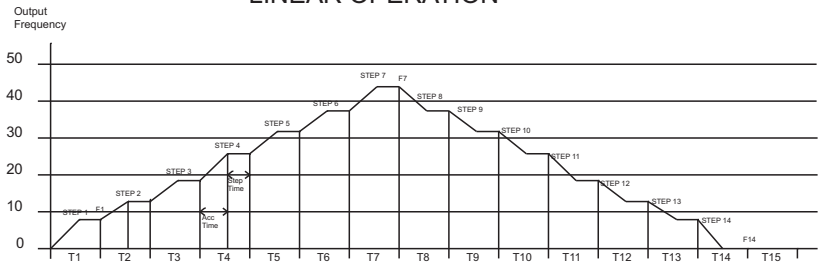
FA.17 Unit of PLC Running time Setting range: 0-1 0: second 1: minute	Factory setting: 0
FA.18 Curve selection Setting range:0-1	Factory setting: 0

0: Mode 1- Linear operation

We ofen see 16 Mult-step controlling in inverter's

In linera operation every step start with main acceleration /deceleration for reching it given frequency"F" .

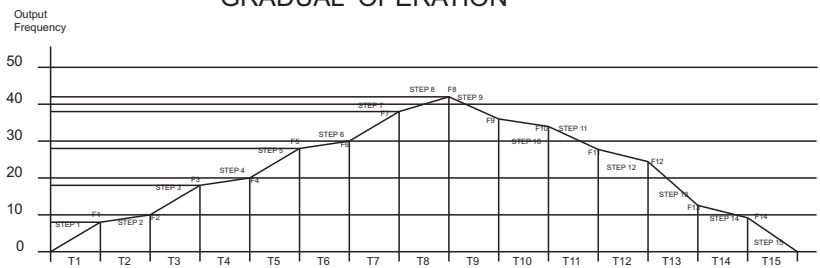
LINEAR OPERATION



2: Mode 2 (No wait time) -Gradual operation

In gradual operation frequency "F" increasing /decreaseing with respect to time "T" in all 16 steps .If the step frequency is set to Zero . the step will be ended .

GRADUAL OPERATION



FA.19 Multi-speed direction source selection	
Setting Range:0～1	Factory Setting :0

The multi-speed driection is external control when FA.16=0 .

The multi-speed driection decided by itself symbol when FA.16=1.

if FA.16 is negative . The multi-speed driection is reverse direction running . Frequency set to 100.0% corresponding to the maximum frequency (F0.04).

Multi-speed takes precedence over the keyboard, analog communication frequency input, can select up to 16 steps speed through a combination of coding Xn,specifically refer to the instructions F5 group parameter.

the start and stop chanel selection of multi-speed running are also determined by the function code F0.01.

FA.20 PLC Accel/Decel Time 1 Setting Range:0.01～3600.0s	Factory Setting:20.0s
FA.21 PLC Accel/Decel Time 2 Setting Range:0.01～3600.0s	Factory Setting:20.0s
FA.22 PLC Accel/Decel Time 3 Setting Range:0.01～3600.0s	Factory Setting:20.0s
FA.23 PLC Accel/Decel Time 4 Setting Range:0.01～3600.0s	Factory Setting:20.0s
FA.24 PLC Accel/Decel Time 5 Setting Range:0.01～3600.0s	Factory Setting:20.0s
FA.25 PLC Accel/Decel Time 6 Setting Range:0.01～3600.0s	Factory Setting:20.0s
FA.26 PLC Accel/Decel Time 7 Setting Range:0.01～3600.0s	Factory Setting:20.0s
FA.27 PLC Accel/Decel Time 8 Setting Range:0.01～3600.0s	Factory Setting:20.0s

FA.20 - FA.27 is used to set PLC acceleration and deceleration time of multi-speed 1-16.

FA.28 Acceleration Selection 1	Factory Setting : 0x1111
FA.32 Deceleration Selection 1	Factory Setting: 0x1111

Setting Range:

Unit's Place: Multi-Speed 1 FA.20-FA.27.

Decade : Multi-Speed 2 FA.20-FA.27.

Hundreds place: Multi-Speed 3 FA.20-FA.27.

Thousands place：Multi-Speed 4 FA.20-FA.27.

FA.29 Acceleration Selection 2	Factory Setting : 0x1111
FA.33 Deceleration Selection 2	Factory Setting: 0x1111

Setting Range:

Unit's Place : Multi-Speed 5 FA.20-FA.27.

Decade: Multi-Speed 6 FA.20-FA.27.

Hundreds place : Multi-Speed 7 FA.20-FA.27.

Thousands place ： Multi-Speed 8 FA.20-FA.27.

FA.30 Acceleration Selection 3	Factory Setting : 0x1111
FA.34 Deceleration Selection 3	Factory Setting: 0x1111

Setting Range:

Unit's Place : Multi-Speed 9 FA.20-FA.27.

Decade: Multi-Speed 10 FA.20-FA.27.

Hundreds place : Multi-Speed 11 FA.20-FA.27.

Thousands place ： Multi-Speed 12 FA.20-FA.27.

FA.31 Acceleration Selection 4	Factory Setting : 0x1111
FA.35 Deceleration Selection 4	Factory Setting: 0x1111

Setting Range:

Unit's Place : Multi-Speed 13 FA.20-FA.27.

Decade: Multi-Speed 14 FA.20-FA.27.

Hundreds place : Multi-Speed 15 FA.20-FA.27.

Thousands place ： Multi-Speed 16 FA.20-FA.27.

FA.36 Direction Selection 1	Factory Setting: 0x0000

Setting Range:

Unit's Place : Multi-Speed 1 (0-1) 0:Forward 1:Reverse

Decade: Multi-Speed 2 (0-1) 0:Forward 1:Reverse

Hundreds place: Multi-Speed 3 (0-1) 0:Forward 1:Reverse

Thousands place: Multi-Speed 4 (0-1) 0:Forward 1:Reverse

FA.37 Direction Selection 2	Factory Setting: 0x0000

Setting Range:

Unit's Place : Multi-Speed 5 (0-1) 0:Forward 1:Reverse

Decade: Multi-Speed 6 (0-1) 0:Forward 1:Reverse

Hundreds place: Multi-Speed 7 (0-1) 0:Forward 1:Reverse

Thousands place: Multi-Speed 8 (0-1) 0:Forward 1:Reverse

FA.38 Direction Selection 3	Factory Setting: 0x0000

Setting Range:

Unit's Place : Multi-Speed 9 (0-1) 0:Forward 1:Reverse

Decade: Multi-Speed 10 (0-1) 0:Forward 1:Reverse

Hundreds place: Multi-Speed 11 (0-1) 0:Forward 1:Reverse

Thousands place: Multi-Speed 12 (0-1) 0:Forward 1:Reverse

FA.39 Direction Selection 4	Factory Setting: 0x0000

Setting Range

Unit's Place : Multi-Speed 13 (0-1) 0:Forward 1:Reverse

Decade: Multi-Speed 14 (0-1) 0:Forward 1:Reverse

Hundreds place: Multi-Speed 15 (0-1) 0:Forward 1:Reverse

Thousands place: Multi-Speed 16 (0-1) 0:Forward 1:Reverse

FA.40 PLC Running Time 1 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.41 PLC Running Time 2 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.42 PLC Running Time 3 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.43 PLC Running Time 4 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.44 PLC Running Time 5 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.45 PLC Running Time 6 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.46 PLC Running Time 7 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.47 PLC Running Time 8 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.48 PLC Running Time 9 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.49 PLC Running Time 10 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)

FA.50 PLC Running Time 11 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.51 PLC Running Time 12 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.52 PLC Running Time 13 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.53 PLC Running Time 14 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.54 PLC Running Time 15 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)
FA.55 PLC Running Time 16 Setting Range : 0.0-6553.5 S(Min)	Factory Setting : 0.0S(Min)

FA.40- FA.55 is used to set PLC multi-speed running time 1-16.

Fb Group –Protection function

Fb.00 Motor overload protection Setting range :0～2	Factory setting :2

0：Disable.

without motor overload protection features (caution), at this time the drive don't have overload protection for the load motor.

1：For normal motor . (with low speed compensation) .the lower the speed,the poorer the cooling effect .based on this reason . If output frequency is lower tha 30Hz. The inverter will reduce the motor overload protection threshold to prevent normal motor from overheat .

2：The variable frequency motor (without low speed compensation). As the cooling effect of variable frequency motor has nothing to do with running speed . it is not required to adjust the motor overload protection threshold.

Fb.01 Motor overload protection current	
Setting range:20.0～120.0%	Factory setting:100.0%

If the power rating of the inverter do not match with the motor , you can modify the parameters to achieve the purpose of protecting the motor. as shown in Figure 6-28.

The value cn be determined by the following formula :

Motor overload protection current=(motor rated current/inverter rated current)*100%.

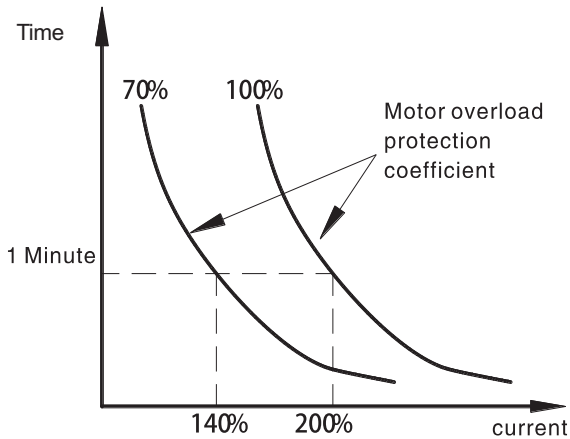


Figure 6-28 Motor overload protection curve

Fb.02 Momentary power drop frequency point	
Setting range :70.0～110.0%	Factory setting:80.0%
Fb.03 Momentary power drop frequency rate of decline	
Setting range:0.00～F0.04	Factory setting:0.00Hz

If Fb.03 is set to 0. Momentary power drop frequency is invalid .

Momentary power drop frequency point enable the inverter to perform low voltage compensation when DC bus voltage drops below Fb.02. the inverter can continue to run without tripping by reducing its output frequency and feedback energy via motor.

TIP

- Please adjust these two parameters properly .It can avoid in the switch of the power grid . and production stop caused by inverter protection .

Fb.04 Over-voltage stall protection Setting range : 0～1	Factory setting:1
Fb.05 Over-voltage stall protection voltage Setting range:110～150%	Factory setting:130%

0：Disable .

1：Enable

During deceleration .the motor's decelerating rate may be lower than that of inverter's output frequency due to the load inertia .at this time .the motor will feed the energy back to the inverter .resulting in DC bus voltage rise .If no measure taken .the inverter will trip due to over voltage .

Over-Voltage stall protection iis the inverter detects DC bus voltage .

And compares it with over voltage stall protection point Fb.05. (Relative to the standard bus voltage: 380V Series 530,220 V Series 310V).

If DC bus voltage exceeds Fb.05, the inverter will stop reducing its output frequency . when the DC bus voltage become lower than Fb.05. the deceleration continues , as shown in following figure 6-29.

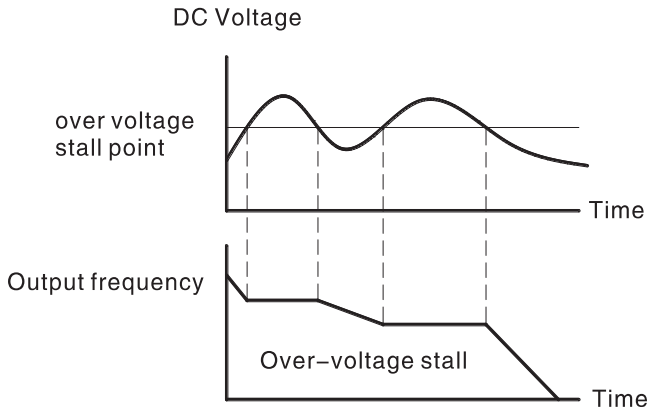


Figure 6-29 Over voltage stall function

Fb.06 Auto current limiting threshold Setting range: 20～200% Factory Setting: 160%
Fb.07 Frequency decrease rate when current limiting Setting range: 0.00～100.00Hz/s Factory Setting: 10.00Hz/s

Auto current limiting is used to limit the current of inverter smaller than the value determined by Fb.06 in real time. Therefore the inverter will not trip due to surge over-current. This function is especially useful for the applications with big load inertia or step change of load.

Fb.06 is a percentage of the inverter's rated current.

Fb.07 defines the decrease rate of output frequency when this function is active. If Fb.06 is too small, overload fault may occur. If it is too big, the frequency will change too sharply, therefore, the feedback energy of motor will be too large and may cause over-voltage fault. This function is always enabled during acceleration and deceleration. Constant speed current limiting is valid or not determined by Fd.09.

Note:

* During auto current limiting process, the inverter's output frequency may change; therefore, it is recommended not to enable the function when requires the inverter's output frequency stable.

* During auto current limiting process, if Fb.06 is too low, the overload capacity will be impacted.

Please refer to following figure.

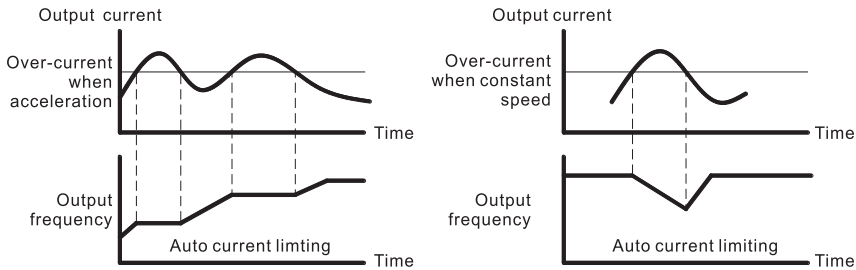


Fig 6-30 Auto current limiting function

Fb.08 Input phase loss protection selection	
Setting Range: 0～2	Factory Setting : Depend on the model

In standay (hardware detectiuon valid) or running (Software or hardward detection valid), The inverter will apprears LP input phase loss protection due to the power phase shortage and three phase input power imbalance

0: **Invalid**

1: **software detect is valid**

2: **hardware detect is valid**

- The software detection is only valid for the model G030T4/P037T4and G015T2 and below power.No hardware detection.While there have software and hardware options when the inverter is power bigger than 30kW.

Fb.09 Under load protection current	
Setting Range: 0～150.0	Factory Setting:0

Fb.10 Under load protection time	
Setting Range:5.0～6500.00s	Factory Setting:5.0s

FC Group Serial communication

FC.00 Local address	
Setting range: 0～247	Factory setting : 1

This parameter determines the slave address used for communication with master. The value "0" is the broadcast address.

FC.01 Baud rate selection	
Setting range: 0～5	Factory Setting: 4

This parameter can set the date transmission rate during serial communication. Note: The baud rate of master and slave address must be the same.

0：1200BPS
1：2400BPS
2：4800BPS
3：9600BPS
4：19200BPS
5：38400BPS

FC.02 Data bit check setting	
Setting Range : 0～17	Factory Setting :1

This parameter defines the baud rate in serial communication, and data format used in protocols , only a consistent format can be normal communication.

0:No parity check （N，8，1）for RTU
1: Even parity check（E，8，1）for RTU
2: Odd parity check（O，8，1）for RTU
3: No parity check（N，8，2）for RTU
4: Even parity check（E，8，2）for RTU
5: Odd parity check（O，8，2）for RTU
6: No parity check（N，7，1）for ASCII
7 Even parity check（E，7，1）for ASCII
8: Odd parity check（O，7，1）for ASCII
9: No parity check（N，7，2）for ASCII
10: Even parity check（E，7，2）for ASCII
11: Odd parity check（O，7，2）for ASCII
12: No parity check（N，8，1）for ASCII
13: Even parity check（E，8，1）for ASCII
14: Odd parity check（O，8，1）for ASCII
15: No parity check （N，8，2）for ASCII
16: Even parity check（E，8，2）for ASCII
17: Odd parity check（O，8，2）for ASCII

The upper computer and the data format of the inverter must be consistent . Otherwise , Communication can't work .

FC.03 Communication answer delay time	
Setting range: 0～200ms	Factory Setting: 5ms

Answer delay: The interval time between the data receiving of the inverter and data sending to the upper monitor. If the answer delay is shorter than the system time, then it is subject to the system time, and if the answer delay is longer than the system, then the waiting time should be prolonged after the data processing to achieve the answer delay and then to send data to the upper monitor.

FC.04 Communication timeout fault time	
Setting range: 0.0～200.0s	Factory Setting: 0.0s

If the function code is set to 0.0s, this parameter is invalid.

If the function code is set to a valid value, when the interval time exceeds the communication overtime, the system will report communication fault (CE 1).

Generally, the parameter is set to invalid. If the parameter is set in a continuous communication system, the communication state can be monitored.

If it doesn't receive correct data signal during the delay time of FC.04, the inverter will determine stop or remain the state according to the solution of communication fault.

FC.05 Communication error action	
Setting range: 0～3	Factory Setting: 1

0: Alarm and coast to stop

1: Do not alarm and keep running

2: Do not alarm and stop at the stopping method (only for communication control mode)

3: Do not alarm and stop at the stopping method (for all communication control modes)

In the abnormal situation, the inverter can act through setting communication fault processing. The selected running state of the inverter is: shield the CE fault, stop or keep running.

FC.06 Response action	
Setting range: 0～1	Factory Setting : 0

0: Response to reading and writing

1: No response to writing

FC.07 Communication parameters address mode	
Setting Range:0～1	Factory Setting :0

0: The address is calculated according to the parameter group.

1:The address is calculated in sequence.increased one by one since F0.00.

FC.08 Linkage proportion coefficient	
Setting Range:0.01～10.00	Factory Setting:1.00

when the local machine is set by the master inverter control . the setting frequency is given by the main station . the parameter is used to set the local machine as a slave via RS485/RS232 interface receiving the weight coefficient of the frequency command .

The actual setting frequency of the load machine is equal to the value of the parameter is multiplied by RS485 / 232 interface receives the frequency setting command value.

FC.09 Linkage proportion source selection	
Setting Range:0～4	Factory Setting:0

0：Keypad or Encoder Setting（FC.08）

1：Annlog AVI setting

2：Annlog ACI setting

3：Multi-stage setting

4：Keyboard or encoder direct setting

Fd Group Supplementary function

Fd.00 Low-frequency threshold of restraining oscillation	
Setting range: 0～500	Factory Setting: 5
Fd.01 High-frequency threshold of restraining oscillation	
Setting range: 0～500	Factory Setting:5

Most motors may have current oscillation at some frequency point. Please be cautious to adjust these parameters to weaken oscillation.

This function is only valid when Fb.04 is set to be 0. The smaller the value of Fd.00 and Fd.01, the stronger the restraining effect.

Fd.02 Amplitude of restraining oscillation	
Setting range: 0～100	Factory Setting: 10

This parameter is used to limit the strength of restraining oscillation. If the value of Fd.02 is too big, it may cause inverter over current. It should be set a little bit smaller for large power motor, vice versa.

Fd.03 Threshold high-low frequency of restraining oscillation	
Setting range: 0.00～F0.04	Factory Setting : 12.50Hz

If output frequency is greater than Fd.00 takes effect, otherwise Fd.01 takes effect.

Fd.04 Restrain oscillation	
Setting range:0～1	Factory setting:1

0：Enabled

1：Disabled

Motor always has current oscillation when its load is light. This will cause abnormal operation even over-current. For details, please refer to description of Fd.00~Fd.03.

Fd.05 PWM mode	
Setting range: 0～2	Factory Setting: 0

0: PWM mode 1 with low noise in lower frequency and high noise in higher frequency.

1: PWM mode 2 with low noise. But it is need to be derated, because of higher temperature rise.

2: PWM mode 3 with high noise. But it can more effectively restrain the oscillation.

Fd.06 Torque setting mode selection	
Setting range: 0～5	Factory Setting: 0
Fd.07 Keypad torque setting	
Setting range: -200.0～200.0%	Factory Setting: 50%

0: Keypad

1: AVI

2: ACI

3: AVI+ACI

4: Multi-step setting

5: Communication

When torque control takes effect,

If Tset＞Tload , output frequency will increase continuously until it reaches upper frequency limit.

If Tset＜Tload， output frequency will decrease continuously until it reaches lower frequency limit.

Inverter can run at any frequency between upper and lower frequency limit only when Tset＝Tload。

Torque control can be seitched to speed control, vice versa.

Switching by multi-functional terminal: For example, if torque control is enabled (P0.00=2), torque setting source is AVI, the value of multi-function terminal S5 is set to 20 (Disable torque control). When S5 is valid, control mode will switch from torque control to speed control, vice versa.

When running at torque control mode, press the key: STOP/ RST, it will seitch to speed control automatically.

If torque setting is positive, inverter will run forward; otherwise it will run reverse.

Note:

When running at torque control mode, the acceleration time has nothing to do with F0.08.

The 100% of torque setting is corresponding to 100% of F3.07 (Torque limit). For example, if torque setting source is keypad (Fd.06=0), Fd.07=80% and F3.07= 90%, then Actual torque setting =80% (Fd.07)*90% (F3.07) = 72%.

Fd.08 Upper frequency limit selection	
Setting range:0～4	Factory Setting:0

0: Keypad

1: AVI

2: ACI

3: Multi-step setting

4 : Communication

The 100% of this parameter is corresponding to 100% of F0.04 (maximum frequency). When running at torque control mode, output frequency can be adjusted by changing upper frequency limit.

Fd.09 Auto current limiting selection	
Setting range:0～1	Factory Setting:0

0: Enabled when constant speed

1: Disabled when constant speed

This function is always enabled during acceleration or deceleration period.

Auto current limiting function is used to prevent inverter trip over-current from surge current. It is especially useful for the applications with big load inertia or step change of load.

Note: During auto current limiting process, the inverter's output frequency may change; therefore, it is recommended not to enable the function when output frequency need to be stable.

Fd.10 Lower limit frequency running mode	
Setting range :0～1	Factory Setting :0

Action mode when running frequency reached to lower limit frequency .

0: lower limit frequency running

1:Zero frequency running and DC braking .

Fd.11 Zero-frequency running braking current	
Setting Range:0.0～150.0%	Factory Setting :0.0%

Set value of DC braking current when Zero frequency operation .It's invalid when Fd.11=0%

Chapter 7 Common Fault &Anomalies and Solutions

7.1 Fault Code and Solutions

Table7–1 Common problem and solutions

Fault code	Fault Type	Reason	Solution
ocA	Over-current when acceleration	①Acc time is too short. ②The load inertia is too big. ③The torque increases too fast or V/F curve is abnormal. ④The voltage of the power supply is too low. ⑤The power of inverter is too low. ⑥Restart the rotating motor after sudden power loss.	①Increase Acc time. ②Reduce the load inertia. ③Lower the load lift or adjust V/F curve. ④Check the power of supply line. ⑤Select a bigger capacity inverter. ⑥Set the start mode F1.00 to rotating tracking start
ocd	Over-current when deceleration	①Dec time is too short. ②The inertia of the load inertia is too strong. ③ The power of the inverter is too low.	① Increase dec time. ②Decrease the inertia of the load. ③Select a bigger capacity inverter.
ocn	Over-current when constant speed running	①The input power is abnormal. ②The load is transient. ③The power of the inverter is too low.	①Check the input power ②Decrease the load transients. ③Select a bigger capacity inverter.
ouA	Over-voltage when acceleration	①The input voltage changes abnormally. ②Restart the rotating motor after sudden power loss.	①Check the input power. ②Set the start mode F1.00 to rotating tracking start
oud	Over-voltage when deceleration	①Dec time is too short. ②Energy feedback loads ③The input power is abnormal.	① Increase dec time. ②Select the proper energy-consumption braking components ③ Check the input power.
oun	Over-voltage when constant speed running	①The input power is abnormal. ②Energy feedback loads ③ Voltage detection channel	①Check the input power. ②Install or select the proper energy-consumption braking components ③ Ask for sevice.

Fault code	Fault Type	Reason	Solution
ouS	Over-voltage when stop	①The input power is abnormal.	① Check the input power.
Lu	Under voltage when running	①The input voltage is too low. ②Sudden power loss. ③Input power fault. ④Poor contact of the DC circuit. ⑤Contactor with poor contact.	①Check the input voltage ②Reset the inverter and check the input power. ③Check the input power of the grid. ④Check the main circuit or ask for service. ⑤Check the contactor or ask for service.
LP	Iutput phase loss	① R,S and T phase loss	①Check the input voltage ②Check installtion distribution
SPO	Output phase loss	①U,V and W phase loss or serious asymmetrical three phase of the load	①Check installtion distribution ②Check the motor and cable
SC	IGBT overheat	①There is direct or indirect short circuit between output 3 phase ②Sudden current of the inverter ③ Ambient temperature is too high. ④Air duct jam or fan damage ⑤The DC assistant power supply is damaged. ⑥The control panel is abnormal.	①Check the distribution. ②Refer to the overcurrent solution. ③Low the ambient ④Dredge the wind channel or change the fan. ⑤Ask for service ⑥Ask for service
oHI	Cooler overheat	①Ambient temperature is too high. ②fan damage ③Air duct jam	①Low the ambient ②change the fan. ③Dredge the wind channel
oL I	Motor overload	①The torque increases too fast or V/F curve is abnormal. ②The voltage of the power supply is too low. ③The motor stall or load transients is too strong; ④The setting of motor overload coefficient is improper.	①Lower the value of torque increses or adjust V/F curve. ②Check the power of supply line. ③ Check the load and motor; ④Set the proper coefficient Fb.01.

Fault code	Fault Type	Reason	Solution
oL2	Inverter overload	①The torque increases too fast or V/F curve is abnormal ②Acc. Time is too short. ③The load is too large ④The voltage of the grid is too low	①Lower the value of torque increses or adjust V/F curve ②Increase the Acc. Time ③ Select a large power inverter ④ Check the voltage of the grid
EF	External fault	①The input terminal of external fault take effect	①Check the external devece
I tE	Current detection fault	①Hoare components is broken or circuit fault ②The DC assistant power fault	①Ask for service ②Ask for service
tE	Autotuning fault	①The motor capacity doesn't comply with the inverter capacity ② The rated parameter of the motor does not set correctly ③The offset between the parameters from autotune and the standard parameter is huge ④Autotune overtime	①Change the inverter mode ②Set the rating parameters according to the nameplate of the motor ③Empty the motor and identify again ④Check the motor wiring and set the parameters
EEP	EEPROM fault	①Error of the write and read of the controlling parameters ②Damage to EEPROM EEPROM	①Ask for service ②Ask for service
PI dE	PID feedback fault	① PID feedback offline PID ②PID feedback source disappear PID	①Check the PID feedback signal wires ②Check PID feedback source
dCE	The main chip fault	①Damage to the main chip	①Seek service

Fault code	Fault Type	Reason	Solution
CE-1	RS485 communication fault	①The baud rate setting is incorrect ②Communication fault ③The communication is off for a long time	①Set proper baud rate ②Check the communication wires. ③Check the communication connection disconnection
CE-4	Keypad communication fault	①The circuit of connecting board and keypad is out of work ②The wires between connecting board and keypad disconnect	①Ask for service ②Check and reconnect it
EAA1	Data upload fault		
EAA2	Data download fault		

7.2 Anomalies and Solutions

Table 7–2 Common faults and solutions

Fault	Reason	Solutions
No display after power on	1.Power grid voltage below 2.DC accessory power supply 3. Charging resistor damaged	①Check the voltage of the grid ②Ask for service ③Ask for service
Power trip	1.Short circuit in the inverter's input side 2. Exiguous air switching capacity	1. Check wiring or seek service 2. Expand air switching capacity
Motor doesn't move	1.Incorrect wiring 2.Error setting of operation	1. Check wiring 2. Reset the operation mode

	mode; 3. Overload or motor stalled	3.Reduce loads or regulate motor's status.
Motor reverse	①Error phase sequence of motor wiring	①Swap random two phases of the output terminals U, V and W
Motor cannot accelerate or decelerate normally	①Acc/Dec time setting is improper ②The setting of over-current stall point is low ③Over-voltage stall prevention enabled ④Improper setting of carrier frequency or oscillation occurred ⑤The load is large	①Reset the Acc/Dec time ②Increase the setting value of over-current stall point ③Increase the dec. Time or reduce load inertia ④Reduce the carrier frequency ⑤Lower the load or replace a larger power inverter
Motor's speed fluctuates while at constant speed.	1.Excessive fluctuation of loads 2.Under setting of motor's overload protection coefficient 3. Loose contact of frequency setting potentiometer	1. Reduce load fluctuation 2. Increase overload protection coefficient 3.Replace the potentiometer or seek service

Chapter 8 Inverter Inspection and Maintenance

8.1 Inspection and Maintenance

The following influences may lead to latent failure of the inverter such as ambient temperature, humidity, dust, vibration, as well as device ageing other causes of the inverter itself during long–period operation on indus occasions. So it is necessary to perform daily and periodic inspections an maintenance on the inverter.

8.1.1 Daily Inspection Items

Table 8-1 Daily Check List

Target of Inspection	Check cycle Content	Inspection	Inspection Method	Criteria	Measuring Instrument
Operating ambient	• Ambient • temperature • Humidity, Dailydust, corrosivegas, oil mist and etc.	Daily	• Thermo -meter test • Nose Inspection • Visual Inspection	• ambient temperature between -10 to 40℃ no-condensing; • Humidity between 20 to 90% no dew or special odo	• Thermo-meter • Hygrometer
Inverter	• Vibrati on • Heat • Noise	Daily	• Touch the housing; • Hearing check	• Stable vibration • Normal temperature • No abnormal noise	

Motor	• Vibrati on • Heat • Noise		• Touch the • housing • Hearing check	• Stable vibration • Normal temperature • No abnormal noise	
Electric Parameter	• Input voltage • Output voltage • Output current		• Meter test	• Each electric Parameter is within the rated value.	• Moving-iron voltmeter • Rectifier voltmeter • Clamp meter

● Make sure that only qualified personnel will pertorm maintenance. inspection and part replacement to avoid accidents.
● Wait at least 10 minutes after turning OFF the input power supply berore performing maintenanceor an inspection. Otherwise, there is the danger of electric shock.
● Make sure toopen the front panel only after the indicator on the control keypad turns OFF and verify the charging indicator at the right side of main loop terminal is OFF after the panel is opend.
● Do use an insulated appliance while performing check and do not operate the equipment with wet hand(s) to avoid unexpected accidents.
● Always keep the equipment clean so that dust and other foreign matter does not enter the inverter.
● Keep electronic equipment away from moisture and oil. Dust, steel filings and other foreign matter can damage the inverier, causing unexpected accidents. so do take a special care.

8.1.2 Periodic Inspection Items

Table 8–2 Periodic Inspection Items

Target or Inspection	Inspection Items	Contents of Inspection	Inspection Cycle	Inspection Method	Criterias
Main circuit	Overall	• Check if there is any loose connector or terminal. • Check if there is any device burnt.	Regular	Visual	• No loose connector or loose terminal. • No burnt device
	Main power module	• Check if it is damaged or not.	Regular	Visual	• No sign of damage..
	Filter capacitor	• Check if there is any leakage. • Check if there is any inflation.	Regular	Visual	• No leakage; • No inflation.
	Relay	• Check if there is any abnormal sound of actuation. • Check if dust has been cleaned.	Regular	• Visual • Hearing check	• Normal sound; • Clean.
Main circuit	Resistor	• Check if there is any big crack. • Check if the color is abnormal.	Regular	Visual	• No crack. • Normal color.
	Fan	• Check if there is any abnormal noise	Regular	Visual Audio	• Normal sound and stable

		or vibration.			vibration.
	PCB	• Check if dust has been cleaned	Regular	Visual	• Neat and clean.
Control circuit	FPC strand socket	• Check if it is loose.	Regular	Visual	• No loose connection.
	Overall	• Check there is any special odor or discoloring. • Check if there is any crack.	Regular	Nose or Visual inspection	• No odor and discoloring; • No crack, smooth surface.
Keyboard	LED	• Check if the LED display is normal.	Regular	Visual	• Normal and clear
	Connecting cable	• Check if there is any scratch. • Check if it is connected tightly.	Regular	Visual	• No scratched surface. • No loose connection.

●Do not remove or shake the device arbitrarily, nor pull out the connector during inspection. Otherwise, this may result in inverter failure or damage.
●Do not leaveany inspection tool(ie., a screwdriver) in the machine after periodic check. Otherwise. there is the danger of damage to the inverter.

8.2 Replacement of the Inverter Wearing Parts

The wearing parts of inverter mainly include cooling fan and filter electrolytic capacitor. Usually, a cooling fan's service life is 20,000~30,000 hours and an electrolytic capacitor's service life is 40,000~50,000 hours. User can decide when to replace these parts according to the corresponding operation time.

1. Cooling Fan

It is advisory to replace the fan when abnormal noise or even vibration occurred to the fan due to bearing wear and fan blade aging. The standard replacement age is 2~3 years.

2 Filter Electrolytic Capacitor

The performance of filter electrolytic capacitor is subject to the pulsating current of main circuit. High ambient temperature or frequent load jump may cause damage to the filter electrolytic capacitor. Generally, every 10 ℃ rise in temperature may lead to reduction of capacitor’s service life by half(as shown in Fig.8–1).if there is any electrolytic leakage of safety valve emission. Just replace it at once, the standard replacement age for electrolytic capacitor is 4~5 years

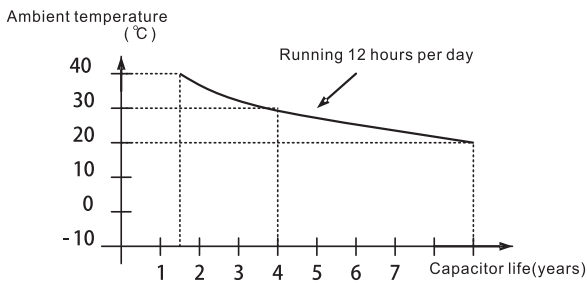


Fig.8-1 Capacitor Life Curve

3. The above replacement duration for inverter's wearing parts is applied to the following conditions:

- Ambient Temperature:30℃ averagely all year round;
- Load Proportion: <85%;
- Operation Time: 12h/day.

If used beyond the above mentioned range, the service life of the inverter's wearing parts will minimize.

8.3 Storage of Inverter

Please pay attention to the following points if an inverter is set aside or stored for a short/long period:

- DO not keep the inverter in a place with high temperature, humidity, heavy dust, and metal shavings, corrosive gas and vibration, and ensure good ventilation.
- Long–term idle of the inverter may cause decreasing in filter characteristic of the electrolytic capacitor. So it should be recharged within half a year and the recharging period should be at least 5 hours.
- DO raise the voltage gradually by using a voltage regulator to some rated value before it is recharged. At the same time, check whether the inverter's function is normal or not, whether there is a short circuit caused by some problems. In case the above problems occur. just remove or seek service as soon as possible.

Chapter 9 Outline Dimension & Mounting Dimension

9.1 Inverter Outline Dimension & Mounting Dimension

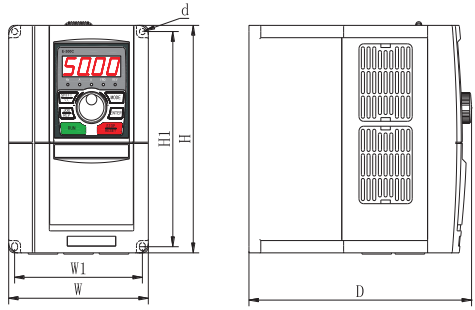


Fig.9 – 1 (Model A) Inverter Outline & Dimension

Inverter Model	Power (kW)	Dimension(mm)						Fig.
		H	H1	W	W1	D	d	
ZVF300H-G0R4T2/S2	0.4	185	175	118	108	170	Φ5	Fig 9-1
ZVF300H-G0R7T2/S2	0.75							
ZVF300H-G0R7T4	0.75							
ZVF300H-G1R5T4	1.5							
ZVF300H-G2R2T4	2.2							
ZVF300H-G1R5T2/S2	1.5	185	175	118	108	190	Φ5	Fig 9-1
ZVF300H-G2R2T2/S2	2.2							
ZVF300H-G3R7/P5R5T4	3.7/5.5							
ZVF300H-G3R7T2/S2	3.7	215	205	145	135	193	Φ5	Fig 9-1
ZVF300H-G5R5/P7R5T4	5.5/7.5							
ZVF300H-G7R5/P011T4	7.5/11							
ZVF300H-G5R5T2	5.5	265	253	185	174	215	Φ6	Fig 9-1
ZVF300H-G011/P015T4	11/15							
ZVF300H-G015/P018T4	15/18.5							
ZVF300H-G7R5T2	7.5	385	370	220	150	210	Φ7	Fig 9-2
ZVF300H-G011T2	11							
ZVF300H-G018/P022T4	18.5/22							
ZVF300H-G022/P030T4	22/30							

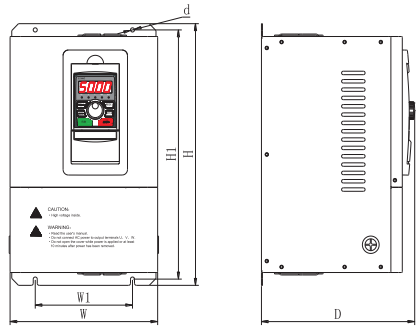


Fig. 9－2 (Model B) Inverter Outline & Dimension

Inverter Model	Power (kW)	Dimension(mm)						Fig.
		H	H1	W	W1	D	d	
ZVF300H-G015T2	15	450	435	260	180	225	Φ7	Fig.9-2
ZVF300H-G018T2	18.5							
ZVF300H-G030/P037T4	30/37							
ZVF300H-G037/P045T4	37/45							
ZVF300H-G022T2	22	510	490	320	220	275	Φ9	Fig.9-2
ZVF300H-G030T2	30							
ZVF300H-G045/P055T4	45/55							
ZVF300H-G055/P075T4	55/75							
ZVF300H-G037T2	37	570	550	380	260	320	Φ9	Fig.9-2
ZVF300H-G045T2	45							
ZVF300H-G055T2	55							
ZVF300H-G075/P090T4	75/90							
ZVF300H-G090/P110T4	90/110							
ZVF300H-G110/P132T4	110/132							
ZVF300H-G132/P160T4	132/160							
ZVF300H-G075T2	75	800	775	460	350	330	Φ11	Fig.9-2
ZVF300H-G090T2	90							
ZVF300H-G160/P185T4	160/185	1100	-	460	-	330	-	Fig.9-3
ZVF300H-G185/P200T4	185/200							
ZVF300H-G110T2	110	900	870	550	400	330	Φ13	Fig.9-2
ZVF300H-G200/P220T4	200/220	1200	-	550	-	330	-	Fig.9-3
ZVF300H-G220/P250T4	220/250							

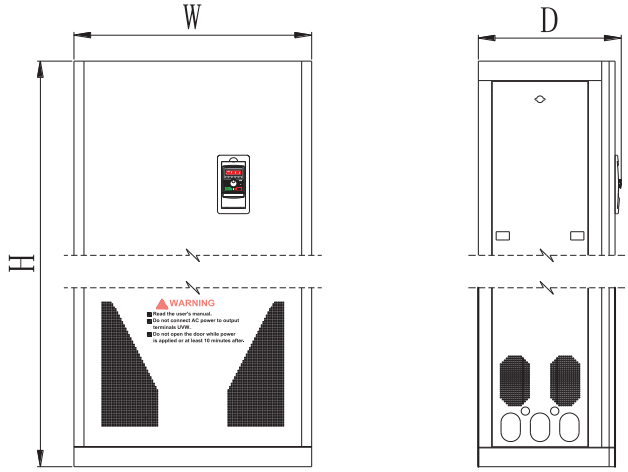


Fig.9—3 (Model C) Inverter Outline & Dimension

Inverter Model	Power (kW)	Dimension(mm)						Fig.
		H	H1	W	W1	D	d	
ZVF300H-G250/P280T4	250/280	950	920	650	550	385	Φ13	Fig.9-2
ZVF300H-G280/P315T4	280/315	1300	-	650	-	385	-	Fig.9-3
ZVF300H-G280/P315T4	280/315	1600	-	660	-	415	-	Fig.9-3
ZVF300H-G315/P350T4	315/350							
ZVF300H-G350/P400T4	350/400	1750	-	750	-	470	-	Fig.9-3
ZVF300H-G400/P450T4	400/450							
ZVF300H-G450/P500T4	450/500	1900	-	950	-	520	-	Fig.9-3
ZVF300H-G500/P560T4	500/560							
ZVF300H-G560/P630T4	560/630							
ZVF300H-G630T4	630							

9.2 Keypad Outline Dimension & Mounting Dimension

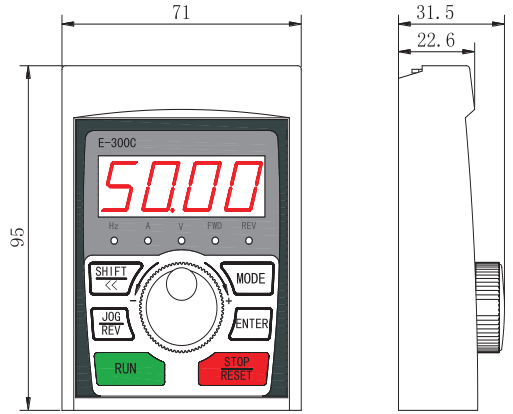


Fig. 9 – 4 Dimension of E–300 keypad

TIP

- Extra mounting frame shall be assembled when E–300 operation panel is pulled out to install.
- Two installation frame are below :Fig.9–5 .Fig 9–6.

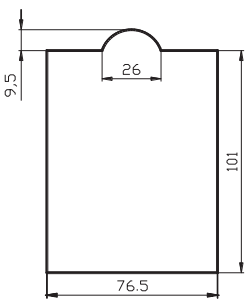


Fig.9 – 5 Hole dimension 1 of keypad.

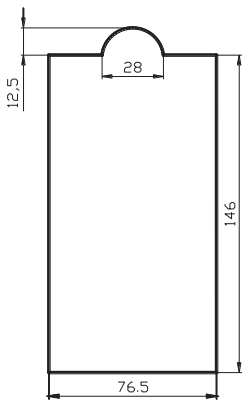


Fig.9 – 6 Hole dimension 2 of keypad

Chapter 10 Quality Warranty

1.Warranty Period under Normal Conditions

- We provide guarantees for repair, replacement and return of the purchase in 1 month from the date of use. (excluded the non–stantard inverters.)
- We provide guarantees for repair and replacement in 3 months from the date of use.
- We provide guarantee for repair in 12 months from the date of use.

2. If the date of use can not be verified, then the warranty period shall be 18 months from the date of manufacturer. Service exceeding the warranty period shall be charged to the purchaser. The purchaser enjoys life–long paid service whenever and wherever he Uses an inverter made in our company.

3. Service in the following cases, even within the warranty period, shall be charged to the purchaser:

- Damage caused by mal–operation in violation of this manual;
- Damage caused by improper use of an inverter that is off technical standard and requirement;
- Malfunction or damage caused by fire, earthquake, flood, abnormal input voltage or other natural disasters;
- Artificial damage caused by unauthorized repair or renovation;
- Induced failure or aging of the device due to poor ambient;
- Delayed or unsatisfied payment in violation of purchase appointment;
- Unidentifiable nameplate, mark and date of manufacture
- Malfunction or damage caused by improper transit or storage after purchase;
- Fail to give an objective description on the use of installation, wiring, operation, maintenance or else;
- Defective products should be sent to us for repair, replacement and return, which can be proceeded only after verifying the burden of liability

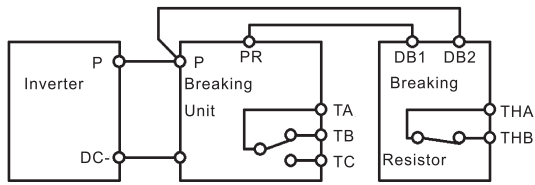
4. In case there is any quality problem or accident, we merely promise to bear the above–mentioned responsibilities. If a user needs more guarantees for liabilities, please assure on the insurance company voluntarily

Appendix 1 : Optional Parts Selection

All the optional parts can be ordered from us if need .

1. Brake Assembly

The brake assembly consists of two parts: braking unit and braking resistor. It is necessary to install a brake assembly on the occasion that quick stop is required though there is a heavy potential load (e.g., elevator) or inertia load.



Appendix 1–1 Brake assembly wiring diagram

- The inverters ZVF300H–G132/P160T4 and below have built–in braking unit . When breaking torque of the internal break assembly is low, you can add an extra breaking resistor.
- When install braking unit. please consider the safety of ambient environment
- About the specific parameters and the function, please refer to the user's manual of break assembly.

Table Appendix 1–1 Recommended Brake Assembly Matching Specifications

Inverter		Breaking Unit		Breaking Resistor		
Voltage	Motor (kW)	Model	Qty (PCS)	Recommended resistor value	Resistor specification	Qty (PCS)
220V	0.75	Built-in		80W200Ω	80W200Ω	1
	1.5	Built-in		160W100Ω	160W100Ω	1
	2.2	Built-in		300W70Ω	300W70Ω	1
	3.7	Built-in		400W40Ω	400W40Ω	1
380V	0.75	Built-in		80W750Ω	80W750Ω	1
	1.5	Built-in		160W400Ω	160W400Ω	1
	2.2	Built-in		300W250Ω	300W250Ω	1
	3.7	Built-in		400W150Ω	400W150Ω	1
	5.5	Built-in		600W100Ω	600W100Ω	1
	7.5	Built-in		800W75Ω	800W75Ω	1
	11	Built-in		1000W50Ω	1000W50Ω	1
	15	Built-in		1500W40Ω	1500W40Ω	1
	18.5	Built-in		2500W35Ω	2500W35Ω	1
	22	Built-in		3000W27.2Ω	1500W54Ω	2
	30	Built-in		5000W19.2Ω	2500W40Ω	2
	37	Built-in		6000W16Ω	2000W50Ω	3
	45	Built-in		9600W13.6Ω	2500W54Ω	4
	55	Built-in		12000W10Ω	2000W60Ω	6
	75	Built-in		16000W7.5Ω	2000W60Ω	8
	90	Built-in		19200W6.8Ω	2500W54Ω	8

2. Remote operation adapter and extended cable

There are two options for remote operation of ZVF300H series inverters. For the distance ⩽ 15m, you can directly use the extended shielded cable to connect with the operation panel. Our company can provide users with 1m, 1.5m, 2m, 3m, 5m, 10m, etc. A standard specification extended shielded cable, if users have special requirements for length, they can be customized to our company.

- When performing remote operation wiring, be sure to cut off the power supply.
- Installation steps:Follow the method in 3.2.2 of this manual.

3.Serial Communication(COM)

The ZVF300H series inverter has a built-in standard RS485 communication interface, and its control terminal can be connected to an RS485 communication cable to realize network control or proportional linkage control.

The RS485 serial communication protocol of the ZVF300H series inverter can run under Windows98/2000. Its monitoring software has a friendly man-machine interface, which can conveniently realize the inverter's network operation, monitoring and other functions. If necessary, you can contact the company's user service center or agent.

Appendix 2: EMI Prevention

Appendix 1: Inverter System EMI Prevention

The electromagnetic environment is very complicated in industrial occasions. Besides, the inverter's working principle also decides that EMI exists in the inverter itself. So it is very important to solve EMC problems effectively to ensure reliable running of the system in such a comprehensive condition. In this chapter, we give a research on EMC and provide corresponding solutions to EMC, in hope of being helpful to you to solve practical problems.

(1) EMI Types and propagation mode

Table Appendix 2-1

Type	Propagation mode
Conducted interference A	1.Common–base impedance coupling 2.Common source impedance coupling
Radiated interference	1.Near field coupling 2.Far field coupling
Inductive interference C:	1.Electric coupling 2.Magnetic field induction

(2) Inverter System EMC Solutions

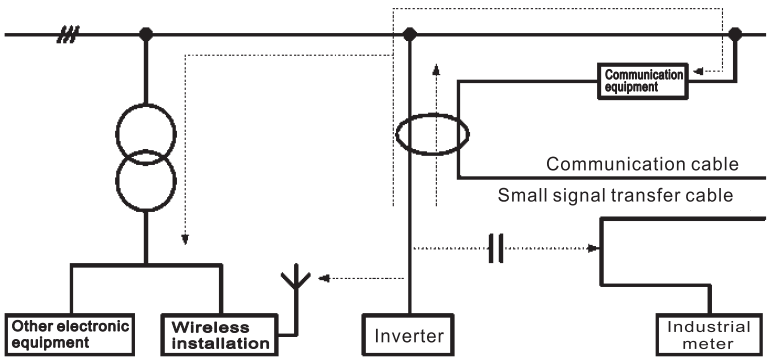
Power supply input cable

1.The distortion of power grid waveform caused by superimposed higher harmonic current arisen out of nonlinear rectifier circuit to source impedance may lead to interference over other electrical equipment under the same power grid. This kind of interference is named type A interference.

type A interference.

2.The power current and higher harmonic current brings in alternating electromagnetic field around the circuit cable, which results in electric field coupling and magnetic flux inductive coupling to the nearer parallel cable such as the communication cable, small signal transmission cable and etc. This kind of interference is named type C① or C② interference.

3.Due to antenna effect of the cable's shielding layer, interference may b produced over external wireless installation. This kind of interference is named type B① interference.

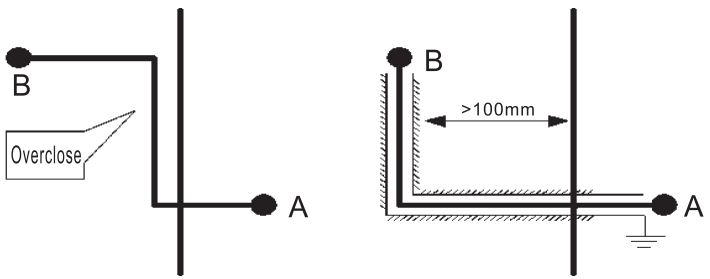


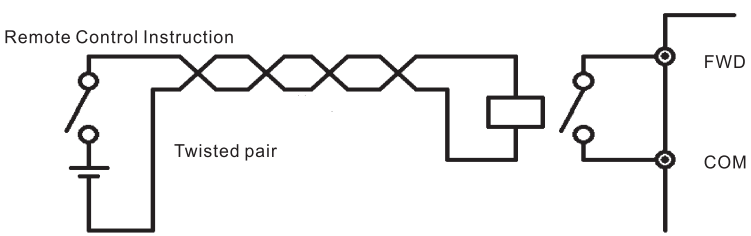
Propagation Diagram of Input Cable's Interference over External Equipment

Solutions:

1. This type of interference can be suppressed by installing an EMI power supply filter or isolation transformer in the power supply input side.

2. This type of interference can be suppressed through well ordered wiring or shielding. For example, the signal cable may adopt shielded wire and the shielding layer shall be firmly grounded to reduce magnetic flux inductive coupling and electric field coupling. The signal cable should be at least 100mm away from the power cable. If the signal wire and the power cable intersect, please intersect orthogonally. Generally speaking, it is not advisory to use an overlong signal wire. If the operation instruction is far from the inverter, then it is recommended to use an intermediate relay to have a control over it, as shown in the figure below.





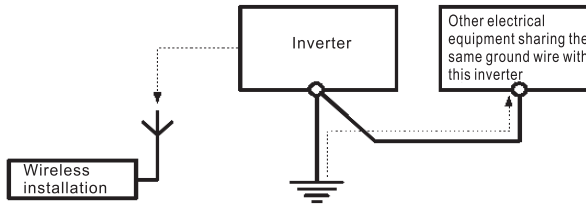
3. This type of interference can be suppressed by a good earth ground of the

cable's shielding layer or by installing a wireless noise filter(i.e., aferrite bead).

Inverter Body

1. The leakage of high frequency electromagnetic field (EMF) produced by the high speed switch of the power elements inside the inverter through the inverter's metal slit can result in radiated interference over external wireless installation. This kind of interference is named type B① interference.

2. When other electrical equipment (including other inverters) share the same ground with this inverter, then type A ①interference will be produced over other equipment if the ground wire impedance is high at this time.



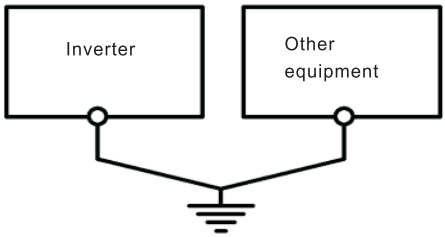
Propagation Diagram of Inverter Body's Interference over External Equipment

Solutions

1. Type B interference can be suppressed by a good earth ground of the inverter housing or by installing the inverter in a well–shielded metal cabinet. Generally radiated interference produced by the inverter body has less influence on the external equipment.

2. It is recommended that other equipment had better connect to the ground

through an independent ground wire and share the same or different point beyond the earth electrode with the inverter, as shown in the figure below. ter (i.e., a ferrite bead).

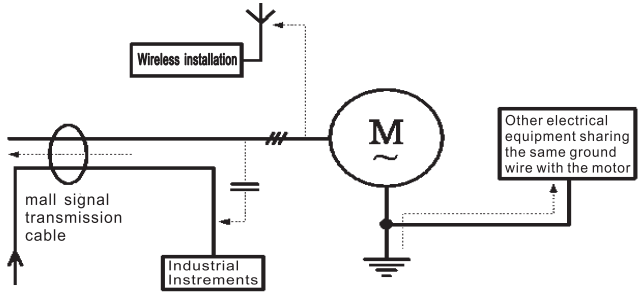


Motor Cable

1. The electromagnetic field (EMF) caused by fundamental current has weaker effect on electric field coupling and magnetic flux inductive coupling of the parallel cable. While the EMF produced by the higher harmonic current has stronger effect on electric field coupling.

2. Radiated interference.

3. Due to the existence of distributed capacity, there is high frequency earth leakage current and inter phase leakage current in the cable, which may lead to malfunction of some leakage protection devices such as circuit breaker, relay and other equipment. DO attach importance to these things.



Propagation Diagram of Motor Cable's Interference over External Equipment

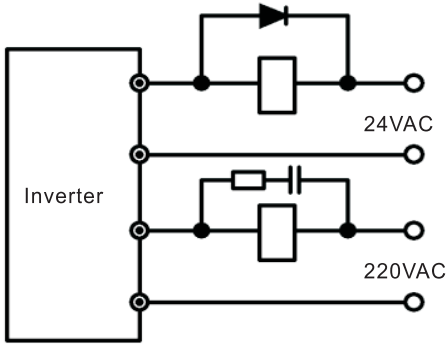
Solutions

1.The basic solutions are the same with the defense of electromagnetic countermeasures of a power cable.

2.Install an output wireless noise filter and keep the sensitive equipment away from the motor cable; or the motor cable adopts a well grounded shielded cable and insert this cable in a metal pipe.

3. Use an insensitive leakage protection breaker for the inverter system only; reduce carrier frequency of the inverter; or use an AC (output) reactor to solve this kind of problems. Relay, contactor and other electromechanical elements

Instantaneous current and voltage surge will be caused by the close and ope of the switch devices such as relay, contactor and etc, which may result in discharging radiation and conductive surge noise. This instantaneous no be prevented when designing the peripheral circuit of the inverter, as sho figure below



As for a 24VDC controlled relay a shunt winding continuous current diode should be inserted at both ends of the coil and pay attention to the polarity of diode. As for a 220V AC controlled contactor; an over–voltage suppressor should be mounted at both ends of the coil (i.e., RC network). Also, the protection of switch contact can not be ignored. This can be realized by forming a shunt winding RC or RCD buffered network, as shown in the figure below

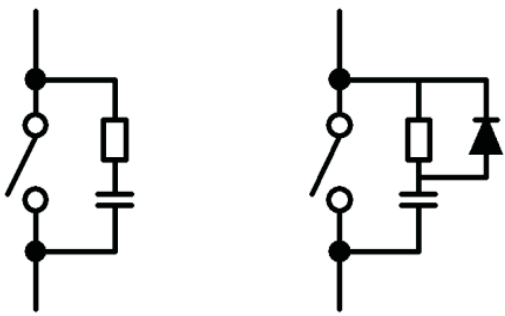


Table Appendix 2-2 Conventional Symbols Illustration

NO.	Name	Figure symbol	NO.	Name	Figure symbol
1	AC motor		2	Frequency meter	
3	Power meter		4	Signal light	
5	Ammeter or Galvanometer		6	Voltmeter	
7	Main circuit terminal		8	Control loop terminal	
9	Contactor		10	Circuit breaker	
11	Thermal relay		12	Relay coil	
13	Reactor		14	Operational amplifier	
15	Diode		16	Optoelectronic coupler	
17	Switch		18	Dc power supply	
19	Non-polar capacitor		20	Polar capacitor	
21	Triode(type NPN)		22	Triode(type PNP)	
23	Discharge tube		24	Piezo-resistor	
25	resistor		26	potentiometer	

Appendix 3: RS485 Communication Protocol

ZVF300H series inverter adopts the popular MODBUS communication protocol under RS485 communication control. Before using RS485 communication, inverter address, communication baud rate and data format must be manually set, and these parameters cannot be modified during the communication process.

MODBUS communication protocol uses two codes: ASCII (American Standard Code for Information Interchange) or RTU (Remote Terminal Unit). ASCII code is to convert the data to be transmitted into the corresponding ASCII before transmission, while RTU is to transmit the data directly without conversion.

ASCII encoding format:

Each Byte data is composed of two ASCII codes, for example: 0x1F, ASCII is represented by '1F', which is composed of '1' (31Hex) and 'F' (46Hex) respectively. The following is the ASCII code of 0-9, A-F.

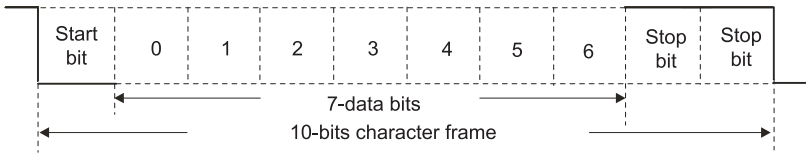
Character	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'
ASCII code	30H	31H	32H	33H	34H	35H	36H	37H
Character	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

RTU encoding format, each Byte data is composed of two 4-bit hexadecimal characters, for example: 0x1F RTU means '1FH'.

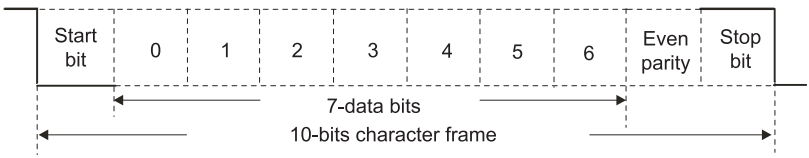
Character structure

10-bit character box (for 7-bit characters):

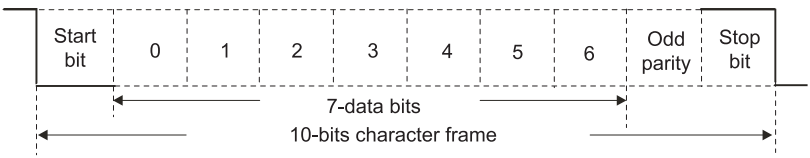
(7, N, 2)



(7, E, 1)

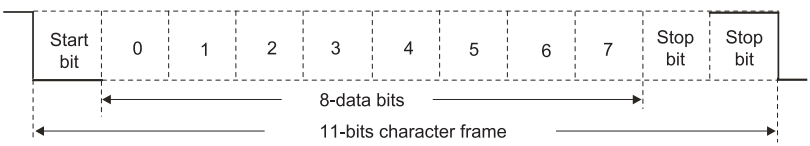


(7, O, 1)

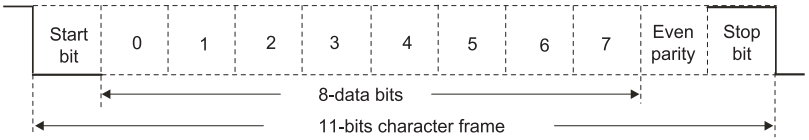


11-bit character box (for 8-bit characters):

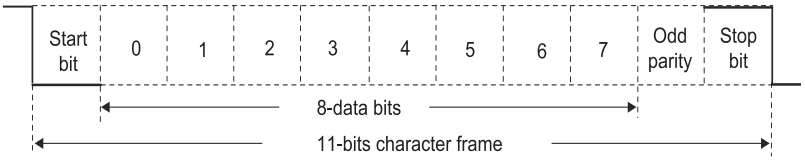
(8, N, 2)



(8, E, 1)



(8, O, 1)



Communication data structures

Communication data format box:

ASCII mode:

STX	Start character ':' (3AH)
ADR 1	Communication address:
ADR 0	8-bit address contains 2 ASCII codes
CMD 1	Command code:
CMD 0	8-bit command contains 2 ASCII codes
DATA (n-1)	Data content:
…….	n×8-bit data contains 2n ASCII codes
DATA 0	n<=16, up to 32 ASCII codes
LRC CHK 1	LRC value:
LRC CHK 0	The 8-bit check sum contains 2 ASCII codes
END 1	END character:
END 0	END1= CR (0DH), END0= LF(0AH)

RTU Mode:

START	More than 10 ms static time or 3.5 bytes transmission time
ADR	Communication address: 8-bit address
CMD	Command code: 8-bit instruction
DATA (n-1)	Data content:
…….	N×8-bit data, n<=32
DATA 0	
CRC CHK Low	CRC check value:
CRC CHK High	The 16-bit check sum consists of 2 characters of 8-bit
END	More than 10 ms static time or 3.5 bytes transmission time

ADR (Communication Address)

The range of legal communication addresses is between 1 and 247. If the communication address is 0, it means to broadcast to all the inverters. In this case, the inverter will not respond to any information to the host.

For example, communication to the inverter with address 16 decimal:

ASCII Mode: (ADR 1, ADR 0) = '1', '0' => '1'=31H, '0'=30H

RTU Mode: (ADR) = 10H

Function code (Function) and data content (Data Characters)

03: Read the data from the inverter register

06: Write a WORD to the inverter register

08: Loop detection

10: Write multiple WORDs to the inverter register

Instruction code: 03H, read the contents of the inverter register.

For example: read 2 words continuously from the address 01H and the starting address 2102H of the inverter.

RTU mode:

Command message：

Address	01H
Function	03H
Starting address	21H
	02H
Number of data (count by word)	00H
	02H
CRC CHK Low	6FH
CRC CHK High	F7H

Response message：

Address	01H
Function	03H
Number of data (count by byte)	04H
Content of data address 2102H	17H
	70H
Content of data address 2103H	00H
	00H
CRC CHK Low	FEH
CRC CHK High	5CH

ASCII Mode:

Command message:

STX	':'
Address	'0'
	'1'
Function	'0'
	'3'
Starting address	'2'
	'1'
	'0'
	'2'
Number of data (count by word)	'0'
	'0'
	'0'
	'2'
LRC Check	'D'
	'7'
END	CR
	LF

Response message:

STX	':'
Address	'0'
	'1'
Function	'0'
	'3'
Number of data (count by byte)	'0'
	'4'
Content of starting address 2102H	'1'
	'7'
	'7'
	'0'
Content of address 2103H	'0'
	'0'
	'0'
	'0'
LRC Check	'7'
	'1'
END	CR
	LF

Command code: 06H, write a word to the inverter register

For example: write 6000 (1770H) to address 0100H of the inverter with address 01H

RTU mode:

Command message:

Address	01H
Function	06H
Data address	01H
	00H
Data content	17H
	70H
CRC CHK Low	86H
CRC CHK High	22H

Response message:

Address	01H
Function	06H
Data address	01H
	00H
Data content	17H
	70H
CRC CHK Low	86H
CRC CHK High	22H

ASCII Code:

Command message:

STX	':'
Address	'0'
	'1'
Function	'0'
	'6'
Data address	'0'
	'1'
	'0'
	'0'
Data content	'1'
	'7'
	'7'
	'0'
LRC Check	'7'
	'1'
END	CR
	LF

Response message:

STX	':'
Address	'0'
	'1'
Function	'0'
	'6'
Data address	'0'
	'1'
	'0'
	'0'
Data content	'1'
	'7'
	'7'
	'0'
LRC Check	'7'
	'1'
END	CR
	LF

Command code: 08H, communication loop test

This command is used to test the communication between the host (usually PC or PLC) and the inverter is normal or not . and the inverter will return the received data content to the host intact.

RTU Mode

Command message:

Address	01H
Function	08H
Data addres	00H
	00H
Data content	17H
	70H
CRC CHK Low	EEH
CRC CHK High	1FH

Response message:

Address	01H
Function	08H
Data addres	00H
	00H
Data content	17H
	70H
CRC CHK Low	EEH
CRC CHK High	1FH

ASCII Code:

Command message:

STX	':'
Address	'0'
	'1'
Function	'0'
	'8'
Data address	'0'
	'0'
	'0'
	'0'
Data content	'1'
	'7'
	'7'
	'0'
LRC Check	'7'
	'0'
END	CR
	LF

Response message:

STX	':'
Address	'0'
	'1'
Function	'0'
	'8'
Data address	'0'
	'0'
	'0'
	'0'
Data content	'1'
	'7'
	'7'
	'0'
LRC Check	'7'
	'0'
END	CR
	LF

Command code: 10H, write multiple words to the inverter register.
For example: write 5000 (1338H) and 4000 (0FA0H) to the 0500H and 0501H addresses of the inverter with address 01H.

RTU mode:

Command message:

Address	01H
Function	10H
Data address	05H
	00H
Number of data (count by word)	00H
	02H
Number of data (count by byte)	04H
The first data content	13H
	88H
The second data content	0FH
	A0H
CRC CHK Low	4DH
CRC CHK High	D9H

Response message:

Address	01H
Function	10H
Starting data address	05H
	00H
Number of data (count by word)	00H
	02H
CRC CHK Low	41H
CRC CHK High	04H

ASCII mode:

Command message:

STX	':'
Address	'0'
	'1'
Function	'1'
	'0'
Starting data address	'0'
	'5'
	'0'
	'0'
Number of data (count by world)	'0'
	'0'
	'0'
	'2'
Number of data (count by byte)	'0'
	'4'
The first data content	'1'
	'3'
	'8'
	'8'
The second data content	'0'
	'F'
	'A'
	'0'
LRC Check	'9'
	'A'
END	CR
	LF

Response message:

STX	':'
Address	'0'
	'1'
Function	'1'
	'0'
Data address	'0'
	'5'
	'0'
	'0'
Number of data (count by world)	'0'
	'0'
	'0'
	'2'
LRC Check	'E'
	'8'
END	CR
	LF

3.5 CHK (check sum)

ASCII mode:

ASCII mode adopt LRC (Longitudinal Redundancy Check) check sum. The LRC check sum is ADR1 to the last data content and the results is 256 as one unit . the excess parts removes , (For example , the receiving results is hexadecimal 128H only take 28H), Then calculate the two times complement and the getting result is LRC check sum.

For example, the first example of inquiry information check sum: 01H +03 H +21 H+02 H+00 H+02 H = 29H, and then take 2's complement = D7H.

RTU mode

CRC (Cyclical Redundancy Check) is calculated by the following steps:

Step 1: Load a 16–bit register (called CRC register) with FFFFH.

Step 2: The first byte of the command message and 16–bit CRC make low byte XOR arithmetic .

Step 3: Shift the CRC register one bit to the right with MSB zero filling. Extract and examine the LSB.

Step 4: If the LSB of CRC register is 0, repeat step 3, else XOR or the CRC register with the polynomial value A001H.

Step 5: Repeat step 3 and 4 until eight shifts have been performed. When this is done, a complete 8–bit byte will have been processed.

Step 6: Repeat steps 2 to 5 for the next 8–bit byte of the command message.

Continue doing this until all bytes have been processed. The final contents of the CRC register is the CRC value. When transmitting the CRC value in the message, the upper and lower bytes of the CRC value must be swapped. i.e. the lower order byte will be transmitted first.

The following is an example of CRC generation using C language. The function takes two arguments:

Unsigned char* data ←a pointer to the message

Unsigned char length ←the quantity of bytes in the message. The function returns the CRC value as a type of unsigned int.

```
Unsigned int crc_chk(unsigned char* data, unsigned char length){
  int j;
  unsigned int reg_crc=0xFFFF;
  while(length--){
    reg_crc ^= *data++;
    for(j=0;j\<8;j++){
      if(reg_crc & 0x01){  /* LSB(b0)=1 */
        reg_crc=(reg_crc>>1) ^ 0xA001;
      }else{
        reg_crc=reg_crc >>1;
      }
    }
  }
 return reg_crc;
}
```

The definition of the communication data address

The communication data address is used to control the operation of the inverter, get the state information and the rated function parameter setting.

The serial number of the function code is corresponding to the register address, but it should convert to hexadecimal number (except group parameters, as they are hexadecimal number), For example , FA.12 hexadecimal number express the function address is 0A0CH.

In addition, the EEPROM are frequently stored , will reduce the life of the EEPROM , For the users , No need to store for some function code in the mode of communication. Only change the value of RAM to meet the requirements.

To realize this function, you only need to turn the top digit of the function code address from 0 to 1.For example . the function code F0.07only modify the RAM value instead of storing it in the EEPROM. and can set the address set to 8007H. this address only use for writing on chip RAM. which can not do the read function . It's will be invalid address if read.

3.6 The definition of communication of Parameter address：

Definition	Parameter Address	Function Description		W/R Feature
Inverter setting parameters	Fx.xxH	x.xx stand for parameter number. For example: F5.05 is represented by 0505H.		
Control Command	1000H	0001H	Forward Running	W/R
		0002H	Reverse Running	
		0003H	JOG forward	
		0004H	JOG reverse	
		0005H	Stop	
		0006H	Coast to stop	
		0007H	Fault Reset	
		0008H	Jog stop	
Monitor State	1001H	0001H	Forward Running	R
		0002H	Reverse Running	
		0003H	Standby	
		0004H	Fault	
Communication setting value	2000H	Communication setting value range (-10000～10000) Note: The communication setting value is the percentage of the relative value (-100.00%～100.00%), which can be used for communication writing. When set as a frequency source, it is relative to the percentage of the maximum frequency (F0.04); when it is set as a torque, it is relative to the percentage of the torque upper limit (F3.07). When it set as PID given or feedback , the relative is the percentage of PID.		W/R
Monitor Parameter	3000H	Running frequency		R
	3001H	Setting frequency		R
	3002H	Output current		R
	3003H	Output voltage		R
	3004H	Output rotation speed		R
	3005H	Output power		R

Definition	Parameter Address	Function Description	W/R Feature
Monitor Parameter	3006H	Output torque	R
	3007H	DC bus voltage	R
	3008H	PID setting value	R
	3009H	PID feedback value	R
	300AH	Input terminal state	R
	300BH	Output terminal state	R
	300CH	Analog AVI value	R
	300DH	Analog ACI value	R
	3010H	The value of AVI	R
	3011H	The value of ACI	R
Inverter fault address	5000H	See the attached table Table:3–1	R
Communication fault address	5001H	See the attached table Table:3–2	R

Appendix Table :3-1 Data and fault type in 5000H

Data	Fault Type	Data	Fault Type
00H	No fault	0CH	Motor overload (OL1)
01H	Overcurrent when acceleration (ocA)	0DH	Inverter overload (OL2)
02H	Overcurrent when deceleration (ocd)	0EH	External fault (EF)
03H	Overcurrent when constant speed running (ocn)	0FH	RS485 communication fault (CE-1)
04H	Overvoltage when acceleration (ovA)	11H	Current detection fault (itE)
05H	Overvoltage when deceleration (ovd)	12H	Keypad communication fault (CE-4)
06H	Overvoltage when constant speed running (ovn)	13H	Motor auto tuning fault (tE)
07H	Overvoltage when stop(ovS)	14H	EEPROM operation fault (EEP)
08H	DC bus under voltage fault (Lv)	15H	PID feedback fault (PIDE)
09H	Iutput phase loss (LP)	16H	Inverter pre-overload (OL3)
0AH	Output short-circuit (SC)	10H，17H～1BH	Reserved
0BH	Over-heat (OH1)	1CH	Output phase loss (SPO)

Additional response to error communication:

When the inverter are communication connection. The inverter will response to the error code if the error caused, and the maximum unit (bit 7) of the command code set to 1 (Function code and 80H) and answer to the host The host will know there will be error.

ASCII mode

STX	':'
Address	'0'
	'1'
Function	'8'
	'6'
Fault address	'5'
	'0'
	'0'
	'1'
Fault code	'0'
	'1'
LRC Check	'2'
	'7'
END	CR
	LF

RTU mode

Address	01H
Function	86H
Fault address	50H
	01H
Fault code	01H
CRC CHK Low	F0H
CRC CHK High	C9H

Appendix Table :3-2 Data and fault type in 5001H

Communication fault address	5001H	00H	No fault
		01H	Command code error
		02H	Illegal address
		03H	Illegal data
		04H～05H	Reserved
		06H	Inverter is busy
		07H～09H	Reserved
		10H	Password error
		11H	Check error
		12H	Invalid modified parameters
		13H	System loacked
		14H	Illegal of data number

Appendix 4: Inverter User’s Warranty Bill

User's details

Company Name		Phone	
Add		Post Code	
Contact Person		Department	

Name of Distributor		The date of Purchase	
Inverter Model		Serial Number	
Equipment Name		Motor Power	
The date of Installation		The date of begin use	

Records of repair

Fault :	
Solution:	
The date of repair:	The name of repair workers:

The user should keep this warranty bill .