

INSTALLATION, OPERATION & MAINTENANCE DATA SHEET

For "EPL-AEB" SERIES

Installation Instructions

This explosion proof VFD must be installed by trained, qualified and competent personnel. Installation must comply with local, state and national regulations, as well as safety practices for this type of equipment.

WARNING: Electrical power **must** be **OFF** during installation. **Disconnect** primary power source and **lock out**.

The mounting location must be flat and provide proper clearance, rigidity and strength to support the enclosure and all contained devices. (Refer to Figures 1 & 2)

Larger enclosures are equipped with factory installed hinges. Enclosures should be mounted with hinges on the left. **Do not** mount the enclosure with hinges on the **top** or **bottom** side. (See Figure 3)

Securely fasten the enclosure to the mounting location, using 1/2" diameter steel mounting bolts and washers, or washer head bolts. Install sealing fittings and conduit using an approved electrical conducting type lubricant on the threads. The conduit thread connections must be tapered pipe thread conforming to ANSI/ASME B1.20.1. A minimum of five (5) full threads engagement is required for all conduit connections. Conduit sealing fittings, approved for the specific hazardous location where the enclosure is used, must be installed within 18" of the enclosure. All unused conduit openings must be plugged using a close-up plug approved for the specific hazardous location where the enclosure is used. Plugs must be tightly installed with a minimum engagement of five (5) full threads.

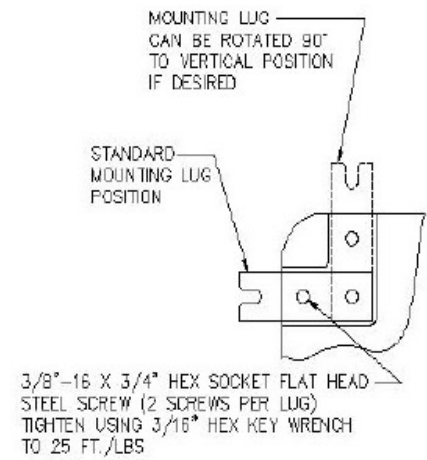
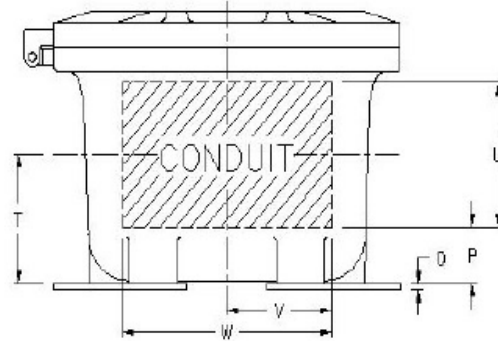
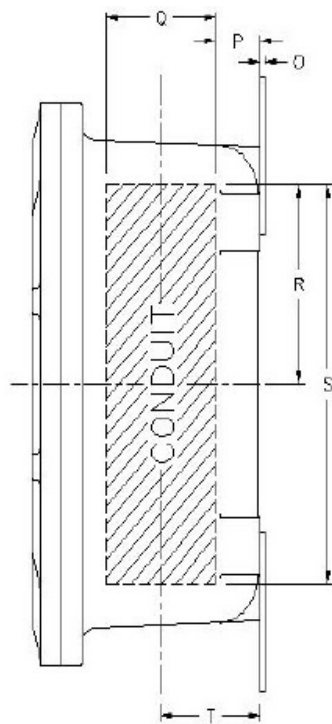
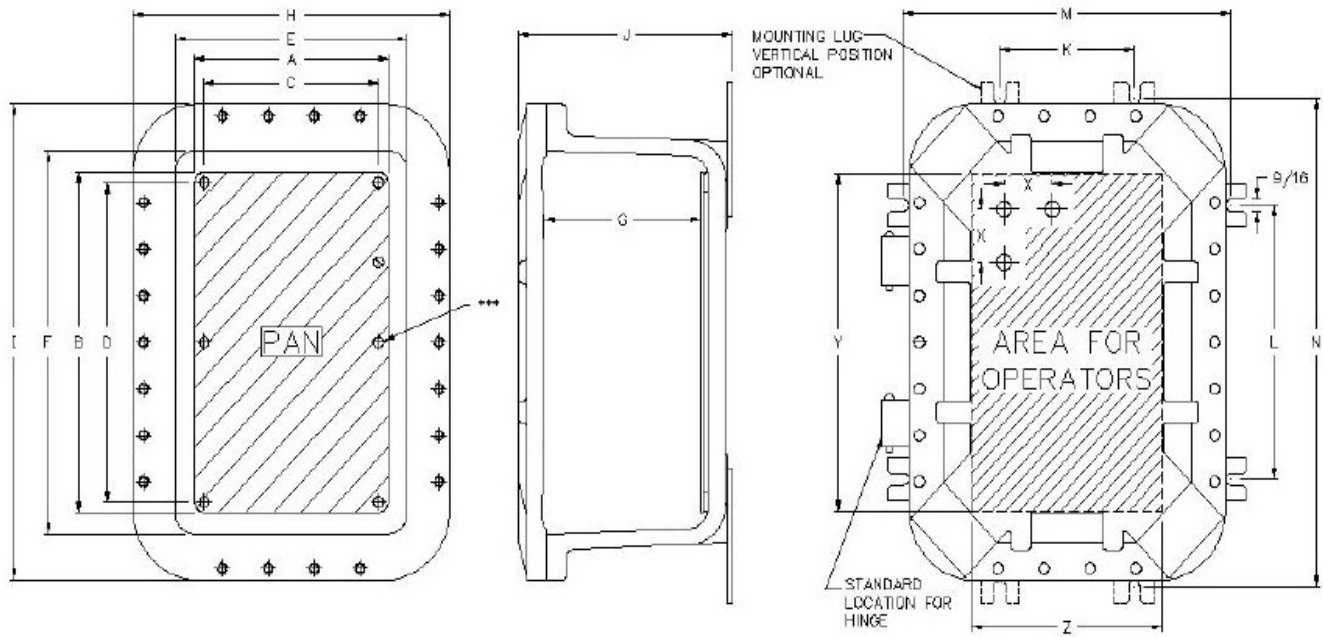
IMPORTANT: Install only U.L. listed and CSA certified auxiliary control devices for hazardous locations (Long and Extra-Long styles only). Refer to individual operator installation sheet for installation details. The minimum wall thickness of counter-bore (where required) and operator spacing are to be determined from the dimensional chart on Pages 2 & 3.

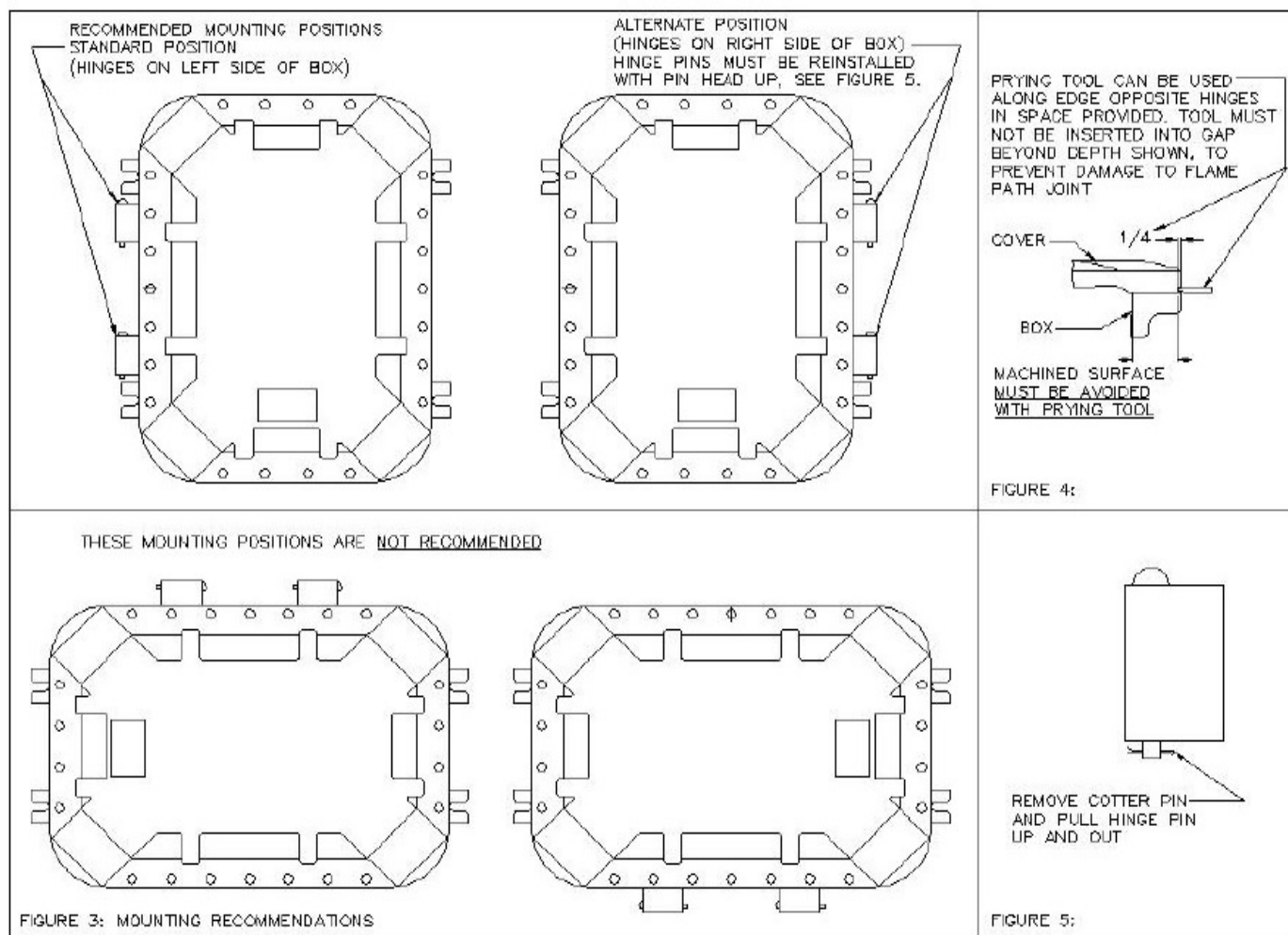
NOTE: If installing a breather and/or drain, make certain they are suitable for the specific hazardous location where they are to be used. Also, provide a protective device to shield the breather and drain during hose-down operations.

Inspect and clean the machined flange (flam path) surfaces of both the cover and box. Surfaces must be smooth, free of nicks, scratches, dirt or any foreign particle build up that would prevent a proper seal. Surface must seat fully against each other to provide a proper explosion-proof joint. Clean surfaces by wiping with a clean, lint-free cloth.

Apply a light coat of lubricant to flange surfaces and close the cover. Install and tighten all cover bolts to 30 ft. lbs. Make certain that no cover bolts are omitted. Use only those bolts supplied with the enclosure. Check the bolted joint with a 0.0015" thick feeler gauge. The gauge **must not enter** the joint more than 1/8" at any point.

NOTE: Missing bolts or an improper joint can result in an explosion, creating a potential for physical injury or property damage.





MAINTENANCE INSTRUCTIONS

After installation, this explosion proof VFD should be inspected at regular intervals. A visual inspection should ascertain that all cover bolts are installed and still tight; that all conduit connections are intact and free of corrosion, and that the enclosure mounting bolts are tight and in good condition.

If the enclosure must be opened for servicing, to check or replace internal devices and apparatus, the following procedures should be followed.

WARNING: Before servicing the enclosure, be certain the electrical power is OFF. Disconnect the enclosure from primary power source and lock out.

Remove all cover bolts. Clean and inspect. Replace any corroded, bent or otherwise damaged bolts with new, factory authorized bolts obtained from an authorized distributor.

Open enclosure. Do not use hammer, screwdriver, or any prying tool to open cover, except as shown in Figure 4.

Inspect cover hinges. If hinges are damaged or do not function properly, contact a factory authorized service representative for hinge replacement and installation.

Inspect machined flange (flame path) surfaces. Surfaces must be smooth, free of nicks, scratches, dirt or any foreign particle build-up that would prevent a proper seal. Should surface be damaged contact factory. Never attempt to rework surfaces by sanding, grinding, ect. Surfaces must seat fully against each other to provide proper explosion-proof joint.

Inspect water exclusion gasket. If gasket is damaged, **do not** attempt field replacement or repair.

Contact a factory authorized representative for a replacement cover. When removing gasketed cover for replacement, **do not** detach hinge body from cover. (NOTE: Optional hinges on 664, 886, 8104, & 8106 enclosures **must** be removed from cover).

Remove cover and hinge body from enclosure by removing the hinge pins. (see Figure 5) The damaged gasket can be removed from the cover and the cover without gasket can be safely used in Class I & II hazardous (classified) locations, however the enclosure may **not** be raintight or hosedown tight.

Clean flange surface by wiping with a clean, lint-free cloth. Apply a light coating of lubricant to flange surfaces and close cover. Install and tighten **all** cover bolts to 30 ft. lbs. Make certain no cover bolts are omitted. Use **only** factory authorized bolts. Check the flame joint with a .0015" feeler gauge. The gauge must not enter the flame joint more than 1/8" at any point. Missing bolts or an improper flame joint can result in an explosion, creating a potential for physical injury and property damage.

Technical information, advice and recommendations contained in these documents is based on information that Larson Electronics believes to be reliable. All the information and advice contained in the documents is intended only for use by persons having been trained and possessing the requisite skill and know-how and to be used by such person only at their own discretion and risk. The nature of these instructions is informative only and does not cover all of the details, variations or combinations in which this equipment may be used, its storage, delivery, installation, check out, safe operation, and maintenance. Since conditions of use of the product are outside of the care, custody and control of Larson Electronics, the purchaser should determine the suitability of the product for his intended use, and assumes all risk and liability whatsoever in connection therewith.

INSTRUCTIONAL DATA SHEET

“EPL-AEB” SERIES

FOR DRILLING & TAPPING OF CONDUIT OPENINGS IN U.L. LISTED, CSA CERTIFIED, CAST ALUMINUM BOXES FOR HAZARDOUS LOCATIONS

GENERAL INSTRUCTIONS & REQUIREMENTS FOR DRILLING & TAPPING IN FIELD.

- 1.) Standard NPT threads (with a 3/4” per foot taper) **must** be used for all conduit openings.
- 2.) Field drilling and tapping of the side walls of blank boxes may be done, provided the location of conduit openings meets the specifications of Chart 1, and minimum wall thickness meets the dimensions shown on Charts 2 & 3. Use Chart 1 to determine the maximum quantity and size of conduit openings permitted.

NOTE: 1/2” trade size is the minimum allowable size for any conduit opening. Refer to Chart 4 for maximum allowable conduit sizes.

- 3.) **CLASS I, DIVISION 1 & CLASS II LOCATIONS** require boxes with a wall thickness sufficient to provide a minimum of five (5) full threads. (See Chart 2)

NOTE: Conduit opening gaging requirement “+1/2 to +3-1/2 turns deeper than nominal” in lieu of the “+1 turn of nominal” described in ANSI / ASME B1.20.1

- 4.) **CLASS II LOCATIONS, WHEN THE BOX IS NOT SUPPORTED BY THE CONDUITS** require a wall thickness sufficient to provide a minimum of 3-1/2 full threads. (See Chart 3)

- 5.) After the size of conduit openings has been determined for specific enclosures, measure the wall thickness and refer to the specific chart per the following steps:

A.) 5 Full Thread Reference Chart 2.

B.) 3-1/2 Full Thread Reference Chart 3.

- 6.) If insufficient wall thickness is encountered, consult the factory.

INSTALLATION PRECAUTIONS

- 1.) **For proper procedure to be used for opening box/cover joint, refer to the general installation sheet, Form K0983.**
- 2.) Before closing the enclosure, be sure to wipe the ground flange surfaces with a clean cloth to remove any dirt or foreign particles. Any dirt on the flanges can prevent a tight seal of the enclosure. The flanges should then be given a light coating of lubricant.
- 3.) **Always** install **all cover bolts** to secure the enclosure. Missing bolts can result in explosions in hazardous areas.

**REMEMBER TO SAVE ONE OF THESE
SHEETS FOR MAINTENANCE
PERSONNEL.**

Chart 1: Minimum Centers for Drilled & Tapped Openings for Conduits.
(Allows for locknut, bushing & union clearance)

SIZE	FORM	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
1/2	(1) MIN	1 3/16											
	(2) PRE	1 3/8											
	(3) GU	1 5/8											
3/4	(1) MIN	1 3/8	1 1/2										
	(2) PRE	1 1/2	1 5/8										
	(3) GU	1 3/4	1 13/16										
1	(1) MIN	1 1/2	1 3/4	1 13/16									
	(2) PRE	1 3/4	1 7/8	2									
	(3) GU	1 7/8	2	2 1/8									
1 1/4	(1) MIN	1 11/16	1 5/16	2 1/16	2 5/16								
	(2) PRE	1 5/16	2 1/16	2 1/4	2 1/2								
	(3) GU	2 1/16	2 1/4	2 5/16	2 1/2								
1 1/2	(1) MIN	1 5/16	2 1/16	2 3/16	2 1/2	2 5/8							
	(2) PRE	2 1/8	2 1/4	2 3/8	2 5/8	2 3/4							
	(3) GU	2 3/16	2 9/32	2 7/16	2 5/8	2 3/4							
2	(1) MIN	2 1/4	2 3/8	2 9/16	2 13/16	2 15/16	3 3/16						
	(2) PRE	2 3/8	2 1/2	2 3/4	3	3 1/8	3 3/8						
	(3) GU	2 1/2	2 19/32	2 3/4	3	3 1/8	3 3/8						
2 1/2	(1) MIN	2 7/16	2 9/16	2 3/4	3	3 3/8	3 3/8	3 5/8					
	(2) PRE	2 5/8	2 3/4	3	3 1/4	3 3/8	3 5/8	4					
	(3) GU	3 1/8	3 7/32	3 3/8	3 9/16	3 11/16	4	4 5/8					
3	(1) MIN	2 13/16	2 5/16	3 1/16	3 5/16	3 7/16	3 3/4	4	4 1/16				
	(2) PRE	3	3 1/8	3 3/8	3 5/8	3 3/4	4	4 3/8	4 3/4				
	(3) GU	3 9/16	3 21/32	3 13/16	4	4 1/8	4 7/16	5 1/16	5 1/2				
3 1/2	(1) MIN	3 1/8	3 1/4	3 3/8	3 5/8	3 3/4	4 1/16	4 5/16	4 5/8	4 15/16			
	(2) PRE	3 3/8	3 1/2	3 5/8	3 7/8	4	4 3/8	4 5/8	5	5 3/8			
	(3) GU												
4	(1) MIN	3 7/16	3 9/16	3 11/16	3 15/16	4 1/16	4 3/8	4 5/8	4 15/16	5 1/4	5 9/16		
	(2) PRE	3 3/4	3 7/8	4	4 1/4	4 3/8	4 3/4	5	5 3/4	5 5/8	6		
	(3) GU												
5	(1) MIN	4 1/8	4 1/4	4 3/8	4 5/8	4 3/4	5	5 1/4	5 5/16	5 7/8	6 3/16	6 13/16	
	(2) PRE	4 3/8	4 1/2	4 5/8	4 7/8	5	5 3/8	5 5/8	6	6 1/4	6 5/8	7 1/4	
	(3) GU												
6	(1) MIN	4 3/4	4 7/8	5	5 1/4	5 3/8	5 5/8	5 7/8	6 3/16	6 1/2	6 13/16	7 7/16	8 1/8
	(2) PRE	5	5 1/8	5 1/4	5 1/2	5 5/8	6	6 1/4	6 5/8	7	7 1/4	8	8 5/8
	(3) GU												
Approx. O.D. of:	LOCKNUT	1 1/4	1 1/8	1 11/16	2 3/16	2 7/16	3	3 7/16	4 3/16	4 13/16	5 3/8	6 11/16	7 15/16
	BUSHING	1	1 1/4	1 1/2	1 5/16	2 13/64	2 5/8	3 7/32	3 3/8	4 7/16	5	6 1/4	7 3/8
	CONDUIT	7/8	1 1/16	1 3/8	1 11/16	1 15/16	2 3/8	2 7/8	3 1/2	4	4 1/2	5 5/16	6 5/8

- (1) Minimum spacing required to provide clearance over locknuts and bushings.
(2) Preferred - More liberal spacings between centers of conduits to be used whenever possible.
(3) GU - When Listed "GU" series unions (1/2" thru 3") are used, additional spacing between conduits will be required, as specified above.

MINIMUM SPACING OF CONDUIT FROM SIDES & BACK												
Conduit Size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Dim. "A" *	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 7/8	4 3/8

* Note: If Listed "GU" series unions are being used (1/2" thru 3"), additional space for clearance may be required. Check dimensions of fittings being used.

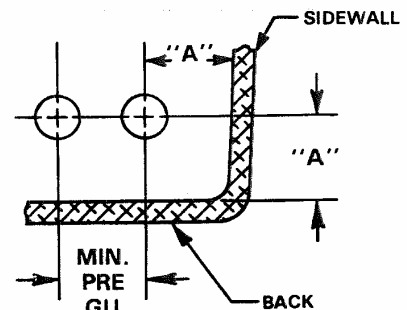


Chart 2: Required wall thickness for five (5) full threads engagement per U.L. 886 Standards.

Class I, Division I
Class II Supported by Conduit

CONDUIT SIZE	MINIMUM NUMBER OF FULL THREADS	MINIMUM WALL THICKNESS
½" & ¾"-14	5 (1)	3/8"
1", 1¼", 1½" & 2"-11½	5 (1)	7/16"
2½", 3", 3½", 4", 5" & 6"-8	5 (1)	5/8"

(1) A box used may have thicker walls than required. For thicker walled boxes, the inner end of each conduit opening shall be smooth and well-rounded, as shown below.

Chart 3: Required wall thickness for 3-1/2 full threads engagement.

Class II Locations Not Supported by Conduit

CONDUIT SIZE	MINIMUM NUMBER OF FULL THREADS	MINIMUM WALL THICKNESS
½" & ¾"-14	3½ (1)	¼"
1", 1¼", 1½" & 2"-11½	3½ (1)	5/16"
2½", 3", 3½", 4", 5" & 6"-8	3½ (1)	7/16"

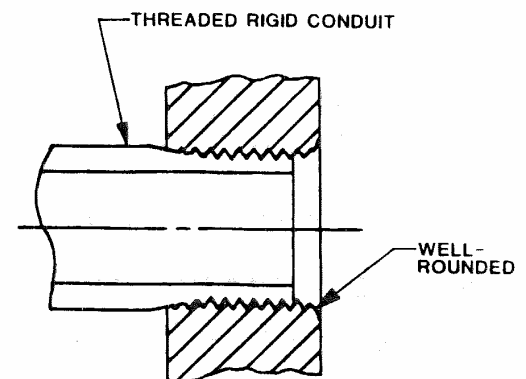
(1) Same as shown for Chart 2.

NOTE:

- 1) Conduit openings must be tapped to a depth which allows the conduit to be fully engaged.
- 2) Do not over-tap conduit openings; the conduit must tighten fully **without** bottoming-out on the unthreaded area of the conduit.
- 3) Conduit opening gaging requirement: "+1/2 to +3-1/2 turns deeper than nominal".

RECOMMENDED TAP DRILL

TAPPED HOLE SIZE - NPT	TAP DRILL SIZE (DIA.)
1/2" - 14 3/4" - 14	23/32" 59/64"
1" - 11-1/2 1-1/4" - 11-1/2 1-1/2" - 11-1/2 2" - 11-1/2	1-5/32" 1-1/2" 1-47/64" 2-7/32"
2-1/2" - 8 3" - 8 3-1/2" - 8 4" - 8 5" - 8 6" - 8	2-5/8" 3-1/4" 3-3/4" 4-1/4" 5-5/16" 6-23/64"



CONDUIT OPENING WITHOUT CONDUIT STOP

Variable Frequency Device Instruction Manual

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Chapter 1 Introduction

1.1 Unpacking Inspection

Upon unpacking, please confirm the following: Any damage occurred during transportation; Check whether the model and specifications on the nameplate of VFD are in accordance with your order.

If there is any error, please contact us or distributors.

The model and specifications on the name plate of VFD on the bottom right of VFD.

1.2 Safety Rules

Inspection



Inspection

1. Please do not install the damaged VFD, otherwise there is a danger of injury.

Installation



Inspection

1. Handling, please hold the bottom of the body, otherwise there is a danger of a body falling foot injury.
2. Please install the VFD on metal or other nonflammable material, otherwise there is a danger of fire.
3. Please install cooling fans when two VFDs are installed in a same cabinet, keep the air intake temperature under 40°C, otherwise, there is a danger of fire.

Cable connection and distribution



Danger

1. Wire-connection job can only be done when the mains are cut off, otherwise, there is a danger of shock or fire.
2. Only qualified personnel can perform wire-connection job, otherwise, there is a danger of shock or fire.
3. The earth terminal of VFD must be connected to earth reliably, otherwise, there is a danger of shock or fire.
(Please use the 3rd grounding method specially for 380V)
4. After connects emergency stop terminal, please make sure it is effective, otherwise, there is a danger of injury.
(The user is responsible for the connection)
5. Please don't touch the output terminals, don't connect the output terminals with the shell, don't short connect the output terminals, otherwise, there is a danger of shock or short circuit.



Attention

1. Please confirm the mains supply is in accordance with rated voltage of VFD, otherwise, there is a danger of injury or fire.
2. Please don't make voltage withstanding test to the VFD. It may damage the semiconductor and other components.
3. Please connect the braking unit or resistance according to the wiring diagram; otherwise, there is a danger of fire.
4. Please use screw drivers with appointed moment of force to tighten the terminals, otherwise, there is a danger of fire.
5. Please don't connect input mains cable with output terminals of U/V/W. It may damage the VFD.
6. Please don't connect shifting capacitor or LC/RC noise filter with output loop. It may damage the VFD.
7. Please don't connect solenoid switch or solenoid contactor with output loop. When VFD is running with load, the action of such switch and contactor will cause surge current. It may trigger over current protection of VFD.
8. Please just disassemble the terminals cover when wiring, don't disassemble the front cover of VFD. It may damage the VFD.

Maintenance and inspection

	Danger
1. Please do not touch the control terminals when it is live, otherwise there is a danger of shock. 2. Please make sure the terminals cover is assembled before power up. Before disassembling the terminals cover, please make sure the power is cut off, otherwise, there is a danger of shock. 3. Only qualified personnel can perform the maintenance and inspection job, otherwise, there is a danger of shock.	

	Attention
1. The keyboard, control circuit board, and driver circuit board were integrated with CMOS circuit. Please be careful when using. Please do not touch these circuit boards by fingers. 2. Please don't change the cable connection when power on.	

1.3 Notes on Usage

In the use of VFD series converter, please pay attention to the following points:

1. Constant torque low speed running

When the VFD outputs to a common motor at low speed for a long term, the output rated torque should be derated due to the worsening radiating effect. If low speed constant torque long term running is required, then a special variable frequency motor is needed.

2. Confirm motor's insulation

Before using VFD, please confirm the motor is insulated; otherwise, the equipment may be damaged. Please confirm motor's insulation termly when motor is working under bad condition.

3. Negative torque load

To some application situation such as lifting load, negative torque load may occur. Braking unit and resistor should be connected with VFD, or over current or over voltage fault may happen.

4. The mechanical resonance point of load

The VFD may encounter the mechanical resonance point of load within certain output frequency range. Jump frequencies have to be set to avoid it.

5. Capacitor and varistor

Because the VFD outputs PWM pulse wave, capacitor and varistor should not be connected with the output terminals of the VFD, or the VFD may trip or components may be damaged, as shown in Fig. 1-3.

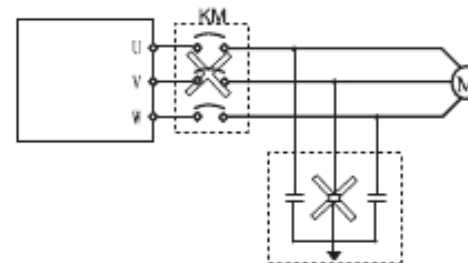


Fig. 1-3 Capacitor connection with VFD output prohibited

6. Motor derating

When basic frequency is set to be lower than rated frequency, motor derating is necessary in order to avoid motor overheating.

7. Running at frequency above 50Hz

If running at frequency above 50Hz, besides the increment of vibration and noise, the ranges of running speed of motor shaft and mechanical device have to be

guaranteed. Be sure to make an enquiry first.

8. The electro-thermal protective value of motor

If the applicable motor is selected as per requirements, the VFD can perform the thermal protection to the motor. If the ratings of applied motor are not in compliance with the VFD, be sure to adjust the protective value to guarantee the safe running of motor.

9. Altitude and derating

When the altitude is higher than 1000m, the cooling effect of VFD is deteriorated because of the rareness of air, derating must be considered.

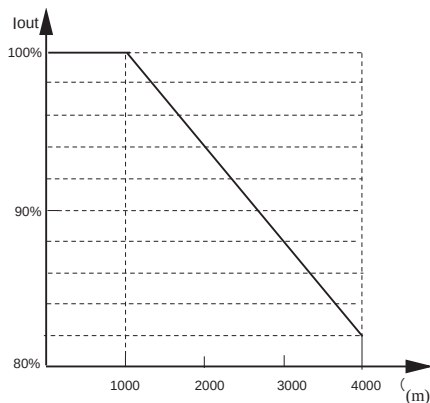


Fig. 1-4 indicates the relationship between the altitude and rated current of VFD.

10. On the level of protection

VFD protection grade IP20 could be reached when the selection of state display unit or the keyboard.

1.4 Notes Regarding Disposal

When you dispose VFD, pay attention to:

The capacitors in the main circuits may explode when they are burned. Poisonous gas may be generated when front panel is burned. Please dispose the VFD as industrial rubbish.

Chapter 2 Installation and Wire Connection

2.1 Installation

2.1.1 Environment Requirements

(1) Please mount inside a well-ventilated location. The ambient temperature is required to be within the range of $-10 \sim 40^{\circ}\text{C}$. If the temperature is higher than 40°C , the VFD should be derated, at the same time the ventilation and heat dissipation should be enhanced.

(2) Be away from the location full of dust or metal powder, and mount in the location free of direct sunlight.

(3) Mount in the location free of corrosive gas or combustible gas.

(4) Humidity should be lower than 90% with no dew condensation.

(5) Mount in the location where vibration is less than 5.9 m/s^2 (0.6G).

(6) Please try to keep the VFD away from EMI source and other electronic devices which are sensitive to EMI.

2.1.2 Mounting Space and Direction

(1) Generally in vertical way.

(2) For the requirements on mounting space and distance, refer to Fig. 3-1.

(3) When several VFDs are installed in one cabinet, they should be mounted in parallel with special incoming and out coming ventilation and special fans. When two VFDs are mounted up and down, an air flow diverting plate should be fixed as shown in Fig. 3-2 to ensure good heat dissipation.

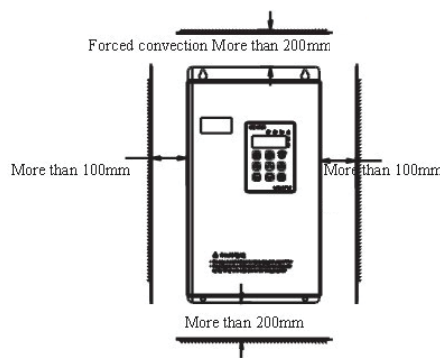


Fig. 3-1 Mounting space and distance

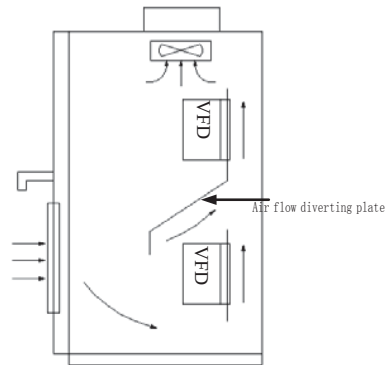


Fig. 3-2 Mounting of multiple VFDs

2.2 Removing and Mounting Front Cover of VFD

Removing: remove 4 screws on the cover and take the cover out.

Mounting: Align the mounting holes and screw them.

2.3 Wire Connection

Attention



(1) Before wiring, please ensure the power has been removed and be waited for at least 10minutes.

(2) Please do not connect AC power to output terminals U/V/W.

(3) To ensure the safety, the VFD and motor should be safety grounding. It is necessary to use copper wire above 3.5mm as ground wire, grounding resistance less than 10Ω.

(4) The VFD has gone through voltage withstand test in factory, please do not make it again.

(5) Solenoid switch or absorbing devices, such as ICEL, is prohibited to connect VFD output.

(6) To provide input over current protection and for convenience in

maintenance, the VFD should be connected to AC power through circuit breaker.

(7) Please use twisted wire or shielded wire above 0.75mm for the wiring of relay input/output loop (X1~X6, FWD, REV, OC, DO). One end of shielding layer suspended, and the other side connected to PE grounding terminal of VFD, wiring length less than 50m.

Danger



(1) The cover can be removed only when the power is switched off, all the LEDs on the panel are off and waiting at least for 10 minutes.

(2) Wiring work can be performed only when the DC voltage between P+ and P- terminals is lower than 36V.

(3) Wiring work can only be done by trained or professional personnel.

(4) Before usage, check whether the mains voltage meets the requirement of VFD input voltage.

2.4 Main Circuit Wiring

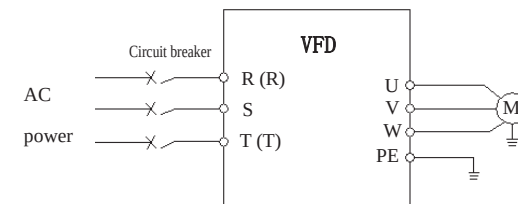
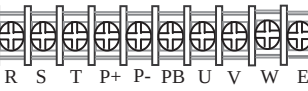


Fig. 3-3 Main circuit wiring

2.4.1 Main Circuit Wiring

Main Circuit input/output terminals, shown as Table 3-1

Table 3-1 Description of Main Circuit input/output terminals

Apply to	Main circuit terminal	Terminal name	function
220V 1-phase 0.4KW~2.2KW		L1, L2	220V 1-phase Input terminals
		U, V, W	380V 3-phase Output terminals
		E	Wiring terminals
380V 3-phase 0.75KW~2.2KW		R, S, T	380V 3-phase Input terminals
		U, V, W	380V 3-phase Output terminals
		P+, PB	Braking resistor wiring terminals
380V 3-phase 2.2KW~5.5KW		R, S, T	380V 3-phase Input terminals
		U, V, W	380V 3-phase Output terminals
		P+, PB	Braking resistor wiring terminals
380V 3-phase 7.5KW~15KW		R, S, T	380V 3-phase Input terminals
		U, V, W	380V 3-phase Output terminals
		P+, PB	Braking resistor wiring terminals
380V 3-phase 18.5KW~450KW		R, S, T	380V 3-phase Input terminals
		U, V, W	380V 3-phase Output terminals
		P+, P-	Braking resistor wiring terminals

2.5 Basic Wiring Diagram

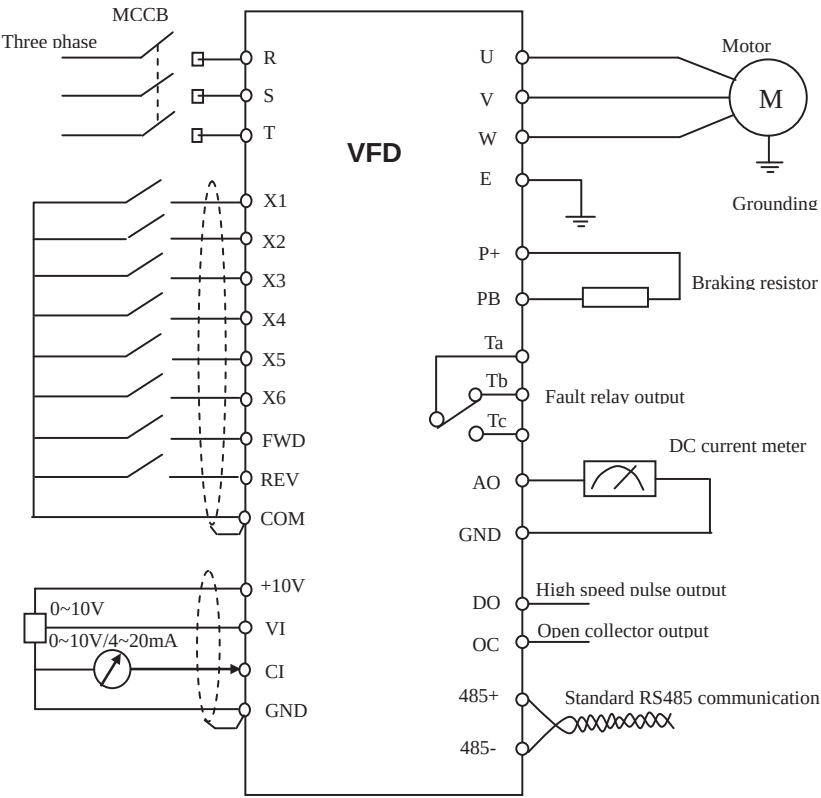


Fig. 3-5 Basic wiring diagram

2.6 Control Circuit Terminal Wiring

2.6.1 Position and Function of Terminals and Jumpers on Control Circuit

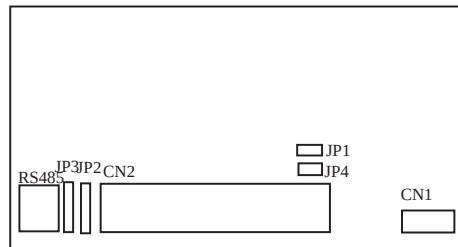


Fig. 3-6 Position of terminals and jumpers on control circuit

Before using the VFD, Please make correct terminals wiring and jumpers setting. It is suggested to use above 1mm² wire as terminal connection wire.

Table 3-2 Jumper switch function

NO	Function Setting	Setting	FD
JP1	Pulse output terminal DO power selection	1-2 connected: internal 24V power of VFD 2-3 connected: external power	external power
JP2	Analog output terminal AO current/voltage output selection	1—2: 0~10V: AO1 output voltage signal 2—3: 4~20mA: AO1 output current signal	0~10V
JP3	Terminal CI current/voltage Input selection	1—2 : V side, 0~10 voltage signal 2—3 : I side, 4~20 mA current signal	0~10V
JP4	X7 terminal input mode selection	1—2 : PLC side, X7 used as multifunctional terminal 2—3 : FCH side: X7 used as an external pulse input	PLC side

2.6.2 Description of Terminals on Control

Circuit (1) Function of CN 1 terminal shown as

Table 3-3

Table 3-3 CN 1 terminal function

Sort	Terminal	Name	Function Description	Specification
Relay output terminal	TA/RA	Multifunctional relay output terminal	Can be defined as multifunctional relay output terminal by programming, refer to Chapter 6.5 P4.12, P4.13	TA-TC: NC, TA-TB: Normally open contact capacity AC250V/2A (COSΦ=1) AC250V/1A (COSΦ=0.4) DC30V/1A
	TB/RB			
	TC/RC			

(2) Control Circuit CN2 terminal shown as Fig. 3-7

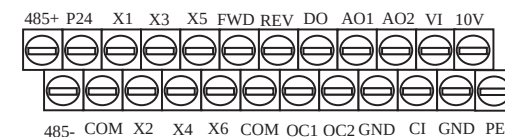


Fig. 3-7 CN2 terminals

(3) Function of CN 2 terminal shown as Table 3-4

Table 3-4 CN 2 terminal function

Sort	Terminal	Name	Function Description	Specification
Communication	485+	RS485 communication port	RS485 differential signal positive terminal	Twisted or shielded wire needed
	485-		RS485 differential signal negative terminal	
Multifunctional output terminal	OC1	Open collector output terminal 1	Can be defined as multifunctional on-off output terminal by programming, refer to Chapter 6.5 P4.10 (Common port: COM)	Opto isolated output Working voltage: 9~30V Max. output current: 50mA
	OC2	Open collector output terminal 2	Can be defined as multifunctional on-off output terminal by programming, refer to Chapter 6.5 P4.11 (Common port: COM)	Opto isolated output Working voltage: 9~30V Max. output current: 50mA
Pulse Output terminal	DO	Open collector pulse Output terminal	Can be defined as multifunctional Pulse output terminal by programming, Refer to Chapter 6.5 P4.21/P4.22 (Common port: COM)	Max. output frequency: 20KHz Output freq range defined by P4.21

Analog input	VI	Analog input VI	Analog voltage input (Grounding: GND)	Input voltage range: 0~10V (input resistance: 47K Ω) Resolution: 1/1000
	CI	Analog input CI	Analog voltage/current input, Choose voltage or current input by Setting JP3 jumper. Factory default: voltage input (Grounding: GND)	Input voltage range: 0~10V (input resistance: 47K Ω) Input current range: 0~20mA (input resistance: 500 Ω) Resolution: 1/1000
Analog output	AO1	Analog output AO1	Analog voltage/current output, indicating 7 quantities, choose voltage or current output by setting JP2 jumper. Factory default: voltage output (Grounding: GND)	Current output range: 4~20mA Voltage output range: 0~10V
	AO2	Analog output AO2	Analog voltage output, indicating 7 quantities (Grounding: GND)	Voltage output range: 0~10V
Running control terminal	FWD	Forward running	Refer to chapter 6.5 P4.08	
	REV	Reverse running		
Multifunctional input terminal	X1	Multifunctional input terminal 1	Can be defined as multifunctional on-off input terminal by programming, refer to Chapter 6.5 P4. (Common port: COM)	Opto isolated input Input resistance: 2K Ω Max. input frequency: 200Hz Input voltage range: 9~30V
	X2	Multifunctional input terminal 2		
	X3	Multifunctional input terminal 3		
	X4	Multifunctional input terminal 4		
	X5	Multifunctional input terminal 5		
	X6	Multifunctional input terminal 6		
Power source	P24	+24V power source	Supply +24V power (negative terminal: COM)	Max. Output current: 50mA
	10V	+10V power source	Supply +10V power (negative terminal: GND)	
	GND	+10V common port	Grounding of analog signal and +10V power source	
	COM	+24V common port	Digital signal input, output common port	

2.6.3 Analog Input/Output Terminal Wiring

(1) Analog voltage signal input through VI terminal as follow wiring:

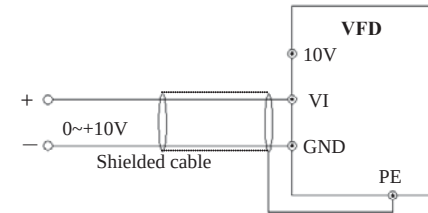


Fig. 3-7 VI terminal wiring

(2) Analog signal input through CI terminal, jumper selection for input voltage (0~10V) or input current (4~20mA) as follow wiring

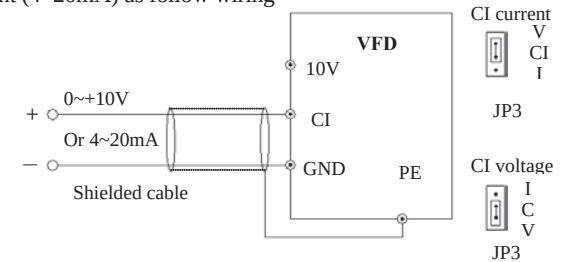


Fig. 3-8 CI terminal wiring

(3) Analog output terminal AO wiring

Analog output terminal can be connected with external analog meter indicating various physical quantity, jumper selection for output voltage (0~10V) or output current (4~20mA) as follow wiring.

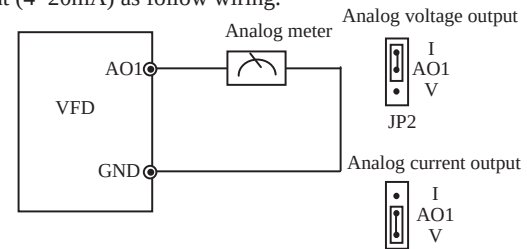


Fig. 3-9 Analog output terminal wiring

Notes:

(1) Filter capacitor or common-mode inductor can be installed between VI and GND terminal or CI and GND terminal when using analog input mode.

(2) Please use shielded cable and do well grounding, keep the wire as short as possible in order to prevent external interference when using analog input/output mode.

2.6.4 Communication Terminal Wiring

The VFD supplies standard RS 485 communication port.

It can constitute a single host-single slave control system or a single host-multi slaves system. The upper computer (PC/PLC) can real time monitor the VFD in the control system and achieve complicated control function such as remote control and supermatic, etc.

(1) Remote control panel can be connected with VFD via RS485 port by plugging in the remote control panel into RS485 port without any parameter setting. The local control panel of VFD and remote control panel can work at the same time.

(2) VFD RS485 port and upper computer wiring as follow:

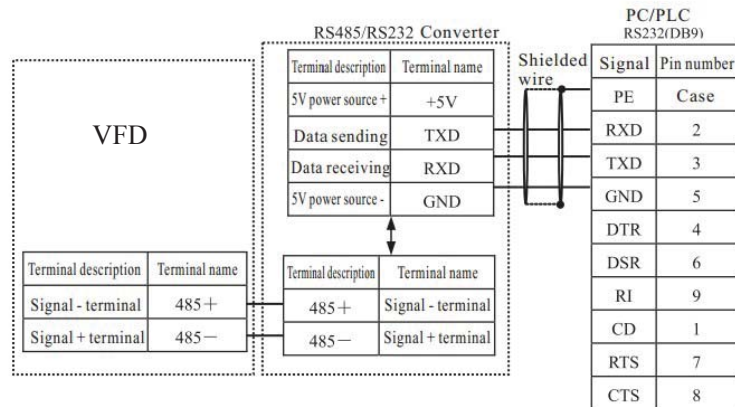


Fig. 3-10 RS485-(RS485/232)-RS232 communication wiring

(3) Multi VFDs can be connected together via RS485, controlled by PC/PLC as a host shown as Fig. 3-12. It also can be controlled by one of VFDs as a host shown as Fig. 3-13.

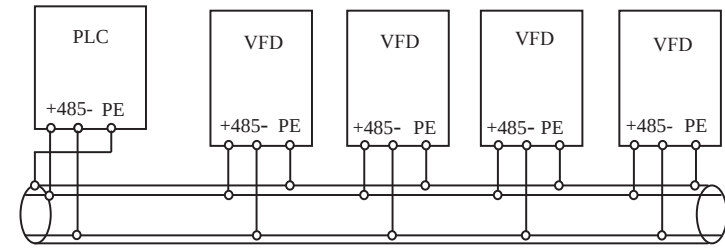


Fig. 3-12 PLC communication with multi VFDs

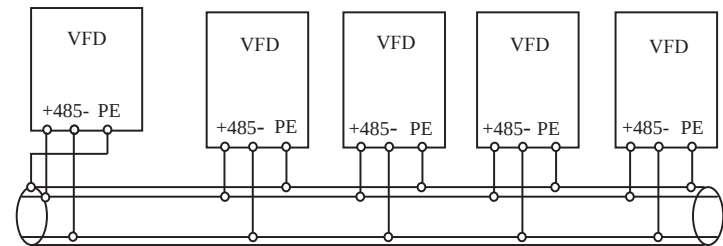


Fig. 3-13 Multi VFDs communication

The more VFDs connected, the more serious the communication interference becomes. Please make wiring as above and do well grounding for VFDs and motors, or adopt the following measures to prevent interference as even above wiring can't work.

(1) Separately power supply to PC/PLC or isolated the power of PC/PLC.

(2) Use EMIFIL to the wire or reduce carrier frequency properly.

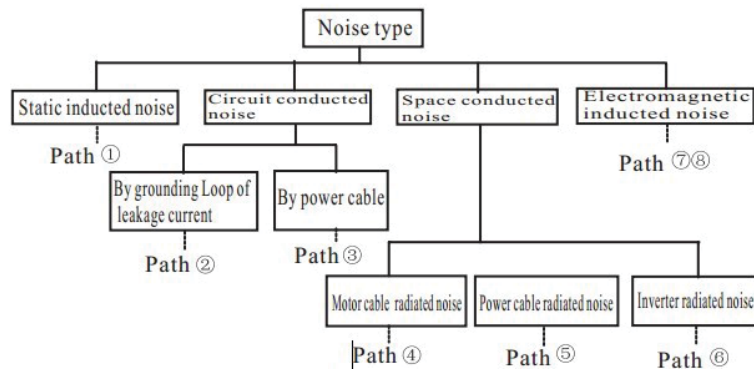
2.7 EMC Installation Instruction

VFD outputs PWM wave, it will produce electromagnetic noise. To reduce the interference, EMC installation will be introduced in this section from noise suppression, wire connection, grounding, leakage current and filter of power supply

2.7.1 Noise Suppression

(1) Noise Type

Noise is unavoidable during VFD operation. Its influence over peripheral equipment is related to the noise type, transmission means, as well as the design, installation, wiring and grounding of the driving system.



(2) Noise Suppression Methods

Table2-5 Noise suppression method

Path	Noise suppression methods
②	If a closed loop is formed between the peripheral equipment and the VFD wiring, the grounding leakage of the VFD will misoperate the equipment. Solution: Remove the grounding of the peripheral equipment
③	When peripheral equipment share the same power source with the VFD, the noise transmitted through the power line may misoperate the peripheral equipment. Solution: Mount a noise filter at VFD input side, or isolate the peripheral equipment with an isolated transformer or power filter.
④⑤⑥	Electronic equipment such as computers, measuring meters, sensors and radio equipment, when in the same cabinet with VFD, with their wiring close to the VFD, may misoperate due to radio interference. Solution: 1) The susceptible equipment and its signal lines should be kept away from the VFD. Use shielded cable for the signal line. Ground the shielding coat. Protect the signal cable with a metal pipe and keep it off the VFD input/output cable. When crossing of the signal line and the VFD input/output cables is inevitable, make sure it's orthogonal. 2) Mount radio noise filter or linear noise filter (choke coil) to the input/output side of the VFD to suppress the radio noise. 3) The shielding coat for the cable connecting VFD and the motor should be thick. The wiring can be arranged through thick pipe (2mm or thicker) or cement trench. The cable should be through a metal pipe, and has its shielding coat grounded. You may use the 4-core cable as the motor power cable. Ground one core at VFD side, with the other end of it connected to the motor case.
①⑦⑧	When the signal cables are parallel to, or bound together with the power cables, the static and electromagnetic induction will cause the noise transmit through the signal cable, misoperating the related equipment. Solution: 1) Avoid laying the signal cable parallel to the power cable, or bind them together. 2) Keep the susceptible peripheral equipment away from the VFD. 3) Keep the susceptible signal cables away from the input/output cables of VFD. Shielded cables should be used as the signal or power cable. Lead them through metal pipes respectively would achieve better effect. The metal pipes should be at least 20 cm away from each other.

2.7.2 Wiring Connection and Grounding

(1) Please try not to wire motor cable (from VFD to motor) in parallel with power cable and keep at least 30cm from each other .

(2) Please try to arrange the motor cable through metal pipe or in-metal wiring groove.

(3) Please use shielded cable as control signal cable, and connect the shielding coat to PE terminal of VFD with proximal grounding to VFD.

(4) PE grounding cable should be directly connected to the earth plate.

(5) The control signal cable should not be in parallel with strong electricity cable (power cable/motor cable). They should not be bent together and should be kept away as least 20cm from each other. If cable crossing is inevitable, please make sure it is orthogonal as Fig. 3-16

(6) Please ground the control signal cable separately with power cable/motor cable.

(7) Please don't connect other devices to VFD power input terminals(R/S/T).

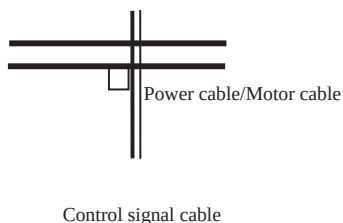


Fig. 3-16 Orthogonal wiring

Chapter 3 Running of VFD

3.1 Running of VFD

3.1.1 Running Command Channels

There are three channels for VFD receiving commands like START, STOP, JOG and others.

Control panel

Use    Keys on the panel to control the VFD. (Factory default)

Control terminal

Use terminal FWD, REV, COM to constitute a 2-wire control mode, or use one of terminals among X1~X6 and FWD, REV to constitute a 3-wire control mode.

Serial port

Use upper computer (PC/PLC) or host VFD to control slave VFD to start or stop via serial port.

The command channels can be selected by setting Function Code P0.03, or by multifunctional input terminal (function code P4.00-P4.07).

Note: These three channels are all switchable. Please make debugging before switch so as to avoid equipment damage and personal injury.

3.1.2 Frequency setting channel

There are 8 kinds of frequency setting channels as follow:

0: by control panel potentiometer

1: by   control panel keys

2: digital setting by function code via control panel

3: via terminal UP/DOWN

4: by upper computer via serial port

5: analog setting via VI terminal

6: analog setting via CI terminal

7: via pulse terminal

8: combination setting

3.1.3 VFD Running States

There are two VFD running states which are stopping state and running state.

Stopping state: The VFD is in stopping state before running control command is accepted after the power is on or deceleration to stop.

Running state: After running control command is accepted, the VFD enters running state.

3.1.4 The Running Modes of VFD

There are five running modes according to priority which are JOG running, close loop running, PLC running, multi-stage speed running, normal running as shown in Fig.4-1.

0: JOG running

In stopping state, after receiving JOG running command, the VFD will run according to JOG frequency, for example, by pressing control panel  key to give JOG command (refer to function code P3.06~P3.08).

1: Close loop running

By setting close loop running control parameter effective (P7.00=1), the VFD will enter close loop running, that is PI regulation (refer to function code P7). To make close loop running invalid, please set multifunctional input terminal (function27) and switch to lower level running mode.

2: PLC running

By setting PLC function parameter effective (P8.00 units 0), the VFD will enter PLC running mode and go to run according to preset running mode (refer to function code P8). To make PLC running invalid, please set multifunctional input terminal (function29) and switch to lower level running mode.

3: Multi-stages peed running

By setting non-zero combination of multifunctional input terminal (function1, 2, 3) and selecting multi-frequency 1-7, the VFD will enter multi-stage speed running mode(refer to function code P3.26~P3.32).

4: Normal running

Simple open loop running mode of VFD.

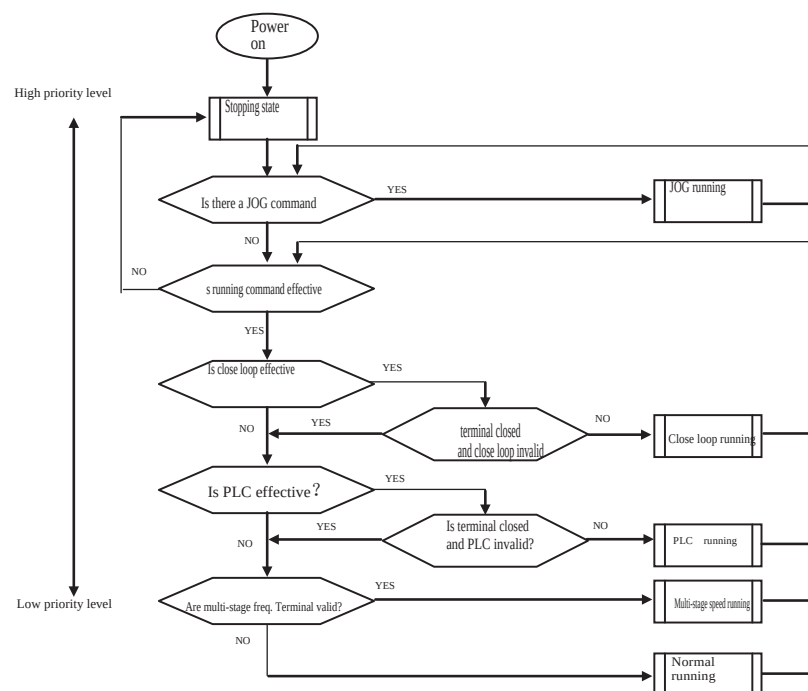


Fig.4-1 Running mode logic diagram

The above 5 kinds of running modes can be running in multiple frequency setting channel except JOG running. PLC running, multi-stage speed running and normal running can carry out swing frequency conditioning.

3.2 Operation and Using of the Control Panel

3.2.1 Control Panel Layout

User can perform VFDs' start, speed modulation, stop, braking, setup the running parameters and control peripheral equipment through control panel and control terminal

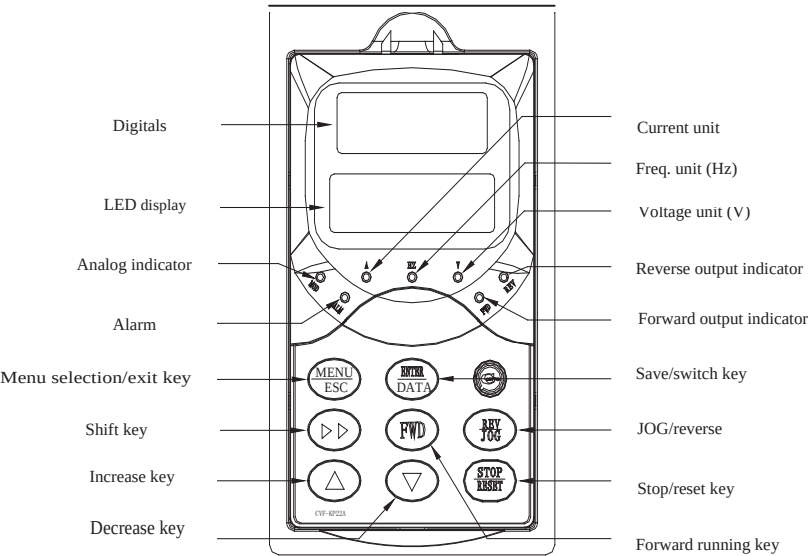


Fig. 4-2 Control panel diagram

3.2.2 Control Panel Function

There are 8 keys and 1 analog potentiometer on the VFD's panel.

The functions are shown as follow:

Keys	Function	Function specification
	Forward running key	Press this key to forward run.

	Stop/reset key	In the panel control mode, press this key to stop VFD running, and reset in fault state.
	Menu selection/exit	Enter or exit programming state
	JOG/reverse key	In the panel control mode, press this key for JOG running or reverse running.
	Increase key	Increase of data or code
	Decrease key	Decrease of data or code
	Shift key	In the programming state, press this key to change the data's revising bit.
	Save/switch key	In the programming state, press this key to enter the next menu or save the function code data.
	Analog potentiometer	In potentiometer control mode (P0.01=0), the output frequency can be controlled by regulating this potentiometer.

3.2.3 LED Display and Indictor Description

There are a 4 digits LED display, 3 unit indicators and 3 state indicators. These 3 unit indicators have 6 kinds of combinations corresponding to 6 kinds of unit indicating as Fig.4-3

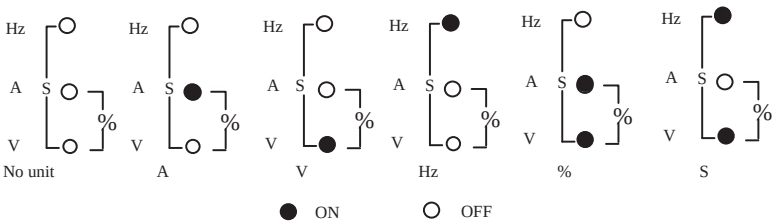


Fig. 4-3 Indicator state and unit indicating

Table 4-2 State indicator description

Item		Function Description	
Display function	LED digital display	Display VFD's running state parameters and setting parameters.	
	State indicator	FWD	When the motor is running forward, this indicator is on.
		REV	When the motor is running reverse, this indicator is on.
		ALM	When there is a fault alarm, this indicator is on

3.2.4 Control Panel Display State

The control panel display state includes parameter displaying in stopping state, function code parameter displaying in programming state, fault displaying in alarm state, and parameter displaying in running state.

A. Parameter displaying in stopping state

When VFD is in stopping state, panel displays stopping state monitoring parameter which usually is set frequency (b-01 monitoring parameter) shown as Fig.4-4 B.

Press  key to display the other monitoring parameter (The VFD default displays the first 7 monitoring parameters of b group. The other parameters can be defined by function code P3.41 and P3.42. Please refer to Chapter 5). When in parameter displaying, press  key for switching to default display parameter b-01, that is setting frequency, or it will always be displaying the monitoring parameter displayed last time.

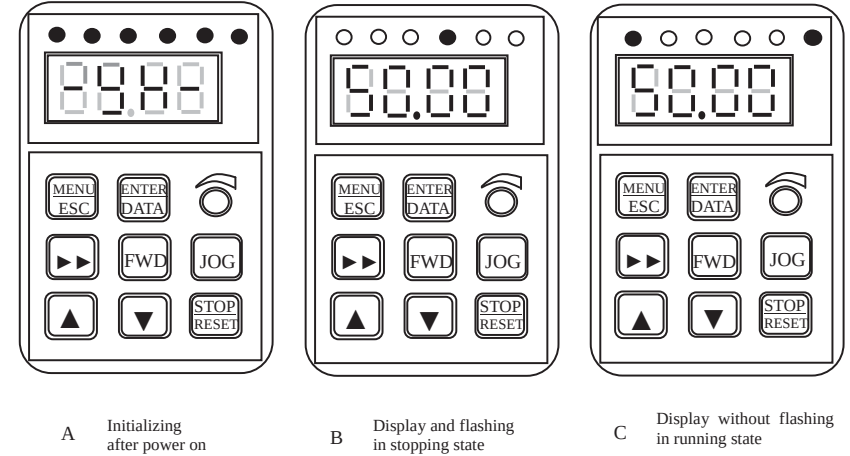


Fig.4-4 Parameter display in initialization, stopping and running state.

B. Parameter displaying in running state

The VFD enters running state after receiving effective running command, and the panel displays running state monitoring parameter. It default displays output frequency (b-00 monitoring parameter) shown as Fig.4-4 C.

Press  key to display the other monitoring parameter (defined by function code P3.41 and 3.42). When in parameter displaying, press  key for switching to default display parameter b-00, that is output frequency, or it will always be displaying the parameter displayed last time.

C. Fault displaying in alarm state

The VFD enters fault alarm display state after fault signal is detected. The displayed fault code will be flashing.

Press  key to check fault related parameter. When checking fault related parameter, press  key for switching to fault code display.

Press **MENU/ESC** key to enter programming state to check P6 group parameter of fault information

After troubleshooting, press **STOP/RESET** key to reset the VFD (or via control terminal/serial port)
If the fault still exists, it will keep displaying the fault code.

Note:

To some serious faults such as IGBT protection, over current, over voltage, etc. Don't reset the VFD before clearing the fault for sure, otherwise there is a danger of damage.

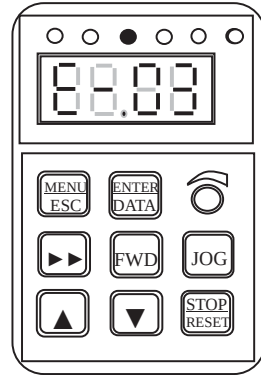


Fig. 4-5 Fault alarm display state

D. Function code programming state

In the state of stopping, running, and fault alarm, press **MENU/ESC** key to enter programming state (A password is required, If it has been set. Please refer to P0.00 description and Fig.4-10).

The programming state includes three display menus shown as Fig.4-6 which in order is function code group → function code number → function code parameter. Press **ENTER/DATA** key to enter each menus. When in function code parameter display menu, press **ENTER/DATA** key to save parameter, press **MENU/ESC** key to go back to previous menu without parameter saving.

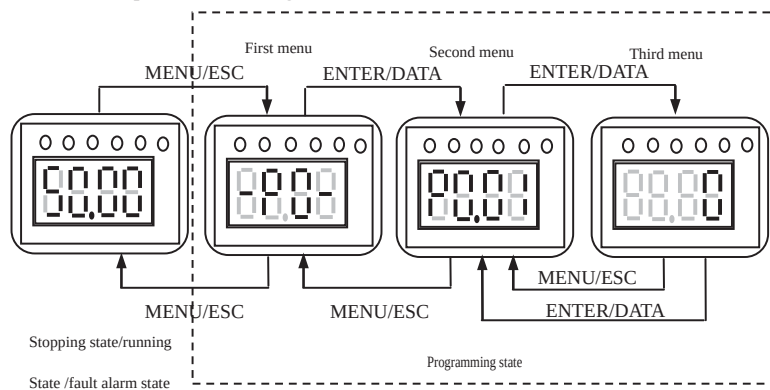


Fig. 4-6 Control panel programming state

3.2.5 Control Panel Operation

Through the operating panel of VFD for various operations, for example as follows:

A. Switching display of state monitoring parameter

Press **▶▶** key to display b group state monitoring parameter. It first displays the order of monitoring parameter, after 1 second, it switches automatically to display the value of this monitoring parameter shown as Fig.4-7.

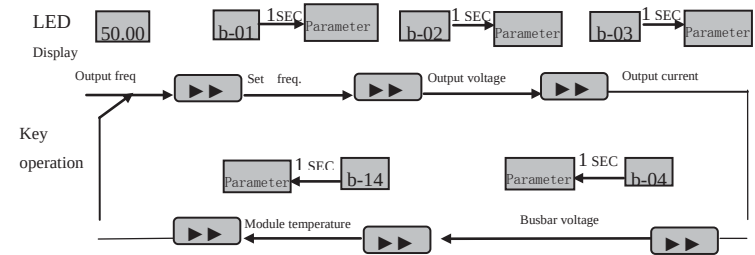


Fig. 4-7 Operation to display monitoring parameter

(2) When viewing monitoring parameter, press **ENTER/DATA** key for switching to default monitoring parameter display state. Default monitoring parameter is setting frequency in stopping state, and default monitoring parameter in running state is output frequency.

B. Function code parameter setting

For example, to set parameter code P3.06 from 5.00Hz to 8.50Hz.

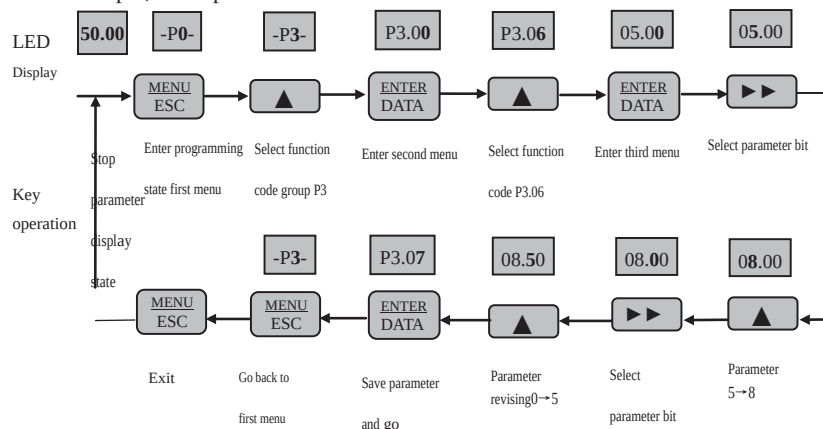


Fig. 4-8 Example of function code parameter setting

Note: In third menu, if the parameter displayed is not in flashing, it means that this function code is unable to be revised. Probably the reasons are:

- (1) This function code parameter is unmodifiable, such as actual detected state parameter, record running parameter, etc.
- (2) This function code parameter can not be revised in running state. It just can be revised in stopping state.
- (3) The parameter is under protection. When function code P3.01 unit's place is 1 or 2, all function code parameter can not be revised. This is parameter protection to avoid fault operation. Set P3.01 unit's place as 0 to make modification available.

C. JOG running operation

Following is an example. Suppose it is in panel control mode and in stopping state, JOG running frequency is 5Hz.

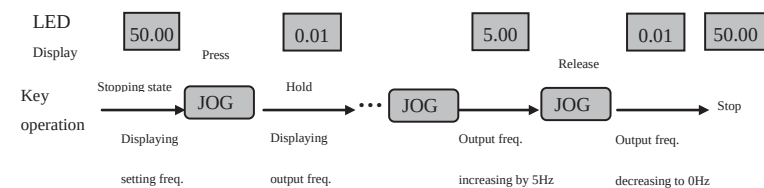


Fig.4-9 JOG running operation

D. Password authentication operation

Suppose P0.00 password parameter has been set as "2345". The authentication operation is shown as Fig. 4-10. The bold figure represents the flashing bit.

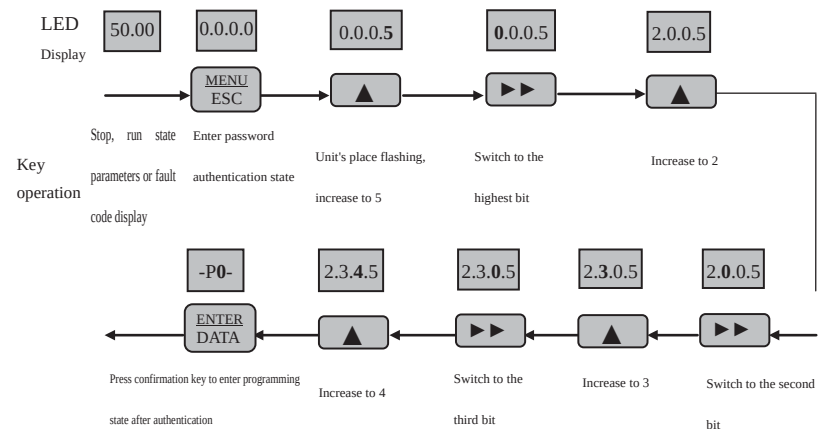


Fig. 4-10 Example of password authentication operation

E. Inquiring fault related parameter

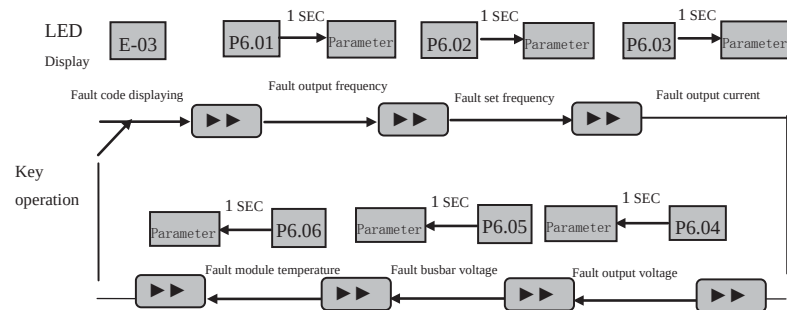


Fig. 4-11 Example of inquiring fault related parameter

Note:

(1) In fault code display state, press ▶▶ key to inquire P6 group function code parameter. The range is from P6.01 to P6.06. After pressing ▶▶ key, LED first displays function code, and 1 second later it displays automatically the value of this function code parameter.

(2) When inquiring fault parameter, press MENU/ESC key to switch back to fault code display state.

F. Frequency defined operation by control panel ▲, ▼ keys

Suppose it is in stopping state and P0.01=1, the operation is as follow.

(1) Frequency integral adjustment.

(2) As press ▲ key and hold it, LED begins to increase from unit's place to ten's place, and then to hundred's place. If release ▲ key and then press ▲ key again, LED will increase from unit's place again.

(3) As press ▼ key and hold it, LED begins to decrease from unit's place to ten's place, and then to hundred's place. If release ▼ key and then press ▼ key again, LED will decrease from unit's place again.

G. Control panel key lock operation

Press MENU/ESC key for 5 seconds to lock control panel key. It displays 'LOCK', as panel locked.

H. Control panel key unlock operation

Press MENU/ESC key for 5 seconds to unlock control panel key.

3.3 Power Applied for VFD

3.3.1 Inspection Before Power

Applied Please perform cable connection according to the requirements in manual.

3.3.2 First Power Applied Operation

After inspecting cable

Connection and power source

for sure, switch on VFD input

AC power switch. The VFD's

LED on control panel will display

dynamic start menu. When it displays

set frequency, it means

initialization has been completed.

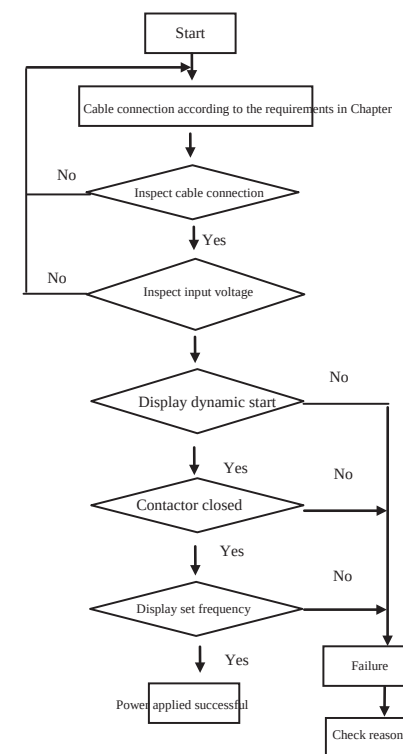


Fig. 4-12 VFD first power applied

Chapter 4 Function Parameter Table

4.1 Symbol Description

"○": means that the parameter can be revised during running state.

"×": means that the parameter can not be revised during running state.

"*": means read-only parameter which can not be revised.

4.2 Function Code Table

P0 Group: Basic running function parameter					
Func Code	Name	Range	Min Unit	Factory Default	Change
P0.00	Control mode selection	0: V/F Control 1: Sensorless vector control	1	0	○
P0.01	Freq control channel selection	0: Analog potentiometer on control panel 1: ▲, ▼ key on control panel 2: Digital setting 1, control panel given 3: Digital setting 2, UP/DOWN terminal given 4: Digital setting 3, serial port given 5: VI analog given (VI-GND) 6: CI analog given (CI-GND) 7: Pulse terminal given (PULSE) 8: Combination given (refer to P3.00)	1	0	○
P0.02	Initial digital set Freq.	P0.19lower limit Freq. ~P0.20upper limit Freq.	0.01HZ	50.00HZ	○
P0.03	Running command mode selection	0: Control panel mode 1: Terminal control mode 2: Serial port control mode	1	0	○
P0.04	Running direction setting	Unit's place: 0: Forward 1: Reverse Ten's place: 0: REV allowed REV 1: REV prohibited	1	10	○
P0.05	FWD/REV dead time	0.0~120.0s	0.1s	0.1s	○
P0.06	Max output Freq.	50.00Hz~500.00Hz	0.01Hz	50.00Hz	×
P0.07	Basic running Freq.	1.00Hz~500.00Hz	0.01Hz	50.00Hz	×
P0.08	Max output voltage	1~480V	1V	Rated voltage	×
P0.09	Torque boost	0.0%~30.0%	0.1%	2.0%	×
P0.10	Torque boost cut-off Freq.	0.00Hz~Basic running Freq. P0.07	0.00	50.00Hz	○
P0.11	Torque boost mode	0: Manual 1: Auto	1	0	○
P0.12	Carrier Freq.	1.0K~14.0K	0.1K	8.0K	×
P0.13	Acc/Dec mode selection	0: Linear Acc/Dec 1: Curve Acc/Dec	1	0	×

P0 Group: Basic running parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P0.14	Time of S curve start stage	10.0%~50.0% (Acc/Dec time) P0.14+P0.15 ≤ 90%	0.1%	20.0%	○
P0.15	Time of S curve ascent stage	10.0%~80.0% (Acc/Dec time) P0.14+P0.15 ≤ 90%	0.1%	60.0%	○
P0.16	Acc/Dec time unit	0: Second 1: Minute	0	0	×
P0.17	Acc time 1	0.1~6000.0	0.1	20.0	○
P0.18	Dec time 1	0.1~6000.0	0.1	20.0	○
P0.19	Upper limit Freq.	Lower limit Freq. ~Max output Freq. P0.06	0.01Hz	50.00Hz	×
P0.20	Lower limit Freq.	0.00Hz~Upper limit Freq.	0.01Hz	0.00Hz	×
P0.21	Lower limit Freq. Running mode	0: Running at lower limit freq 1: Stopping	1	0	×
P0.22	V/F curve setting	0: Constant torque curve 1: Reduced torque curve 1 (1.2 times the power) 2: Reduced torque curve 2 (1.7 times the power) 3: Reduced torque curve 3 (2.0 times the power) 4: Customized V/F curve	1	0	×
P0.23	V/F Freq. valueP3	P0.25 ~ P0.07 Basic running Freq.	0.01Hz	0.00Hz	×
P0.24	V/F Volt.valueV3	P0.26 ~ 100.0%	0.1%	0.0%	×
P0.25	V/F Freq. valueP2	P0.27 ~ P0.23	0.01Hz	0.00Hz	×
P0.26	V/F Volt.valueV2	P0.28 ~ P0.24	0.1%	0.0%	×
P0.27	V/F Freq. valueP1	0.00~P0.25	0.01Hz	0.00Hz	×
P0.28	V/F Volt.valueV1	0~ P0.26	0.1%	0.0%	×

P1 Group: Frequency setting function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P1.00	Analog filtering time constant	0.01~30.00s	0.01s	0.20s	○
P1.01	VI channel gains	0.01~9.99	0.01	1.00	○
P1.02	VI min given	0.00~P1.04	0.01Hz	0.00V	○
P1.03	Corresponding Freq. to VI min given	0.00~Upper limit Freq.	0.01Hz	0.00Hz	○
P1.04	VI max given	P1.04~10.00V	0.01V	10.00V	○
P1.05	Corresponding Freq. to VI max given	0.00~Upper limit Freq.	0.01Hz	50.00Hz	○

P1.06	CI channel gains	0.01~ 9.99	0.01	1.00	○
P1.07	CI min given	0.00~ P1.09	0.01V	0.00V	○
P1.08	Corresponding Freq. to CI min given	0.00~Upper limit freq	0.01Hz	0.00Hz	○
P1.09	CI max given	P1.07 ~10.00V	0.01V	10.00V	○
P1.10	Corresponding Freq. to CI max given	0.00~Upper limit freq	0.01Hz	50.00Hz	○
P1.11	Max input pulse freq	0.1~20.0K	0.1K	10.0K	○
P1.12	Pulse min given	0.0~P1.14 (Pulse max given)	0.1K	0.0K	○
P1.13	Corresponding Freq. to pulse min given	0.00~Upper limit freq	0.01Hz	0.00Hz	○
P1.14	Pulse max given	P1.12 (Pulse min given) ~P1.11 (Max input pulse Freq.)	0.1K	10.0K	○
P1.15	Corresponding Freq. to pulse max given	0.00~Upper limit freq	0.01Hz	50.00Hz	○

P2 Group: Start/Brake function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P2.00	Start running mode	0: Start from start Freq. 1: Brake first, then start from start Freq. 2: Track speed, then start.	1	0	×
P2.01	Start Freq.	0.40~20.00Hz	0.01Hz	0.50Hz	○
P2.02	Start Freq. running duration	0.0~30.0s	0.1s	0.0s	○
P2.03	DC brake current as start	0~15%	1%	0%	○
P2.04	DC brake time as start	0.0~60.0s	0.1s	0.0s	○
P2.05	Stop mode	0: Dec 1: Free Stop 2: Dec+DC brake	1	0	×
P2.06	Start Freq. of DC brake as stop	0.0~15.00Hz	0.0Hz	3.00Hz	○
P2.07	DC brake time as stop	0.0~60.0s	0.1s	0.0s	○
P2.08	DC brake current as stop	0~15%	1%	0%	○

P3 Group : Auxiliary running parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P3.00	Freq. control channel combination	0: VI+CI 1: VI- CI 2: External pulse given+VI+control panel▲, ▼ key given 3: External pulse given-VI-control panel▲, ▼ key given 4: External pulse given+CI 5: External pulse given-CI 6: RS485 given+VI+control panel▲, ▼key given 7: RS485 given-VI-control panel▲, ▼key given 8: RS485 given+CI+control panel▲, ▼key given 9: RS485 given-CI-control panel▲, ▼key given 10: RS485 given+CI+External pulse given 11: RS485 given-CI-External pulse given 12: RS485 given+VI+External pulse given 13: RS485 given-VI-External pulse given 14: VI+CI+control panel▲, ▼key given+digital given (P0.02) 15: VI+CI-control panel▲, ▼key given+digital given (P0.02) 16: MAX (VI, CI) 17: MIN (VI, CI) 18: MAX (VI, CI, PULSE) 19: MIN (VI, CI, PULSE) 20: VI, CI (Availability except 0, VI prior)	1	0	×
P3.01	Parameter initialization setting	LED unit's place: 0: All parameters are allowed to be revised. 1: All parameters are not allowed to be revised except this parameter itself. 2: All parameters are not allowed to be revised except P0.02 parameter and this parameter itself LED ten's place: 0: Inaction 1: Factory default reset 2: Clear history fault record	1	0	×
P3.02	Parameter copy	0: Inaction 1: Parameter upload 2: Parameter download Note: only valid in remote control mode	1	0	×
P3.03	Auto energy save running	0: Inaction 1: Action	1	0	×
P3.04	AVR function	0: Inaction 1: Always action 2: Inaction only in Dec	1	0	×

P3.05	Slip Freq. compensation	0~150%	1%	0%	×
P3.06	JOG running Freq.	0.10~50.00Hz	0.01Hz	5.00Hz	○
P3.07	JOG Acc time	0.1~60.0s	0.1s	20.0s	○
P3.08	JOG Dec time	0.1~60.0s	0.1s	20.0s	○
P3.09	Communication configuration	LED unit's place: baud rate selection 0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS LED ten's place: data format 0: 1—7—2 Format, without check 1: 1—7—1 Format, odd parity check 2: 1—7—1 Format, even parity check 3: 1—8—2 Format, without check 4: 1—8—1 Format, odd parity check 5: 1—8—1 Format, even parity check 6: 1—8—1 Format, without check LED hundred's place: communication mode 0: MODBUS, ASCII Mode 1: MODBUS, RTU Mode	1	005	×
P3.10	Local address	0~248 0: Broadcast address 248: Host address	1	1	×
P3.11	Communication overtime detection time	0.0~1000.0s 0.0: Function invalid	0.1s	0.0s	×
P3.12	Local response delay	0~1000ms	1	5ms	×
P3.13	Multi-running running proportion	0.01~1.00	0.01	1.00	×
P3.14	Acc time2	0.1~6000.0	0.1	20.0	○
P3.15	Dec time2	0.1~6000.0	0.1	20.0	○
P3.16	Acc time3	0.1~6000.0	0.1	20.0	○
P3.17	Dec time3	0.1~6000.0	0.1	20.0	○
P3.18	Acc time4	0.1~6000.0	0.1	20.0	○
P3.19	Dec time4	0.1~6000.0	0.1	20.0	○
P3.20	Acc time5	0.1~6000.0	0.1	20.0	○
P3.21	Dec time5	0.1~6000.0	0.1	20.0	○
P3.22	Acc time6	0.1~6000.0	0.1	20.0	○
P3.23	Dec time6	0.1~6000.0	0.1	20.0	○

P3.24	Acc time7	0.1~6000.0	0.1	20.0	○
P3.25	Dec time7	0.1~6000.0	0.1	20.0	○
P3.26	Multi-stage Freq. 1	Lower limit Freq. ~Upper limit Freq.	0.01Hz	5.00Hz	○
P3.27	Multi-stage Freq. 2	Lower limit Freq. ~Upper limit Freq.	0.01Hz	10.00Hz	○
P3.28	Multi-stage Freq. 3	Lower limit Freq. ~Upper limit Freq.	0.01Hz	20.00Hz	○
P3.29	Multi-stage Freq. 4	Lower limit Freq. ~Upper limit Freq.	0.01Hz	30.00Hz	○
P3.30	Multi-stage Freq. 5	Lower limit Freq. ~Upper limit Freq.	0.01Hz	40.00Hz	○
P3.31	Multi-stage Freq. 6	Lower limit Freq. ~Upper limit Freq.	0.01Hz	45.00Hz	○
P3.32	Multi-stage Freq. 7	Lower limit Freq. ~Upper limit Freq.	0.01Hz	50.00Hz	○
P3.33	Jump Freq. 1	0.00~500.00Hz	0.01Hz	0.00Hz	×
P3.34	Jump Freq. 1range	0.00~30.00Hz	0.01Hz	0.00Hz	×
P3.35	Jump Freq. 2	0.00~500.00Hz	0.01Hz	0.00Hz	×
P3.36	Jump Freq. 2range	0.00~30.00Hz	0.01Hz	0.00Hz	×
P3.37	Reserved	0000~9999	1	0000	×
P3.38	Zero frequency DC braking voltage	0.0%~15.0%	0.1%	0.0%	×
P3.39	Set running time	0~65.535K hour	0.001K	0.000K	○
P3.40	Total running time	0~65.535K hour	0.001K	0.000K	*
P3.41	Slow down and start wait time	00.0~60.0	0.1s	02.0 s	○
P3.42	Inspection speed and start the maximum output current level	00.0~150.0%	0.1%	100.0%	○
P3.43	Running display parameter selection1	00~15	1	00	○
P3.44	Stop display parameter selection2	00~15	1	00	○
P3.45	No unit display coefficient	0.1~60.0	0.1	29.0	○
P3.46	JOG/REVS witching control	0: Select the JOG point operation 1: Select the REV reverse operation	1	0	×

P4 Group: Terminal control function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P4.00	Input terminal X1 function selection	0: Idle terminal 1: Multi-stage speed control terminal 1 2: Multi-stage speed control terminal 2 3: Multi-stage speed control terminal 3	1	0	×

		4: External FWD JOG control input 5: External REV JOG control input 6: Acc/Dec time terminal 1 7: Acc/Dec time terminal 2 8: Acc/Dec time terminal 3 9: 3-wire control 10: Free stop input (FRS) 11: External stop command 12: Stopping DC brake input command DB 13: VFD running prohibited 14: Freq. increase command (UP) 15: Freq. decrease command (DOWN) 16: Acc/Dec prohibited command 17: External reset input (clear fault) 18: Peripheral equipment fault input (normally open) 19: Freq. control channel selection 1 20: Freq. control channel selection 2 21: Freq. control channel selection 3 22: Command switched to terminal 23: Running command control mode selection 1 24: Running command control mode selection 2 25: Swing frequency selection 26: Swing frequency running reset 27: Close loop invalid 28: Simple PLC pause running command 29: PLC invalid 30: PLC Reset in stopping state 31: Freq. switch to CI 32: Counter trig signal input 33: Counter clear input 34: External interrupt input 35: Pulse Freq. input (only valid for X6)			
P4.01	Input terminal X2 function selection	Ditto	1	0	×
P4.02	Input terminal X3 function selection	Ditto	1	0	×
P4.03	Input terminal X4 function selection	Ditto	1	0	×
P4.04	Input terminal X5 function selection	Ditto	1	0	×
P4.05	Input terminal X6 function selection	Ditto	1	0	×
P4.06	Input terminal X7	Ditto	1	0	

	function selection				
P4.07	Input terminal X8 function selection	Ditto	1	0	
P4.08	FWD/REV running mode selection	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	×
P4.09	UP/DN Rate	0.01—99.99Hz/s	0.01	1.00Hz/s	○
P4.10	2-way open collector output terminal OC1 output selection	0: VFD in running (RUN) 1: Freq. arrival signal (FAR) 2: Freq. level detected signal (FDT1) 3: Reserved 4: Overload pre-alarm signal (OL) 5: Under voltage locking (LU) 6: External fault stopping (EXT) 7: Output Freq. upper limit (FH) 8: Output Freq. lower limit (FL) 9: VFD in zero speed running 10: Simple PLC stage running finish 11: A PLC running cycle finish 12: Set counts arrival 13: Specified counts arrival 14: VFD ready for running (RDY) 15: VFD fault 16: Start Freq. running time 17: DC brake time when start 18: DC brake time when stop 19: Swing Freq. upper/lower limit 20: Set running time arrival 21: Upper limit of pressure alarm signal 22: Lower pressure alarm signal	1	0	×
P4.11	2-way open collector output terminal OC2 output selection	Ditto	1	0	×
P4.12	Relay TA/TB/TC output selection	Ditto	1	15	×
P4.13	Relay RA/RB/RC output selection	Ditto	1	0	×
P4.14	Freq. arrival detection range	0.00~400.00Hz	0.01Hz	5.00Hz	○
P4.15	FDT1 (Freq. level)	0.00~Upper limit freq	0.01Hz	10.00Hz	○
P4.16	FDT1 lag	0.00~50.00Hz	0.01Hz	1.00Hz	○
P4.17	Analog output (AO1) selection	unit's place : Output Freq. (0~upper limit Freq.) 1: Output current (0~2 times motor rated current) 2: Output voltage (0~1.2 times	01	00	○

		VFD rated voltage) 3: Busbar voltage 4: PID given 5: PID feedback 6: VI (0~10V) 7: CI (0~10V/4~20mA) Ten's place: 0: 0~10V 1: 0~20mA 2: 4~20mA			
P4.18	Analog output (AO1) gain	0.50~2.00	0.01	1.00	○
P4.19	Analog output (AO2) selection	unit's place : Output Freq. (0~upper limit Freq.) 1: Output current (0~2 times motor rated current) 2: Output voltage (0~1.2 times VFD rated voltage) 3: Busbar voltage 4: PID given 5: PID feedback 6: VI (0~10V) 7: CI (0~10V/4~20mA) ten's place: 0: 0~10V 1: 0~20mA 2: 4~20mA	01	00	○
P4.20	Analog output (AO2) gain	0.50~2.00	0.01	1.00	○
P4.21	DO output terminal function selection	unit's place : 0: Output Freq. (0~upper limit Freq.) 1: Output current (0~2 times motor rated current) 2: Output voltage (0~1.2 times VFD rated voltage) 3: Busbar voltage (0~800V) 4: PID given 5: PID feedback 6: VI (0~10V) 7: CI (0~10V/4~20mA)	1	0	○
P4.22	DO max pulse output Frequency	0.1K~20.0K (max 20KHz)	0.1KHz	10.0KHz	○
P4.23	Set counts given	F4.20~9999	1	0	○
P4.24	Specified counts given	0~F4.19	1	0	○
P4.25	Overload pre-alarm detection level	20%~200%	1	130%	○
P4.26	Overload pre-alarm delay time	0.0~20.0s	0.1s	5.0s	○

P5 Group: Protection function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P5.00	Motor overload protection mode selection	0: Stop outputting 1: Inaction	1	0	×
P5.01	Motor overload protection coefficient	20~120%	1	100%	×
P5.02	Overvoltage stall Selection	0: Prohibited 1: Allowed	1	1	×
P5.03	Overvoltage stall point	380V: 120~150% 220V: 110~130%	1%	140% 120%	○
P5.04	Auto current limit level	110%~200%	1%	150%	×
P5.05	Freq. drop rate during current limit	0.00~99.99Hz/s	0.01Hz/s	10.00Hz/s	○
P5.06	Auto current limit mode selection	0: Constant speed invalid 1: Constant speed valid Note: Acc/Dec valid	1	1	×
P5.07	Restart setting after power failure	0: Inaction 1: Action	1	0	×
P5.08	Restart waiting time after power failure	0.0~10.0s	0.1s	0.5s	×
P5.09	Fault self-recovery times	0~10 0: Self-recovery invalid Note: Self-recovery invalid in overload or overheat	1	0	×
P5.10	Self-recovery interval time	0.5~20.0s	0.1s	5.0s	×
P5.11	Output missing phase protection	0: Inaction 1: Action	1	0	○

P6 Group: Fault record function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P6.00	Last fault record	Last fault record	1	0	*
P6.01	Output Freq. in last fault	Output Freq. in last fault	0.01Hz	0	*
P6.02	Set Freq. in last fault	Set Freq. in last fault	0.01Hz	0	*
P6.03	Output current in last fault	Output current in last fault	0.1A	0	*
P6.04	Set Freq. in last fault	Set Freq. in last fault	1V	0	*
P6.05	Output current in last fault	Output current in last fault	1V	0	*
P6.06	Output voltage in last fault	Output voltage in last fault	10C	0	*
P6.07	Last 2 fault record	Last 2 fault record	1	0	*

P6.08	Last 3 fault record	Last 3 fault record	1	0	*
P6.09	Last 4 fault record	Last 4 fault record	1	0	*
P6.10	Last 5 fault record	Last 5 fault record	1	0	*
P6.11	Last 6 fault record	Last 6 fault record	1	0	*

P7 Group: Close loop running control function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P7.00	Close loop running control selection	0: Invalid 1: Valid	1	0	×
P7.01	Close loop given channel selection	0: P7.05 Digital given + panel▲, ▼ Fine tuning 1: VI analog 0~10V voltage given 2: CI analog 0~10V given 3: Panel analog potentiometer given 4: RS485 communication given 5: Pulse input given 6: CI simulation4~20mA Current setting	1	0	×
P7.02	Feedback channel selection	0: VI analog 0~10V input voltage 1: CI analog input (0~10V/0~20mA) 2: VI+CI 3: VI-CI 4: Min { VI, CI } 5: Max { VI, CI } 6: CI analog input (4~20mA)	1	0	×
P7.03	Given channel filtering time constant	0.01~50.00s	0.01s	0.50s	○
P7.04	Feedback channel filtering time constant	0.01~50.00s	0.01s	0.50s	○
P7.05	Given value digital setting	0.001~20.000Mpa	0.001Mpa	0.000Mpa	×
P7.06	Close loop adjustment characteristics	0: Positive effect 1: Negative effect	1	0	○
P7.07	Feedback channel gain	0.01~10.00	0.01	1.00	○
P7.08	Lower pressure limit	0.001~P7.09	0.001	0.001	○
P7.09	Upper pressure limit	P7.08~P7.27	0.001	1.000	○
P7.10	PID Controller structure	0: Proportional control 1: Integral control 2: Proportional integral control 3: Proportional, integral and differential control	1	1	×
P7.11	Proportional gain KP	0.00~5.00	0.01	0.50	○

P7.12	Integral time constant	0.1~100.0s	0.1	10.0s	○
P7.13	Differential gain	0.0~5.0	0.1	0.0	×
P7.14	Sampling period	0.01~1.00s	0.01	0.10	○
P7.15	Tolerance limit	0.0~20.0%	0.1%	0.0%	○
P7.16	PID Feedback disconnected detection threshold	0~Upper limit freq	0.01Hz	0.00Hz	○
P7.17	PID Feedback disconnected action selection	0~3	1	0	○
P7.18	PID Feedback disconnected operation delay time	0.01~5.00s	0.01s	1.00s	○
P7.19	Pressure level.	0.001~P7.20	0.001Mpa	0.001Mpa	○
P7.20	Sleep pressure level	P7.19~P7.27	0.001Mpa	1.000Mpa	○
P7.21	Sleep level continuous time	0~250s	1s	10s	○
P7.22	Sleep frequency	0.00~400.0Hz	0.01Hz	20.00Hz	○
P7.23	Sleep frequency continuous time	0~250s	1s	10s	○
P7.24	Low alarm limit pressure	0.001~P7.25	0.001Mpa	0.001Mpa	○
P7.25	The alarm limit pressure	P7.24~P7.27	0.001Mpa	1.000Mpa	○
P7.26	Constant pressure water supply mode	0: Choosing not to constant pressure water supply mode 1: With a constant pressure water supply mode 2: A two constant pressure water supply mode 3: A three constant pressure water supply mode 4: A four constant pressure water supply mode	1	0	×
P7.27	Remote pressure gauge range	0.001~20.000Mpa	0.001Mpa	1.000Mpa	○
P7.28	Multi pump operation mode	0: Fixed sequence switch 1: Timing of the rotation	1	0	○
P7.29	Rotation in timed intervals	0.5~100.0H	0.1H	5.0H	○
P7.30	Pump switching judgment time	0.1~1000.0s	0.1s	300.0s	×

P7.31	Electromagnetic switching delay time	0.1~10.0s	0.1s	0.5s	×
P7.32	PID Control of positive and negative role and feedback pressure error polarity	unit's place: 0: PID Control action 1: PID Control reaction ten's place: 0: Feedback pressure less than the actual pressure 1: Feedback pressure is greater than the actual pressure	1	00	×
P7.33	Feedback error of pressure adjustment coefficient	0.001~20.000Mpa	0.001Mpa	0.000Mpa	×
P7.34	Closed loop of preset frequency	Range: 0~Upper limit freq	0.00Hz	0.00Hz	×
P7.35	Closed loop of preset frequency holding time	Range: 0.0~200.0s	0.1s	0.0s	×

P8 Group PLC running parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P8.00	PLC running mode selection	0000~1113 LED unit's place: mode selection 0: Inaction 1: Stop after single cycle 2: Running at final freq after single cycle 3: Continuous cycle LED ten's place: restart mode selection 0: Restart from the first stage 1: Restart from the Freq. of break stage 2: Restart from the running of break stage LED hundred's place: parameter save mode selection 0: No save 1: Save LED thousand's place: running time unit 0: Second 1: minute	1	0000	×
P8.01	Stage 1 setting	000~621 LED unit's place: freq setting 0: Multi-stage freq i (i=1~7) 1: Freq. defined by P0.01 function code LED ten's place: direction selection 0: Forward	1	000	○

		1: Reverse 2: Controlled by running command LED hundred's place: Acc/Dec time selection 0: Acc/Dec time 1 1: Acc/Dec time 2 2: Acc/Dec time 3 3: Acc/Dec time 4 4: Acc/Dec time 5 5: Acc/Dec time 6 6: Acc/Dec time 7			
P8.02	Stage 1 running time	0.1~6000.0	0.1	10.0	○
P8.03	Stage 2 setting	000~621	1	000	○
P8.04	Stage 2 running time	0.1~6000.0	0.1	10.0	○
P8.05	Stage 3 setting	000~621	1	000	○
P8.06	Stage 3 running time	0.1~6000.0	0.1	10.0	○
P8.07	Stage 4 setting	000~621	1	000	○
P8.08	Stage 4 running time	0.1~6000.0	0.1	10.0	○
P8.09	Stage 5 setting	000~621	1	000	○
P8.10	Stage 5 running time	0.1~6000.0	0.1	10.0	○
P8.11	Stage 6 setting	000~621	1	000	○
P8.12	Stage 6 running time	0.1~6000.0	0.1	10.0	○
P8.13	Stage 7 setting	000~621	1	000	○
P8.14	Stage 7 running time	0.1~6000.0	0.1	10.0	○

P9 Group Swing frequency function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
P9.00	Swing Freq. selection	0: Inaction 1: Action	1	0	×
P9.01	Swing Freq. running mode	0000~11 LED unit's place: start mode 0: Auto start 1: Manual start by terminal LED ten's place: swing amplitude control 0: Variable swing amplitude 1: Fixed swing amplitude	1	00	×
P9.02	Preset swing Freq.	0.00~500.00Hz	0.01Hz	0.00Hz	○
P9.03	Preset swing Freq. waiting time	0.0~3600.0s	0.1s	0.0s	○

P9.04	Swing amplitude	0.0~50.0%	0.1%	0.0%	○
P9.05	Kick Freq.	0.0~50.0%	0.1%	0.0%	○
P9.06	Swing Freq. cycle	0.1~999.9s	0.1s	10.0s	○
P9.07	delta wave ascent time	0.0~98.0%	0.1%	50.0%	○
P9.08	Fan control selection	0: VFD operation of fan operation 1: Power on the wind turbine operation	1	0	○
P9.09	Reserved	0000~9999	1	0000	○
P9.10	Braking unit use rate	0~100.0%	0.1%	30.0%	○
P9.11	Overpressure protection threshold value	0~780V	1V	780V	○
P9.12	Energy consumption braking busbar voltage	0~780V	1V	640V or 358V	○
P9.13	G, P Model set	0, 1	1	0	○
P9.14	User password	1~9999	1	0	○

PA Group: Vector control parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
PA.00	Motor parameter self-learning function	0: Inaction 1: Resting self-learning	1	0	×
PA.01	Motor rated voltage	0~400V	1	depends on model type	×
PA.02	Motor rated current	0.01~500.00A	0.01A	depends on model type	×
PA.03	Motor rated frequency	1~500Hz	1Hz	depends on model type	×
PA.04	Motor rated rotating speed	1~9999 r/min	1r/min	depends on model type	×
PA.05	Motor poles number	2~16	1	depends on model type	×
PA.06	Motor stator inductance	0.1~5000.0mH	0.1mH	depends on model type	×
PA.07	Motor rotor inductance	0.1~5000.0mH	0.1mH	depends on model type	×
PA.08	Motor stator and rotor mutual inductance	0.1~5000.0mH	0.1mH	depends on model type	×
PA.09	Motor stator resistance	0.001~50.000Ω	0.001Ω	depends on model type	×
PA.10	Motor rotor resistance	0.001~50.000Ω	0.001Ω	depends on model type	×
PA.11	Overcurrent protection coefficient of torque current	0~15	1	15	×

PA.12	Proportion adjustment coefficient of speed deviation	50~120	1	85	×
PA.13	Integral adjustment coefficient of speed deviation	100~500	1	360	×
PA.14	Vector torque boost	100~150	1	100	×
PA.15	Reserved	0	0	0	×
PA.16	Reserved	1~5	1	4	×
PA.17	Reserved	100~150	1	150	×
PA.18	Reserved	150	1	150	×
PA.19	Reserved	0~2	1	0	

PF Group: Factory function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
PF.00 ~PF.10	Reserved	—	—	—	—

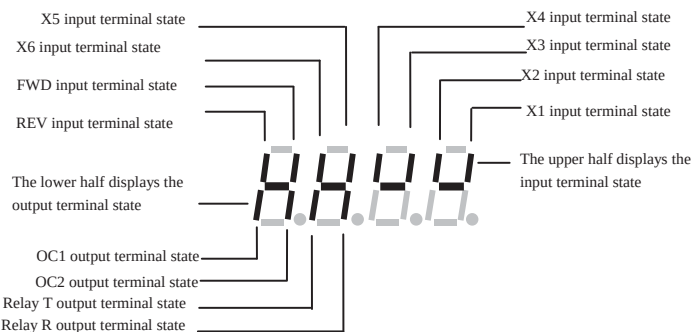
5.3 State Monitoring Parameter Table

B-Monitoring: function parameter					
Func Code	Name	Range	Min Unit	Factory default	Change
b-00	Output freq	Present output freq	0.01Hz		*
b-01	Set Freq.	Present set Freq.	0.01Hz		*
b-02	Output voltage	Effective value of present output voltage	1V		*
b-03	Output current	Effective value of present output current	0.1A		*
b-04	Busbar voltage	Present DC busbar voltage	1V		*
b-05	Module temperature	IGBT heat sink temperature	10C		*
b-06	Motor speed	Present motor speed	1r/min		*
b-07	Running time	One continuous running time	1H		*
b-08	Input/output terminal state	Input/output terminal state	—		*
b-09	Analog input VI	Analog input VI value	0.01V		*

b-10	Analog input CI	Analog input CI value	0.01V		*
b-11	External pulse input	External pulse width input value	1ms		*
b-12	VFD rated current	VFD rated current	0.1A		*
b-13	VFD rated voltage	VFD rated voltage	1V		*
b-14	Set pressure	Water supply control when the set pressure of the pipeline	0.001Mpa		
b-15	Feedback pressure	Water supply control feedback pipeline pressure	0.001Mpa		
b-16	No unit display	No unit display	1		

4.4 Terminal Monitoring State

Note: Monitoring parameter input/output terminal state displayed as follow:



Note: " / " Means invalidity ((LED OFF)) " / " Means validity (LED ON)

Chapter 5 Troubleshooting

5.1 Fault Alarm and Troubleshooting

When the VFD is abnormal, protection function acts: LED displays fault code and the content, fault relay acts, the VFD stops output and the motor coasts to stop. VFD's fault contents and troubleshooting is shown in Table 7-1. After fault alarm occurs, fault phenomenon should be recorded in detail, the fault should be processed according to Table 7-1. When in need of technical assistance, please contact your supplier.

Table 7-1 Alarms and troubleshooting

Fault code	Type of faults	Possible fault reasons	Troubleshooting
E-01	Acc over current	Acc time is too short	Adjust acc time
		V/F curve setup is not suitable	Adjust V/F curve
		Restart the motor in running	Setup start mode as speed tracking restart
		Torque boost setup is too big	Adjust torque boost or set as auto mode
		VFD capacity is too low	Select VFD with proper capacity
E-02	Dec over current	Dec time is too short	Adjust Dec time
		Potential load or load inertia is too big	Add suitable braking device
		VFD capacity is too low	Select VFD with proper capacity
E-03	Over current at constant speed running	Load mutation	Check load
		Acc or Dec time is too short	Adjust Acc or Dec time
		Input voltage abnormal	Check input power supply
		Load abnormal	check load
		VFD capacity is too low	Select VFD with proper capacity
E-04	Acc overvoltage	Input voltage abnormal	Check input power supply
		Acc time is too short	Adjust Acc time
		Restart the motor in running	Setup start mode as speed tracking restart
E-05	Dec overvoltage	Dec time is too short	Adjust the Dec time
		Potential load or load inertia is too big	Add suitable braking device

Fault code	Type of faults	Possible fault reasons	Troubleshooting
E-06	Overvoltage at constant speed running	Input voltage abnormal	Check input power supply
		Acc or Dec time is too short	Adjust the Acc or Dec time
		Abnormal change of input voltage	Mount input reactor
		Load inertia is too big	Add suitable braking device
E-07	Overvoltage of control power supply	Input voltage abnormal	Check input power supply
E-08	VFD overheat	Air duct obstruction	Clean air duct
		Environment temperature is too high	Improve the ventilation or decrease the carrier frequency
		Fan damaged	Replace a new fan
		VFD module abnormal	Contact supplier
E-09	VFD overload	Acc time is too short	Adjust Acc time
		DC braking value is too high	Decrease DC braking current and increase braking time
		V/F curve setup is not suitable	Adjust V/F curve
		Restart the motor in running	Setup start mode as speed tracking restart
		Mains voltage is too low	Check mains voltage
		Too heavy load	Select VFD with proper capacity
E-10	Motor overload	V/F curve setup is not suitable	Adjust V/F curve
		Mains voltage is too low	Check mains voltage
		General motor runs at low speed with heavy load for long term	Use a special motor for long term running
		Wrong setting of motor overload protection factor	Set the factor right
		Motor chocked or sudden change of load	Check load
E-11	Under voltage in running	Mains voltage is too low	Check mains voltage
E-12	VFD module protection	VFD over current	Refer to over current troubleshooting
		Output 3-phase fault or ground short	Re-wiring

		Air duct obstruction or fan damaged	Clean air duct or replace a new fan
		Environment temperature too high	Decrease environment temperature
		Control board connecting wire or plug-in unit loose	Check and re-wiring
		Current waveform abnormal due to output missing phase, etc.	Check wiring
		Auxiliary power damaged, or driving voltage under voltage	Contact supplier
		Control board abnormality	Contact supplier
E-13	Peripheral fault	Close external fault terminals	Check the reason
E-14	Current detecting circuit fault	Loose wiring or terminal connections	Check and re-wiring
		Auxiliary power source damaged	Contact supplier
		Hall component damaged	Contact supplier
		Abnormal amplifier circuit	Contact supplier
E-15	RS232/485 Communication fault	Wrong baud rate setting	Set baud rate properly
		Serial port communication fault	Press  key to reset or contact supplier
		Improper fault alarm parameter setting	Revise function code P3. 09~P3. 12
		Upper computer doesn't work	Check upper computer and connecting cable
E-16	System interference	Serious interference	Press  key to reset or install input power source filter
		DSP read/write error	Reset or contact supplier
E-17	E ² PROM error	Read/write error of control parameter	press  key to reset or install input power source filter
E-18	Motor parameter over current fault	Power range of Motor and VFD do not match	Contact supplier press  key to reset
E-19	Input phase loss protection	One of R, S, T port has no voltage	press  key to reset check voltage of R, S, T
E-20	Over current fault when restart	Over current when VFD restart and check speed	press  key to reset adjust relevant parameters

5.2 Fault Record Search

This series VFD record the fault codes occurred in the last 6 times and VFD running parameter when last fault occurred. The fault information is saved in P6 group.

5.3 Fault Reset

When fault occurred, please select the following methods to recover:

- (1) When fault code is displayed, after ensure it can be reset, press  key to reset.
- (2) Set any one of X1~X8 terminal as external RESET input (P4. 00~P4. 07=17).
- (3) Cut off power.



Attention

- (1) Reset the VFD after thoroughly investigating the cause of fault and clearing, otherwise, the VFD may be damaged.
- (2) If it can't be reset or fault occurs again after reset, please check the cause of fault, continuous reset may damage VFD.
- (3) Reset the VFD after waiting for 5mins when overload or overheat protection occurs.

Chapter 6 Preservation and Maintenance

6.1 Preservation and Maintenance

Potential hazards exist due to aging, wear and tear of VFD internal components as well as environmental influences to the VFD, such as temperature, humidity particles etc. Therefore, daily inspection, periodic preservation and maintenance must be performed to the VFD and its driving mechanism during their storage and operation.

6.1.1 Daily Maintenance

The following must be verified before starting up:

- (1) No abnormal vibration and no abnormal noise.
- (2) No abnormal heat.
- (3) No abnormal ambient temperature.
- (4) The ammeter satisfy the specification
- (5) Fan is working in good condition

6.2 Periodic Preservation and Maintenance

6.2.1 Periodic Maintenance

Cut off the power when VFD is maintained termly, check after the main circuit power indicator light is off. The checking content is shown in Table 8-1.

Table 8-1 Periodic inspections

Checking item	Checking content	Troubleshooting
Screws of control terminals and main circuit terminals	The screws are loose or not	If loose, tighten them with screw driver
Heat sink	Whether there is dust	Clean thoroughly the dust
Printed circuit board	Whether there is dust	Clean thoroughly the dust
Cooling fans	Whether there is abnormal vibration or abnormal noise	Replace cooling fans
Power element	Whether there is dust	Clean thoroughly the dust
Electrolytic capacitor	Whether there is discoloring, peculiar smell	Replace electrolytic capacitor

6.2.2 Termly maintaining

In order to let VFD work well for a long term, user must maintain the VFD termly.

The replace time of element of VFD is shown in Table 8-2.

Table 8-2 VFD parts replacement time

Device name	Standard replacement time
Cooling fans	2-3 years
Electrolytic capacitors	4-5 years
Printed circuit board	5-8 years
Fuse	10 years

The working condition of the VFD as following:

- (1) Environment temperature: average 30C.
- (2) Load coefficient: under 80%.
- (3) Running time: under 12 hour every day.

6.3 Warranty of VFD

Please contact manufacturer regarding warranty.