
R/L1
S/L2
T/L3
POWER
Hz
A
V
FIR
RUN
STOP
PRG
ENTER
RESET
200V 1PHASE
3.7KW
ACT2220-3A7G
ACT MOTOR GmbH


ACT MOTOR
ACT MOTOR GmbH
Rosenheimer Str.10
28219 Bremen,Germany
ACT MOTOR
ACT2220-3A7G
INPUT: 1PH 220V 50HZ/60HZ
OUTPUT:3PH 220V 16A 3.7KW
FREQ RANGE:0.1-320HZ
www.act-motor.com

2000 Series
VFD
Manual

E-mail:info@act-motor.com; Mobile:+49 160 9988 9968

Contents

Chapter 1 Introduction
1.1 Technology Features

Chapter 2 Installation and wiring
2.1 Environment and installation requirements
2.2 The opening size of the keyboard
2.3 The inverter wiring
2.4 Control terminals

Chapter 3 Operation
3.1 Digital operator description
3.2 Operational process
3.3 Running state

Chapter 4 Fault checking and ruled out
4.1 Fault alarm and countermeasures
4.2 Common faults and solutions

Chapter 5 Maintenance
5.1 Inspection
5.2 Periodic maintenance
5.3 Replacement of wearing parts

Appendix A List of function parameters
Appendix B Communication protocol

Chapter 1 Introduction

1.1 Technology Features

Item		ACT2000
Standard Function	Control mode	Sensorless flux vector control (SFVC) Voltage/Frequency (V/F) control
	Maximum frequency	Vector control: **0–320 Hz** V/F control: **0–3200Hz**
	Carrier frequency	1–16 kHz The carrier frequency is automatically adjusted based on the load features.
	Input frequency	Digital setting: 0.01 Hz
	resolution	Analog setting: maximum frequency x 0.025%
	Startup torque	G type: 0.5 Hz/150% (SFVC); P type: 0.5 Hz/100%
	Speed range	1:100 (SFVC)
	Speed stability accuracy	± 0.5% (SFVC)
	Overload capacity	G type: 60s for 150% of the rated current, 3s for 180% of the rated current. Q type: 60s for 120% of the rated current, 3s for 150% of the rated current.
	Torque boost	Auto-boost Customized boost 0.1%–30.0%
	V/F curve	Liner V/F curve Multi-point V/F curve N-power V/F curve (1.2-power, 1.4-power, 1.6-power,1.8-power, square)
	V/F separation	Two types: complete separation; half separation
	Ramp mode	Straight-line ramp S-curve ramp Four groups of acceleration/deceleration time with the range of 0.0–6500.0s
	DC braking	DC braking frequency: 0.00 Hz to maximum frequency Braking time: 0.0–36.0s Braking action current value: 0.0%–100.0%
	JOG control	JOG frequency range: 0.00–50.00 Hz JOG acceleration/deceleration time: 0.0– 6500.0s

Item		ACT2000
Standard Function	Onboard multiple preset speeds	It implements up to 16 speeds via the simple PLC function or by input(X) terminal states
	Onboard PID	It realizes process-controlled closed loop control system easily.
	Auto voltage regulation (AVR)	It can keep constant output voltage automatically when the mains voltage changes.
	Overvoltage/Overcurrent stall control	The current and voltage are limited automatically during the running process so as to avoid frequent tripping due to over-voltage/over-current.
	Torque limit and control	It can limit the torque automatically and prevent frequent over-current tripping during the running process.
	Instantaneous stop doesn't stop	The load feedback energy compensates the voltage reduction so that the AC drive can continue to run for a short time.
	Rapid current limit	It helps to avoid frequent over-current faults of the AC drive.
	High performance	high-performance current vector control technology.
	Timing control	Time range: 0.0–6500.0 minutes
	Communication methods	RS485
	Running command channel	Given by the panel, control terminals, Serial communication port,can be switched by many ways
	Frequency source	10 kinds of frequency source,given by Digital analog voltage, analog current,Pulse, serial port.can be switched by many ways
	Auxiliary frequency source	10 kinds of Frequency source,can easily realize Micro adjustment,frequency Synthesizer
	Input terminals	6 digital input terminals, one of which supports up to 100 kHz high-speed pulse input. 1 analog input terminal, switchable between 0–10 V input and 4–20 mA input.
	Output terminal	1 digital output terminal 1 relay output terminal 1 analog output terminal :that supports 0–20 mA current output or 0–10 V

Item		ACT2000
operation on the operation panel	LED display	It displays the parameters.
	Key locking and	It can lock the keys partially or completely and define the
	function selection	function range of some keys so as to prevent mis-function.
	Protection mode	Motor short-circuit detection at power-on, output phase loss protection, over-current protection, over-voltage protection, under voltage protection, overheat protection and overload protection.
Environment	Installation location	Indoor, avoid direct sunlight, dust, corrosive gas, combustible gas, oil fog, steam, drip or salt.
	Altitude	Lower than 1000 m(Lower the grades when using higher than 1000m)
	Ambient temperature	-10°C~40°C(Lowerthegrades if the ambient temperature is between 40°C and 50°C)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9 m/s2 (0.6 g)
	Storage temperature	-20°C~60°C

Chapter 2 Installation and wiring

2.1 Environment and installation requirements

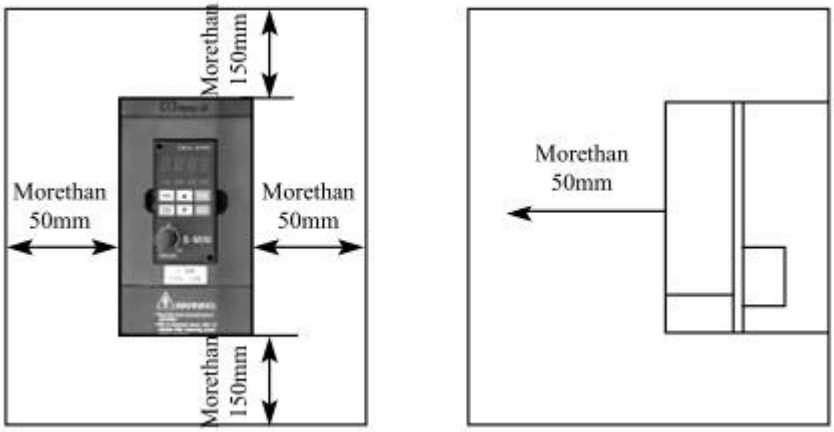
Inverter's installation environment on the service life of inverter, and has direct influence on the normal function, Inverter can't satisfy the specification of environment , protection or fault could lead to the Inverter

ACT2000 series inverter of wall hung inverter, please use the vertical installation so that the air convection and the heat dissipation effect can be better.

Inverter's installation environment, please make sure it must comply with

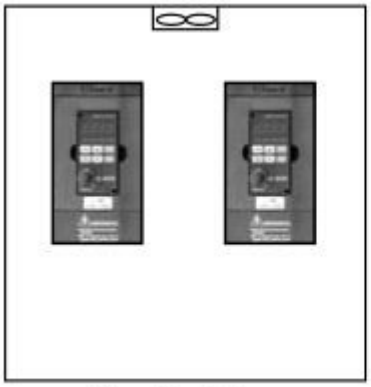
(01) - 10 ℃ to + 40 ℃ ambient temperature
(02) Environment humidity 0 ~ 95% and no condensation
(03) Avoid direct sunlight
(04) Environment does not contain corrosive gas and liquid
(05) Environment without dust, floating fiber, cotton and metal particles
(06) Away from the radioactive material and fuel
(07) Away from electromagnetic interference source (such as electric welding machine, big power machine)
(08) Installed planar solid, no vibration, if it cannot avoid vibration, please add antivibration pads to reduce the vibration
(09) Please install the inverter in the well ventilated place, easy to check and maintain , and install on the solid non-combustible material, away from the heating element (such as braking resistance, etc.)
(10) Inverter can output the rated power when installed in the altitude of lower than 1000m. It will be derated when the altitude is higher than 1000m.
(11) Inverter's installation ,please reserve enough space, especially many inverters' installation, please pay attention to the placement of the Inverter, and configure cooling fans, make the environment temperature lower than 45 ℃.

(1) single inverter installation

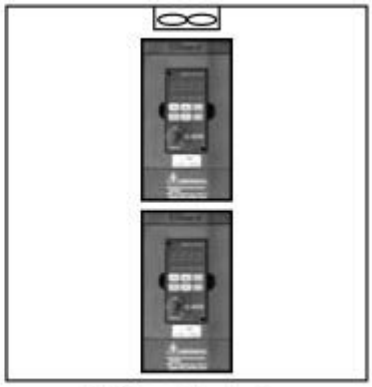


(2) Multiple inverters installed in one control cabinet. Please pay attention:

①when encasing the multiple inverters,install them in paralled as a cooling measure.

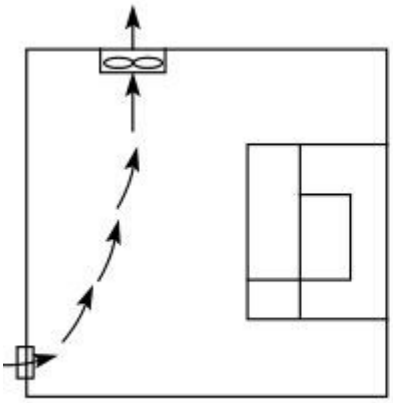


Favorable placing

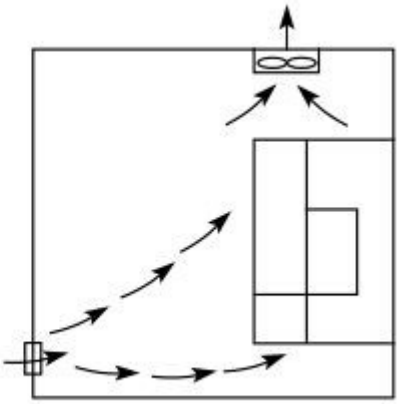


Unfavorable placing

②If multiple inverters are installed in one control cabinet, please leave enough clearances and take cooling measure

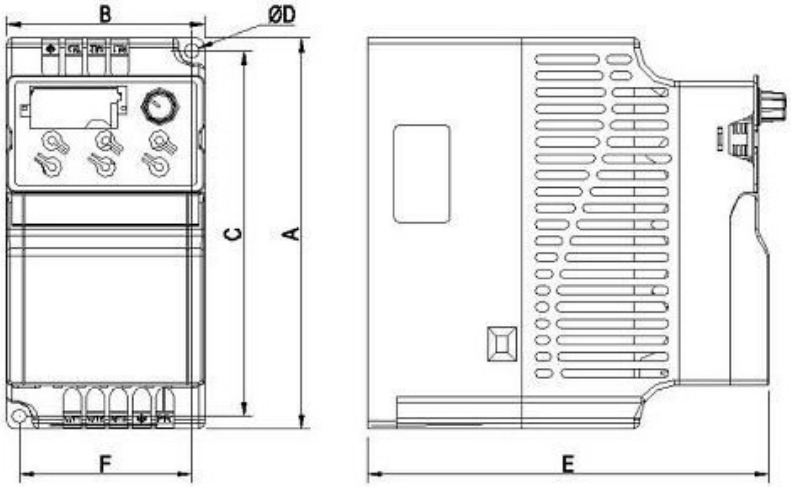


Correct installation position of the fan



Incorrect installation position of the fan

the inverter's outside shape and the installation dimensions



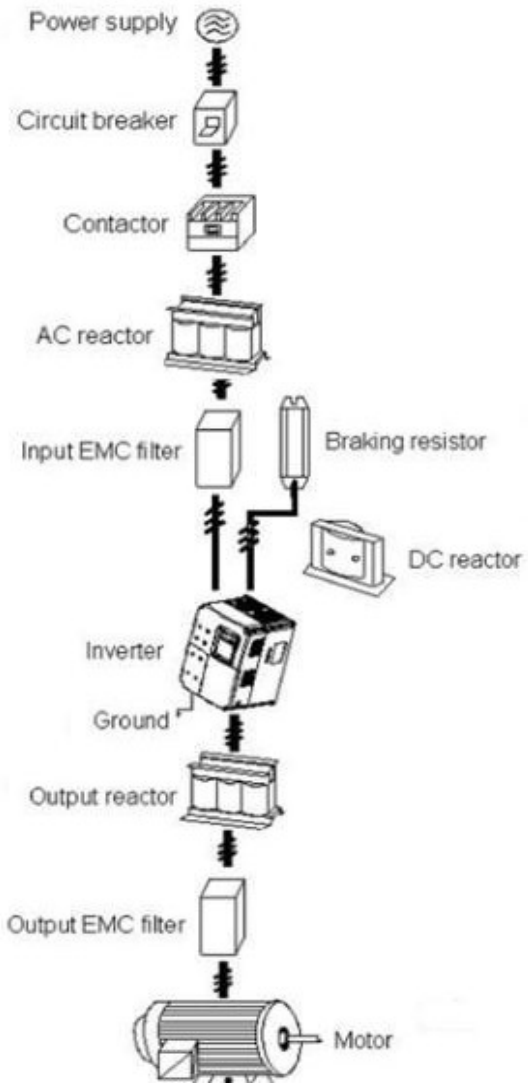
2.2 The opening size of the keyboard

68.5㎜×39㎜

2.3 The Inverter Wiring

the inverter wiring of the main part and the control part

2.3.1 the inverter wiring of the main part



2.3.2 the descriptions of peripheral devices

(1) AC power supply
Use within the permissible power supply specifications of the inverter.
(2) Moulded case circuit breaker: (MCCB)
When the power supply voltage is low or the input terminal short circuit occurs,the breaker can provide protection,during inspection,maintenance or the inverter is not running,you can cut off the breaker to separate the inverter from the power supply
(3) Magnetic contractor(MC)
The contractor can turn on and turn off the power of the inverter to ensure safety.
(4) AC current reactor
a suppress high harmonic to protect the inverter to ensure safety.
(5) Brake resistor
When the motor is braking,the resistor can avoid DC bus high voltage of the inverter ,and improve the braking ability of the internal brake unit.

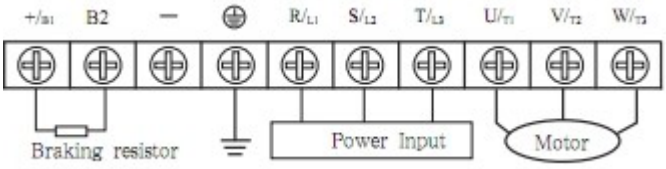
2.3.3 Precautions main circuit wiring

(1) Circuit wiring ,refer to requirements of electrical codes.
(2) Application of supply power to output terminals(U,V,W)of the invert will damage it,so never perform such wiring.
(3) Power supply's wiring ,please use isolated wire and wire pipe if possible,and make isolated wire and wire pipe link to the earth.
(4) The inverter and welding device, high-power motor,high-power load can't use a earth cable.
(5) The ground terminal E,ground impedance is lower than 100Ω
(6) Use the shortest earth cable possible.
(7) Many inverters are earthed,pay attention not to cause ground loops
(8) the power cables and the control cables must be separated in the main circuit.keep the power cables more than 10 cm away from the parallelled control cables,when the power cables and the control cables are crossed,make them vertical.Don't make the power cables and the control cables together ,or the interference will cause.
(9) Under normal circumstances,the distance between the inverters and the motors is less than 30m,the current produced by the parasitic capacitance may cause over-current protection,mis-action,inverter's fault and equipment operating faults .The maximum distance is 100m,when the distance is long ,please select the output side filter,and reduce the carrier frequency.
(10) Don't install an absorbing capacitor or other capacitance-resistance absorbing devices.
(11) Ensure the terminals are all locked tightly,the cables are connected well with the terminals,present the looseness due to an action of shaking,cause sparks and the short circuit
(12) To minimize the interference,it is recommended that the contactor and relay should be connected to the surge absorber.

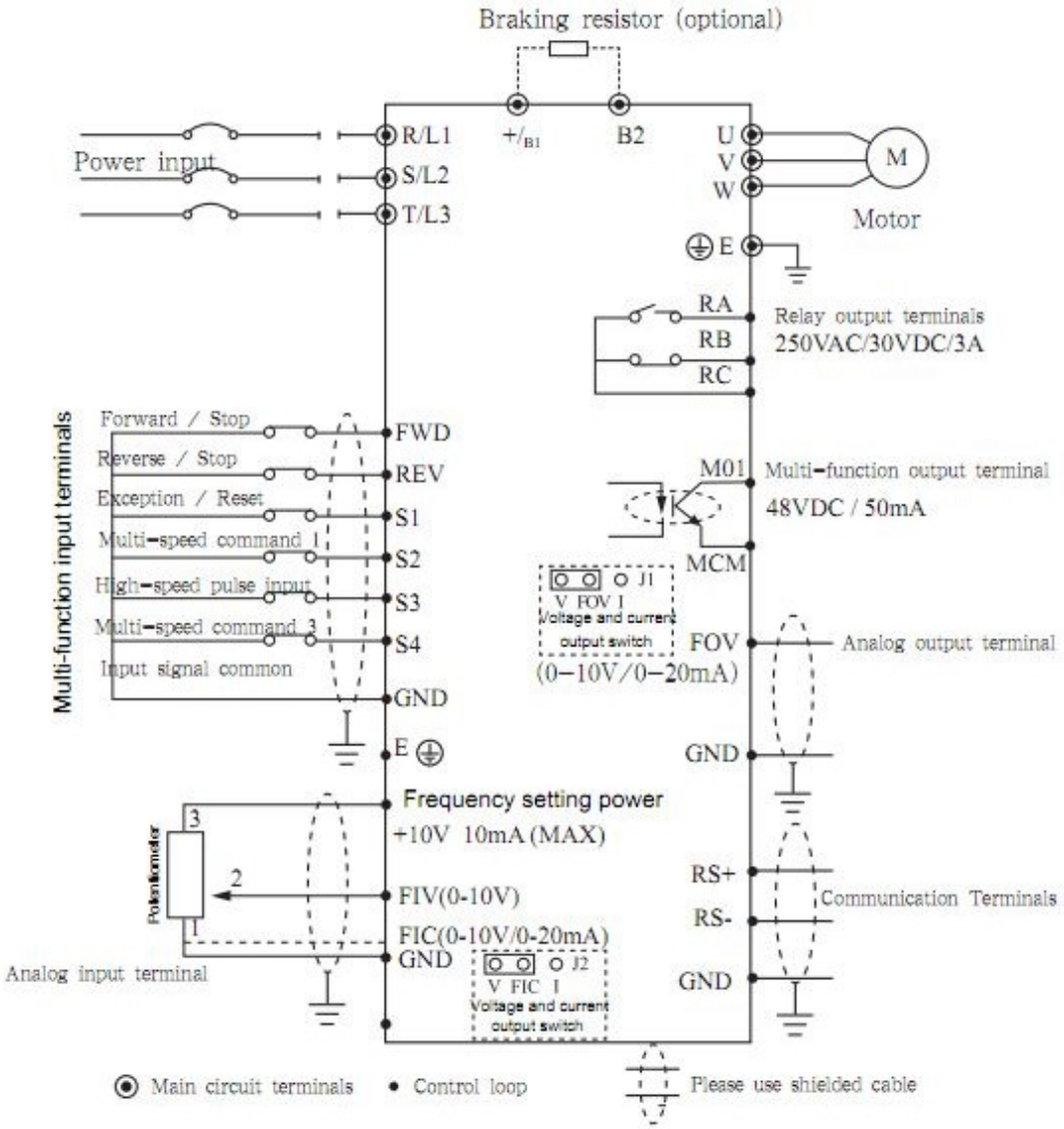
2.3.4 Description of main circuit terminals

Terminal Name	Description
R/L1、 S/L2、 T/L3	Connect to the commercial power supply.
U/T1、 U/T2、 U/T3	Inverter output terminal,connect a three-phase motor.
+/B1、 -	Positive and negative DC inverter, brake unit can be connected.
+/B1、 B2	Connect brake resistor.
+、 PR	
⏚	Earth (ground)

Wiring Example

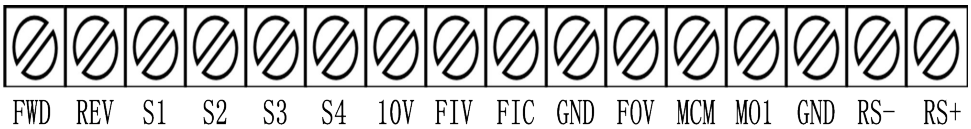


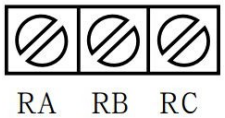
The basic wiring diagram



2.4 Control Terminals

Control terminal arrangement





2.4.1 Control Terminal Description

Terminal Name	Function Description	Remarks
FWD	Forward command input (multi-function input terminals)	Multi-function input terminals S1 ~ S4, FWD, REV terminals by reference number of specific settings, set the terminal and GND closed effective
REV	Reverse command input (multi-function input terminals)	
S1	Multi-function input terminals	
S2	Multi-function input terminals	
S3	High-speed pulse input terminal	
S4	Multi-function input terminals	
FOV	Analog output terminal	0～10V/0～20mA
10V	Frequency setting power	
FIV	Analog voltage input terminal	0～10V
FIC	Analog input terminal	0～20mA/0～10V
GND	Input signal common	
MCM	Optically coupled output common	
M01	Multifunctional optical coupling output contacts	
RS+	RS485 positive	RS485 communication
RS-	RS485 negative	
RA	Relay output contacts (normally open)	
RB	Relay output contacts (normally closed)	
RC	Relay output contacts RA, RB common	

Control panel switch Description:

Switch name	**Switch Description**
J2	Voltage (0 ~ 10V) / current (0 ~ 20mA) input switch V, FIC short for voltage input; I, FIC short for current input
J1	Voltage (0 ~ 10V) / current (0 ~ 20mA) output switch V and FOV shorted to voltage output; I and FOV shorting current output

Control loop distribution NOTES:

(1) Please let the control signal lines and the main lines, and other power lines, power lines separate traces.
(2) In order to prevent interference caused by malfunction, use stranded or double-stranded shielded wire line, specifications for 0.5 ~ 2mm2
(3) Make sure that each using terminal to allow conditions, such as: power supply, the maximum current.
(4) correct ground terminal E, grounding resistance is less than 100Ω.
(5) each terminal's wiring requirements, the correct selection of accessories such as potentiometers, voltmeter, input power supplies.
(6) After completing the wiring correctly and check to make sure it is correct and then the power can be on.

Chapter 3 Operation

3.1 Digital Operator Description

Digital Operator can also be called Panel

3.1.1 the picture of the panel

3.1.2 the descriptions of the key's function

Key	Name	Description
PRG	Programming key	Entry or escape of first-level menu
ENTER	Data enter key	Progressively enter menu and confirm parameters.
▲	UP Increment Key	Progressively increase data or function codes.

Key	Name	Description
▼	DOWN Decrement Key	Progressive decrease data or function codes.
◀	Right shift Key	In parameter setting mode, press this button to select the bit to be modified. In other modes, cyclically displays parameters by right shift
RUN	Run key	Start to run the inverter in keypad control mode.
STOP RESET	Stop key/Fault reset key	In running status, restricted by F7.04, can be used to stop the inverter. W hen fault alarm, can be used to reset the inverter without any restriction.

3.1.3 Indicator light descriptions

Indicator Light Name	Indicator Light Description
Hz	Frequency unit
A	Current unit
V	Voltage unit
FWD/REV	Light off: forward operation. Light on: reverse operation.

3.2 Operational process

3.2.1 Parameter Settings

three-level menu :

1.The function code group (first menu);

2.Function code symbols (second menu);

3.Function code set value (third menu).

Explanation: the three-level menu operation, can press PRG or ENTER to return to the secondary menu.The difference between the two menu is: press ENTER to set parameters in control panel, and then return to the secondary menu, and automatically move to the next function code;Press PRG directly to return to the secondary menu, don't store parameters, and keep staying in the current function code. Example: change the function code P1.03 from 00.00 Hz the sample set to 50.00 Hz

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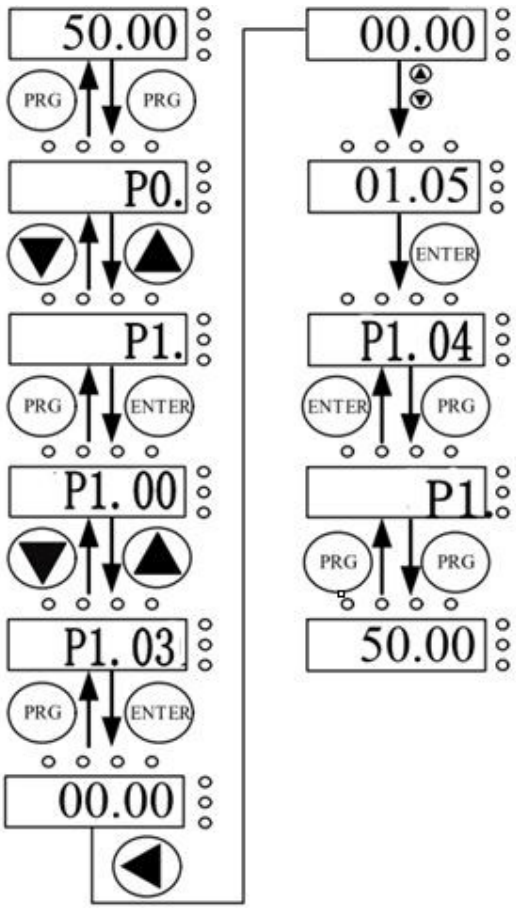

In three-level state, if the parameter is not flashing, means the function code cannot be modified, possible reasons are:

1) The function code parameters can not be modified .Such as the actual testing parameters, operation records, etc.
2) The function code in the running state cannot be modified, need to stop to modify;

3.2.2 Fault reset

After the failure of the inverter, the inverter will prompt the related fault information.Users can press STOP key on the keyboard or terminal function to conduct the fault reset (P5), after fault reset,the inverter is in the standby state.If the inverter is in fault state, the user does not carry on the fault reset, the inverter is in the running to protect state, inverter can't run.

3.2.3 Motor parameter auto-tuning

1: The dynamic parameter auto-tuning

Choosing no PG vector control operation mode, input motor nameplate parameters must be accurate, inverter will base on nameplate parameters matching standard motor; In order to get better control performance, motor parameter auto-tuning is suggested and auto-tuning steps are as follows:

First will run command channel choice (P2.00) choice for keyboard commands.Then the actual parameters according to the motor, please input the following parameters.

P2.00:the motor type;
P2.01: the motor rated power;
P2.02: the motor rated voltage;
P2.03: the motor rated current;
P2.04: the motor rated frequency;
P2.05: the motor rated speed.

Note: in the process of auto-tuning ,motor and load should be released, otherwise, the motor parameters obtained from the auto-tuning may not be correct.

2: the static parameters of the auto-tuning

Motor static parameters auto-tuning, don't need to release motor with the load, motor parameter auto-tuning,must correct the input parameters of motor nameplates (P2.01 - P2.05), since auto-tuning will detect the motor stator resistance and rotor resistance and leakage inductance of the motor.And mutual inductance of the motor and no-load current will not be able to measure, the user can input the corresponding values according to the motor nameplates.

3.1 Running state

3.1.1 Power-on initialization

In the process of the Inverter’s power-on, the system first initializes, LED display for "2000", and 4 lights are all bright. After the initialization is complete, the drive is in the standby mode.

3.1.2 Standby status

In the stopping or running status, can display a variety of state parameters. select whether to display this parameter by Function Code P7.03 (operating parameters), P7.05 (stop parameter) binary bits , Various definitions can refer to P7.03 and P7.05 function code.

3.1.3 Motor parameters self-learning

Please refer to the detailed descriptions of P2.37 function code.

3.1.4 Running

In the running state, a total of 29 status parameters can choose whether to display the status parameters : operating frequency, set frequency, bus voltage, output voltage, output current, whether to display the function code is decided by P7.03 and P7.04 bit (converted into binary) choice, press the key to switch the display order of the selected parameters, press the JOG key to switch in order to the selected display parameters.

3.1.5 Failure

Variety of fault information, please refer inverter faults and their countermeasures.

Chapter 4 Fault checking and ruled out

4.1 Fault alarm and countermeasures

ACT2000 inverter with a total of 24 warning information and the protection function, once the failure, protection function, inverter to stop output, inverter fault relay contact action, and in the inverter fault code shown on the display panel. the user can check by himself according to the tips before seeking service, analyze the cause of the problem, find out the solution. If it belongs the dotted line frame stated reason, please seek service ,with your purchased inverter agents or direct contact with our company.

warning information OUOC is overcurrent or overvoltage signals for hardware, in most cases the hardware overvoltage fault cause OUOC alarm.

Fault Name	Display of Panel	Possible Causes	Solutions
Inverter unit protection	OC	1: The output circuit is grounded or short circuited. 2: The connecting cable of the motor is too long. 3: The module overheats. 4: The internal connections become loose. 5:The main control board is faulty. 6: The drive board is faulty. 7: The inverter module is faulty	1:Eliminate external faults. 2: Install a reactor or an output filter. 3:Check the air filter and the cooling fan. 4:Connect all cables Properly. 5:Looking for technical support. 6:Looking for technical support. 7:Looking for technical support
Over-current during acceleration	oc1	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not Performed. 3: The acceleration time is too Short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during Acceleration. 8: The AC drive model is of too small power class.	1:Eliminate external faults. 2:Perform the motor auto-tuning. 3:Increase the acceleration time. 4:Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6:Select rotational speed tracking restart or start the motor after it stops. 7:Remove the added load. 8:Select an AC drive of higher power class.
Over-current during acceleration	oc2	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too Short. 4: The voltage is too low. 5: A sudden load is added during Deceleration. 6: The braking unit and braking resistor are not installed.	1: Eliminate external faults. 2: Perform the motor auto- tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor.

Fault Name	Display of Panel	Possible Causes	Solutions
Over-current at constant speed	OC3	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto- tuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an AC drive of higher power class.
Over-voltage during acceleration	OU1	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too Short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.
Over-voltage during deceleration	OU2	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too Short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 3: Install the braking unit and braking resistor.
Over-voltage at constant speed	OU3	1: The input voltage is too high. 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.
Control power supply fault	POF	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range.
Lack of voltage	LU	1: Instantaneous power failure occurs on the input power supply. 2: The AC drive's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are abnormal. 5: The drive board is abnormal. 6: The main control board is abnormal.	1: Reset the fault. 2: Adjust the voltage to normal range. 3,4,5,6:Looking for technical support
AC drive overload	OL2	1: The load is too heavy or motor-stalled occurs on the motor. 2: The power of VFD is too small to have enough torque.	1: Reduce the load and check the motor and mechanical condition. 2:Select an AC drive of higher power class.
Motor overload	OL1	1: P9.01 is set improperly. 2: The load is too heavy or motor-stalled occurs on the motor. 3: The AC drive model is of too small power class.	1:Set P9.01 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3:Select an AC drive of higher power class.
Power output phase loss	LO	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase output is unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty.	1:Eliminate external faults. 2:Check whether the motor three-phase winding is normal. 3:Looking for technical support.

Fault Name	Display of Panel	Possible Causes	Solutions
Module overheat	OH	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4:The thermally sensitive resistor of the module is damaged. 5:The inverter module is damaged.	1:Lower the ambient temperature. 2:Clean the air filter. 3:Replace the damaged fan. 4:Replace the damaged thermally sensitive resistor. 5:Replace the inverter module.
External equipment fault	EF	1: External fault signal is input via X. 2: External fault signal is input via virtual I/O.	Reset the operation.
Communication fault	CE	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: P028 is set improperly. 4:The communication parameters in group PD are set improperly.	1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set P028 correctly. 4: Set the communication parameters properly.
Contactor fault	RAY	1: The drive board and power supply are faulty. 2: The contactor is faulty.	1: Replace the faulty drive board or power supply board. 2: Replace the faulty Contactor.
Current detection fault	IE	1: The HALL device is faulty. 2: The drive board is faulty.	1: Replace the faulty HALL device. 2: Replace the faulty drive board.
Motor auto-tuning fault	TE	1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out.	1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the AC drive and the motor.
EEPROM read- write fault	EEP	The EEPROM chip is damaged.	Replace the main control board.
AC drive hardware fault	OU OC	1: Over-voltage exists. 2: Over-current exists.	1: Handle based on Over-voltage. 2: Handle based on Over-current.
Short circuit to ground fault	GND	The motor is short circuited to the ground.	Replace the cable or motor.
Accumulative running time reached	END1	The accumulative running time reaches the setting value.	Clear the record through the parameter initialization function.
Accumulative power-on time reached	END2	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
Load becoming 0	LOAD	The AC drive running current is lower than P9.64.	Check that the load is disconnected or the setting of P9.64 and P9.65 is correct.
PID feedback lost during running fault	PIDE	The PID feedback is lower than the setting of PA.26.	Check the PID feedback signal or set PA.26 to a proper value.
Pulse-by-pulse current limit fault	CBC	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.

Fault Name	Display of Panel	Possible Causes	Solutions
Too large speed deviation fault	ESP	1: The encoder parameters are set incorrectly. 2:The motor auto-tuning is not performed. 3:Parameters of too large speed deviation P9.69 and P9.70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto- tuning. 3: Set P9.69 and P9.70 correctly based on the actual situation.
Motor over-speed fault	OSP	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed. 3:Motor over-speed detection parameters P9.69 and P9.70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto- tuning. 3:Set motor over- speed detection parameters correctly based on the actual situation.

4.1 Common Faults and Solutions

You may come across the following faults during the use of the AC drive.Refer to the following table for simple fault analysis.

Table 4-1 Troubleshooting to common faults of the AC drive

SN	Fault	Possible Causes	Solutions
1	There is no display when the power is on	1: There is no power supply to the AC drive or the power input to the AC drive is too low. 2: The power supply of the switch on the drive board of the AC drive is Faulty. 3:The rectifier bridge is damaged. 4: The control board or the operation panel is faulty. 5:The cable connecting the control board and the drive board and the operation panel breaks	1: Check the power supply. 2: Check the bus voltage. 3: Looking for technical support
2	“2000” is displayed when the power is on	1: The cable between the drive board and the control board is in poor contact. 2: Related components on the control board are damaged. 3: The motor or the motor cable is short circuited to the ground. 4: The HALL device is faulty. 5: The power input to the AC drive is too low.	Looking for technical support
3	“GND” is displayed when the power is on	1: The motor or the motor output cable is short-circuited to the ground. 2: The AC drive is damaged.	1: Measure the insulation of the motor and the output cable with a megger. 2: Looking for technical support
4	The AC drive display is normal when the power is on. But “2000” is displayed after running and stops immediately.	1:The cooling fan is damaged or locked-rotor occurs. 2: The external control terminal cable is short circuited.	1: Replace the damaged fan. 2: Eliminate external faults.

SN	Fault	Possible Causes	Solutions
5	OH (module overheat) fault is reported frequently.	1: The setting of carrier frequency is too high. 2: The cooling fan is damaged,or the air filter is blocked. 3: Components inside the AC drive are damaged (thermal coupler or others).	1: Reduce the carrier frequency (P0.17). 2: Replace the fan and clean the air filter. 3: Looking for technical support
6	The motor does not rotate after the AC drive runs.	1: Check the motor and the motor cables. 2: The AC drive parameters are set improperly (motor parameters). 3: The cable between the drive board and the control board is in poor contact. 4: The drive board is faulty.	1: Ensure the cable between the AC drive and the motor is normal. 2: Replace the motor or clear mechanical faults. 3: Check and reset motor parameters.
7	The S terminals are disabled.	1: The parameters are set incorrectly. 2: The external signal is incorrect. 3: The jumper bar across OP and +24 V becomes loose. 4: The control board is faulty.	1: Check and reset the parameters in group P5. 2: Re-connect the external signal cables. 3: Re-confirm the jumper bar across OP and +24 V. 4:Looking for technical support
8	Reserved		
9	The AC drive reports Over-current and over-voltage frequently.	1: The motor parameters are set improperly. 2: The acceleration/ deceleration time is improper. 3: The load fluctuates.	1:Reset motor parameters or re-perform the motor auto-tuning. 2: Set proper acceleration/ deceleration time. 3: Looking for technical support.
10	RAY is reported when the power is or the AC drive is running.	The soft startup contactor is not picked up.	1: Check whether the contactor cable is loose. 2: Check whether the contactor is faulty. 3: Check whether 24 V power supply of the contactor is faulty. 4: Looking for technical support.

Chapter 5 Maintenance

⚠ WARNING

- Maintenance must be performed according to designated maintenance methods.
- Maintenance, inspection and replacement of parts must be performed only by certified person.
- After turning off the main circuit power supply, wait for 10 minutes before maintenance or inspection.
- DO NOT directly touch components or devices of PCB board. Otherwise inverter can be damaged by electrostatic.
- After maintenance, all screws must be tightened.

5.1 Inspection

In order to prevent the fault of inverter to make it operate smoothly in high-performance for a long time, user must inspect the inverter periodically (within half year). The following table indicates the inspection content.

Items to be checked	contents
Temperature/humi dity	ambient temperature shall be lower than 40℃ Humidity shall meet the requirement of 20～90% and has no Gel
Smoke and dust	No dust accumulation,no traces of water leakage and no condensate.
Inverter	Check the inverter to ensure it has no abnormal heat. abnormal vibration
Fan	Ensure the fan operation is normal,no debris stuck,etc.
Power input	power input voltage and frequency are at the permissible range
Motor	To check the motor whether the motor has abnormal vibration ; abnormal heat; abnormal noise and phase loss,etc

5.2 Periodic Maintenance

Customers should check the drive in a regular time to make it operate smoothly in high-performance for a long time.the checking contents are as follows:

5.3 Replacement of wearing parts

Fans and electrolytic capacitors are wearing part, please make periodic replacement to ensure long term, safety and failure-free operation. The replacement periods are as follows:

- Fan: Must be replaced when using up to 20,000 hours;
- Electrolytic Capacitor: Must be replaced when using up to 30,000~40, 000 hours.

5.4 Inverter Warranty

The company provides 12 months of warranty for ACT2000 Inverter since it go out from the factory

Items to be checked	checking contents	Solutions
the screws of control terminals	whether the screws of control terminals are loose	tighten them
PCB	Duct and dirt	Clean the dust on PCBs and air ducts with a vacuum cleaner
Fan	abnormal noise,abnormal vibration, whether it has used up 20,000 hours	Clear debris and replace the fan
Electrolytic capacitor	Whether the clour is changed and the smell is abnormal	Change the electrolytic capacitor
Heatsink	Duct and dirt	Clean the dust and air ducts with a vacuum cleaner
Power Components	Duct and dirt	Clean the dust and air ducts with a vacuum cleaner

Appendix A
List of Function Parameters

If PP-00 is set to a non-zero number, parameter protection is enabled. You must enter the correct user password to enter the menu. To cancel the password protection function, enter with password and set PP-00 to 0.

Parameters menu the user customizes are not protected by password.Group P is the basic function parameters , Group D is to monitor the function parameters.The symbols in the function code table are described as follows:

"☆": The parameter can be modified when the AC drive is in either stop or running state.
"★": The parameter cannot be modified when the AC drive is in the running state. "●": The parameter is the actually measured value and cannot be modified.
"*": The parameter is factory parameter and can be set only by the manufacturer.
Standard Function Parameters

Function Code	Parameter Name	Setting Range	Default	Property
Group P0: Standard Function Parameters				
P0.00	G/Q type display	1:G type (constant torque load) 2:Q type (variable torque load e.g. fan and pump)	Model dependent	★
P0.01	Control mode selection	0:(V/F) control 1:No PG (speed sensor) vector control	0	★
P0.02	Command source selection	0:Operation panel control (LED off) 1:Terminal control (LED on) 2:Communication control (LED linking)	0	☆
P0.03	Frequency source superposition selection	Unit's digit (Frequency source) 0:Main frequency source X 1:X and Y operation(operation relationship determined by ten's digit) 2:Switchover between X and Y 3:Switchover between X and "X and Y operation" 4:Switchover between Y and "X and Y operation" Ten's digit (X and Y operation) 0:X+Y 1:X-Y 2:Both the maximum 3:Both the minimum	0	☆

P0.04	Main frequency source X selection	0:Digital setting (P0.10 preset frequency, can modify the UP/DOWN, power lost don't memory) 1:Digital setting (P0.10 preset frequency, can modify the UP/DOWN, power lost memory) 2: FIV 3: FIC 4: Reserved 5:Pulse setting（S3） 6:Multistage instruction 7:Simple PLC 8:PID 9:Communications given	0	★
P0.05	Auxiliary frequency source Y selection	The same as P0.04 (Main frequency source X selection)	0	★
P0.06	Auxiliary frequency source superposition Y range selection	0:Relative to the maximum frequency 1:Relative to the main frequency source X	0	☆
P0.07	Auxiliary frequency source superposition Y range	0% ~ 150%	100%	☆
P0.08	Acceleration time 1	0.00s ~ 65000s	Model dependent	☆
P0.09	Deceleration time 1	0.00s ~ 65000s	Model dependent	☆
P0.10	Frequency preset	0.00Hz ~ maximum frequency （P0.12）	50.00Hz	☆
P0.11	Rotation direction	0:Same direction 1:Reverse direction	0	☆
P0.12	Maximum frequency	50.00Hz ~ 320.00Hz	50.00Hz	★
P0.13	Upper limit frequency source	0:P012 setting 1:FIV 2:FIC 3:Reserved 4:PULSE settings 5:communication settings	0	★
P0.14	Upper limit frequency	Frequency lower limit P0.16 ~ Maximum frequency P0.12	50.00Hz	☆
P0.15	Upper limit frequency offset	0.00Hz ~ Maximum frequency P0.12	0.00Hz	☆
P0.16	Frequency lower limit	0.00Hz ~ Upper limit frequency P0.14	0.00Hz	☆
P0.17	Carrier frequency	1kHz ~ 16.0kHz	Model dependent	☆
P0.18	Carrier frequency adjustment with temperature	0:No 1:Yes	1	☆

P0.19	Acceleration/ Deceleration time unit	0:1s 1:0.1s 2;0.01s	1	★
P0.21	Frequency offset of auxiliary frequency source for X and Y operation	0.00Hz ~ Maximum frequency P0.12	0.00Hz	☆
P0.22	Frequency Multi-Reference	1:0.1Hz 2:0.01Hz	2	★
P0.23	Retentive of digital setting frequency upon power	0:Not retentive 1:Retentive	0	☆
P0.24	Acceleration/ Deceleration time base frequency	0:Maximum frequency（P0.12） 1:Set frequency 2:100Hz	0	★
P0.25	Base frequency for UP/DOWN modification during running	0:Running frequency 1:Set frequency	0	★
P0.26	Binding command source to frequency source	Unit's digit:Binding operation panel command to frequency source 0:No binding 1:Frequency source by digital setting 2:FIV 3:FIC 4:Reserved 5:Pulse setting （S3） 6:Multi-Reference 7:Simple PLC 8:PID 9:Communication setting Ten's digit:Binding terminal command to frequency source Hundred's digit:Binding communication command to frequency source	000	☆
P0.27	Communication type	0:Modbus communication card	0	☆
P0.28	Reserved		0	★

Function Code	Parameter Name	Setting Range	Default	Property
Group P1:Start/Stop Control				
		0:direct start		
P1.00	Start mode	1:Rotational speed tracking restart 2:Pre-excited start (asynchronous motor)	0	☆
P1.01	Rotational speed tracking mode	0:From frequency at stop 1:From zero speed 2:From maximum frequency	0	★
P1.02	Rotational speed tracking speed	1 ~ 100	20	☆
P1.03	Startup frequency	0.00Hz ~ 10.00Hz	0.00Hz	☆
P1.04	Startup frequency holding time	0.0s ~ 100.0s	0.0s	★
P1.05	Startup DC braking current/Pre-excited current	0% ~ 100%	0%	★
P1.06	Startup DC braking time/Pre-excited time	0.0s ~ 100.0s	0.0s	★
P1.07	Acceleration/ Deceleration mode	0;Linear acceleration/deceleration 1:S-curve acceleration/deceleration A 2:S-curve acceleration/deceleration B	0	★
P1.08	Time proportion of S-curve start	0.0% ~ (100.0%-P1.09)	30.0%	★
P1.09	Time proportion of S-curve end	0.0% ~ (100.0%-P1.08)	30.0%	★
P1.10	Stop mode	0:Decelerate to stop 1:Coast to stop	0	☆
P1.11	Initial frequency of stop DC braking	0.00Hz ~ maximum frequency	0.00Hz	☆
P1.12	Waiting time of stop DC braking	0.0s ~ 100.0s	0.0s	☆
P1.13	Stop DC braking current	0% ~ 100%	0%	☆
P1.14	Stop DC braking time	0.0s ~ 100.0s	0.0s	☆
P1.15	Brake use ratio	0% ~ 100%	100%	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group P2: Motor Parameter				
P2.00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	0	★
P2.01	Rated motor power	0.1kW ~ 1000.0kW	Model dependent	★
P2.02	Rated motor voltage	1V ~ 2000V	Model dependent	★
P2.03	Rated motor current	0.01A ~ 655.35A (AC drive power<=55kW) 0.1A ~ 6500.0A (AC drive power>55kW)	Model dependent	★
P2.04	Rated motor frequency	0.01Hz ~ maximum frequency	Model dependent	★
P2.05	Rated motor rotational speed	1rpm ~ 65535rpm	Model dependent	★
P2.06	Stator resistance (asynchronous motor)	0.001Ω ~ 65.535Ω (AC drive power<=55kW) 0.0001Ω ~ 6.5535Ω (AC drive power>55kW)	Auto-tuning	★
P2.07	Rotor resistance (asynchronous motor)	0.001Ω ~ 65.535Ω (AC drive power<=55kW) 0.0001Ω ~ 6.5535Ω (AC drive power>55k)	Auto-tuning	★
P2.08	Leakage inductive reactance (asynchronous	0.01mH ~ 655.35mH (AC drive power<=55kW) 0.001mH ~ 65.535mH (AC drive power>55kW)	Auto-tuning	★
P2.09	Mutual inductive reactance (asynchronous motor)	0.1mH ~ 6500.0mH (AC drive power<=55kW) 0.01mH ~ 655.35mH (AC drive power>55kW)	Auto-tuning	★
P2.10	No-load current (synchronous motor)	0.01A ~ P2.03 (AC drive power<=55kW) 0.1A ~ P2.03 (AC drive	Auto-tuning	★
P2.11-P2.36 Reserved				
P2.37	auto-tuning selection	0:No operation 1:Asynchronous motor static auto-tuning 2:Asynchronous motor dynamic parameters auto-tuning	0	★

Function Code	Parameter Name	Setting Range	Default	Property
Group P3: Vector Control Parameters				
P3.00	Speed loop proportional gain 1	1 ~ 100	30	☆
P3.01	Speed loop integral time 1	0.01s ~ 10.00s	0.50s	☆
P3.02	Switchover frequency 1	0.00 ~ P3.05	5.00Hz	☆
P3.03	Speed loop proportional gain 2	1 ~ 100	20	☆
P3.04	Speed loop integral time 2	0.01s ~ 10.00s	1.00s	☆
P3.05	Switchover frequency 2	P3.02 ~ maximum output frequency	10.00Hz	☆
P3.06	Vector control slip	50% ~ 200%	100%	☆
P3.07	Time constant of speed loop filter	0.000s ~ 0.100s	0.000s	☆
P3.08	Vector control over-excitation gain	0 ~ 200	64	☆
P3.09	Torque upper limit source in speed control mode	0:Function code P3.10 setting 1:FIV 2:FIC 3:Reserved 4:Pulse setting 5:Communication setting 6:MIN (FIV,FIC) 7:MAX (FIV,FIC) 1-7's Full Scale to P3.10	0	☆
P3.10	digital setting of torque upper limit in speed control mode	0.0% ~ 200.0%	150.0%	☆
P3.13	Excitation adjustment proportional gain	0 ~ 60000	2000	☆
P3.14	Excitation adjustment integral gain	0 ~ 60000	1300	☆
P3.15	Torque adjustment proportional gain	0 ~ 60000	2000	☆
P3.16	Torque adjustment integral gain	0 ~ 60000	1300	☆
P3.17	Speed loop integral property	Unit's digit: integral separation 0:Disabled 1:Enabled	0	☆
P3.18	Reserved			
P3.19	Reserved			
P3.20	Reserved			
P3.21	Reserved			
P3.22	Reserved			

Function Code	Parameter Name	Setting Range	Default	Property
Group P4: V/F Control Parameters				
P4.00	V/F curve setting	0:Linear V/F 1:Multi-point V/F 2;Square V/F 3;1.2-power V/F 4:1.4-power V/F 6;1.6-power V/F 8:1.8-power V/F 9:Reserved 10:V/F complete separation 11:V/F half separation	0	★
P4.01	Torque boost	0.0%:(Automatic torque boost) 0.1% ~ 30.0%	Model dependent	☆
P4.02	Cut-off frequency of torque boost	0.00Hz ~ maximum output frequency	50.00Hz	★
P4.03	Multi-point V/F frequency 1 (F1)	0.00Hz ~ P4.05	0.00Hz	★
P4.04	Multi-point V/F voltage 1 (V1)	0.0% ~ 100.0%	0.0%	★
P4.05	Multi-point V/F frequency 2 (F2)	P4.03 ~ P4.07	0.00Hz	★
P4.06	Multi-point V/F voltage 2 (V2)	0.0% ~ 100.0%	0.0%	★
P4.07	Multi-point V/F frequency 3 (F3)	P4.05 ~ rated motor frequency (P1.04)	0.00Hz	★
P4.08	Multi-point V/F voltage 3 (V3)	0.0% ~ 100.0%	0.0%	★
P4.09	V/F slip compensation gain	0.0% ~ 200.0%	0.0%	☆
P4.10	V/F over-excitation gain	0 ~ 200	64	☆
P4.11	V/F oscillation suppression gain	0 ~ 100	Model dependent	☆
P4.13	Voltage source for V/F separation	0:digital setting (P4.14) 1:FIV 2;FIC 3:Reserved 4:PULSE setting (S3) 5:Multi-Reference 6:Simple PLC	0	☆
P4.14	Voltage digital setting for V/F separation	0V ~ rated motor voltage	0V	☆
P4.15	Voltage rise time of V/F separation	0.0s ~ 1000.0s It indicates the time for the voltage rising from 0 V to rated motor voltage.	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group P5: Input Terminals				
P5.00	FWD function selection	0:No function 1:Forward RUN (FWD) 2:Reverse RUN (REV) 3:Three-line control 4:Forward JOG (JOG-F) 5:Reverse JOG (JOG-R) 6:Terminal UP 7:Terminal DOWN 8:Coast to stop 9:Fault reset (RESET) 10:RUN pause 11:Normally open (NO) input of external fault 12:Multi-Reference terminal 1 13:Multi-Reference terminal 2 14:Multi-Reference terminal 3 15:Multi-Reference terminal 4 16:Terminal 1 for acceleration/ deceleration time selection 17:Terminal 2 for acceleration/deceleration time selection 18:Frequency source Switchover 19:UP and DOWN setting clear (terminal, operation panel) 20:Command source switchover terminal 21:Acceleration/Deceleration prohibited 22:PID pause 23:PLC status reset 24:Swing pause 25:Counter input 26:Counter reset 27:Length count input 28:Length reset 29:Torque control prohibited 30:Pulse frequency input(enabled onlyfor S3) 31:Reserved 32:Immediate DC braking 33:Normally closed (NC) input of external fault 34:Frequency modification forbidden 35:Reverse PID action direction 36:External STOP terminal 1 37:Command source switchover terminal 2 38:PID integral pause 39:Switchover between main frequency source X and preset frequency 40:Switchover between auxiliary frequency source Y and preset frequency 41:Reserved 42:Reserved 43:PID parameter switchover 44:Reserved 45:Reserved 46 :Speed control/Torque control switchover	1	★
P5.01	REV function selection		2	★
P5.02	S1 function selection		9	★
P5.03	S2 function selection		12	★
P5.04	S3 function selection		13	★

P5.05	S4 function selection	47:Emergency stop 48:External STOP terminal 2 49:Deceleration DC braking 50:Clear the current running time 51-59:Reserved	0	★
P5.10	S filter time	0.000s ~ 1.000s	0.010s	☆
P5.11	Terminal command mode	0:Two-line mode 1 1:Two-line mode 2 2:Three-line mode 1 3:Three-line mode 2	0	★
P5.12	Terminal UP/DOWN rate	0.001Hz/s ~ 65.535Hz/s	1.00Hz/s	☆
P5.13	FI curve 1 minimum input	0.00V ~ P5.15	0.00V	☆
P5.14	Corresponding setting of FI curve 1 minimum input	-100.0% ~ +100.0%	0.0%	☆
P5.15	FI curve 1 maximum input	P5.13 ~ +10.00V	10.00V	☆
P5.16	Corresponding setting of FI curve 1 maximum input	-100.0% ~ +100.0%	100.0%	☆
P5.17	FI curve 1 filter time	0.00s ~ 10.00s	0.10s	☆
P5.18	FI curve 2 minimum input	0.00V ~ P5.20	0.00V	☆
P5.19	Corresponding setting of FI curve 2 minimum input	-100.0% ~ +100.0%	0.0%	☆
P5.20	FI curve 2 maximum input	P5.18 ~ +10.00V	10.00V	☆
P5.21	Corresponding setting of FI curve 2 maximum input	-100.0% ~ +100.0%	100.0%	☆
P5.22	FI curve 2 filter time	0.00s ~ 10.00s	0.10s	☆
P5.23	FI curve 3 minimum input	-10.00V ~ P5.25	-10.00V	☆
P5.24	Corresponding setting of FI curve 3 minimum input	-100.0% ~ +100.0%	-100.0%	☆
P5.25	FI curve 3 maximum input Corresponding	P5.23 ~ +10.00V	10.00V	☆
P5.26	setting of FI curve 3 maximum input	-100.0% ~ +100.0%	100.0%	☆
P5.27	FI curve 3 filter time	0.00s ~ 10.00s	0.10s	☆
P5.28	PULSE minimum input Corresponding	0.00kHz ~ P5.30	0.00kHz	☆

P5.29	setting of pulse minimum input	-100.0% ~ 100.0%	0.0%	☆
P5.30	PULSE maximum input	P5.28 ~ 100.00kHz	50.00kHz	☆
P5.31	Corresponding setting of pulse maximum input	-100.0% ~ 100.0%	100.0%	☆
P5.32	PULSE filter time	0.00s ~ 10.00s	0.10s	☆
P5.33	FI curve selection	Unit's digit:FIV curve selection 1:Curve 1 (2 points, see P5.13 ~ P5.16) 2:Curve 2 (2 points, see P5.18 ~ P5.21) 3:Curve 3 (2 points, see P5.23 ~ P5.26) 4:Curve 4 (4 points, see C6.00 ~ C6.07) 5:Curve 5 (4 points, see C6.08 ~ C6.15) Ten's digit:FIC curve selection(1 ~ 5,same as FIV)	321	☆
P5.34	Setting selection for FI less than minimum input	Unit's digit:Setting for FIV less than minimum input 0:Corresponds to the minimum input settings 1:0.0% Ten's digit:Setting selection for FIC less than minimum input (0 ~ 1,same as FIV)	000	☆
P5.35	FWD delay time	0.0s ~ 3600.0s	0.0s	★
P5.36	REV delay time	0.0s ~ 3600.0s	0.0s	★
P5.37	S1 delay time	0.0s ~ 3600.0s	0.0s	★
P5.38	S valid mode selection 1	0:High level valid 1:Low level valid Unit's digit:FWD Ten's digit:REV Hundred's digit:S1 Thousand's digit:S2 Ten thousand's digit:S3	00000	★
P5.39	S valid mode selection 2	0:High level valid 1:Low level valid Unit's digit:S4	00000	★

Function Code	Parameter Name	Setting Range	Default	Property
Group P6: Output Terminals				
P6.00	M01 terminal output mode	1：Switch signal output（M01）	1	☆
P6.01	M01 function selection	0:No output 1:AC drive running 2:Fault output (stop) 3:Frequency-level detection FDT1 output 4:Frequency reached 5:Zero-speed running(no output a stop) 6:Motor overload pre-warning 7:AC drive overload pre-warning 8:Setting count value Reached 9:Designated count value reached 10:Length reached 11:PLC cycle complete 12:Accumulative running time reached 13:Frequency limited 14:Torque limited 15:Ready for RUN 16:FIV>FIC 17:Frequency upper limit reached 18:Frequency lower limit reached(no output at stop) 19:Under voltage state output 20:Communication setting 21:Positioning completed(Reserved) 22:Positioning closed(Reserved) 23:Zero-speed running 2(having output at stop) 24:Accumulative power-on time reached 25:Frequency level detection FDT2 output 26:Frequency 1 reached output 27:Frequency 2 reached output 28:Current 1 reached output 29:Current 2 reached output 30:Timing reached output 31:FIV input limit exceeded 32:Load becoming 0 33:Reverse running 34:Zero current state 35:Module temperature reached 36:Output current limit exceeded 37:Frequency lower limit reached(having output at stop) 38:Alarm output(Keep running) 39:Reserved 40:Current running time reached	0	☆
P6.02	Relay output function selection (RA-RB-RC)		2	☆

P6.07	FOV output function selection	0:Running frequency 1:Setting frequency 2:Output current 3:Output torque 4:Output power 5:Output voltage 6:Pulse input(100.0% for 100.0kHz) 7:FIV 8:FIC 9:Reserved 10:Length 11:Count value 12:Communication setting 13:Motor rotational speed 14:Output current(100.0% for 1000.0A) 15:Output voltage(100.0% for 1000.0V) 16:Reserved	0	☆
P6.08	Reserved			
P6.09	Reserved			☆
P6.10	FOV bias coeffcient	-100.0% ~ +100.0%	0.0%	☆
P6.11	FOV gain	-10.00 ~ +10.00	1.00	☆
P6.12	Reserved			☆
P6.13	Reserved			☆
P6.17	M01 output delay time	0.0s ~ 3600.0s	0.0s	☆
P6.18	RA-RB-RC output delay time	0.0s ~ 3600.0s	0.0s	☆
P6.19	Reserved			☆
P6.20	Reserved			☆
P6.21	Reserved			☆
P6.22	Output terminal valid mode selection	0:Positive logic 1:Negative logic Unit's digit:M01 Ten's digit:RA-RB-RC	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group P7: Operation Panel and Display				
P7.00	Output power correction factor	0.0-200.0	100.0	☆
P7.01	Reserved			
P7.02	STOP/RESET key function	0:STOP/RESET key enabled only in operation panel control 1:STOP/RESET key enabled in any operation mode	1	☆
P7.03	LED display running parameters 1	0000–FFFF Bit00:Running frequency 1(Hz) Bit01:Setting frequency(Hz) Bit02:Bus voltage(V) Bit03:Output voltage(V) Bit04:Output current(A) Bit05:Output power(kW) Bit06:Output torque (%) Bit07:S input status Bit08:M01 output status Bit09:FIV voltage(V) Bit10:FIC voltage(V) Bit11:Reserved Bit12:Count value Bit13:Length value Bit14:Load speed display Bit15:PID setting	1F	☆
P7.04	LED display running parameters 2	0000–FFFFH Bit00:PID feedback Bit01:PLC stage Bit02:Pulse input frequency(kHz) Bit03:Running frequency 2 (Hz) Bit04:Remaining running time Bit05:FIV voltage before correction (V) Bit06:FIC voltage before correction (V) Bit07:Reserved Bit08:Linear speed Bit09:Current power-on time(Hour) Bit10:Current running time (Min) Bit11:Pulse input frequency(KHz) Bit12:Communication setting value Bit13:Reserved Bit14:Main frequency X display(Hz) Bit15:Auxiliary frequency Y display (Hz)	0	☆

P7.05	LED display stop parameters	0000–FFFF Bit00:Set frequency (Hz) Bit01:Bus voltage (V) Bit02:S input status Bit03:M01 output status Bit04:FIV voltage (V) Bit05:FIC voltage (V) Bit06:Reserved Bit07:Count value Bit08:Length value Bit09:PLC stage Bit10:Load speed Bit11:PID setting Bit12:Pulse setting frequency(kHz)	33	☆
P7.06	Load speed display coeffcient	0.0001 ~ 6.5000	10.000	☆
P7.07	Heatsink temperature of inverter	0.0℃ ~ 150.0℃	-	●
P7.08	Temporary software version	0.0℃ ~ 150.0℃	-	●
P7.09	Accumulative running time	0h ~ 65535h	-	●
P7.10	Reserved	-	-	●
P7.11	Software version	-	-	●
P7.12	Numbers of decimal places for load speed display	0:0 decimal place 1:1 decimal place 2:2 decimal places 3:3 decimal places	1	☆
P7.13	Accumulative power-on time	0h ~ 65535h	-	●
P7.14	Accumulative power consumption	0kW ~ 65535kW	-	●

Function Code	Parameter Name	Setting Range	Default	Property
Group P8: Auxiliary Functions				
P8.00	JOG running	0.00Hz ~ maximum frequency	2.00Hz	☆
P8.01	JOG acceleration	0.0s ~ 6500.0s	20.0s	☆
P8.02	JOG deceleration	0.0s ~ 6500.0s	20.0s	☆
P8.03	Acceleration time 2	0.0s ~ 6500.0s	Model dependent	☆
P8.04	Deceleration time 2	0.0s ~ 6500.0s	Model dependent	☆
P8.05	Acceleration time 3	0.0s ~ 6500.0s	Model dependent	☆
P8.06	Deceleration time 3	0.0s ~ 6500.0s	Model dependent	☆
P8.07	Acceleration time 4	0.0s ~ 6500.0s	Model dependent	☆
P8.08	Deceleration time 4	0.0s ~ 6500.0s	Model dependent	☆
P8.09	Jump frequency 1	0.00Hz ~ maximum frequency	0.00Hz	☆
P8.10	Jump frequency 2	0.00Hz ~ maximum frequency	0.00Hz	☆
P8.11	Frequency jump amplitude	0.00Hz ~ maximum frequency	0.01Hz	☆
P8.12	Forward/Reverse rotation dead-zone time	0.0s ~ 3000.0s	0.0s	☆
P8.13	Reverse control	0:Enabled 1:Disabled	0	☆
P8.14	Running mode when set frequency lower than frequency lower limit	0:Run at frequency lower limit 1:Stop 2:Run at zero speed	0	☆
P8.15	Droop control	0.00Hz ~ 10.00Hz	0.00Hz	☆
P8.16	Accumulative power-on time threshold	0h ~ 65000h	0h	☆
P8.17	Accumulative running time threshold	0h ~ 65000h	0h	☆
P8.18	Startup protection	0:No 1:Yes	0	☆
P8.19	Frequency detection value(FDT1)	0.00Hz ~ maximum frequency	50.00Hz	☆
P8.20	Frequency detection hysteresis(FDT1)	0.0% ~ 100.0% (FDT1 level)	5.0%	☆
P8.21	Detection range of frequency reached	0.0% ~ 100.0%(maximum frequency)	0.0%	☆
P8.22	Jump frequency during acceleration/deceleration	0:Disabled 1:Enabled	1	☆
P8.25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00Hz ~ maximum frequency	0.00Hz	☆

P8.26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00Hz ~ maximum frequency	0.00Hz	☆
P8.27	Terminal JOG preferred	0:Disabled 1:Enabled	0	☆
P8.28	Frequency detection value (FDT2)	0.00Hz ~ maximum frequency	50.00Hz	☆
P8.29	Frequency detection hysteresis (FDT2)	0.0% ~ 100.0% (FDT2 level)	5.0%	☆
P8.30	Any frequency reaching detection value 1	0.00Hz ~ maximum frequency	50.00Hz	☆
P8.31	Any frequency reaching detection amplitude 1	0.0% ~ 100.0% (maximum frequency)	0.0%	☆
P8.32	Any frequency reaching detection value 2	0.00Hz ~ maximum frequency	50.00Hz	☆
P8.33	Any frequency reaching detection amplitude 2	0.0% ~ 100.0% (maximum frequency)	0.0%	☆
P8.34	Zero current detection level	0.0% ~ 300.0% 100.0% for rated motor current	5.0%	☆
P8.35	Zero current detection delay time	0.01s ~ 600.00s	0.10s	☆
P8.36	Output over-current threshold	0.0% (no detection) 0.1% ~ 300.0% (rated motor current)	200.0%	☆
P8.37	Output over-current detection delay time	0.00s ~ 600.00s	0.00s	☆
P8.38	Any current reaching 1	0.0% ~ 300.0% (rated motor current)	100.0%	☆
P8.39	Any current reaching 1 amplitude	0.0% ~ 300.0% (rated motor current)	0.0%	☆
P8.40	Any current reaching 2	0.0% ~ 300.0% (rated motor current)	100.0%	☆
P8.41	Any current reaching 2 amplitude	0.0% ~ 300.0% (rated motor current)	0.0%	☆
P8.42	Timing function selection	0:Disabled 1:Enabled	0	☆
P8.43	Timing duration source	0:P8.44 1:FIV 2:FIC 100% of analog input corresponds to the value of P8.44	0	☆
P8.44	Timing duration	0.0Min ~ 6500.0Min	0.0Min	☆
P8.45	FIV input voltage lower limit	0.00V ~ P8.46	3.10V	☆
P8.46	FIV input voltage upper limit protection value	P8.45 ~ 10.00V	6.80V	☆
P8.47	Module temperature threshold	0℃ ~ 150℃	100℃	☆
P8.48	Cooling fan control	0:Fan working during running 1:Fan working continuously	0	☆

P8.49	Wakeup frequency	Dormant frequency (P8.51) ~ maximum frequency (P0.12)	0.00Hz	☆
P8.50	Wakeup delay time	0.0s ~ 6500.0s	0.0s	☆
P8.51	Dormant frequency	0.00Hz ~ wakeup frequency	0.00Hz	☆
P8.52	Dormant delay time	0.0s ~ 6500.0s	0.0s	☆
P8.53	Current running time reached setting	0.0Min ~ 6500.0Min	0.0Min	☆

Function Code	**Parameter Name**	**Setting Range**	**Default**	**Property**
Group P9: Fault and Protection				
P9.00	Motor overload protection selection	0:Disabled 1:Enabled	1	☆
P9.01	Motor overload protection gain	0.20 ~ 10.00	1.00	☆
P9.02	Motor overload warning coeffcient	50% ~ 100%	80%	☆
P9.03	Over-voltage stall gain	0 ~ 100	0	☆
P9.04	Over-voltage stall protective voltage	120% ~ 150%	130%	☆
P9.05	Over-current stall gain	0 ~ 100	20	☆
P9.06	Over-current stall protective current	100%~200%	150%	☆
P9.07	Short-circuit to ground upon	0:Disabled 1:Enabled	1	☆
P9.09	Fault auto reset	0~20	0	☆
P9.10	M01 action during fault auto reset	0:No act 1:Act	0	☆
P9.11	Time interval of fault auto reset	0.1s~100.0s	1.0s	☆
P9.12	Reserved			☆
P9.13	Output phase loss protection selection	0:Disabled 1:Enabled	1	☆
P9.14	1st fault type	0: No fault 1: Inverter unit protection 2: Over-current during acceleration 3: Over-current during deceleration 4: Over-current at constant speed 5: Over-voltage during acceleration 6: Over-voltage during deceleration 7: Over-voltage at constant speed 8: Control power fault 9: Undervoltage 10: AC drive overload 11: Motor overload 12:Reserved	-	●

P9.15	2nd fault type	13: Power output phase loss 14: Module overheat 15: External equipment fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Reserved 21: Parameters read-write fault 22: AC drive hardware fault 23: Short circuit to ground 24: Reserved 25: Reserved 26:Accumulative running time reached 27: Reserved 28: Reserved 29: Accumulative power-on time reached 30: Load becoming 0 31: PID feedback lost during running 40: Fast limit overtime 41-43: Reserved 51: Reserved	-	●
P9.16	3rd (latest) fault type		-	●
P9.17	Frequency upon 3rd(latest) fault	-	-	●
P9.18	Current upon 3rd (latest)fault	-	-	●
P9.19	Bus voltage upon 3rd(latest) fault	-	-	●
P9.20	Input terminal status upon 3rd(latest) fault	-	-	●
P9.21	Output terminal status upon 3rd (latest)fault		-	●
P9.22	AC drive status upon 3rd(latest) fault	-	-	●
P9.23	Power-on time upon 3rd (latest) fault	-	-	●
P9.24	Running time upon 3rd (latest) fault	-	-	●
P9.27	Frequency upon 2nd fault	-	-	●
P9.28	Current upon 2nd fault	-	-	●
P9.29	Bus voltage upon 2nd fault	-	-	●
P9.30	Input terminal status upon 2nd fault	-	-	●
P9.31	Output terminal status upon 2nd fault	-	-	●
P9.32	Frequency status upon 2nd fault	-	-	●
P9.33	Power-on time upon 2nd fault	-	-	●
P9.34	Running time upon 2nd fault	-	-	●
P9.37	Frequency upon 1st fault	-	-	●

P9.38	Current upon 1st fault	-	-	●
P9.39	Bus voltaget upon 1st fault	-	-	●
P9.40	Input terminal status upon 1st fault	-	-	●
P9.41	Output terminal status upon 1st fault	-	-	●
P9.42	Frequency status upon 1st fault	-	-	●
P9.43	Power-on time upon 1st fault	-	-	●
P9.44	Running time upon 1st fault	-	-	●
P9.47	Fault protection action selection 1	Unit's digit:Motor overload(OL1) 0:Coast to stop 1:Stop according to the stop mode 2:Continue to run Ten's digit:Reserved Hundred's digit:Power output phase loss（LO） Thousand's digit:External equipment fault（EF） Ten thousand's digit： Communication fault（CE）	0	☆
P9.48	Fault protection action selection 2	Unit's digit:Reserved 0:Coast to stop Ten's digit:Function code read-write fault(EEP) 0:Coast to stop 1:Stop according to the stop mode Hundred's digit:Reserved Thousand's digit:Reserved Ten thousand's digit:Accumulative running time reach(END1)	0	☆

P9.49	Fault protection action selection 3	Unit's digit:Reserved 0:Coast to stop 1:Stop according to the stop mode 2:Continue to run Ten's digit:Reserved 0:Coast to stop 1:Stop according to the stop mode 2:Continue to run Hundred's digit:Accumulative power-on time reache(END2) 0:Coast to stop 1:Stop according to the stop mode 2:Continue to run Thousand's digit:Load becoming(LOAD) 0:Coast to stop 1:Stop according to the stop mode 2:Continue to run at 7% of rated motor frequency and resume to the set frequency if the load recovers Ten thousand's digit:PID feedback loss of running 0:Coast to stop 1:Stop according to the stop mode 2:Continue to run	00000	☆
P9.50	Reserved			☆
P9.54	Frequency selection for continuing to run	0:Current running frequency 1:Set frequency 2:Frequency upper limit 3:Frequency lower limit 4:Backup frequency upon abnormality	0	☆
P9.55	Backup frequency upon abnormality	60.0% ~ 100.0% (100.0% corresponds to the maximum frequency P0.12)	100.0%	☆
P9.56	reserved			☆
P9.57	reserved			☆
P9.58	reserved			☆
P9.59	Action selection at instantaneous power failure	0:Invalid 1:Decelerate 2:Decelerate to stop	0	☆
P9.60	Action pause judging voltage at instantaneous power	0.0% ~ 100.0%	100.0%	☆
P9.61	time at instantaneous power failure	0.00s ~ 100.00s	0.50s	☆
P9.62	Action judging voltage at instantaneous power	60.0% ~ 100.0% (standard bus voltage)	80.0%	☆
P9.63	Protection upon load becoming 0	0:Disabled 1:Enabled	0	☆
P9.64	Detection level of load becoming 0	0.0 ~ 100.0%	10.0%	☆
P9.65	Detection time of load becoming 0	0.0 ~ 60.0s	1.0s	☆

P9.67	Reserved			☆
P9.68	Reserved			☆
P9.69	Reserved			☆
P9.70	Reserved			☆

Function Code	Parameter Name	Setting Range	Default	Property
Group PA: Process Control PID Function				
PA.00	PID setting source	0:PA.01 1:FIV 2:FIC 3:Reserved 4:PULSE setting（S3） 5:Communication setting 6:Multi-Reference	0	☆
PA.01	PID digital setting	0.0% ~ 100.0%	50.0%	☆
PA.02	PID feedback source	0:FIV 1:FIC 2:Reserved 3:FIV-FIC 4:PULSE setting（S3） 5:Communication setting	0	☆
PA.03	PID action direction	0:Forward action 1:Reverse action	0	☆
PA.04	PID setting feedback range	0~65535	1000	☆
PA.05	Proportional gain Kp1	0.0~100.0	20.0	☆
PA.06	Integral time Ti1	0.01s~10.00s	2.00s	☆
PA.07	Differential time Td1	0.000s~10.000s	0.000s	☆
PA.08	Cut-off frequency of PID reverse	0.00~maximum frequency	2.00Hz	☆
PA.09	PID deviation limit	0.0%~100.0%	0.0%	☆
PA.10	PID differential	0.00%~100.00%	0.10%	☆
PA.11	PID setting change time	0.00~650.00s	0.00s	☆
PA.12	PID feedback filter time	0.00~60.00s	0.00s	☆
PA.13	PID output filter time	0.00~60.00s	0.00s	☆
PA.14	Reserved	-	-	☆
PA.15	Proportional gain Kp2	0.0~100.0	20.0	☆
PA.16	Integral time Ti2	0.01s~10.00s	2.00s	☆
PA.17	Differential time Td2	0.000s~10.000s	0.000s	☆
PA.18	PID parameter switchover condition	0:No switchover 1:Switchover via S 2:Automatic switchover based on deviation	0	☆
PA.19	PID parameter switchover deviation 1	0.0%~PA.20	20.0%	☆
PA.20	PID parameter switchover deviation 2	PA.19~100.0%	80.0%	☆
PA.21	PID initial value	0.0%~100.0%	0.0%	☆
PA.22	PID initial value holding time	0.00~650.00s	0.00s	☆
PA.23	Twice the maximum output deviation forward	0.00%~100.00%	1.00%	☆

PA.24	Twice the maximum output of the reverse bias	0.00%~100.00%	1.00%	☆
PA.25	PID integral property	Unit's digit:Integral separated 0:Invalid 1:Valid Ten's digit:Whether to stop integral operation when the output reaches 0:Continue integral operation 1:Stop integral operation	00	☆
PA.26	Detection value of PID feedback loss	0.0%：Not judging feedback loss 0.1%～100.0%	0.0%	☆
PA.27	Detection time of PID feedback loss	0.0s～20.0s	0.0s	☆
PA.28	PID stop operation	0:No PID operation at stop 1:PID operation at stop	0	☆

Function Code	**Parameter Name**	**Setting Range**	**Default**	**Property**
Group Pb: Swing Frequency, Fixed Length and Count				
Pb.00	Swing frequency setting mode	0：Relative to the central frequency 1：Relative to the maximum frequency	0	☆
Pb.01	Swing frequency amplitude	0.0%～100.0%	0.0%	☆
Pb.02	Jump frequency amplitude	0.0%～50.0%	0.0%	☆
Pb.03	Swing frequency cycle	0.1s～3000.0s	10.0s	☆
Pb.04	Triangular wave rising time coefficient	0.1%～100.0%	50.0%	☆
Pb.05	Set length	0m～65535m	1000m	☆
Pb.06	Actual length	0m～65535m	0m	☆
Pb.07	Number of pulses per meter	0.1～6553.5	100.0	☆
Pb.08	Set count value	1～65535	1000	☆
Pb.09	Designated count value	1～65535	1000	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group PC: Multi-Multi-Reference and Simple PLC Function				
PC.00	Multi-Reference 0	-100.0% ~ 100.0%	0.0%	☆
PC.01	Multi-Reference 1	-100.0% ~ 100.0%	0.0%	☆
PC.02	Multi-Reference 2	-100.0% ~ 100.0%	0.0%	☆
PC.03	Multi-Reference 3	-100.0% ~ 100.0%	0.0%	☆
PC.04	Multi-Reference 4	-100.0% ~ 100.0%	0.0%	☆
PC.05	Multi-Reference 5	-100.0% ~ 100.0%	0.0%	☆
PC.06	Multi-Reference 6	-100.0% ~ 100.0%	0.0%	☆
PC.07	Multi-Reference 7	-100.0% ~ 100.0%	0.0%	☆
PC.08	Multi-Reference 8	-100.0% ~ 100.0%	0.0%	☆
PC.09	Multi-Reference 9	-100.0% ~ 100.0%	0.0%	☆
PC.10	Multi-Reference10	-100.0% ~ 100.0%	0.0%	☆
PC.11	Multi-Reference11	-100.0% ~ 100.0%	0.0%	☆
PC.12	Multi-Reference12	-100.0% ~ 100.0%	0.0%	☆
PC.13	Multi-Reference13	-100.0% ~ 100.0%	0.0%	☆
PC.14	Multi-Reference14	-100.0% ~ 100.0%	0.0%	☆
PC.15	Multi-Reference15	-100.0% ~ 100.0%	0.0%	☆
PC.16	Simple PLC running mode	0:Stop after the AC drive runs one cycle 1:Keep final values after the AC drive runs one cycle 2:Repeat after the AC drive runs one cycle	0	☆
PC.17	Simple PLC retentive selection	Unit's digit:Retentive upon power failure selection 0:No 1:Yes Ten's digit:Retentive upon stop selection 0:No 1:Yes	00	☆
PC.18	Running time of simple PLC reference 0	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.19	Acceleration/deceleration time of simple PLC reference 0	0 ~ 3	0	☆
PC.20	Running time of simple PLC reference 1	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.21	Acceleration/deceleration time of simple PLC reference 1	0 ~ 3	0	☆
PC.22	Running time of simple PLC reference 2	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.23	Acceleration/deceleration time of simple PLC reference 2	0 ~ 3	0	☆

PC.24	Running time of simple PLC reference 3	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.25	Acceleration/deceleration time of simple PLC reference 3	0 ~ 3	0	☆
PC.26	Running time of simple PLC reference 4	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.27	Acceleration/deceleration time of simple PLC reference 4	0 ~ 3	0	☆
PC.28	Running time of simple PLC reference 5	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.29	Acceleration/deceleration time of simple PLC reference 5	0 ~ 3	0	☆
PC.30	Running time of simple PLC reference 6	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.31	Acceleration/deceleration time of simple PLC reference 6	0 ~ 3	0	☆
PC.32	Running time of simple PLC reference 7	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.33	Acceleration/deceleration time of simple PLC reference 7	0 ~ 3	0	☆
PC.34	Running time of simple PLC reference 8	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.35	Acceleration/deceleration time of simple PLC reference 8	0 ~ 3	0	☆
PC.36	Running time of simple PLC reference 9	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.37	Acceleration/deceleration time of simple PLC reference 9	0 ~ 3	0	☆
PC.38	Running time of simple PLC reference 10	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.39	Acceleration/deceleration time of simple PLC reference 10	0 ~ 3	0	☆
PC.40	Running time of simple PLC reference 11	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.41	Acceleration/deceleration time of simple PLC reference 11	0 ~ 3	0	☆
PC.42	Running time of simple PLC reference 12	0.0s (h) ~6500.0s (h)	0.0s (h)	☆
PC.43	Acceleration/deceleration time of simple PLC reference 12	0 ~ 3	0	☆
PC.44	Running time of simple PLC reference 13	0.0s (h) ~6500.0s (h)	0.0s (h)	☆

PC.45	Acceleration/deceleration time of simple PLC reference 13	0 ~ 3	0	☆
PC.46	Running time of simple PLC reference 14	0.0s (h) ~ 6500.0s (h)	0.0s (h)	☆
PC.47	Acceleration/deceleration time of simple PLC reference 14	0 ~ 3	0	☆
PC.48	Running time of simple PLC reference 15	0.0s (h) ~ 6500.0s (h)	0.0s (h)	☆
PC.49	Acceleration/deceleration time of simple PLC reference 15	0 ~ 3	0	☆
PC.50	Time unit of simple PLC running	0:s (second) 1:h (hour)	0	☆
PC.51	Reference 0 source	0:Set by PC.00 1:FIV 2:FIC 3:Reserved 4:PULSE setting 5:PID 6:Set by preset frequency (P0.10), modified via terminal UP/DOWN	0	☆

Function Code	**Parameter Name**	**Setting Range**	**Default**	**Property**
Group PD: Communication Parameters				
PD.00	Baud rate	Unit's digit:MODBUS 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS Ten's digit :Reserved Hundred's digit:Reserved Thousand's digit:Reserved	0005	☆
PD.01	Data format	0:No check, <8,N,2> 1:Even parity check, <8,E,1> 2:Odd Parity check, <8,O,1> 3:8-N-1	0	☆
PD.02	Local address	1 ~ 247, 0: Broadcast address	1	☆
PD.03	Response delay	0ms ~ 20ms	2	☆
PD.04	Communication timeout	0.0(invalid), 0.1s ~ 60.0s	0.0	☆
PD.05	Data transfer format selection	Unit's digit: Modbus 0:Non-standard Modbus protocol 1:Standard Modbus protocol Ten's digit:reserved	1	☆

PD.06	Communication reading current resolution	0:0.01A 1:0.1A	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group PE: Reserved				
Group PP: User-Defined Function Codes				
PP.00	User password	0 ~ 65535	0	☆
PP.01	Parameter Initialization	0:No operation 01:Restore factory settings except motor parameters 02:Clear records 04:Restore user backup parameters 501:Back up current user parameters	0	★
Group C0: Torque Control and Restricting Parameters				
C0.00	Speed/Torque control selection	0:Speed control 1:Torque control	0	★
C0.01	Torque setting source selection in torque control	0:Digital setting（C0.03） 1:FIV 2:FIC 3:Reserved 4:PULSE setting 5:Communication setting 6:MIN（FIV,FIC） 7:MAX（FIV,FIC） (Full Scale 1-7 options, corresponding C0.03 digital set)	0	★
C0.03	Torque digital setting in	-200.0% ~ 200.0%	150.0%	☆
C0.05	Forward maximum frequency in torque control	0.00Hz ~ maximum frequency	50.00Hz	☆
C0.06	Reverse maximum frequency in torque control	0.00Hz ~ maximum frequency	50.00Hz	☆
C0.07	Acceleration time in torque control	0.00s ~ 65000s	0.00s	☆
C0.08	Deceleration time in torque control	0.00s ~ 65000s	0.00s	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group C1-C4: Reserved				
Group C5: Control Optimization Parameters				
C5.00	PWM switchover frequency upper limit	0.00Hz ~ 15.00Hz	12.00Hz	☆
C5.01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
C5.02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1 2: Compensation mode 2	1	☆
C5.03	Random PWM depth	0: Random PWM invalid 1–10:PWM carrier frequency random depth	0	☆
C5.04	Rapid current limit enable	0: Disabled 1: Enabled	1	☆
C5.05	Current detection compensation	0 ~ 100	5	☆
C5.06	Undervoltage threshold setting	60.0% ~ 140.0%	100.0%	☆
C5.07	No PG optimization mode selection	0:No optimization 1;Optimization mode 1 2:Optimization mode 2	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group C6: FI Curve Setting(FI is FIV or FIC)				
C6.00	FI curve 4 minimum input	0.00V ~ C6.02	0.00V	☆
C6.01	Corresponding setting of FI curve 4 minimum input	-100.0% ~ +100.0%	0.0%	☆
C6.02	FI curve 4 inflexion 1 input	C6.00 ~ C6.04	3.00V	☆
C6.03	Corresponding setting of FI curve 4 inflexion 1 input	-100.0% ~ +100.0%	30.0%	☆
C6.04	FI curve 4 inflexion 2 input	C6.02 ~ C6.06	6.00V	☆
C6.05	Corresponding setting of FI curve 4 inflexion 2 input	-100.0% ~ +100.0%	60.0%	☆
C6.06	FI curve 4 maximum input	C6.06 ~ +10.00V	10.00V	☆
C6.07	Corresponding setting of FI curve 4 maximum input	-100.0% ~ +100.0%	100.0%	☆
C6.08	FI curve 5 minimum input	0.00V ~ C6.10	0.00V	☆

C6.09	Corresponding setting of FI curve 5 minimum input	-100.0%~+100.0%	-100.0%	☆
C6.10	FI curve 5 inflexion 1 input	C6.08 ~ C6.12	3.00V	☆
C6.11	Corresponding setting of FI curve 5 inflexion 1 input	-100.0% ~ +100.0%	-30.0%	☆
C6.12	FI curve 5 inflexion 2 input	C6.10 ~ C6.14	6.00V	☆
C6.13	Corresponding setting of FI curve 5 inflexion 2 input	-100.0% ~ +100.0%	30.0%	☆
C6.14	FI curve 5 maximum input	C6.12 ~ +10.00V	10.00V	☆
C6.15	Corresponding setting of FI curve 5 maximum input	-100.0% ~ +100.0%	100.0%	☆
C6.16	Jump point of FIV input	-100.0% ~ 100.0%	0.0%	☆
C6.17	Jump amplitude of FIV input	0.0% ~ 100.0%	0.5%	☆
C6.18	Jump point of FIC input	-100.0% ~ 100.0%	0.0%	☆
C6.19	Jump amplitude of FIC input	0.0% ~ 100.0%	0.5%	☆

Function Code	**Parameter Name**	**Setting Range**	**Default**	**Property**
Group CC: FI/FO Correction				
CC.00	FIV measured voltage 1	0.500V ~ 4.000V	Factory-correcte	☆
CC.01	FIV displayed voltage 1	0.500V ~ 4.000V	Factory-correcte	☆
CC.02	FIV measured voltage 2	6.000V ~ 9.999V	Factory-correcte	☆
CC.03	FIV displayed voltage 2	6.000V ~ 9.999V	Factory-correcte	☆
CC.04	FIC measured voltage 1	0.500V ~ 4.000V	Factory-correcte	☆
CC.05	FIC displayed voltage 1	0.500V ~ 4.000V	Factory-correcte	☆
CC.06	FIC measured voltage 2	6.000V ~ 9.999V	Factory-correcte	☆
CC.07	FIC displayed voltage 2	6.000V ~ 9.999V	Factory-correcte	☆
CC.08	Reserved			☆
CC.09	Reserved			☆
CC.10	Reserved			☆
CC.11	Reserved			☆
CC.12	FOV target voltage 1	0.500V ~ 4.000V	Factory-correcte	☆

CC.13	FOV measured voltage 1	0.500V ~ 4.000V	Factory-correcte	☆
CC.14	FOV target voltage 2	6.000V ~ 9.999V	Factory-correcte	☆
CC.15	FOV measured voltage 2	6.000V ~ 9.999V	Factory-correcte	☆
CC.16	Reserved			☆
CC.17	Reserved			☆
CC.18	Reserved			☆
CC.19	Reserved			☆

Group D0: Monitoring Parameters

Function Code	Parameter Name	Unit
D0.00	Running frequency (Hz)	0.01Hz
D0.01	Set frequency (Hz)	0.01Hz
D0.02	Bus voltage (V)	0.1V
D0.03	Bus voltage (V)	1V
D0.04	Output current (A)	0.01A
D0.05	Output power (kW)	0.1kW
D0.06	Output torque (%)	0.1%
D0.07	S input state	1
D0.08	M01 output state	1
D0.09	FIV voltage (V)	0.01V
D0.10	FIC voltage (V)	0.01V
D0.11	Reserved	
D0.12	Count value	1
D0.13	Lengthvalue	1
D0.14	Load speed show	1
D0.15	PID setting	1
D0.16	PID feedback	1
D0.17	PLCstage	1
D0.18	Input pulse frequency(kHz)	0.01kHz

D0.19	Reserved	
D0.20	Remaining running time	0.1Min
D0.21	FIV voltage before correction	0.001V
D0.22	FIC voltage before correction	0.001V
D0.23	Reserved	
D0.24	Linear speed	1m/Min
D0.25	On the current time	1Min
D0.26	The current running time	0.1Min
D0.27	Pulse input frequency	1Hz
D0.28	Communication setting value	0.01%
D0.29	Reserved	
D0.30	Reserved	
D0.31	Auxiliary frequency Y show	0.01Hz
D0.32	View any memory address values	1
D0.33	Reserved	
D0.34	Motor temperature value	1℃
D0.35	Target torque(%)	0.1%
D0.36	Reserved	
D0.37	Power factor angle	0.1°
D0.38	Reserved	
D0.39	Target voltage upon V/F separation	1V
D0.40	Output voltage upon V/F separation	1V
D0.41	Reserved	
D0.42	Reserved	
D0.43	Reserved	
D0.44	Reserved	
D0.45	Fault information	0

Appendix B
Communication Protocol

ACT2000 series inverter provides RS232 / RS485 communication interface, and support the Modbus communication protocol. Users can be achieved by computing machine or PLC central control, through the communication protocol set frequency converter running commands, modify or read function code parameters, read the inverter working condition and fault information, etc.

1. The agreement content

The serial communication protocol defines the serial communication transmission of information content and format.Including: host polling or wide planting format;Host encoding method, the content includes: the function of the required action code, data transmission and error checking, etc.From the ring of machine should be used is the same structure, content including: action confirmation, return the data and error checking, etc.If there was an error in receiving information from a machine, or cannot achieve the requirements of the host, it will organize a fault feedback information in response to the host.

2. Application methods

Application mode converter with RS232 / RS485 bus access to the "from" single main PC/PLC control network.

3. Bus structure

(1) The interface way RS232 / RS485 interface hardware

(2) Asynchronous serial transmission mode, half-duplex transmission mode.At the same time the host and the only one to send data from the machine and the other can only receive data.Data in the process of serial asynchronous communication, the form of a message, a frame of a frame to send

(3) Topological structure from single host machine system.From the machine address set in the range of 1 ~ 247, 0 for broadcast communication address.In the network from the machine address must be unique.

4. Protocol Description

ACT2000 series inverter is a kind of asynchronous serial port communication protocol of master- slave Modbus communication protocol, the network has only one equipment (host) to establish agreement (called "query/command").Other equipment (machine) can only by providing data response of the main machine "query/command", or "query/command" according to the host to make the corresponding action.Host in this refers to the personal computer (PC), industrial control equipment or programmable logic controller (PLC), etc., from machine refers to ACT2000 inverter.

The host can communicate to a separate from the machine, also can to all under a broadcast information from machine release.For access to the host alone "query/command", from the machine to return to a information (called response), for radio host information, from the machine without feedback response to the host.

5. Communications data structure

Communication data structure ACT2000 series frequency converter of the Modbus protocol communication data format is as follows: using the RTU mode, messages are sent at least begin with 3.5 characters pause time interval.
In network wave rate under varied characters of the time, this is the most easy to implement (below T1, T2, T3, T4).Transmission equipment is the first domain address.

The transmission character of you can use is the hex 0...9, A...F.Continuously detect network bus network facilities, including pause interval of time.When the first domain (domain) to receive, every equipment decoding to determine whether to own.After the last transmission character, a pause at least 3.5 characters time calibration for the end of the message.A new message can be started after the pause.

The entire message frame must be as a continuous flow of transmission.If the time frame to complete more than 1.5 characters before pause time, receiving equipment will refresh incomplete message and assume that the next byte is a new message the address of the domain.Likewise, if a new message in less than 3.5 characters of time and then a message before, receiving equipment will think it is a continuation of the previous message.This will result in an error, because in the final CRC field value can't be right.

RTU frame format:

The frame header START	3.5 characters
Slave address ADR	Communication address：1~247
command code CMD	03:Read the machine parameters； 06:write the machine parameters
Date content DATA（N-1）	Information content：Function code parameter address, function code number of parameters, function code parameter values, etc
Data content DATA（N-2）	
……	
Data contentDATA0	
high-order position of CRC CHK	estimated value： CRC value
low-order position of CRC CHK	
END	3.5 characters'time

CMD(Command instruction) and DATA (the description of data word)
command code：03H，read N word（Word） （Can read the most words of 12）For example,From the machine address of 01 inverter startup F105 continuous read for two consecutive values The host command information

ADR	01H
CMD	03H
high-order position of the starting address	F1H
low-order position of the starting address	05H
high-order position of register	00H
low-order position of register	02H
low-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

In response to information from the slave machine

Set PD.05 to 0：

ADR	01H
CMD	03H
high-order position of bytes	00H
low-order position of bytes	04H
Data high-order position of F002H	00H
Data low-order position of F002H	00H
Data high-order position of F003H	00H
Data low-order position of F003H	01H
low-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

Set PD.05 to 1:

ADR	01H
CMD	03H
The number of bytes	04H
Data high-order position of F002H	00H
Data low-order position of F002H	00H
Data high-order position of F003H	00H
Data low-order position of F003H	01H
low-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

The command code：06H write a word（Word）For example,write 3000（BB8H）to slave machine. Address 05H frequency converter's F00AH address.

The host command information

ADR	05H
CMD	06H
high-order position of data address	F0H
low-order position of data address	0AH
high-order position of information content	0BH

low-order position of information content	B8H
low-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

In response to information from the slave machine

ADR	02H
CMD	06H
high-order position of data	F0H
low-order position of data	0AH
high-order position of information content	13H
low-order position of information content	88H
low-order position of CRC CHK	Wait to calculate the CRC CHK values
high-order position of CRC CHK	

Check way—CRC Check way:CRC（Cyclical Redundancy Check）use RTU frame format,The message includes error detection field based on the method of CRC .CRC domain test the whole content of a message 。CRC domain is two bytes, contains a 16-bit binary values.it is calculated by the transmission equipment, added to the message.receive messages the device recalculate.And compared with receives the CRC in the domain of value, if the two CRC value is not equal, then there is an error in transmission.

CRC is saved in 0xFFFF,Then call a process to continuous 8-bit bytes of the message and the values in the current register for processing.Only 8 bit data in each character of CRC is effective，Starting bit and stopping bit and parity bits are invalid.

In the process of CRC,Each of the eight characters are separate and dissimilar or register contents(XOR). The results move to the least significant bit direction, set the most significant bit to 0. LSB is extracted to test, if set LSB to 1. Register and preset value dissimilarity or alone, if set LSB to 0, is not to.The whole process will repeat 8 times.When the last time (the eighth time) is completed, next 8-bit bytes and separate and register under the current value of the alien or. The values in the final register is all bytes in the message is executed after the CRC value.

When CRC added to the messages. The low byte to join first and then high byte.CRC Simple function is as follows:

```
unsigned int crc_cal_value(unsigned char *data_value,unsigned char data_length)
{
int i;
unsigned int crc_value=0xffff; while(data_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);
    }
```

Address definition of communication parameters

This part is the content of the communication, used to control the operation of the inverter, inverter status and related parameters setting.Read and write functional code parameter (some function code which can not be changed, only for the use of manufacturers or monitoring) : function code parameter addresslabel rules: By function block number and the label for the parameter address representation rules .

High byte: F0~FF(P group), A0~AF(C group),70~7F(D group)low byte:00~FF

Such as:

P3.12,The address is expressed as F30C; attention: PF group: Neither read the parameters, and do not change parameters; D group: only can read, do not change the parameters.

When some parameters in converter is in operation, can't not be changed; Some parameters of the frequency converter in any state, cannot be changed;Change function code parameters, but also pay attention to the range of parameters, units, and related instructions.

In addition, because the EEPROM is stored frequently, the service life of the block can reduce the the life of the block EPROM, so some function codes under the mode of communication, do not need to be stored, just change the value of RAM.If it is P group of parameters, in order to realize the function, as long as putting this function code address high F into 0 can be achieved.If it is C group of parameters, in order to realize the function, as long as putting the function code the address of high A into 4 can be achieved.Corresponding function codes are shown as the following address: the high byte: 00 ~ 0F (P group), 40 ~ 4F(group B) low byte: 00 to FF

Such as:

Function code P3.12 is not stored in the EEPROM,The address is expressed as 030C; Function code C0-05 is not stored in the EEPROM,The address is expressed as 4005 ;The address representation can only do writing RAM, can't do reading action,when reading,it is invalid address. For all the parameters, can also use the command code 7H to implement this function.

Stopping/starting parameters:

Parameter address	**Parameter description**
1000	Communication Setting value (-10000~10000) (decimal system)
1001	Operating frequency
1002	Bus voltage
1003	output voltage
1004	output current
1005	output power
1006	output torque
1007	running velocity
1008	S Input Flag
1009	M01 output Flag
100A	FIV voltage
100B	FIC voltage
100C	Reserved
100D	count value input
100E	The length value of the input
100F	The load speed
1010	PID setting
1011	PID feedback
1012	PLC steps
1013	PULSE input pulse frequency,unit 0.01kHz
1014	Reserved

1015	The remaining running time
1016	FIV before correction voltage
1017	FIC before correction voltage
1018	Reserved
1019	Linear velocity
101A	the current access to electricity time
101B	the current running time
101C	PULSE input pulse frequency,unit 1Hz
101D	Communication Setting value
101E	Reserved
101F	The main frequency X show
1020	Auxiliary frequency Y show

Attention:

Communication setting value is relative percentage, 10000 corresponds to 100.00% and - 10000-100.00%.The frequency of dimensional data, the percentage is relative to the percentage of maximum frequency (P0.12);Counter rotating torque dimensional data, the percentage is P2.10.

Control command input to the converter:(write-only)

The command word	Command function
2000	0001：Running forward
	0002：Reverse running
	0003：Forward point move
	0004：Reversal point move
	0005：Free downtime
	0006： Slowdown stop
	0007：Fault reset

Read the inverter state: (read-only)

Status word address	Status word function
3000	0001：Running forward
	0002：Reverse running
	0003：closing down

Parameters lock password check: (if return for 8888H,it indicates that the password check through)

Password address	The content of the input password
1F00	*****

Command address	Command content
2001	BIT0: (reserve) BIT1: (reserve) BIT2: RA-RB-RC output control BIT3: Reserve BIT4: MO1 output control

Analog output FOV control: (write-only)

Command address	Command content
2002	0～7FFF represent 0%～100%

Analog output control: (Reserved)

Command address	Command content
2003	0～7FFFrepresent 0%～100%

PULSE (PULSE) output control: (write -only)

Command address	Command content
2004	0～7FFFrepresent 0%～100%

Frequency converter fault description:

Frequency converter fault	Frequency converter fault information
8000	0000: No fault 0001: Inverter unit fault 0002: Accelerate over-current 0003: Slow down over-current 0004: Constant speed over-current 0005: Accelerate over the voltage 0006: Slow down over voltage 0007: Constant speed over voltage 0008: Control power fault 0009: Under-voltage fault 000A: The inverter overload 000B: Motor overload 000C: Reservation 000D: The output phase 000E: Module is overheating 000F: External fault 0010: Abnormal communication 0011: Abnormal contactor 0012: Current detection fault 0013: Motor tuning fault 0014: Reservation 0015: Abnormal parameters, reading and writing 0016: Inverter hardware fault 0017: Motor for short circuit to ground fault 0018: Reservation 0019: Reservation

8000	001A：Running time reached 001B: Reservation 001C: Reservation 001D: Accumulative power-on time reached 001E：Load becoming 0 001F：PID feedback lost during running 0028：Fast fault current limiting overtime fault

Communication failures address	Failures functional description
8001	0000：No fault 0001：Password error 0002：The command code error 0003：CRC Checking error 0004：Invalid address 0005：Invalid parameter 0006：correcting parameter is invalid 0007：System is locked 0008：Block is EEPROM operation

FD group Communication parameters description

PD.00	Baud rate	The factory value	6005
	setting range	units' digit:MODUBS Baud rate 0：300BPS 1：600BPS 2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS 8：57600BPS 9：115200BPS	

This parameter is used to set data transfer rate between the PC and inverter. Notice that setting the baud rate of upper machine and converter must be consistent, otherwise, the communication can't carry on.The faster the baud rate, the greater the communication.

PD.01	The data format	The factory value	0
	setting range	0:No check:The data format<8,N,2> 1:Even-parity:The data format<8,E,1> 2:Odd parity check:The data format<8,O,1> 3:No check:The data format<8-N-1>	

PC and data format set by the frequency converter must be consistent, otherwise, the communication can't carry on.

PD.02	The machine address	The factory value	1
	setting range	1~247,0 is the broadcast address	

When the machine address is set to 0, namely for the broadcast address, realize PC broadcasting functions.
The machine address has uniqueness (except the broadcast address), which is to achieve the basis of upper machine and inverter peer-to-peer communications

PD.03	Response delay	The factory value	0
	setting range	0~20ms	

Response delay: refers to the frequency converter data to accept the end up to a upper machine to send data in the middle of the interval of time.
If the response time delay is less than the system processing time, the response time delay will be subject to system processing time, processing time, such as response time delay is longer than system after processing the data, the system will delay waiting, until the response delay time to up to a upper machine to send data.

PD.04	Communication timeout	The factory value	0.0 s
	setting range	0.0 s（invalid） 0.1~60.0s	

When the function code is set to 0.0 s, communication timeout parameter is invalid.
When the function code is set to valid values, if a communication and the interval time of the next communication beyond the communication timeout, system will be submitted to the communication failure error (CE).Usually, set it as invalid. If in the continuous communication system times parameter is set , you can monitor the communication status.

PD.05	Communication protocol selection	The factory value	1
	setting range	0:Non standard Modbus protocol 1:The standard Modbus protocol	

PD.05=1：choose the standard Modbus protocol
PD.05=0 ：when reading command ,Returns number of bytes from the machine is a byte more than the standard Modbus protocol, detailed in this agreement
5 Communications data structures.

PD.06	Communication read the current resolution	The factory value	0
	Setting range	0:0.01A 1:0.1A	

Used to determine the communication while reading the output current, current value of the output units.