VEIKONG

Operation manual

VFD200 Series

High Performance Universal Inverter

Preface

Thank you very much for choosing XX200 series high-performance converter. This manual can provide you with the detailed rules and precautions, including installation, wiring, the setting of functional parameter, daily maintenance, malfunction diagnosis and solution etc.

To give full play to its function and ensure the safety of both users and product, please read this manual carefully before using it. Any incorrect operations may lead to fault, malfunction or shortened lifetime, even damage of device and accident casualty.

Please pay attention to the following points when using it:

- Power must be shut off before wiring
- Ground wire must be connected correctly
- In any case, AC power lines can't be connected to the output terminals, such as U, V or W
- Do not touch the internal components for safety
- Only the qualified electronic engineer is allowed to assemble, wire, repair or maintain the converter
- Converter must be installed in appropriate operating environment and far away from humidity or water drops; care must be taken to prevent it from direct sunlight or being overheated
- Do not conduct the procedure of inspection or maintenance until converter has been shut down for more than 3 minutes
- No permission is granted to change or modify the internal components or circuits.
- Do not conduct the Withstand Voltage Test on the internal components
- This product can't be applied in the situation that may endanger personal safety

This manual enclosed randomly as an attachment, please keep it safe in case that you need it for the inspection or maintenance of this product. Any information in this manual is subject to change without prior notice.

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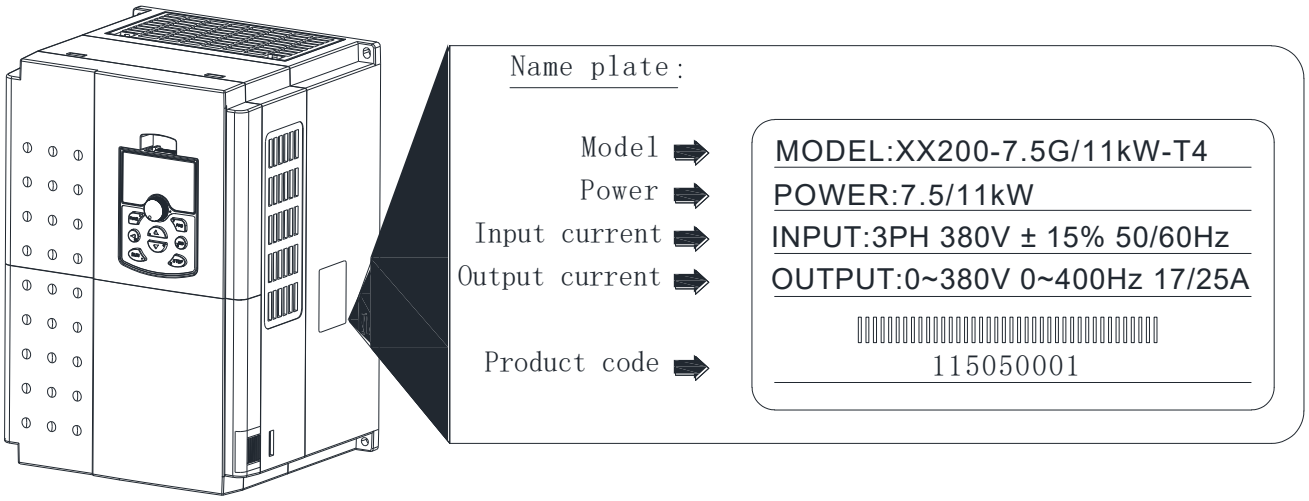
Chapter 1 Acceptance

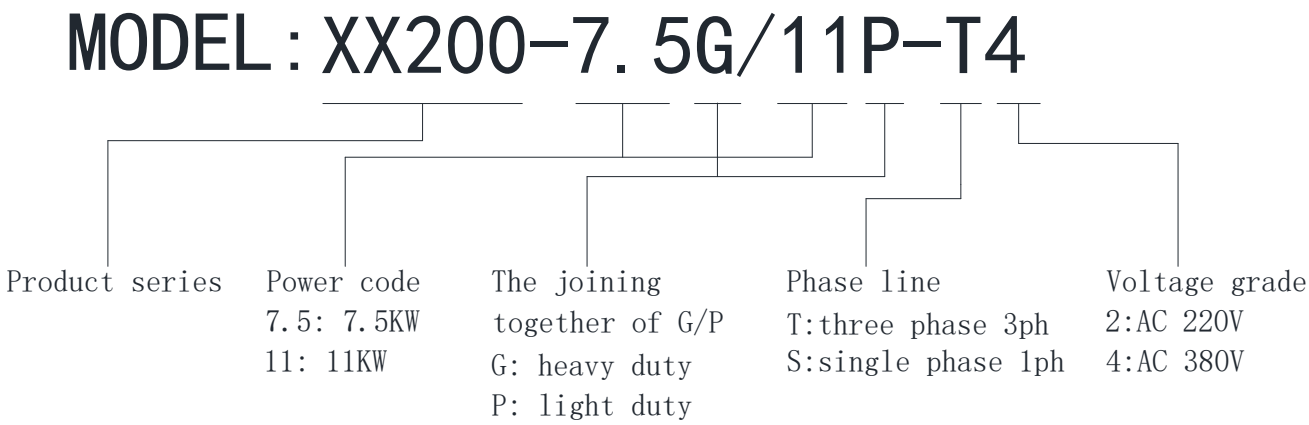
1-1 Inspection on Delivery

- Pre-delivery inspection for each converter will be implemented strictly by our QC Department; meanwhile, the packaging will be strengthened with special packing materials which can protect it from damage caused by collision. Please find the following points to check after unpacking it:
- Please check if there is any damage caused during the transportation;
- Please check if the enclosed documents are all inside the case, including manual, certificate and warranty card
- Please check if this is the model of the product for which you placed an order
- Please check whether you receive the right converter accessories you ordered

1-2 Illustrations for Nameplate description of XX200 series inverter



Illustrations for Product Model



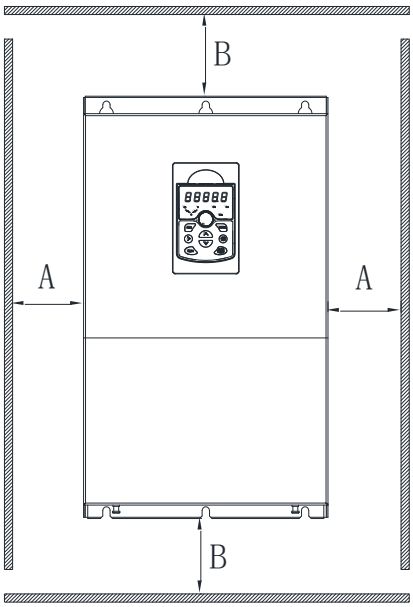
Chapter 2 Installation

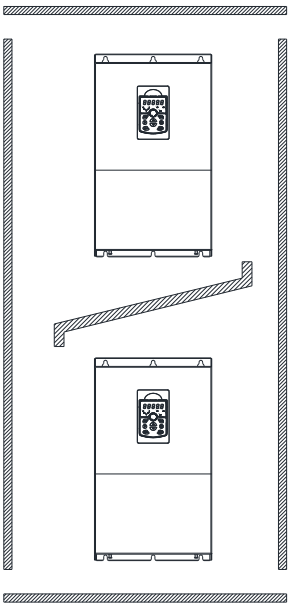
2-1 Installation environment

- No Water drops, steam, dust or oily dust surrounded
- No caustic or inflammable gas and liquid surrounded
- No floating dust and metal particles surrounded
- Solid base without vibration
- No electromagnetic or noise interference
- Ambient temperature should be -10°C ~ +50°C; in case that the ambient temperature is higher than 40°C and that it is overheated, it should be stored in a place where there is good ventilation

2-2 Installation Instructions and Space Limit

- It should be installed on the fire-proof frame, for example metal frame, in case that it causes fire accidents
- It should be mounted by screws vertically; upside-down, slant or horizontal mounting are not allowed
- Spare space must be ensured for the ventilation of converter in case that it's overheated while it's running
- Ventilation must be taken into consideration to ensure that ambient temperature is lower than specified value when converter is installed inside a control cabinet
- To minimize the heat effect on each other, they should be horizontally installed abreast if two or more converters are installed in the same control cabinet; Baffle plate must be set up between them for the same reason if they have to be installed vertically
- It should be kept away from various impurity, such as fiber, paper scraps, wood chips or metal filing

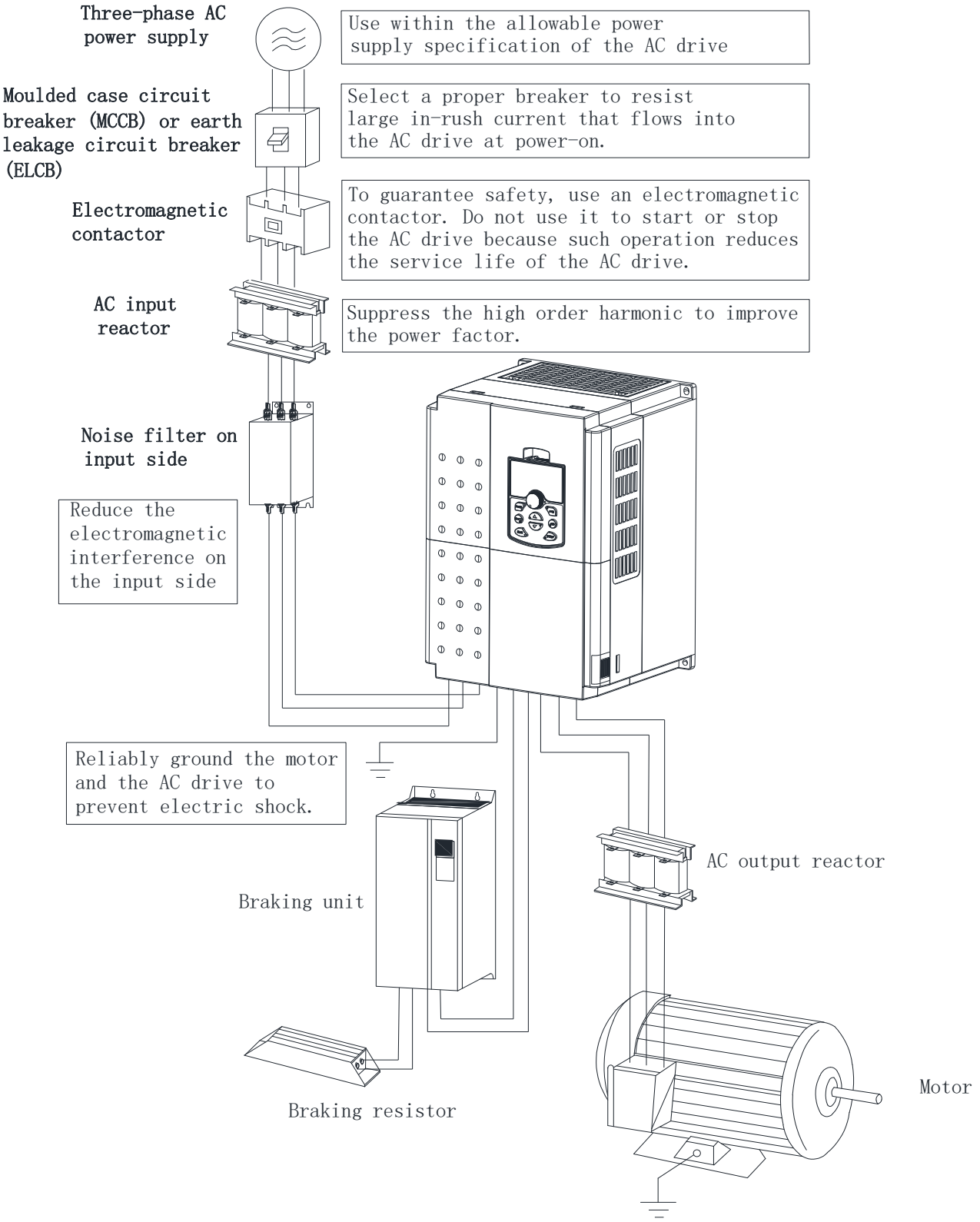




Power	Installation size	
	A	B
⩽15kw	⩾20mm	⩾100mm
18.5～30kw	⩾50mm	⩾200mm
⩾37kw	⩾50mm	⩾300mm

Chapter 3 WIRING

3-1 Connection Methods for Assorted Devices



(For the safety of operator as well as devices, only the qualified electronic engineer is allowed to operate it. Please pay attention to the following precautions while wiring :)

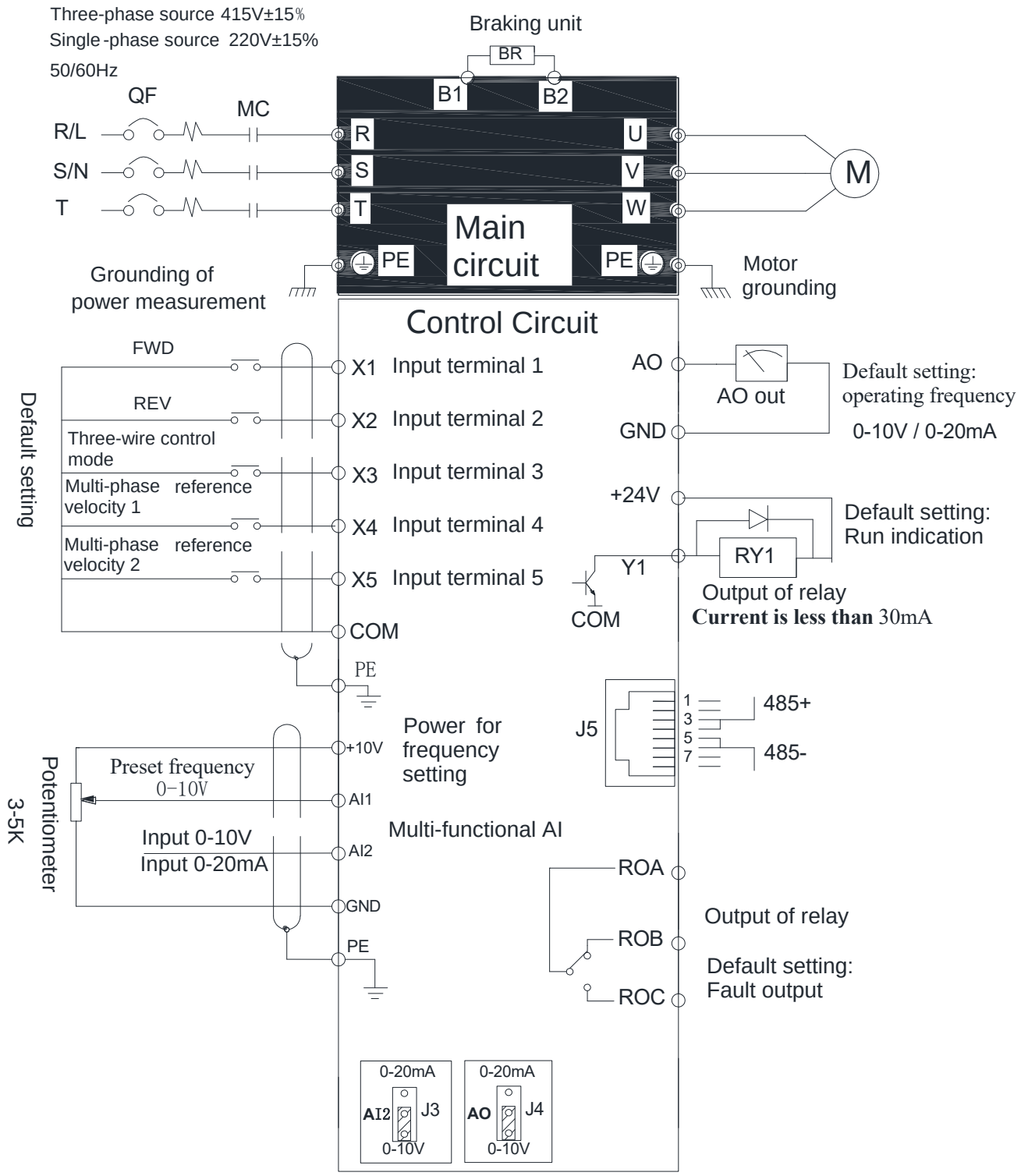
- Power must be shut off before wiring

- PE earth terminal must be connected with the ground
- The rated voltage must be in conformity with AC voltage
- Power cords must be connected with the terminal R, S and T while lines for motor should be connected with terminal U,V and W; any incorrect connection may cause damage to the internal components of converter
- The reliability of the terminals and wires must be evaluated before wiring, and screws for the terminals of major loop must be fastened solidly.

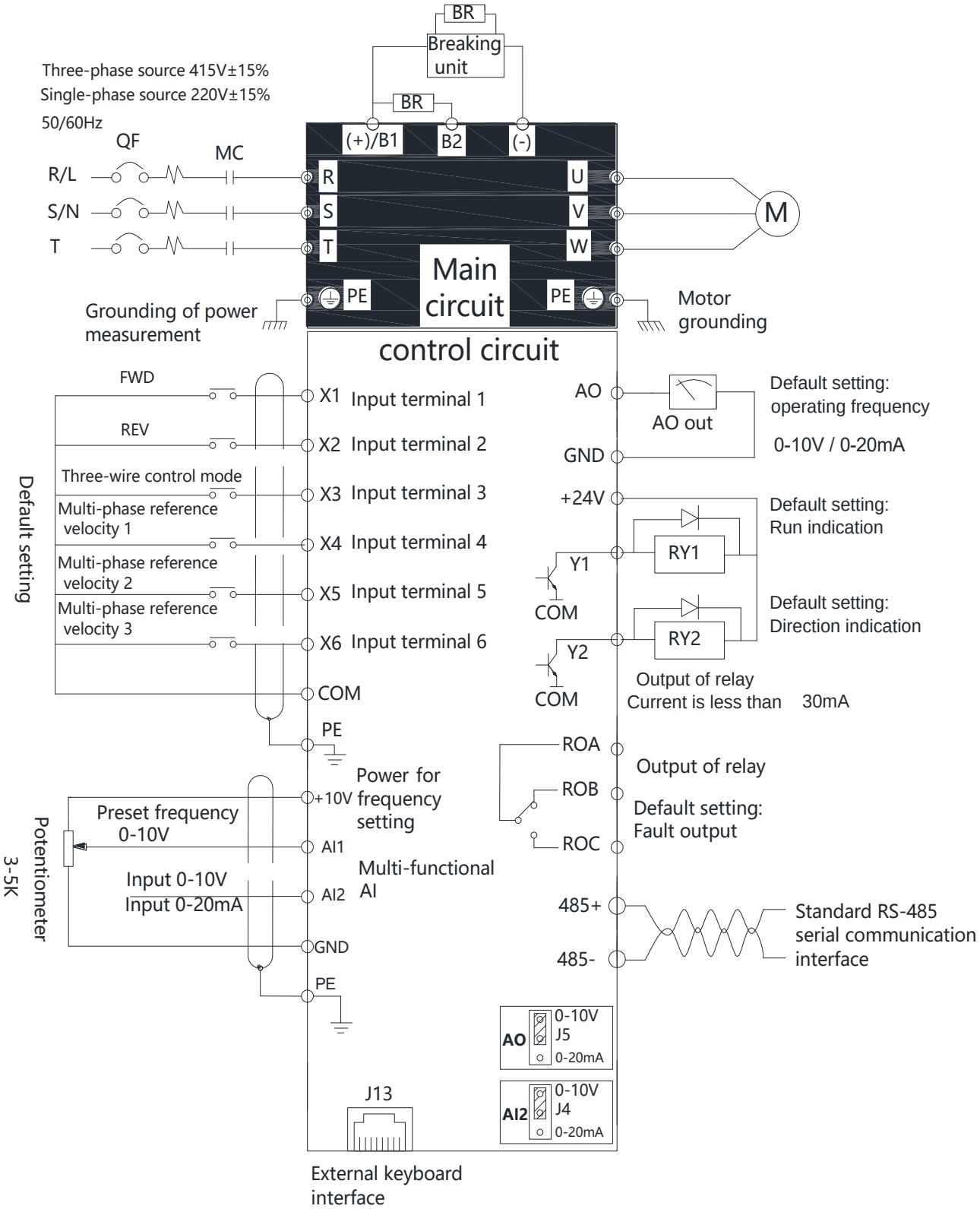
To avoid electric shock, do not touch the terminals of major loop

3-2 Standard Wiring Diagram

3-2-1 XX200 Mini-series Standard wiring diagram



3-2-2 XX200 General Series Standard wiring diagram



3-3 Description of Major Loop's Terminal

Terminal symbol(code)	Functional Descriptions
R S T	Terminals for three-phase AC input 380V
L N	Terminals for Single-phase AC input 220V
U V W	output terminals，connect with three-phase AC electromotor
B1 B2	terminals for braking resistor(optional)
(+) (-)	terminals for external braking unit(optional)
	Terminal of ground (Earth terminal)

For safety's sake, please connect wires according to the regulations of National Electrical Code while proceeding wiring

3-3-1 Connection of input terminal R, S, T or L, N

An additional breaker/chopper must be connected in series with the terminals of major loop(R,S,T or L,N) and three-phase AC or Single-phase AC input. For better running, an electromagnetic contactor should be connected with them in series so that it could cut off the power while the protection function of converter is activated (Tip: R-C surge absorbers should be added to the ends of electromagnetic contactor.

If an additional earth leakage circuit breaker (ELCB) is installed as a protective device for electric leakage, the sensitivity of current should be more than 200mA while actuation time should be no less than 0.1 second in order to prevent ELCB from malfunctioning.

AC reactor must be connected with the input terminals in case that some of rectifiers are damaged by high-voltage and high-current input circuit from the grid, which could also improve the power factors of input terminals.

Do not control the converter by adopting the way of powering on or off major loop. Instead of that, RUN/STOP buttons on the keyboard or control loop terminals should be applied to the control of converter; if it has to be controlled by that way, it can be implemented only once every one hour.

It's feasible to reduce the interference with devices nearby by connecting an additional noise filter with the input terminals.

Do not connect converter driven by three-phase power to single-phase source.

3-3-2 Connection of output terminal U, V, W

Output terminals must be connected to three-phase motor in the correct order; if motor rotates in the wrong direction, any two wires among U, V and W electrical wiring can be switched with each other.

In any case, do not connect output terminals to phasing capacitor or surge absorber.

When the length of wire connecting converter with motor is more than 50 meters, there may be a large amount of electric leakage caused by the capacitors between the wiring, which may lead to over current; additionally, to protect the insulation of motor from being damaged, an additional output reactor must be installed.

An additional noise filter can be installed to reduce the electromagnetic interference of output if surroundings can be easily affected by converter; interference can also be minimized by reducing its carrier frequency.

3-3-3 Connection of braking resistors and braking unit

If inertia load is so large that converter needs to be shut off frequently or in a short time, braking resistors or braking unit should be selected and installed accordingly to solve the issue of insufficient braking capacity or lengthen braking torque.

Terminals (B1, B2) of major loop must be connected with braking resistors (Tip: terminal B1 or B2 indicates that this converter is the one with built-in braking units)

If there is no built-in braking unit, positive (+) and negative (-) terminals of major loop should be connected to external braking units.

Do not connect positive (+) and negative (-) terminals of major loop to braking resistor.

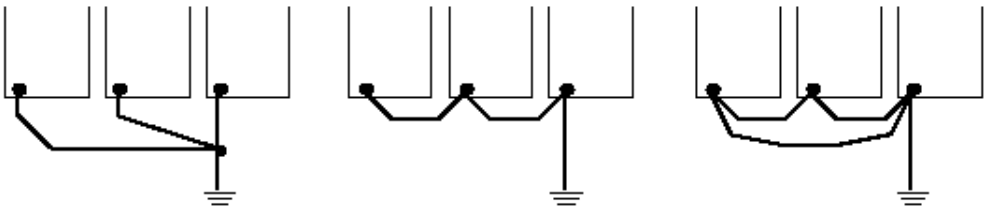
3-3-4 Earth terminal PE

For safety's sake, earth terminal PE must be well grounded in order to reduce noise.

Please use the standard ground lead which should be as short and thick as possible (its grounding impedance should be no more than 10Ω)

Do not connect its ground lead with that of high-current loading machine to ground at the same time, for example welder or high-power motor, they must be grounded separately.

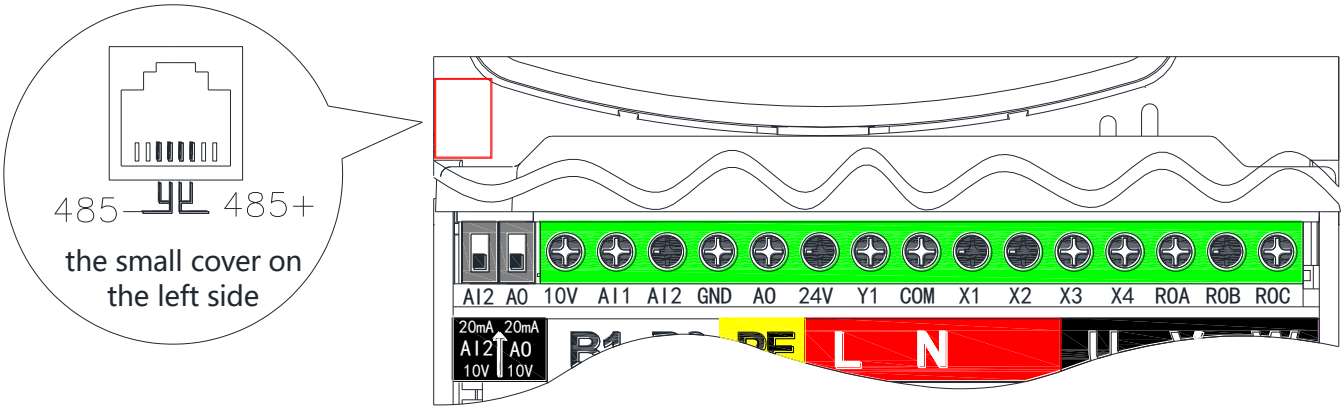
All the converters must be connected to the same earth terminal directly if two or more converters are installed together; please refer to the wiring layout below:



(a) correct （b） not recommend （c） error

3-4 Explanations of control Loop's terminals

XX200 Mini-series Explanations of control loop terminals

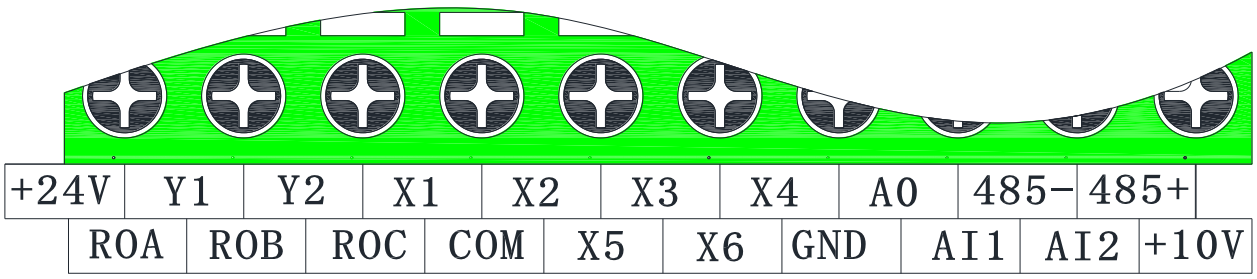


Items	symbol	Terminal name	Terminal description and default setting
Multi-functional Input	X1	Multi-functional Input Terminal 1	default setting： 1 Forward /Stop
	X2	Multi-functional Input Terminal 2	default setting： 2 Reverse /Stop

	X3	Multi-functional Input Terminal 3	default setting：3 Three-wire control mode
	X4	Multi-functional Input Terminal 4	default setting：4 Multi-step& speed reference 1
	X5	Multi-functional Input Terminal 5	default setting：5 Multi-step &speed reference 2
	COM	Common terminal	Multi-functional input common terminal、+24V power reference ground
analog input	AI1	analogue input 1	0~10V input
	AI2	analogue input 2	0~10V/0~20mA input (J3 jumper is optional)
	+10V	Analogue preset power source	+10V DC 10mA（potentiometer 3~5K）
	GND	analogue reference ground	analogue input、output reference ground
Multi-functional output	Y1	Multi-functional output Terminal 1	default setting：running status
	ROA	Relay output	default setting：fault output ROA-ROB (normally closed) ROA-ROC (normally opened)
	ROB		
	ROC		
analogue output	AO	analogue output terminal	0~10V/0~20mA output (J4 jumper is optional) GND is also known as reference ground
Power source	+24V	+24V power source	+24V DC 100mA COM is also known as power ground
communication	485+	485 signal positive terminal	Standard serial communication interface RS-485; Please use twisted-pair or shielded line
	485-	485 signal negative terminal	

- Please use multi-core shielded cable or stranded cable to connect the control terminals. The terminal which is closed to converter must be connected to earth terminal PE while shield cable is applied to it. When wiring, control cable must be kept away from main circuit and high-current circuit at least 20cm, such as power lines, motor wires, wires for contactor and relay. Instead of parallel wiring, vertical wiring should be adopted to prevent converter from malfunction resulted from external interference.

- XX200 General series Explanations of control loop terminals

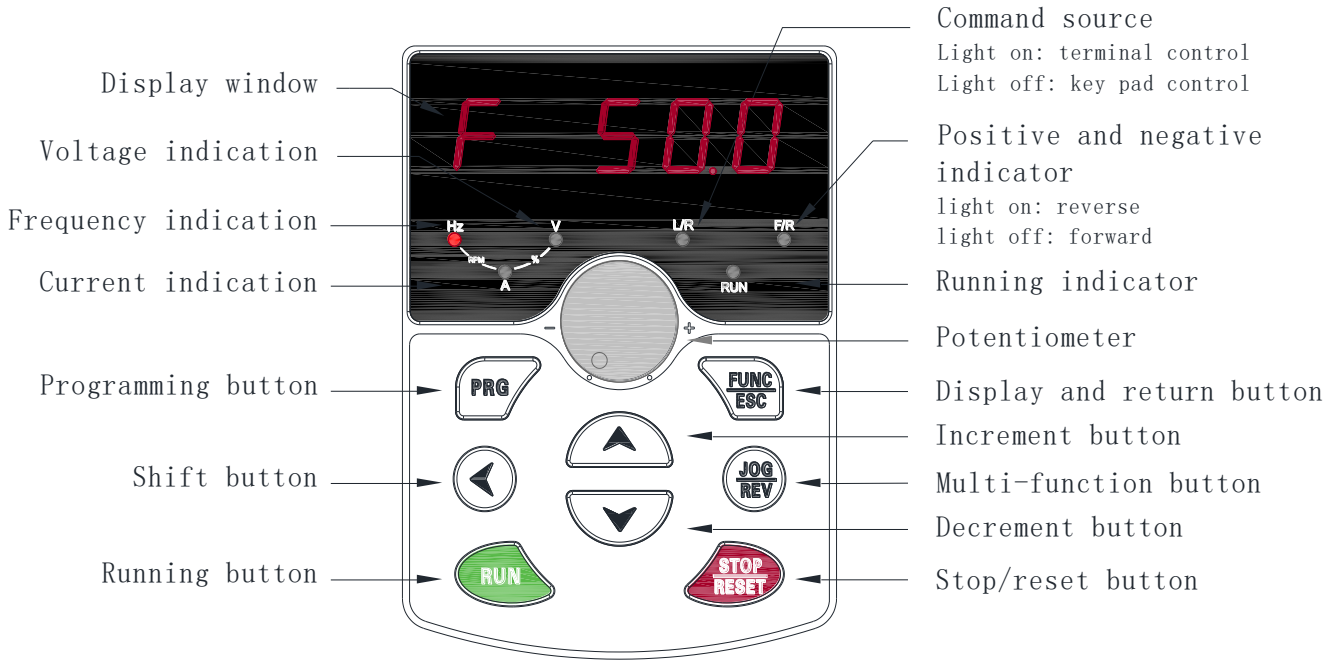


Items	symbol	Terminal name	Terminal description and default setting
Multi-functional Input	X1	Multi-functional Input Terminal 1	default setting：1 Forward /Stop
	X2	Multi-functional Input Terminal 2	default setting：2 Reverse /Stop
	X3	Multi-functional Input Terminal 3	default setting：3 Three-wire control mode
	X4	Multi-functional Input Terminal 4	default setting：4 Multi-step & speed reference 1
	X5	Multi-functional Input Terminal 5	default setting：5 Multi-step & speed reference 2
	X6	Multi-functional Input Terminal 6	default setting：6 Multi-step & speed reference 3
	COM	Common terminal	Multi-functional input common terminal、+24V power reference ground
analog input	AI1	analogue input 1	0~10V input
	AI2	analogue input 2	0~10V/0~20mA input (J4 jumper is optional)
	+10V	Analogue preset power source	+10V DC 10mA（potentiometer 3~5K）
	GND	analogue reference ground	analogue input、output reference ground
Multi-functional output	Y1	Multi-functional output Terminal 1	default setting：running status
	Y2	Multi-functional output Terminal 2	default setting：running direction
	ROA	Relay output ROA-ROB (normally closed) ROA-ROC (normally opened)	default setting：fault output
	ROB		
	ROC		
analogue output	AO	analogue output terminal	0~10V/0~20mA output (J5 jumper is optional) GND is also known as reference ground
Power source	+24V	+24V power source	+24V DC 100mA COM is also known as power ground
communication	485+	485 signal positive terminal	Standard serial communication interface RS-485; Please use twisted-pair or shielded line
	485-	485 signal negative terminal	

- Multi-core shielded cable or stranded wire should be used to connect and control terminals. The terminal which is closed to converter must be connected to earth terminal PE while shielded cable is applied to it. When wiring, control cable must be kept away from main circuit and high-current circuit at least 20 cm, such as power lines, motor wires, wires for contactor and relay. Instead of parallel wiring, vertical wiring should be adopted to prevent converter from malfunction resulted from external interference.

Chapter 4 Keyboard and Panel

4-1 K20 Series Diagram of Keyboard



4-2 Panel indicator description

1) Functional indicator light:

Light is the name of the	Indicator light show
RUN	Running status indicator light: When the lights went out said inverter in the down state; Light flash frequency converter in the parameter self-learning state; When the light is said inverter in the running state
F/R	And reversing lamp: Said the lights went out in the forward state; The light is said in a state of inversion.
L/R	External terminal control indicator: Said the lights went out the keyboard control state; The light is said terminal control state.

2) Unit indicator light shows:

Light is the name of the	Indicator light show
Hz	Frequency unit
A	Current unit
V	Voltage unit

3) Digital display area and Keys function description

Five LED display, can display setting frequency, output frequency and so on all sorts of monitoring data and alarm code.

button	name	function
	Programming key	Enter or exit menu level I.
	Return key	Under the outage display and operation interface, recycled display status information; Return to the superior programming menu.
	Increasing key	Increase data or function code.
	Decreasing key	Decrease data or function code.
	Menu move / monitoring key	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
	Running key	Start the frequency inverter in the operation panel control mode.
	Stop/Reset	Stop the operation when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted by P0-02.
	Multi-functional Selection Key	Regulate the speed directly by panel potentiometer when P0-010 is set to 1.
	potentiometer	Adjust the frequency, the restriction of the function code P0-01.

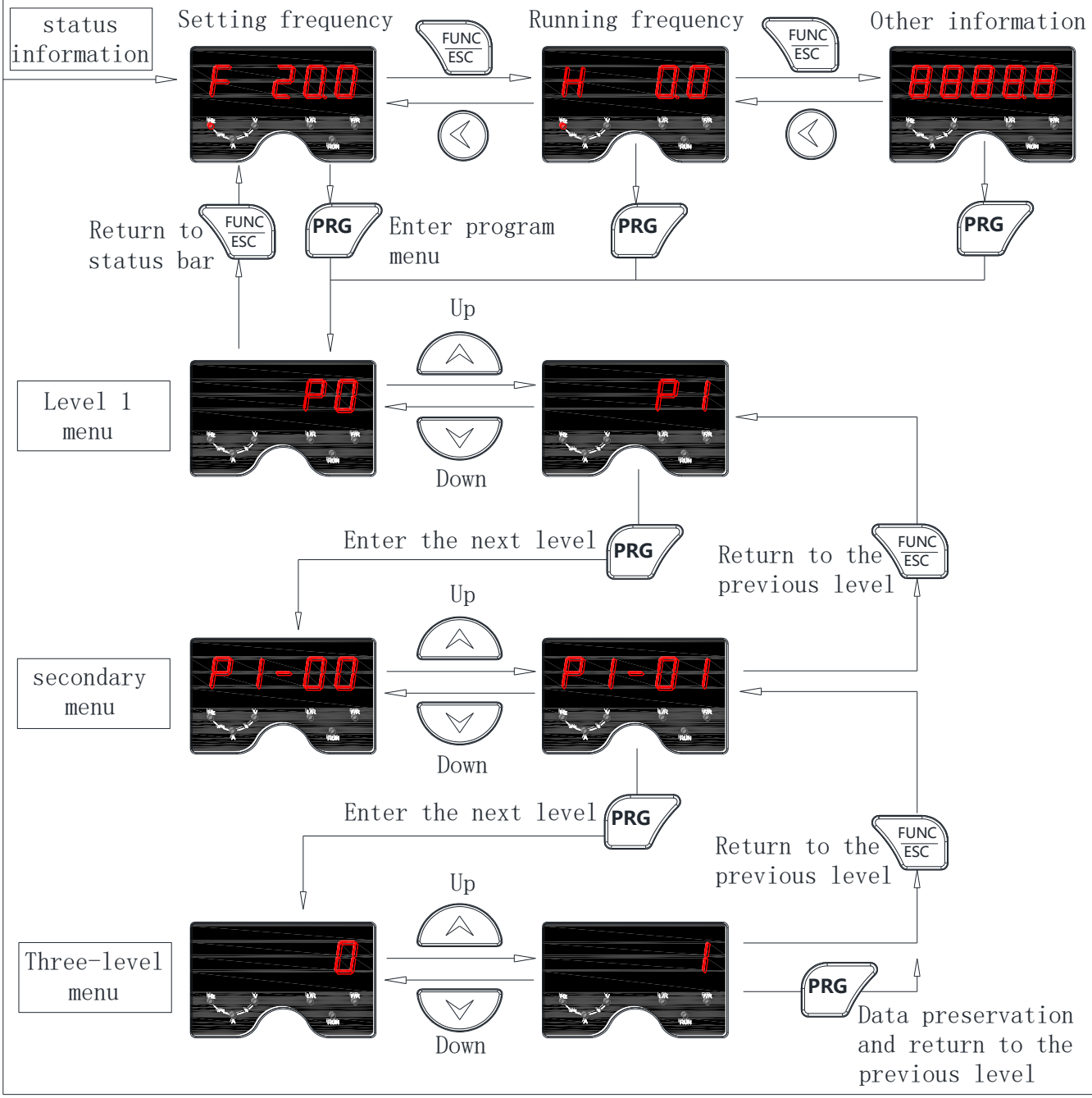
4-3 Illustrations of Keyboard Operation

status information (Default screen)

The operation panel of this series inverter adopts three-level menu structure for parameter setting and other operations. The three-level menus are as follows:

Function Parameter Group (Level 1 menu) ⇒ Parameters (secondary menu) ⇒ Parameter Setting value (Three-level menu)

After entering the third level menu, press key, key, key to modify and press PRG key to save when the display bit blinks. The operation process is shown in the figure below.



Chapter 5 Running

5-1 Commissioning

5-1-1 Check before Running

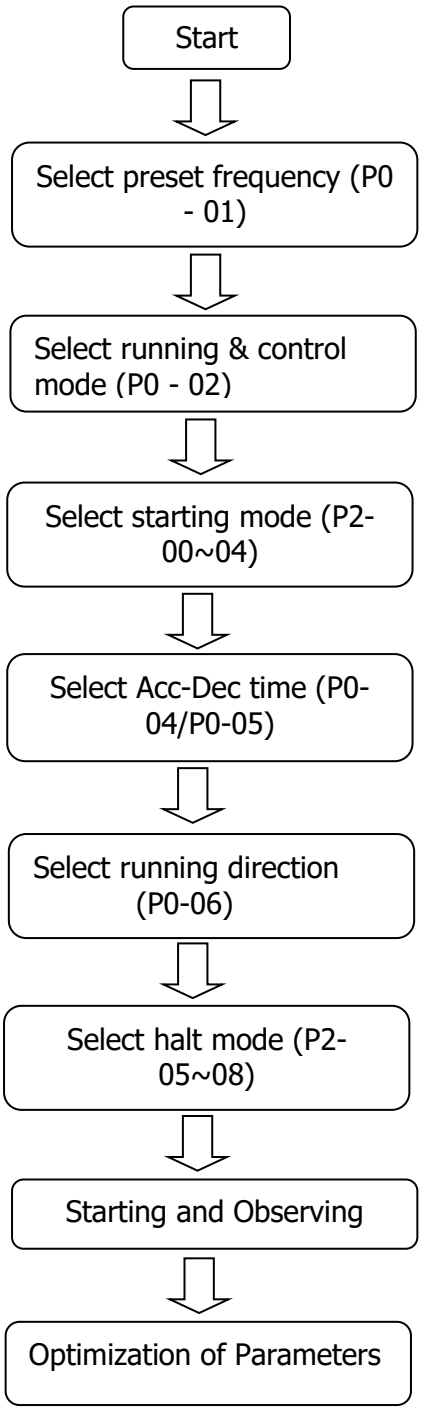
- Please check whether wiring is correct or not, especially output terminals (U, V, W) which mustn't be connected to power source; additionally, earth terminals PE must be well grounded as well.
- Please confirm that there is no short circuit or line-to-ground short circuit between terminals or any exposed charged component.
- Please confirm that all the components are fastened, such as terminals, pluggable connectors or screws.
- Make sure that all the switches are off before it's connected to power source, and that converter will not malfunction or be started when it's switched on.
- Do not connect it to power s until its enclosure is assembled.

5-1-2 Commissioning

- Converter must be checked and confirmed comprehensively before commissioning; its default running mode is to be controlled through keyboard and panel.
- Please push the button JOG REV and check the following points (its default jog frequency is 5.0 HZ):
- Whether motor is rotating in the right direction or not;
- Whether its rotation is smooth or not(NO abnormal noise or vibration is permitted)
- Whether the acceleration or deceleration of motor is stable.
- If converter functions properly, please preset its operating frequency first; please press the button RUN to start commissioning and check whether its output current/voltage is normal or not; only after confirmation can it be power-on.

Converter must be switched off immediately by pushing the button STOP RESET if there is anything goes wrong with converter or motor; meanwhile, please refer to Chapter 7 Fault Correcting to find out the reason why it malfunctions. Even it is shut off, output terminals(U, V, W) may still cause electric shock to anyone who touches them unless power ports(R, S, T) are disconnected from main circuit. Additionally, it will take some times for filter capacitor to discharge because there is still charging voltage stored in the filter capacitor even main power source is shut off. Charging indicator will be off if main power source is shut off; voltage in the middle DC circuit must be tested by voltmeter. Only after it's confirmed that the voltage is lower than specified value can internal circuit be touched.

5-2 Quick Debugging/Quick set up instructions



P0-01	0: preset frequency
	1: preset panel potentiometer
	2: preset external AI1
	3: preset external AI2
	。。。。。
P0-02	0: keyboard control
	1: Running by terminals, effective control by STOP Key
	2: Running by terminals, ineffective control by STOP Key
P2-00	0: starting directly
	1: starting after DC braking
P0-06	0: default direction
	1: reverse direction
P2-05	0: freely stopping
	1: stopping by decelerating
	2: stopping by decelerating then DC braking Stopping

Chapter 6 Specification of Functional Parameters

6-1 Functional Parameters Table

"○": It indicates that it's only when converter is running or shut down on the condition that P0-00 equals zero that code parameters can be changed or modified.
"●": It indicates that code parameters cannot be changed or modified while converter is running.
"×": It indicates that code parameters are read-only, which cannot be changed or modified.
"①" only apply to XX200 Mini-series.
"②" only apply to XX200 General Series.

P0: Basic functional parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P0-00	Parameter setting mode	0: Enabled (except those parameters marked with "×") 1: Disabled (except P0-00) 99: Factory reset	0	●	1000
P0-01	Frequency setting mode	0: Frequency setting (UP/DOWN) 1: Panel potentiometer 2: External AI1 3: External AI2 4: PID regulation 5: UP/DOWN by the P5-20 add and subtract 6: UP/DOWN by the P5-20 add and subtract, frequency clear to zero 7: Frequency communication setting	1	●	1001
P0-02	Control mode for running	0: Controlled by keyboard 1: Controlled by terminals, STOP Key disabled 2: Controlled by terminals, STOP Key enabled 3: Controlled by communication	0	●	1002
P0-03	Frequency setting	0.0 Hz ~ Upper limiting frequency (P0-09)	50.0Hz	○	1003
P0-04	Acceleration time 0	0.1s~3600.0s	Depending on model	○	1004
P0-05	Deceleration time 0	0.1s~3600.0s	Depending on model	○	1005
P0-06	Running direction Option	0: Default direction 1: Reverse direction	0	●	1006
P0-07	Anti-reversion Setting	0: Enabled 1: Disabled	0	●	1007
P0-08	Maximum frequency	Upper limit frequency (P0-09) ~400.0Hz	60.0 Hz	●	1008
P0-09	Upper limiting frequency	Lower limiting frequency (P0-10) ~Maximum frequency (P0-08)	50.0Hz	●	1009
P0-10	Lower limiting frequency	0.0Hz~Upper limiting frequency (P0-09)	0.0Hz	●	1010

P0-11	Jog frequency	0.0Hz~Upper limiting frequency（P0-09）	5.0Hz	○	1011
P0-12	Carrier frequency	1~16KHz	Depending on model	●	1012
P0-13	Carrier frequency Regulation	0：Regular PWM mode 1：Random PWM mode	0	●	1013
P0-14	Keyboard frequency setting （UP/DOWN）	0：Automatic storage when power down 1：No storage for power-down	0	○	1014
P0-15	Modbus address	1-247	1		

（P0-16~ P0-17 Reserved）

P1: Human Interface parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P1-00	Default display information for Starting	0：Setting frequency 1：Output frequency 2：Output current 3：Bus voltage 4：Rotational Speed of motor 5：Percentage of output current 6：IGBT temperature 7：Output voltage 8：Output power 9：Count value 10：PI index value 11：PI feedback value 12：Accumulated running time(hour) 13：Input terminal status 14：Output terminal status 15：Power	0	○	1018
P1-01	Setting of display information	0: 0~3 messages 1: 0~7 messages 2: 0~11 messages 3: 0~15 messages	1	○	1019
P1-02	Display coefficient of mechanical speed	0.1~60.0	29.0	○	1020
P1-03	JOG/REV (function selector)	0：Jog 1：FWD/REV switching	0	●	1021

（P1-04~ P1-06 Reserved）

P2: Parameters of Start-Stop Mode

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P2-00	Starting Mode	0: Starting directly 1: DC braking-Starting	0	●	1025
P2-01	Starting frequency	0.0~10.0Hz	0.5 Hz	●	1026
P2-02	Retention time for starting	0.0~50.0 s	0.0s	●	1027

P2-03	Braking current before starting	0~150.0%	50.0%	●	1028
P2-04	Braking time before starting	0~50.0s	0.0s	●	1029
P2-05	Stop mode	0：Regular stopping 1：Stop by decelerating 2：Decelerating-DC braking-Stopping	1	●	1030
P2-06	Start frequency of DC braking	0.0~10.0Hz	2.0Hz	●	1031
P2-07	Braking current for stopping	0~150.0%	50.0%	●	1032
P2-08	Braking time for stopping	0~50.0s	0.0s	●	1033
P2-09	FWD/REV Dead time	0.0~50.0 s	0.2s	●	1034
P2-10	Lower limiting frequency for running control	0：running with lower limiting frequency 1：stopping 2：standby	0	●	1035

（P2-11~ P2-12 Reserved）

P3: Parameters of Motor

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P3-00	Rated frequency	F3（P4-05）～400.0Hz	50.0Hz	●	1038
P3-01	Rated voltage	200～440V	Depending on model	●	1039
P3-02	Rated current	0.1～999.9A	Depending on model	●	1040
P3-03	Rated power	0.1～630.0kW	Depending on model	●	1041
P3-04	Rated rotational Speed	1～36000rpm	1440rpm	●	1042
P3-05	No-load current	0.1～999.9A	Depending on model	●	1043
P3-06	Stator resistance	0.001～50.000Ω	Depending on model	●	1044
P3-07	Excitation/Magnetic inductance	0.1～5000.0mH	Depending on model	●	1045
P3-08	Motor self-learning	0：no operation ②1：Motor parameters comprehensive self -learning	0	●	1046

（P3-09~ P3-12 Reserved）

P4: V/F Control Parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P4-00	V/F curve setting	0：General V/F 1：2 power V/F 2：3 power V/F 3：high starting torque V/F 4：Self-setting V/F 5：Self-adaptive control	0	●	1051
P4-01	V/F Intermediate frequency 1	0.0Hz～ F2 (P4-03)	5.0Hz	●	1052
P4-02	V/F Intermediate voltage 1	0~ rated voltage（P3-00）	38V	●	1053
P4-03	V/F Intermediate	F1 (P4-01)～F3 (P4-05)	25.0Hz	●	1054

	frequency 2				
P4-04	V/F Intermediate voltage 2	0~ rated voltage（P3-00）	190V	●	1055
P4-05	V/F Intermediate frequency 3	F2 (P4-03)～rated frequency（P3-00）	50.0Hz	●	1056
P4-06	V/F Intermediate voltage 3	0~ rated voltage（P3-00）	380V	●	1057
P4-07	Torque upgrade	0.0～15.0%	Depending on model	●	1058
P4-08	Slip compensation	0.0～10.0Hz	0.0 Hz	●	1059
P4-09	AVR function	0：Disabled 1：always enabled 2：only enabled in process of deceleration	1	●	1060
P4-10	Energy-efficient running	0：Disabled 1：Enabled	0	●	1061

（P4-11~ P4-18 Reserved）

P5: Input function parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P5-00	AI1 lower limiting value	0～10.00V	0.05V	○	1070
P5-01	Corresponding setting for AI1 lower limit	0～100.0%	0.0%	○	1071
P5-02	AI1 upper limiting value	AI1 lower limiting value～10.00V	10.00V	○	1072
P5-03	Corresponding setting for AI1 upper limit	0～100.0%	100.0%	○	1073
P5-04	AI1 input filtering time	0.0s～10.0s	0.1s	○	1074
P5-05	AI2 lower limiting value	0.00V～10.00V	0.05V	○	1075
P5-06	Corresponding setting for AI2 lower limit	0～100.0%	0.0%	○	1076
P5-07	AI2 upper limiting value	AI2 lower limiting value～10.00V	10.00V	○	1077
P5-08	Corresponding setting for AI2 upper limit	0～100.0%	100.0%	○	1078
P5-09	AI2 input filtering time	0.0s～10.0s	0.1s	○	1079
P5-10	Multi-functional Input Terminal X1	0: Disabled 1: Forward 2: Reverse 3：Three-wire control 4：Multi-phase reference velocity 1 5：Multi- phase reference velocity 2 6：Multi- phase reference velocity 3 7：JOG forward 8：JOG reverse 9：Increasing frequency 10：Decreasing frequency 11：Acc-Dec time Option 1 12：Acc-Dec time Option 2 13：Stop of Acc/Dec 14：External fault Input	1	●	1080
P5-11	Multi-functional Input Terminal X2		2	●	1081
P5-12	Multi-functional Input Terminal X3		3	●	1082
P5-13	Multi-functional Input Terminal X4		4	●	1082
P5-14	Multi-functional Input Terminal X5 (①CN1 needle base input)		5	●	1084
P5-15	Multi-functional Input Terminal X6 ②		6	●	1085

P5-16	Multi-functional Input Terminal X7	15：Fault reset 16：Regular stopping 17：External count value input 18：count clear 19：program run 20：pause of program run	Reserved	●	1086
P5-17	Multi-functional Input Terminal X8		Reserved	●	1087
P5-18	Terminal control mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	0	●	1088
P5-19	Terminal filtering time	2ms~100 MS	10 ms	○	1089
P5-20	The range of the external terminal UP/DOWN increasing decline	0.0~50.0Hz	0.1	○	1090
P5-25	Communication baud rate	2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS	5	○	
P5-26	Modbus data format	0: No check (8-n-1) 1: No check (8-n-2) 2: Even check (8-e-1) 3: odd check (8-o-1)	0	o	
P5-27	Modbus response delay	0 ~ 200ms	20	o	1097
P5-28	Communication exception timeout	0.0: invalid (not detected) 0.1 ~ 60.0s	0.0	o	1098
P5-29	Communication abnormal action selection	0: continue running 1: alarm shutdown	0	o	1099

（P5-20~ P5-24,P5-30 Reserved）

P6: Output function parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P6-00	Y1 output options	0: Disabled 1: Running 2: Direction 3: Fault output 4: On standby 5: Frequency received 6: FDT 7: Upper limiting frequency received 8: Lower limiting frequency received 9: Setting count value received 10: Designated count value received 12: Stop delay output. Output signal ON immediately after shutdown, and the output time is determined by P6-05	1	○	1101
P6-01	Y2 output options ②		2	○	1102
P6-02	Relay output options		3	○	1103
P6-03	AO options	0: Operating frequency 1: Output current 2: Bus voltage 3: Output voltage	0	○	1104
P6-04	AO correction coefficient	0.0~250.0%	100.0%	○	1105
P6-05	Stop delay time setting	0~3000.0S	0	○	1106

（P6-05~ P6-08 Reserved）

P7: PID control parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P7-00	PID preset source options	0: Digital keyboard 1: Panel potentiometer 2: Analog channel AI1 3: Analog channel AI2	0	○	1110
P7-01	PID set value	0.00~10.00 V	0.00V	○	1111
P7-02	PID feedback source options	0: Analog channel AI1 1: Analog channel AI2	0	○	1112
P7-03	PID output characteristics options	0: Positive 1: Negative	0	○	1113
P7-04	Proportional gain (P)	0.0 ~ 10.0	0.1	○	1114
P7-05	Integral time (I)	0.0 ~ 100.0s	0.1s	○	1115
P7-06	Deviation limit	0.00 ~ 2.00	0.02	○	1116
P7-07	Sampling period(T)	0.1 ~ 100.0s	0.02s	○	1117
P7-08	Detected value of feedback disconnection	0.00 ~ 5.00	0.0	○	1118
P7-09	Time for detecting feedback disconnection	0.0 ~ 100.0s	10.0s	○	1119
P7-12	Sleep time	0 ~ 3000S	600	○	1122
P7-13	Dormancy pressure	0 ~ 10.00	0	○	1123
P7-14	Dormancy frequency	0 ~ 50.0Hz	0	○	1124
P7-15	Wake up the pressure	0 ~ 10.00	0	○	1125

（P7-10~ P7-11 Reserved）

P8: Simple PLC and Multispeed Parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P8-00	Simple PLC mode	0: Disabled 1: Program stop after one cycle of running 2: Program operates as last program runs after one cycle of running 3: Circulatory running of program	0	●	1126
P8-01	First phase speed	Lower limiting frequency ~ Upper limiting frequency	11.0Hz	○	1127
P8-02	Second phase speed	Lower limiting frequency ~ Upper limiting frequency	12.0Hz	○	1128
P8-03	Third phase speed	Lower limiting frequency ~ Upper limiting frequency	13.0Hz	○	1129
P8-04	Forth phase speed	Lower limiting frequency ~ Upper limiting frequency	14.0Hz	○	1130

P8-05	Fifth phase speed	Lower limiting frequency ~ Upper limiting frequency	15.0Hz	○	1131
P8-06	Sixth phase speed	Lower limiting frequency ~ Upper limiting frequency	16.0Hz	○	1132
P8-07	Seventh phase speed	Lower limiting frequency ~ Upper limiting frequency	17.0Hz	○	1131
P8-08	Runtime of principal frequency	0~6400.0	0.0	○	1134
P8-09	First phase time	0~6400.0	0.0	○	1135
P8-10	Second phase time	0~6400.0	0.0	○	1136
P8-11	Third phase time	0~6400.0	0.0	○	1137
P8-12	Forth phase time	0~6400.0	0.0	○	1138
P8-13	Fifth phase time	0~6400.0	0.0	○	1139
P8-14	Sixth phase time	0~6400.0	0.0	○	1140
P8-15	Seventh phase time	0~6400.0	0.0	○	1141
P8-16	Time unit of multi-velocity	0: second 1: minute 2: hour	0	●	1142
P8-17	Running directions of programs	0~255 BIT 0~7 indicates 0~7 directions (0: Forward 1: Reverse)	0	●	1143
P8-18	Timing for each program's Acc-Dec	0~65535 BIT 0~15 indicates Acc-Dec time of 0~7 phase	0	○	1144

（P8-19~ P8-20 Reserved）

P9: Protection Function parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
P9-00	Options for overload protection	0: Disabled 1: Enabled	0	●	1147
P9-01	Critical point of overload protection	50~120%	110%	●	1148
P9-02	Overvoltage protection	0: Disabled 1: Enabled	1	●	1149
P9-03	Critical point of Overvoltage	110.0～150.0%	135	●	1150
P9-04	Over-current protection	0: Disabled 1: Enabled	1	●	1151
P9-05	Critical point of over-current	100～180%	180	●	1152
P9-06	Phase-failure protection of input	0: Disabled 1: Enabled	0	●	1153
P9-07	Phase-failure protection of output	0: Disabled 1: Enabled	0	●	1154

P9-08	Latest fault information	0~21		×	1155
P9-09	Last fault information	0~21		×	1156
P9-10	Last two fault messages	0~21		×	1157
P9-11	Operating frequency of latest fault			×	1158
P9-12	Output current of latest fault			×	1159
P9-13	Bus voltage of latest fault			×	1160
P9-14	Input state of latest fault			×	1161
P9-15	Output state of latest fault			×	1162
P9-16	Fault since the reset function	0: invalid 1: under-voltage fault alarm automatic reset (unlimited) 2 ~ 20: fault self-recovery	0	●	1163

（P9-17 Reserved）

PA: Enhancement Function Parameters

Function Code	Description	Description and Range	Default	Modification	Modbus address (decimal)
PA-00	Acceleration time 1	0.0 ~ 3600.0s	20.0s	○	1165
PA-01	Deceleration time 1	0.0 ~ 3600.0s	20.0s	○	1166
PA-02	Acceleration time 2	0.0 ~ 3600.0s	20.0s	○	1167
PA-03	Deceleration time 2	0.0 ~ 3600.0s	20.0s	○	1168
PA-04	Acceleration time 3	0.0 ~ 3600.0s	20.0s	○	1169
PA-05	Deceleration time 3	0.0 ~ 3600.0s	20.0s	○	1170
PA-06	Jog acceleration time	0.0 ~ 3600.0s	5.0s	○	1171
PA-07	Jog deceleration time	0.0 ~ 3600.0s	5.0s	○	1172
PA-08	Hopping frequency 1	0.0 ~ Upper limiting frequency（P0-09）	0.0Hz	○	1173
PA-09	Hopping frequency 2	0.0 ~ Upper limiting frequency（P0-09）	0.0Hz	○	1174
PA-10	Amplitude of Hopping frequency	0.0 ~ Upper limiting frequency（P0-09）	0.0Hz	○	1175
PA-11	FDT level value	0.0 ~ Upper limiting frequency（P0-	0.0Hz	○	1176

		09)			
PA-12	FDT lagged value	0.0 ~ FDT level value (PA-11)	0.0Hz	○	1177
PA-13	Amplitude of detected frequency FAR	0.0 ~ Upper limiting frequency (P0-09)	0.0Hz	○	1178
PA-14	Setting count value	1~65535	10	○	1179
PA-15	Specified count value	1~65535	10	○	1180
PA-16	Overload reduction frequency function	0: Disabled 1: Enabled	1	●	1181
PA-17	Dc braking factor	110 ~ 150%	130	●	1182
PA-21	Dead zone compensation time	Depending on model	Depending on model	●	1186
PA-22	Reduce the frequency current point	100 ~ 300%	210	●	1187

(PA-23~ PA-26 Reserved)

6-2 Detailed of function parameters

P0 Basic functional parameters

P0-00	Parameter setting mode	0: Enabled (except those parameters marked with"×") 1: Disabled (except P0-00) 99: Factory reset	Default: 0

It's mainly applied to the setting of functional parameters; “factory reset" option should be used with caution, especially after all these parameters are set.

P0-01	Frequency setting mode	0：Frequency setting (UP/DOWN) 1：Panel potentiometer 2：External AI1 3：External AI2 4：PID regulation 5：UP/DOWN by the P5-20 add and subtract 6:： UP/DOWN by the P5-20 add and subtract, frequency zero downtime 7：: Frequency communication setting	Default: 1

It's mainly used to select the source of operating frequency for converter.

0：Frequency setting

The frequency of converter can be preset by parameter P0-03; frequency can be preset or changed directly through these two keys ▲ ▼ on the panel when state information is displayed; it also can be changed directly by external terminals UP/DOWN when they are enabled.

1：Panel potentiometer

Operating frequency can be set by the potentiometer on the panel.

2 / 3：Preset of external analog voltage AI1 /AI2

Operating frequency not only can be set by the signal of external analog voltage (0.0~10.0V) sent out by AI1 or AI2 whose input voltage is formed by the synergy of internal +10V power source and potentiometer.

AI2 can be done through the signal of external analog current (0~20mA) via J4 jumper.

4：PID regulation

Precaution: Corresponding multispeed frequency will be applied firstly when external multispeed terminals are enabled. For detailed information, XX200 Series please refer to the standard wiring diagram on jumper 3. XX200 Series please refer to the standard wiring diagram on jumper 4.

5.6：Frequency by external terminals given (note: each time the increase or decrease of a given frequency range be determined by the P5-20), when set to 6, the frequency converter after every stop, zero frequency.

7：The frequency is set by Modbus communication.

P0-02	Control mode for running	0：Controlled by keyboard 1：Controlled by terminals, STOP Key disabled 2：Controlled by terminals, STOP Key enabled 3： Controlled by communication	Default: 0

It's mainly applied to the instruction sources of booting, stopping or jog for converter.

0: Converter can be controlled through the following three keys RUN STOP/RESET JOG/REV which stand for booting, stopping, jog or forward/reverse accordingly.

1: STOP/RESET key will be disabled when converter is controlled by external terminals, including its booting, stopping, jog or forward/reverse running.

2: STOP/RESET key will be enabled when converter is controlled by external terminals, including its booting, stopping, jog or forward/reverse running.

3: Communications command channel, it is controlled by communication via upper monitor

P0-03	Frequency setting	0.0 Hz ～Upper limiting frequency（P0-09）	Default: 50.0Hz

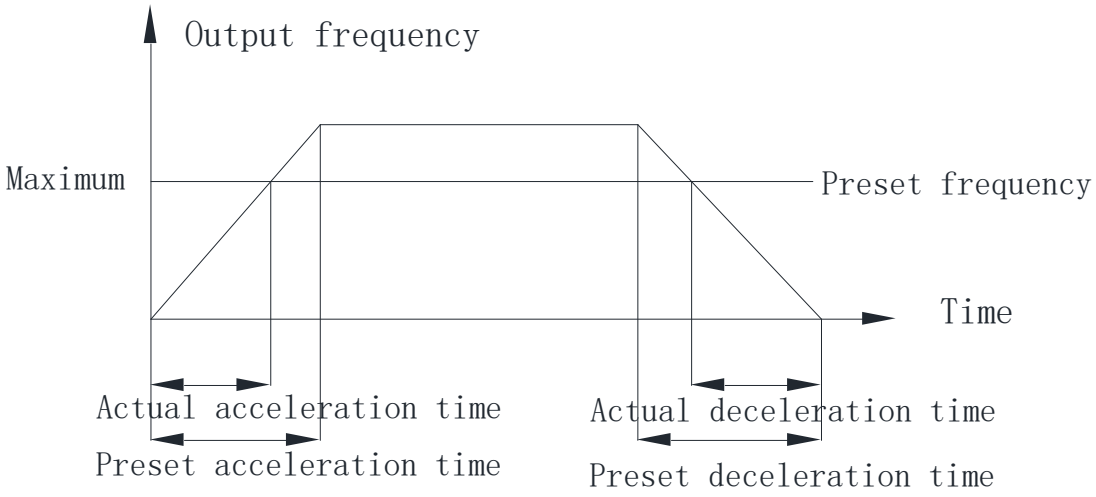
Frequency of output can be set by setting this parameter only when P0-01 equals zero.

P0-04	Acceleration time 0	0.1s~3600.0s	Default: Depending on model
P0-05	Deceleration time 0	0.1s~3600.0s	Default: Depending on model

Acceleration time 0: Time for converter to increase its frequency from 0 Hz to maximum frequency (P0-08).

Deceleration time 0: Time for converter to decrease its frequency from maximum frequency (P0-08) to 0 Hz.

Please refer to following graph.：



P0-06	Running direction	0：Default direction 1：Reverse direction	Default: 0

Running direction can be preset through this parameter, which will also be taken as forward direction by default. It will also be chosen as a reference for reverse direction which is controlled by JOG/REV key as well as external terminals.

0: Converter will be running in default direction

1: Running direction will be changed, which also means that it is changed by altering any two of motor wires (U, V, W).

P0-07	Anti-reversion Setting	0: Enabled 1: Disabled	Default: 0

Running direction will be controlled by parameter "P0-06" when reverse direction is disabled. Both JOG/REV key and external terminals will be disabled.

P0-08	Maximum frequency	Upper limit frequency（P0-09）~400.0Hz	Default: 60.0Hz

The setting of Acc-Dec time is based on maximum output frequency of running.

P0-09	Upper limiting frequency	Lower limiting frequency（P0-10）~Maximum frequency（P0-08）	Default: 50.0Hz
P0-10	Lower limiting frequency	0.0Hz~Upper limiting frequency（P0-09）	Default: 0.0Hz

It's mainly applied to the setting of the amplitude between upper limiting frequency and Lower limiting frequency, which are also the range values of frequency regulation displayed on the panel potentiometer.

These two parameters are also related to the amplitude of upper limiting voltage and lower limiting voltage set by AI1 or AI2. For detailed information, please refer to P5-00~08.

P0-11	Jog frequency	0.0Hz~Upper limiting frequency（P0-09）	Default:5.0Hz

It's mainly applied to the setting of running frequency for jog.

P0-12	Carrier frequency	1~16KHz	Default: Depending on model

The switching frequency of interior power module is controlled by this parameter.

Audio noise and heat effect generated during the process of running are mainly affected by carrier frequency. Carrier frequency must be increased slightly in order to achieve a quiet running; however, the maximum load will be decreased somehow at the same time, which may increase the risk of electric leakage between motor lines or between wires and earth. When ambient temperature is too high or there is too much load for motor, carrier frequency should be decreased properly to improve converter's thermal characteristics.

Generally, carrier frequency will be preset right before delivery; therefore, it doesn't need to be reset or modified.

It should be used by dreading if the carrier frequency which is being applied by operator exceeds the default value preset by factory.

P0-13	Carrier frequency Regulation	0：Regular PWM mode 1：Random PWM mode	Default: 0

Noise frequency of motor is fixed while running in regular PWM mode; frequency domain of noise is wider while the running of motor is set in random PWM mode.

P0-14	Keyboard frequency （UP/DOWN）	0：Automatic storage when it powers down 1：No storage when it powers down	Default: 0

It's mainly used to alter the operating frequency through ▲ ▼ keys or external terminals UP/DOWN. Whether a modified operating frequency would be saved in the parameter P0-03 after it powers down depends on the setting of this parameter.

P0-15	Modbus address	1-247. 0 is broadcast address	Default: 1

The local Modbus address is unique (except the broadcast address), which is the basis for the peer-to-peer communication between the host computer and the inverter.

P1: Human Interface parameters

P1-00	Default display information	0：Setting frequency　1：Output frequency 2：Output current　3：Bus voltage 4：Rotational Speed of motor 5：Percentage of output current	Default: 0

	for Starting	6：IGBT temperature 7：Output voltage 8：Output power 9：Count value 10：PI index value 11：PI feedback value 12：Accumulated running time（hour） 13：Input terminal status 14：Output terminal status 15：Power	

It's mainly applied to the setting of default display information for starting.

Set value	Status information	Descriptions	Unit	Set value	Status information	Descriptions	Unit
0	F 20.0	Preset frequency	Hz	8	P 0.0	Output power	kW
1	H 0.0	Output frequency	Hz	9	A 0	Count value	
2	C 0.0	Output current	A	10	c 12	PID preset value	
3	U 540	Bus voltage	V	11	J 1.1	PID feedback value	
4	n 0	Rotational speed of motor	r/min	12	r 0	Total run time（Hour）	H
5	C. 0.0	Percentage of output current	%	13	I ıııııı I	Status of input terminal	
6	o 25	IGBT Temperature	℃	14	o ıııııı II	Status of output terminal	
7	d 0	Output voltage	V	15	Y 15.0	Converter power	kW

P1-01	Setting of display information	0: 0~3 messages 1: 0~7 messages 2: 0~11 messages 3: 0~15 messages	Default: 1

It's mainly applied to the setting for how many messages are allowed to display on the panel. About the corresponding information for No. 0~15, please refer to P1-00.

P1-02	Display coefficient of mechanical speed	0.1~60.0	Default: 29.0

It's mainly applied to the adjustment of displayed value for the rotational speed of motor. Display coefficient of mechanical speed = rotational speed of motor/operating frequency

P1-03	JOG/REV Function selection	0：Jog 1：FWD/REV switching	Default: 0

It's mainly applied to the features setup of JOG/REV key; and when running is under the control of keyboard:

0: Jogging will be enabled by pressing JOG/REV key;

1: Forward direction and reverse direction can be switched to each other by JOG/REV key.

P2: Parameters of Start-Stop Mode

P2-00	Starting Mode	0: Starting directly 1: DC braking-Starting	Default: 0

0: It starts directly with the original start frequency;

1: DC braking-Starting -- DC braking will be enabled first; then motor starts running with the original start frequency; this is applicable for the situation when reverse may be caused by small inertia load during the process of starting.

P2-01	Starting frequency	0.0~10.0Hz	Default: 0.5 Hz
P2-02	Retention time for starting	0.0~50.0 s	Default: 0.0s

Applicable starting frequency can ensure that there is enough torque for starting.

Retention time for starting is needed for the formation of magnetic flow while motor is on standby, so that it can start accelerating after start frequency is stabilized for a certain time.

P2-03	Braking current before starting	0~150.0%	Default: 50.0%
P2-04	Braking time before starting	0~50.0s	Default: 0.0s

It's only when P2-00 equals 1 that DC braking can be enabled before starting. When converter is about to be started, DC braking should be proceeded according to the preset braking current (P2-03); after the preset braking time (P2-04) is over, it will start running.

Braking current means the percentage comparing with rated current. The higher braking DC is the stronger braking force will be.

P2-05	Stop mode	0：Regular stopping 1：Stop by decelerating 2：Decelerating-DC braking-Stopping	Default: 1

It's mainly applied to the setting of stop mode for converter.

0: Regular stopping -- the output of converter will be blocked immediately once stop instruction comes into effect.

1: Stopping by decelerating -- output frequency will be decreased slowly according to the preset deceleration time once stop instruction comes into effect; when it comes to zero, converter will be shut down.

2: Decelerating-DC braking-Stopping: output frequency will be reduced down to start frequency(P2-06) according to the preset deceleration time once stop instruction comes into effect; since then, DC braking will be enabled; after braking time(P2-08) is over, converter will be shut down.

P2-06	Start frequency of DC braking	0.0~10.0Hz	Default: 2.0Hz

If parameter P2-05 equals two，it will be stopped through DC braking when converter reaches up to the corresponding frequency.

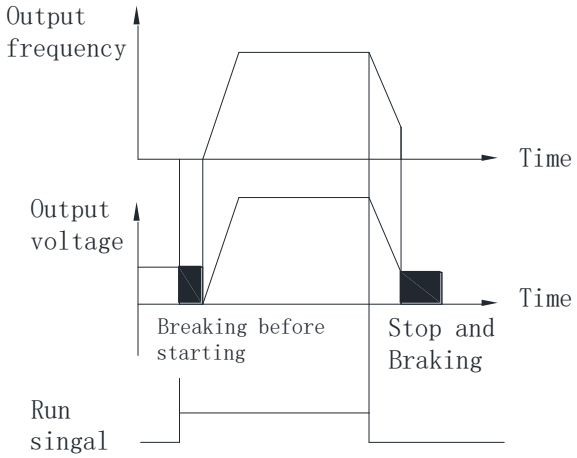
Braking current for stopping means the amperage of direct current for braking; the higher the amperage is, the stronger the braking force will be.

Braking time for stopping means the time for increasing enough amperage of direct current to stop converter; when the value comes to zero, it means that there is no DC braking during the process.

P2-07	Braking current for stopping	0~150.0%	Default: 50.0%
P2-08	Braking time for stopping	0~50.0s	Default: 0.0s

Braking current for stopping means the amperage of direct current for braking; the higher the amperage is, the stronger the braking force will be.

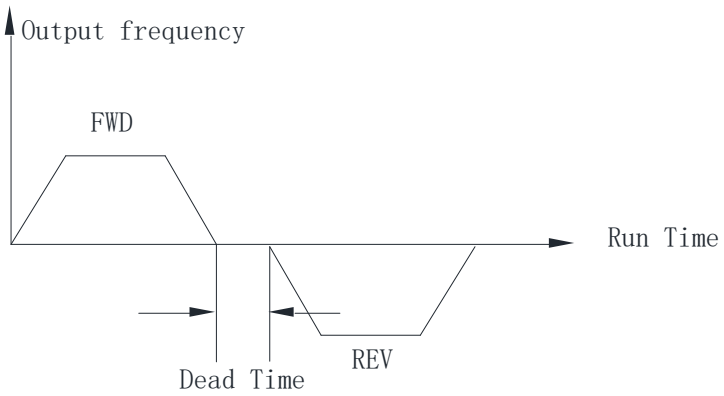
Braking time for stopping means the time for increasing enough amperage of direct current to stop converter; when the value comes to zero, it means that there is no DC braking during the process.



P2-09	Dead time of FWD/REV	0.0~50.0 s	Default: 0.2s

It mainly applied to the setting of transient time for zero output frequency during the transient process between forward and reverse.

Please refer to the following graph:



P2-10	Lower limiting frequency for running control	0：running in lower limiting frequency 1：on standby 2：stopping	Default: 0

It's mainly applied to the setting of running status when preset frequency is less than lower limiting frequency.

0: Converter will be running in lower limiting frequency if preset frequency is less than lower limiting frequency.

1: Converter will be shut down when preset frequency is less than lower limiting frequency; and it will be started again automatically when preset frequency is higher than or equivalent to lower limiting frequency.

2: This parameter is applicable to stop the converter in case that motor keeps running in a low speed.

P3: Parameters of Motor

P3-00	Rated frequency	F3（P4-05）～400Hz	Default: 50.0Hz
P3-01	Rated voltage	200～440V	Default: Depending on model
P3-02	Rated current	0.1～999.9A	Default: Depending on model
P3-03	Rated power	0.1～630.0kW	Default: Depending on model
P3-04	Rated rotational Speed	1～36000rpm	Default: 1440rpm

These parameters above must be set according to the information of nameplates on the motor.

These parameters of motor must be accurate in order to improve the performance of self-adaptive control. These parameters of typical four-pole motor which is compatible with this converter by default are included, which should be input when the capacity of motor is not in conformity with that of this converter.

P3-05	No-load current	0.1～999.9A	Default: Depending on model
P3-06	Stator resistance	0.001～50.000Ω	Default: Depending on model
P3-07	Excitation/Magnetic inductance	0.1～5000.0mH	Default: Depending on model

These parameters above are mainly applied to the setting of basic electrical parameters, which are essential to complete the algorithm of self-adaptive control.

If the capacity of the matched motor is also the same as that of typical motor, the default parameters can be applicable.

They can also be input manually if those precise parameters can be obtained in advance. All the internal default parameters will be restored automatically according to its model during the process of initialization.

Precaution: Do not change or modify these parameters casually.

P3-08	Motor self-learning	0：no operation ②1：Motor parameters comprehensive self - learning	Default: 0

0: no operation

1: Determine the motor and load detach to make the motor in no-load state and static; Then set the parameters of the motor according to the nameplate of the motor (P3-00 ~ P3-04); Set the P3-08 = 1

Save and the LED displays "- TUN-"; Then press the RUN key to start parameter self-learning, and "TUNE" will be displayed; When the parameter after the END of learning, display "-END-";Finally return to the state of shutdown interface, the end of self-learning.

In the parameter self-learning process, you can press the STOP RESET key to terminate the parameter self-learning operation.

P4: V/F Control Parameters

P4-00	V/F curve setting	0：General V/F　1：2 power V/F 2：3 power V/F　3：high starting torque V/F 4：Self-setting V/F　5：Self-adaptive control	Default: 0

It's mainly applied to the setting of corresponding curves for output voltage and output frequency according to different conditions of loading.

0: General V/F is generally applicable to constant load torque;

1/2: 2 or 3 power V/F is applicable to the operation with centrifugal load, for example draught fan or pump, etc.

3: high starting torque V/F is applicable to the operating situations which require higher starting torque.

4: Self-setting V/F indicates that V/F curve can be preset randomly by the functional codes P4-01~P4-06, which is applicable to the operation with special load, for example dewatered or centrifuge, etc.

5: Self-adaptive control can be applied to running regulation by adapting itself to actual load automatically, which is applicable to the operating situations which require Greater low-frequency torque as well as strict control on speed.

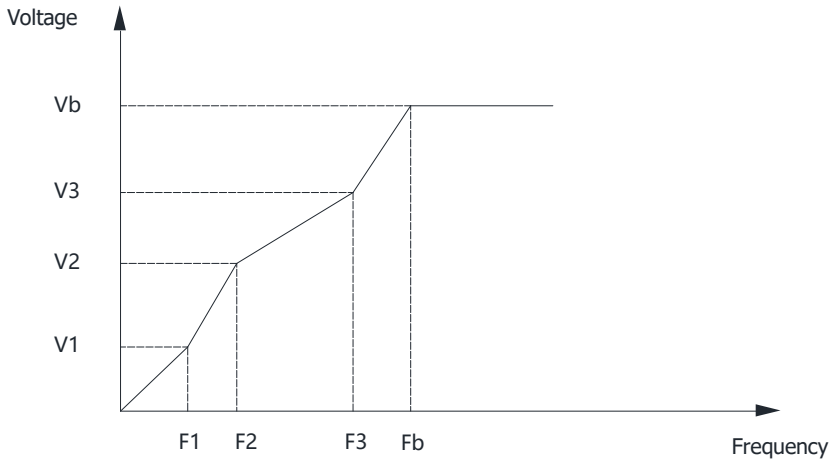
Parameters must be set correctly according to the information of nameplate on the motor if this function needs to be enabled; it's only when the capacity of the motor is the same as that of this converter can its performance be improved greatly.

P4-01	V/F Intermediate frequency 1	0.0Hz～P4-03 (Intermediate frequency 2)	Default: 5.0Hz
P4-02	V/F Intermediate voltage 1	0~ rated voltage（P3-01)	Default: 38V
P4-03	V/F Intermediate frequency 2	P4-01(Intermediate frequency 1)～P4-05 (Intermediate frequency)	Default: 25.0Hz
P4-04	V/F Intermediate voltage 2	0~ rated voltage（P3-01）	Default: 190V
P4-05	V/F Intermediate frequency 3	P4-03 (Intermediate frequency 2)～P3-00(rated frequency)	Default: 50.0Hz
P4-06	V/F Intermediate voltage 3	0~ rated voltage（P3-01）	Default: 380V

Multiple-phase V/F curves can be defined by these six parameters above (P4-01~ P4-06)

The set value of V/F curves is generally set according to the load characteristics of motor.

Precaution: motor may be overheated or even burned if preset low-frequency voltage is too high, which may activate it's over current protection. V1＜V2＜V3，F1＜F2＜F3.



P4-07	Torque upgrade	0.0～15.0%	Default: Depending on model

This parameter can make compensation for output voltage when converter is running in a low frequency, so that the characteristics of low-frequency torque which is controlled by V/F can be

compensated and upgraded.

If the setting of torque upgrade is too high, not only motor tends to be overheated but also over current may be caused by it. In general, the setting of torque upgrade must be no more than 10%. To prevent converter from over current effectively, this parameter must be adjusted properly. This parameter should be increased whenever there is heavy load; otherwise, please decrease this parameter.

P4-08	Slip compensation	0.0～10.0Hz	Default: 0.0 Hz

The practical slip of motor varies from load to load. Output frequency can be adjusted automatically according to the condition of loading by this functional parameter, so that compensation can be made for the influence of load on rotational speed of motor.

P4-09	AVR function	0：Disabled 1：always enabled 2：only enabled in process of deceleration	Default: 1

AVR function is also known as Automatic Voltage Regulation function. Adjustment will be made automatically to stabilize output voltage whenever there is fluctuation of input voltage, so that it can prevent converter from overheat of motor caused by high output voltage or poor performance caused by low output voltage.

Effective period of AVR can be selected by this parameter. AVR option will be disabled when converter is stopped by decelerating; though the deceleration time is very short, the current is a little high. When AVR option is enabled, the deceleration time will be longer, but the current will be lower.

P4-10	Energy-efficient running	0：Disabled 1：Enabled	Default: 0

During the process of no-load or light-load running, output voltage can be adjusted properly to achieve automatic energy conservation by detecting load current.

This parameter is applicable to the load of draught fan or pump.

P5: Input function parameters

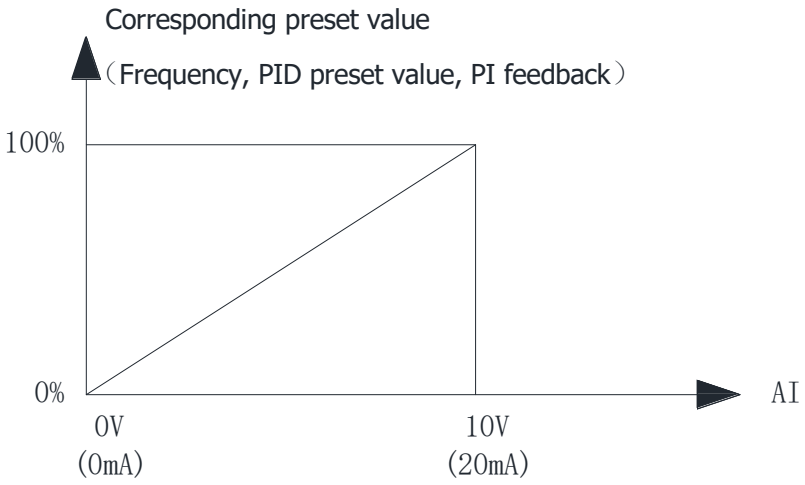
P5-00	AI1 lower limiting value	0～10.00V	Default: 0.05V
P5-01	Corresponding setting for AI1 lower limit	0～100.0%	Default: 0.0%
P5-02	AI1 upper limiting value	AI1 lower limiting value～10.00V	Default: 10.00V
P5-03	Corresponding setting for AI1 upper limit	0～100.0%	Default: 100.0%
P5-04	AI1 input filtering time	0.0s～10.0s	Default: 0.1s

The functional codes above define the relationships between analogue input voltage and corresponding setting of AI. Calculation will be based on the maximum or minimum one whenever analogue input voltage exceeds the range between preset maximum input and minimum input.

The corresponding nominal value of analogue setting varies from situation to situation. For detailed information, please refer to the relevant instructions for each parameter.

The following graphs are listed to demonstrate several situations of setting.

Precaution: preset lower limiting value of AI1 must be less than or equivalent to preset upper limiting value of AI1.



The sensitivity of analogue input is decided by AI1 input filtering time. The parameter must be increased to improve the anti-jamming capability which can prevent analog quantity from being interfered, so that malfunctions can be reduced somehow; however, it may reduce the sensitivity of analogue input.

P5-05	AI2 lower limiting value	0.00V～10.00V	Default: 0.05V
P5-06	Corresponding setting for AI2 lower limit	0～100.0%	Default: 0.0%
P5-07	AI2 upper limiting value	AI2 lower limiting value～10.00V	Default: 10.00V
P5-08	Corresponding setting for AI2 upper limit	0～100.0%	Default: 100.0%
P5-09	AI2 input filtering time	0.0s～10.0s	Default: 0.1s

The setting of AI2 function is similar to that of AI1. 0~20mA input current is equivalent to 0~10V input voltage when analogue input is preset as current input. 0~10V or 0~20mA input can also be selected through jumper.

P5-10	Multi-functional Input Terminal X1	0: Disabled 1: Forward 2: Reverse 3：Three-wire control 4：Multi-phase reference velocity 1 5：Multi- phase reference velocity 2 6：Multi- phase reference velocity 3 7：JOG forward 8：JOG reverse 9：Increasing frequency 10：Decreasing frequency 11：Acc-Dec time selection 1 12：Acc-Dec time selection 2 13：Acc-Dec pause 14：External fault Input 15：Fault reset 16：Freely stopping	Default: 1
P5-11	Multi-functional Input Terminal X2		Default: 2
P5-12	Multi-functional Input Terminal X3		Default: 3
P5-13	Multi-functional Input Terminal X4		Default: 4
P5-14	Multi-functional Input Terminal X5 (CN1 needle base input)		Default: 5
P5-15	Multi-functional Input Terminal X6②		Default: 6

P5-16	Multi-functional Input Terminal X7	17：External count value input 18：count clear 19：program run 20：pause of program run	Reserved
P5-17	Multi-functional Input Terminal X8		Reserved

It's mainly applied to the setting of corresponding functions for digital Multi-functional input terminals.

Table of Functions

<table>
<tr><th>Set value</th><th>Functions</th><th>Descriptions</th></tr>
<tr><td>0</td><td>Disabled</td><td>Please set unused terminals to be invalid to avoid malfunction.
It's applied to the setting of terminals which have no function; those additional terminals can be set as non-functional terminals to prevent converter from malfunctioning</td></tr>
<tr><td>1</td><td>Forward</td><td rowspan="2">Set the forward and reverse of converter.
Please refer to description of P5-18. It's applied to the setting of terminals which control the running direction(forward/reverse) of converter; for detailed information, please refer to the instruction on Page5~18</td></tr>
<tr><td>2</td><td>Reverse</td></tr>
<tr><td>3</td><td>3-wire control</td><td>Please refer to description of P5-18 .It's applied to the setting of three-wire control terminals(it's activated only when three-wire control is enabled); for detailed information, please refer to the instruction on Page5~18</td></tr>
<tr><td>4</td><td>Multi-phase reference velocity 1</td><td rowspan="3">8 steps speed control can be realized by the combination of these four terminals.
Eight kinds of speeds can be set through the combination of numbers which are decided by three terminals separately
<table>
<tr><th>S_3</th><th>S_2</th><th>S_1</th><th>Frequency</th><th>Parameter</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>Multi-phase reference velocity 0</td><td>P0-03</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>Multi-phase reference velocity 1</td><td>P8-01</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>Multi-phase reference velocity 2</td><td>P8-02</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>Multi-phase reference velocity 3</td><td>P8-03</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>Multi-phase reference velocity 4</td><td>P8-04</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>Multi-phase reference velocity 5</td><td>P8-05</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>Multi-phase reference velocity 6</td><td>P8-06</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>Multi-phase reference velocity 7</td><td>P8-07</td></tr>
</table></td></tr>
<tr><td>5</td><td>Multi-phase reference velocity 2</td></tr>
<tr><td>6</td><td>Multi-phase reference velocity 3</td></tr>
<tr><td>7</td><td>Forward jogging</td><td rowspan="2">Set the jog forward and jog reverse of converter.
It's applied to the setting of terminals which control jogging direction(forward/reverse)</td></tr>
<tr><td>8</td><td>Reverse jogging</td></tr>
<tr><td>9</td><td>Increasing frequency (Up)</td><td rowspan="2">The reference frequency of inverter can be adjusted by UP command and DOWN command.
It's applied to the setting of external terminals which can change or modify the instructions to increase or decrease frequency. Upward or</td></tr>
<tr><td>10</td><td>Decreasing</td></tr>
</table>

<table>
<tr><td></td><td>Increasing (Down)</td><td>downward adjustment of frequency can be made through these two functions when frequency is set decided by number.</td></tr>
<tr><td>11</td><td>Acc-Dec time Option 1</td><td rowspan="2">4 groups of ACC/DEC time can be selected by the combination of these two terminals.
Four kinds of Acc-Dec times can be set through the combination of numbers which are decided by two terminals separately.
<table>
<tr><th>Terminal 2</th><th>Terminal 1</th><th>Acc-Dec time Options</th><th>Parameter</th></tr>
<tr><td>0</td><td>0</td><td>Acc-Dec time 0</td><td>P0-04、P0-05</td></tr>
<tr><td>1</td><td>1</td><td>Acc-Dec time 1</td><td>PA-00、PA-01</td></tr>
<tr><td>1</td><td>0</td><td>Acc-Dec time 2</td><td>PA-02、PA-03</td></tr>
<tr><td>1</td><td>1</td><td>Acc-Dec time 3</td><td>PA-04、PA-05</td></tr>
</table></td></tr>
<tr><td>12</td><td>Acc-Dec time Option 2</td></tr>
<tr><td>13</td><td>Stop of Acc/Dec</td><td>When the terminal is valid, in ACC/DEC situation, it is running as current frequency.
Acceleration or deceleration mode will be shut down when terminals are enabled; converter will be running in current frequency.</td></tr>
<tr><td>14</td><td>External fault Input</td><td>Stop the inverter and output an alarm when a fault occurs in a peripheral device. Converter can detect fault and shut itself down automatically when external fault signal is received.</td></tr>
<tr><td>15</td><td>Fault reset</td><td>Resets faults that have occurred. It has the same function a RESET key.
It functions as RESET key functions, which can also be used to achieve remote control of fault reset.</td></tr>
<tr><td>16</td><td>Regular stopping</td><td>The inverter blocks the output immediately. The motor coasts to stop by its mechanical inertia.
The process of stopping will not be affected by converter if there is no output signal sent to motor. It's applicable to any situation and the operation with large inertia load.</td></tr>
<tr><td>17</td><td>External count value input</td><td>Outer count input/pulse input.
Switching value of external count / pulse input</td></tr>
<tr><td>18</td><td>Counter reset</td><td>To counter the state cleared
To reset the counter</td></tr>
<tr><td>19</td><td>Program run</td><td>program is running according the terminal
Program can be started by the terminal</td></tr>
<tr><td>20</td><td>Pause of program run</td><td>Keep the converter in current running frequency when the terminal is valid, and the running time is not include in program running time.
It can keep converter running in current frequency when terminals are enabled; during this period, running time is not count into the time of program run.</td></tr>
<tr><td>20~31</td><td>Reserved</td><td>Reserved</td></tr>
</table>

P5-18	Terminal control mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	Default: 0

This parameter defines three different control modes of external terminals.

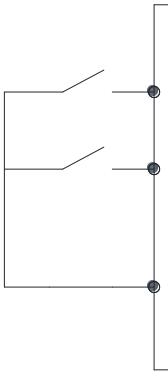
0: Two-wire control mode 1 is the most common two-wire mode, which can make directions conformed to each other; Forward or reverse direction will be decided by the instructions from FWD/REV terminals.

1: Two-wire control mode 2 can keep directions separated with each other; FWD terminal will be enabled while this mode is enabled; but direction will be decided by REV.

2: Rising edge of pulse and terminal Sin will be enabled while three-wire control mode 1 is enabled; direction is controlled by REV Key; stop signal is controlled by input terminal Sin. The function of corresponding input terminal is defined by Sin terminal as No.3 function "three-wire control".

3: Rising edge of pulse and terminal Sin will be enabled while three-wire control mode 2 is enabled; run command is controlled by both REV of FWD keys which control the running direction at the same time; stop signal is generated by a constant-closed input terminal Sin. The function of corresponding input terminal is defined by Sin terminal as No.3 function "three-wire control".

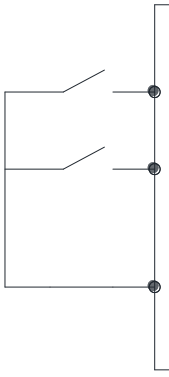
2-wire control mode 1



X1	X2	Operation instruction
OFF	OFF	STOP
ON	OFF	FWD
ON	ON	FWD
OFF	ON	REV

Parameter setting	
	P0-02=1 OR 2
	P5-10=1
	P5-11=2
	P5-18=0

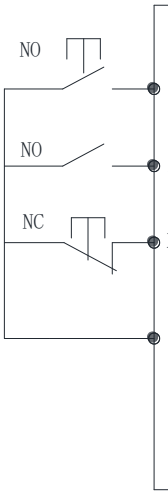
2-wire control mode 2



X1	X2	Operation instruction
OFF	OFF	STOP
ON	OFF	FWD
ON	ON	REV
OFF	ON	STOP

Parameter setting	
	P0-02=1 OR 2
	P5-10=1
	P5-11=2
	P5-18=1

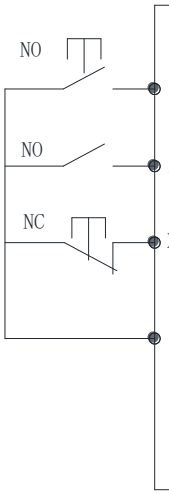
3-wire control mode 1



X1	X2	X3	Operation instruction
OFF	OFF	ON	STOP
PULSE ON	OFF	ON	FWD
PULSE ON	ON	ON	REV
OFF/ON		PULSE OFF	STOP

Parameter setting	
	P0-02=1 OR 2
	P5-10=1
	P5-11=2
	P5-12=3
	P5-18=2

3-wire control mode 2



X1	X2	X3	Operation instruction
OFF	OFF	ON	STOP
PULSE ON	OFF	ON	FWD
OFF	PULSE ON	ON	REV
OFF/ON		PULSE OFF	STOP

Parameter setting	
	P0-02=1 OR 2
	P5-10=1
	P5-11=2
	P5-12=3
	P5-18=3

Tips: As for two-wire control mode, with the premise of the following two points, even control terminals FWD/REV remain enabled, converter will not be running any more after stop signal disappears:

1) FWD/REV terminals are enabled;

2) Converter is shut down because of stop signal generated by the other source;

FWD/REV terminals must be enabled again if converter needs to be started.

P5-19	Terminal filtering time	2 ms~100 ms	Default: 10 ms

It's mainly used to set the sensitivity of terminals from X1 to X8. The parameter must be increased to improve the anti-jamming capability which can prevent DI terminals from being interfered, so that malfunctions can be reduced somehow; however, it may reduce the sensitivity of DI terminals.

P5-20	The range of the external terminal UP/DOWN increasing decline	0.0~50.0Hz	0.1

When the frequency of the outer terminal is set to increase or decrease, the frequency of each increase or decrease is determined by P5-20.

P5-25	Communication baud rate	2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS	5

This parameter is used to set the data transmission rate between the upper computer and the frequency converter. Note that the baud rate set by the upper computer and the frequency converter must be consistent, otherwise the communication cannot be carried out.

P5-26	Modbus data format	0: No check (8-n-1) 1: No check (8-n-2) 2: Even parity (8-e-1) 3: odd parity (8-o-1)	0

The data format set by upper computer and frequency converter must be consistent, otherwise, communication cannot be carried out.

P5-27	modbus response delay	0 ～ 200ms	20

Response delay: refers to the time interval between the end of data reception of the inverter and data sending to the uploaded. If the response delay is less than the system processing time, the response delay shall be subject to the system processing time. If the response delay is longer than the system processing time, the system shall delay and wait after processing the data until the response delay time is reached before sending the data up to the computer.

P5-28	Serial communication timeout	0.0: invalid (not detected) 0.1 ～ 60.0s	0.0

When the function code is set to 0.0s, the communication timeout parameter is invalid.

When the function code is set to a valid value, if the interval between one communication and the next communication exceeds the communication timeout, the system will report a communication failure error (CE).Typically, it is set to invalid. If you set this parameter on a continuously communicating system, you can monitor the state of communication.

P5-29	Communication abnormal action selection	0: continue running 1: alarm and shutdown	0

When the frequency converter communication alarm, you can choose the frequency converter can continue to run or alarm stop.

P6: Output function parameters

P6-00	Y1 output options	0: Disabled 1: Running 2: Direction 3: Fault output 4: On standby 5: Frequency received 6: FDT 7: Upper limiting frequency received 8: Lower limiting frequency received 9: Setting count value received 10: Designated count value received 12: Stop delay output.	Default: 1
P6-01	Y2 output options ②		Default: 2
P6-02	Relay output options		Default: 3

Table of Output Functions

Set value	Functions	Descriptions
0	Disabled	Output terminals without any function
1	Running	When the converter is running, output the close signal It means that converter is running; closed signal is output.
2	Direction	On run reverse, output the close signal It indicates the running direction of converter; closed signal is output when it's running in reverse direction.
3	Fault output	When the converter is out of work, output the close signal Closed signal is output when it's malfunctioning.
4	On standby	Major loop and control circuit are established, converter is on standby; closed signal is output.
5	Frequency received	Please refer to the explanations of function code PA-11~13
6	FDT	
7	Upper limiting frequency received	ON: Running frequency reaches the value of P0-09 Signal "ON" is output when running frequency reaches upper limiting frequency
8	Lower frequency limiting received	ON: Running frequency reaches the value of P0-10 Signal "ON" is output when running frequency is equivalent to or lower than lower limiting frequency
9	Setting count value received	ON: the value of count reach the setting value of PA-14 Signal "ON" is output when count value reaches the value set by PA-14.
10	Designated count value received	ON: the value of count reach the setting value of PA-15 Signal "ON" is output when count value reaches the value set by PA-15.
12	Stop delay output.	Output signal ON immediately after shutdown, and the output time is determined by P6-05
11,13~15	Reserved	Reserved

P6-03	AO options	0: Operating frequency 1: Output current 2: Bus voltage 3: Output voltage	Default: 0

The standard range of analogue input current/voltage is 0~20mA/0~10V, which can be selected by Jumper 5. Output signals can be selected by the setting of this parameter, which correspond to output frequency or output current of converter.

Corresponding range of AO (0~10V/0~20mA) is as followed:

Set value	Functions	Descriptions
0	Running frequency	0～upper limiting frequency
1	Output current	0~double rated current
2	Bus voltage	0~ double rated voltage
3	Output voltage	0~ double rated voltage

P6-04	AO correction coefficient	0.0~250.0%	Default: 100.0%

It is mainly used for the calibration of analog output voltage and can also be used to adjust the range of analog output voltage.

Analogue output voltage = Analogue output voltage ×AO correction coefficient

If the set value of parameter P6-03 is zero while the set value of parameter P6-04 is 100%, the corresponding AO of upper limiting frequency is +10V (20mA). AO correction coefficient can be increased properly to calibrate the analogue output voltage if practical AO is only 9.8V because of differences of circuit.

P6-05	Stop delay time setting	0~3000.0S	0

When the inverter output signal when stop the machine open, until the P6-05, the output signal to shut down.

P7: PID control parameters

PID control is a common control method. The output frequency can be adjusted according to the difference between the feedback signal of the controlled variable and the signal of the target variable.

P7-00	PID preset source options	0: Digital keyboard 1: Panel potentiometer 2: Analog channel AI1 3: Analog channel AI2	Default: 0

This parameter functions if PID is chosen as frequency source, which means that the selection of P0-01 is option 4. The preset channel of objective variables for PID is determined by this parameter. The setting objective variables of PID are relative value; the percentage of the setting (100%) corresponds to the percentage of feedback signal (100%) in the controlled system. And operation is proceeded by the system according to the relative value (0~100%).

P7-01	PID set value	0.00~10.00V	Default: 0.00

When P7-00 equals zero, PI set value will be set by this parameter.

P7-02	PID feedback source options	0: Analog channel AI1 1: Analog channel AI2	Default: 0

PID feedback channel is determined by this parameter.

P7-03	PID output characteristics options	0: Positive 1: Negative	Default: 0

Positive PID output characteristics: output frequency must be lowered to make it balance when the value of feedback signal is greater than PI set value, for example PID control on winding tension.

Negative PID output characteristics: output frequency must be increased to make it balance when the value of feedback signal is greater than PI set value, for example PI control on unwinding tension.

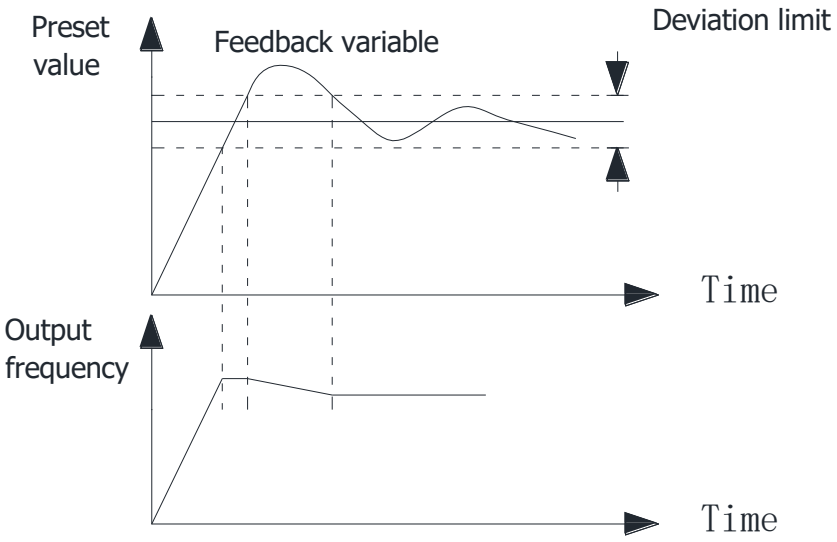
P7-04	Proportional gain (P)	0.0～10.0	Default: 1.0
P7-05	Integral time (I)	0.0～100.0s	Default: 1.0s

Proportional gain (P) determines the intensity of adjustment of PI regulator; the larger P value is, the higher the intensity of adjustment will be. The parameter 100.0 means that when the deviation between the PID feedback quantity and the given quantity is 100.0%, the adjustment range of the PID regulator to the output frequency instruction is the maximum frequency.

Integral time (I) determines the speed of integral regulation on the difference between PID feedback quantity and given quantity. The less integral time is, the higher the intensity of adjustment will be. Integral time refers to that when the deviation between the PID feedback quantity and the given quantity is 100.0%, the integral regulator is continuously adjusted through this time, and the adjustment quantity reaches the maximum frequency.

P7-06	Deviation limit of PID control	0.00～2.00	Default: 0.02

Deviation limit of PID control defines the comparison between PID system output and maximum deviation value which is limited by closed-loop set value. As is shown in the graph, PID regulator is shut down while it's within deviation limit. The precision and stability of PID system can be improved by setting this function code properly.



P7-07	Sampling period(T)	0.1～100.0s	Default: 0.02s

Sampling period (T) means sampling period of feedback quantity; operation is performed by regulator once every one sampling period. The longer sampling period is the slower response will be.

P7-08	Detected value of feedback disconnection	0.00～5.00	Default: 0.0
P7-09	Time for detecting feedback disconnection	0.0～100.0s	Default: 10.0s

The feedback variable of PID can be always detected by system; if feedback variable is less than the detected value of feedback disconnection, system will consider feedback signal to be disconnected by default; if feedback variable is still less than the detected value of feedback disconnection while actual time is more than the time for detecting feedback disconnection, PIE can be detected and sent out by the system.

P7-12	Sleep time	0～3000S	600
P7-13	Dormancy pressure	0～10.00	0
P7-14	Dormancy frequency	0～50.0Hz	0
P7-15	Wake up the pressure	0～10.00	0

Dormancy function description: when the back pressure value > dormancy pressure (P7-13), the frequency of running < dormancy frequency (P7-14). Waiting for the time of sleep (P7-12), began to sleep. When the pressure of the feedback < wake up pressure (P7-15), will cease to dormancy, inverter will run again。

1.1 Dormancy frequency (P7-14) Settings:

In under the condition of no water or gas, make the inverter running in the PID control mode (P0-01 = 0 or 1), start the inverter. Observation line pressure, slowly increase the frequency to the target according to user's requirements, record the current operating frequency after downtime. Set the dormant frequency (P7-14) just above the record frequency of 1-3 Hz or so.

1.2 dormancy pressures (P7-13) set: dormancy pressure value slightly smaller than the target value.

1.3 when a dormant frequency P7-14 = 0 or resting pressure P7-13 = 0, don't start the sleep function.

P8: Simple PLC and Multispeed Parameters

P8-00	Simple PLC Program run mode	0: Disabled 1: Program stop after one-cycle running 2: Program operates as last program runs after one-cycle running 3: Circulatory running of program	Default: 0

0: Disabled

1: Program stop after one-cycle running

Converter will be stopped automatically after one-cycle running; only after run command is entered again will it be started.

2: Program operates as last program runs after one-cycle running

The operating frequency and direction in the last program will be remained to the end after one-cycle running.

3: Circulatory running of program

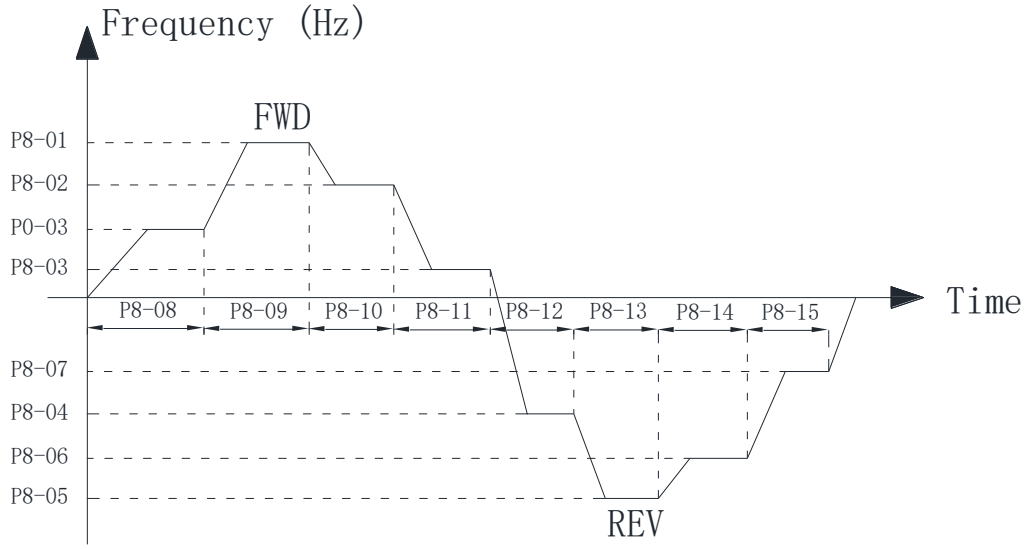
The next cycle of operation will be proceeded by converter automatically right after one-cycle running; system will not be shut down until stop command is received.

P8-01	First phase speed	Lower limiting frequency ~ Upper limiting frequency	Default: 11.0Hz
P8-02	Second phase speed	Lower limiting frequency ~ Upper limiting frequency	Default: 12.0Hz
P8-03	Third phase speed	Lower limiting frequency ~ Upper limiting frequency	Default:13.0Hz
P8-04	Forth phase speed	Lower limiting frequency ~ Upper limiting frequency	Default:14.0Hz
P8-05	Fifth phase speed	Lower limiting frequency ~ Upper limiting frequency	Default: 15.0Hz
P8-06	Sixth phase speed	Lower limiting frequency ~ Upper limiting frequency	Default: 16.0Hz
P8-07	Seventh phase speed	Lower limiting frequency ~ Upper limiting frequency	Default: 17.0Hz

These parameters above are mainly applied to the setting of seven different phase speeds; principal frequency is still controlled by parameter P0-03.

P8-08	Runtime of principal frequency	0~6400.0	Default: 0.0
P8-09	First phase time	0~6400.0	Default: 0.0
P8-10	Second phase time	0~6400.0	Default: 0.0
P8-11	Third phase time	0~6400.0	Default: 0.0
P8-12	Forth phase time	0~6400.0	Default: 0.0
P8-13	Fifth phase time	0~6400.0	Default: 0.0
P8-14	Sixth phase time	0~6400.0	Default: 0.0
P8-15	Seventh phase time	0~6400.0	Default: 0.0
P8-16	Time unit of multi-velocity	0: second 1: minute 2: hour	Default: 0

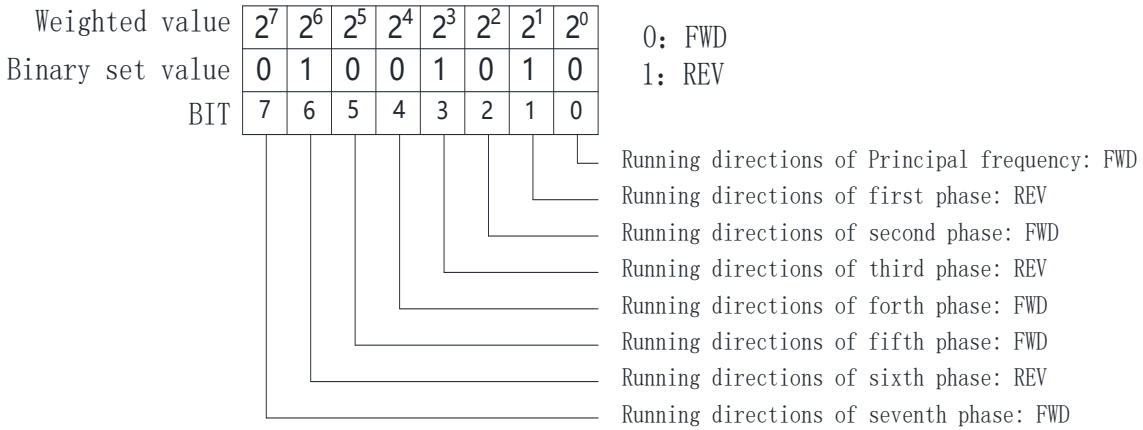
These parameters from P8-08 to P8-15 are mainly applied to the setting of run time for the velocity of each phase. Time unit can be preset by parameter P8-16.



P8-17	Running directions of programs	0~255 BIT 0~7 indicates 0~7 directions (0: Forward 1: Reverse)	Default: 0

It's mainly applied to the setting of running directions for each program, which is preset by binary mode (8 bit). Parameter can be entered only after the binary value is converted into decimal value.Take the following settings for example:

Parameter values = $bit7\times2^7+bit6\times2^6+bit5\times2^5+bit4\times2^4+bit3\times2^3+bit2\times2^2+bit1\times2^1+bit0\times2^0$



$=0\times2^7+1\times2^6+0\times2^5+0\times2^4+1\times2^3+0\times2^2+1\times2^1+0\times2^0$

$=0+64+0+0+8+0+2+0$

$=74$

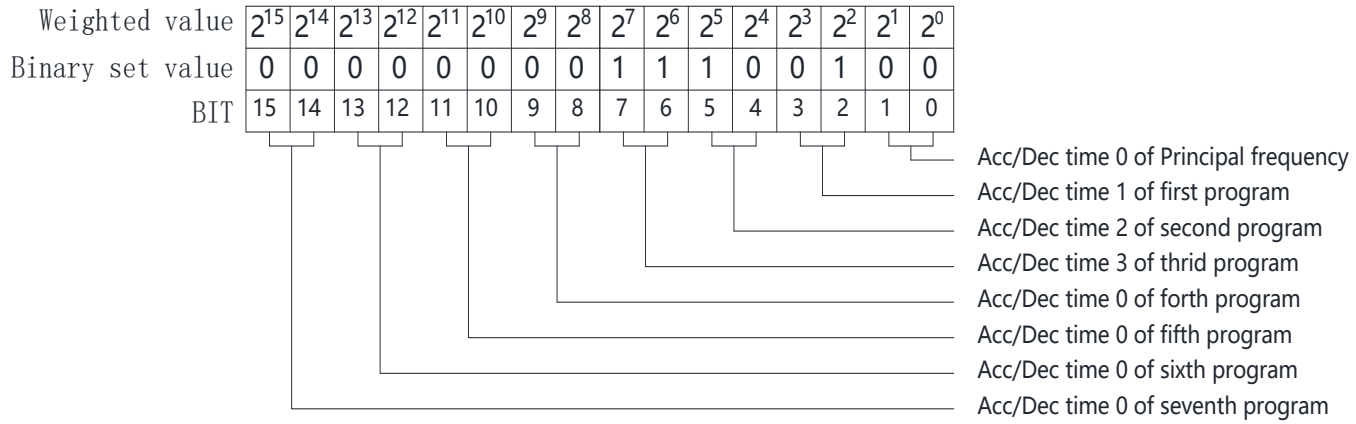
Namely (01001010)2 = (74)10

Hence P8-17 should be set as 74

P8-18	Timing for each program's Acc-Dec	0~65535 BIT 0~15 indicates the ACC/DEC time of 0~7	Default: 0

It's mainly applied to the setting of Acc/Dec time for each program, which is preset by binary mode (16 bit). Parameter can be entered only after the binary value is converted into decimal value.

Take the following settings for example:



Parameter values= $(0000000011100100)_2 = (228)_{10}$

Hence the P8-18 should be set as 228

P9: Protection Function parameters

P9-00	Options for overload protection	0: Disabled 1: Enabled	Default: 0
P9-01	Critical point of overload protection	50~120%	Default: 110%

These two parameters are mainly applied to the setting of real-time relay protection of load motor. Effective thermal protection of motor can be achieved by setting this parameter correctly when rated current of motor is not matched with rated current of converter.

Critical point of overload protection (motor) = (allowed max. load current / rated current of motor) * 100%

P9-02	Overvoltage protection	0: Disabled 1: Enabled	Default: 1
P9-03	Critical point of Overvoltage	110.0～150.0%	Default: 135

Under the influence of load inertia, the actual decrease rate of motor speed may be lower than that of output frequency. At this time, the electrical energy will be feedback to the inverter, causing the inverter bus voltage rise. If the measures are not taken in time, the bus voltage will be too high and cause the frequency converter trip.

Overvoltage protection function will be enabled so that the decreasing output frequency of converter can be slowed down if bus voltage detected by converter while running exceeds the critical point of overvoltage defined by parameter P9-03(in comparison with standard bus voltage); if it's detected that the bus voltage is lower than the critical point, converter will continue to decelerate again.

P9-04	Over-current protection	0: Disabled 1: Enabled	Default: 1
P9-05	Critical point of over-current	100～180%	Default: 180

Because of excessive load, actual rate of rotational speed rise of motor may be lower than the rate of output frequency rise while converter is decelerating; if no action is taken in time, stripping may be caused by over current.

Over-current protection function will be enabled so that increasing output frequency of converter can be slowed down if bus current detected by converter while running exceeds the critical point of over current defined by parameter P9-05; if it's detected that output current is lower than the critical point, converter will continue to accelerate again.

P9-06	Phase-failure protection of input	0: Disabled 1: Enabled	Default: 0
P9-07	Phase-failure protection of output	0: Disabled 1: Enabled	Default: 0

Phase-failure protection of input: options are selected to enable or disable phase-failure protection for input

Phase-failure protection of output: options are selected to enable or disable phase-failure protection for output

P9-08	Latest fault information	0~21	
P9-09	Last fault information	0~21	
P9-10	Last two fault messages	0~21	

These parameters above can't be modified or changed; they are read-only.

The latest three fault types can be recorded by converter:

Zero means there is no malfunction

1~21 stands for twenty different malfunctions; for detailed information, please refer to Chapter 7 "Fault Correcting".

P9-11	Operating frequency of latest fault		

P9-12	Output current of latest fault		
P9-13	Bus voltage of latest fault		
P9-14	Input state of latest fault		
P9-15	Output state of latest fault		

These parameters above can't be modified or changed; they are read-only.

Status information about the latest malfunctions can be recorded by converter, including its operating frequency, current and voltage.

P9-16	Fault since the reset function	0: invalid 1: under-voltage fault alarm automatic reset (unlimited) 2 ~ 20: fault self-recovery	0

Please set this function carefully, to ensure that the fault occurs again after the operation of the safety of person or equipment.

After 2 ~ 20: frequency converter fault alarm automatically reset the number of times. Under-voltage alarm reset is always valid.

PA: Enhancement Function Parameters

PA-00	Acceleration time 1	0.0～3600.0s	Default: 20.0s
PA-01	Deceleration time 1	0.0～3600.0s	Default: 20.0s
PA-02	Acceleration time 2	0.0～3600.0s	Default: 20.0s
PA-03	Deceleration time 2	0.0～3600.0s	Default: 20.0s
PA-04	Acceleration time 3	0.0～3600.0s	Default: 20.0s
PA-05	Deceleration time 3	0.0～3600.0s	Default: 20.0s

Acc/Dec times are available to be selected, included three kinds of Acc/Dec times above, P0-04 and P0-05. They are all the same in definition; for detailed explanations, please refer to P0 series.

Acc/Dec time 0~3 can be selected through different combinations of multi-functional digital input terminals.

PA-06	Jog acceleration time	0.0～3600.0s	Default: 5.0s
PA-07	Jog deceleration time	0.0～3600.0s	Default: 5.0s

These two parameters above are applied to the definition of Acc/Dec time for jogging which can be started or stopped through direct starting or stop by decelerating.

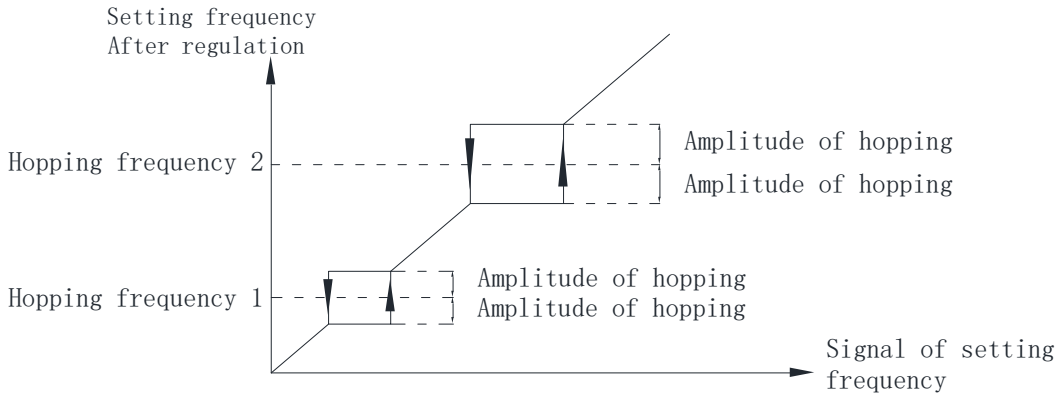
Jog acceleration time indicates the time for converter to accelerate from 0 Hz to maximum frequency (P0-08).

Jog deceleration time indicates the time for converter to decelerate from maximum frequency (P0-08) to 0 Hz.

PA-08	Hopping frequency 1	0.0～Upper limiting frequency（P0-09）	Default: 0.0Hz
PA-09	Hopping frequency 2	0.0～Upper limiting frequency（P0-09）	Default: 0.0Hz
PA-10	Amplitude of Hopping frequency	0.0～Upper limiting frequency（P0-09）	Default: 0.0Hz

Actual operating frequency will be held at the boundary of hopping frequency which is closed to preset frequency when preset frequency is within the range of hopping frequency.

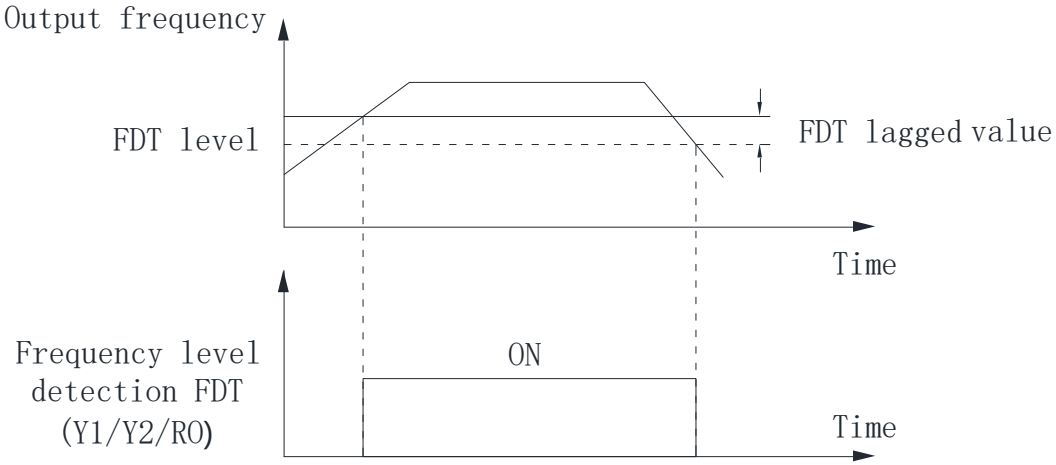
Converter can be kept away from the resonance point of load by the setting of hopping frequency. Two hopping points of frequency are set for this converter; if both of these two points are set as zero,



this function will be disabled.

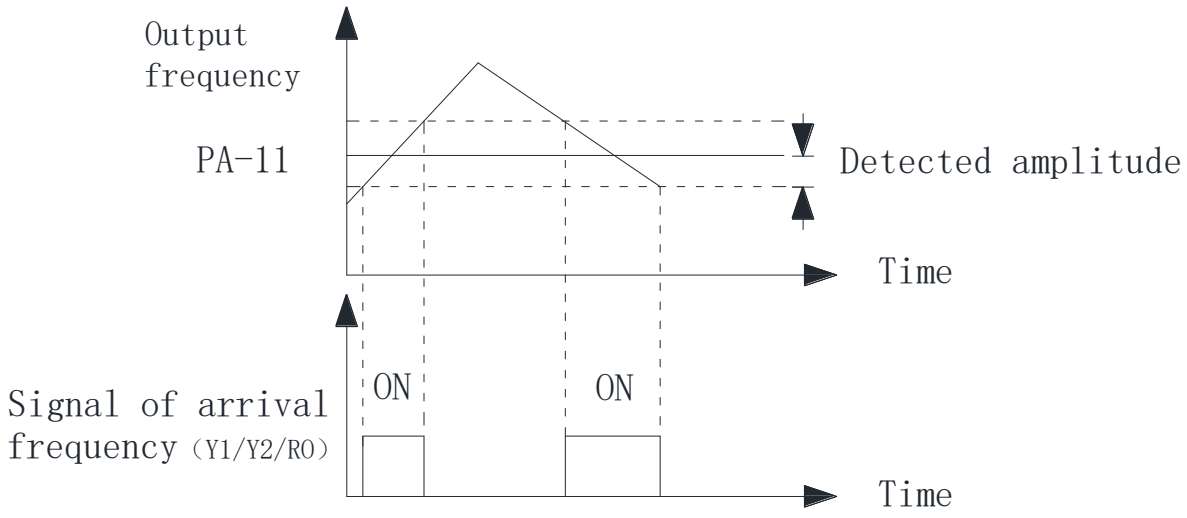
PA-11	FDT level value	0.0～Upper limiting frequency（P0-09）	Default: 0.0Hz
PA-12	FDT lagged value	0.0～FDT level value（PA-11）	Default: 0.0Hz

These two parameters above are mainly applied to the setting of the detected value of output frequency (PA-11) as well as lagged value obtained after output is enabled.



PA-13	Amplitude of detected frequency FAR	0.0～Upper limiting frequency（P0-09）	Default: 0.0Hz

It's mainly applied to the setting of amplitude detection for detected frequency. Please refer to the following graph:



PA-14	Setting count value	1~65535	Default: 10
PA-15	Specified count value	1~65535	Default: 10

Counts of pulse signal or switching signal can be input by the counter which is installed in the multi-functional DI terminal.

When count value reaches up to preset count value, signal will be output by DO terminal to prove that preset count value is reached.

When count value reaches up to specified count value, signal will be output by DO terminal to prove that specified count value is reached. Counter will not stop until it reaches up to “setting count value”

Specified count value PA-15 must be no more than setting count value PA-14.

PA-16	Overload reduction frequency function	0: Disabled 1: Enabled	Default: 1

Converter’s current will also be increased as abnormal load transient boosts instantaneously; if no action is taken in time, stripping may be caused by over current.

PA-17	Dc braking factor	110～150%	Default: 130

Inverter in the running process, detect the bus voltage is higher than that of PA - 17 set value corresponding to the rated voltage (100%), open the dc brake.This function should be used together with brake unit and brake resistance, otherwise it is invalid.

PA-21	Dead zone compensation time	Depending on model	Default: Depending on model

Dead zone compensation time on different models are different.

PA-22	Reduce the frequency current point	100 ~ 300%	Default:210

Frequency converter in the process of running current is higher than the set value, the inverter frequency reduction.100% of the rated current of the converter.

Chapter 7 Fault Correcting

7-1 Malfunction and Solutions

Fault indication	Code	Fault Type	Fault cause	Solutions
LU	3	Under voltage	Abnormal power supply or loose contact	Input voltage and wiring should be checked
OU	4	Overvoltage	1、Input voltage 2、Rapid deceleration 3、Excessive inertia load	1、check input voltage 2、increase deceleration time 3、select dynamic braking components
OC	6	Over current	1、mismatch of capacity 2、low voltage of grid 3、Rapid acceleration and deceleration 4、high torque of inertia load 5、abnormal load	1、select converter with large capacity 2、check power source and wiring 3、Increase Acc-Dec time 4、select applicable braking parts 5、detect and reduce load changing
OL	5	Overload (converter)	1、please refer to fault cause of over current(OC) 2、overload(motor) 3、inapplicable setting of V/F curve	1、please refer to solutions for over current(OC) 2、reduce motor load 3、reset parameters
OL1	15	Overload (motor)	1、low voltage of grid 2、Excessive motor stalling or load changing 3、inapplicable setting of V/F curve, rated current or critical point of overload protection	1、check the voltage of grid 2、check motor load 3、reset parameters
SC	9	short-circuit output	1、please refer to fault cause of over current(OC) 2、short circuit of output terminal(U,V,W) or earth terminal 3、loose plug-in units or wiring of control panel 4、damages of power module or other parts	1、please refer to solutions for over current(OC) 2、check the state of insulation(motor & cable) 3、check the connection of plug-in units 4、seek technical support for damages
SPI	7	Input Failure	default phase of power source R,S,T	1、check power source and its voltage 2、check the connection of power line

SPO	8	Output failure	1、default phase of output terminals U，V，W 2、unsymmetrical three-phase load	1、check the connection of output line 2、check motor and its cables
OH	13	Overheat	1、high ambient temperature 2、obstruction of ventilation duct or damage of cooling fan 3、excessive motor load	1、Lower the ambient temperature 2、Clear the ventilation duct and replace the cooling fan 3、Reduce motor load or carrier frequency
PIE	12	PID fault	No detection of PI feedback signal for a certain time	Check on PI feedback signal and connection
EF	11	External fault	input terminal for external fault signal is enabled	Check the input of external devices
EEP	1	EEPROM fault	1. R/W errors of parameter 2. Damage of EEPROM	1. factory reset 2. seek technical support for damages
NCE	16	Contactor fault	1、low voltage of grid 2、damage of contactor 3、the other damaged circuit	1、check the voltage of grid 2、replace the contactor of major loop 3、seek technical support for damages
OPSE	10	System failure	Severe interference from external factors, e.g. noise	install additional filter or seek technical support for damages
CF	20	The current detecting signal failure	1, the current sensor is damaged 2, signal lines, poor contact 3, other line fault	1, change the current sensor 2, check the signal lines 3, seeking services
CE	21	Communication failures	Poor or broken communication	1. Check whether the communication Settings are correct 2. Whether the communication line is broken or in bad contact

7-2 Common Faults and Processing Schemes

If the following situations are met during the application of converter; please refer to the instructions below:

No information display after power on

Please confirm whether the voltage of power source is compatible with the rated voltage of converter.

Please check whether the three-phase rectifier bridge is in good condition. In case of damage, please seek technical support.

Please check if power indicator is on or not; if it's off, malfunction is mainly caused by abnormal rectifier and buffer resistance; if it's on, malfunction is mainly caused by switching power supply. Meanwhile, please seek for technical support.

Air switch of power source trips when power on

Please check whether power source is grounded or short-circuited; please solve it accordingly.

Please check whether Rectifier Bridge is burned; if it's damaged, please seek for technical support.

Motor doesn't start running after converter is started

Please check whether there is three-phase symmetrical output among U, V, W. If there is, motor or its circuit is damaged mostly; or stalling may be caused by mechanical problem. Please solve it accordingly.

If three-phase output is unsymmetrical, then driver board or output module of converter may be damaged. Please seek for technical support.

If there is output voltage, then driver board or output module may also be damaged. Please also seek for technical support.

Air switch of power source trips while running

Please check whether output modules between phase and phase are short-circuited; if there is short circuit, please seek for technical support.

Please check whether motor lines are short-circuited or grounded; if they are, please solve it accordingly.

If tripping is an occasional occurrence and the distance between the motor and the inverter is long, please consider installing an AC reactor.

Chapter 8 Maintenance

Only the qualified engineer is allowed to conduct maintenance for converter; please pay attention to the following precautions:

- Maintenance must be conducted by qualified engineer in specified way;
- Only when converter is shut down for 5 minutes can maintenance be conducted;
- Do not touch the components on the PCB directly; otherwise, components can be damaged by static easily.
- Make sure that all the screws are fastened after the maintenance.

8-1 Daily Maintenance and Upkeep

Affected by environmental conditions (e.g. temperature, humidity or smog) and aging of internal components, converter may malfunction. Therefore, daily inspection and maintenance on converter must conduct during the process of storage and application. For the detailed information of daily inspection and maintenance, please refer to the following table:

Items	examination period		check points	criterion and maintenance
	non-periodical	regular		
Environmental conditions	√		1. temperature&humidity 2. dust&mist 3. Gas	1. temperature <50℃, humidity < 90%， no frost 2. No odor, Nonflammable or explosive gas
Cooling system		√	1. installation environment 2. built-in fan	1. good ventilation, no obstruction of ventilation duct 2. normal operation of built-in fan, no abnormal noise
Converter	√		1. vibration and temperature rise 2. noise 3. dust or impurity 4. lead and terminals	1. stable vibration, normal blast temperature 2. No abnormal noise or odor 3. remove dust by dry compressed air 4. no loose screws
motor	√		1. Vibration and temperature rise 2. noise	1. stable operation and normal temperature 2. No malfunction or abnormal noise
I/O parameters	√		1. input voltage 2. output current	1. Input voltage is within specified range 2. output current is lower than rated value

8-2 Inspection and replacement of damageable parts

As for some of internal components, abrasion or performance degradation may be caused during use. To ensure stable and reliable operation, preventive maintenance on converter must be conducted. If necessary, please replace them:

Fan must be replaced after more than 20,000 hours' running

Electrolytic capacitor must be replaced after 30,000~40, 000 hours' running

8-3 Storage

This product can't be taken out from box until it's about to be installed. To ensure that it's still valid for warranty and available for maintenance in the future during the period of storage, please pay attention to the following points:

- **converter must be stored in a dry place where there is no dust;**
- **ambient temperature must be within the range between -20℃ and +60℃;**
- **relative humidity must be within the range between 0% and 95%; no condensation is permitted;**
- **it must be protected from caustic gas or liquid;**
- **It must be packed properly and put on the shelf or desk.**

8-4 Product Warranty

Any of the following situations will be our company's responsibility, which will be considered and guaranteed:

- The warranty period for this product is 18 months but only 12 months for final buyer. During the period, any damage or fault without any wrong operation will be our responsibility to fix, which is free of charge. Maintenance fee will be charged accordingly if warranty expires.
- Regarding the faults caused by the following points, extra fee will need to be charged as service fee:

1) Fault caused by faulty operation which is not in conformity with manual or specification

2) Fault caused by unauthorized maintenance modification;

3) Damage caused during the transportation or improper safekeeping;

4) Fault caused by misuse failure

5) As for the damages caused by fire, salt corrosion, gaseous corrosion, earthquake, storm, flood, thunder strike, abnormal voltage and other irresistible factor

- Even after the warranty period, the company also provides lifetime paid maintenance services

Chapter 9 Communication Protocol

Modbus protocol is the main communication method applied in XX200 series converter with RS485 interfaces, which is compliant with International Communication Standards. Centralized control can be implemented by PC/PLC as well as superior controller to adapt specific requirements for applications, including setting of control command, operating frequency, modification of parameters for relevant function code, monitoring of operating status or malfunction.

9.1 Protocol Content

Modbus, also known as serial communication protocol, has defined its frames and format during the asynchronous transmission, including the format of polling to the host, broadcast frames and response fames to slave controller. The frames generated by the host included slave address/broadcast address, executive command, data & error correction; and the response of the slave controller has the similar frames as the host, including confirmation of instructions, data feedback and error correction. If any error happens when the slave controller receives the frames, or any instruction requested by the host can't be done, it will generate a malfunction frame and send feedback to the host.

9.1.1 Application mode

Series converter is compatible with control network equipped with RS485 bus which has single host & multiple slave controllers.

9.1.2 Bus Structure

(1)Hardware interface

RS485 hardware interface

(2)Transmission mode

Serial asynchronous, half-duplex transmission -- TXD and RXD can be done at the same time by either the host or the slave controller separately, which means there are only one sender and one receiver at a time. Data will be transmitted frame by frame in the format of message during the serial asynchronous communication.

(3) System with single host & multiple slave controllers

The range of slave address should be 1~127; every single salve address on the Internet is unique, which is the foundation of Modbus serial communication.

9.2 Protocol Introductions

The protocol of XX200 Series Converter is a kind of serial &asynchronous communication protocol with principal and subordinate Modbus; there is only one device (host) could set up protocol (named "query /command"), and the other devices (slave) can only response to the host's "query /command" by sending data, or issue commands/instructions according to the "query /command" from the host. The host herein mainly refers to personal computer, industrial control facility or Programmable Logic Controller (PLC); and the slave herein mainly refers to XX200 Series Converter or the other control facilities with similar/same communication protocol. The host can not only communicate with a certain slave controller independently but also send broadcast message to all the slave controllers. As to any independent access to the host's "query /command", a message (called response) must be sent out from the slave controller; however, regarding the broadcast message issued by the host, it's not necessary for the slave controller to send feedback to the host.

9.3 Frame Structure

The data format of Modbus communication protocol applied in the XX200 Series Converter is RTU mode (Remote Terminal Unit)

In the RTU mode, the format of each byte is as follow: encoding system -- 8-bit binary system, there are two hexadecimal characters included in every 8-bit frame (hexadecimal characters include 0~9 & A~F). The transmission of new frame will always be restarted with an interval of 3.5 bytes transmission time. When it's connected with the Internet of which transmission rate is calculated by Baud rate, 3.5-byte transmission time is easy to be controlled. The data fields of transmission will be sent in sequence as below: slave address - operating command code - data & CRC check word; and transmission byte of each field are hexadecimal (0~9, A~F). The networking devices will always monitor the operation of communication bus;

When the first domain (address information) is received, it will be confirmed again by each networking device; when the transmission of last byte is done, there will be an interval of 3.5 bytes transmission time to identify the end of this frame. After that, transmission of new

Frame will be started again.

Frame Format of RTU Data					
	MODBUS Message				
Initiate: an interval of at least 3.5 bytes	Slave address	Function code	Data	Verification	Terminate: an interval of at least 3.5 bytes

A frame message must be transmitted in a consecutive data stream; if the interval is more than 1.5-byte transmission time before transmission of the whole frame is finished, those incomplete messages will be cleared by the receiver which will take the next byte as part of address field of new frame by mistake; likewise, if the interval is less than 3.5-byte transmission time, the receiver will identify it as the extension of last frame. Because of disorder of frames, CRC value will be incorrect, which may result in malfunction.

Frame header STAR	T1-T2-T3-T4(3.5-byte transmission time)
Slave address field ADDR	Communication address: 0~147(decimal system) / (Zero stands for broadcast communication address)
Function domain (CMD)	0x03: reading parameters of slave controller 0x06: programming parameters of slave controller
Data field ENTER（N-1） … ENTER（0）	2*N-byte data is not only the main content of communication but also the core of data exchange during the communication.
Checksum	estimated value: CRC value (16BIT)
Frame ending END	T1-T2-T3-T4 (3.5-byte transmission time)

Standard structure for RTU frames

9.4 Command code & data description

9.4.1 Format of No.1 address for Setting as follows, setting frequency 50Hz (P0-03)

Superior host command:

Frame header	3.5-byte interval
Address	0x01
Function code	0x06
Register address	0x03EB
Register information	0x01F4
Checksum	0xF9AD
END	3.5-byte interval

Converter's response:

Frame header	3.5-byte interval
Address	0x01
Function code	0x06
Register address	0x03EB
Register information	0x01F4
Checksum	0xF9AD
END	3.5-byte interval

9.4.2 Format of No.1 address for reading as follows, setting frequency (P0-03)

Note: register number must be one only when reading

Superior host command:

Frame header	3.5-byte interval
Address	0x01
Function code	0x03
Register address	0x00DD
Register number	0x0001
Checksum	0x1430
END	3.5-byte interval

Converter's response:

Frame header	3.5-byte interval
Address	0x01
Function code	0x03
Register address	0x02
Register information	0x01F4
Checksum	0xB853
END	3.5-byte interval

9.4.3 Frame format of response error as follows, setting frequency 60Hz (P0-03)

Type of error:

01H -- data address overrun

02H -- number of data overrun& read-in data content exceeding bounds (ceiling & floor)

03H -- Operating, no read-in data are permitted

Superior host command:

Frame header	3.5-byte interval
Address	0x01
Function code	0x06
Register address	0x0003
Register information	0x0258
Checksum	0x7950
END	3.5-byte interval

Converter's response:

Frame header	3.5-byte interval
Address	0x01
Function code	0x86
Error code	0x02
Checksum	0xC3A1
END	3.5-byte interval

9.4.4 CRC Mode

RTU frame format is mainly applied to CRC (Cyclical Redundancy Check), error detecting field based on CRC is included in the message. CRC domain can detect all the information of message, which is two bytes with 16-bit binary value included. It will be added into the message after the calculation of transmission devices. The receiver will recalculate the CRC receiving the message, and compare it with the values in the CRC domain received by devices; if the CRC value is not equivalent to another one, it proves that there is error in the transmission.

CRC will write 0xFFFF in superior host, and call a program to process the consecutive 8 bytes in the message as well as the values in the register. Only 8-bit data of each character is valid to CRC, the others are all invalid, including start bit, stop bit and parity check bit.

During the operation of CRC, each of 8-bit character is exclusive (XOR) with register content separately; result will be inclined to the least significant bit (LSB) while the most significant bit will be filled with Zero. LSB will be extracted from the data for checking; if LSB is one, register will be exclusive (XOR) with preset value separately; if LSB is zero, calculation will not be conducted. This instruction of process will repeat for 8 times; when it comes to the last bit (8th bit), the next 8-bit bytes will be exclusive (XOR) with register value again. The final value in the register is the CRC value after the calculations of all the bytes in the message.

When CRC is added into the message, lower byte will be added first, then the high byte. The simple function of CRC is as follows:

```
unsignedintcrc_chk_value（unsignedchar*data_value, unsignedcharlength） {
                                    unsignedintcrc_value=0xFFFF;
                                    into;
                                    while（length--）{
```

```
                    crc_value^=*data_value++;
                    for（i=0;i<8;i++）{
                        if（crc_value&0x0001）
                {
                    crc_value=（crc_value>>1）
^0xa001
                        }
                        else
                        {
                    crc_value=（crc_value>>1）
                        }
                    }
                }
                return（crc_value）;
}
```

9.5 Read-write rules of parameter address for function code

This part defines the address of communication data; it's mainly used to control the operation of converter, get access to the status information as well as relevant function parameter setting. It helps converter to find the corresponding communication address for the parameter by the serial number of function code. Note: the entire serial numbers(S/N) of function code's address is decimal number.

(1) Expression rules of parameter address for function code

All parameters from P0-00 to PA-26 in the parameter table correspond to the corresponding RAM (power loss without storage) address: 1000 ~ 1191 (decimal).If you need to store data in EEPROM, subtract 1000.Example: the RAM address of function code P0-04 is expressed as 1004. In EEPROM, the address is 0004.

The specific address of parameters in the parameter table is specified in the specification. The related addresses in other nonparametric tables show no such difference.

Register address (decimal)	Data description	Register address (decimal)	Data description
220	Setting frequency	232	Run time
221	Output frequency	233	Input interface
222	Output current	234	Output interface
223	Busbar voltage	235	Rated power
224	Motor speed	236	Compensation frequency
225	Percentage of current	237	Compensation voltage
226	IGBT temperature	238	Phase angle
227	Output voltage	239	Load factors
228	Output power	242	The analog quantity AI1
229	Count value	243	The analog quantity AI2
230	PID preset value	244	Keyboard potentiometer given value
231	PID feedback value		

(2) Descriptions of the other functions' address

Parameters address monitoring:

Control command
(Valid when P0-02 =3)

Register address (decimal)	Data description	
200	1: FWD run	8: Stop
	2: FWD jogging	16: Regular stopping
	5: REV run	32: Reset
	6: REV jogging	

Communication control running frequency

(Read-write, valid when P0-01 is changed into 7)

Register address (decimal)	Data description
1003	The value is the given frequency of the converter

Status of Converter

Register address (decimal)	Data description	
240	0: Operating	2: REV running
	1: FWD running	3: Malfunctioning

Fault address

Register address (decimal)	Data description	
241	1: Storage fault	11: External fault
	3: Under voltage	12: PI fault
	4: Overvoltage	13: Over temperature
	5: Overload	14: Over current
	6: Over current	15: Motor overload
	7: Input default phase	16: Contactor off
	8: Output default phase	20: Signal failure of current
	9: Output short circuit	21: Communication failures
	10: System fault	

9.6 Parameter description of communication

Function Code	Description	Description and Range	Default

P0-01	Frequency setting mode	0：Frequency setting (UP/DOWN) 1：Panel potentiometer 2：External AI1 3：External AI2 4：PID regulation 5：UP/DOWN by the P5-20 add and subtract 6：UP/DOWN by the P5-20 add and subtract, Stop frequency clear 0 7：Frequency communication setting	0
※ For a given frequency of communication, you can set P0-01 =7 and the corresponding address is 1003 (decimal). If it is given in other ways, please set it as required.			
P0-02	Control mode for running	0：Controlled by keyboard 1：Controlled by terminals, STOP Key disabled 2：Controlled by terminals, STOP Key enabled 3： Controlled by communication	0
※ start and stop the frequency converter through communication, the corresponding address is 200 (decimal)			
P0-15	Modbus address	1～125	1
※The uniqueness of the local address is the basis for the point-to-point communication between the host computer and the converter.			
P5-25	Communication baud rate	2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS	5
※ This parameter is used to set the data transmission rate between the upper computer and the frequency converter. Note that the baud rate set by the upper computer and the frequency converter must be consistent, otherwise the communication cannot be carried out.			
P5-26	Modbus data format	0: No check (8-n-1) 1: No check (8-n-2) 2: Even parity (8-e-1) 3: odd parity (8-o-1)	0
※ the data format set by upper computer and frequency converter must be consistent, otherwise, communication cannot be carried out.			
P5-27	Modbus response delay	0 ～ 200ms	20
※ refers to the interval time between the end of data receiving of the inverter and data sending to the uploaded. If the response delay is less than the system processing time, the response delay shall be subject to the system processing time. If the response delay is longer than the system processing time, the system shall delay and wait after processing the data until the response delay time is reached before sending the data up to the computer.			

P5-28	Serial communication timeout	0.0: invalid (not detected) 0.1 ~ 60.0s	0.0
P5-29	Communication abnormal action selection	0: continue running 1: alarm and shutdown	0
※ When the function code is set to P5-28 = 0.0s, the communication timeout parameter is invalid. When the P5-28 function code is set to a valid value, if the interval between one communication and the next communication exceeds the communication timeout, and P5-29 = 1, the system will report a communication failure error (CE) and stop. Typically, it is set to invalid. If you set this parameter on a continuously communicating system, you can monitor the state of communication.			

Chapter 10 Appendix

10-1 List of braking resistor

If controlled motor decelerates too fast, or load jittering of motor is too fast while converter is running, its electromotive force will charge the internal capacitors of converter through converter's reverse function, which will raise the voltage of power module and damage converter. However, this will be restrained by converter's internal control according to the condition of loading; additional braking resistor needs to be installed externally to release the power in time when braking performance doesn't meet customers' requirements.

External braking resistor works by consuming energy which will be consumed completely by power braking resistor; therefore, power and resistance of braking resistor must be applicable and effective. Braking resistors whose power and resistance value are as followed are recommended to be applied to this converter. According to the condition of loading, value can be changed properly; but it must be no less than the minimum of this converter

Converter power	Recommended resistance	Minimum resistance
0.75kW/220V	80W 150Ω	80Ω
1.5kW/220V	200W 100Ω	55Ω
2.2kW/220V	200W 70Ω	35Ω
0.75kW/380V	150W 400Ω	260Ω
1.5kW/380V	200W 300Ω	200Ω
2.2kW/380V	250W 200Ω	150Ω
3.7kW/380V	400W 150Ω	90Ω
5.5kW/380V	500W 90Ω	60Ω
7.5kW/380V	800W 60Ω	47Ω
11kW/380V	1000W 47Ω	36Ω
15kW/380V	1500W 36Ω	27Ω
18.5kW/380V	1500W 36Ω	25Ω
22kW/380V	1500W 36Ω	22Ω
30kW/380～500kW/380V	According to the requirements of brake units and recommended to choose	

Due to the energy consumption of braking resistor, a mass of heat may be generated if it keeps braking frequently; therefore, safety and inflammability of the surrounding must be taken into consideration

10-2 Technical specification

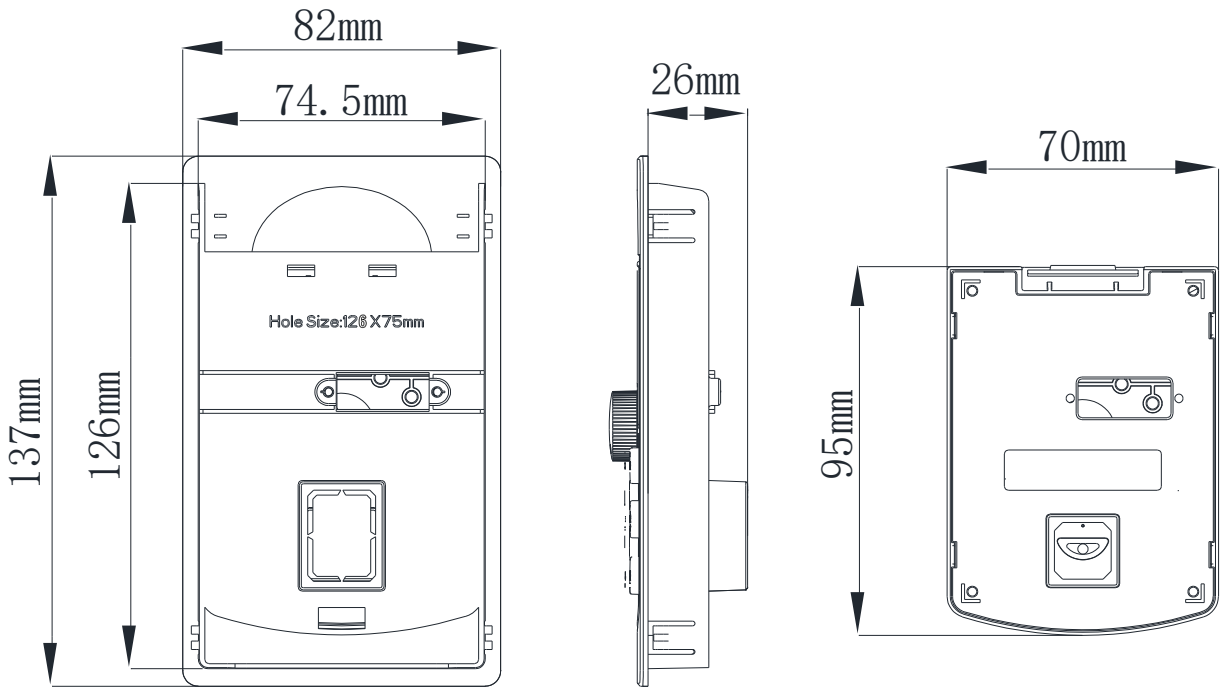
Rated power kW	0.7	1.5	2.2	0.7	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45
Output current A	5	7	11	2.5	3.7	5.1	9	13	17	25	32	38	45	60	75	90
rated voltage V	single-phase 220V			three-phase 380V												
Rated power kW	55	75	90	110	132	160	185	200	220	250	280	315	350	400	450	500
Output current A	110	150	176	210	250	300	340	380	420	470	520	585	650	725	820	900
rated voltage V	three-phase 380V															

rated output frequency		The maximum can reach up to 400Hz by programming
Power supply	Rated input voltage/frequency	one-phase/three-phase 220V 50Hz/60HZ; three-phase 380V 50Hz/60HZ;
	Allowed voltage fluctuation	+15%, -15%
	Allowed frequency fluctuation	±5%
Control feature	Control method	Optimize the control of space vector SVPWM
	control range of frequency	0.1~400.0Hz
	Frequency precision	Digital setting: 0.01% analog instruction: 0.1% (max. frequency)
	Frequency resolution	Digital command: 0.1Hz analog instruction: 0.1Hz
	Acc-Dec time	0.0 ~ 3600s(separate setting of acceleration/deceleration time) four kinds of acceleration/deceleration time are optional
	multispeed running	Built-in PLC programming is running in multiple speeds multispeed running is controlled by external multispeed terminals
	Built-in PID	automatic control system can be set up easily
	Built-in counter	With the combination of built-in PLC, automatically-controlled production line can be achieved
	overload capacity	model G -- 150% rated current per minute model P -- 120% rated current per minute
	Braking torque	About 20%(it can reach up to 150% whenever there is braking resistance)
	V/F mode	Three preset V/f model and V/f model which can program arbitrarily
	Automatic energy-efficient operation	Energy-efficient operation can be achieved by changing V/F curve automatically according the condition of loading
	Automatic voltage regulation(AVR)	it can stabilize output voltage automatically whenever there is change for the voltage of grid

Running function	preset running instruction	preset panel and preset external terminal
	Setting of frequency	Digital setting setting of analog voltage setting of analog current
	Input signal	FDW/REV instruction Jog option multispeed control regular stopping external fault
	Output signal	Failure alarm output (250V/2A contact) open-collector output
Protection function		Over current、 overvoltage、under voltage、overheating、 overload、default phase、anti-stall voltage/current
Display		Parameter setting、information display、fault indication
environmental conditions	operating environment	Temperature -10℃ ~ +50℃ Humidity < 90%RH No condensation
	operating situation	Indoor (it must be protected from corrosive gas or dust) Altitude: no more than 1000 meter
	storage temperature	-20℃ ~ +60℃
	vibration	Less than 5.9 m/s2(0.6g)

10-3 Dimension for Installation

Pallet dimension

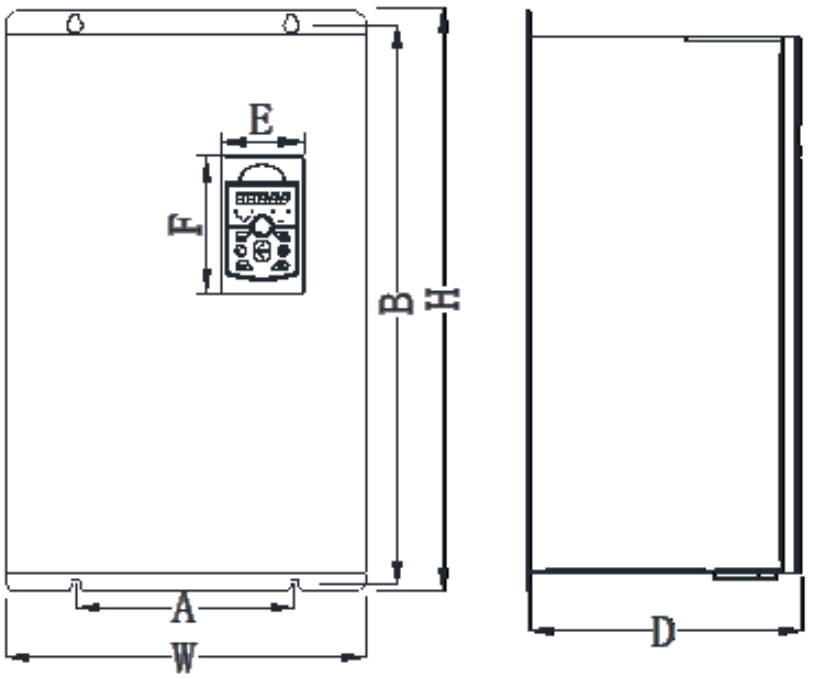


※: Keyboard base pallet hole size: width: 74.5mm; Length: 126 mm

XX200 Mini-series Dimension for Installation

Model	Mounting Dimension		Dimension			Pore Diameter (mm)
	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	
AC380V 0.75～3.7kW AC220V 0.75～2.2kW	141	80.5	152	89	123	5.2
Keyboard tap installation hole size: E = 74.5 mm wide; F = 126 mm long						

XX200 General Series Dimension for Installation

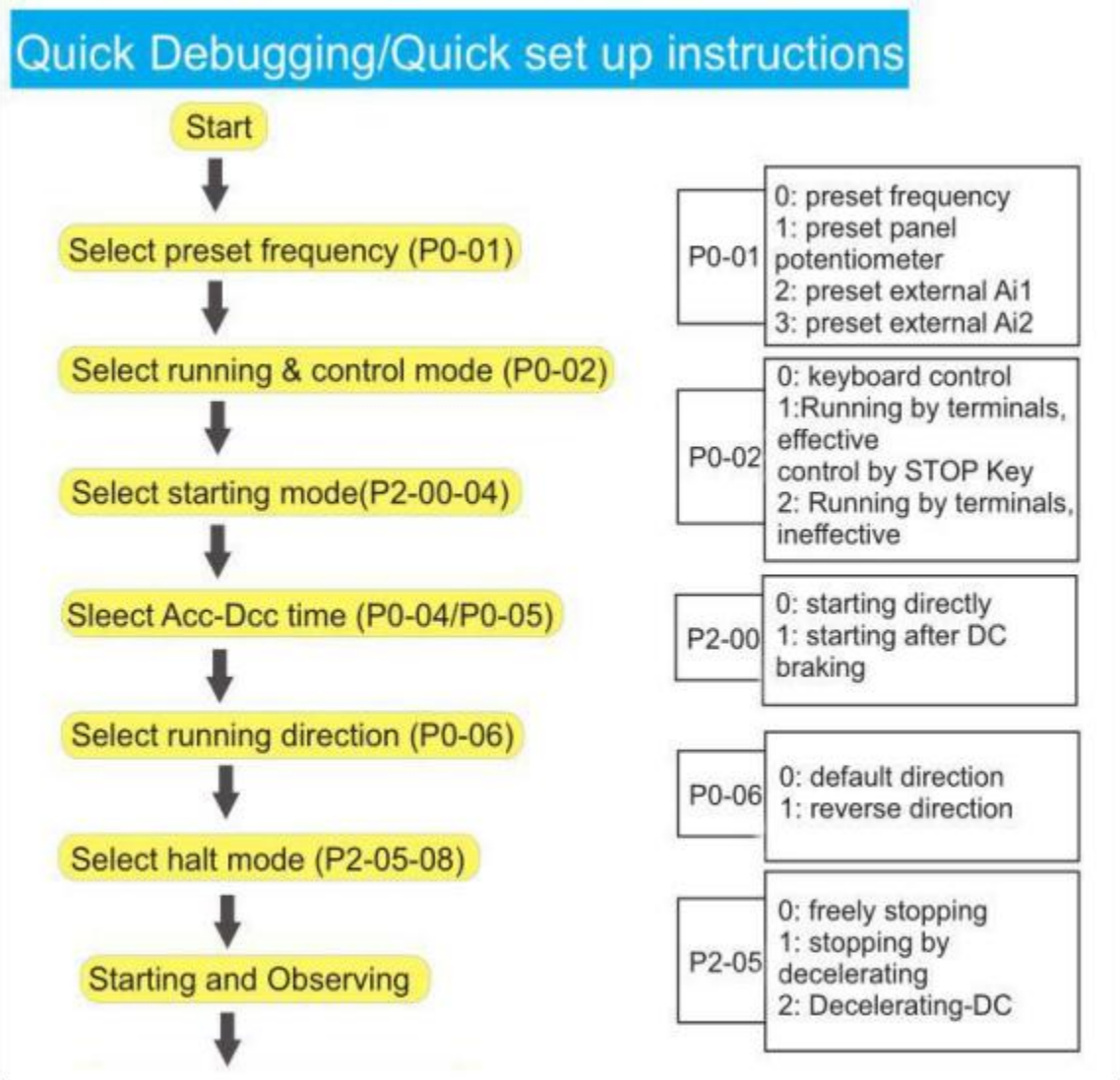


Model		Mounting Dimension		Dimension			Pore Diameter (mm)
		A(mm)	B(mm)	H(mm)	W(mm)	D(mm)	
200-0.75G-T4		107	175	185	118	167	Φ4.5
200-1.5G-T4							
200-2.2G-T4							
200-3.7G/5.5P-T4							
200-5.5G/7.5P-T4		107	175	185	118	187	Φ4.5
200-7.5G/11P-T4		148	235	247	160	190	Φ5.5
200-11G/15P-T4							
200-15G/18.5P-T4		205	305	320	220	205	Φ5.5
200-18.5G/22P-T4							
200-22G/30P-T4							
200-22G/30P-T4		180	416	432	255	234.5	Φ7
200-30G/37P-T4							
200-37G/45P-T4							
200-45G/55P-T4		244	497	518	300	260	Φ9
200-55G/75P-T4							
200-75G/90P-T4		300	598	620	390	300	Φ11
200-90G/110P-T4							
200-110G/132P-T4							
200-132G/160P-T4		350	745	780	480	360	Φ12
200-160G/185P-T4							
200-185G/200P-T4	hanging	400	830	855	500	360	Φ12
200-200G/220P-T4							
200-185G/200P-T4	Cabinet type	/	/	1138.4	500	360	/
200-200G/220P-T4							
200-220G/250P-T4	hanging	480	942	970	650	418	Φ13

200-250G/280P-T4							
200-280G/315P-T4							
200-315G/350P-T4							
200-220G/250P-T4	Cabinet type	/	/	1320	650	418	/
200-250G/280P-T4							
200-280G/315P-T4							
200-315G/350P-T4							
200-350G/400P-T4	Cabinet type	/	/	1720.4	800	490	/
200-400G/450P-T4							
200-450G/500P-T4							
200-500G-T4							
Keyboard tap installation hole size: E = 74.5 mm wide; F = 126 mm long							

10-4 Table of Parameter Setting

Customer Name		Model	
Operational environment		Telephone	
Address			
Parameter Code	Setting	Parameter Code	Setting


Quick Debugging/Quick set up instructions
Start
Select preset frequency (P0-01)
Select running & control mode (P0-02)
Select starting mode(P2-00-04)
Sleect Acc-Dcc time (P0-04/P0-05)
Select running direction (P0-06)
Select halt mode (P2-05-08)
Starting and Observing
P0-01
0: preset frequency
1: preset panel potentiometer
2: preset external Ai1
3: preset external Ai2
P0-02
0: keyboard control
1:Running by terminals, effective
control by STOP Key
2: Running by terminals, ineffective
P2-00
0: starting directly
1: starting after DC braking
P0-06
0: default direction
1: reverse direction
P2-05
0: freely stopping
1: stopping by decelerating
2: Decelerating-DC