NIETZ

NZS IP65 series

User Manual

Intellingent Pump Controller

NIETZ ELECTRIC CO.,LTD

Thank you for choosing the Intelligent Pump Controller.

Incorrect handing might cause an unexpected fault. Before using the inverter, always read this instruction manual and the instruction manual packed with the product carefully to use the equipment to its optimum.

Do not attempt to install, operate, maintain or inspect the inverter until you have read through instruction manual and appended documents carefully and can use the equipment correctly. Do not use the inverter until you have a full knowledge of the equipment, safety information and instructions. In this instruction manual the safety instruction levels are classified into "Danger" and "Warning", please pay special attention to the symbols "Danger " and "Warning" and their relevant contents.

"Danger" Assumes that incorrect handing may cause hazardous conditions,resulting in death or severe injury.

"Warning" Assumes that incorrect handing may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.

The figures in this instruction manual are for convenience with description, they may have slight differences compared to the product, and the product update can also cause slight differences between the figure and product, the actual sizes are subject to actual products.

Please read carefully the operation manual before putting the inverter to use so as to correctly install and operate the inverter, give full play to its functions and ensure the safety. Please keep the operation manual handy for future reference, maintenance, inspection and repair.

If you have any questions, please contact us or our agents in time, you will always receive our best attention.

Contents

Chapter 1 Safety Cautions

1-1 Confirmation on receiving

⚠ Warning

The inverter has been strictly and well packed before ex-work . Inconsideration of various factors during the transportation special attention should be paid to the following points before the assembly and installation. If there is anything abnormal please notify the dealer or the relevant people of our company.

- Check if the inverter has got any damage or deformation during the transportation and handling.
- Check if there is one piece of NZS series inverter and one copy of the instruction manual available when unpacking it.
- Check the information on the nameplate to see if the specifications meet your order (Operating voltage and KVA value).
- Check if there is something wrong with the inner parts, wiring and circuit board.
- Check if each terminal is tightly locked and if there is any foreign article inside the inverter.
- Check if the operator buttons are all right.
- Check if the optional components you ordered are contained.
- Check if there is a certificate of qualification and a warranty card.

1-2 Transportion and installation

⚠ Warning

- When carrying products, use correct lifting gear to prevent injury.
- Do not stack the inverter boxes higher than the number

recommended.

- Ensure that installation position and material can withstand the weight of the inverter. Install according to the information in the instruction manual.
- Do not install or operate the inverter if it is damaged or has parts missing.
- When carring the inverter, do not hold it by the front cover or setting dial. It may fall or fail.
- Do not stand or rest heavy objects on the product.
- Check the inverter mounting orientation is correct.
- Prevent other conductive bodies such as screws and metal fragments or other flammable substance such as oil from entering the inverter.
- As the inverter is a precision instrument, do not drop or subject it to impact.
- Use the inverter under the following enviromental conditions. Otherwise, the inverter may be damaged.

Ambient temperature: −10℃~40℃ <non-freezing>.

Ambient humidity: 95% RH or less <non-condensing>

Ambient environment: indoors <free from corrosive gas,flammable gas,oil mist,dust and dirt, free from direct sunlight>

Vibration: max. 0.5G

- Please make sure that the screws are fixed, fastened firmly in accordance with the stipulations of the instruction manual, to prevent the inverter falling.
- If two or more inverters are installed in a control cabinet, please install them according to the information in the instruction manual, and it is required to keep enough space and install extra cooling fans to keep the air in the cabinet flowing freely to keep the temperature inside the cabinet lower than 40℃. Overheating may cause inverter fault, fire or other accidents.
- Due to the inverter of akind of electrical and electronic product

it must be installed, tested and adjusted with parameters by specialized engineering persons of motors.

1-3 Wiring and Junction

⚠ Warning

- Please do not damage the wires. Let the wires bear weight or be clamped may damage the wires and cause an electric shock.
- Do not install a power factor correction capacitor or surge suppressor/radio noise filter (capacitor type filter) on the inverter output side.
- Do not install switch devices such as the air switch and contactor on the inverter output side, if it is for technologic demand, please ensure that the inverter is switching without output.
- Wrong wiring might lead to damage of the inverter. The control signal lines must be kept fully away from the main circuit to protect them from noise.

Danger

- Please ensure that the power is off before junction.
- The wiring work shall be done by qualified electricians.
- Please wire the wires in accordance with the specifications stipulated in the instruction manual.
- The grounding connection shall be done correctly and in accordance with relative regulations in the instruction manual, otherwise it may cause an electric shock or fire.
- Please use independent power supply for the inverter, never use the same power supply with strong interference equipment like electric welder.
- Please do not touch the bottom plate with wet hand, otherwise you may get an electric shock.
- Please do not touch the terminals directly, do not connect the

inverter's input or output terminals to the inverter's shell, otherwise you may get an electric shock.

- Please make sure that the voltage of the power supply and the voltage of the inverter are same, otherwise it may cause the inverter fault or personnel injury.
- The power supply cables must be connected to R,S,T. Never connect the power cable to the U,V,W of the inverter.Doing so will damage the inverter.
- Please do not conduct pressure resistance test to the inverter, otherwise it may cause the inverter's internal fault.
- Please install accessories such as brake units, brake resistors in accordance with the regulations of the instruction manual, otherwise it may cause the inverter fault or fire.
- Please ensure that the screws of the terminals are firmly locked, otherwise it may cause the inverter fault.

1-4 Power-on, Test operation

⚠ Warning

- While power is on or when the inverter is running, do not open the front cover. Otherwise you may get an electric shock.
- Do not run the inverter with the front cover or wiring cover removed. Otherwise, you may access the exposed high-voltage terminals or the charging part of the circuitry and get an electric shock.
- Before starting operation , confirm and adjust the parameters. A failure to do so may cause some machines to make unexpected motions.
- It is recommended to undertake test runs with no load.
- Please provide an emergency stop switch when the "stop" function setting is unavailable.
- Do not use the inverter input side magnetic contactor to start/stop

the inverter, otherwise it may affect the life of the inverter.

Danger

- When fault restart function is set, please do not approach the equipment because the equipment may automatically restart after the running stop.
- Make sure that the specification and rating match the system requirements. Exceeding their use range can cause motor and machine fault.
- Please do not change the parameter settings of inverter casually during running.
- While power is on or for some time after power-off, do not touch the inverter as it is hot and you may get burnt.
- Perform setting dial and key operations with dry hands to prevent an electric shock. Otherwise you may get an electric shock.
- Please do not link or withdraw motors during the inverter running, otherwise it may cause inverter protection or fault.

1-5 Inspection and Maintenance

Warning

- Please ensure that the power supply and the power indicating light is off before inspecting and maintaining. Otherwise you may get an electric shock.
- For prevent damage due to static electricity,touch nearby metal before touching this product to eliminate static electricity from your body.
- Do not carry out a megger (insulation resistance) test on the control circuit of the inverter.

Danger

- Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.
- Please do check, maintenance and replacement of the components according to the appointed methods in the instruction manual, strictly prohibit modifying by yourself. If you do so, you may get an electric shock and injury or the inverter may get damaged.

1-6 Emergency stop

Danger

- Provide a safty backup such as an emergency brake which will prevent the machine and equipment from hazardous conditions if the inverter fails.
- When the braker on the inverter input side trips, check for the wiring fault (short circuit), damage to internal parts of the inverter, etc. Identify the cause of the trip, then remove the cause and power on the breaker.
- When the protective function is activated, take the corresponding corrective action, then reset the inverter, and resume operation.

1-7 Disposing of the inverter

Warning

Treat as industrial waste. Do not burn it up!

Chapter 2
Product Introduction

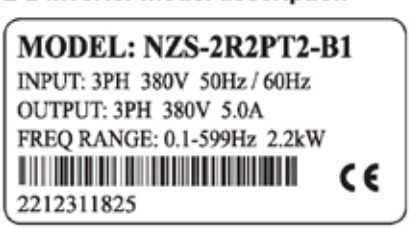
2-1 Unpacking Confirmation

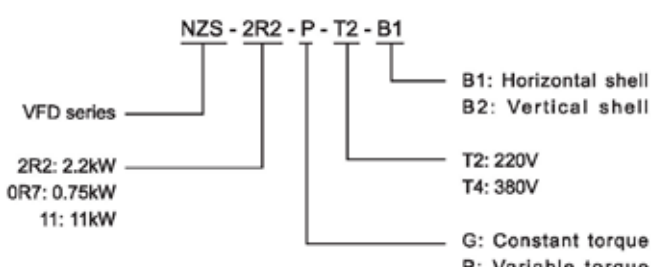
In unpacking, please confirm the following:

- Check whether the model type of the inverter is in accordance with your order.
- Check whether the inverter is damaged and related accessories are included.

If you find an omission or disagreement, please contact the suppliers.

2-2 Inverter model description





2-3 Product Specifications

Items		NZS
Power Supply	Rated voltage, Frequency	1PH 220V50/60Hz; 3PH 380V50/60Hz
	Voltage Range	220V: 170--240V; 380V: 330--440V
Output	Voltage Range	220V: 0--220V; 380V: 0--380V
	Frequency Range	0.10~599Hz
Control method		V/F control, Space vector control.
Indication		Operating status/Alarm definition/interactive guidance: eg, frequency setting, the output frequency/current, DC bus voltage, the temperature and so on.
Control Specifications	Output Frequency Range	0.10Hz~599Hz
	Frequency Setting Resolution	Digital input : 0.1 Hz, analog input: 0.1% of maximum output frequency
	Output Frequency Accuracy	0.1Hz
	V/F Control	Setting V/F curve to satisfy various load requirements.
	Torque Control	Auto increase: auto raise torque by loading condition; Manual increase:enable to set 0.0~20.0% of raising torque.
	Multifunctional Input Terminal	Six multi-function input terminals, realizing functions including fifteen section speed control, program running, four-section acceleration/ deceleration speed switch, UP/DOWN function and emergency stop and other functions
	Multifunctional Output Terminal	2 multi-function output terminals for displaying of running, zerospeed, counter, external abnormity, program operat ion and other information and warnings.
	Acceleration/ deceleration Time Setting	0~999.9s acceleration/deceleration time can be set individually.

Items		NZS
Other Functions	PID Control	Built-in PID control
	RS485	Standard RS485 communication function (MODBUS)
	Frequency Setting	Analog input:0 to 10V, 0 to 20mA can be selected; Digital input: Input using the setting dial of the operation panel or RS485or UP/DOWN.
	Multi-speed	Six multifunction input terminals, 15 section speed can be set
	Automatic voltage regulation	Automatic voltage regulation function can be selected
	Counter	Built-in 2 group of counters
Protection/ Warning Function	Overload	150%, 60second (Constant torque)
	Over Voltage	Over voltage protection can be set.
	Under Voltage	Under voltage protection can be set.
	Other Protections	Overheat ,output shortcircuit, over current, and parameter lock and so on.
Environment	Ambient Temperature	-10□ to 40□ (non-freezing)
	Ambient Humidity	Max. 95% (non-condensing)
	Altitude	Lower than 1000m
	Vibration	Max. 0.5G
Structure	Cooling Mode	Forced air cooling or Natural cooling
	Protective Structure	IP65
Installation	Mode	Wall Mounted

2-4 Product storage

The inverter must be put in the packaging box before installation. If the inverter is not used for the moment, during the storage, please

pay attention those as below:

1. The products must be placed in the location with dry and without dust and dirt.

2. The relative humidity of the environment is within 0~95%, and without condensing.

3. The storage temperature of the environment must be within the range of -26℃ to +65℃.

4. There are no corrosive gas and liquids in the storage environment, and the product is away from direct sunlight.

It is better not to store the inverter for long time. Long time storage of the inverter will lead to the deterioration of electrolytic capacity. If it needs to be stored for a long time make sure to power it up one time within a year and the power-up time should be at least above five hours. When powered up the voltage must be increased slowly with a voltage regulator to the rated voltage value.

Chapter 3
Installation of the Inverter

3-1 Installation environment and requirements

Environment of installation has direct effect on the inverter's life. If the inverter is used in the environment that does not accord with the allowed range of the operation instruction, and may lead to the inverter protection or fault.

About the inverter's installation environment, please ensure it is in accordance with the following condition:

(1) Environment temperature from -10℃ to +40℃

(2) Environment humidity 0~95% without condensing

(3) Away from direct sunlight

(4) The environment does not contain corrosive gas and liquid

(5) The environment does not contain dust, floating fiber and metal dust.

(6) Far away from radioactive materials and combustible substances

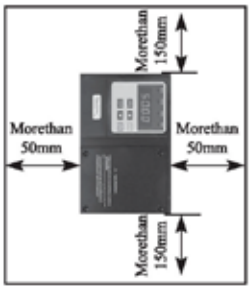
(7) Far away from electromagnetic interference sources (as welder, high-powered machines)

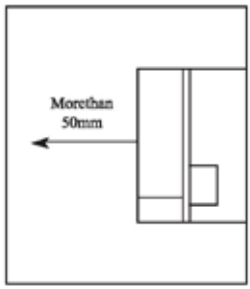
(8) The installation surface shall be firm. Without vibration, the vibration cannot be avoided, please add anti-vibration spacer to reduce vibration.

(9) Please install the inverter to a location where it is good for ventilation, inspection and maintenance, and away from heating unit (as brake resistor).

(10) Preserved enough space for inverter installation, especially for multiple inverters installation, please pay attention to the laying position of the inverter, and install an extra cooling fan to keep the environment temperature lower than 45℃.

① Single inverter installation





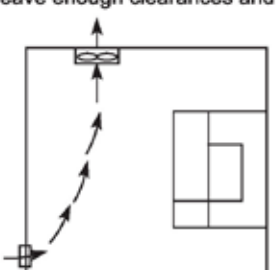
② Multiple inverters installed in one control cabinet.

Please pay attention: When encasing the multiple inverters, install them in paralled as a cooling measure.

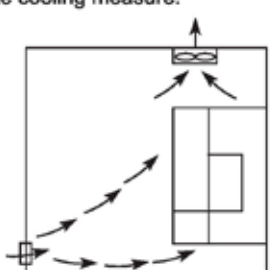
Favorable placing

Unfavorable placing

③ If multiple inverters are installed in one control cabinet, please leave enough clearances and take cooling measure.



Correct installation position of the fan

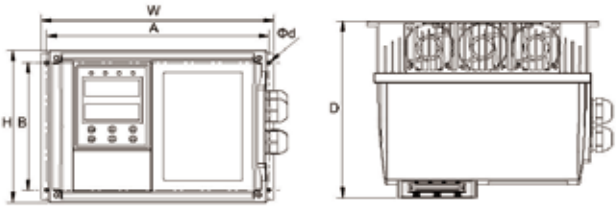


Incorrect installation position of the fan

3-2 Inverter outline dimension drawings

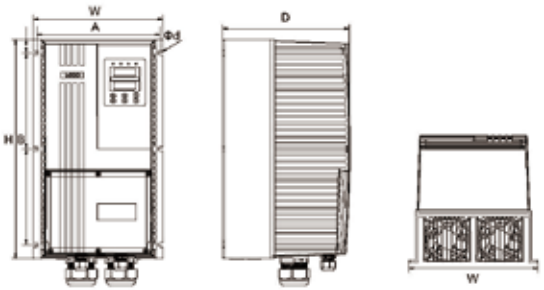
Unit: mm

SIZE A



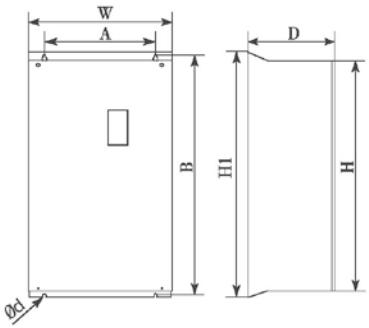
Inverter Model	Applicable Motors (kW)	Input current (A)	Output current (A)	External dimensions (mm)			Installation dimensions (mm)		
				W	H	D	A	B	Φd
NZS-0R7T2P-B1	0.75kW	7.2A	5.0A	188	122	134	178	105	4
NZS-1R5T2P-B1	1.5kW	10A	7.0A						
NZS-2R2T2P-B1	2.2kW	16A	11.0A						
NZS-0R7T4P-B1	0.75kW	3.8A	2.7A						
NZS-1R5T4P-B1	1.5kW	5.0A	4.0A						
NZS-2R2T4P-B1	2.2kW	5.8A	5.0A						
NZS-3R7T4P-B1	3.7kW	10.0A	8.6A	235	154	179	225	129	4
NZS-5R5T4P-B1	5.5kW	15A	12.5A						
NZS-7R5T4P-B1	7.5kW	20A	17.5A						
NZS-11TT4P-B1	11kW	26A	24.0A						

SIZE B



Inverter Model	Applicable Motors (kW)	Input current (A)	Output current (A)	External dimensions			Installation dimensions		
				W	H	D	A	B	Φd
NZS-0R7T2P-B2	0.75kW	7.2A	5.0A	140	190	138	130	160	4.5
NZS-1R5T2P-B2	1.5kW	10A	7.0A						
NZS-2R2T2P-B2	2.2kW	16A	11.0A						
NZS-0R7T4P-B2	0.75kW	3.8A	2.7A						
NZS-1R5T4P-B2	1.5kW	5.0A	4.0A						
NZS-2R2T4P-B2	2.2kW	5.8A	5.0A						
NZS-3R7T4P-B2	3.7kW	10.0A	8.6A	192	280	178	180	200	5.5
NZS-5R5T4P-B2	5.5kW	15A	12.5A						
NZS-7R5T4P-B2	7.5kW	20A	17.5A						
NZS-11TT4P-B2	11kW	26A	24.0A						
NZS-15TT4P-B2	15kW	35A	33A						
NZS-18.5TT4P-B2	18.5kW	38A	40A	236	300	204	225	250	7
NZS-22TT4P-B2	22kW	46A	47A						
NZS-30TT4P-B2	30kW	62A	65A	236	400	231	225	175+175	7
NZS-37TT4P-B2	37kW	76A	80A						

SIZE C

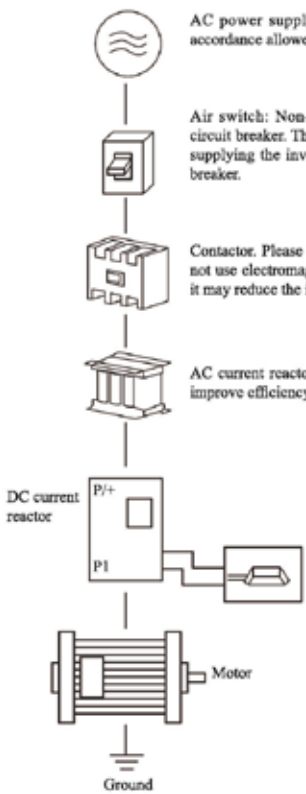


Inverter Model	Applicable Motors (kW)	Input current (A)	Output current (A)	External dimensions				Installation dimensions		
				W	H	H1	D	A	B	Φd
NZS-45TT4P-B2	45kW	92A	90A	300	450	482	293	210	465	9
NZS-55TT4P-B2	55kW	113A	110A							
NZS-75TT4P-B2	75kW	157A	152A	400	628	668	275	300	643	9
NZS-90TT4P-B2	90kW	180A	176A							
NZS-110TT4P-B2	110kW	214A	210A							
NZS-132TT4P-B2	132kW	256A	255A	400	860	900	321.5	330	876	11
NZS-160TT4P-B2	160kW	307A	305A							

Note: 380V/0.75-11KW allows for both horizontal and vertical installation, while 15KW and above are for vertical installation.

Chapter 4 Wiring

The wiring of the inverter can be divided into main circuit and control circuit.



4-1 Main Circuit Wiring

4-1-1 Peripheral Devices Description

(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.

b: Improve the power efficiency.

4-1-2 Main Circuit Wiring Notice

The NZS series is a highly reliable product, but incorrect peripheral circuit making or operation / handing method may shorten the product life or damage the product.

Before starting operation, always recheck the following items.

(1) Use crimping terminals with insulation sleeve to wire the power supply and motor.

(2) Application of supply power to the output terminals (U,V,W) of the inverter will damage the inverter. Never perform such wiring.

(3) After wiring, wire offcuts must not be left in the inverter.

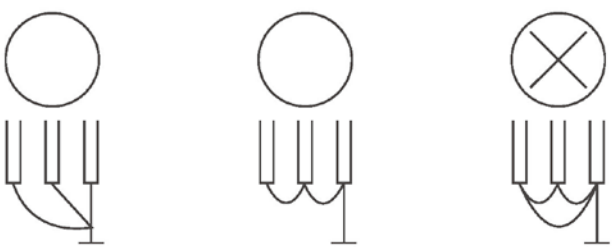
Wire offcuts can cause an alarm ,failure or malfunction. Always keep the inverter clean . When drilling mounting holes in an enclosure etc., take are not to allow chips and other foreign matter to enter the inverter.

(4) This inverter must be earthed. Earthing must conform to the requirements of national and local safety regulations and electrical codes.

(5) Use the thickest possible earth cable.

(6) The grounding point should be as near as possible to the inverter, and the ground wire length should be as short as possible.

(7) Where possible, use independent earthing for the inverter. If independent earthing is impossible, use joint earthing (Ⅰ , Ⅱ) where the inverter is connected with the other equipment at an earthing point. Joint earthing as in (Ⅲ) must be avoided as inverter is



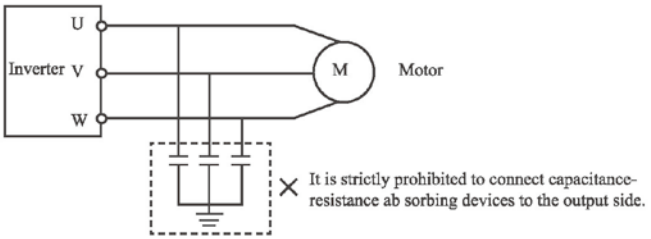
connected with the other equipment by a common earth cable.

(8) To prevent a malfunction due to noise, keep the signal cables more than 10 cm away from the power cables.

(9)The overall wiring length should be 100 m maximum.

Especially for long distance wiring, the fast-response current limit function may be reduced or the equipment connected to the inverter output side may malfunction or become faulty under the influence of a charging current due to the stray capacity of the wiring. therefore, note the overall wiring length.

(10) Do not install a power factor correction capacitor, surge



suppressor or radio noise filter on the inverter output side.

(11) Before starting wiring or other work after the inverter is operated, wait for at least 10 minutes after the power supply has been switched off, and check that there are no residual voltage using a tester or the like. The capacitor is charged with high voltage for some time after power off and it is dangerous.

(12) Electromagnetic wave interference

The input/output (main circuit) of inverter includes high frequency components, which may interfere with the communication devices (such as AM radios) used near the inverter. In this case,set the EMC filter valid to minimize interference.

(13) Across P/+ and PR terminals, connect only an external regenerative brake discharge resistor. Do not connect a mechanical brake.

4-1-3 Peripheral Devices Specifications

Check the motor capacity of the inverter you purchased . Appropriate peripheral devices must be selected according to the capacity. Refer to the following list and prepare appropriate peripheral devices:

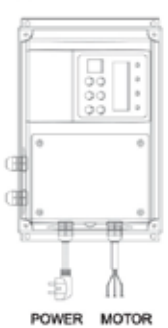
Applicable Inverter Type	Input voltage	Motor Output (kW)	Main Circuit Cable Type (mm^2)	Breaker Selection (A)	Input Side Magnetic contractor (A)
NZS-0R7T2P-B1	1PH 220V ±15%	0.75	0.75	16	12
NZS-1R5T2P-B1		1.5	1.5	25	18
NZS-2R2T2P-B1		2.2	2.5	32	25

Applicable Inverter Type	Input voltage	Motor Output (kW)	Main Circuit Cable Type (mm^2)	Breaker Selection (A)	Input Side Magnetic contractor (A)
NZS-0R7T4P-B1(2)	3PH 380V±15%	0.75	0.75	6	9
NZS-1R5T4P-B1(2)		1.5	2.5	16	12
NZS-2R2T4P-B1(2)		2.2	2.5	16	12
NZS-3R7T4P-B1(2)		3.7	2.5	16	12
NZS-5R5T4P-B1(2)		5.5	2.5	20	18
NZS-7R5T4P-B1(2)		7.5	4	32	25
NZS-11TT4P-B1(2)		11	4	40	32
NZS-15TT4P-B2		15	6	50	38
NZS-18.5TT4P-B2		18.5	10	80	65
NZS-22TT4P-B2		22	10	80	65
NZS-30TT4P-B2		30	16	100	65
NZS-37TT4P-B2		37	25	100	80
NZS-45TT4P-B2		45	35	160	95
NZS-55TT4P-B2		55	50	160	115
NZS-75TT4P-B2		75	70	250	150
NZS-90TT4P-B2		90	95	250	170
NZS-110TT4P-B2		110	120	400	205
NZS-132TT4P-B2		132	150	400	245
NZS-160TT4P-B2		160	185	400	300

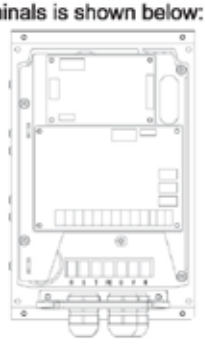
*The above data are for reference only.

4-1-4 Specification of main circuit terminal

The arrangement of main circuit terminals is shown below:



(1) 0.75--2.2kW



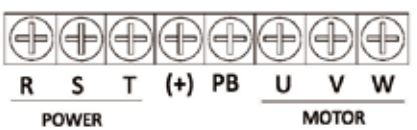
(2) 3.7--160kW

Main circuit terminal description

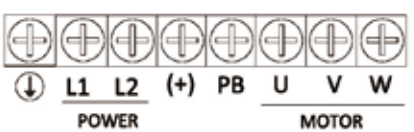
220V 0.75-2.2KW-Horizontal schematic diagram:

380V 0.75-5.5KW-Horizontal schematic diagram:

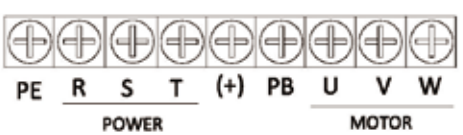
380V 7.5-11KW-Horizontal schematic diagram:



220V 0.75-2.2KW-Vertical illustration:



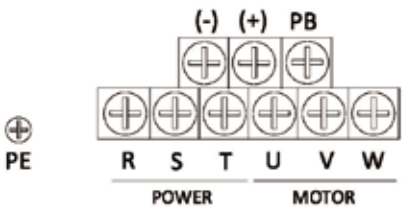
380V 0.75-7.5KW-Vertical schematic diagram:



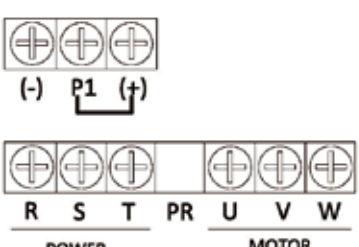
380V 11KW-15KW--Vertical schematic diagram:

380V 18.5KW-22KW Schematic diagram:

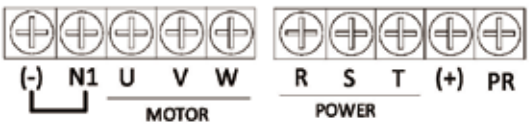
380V 30KW--37KW Schematic diagram:



380V 45KW--110KW Schematic diagram:



380V 132KW--160KW Schematic diagram:

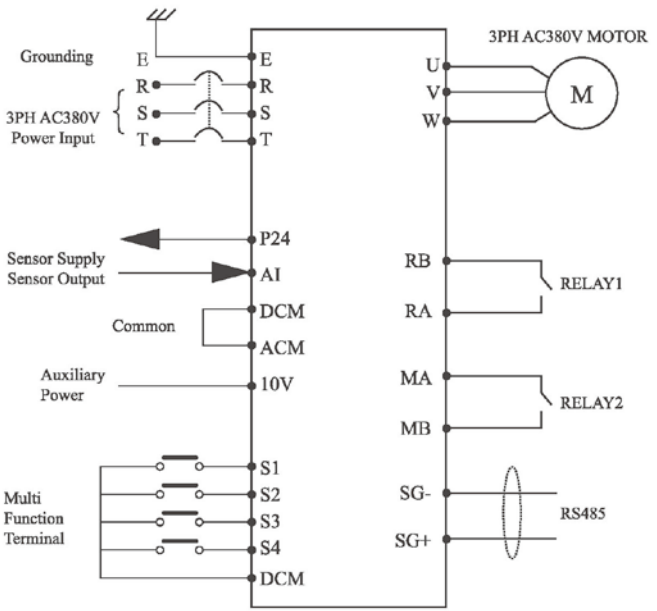


Name	Function Description
⏚ PE	Grounding terminal
R, S, T	Power input terminal
L1, L2	
U, V, W	Connect to a three-phase AC current motor
+, PB	Braking resistor terminals
+, PR	
P, PB	
+, -	The inverter's DC positive and negative terminals can be connected to a braking unit.
+, P1	After removing the shorting link, a DC reactor can be connected.
-, N1	

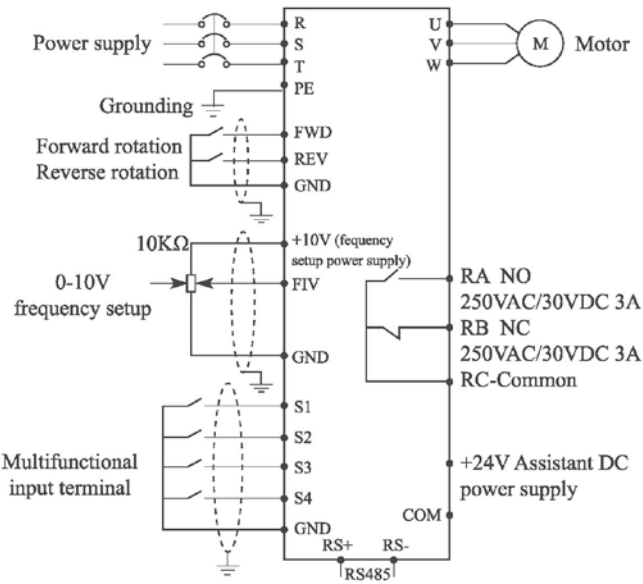
4-2 Control circuit terminal

4-2-1 Basic wiring diagram

(1) 0.75--5.5kW



(2) 7.5-160kW



4-2-2 Control terminals layout

(1) 0.75-5.5kW

(2) 7.5--160kW

4-2-3 Control circuit terminals description

Indicates that terminal functions can be selected using P315 to P329. (I/O terminal function selection)

Name of the terminal	Instruction	Remark
FWD/REV	Multi Function of Input Terminal	Multifunctional Terminal S1-S4/FWD/REV can setting according to the P315-P320,when the terminal is cut with DCM/GND, it can worked effectively
S1--S4	Multi Function of Input Terminal	
	Multi Function of Input Terminal	
	Multi Function of Input Terminal	
DCM/GND	Digital Signal of Public Terminal	
P24/24V (COM)	DC24V Maximum 100mA	
10V	Frequency Setting Power	
AI (FIV)	The Analog Voltage of Input Terminal	0~10V/0-20MA
ACM	Analogous earth terminal	
MA,MB	Output Terminal (opening)	250VAC/3A
RA,RB,RC	Output Terminal (opening)	250VAC/3A
SG+,SG-/ RS+,RS-	RS485 Protocol	

4-2-4 Wiring instructions

(1) Use shielded or twisted cables for connection to the control circuit terminals and run them away from the main and power circuits (including the 200V relay sequence circuit).

(2) Use two or more parallel micro-signal contacts or twin contacts to prevent a contact faults when using contact inputs since the control circuit input signals are micro-currents.

(3) Do not apply a voltage to the contact input terminals of the

control circuit.

(4) Always apply a voltage to the alarm output terminals (RA, RB, RC) via a relay coil, lamp, etc.

(5) It is recommended to use the cables of 0.75mm^2 gauge for connection to the control circuit terminals.

(6) The wiring length should be 30m maximum.

Chapter 5 Operation

The digital manipulator is located at the center of the inverter, and it is divided into two parts: displaying part and key control part. The displaying part indicates the parameter setting and different operation status, and the key control part is the communication channel between the user and the inverter.

Status indicator: various operation status

Displaying part: set frequency, operation frequency, current, parameter setting and irregularity content, etc.

Operation command key: start running

Programming key

Stop/ Reset key: stop running or reset after an interrupt because of any irregularity

Shift / data enter key: enter the data to modify a parameter and display the status, parameters, set frequency, output current, forward / backward rotating, physical quantities, etc.

LED indicators:

5-1 Opeation panel

5-1-1 Key Function description

Key Symbol	Function description
PRG	Function selecting key, for select a function menu
▲ ▼	Figure modifying key, for modify a function code and parameter
ENTER DISP	Shift key or enter key Shift to an another digit or switch to another display by short-pressing, confirm a setting by long-pressing
RUN	Command for running
STOP RESET	Command for stopping (applicable in the manipulator controlled status) or reset after an fault

5-1-2 Displays description

Step	Display item	Description
1	F00.0	Frequency setting after the power supply is switched on
2	H00.0	Actual running frequency
3	A00.0	Current for motor running
4	Frd rEu	Motor rotating direction

* The above display items can be switched and read by short pressing the ENTER DISP key on the main menu.

5-2 Operating panel operation instruction

(1) Parameter setting <taking modifying P104 reverse Valid setup as example>

Step	Key name	Display	Description
1	Power on	STOP FWD F00.0	① Display the frequency setting (initial display). ② The inverter is standing by.
2	Press PRG	STOP FWD P000	To enter the parameter setup state, and the first letter blinks (means modifiable item)
3	Press ▲ for four times	STOP FWD P004	The digit is modified into "4" from "0".
4	Quickly press ENTER DISP 2 times (quick press means shift)	STOP FWD P004	Shift leftward for two digits and the third digit will clicker.
5	Press ▲ for once	STOP FWD P104	The digit is modified into "1" from "0".
6	Press and hold ENTER DISP	STOP FWD 0001	Enter the parameter setting interface.
7	Press ▲ ▼	STOP FWD 0000	Modified "1" into "0".
8	Press and hold ENTER DISP	STOP FWD P105	To confirm that the value "P104" has been modified.
9	Press PRG	STOP FWD F00.0	Return back to the initial display.

Note:

1. Pressing PRG can interrupt the modification and return back to the main display interface.

2. When a modification is confirmed, An Err may be displayed to show the parameter modification is failed.

(2) Status display and inquiry

Parameter set: the frequency for the startup and shutdown (P102=0) of the frequency converter controlled by the manipulator is given by the potentiometer of the manipulator (P101=3).

Step	Key name	Display	Description
1	Power on	STOP FWD F00.0	Frequency setting display state.
2	Press RUN	RUN FWD F05.0	Forward running of the frequency is turned on.
3	Press ENTER DISP	RUN FWD F05.0	Switch to the actual running frequency display.
4	Press ENTER DISP for once	RUN FWD A00.0	Switch to the current display when the current output is 0A.
5	Press ENTER DISP for once	RUN FWD Frd	Switch to the setting interface (press to switch the rotating direction)
6	Press RUN for once	RUN FWD P000	Switch to the parameter setting status.
7	Press ▲ for once	RUN FWD P006	Select parameter code P006 to be modified.
8	Long press ENTER DISP	RUN FWD 022.8	P006 content: the current temperature of the frequency converter is 22.8℃.
9	Press PRG for twice	RUN FWD F15.0	Return back to the main display, the set frequency is 15Hz.
10	Press STOP RESET	STOP FWD F15.0	During the frequency converter is decelerating before stop, the key will flicker and then the and keys will turn on, and the set frequency displayed is 15Hz

Note: The set frequency, running frequency, output current and running speed of the frequency converter can be monitored by switching keys during operation, and the main display can be modified by P000 setting as per the practical requirement, and meanwhile the related content can be monitored by the user through P001-P018.

Chapter 6
Table of Function Parameters

"☆": Indicates that the setting of this parameter can be changed whether the inverter is stopped or running;

"★": Indicates that the setting of this parameter cannot be changed when the inverter is running;

"●": Indicates that the value of this parameter is the actual measured and recorded value and cannot be changed;

"*": Indicates that this parameter is a "manufacturer parameter" and can only be set by the manufacturer; user operation is prohibited.

Function code	Name	Setting Range	Factory value	Change
P0 monitoring parameter group				
P000	Display selection settings	0: Set frequency 1: Operating frequency 2: Output current; 3: Rotation speed 4: Bus voltage 5: Output voltage; 6: Retain 7: Display PID command feedback 15: Pulse Counting	0	☆
P001	Set frequency	Unit: 0.1 Hz		
P002	Output frequency	Unit: 0.1Hz		●
P003	Output current	Unit: 0.01A		●
P004	rotational speed	Unit: RMP		●
P005	DC bus voltage	Unit: 0.1V		●

Function code	Name	Setting Range	Factory value	Change
P006	Inverter temperature	Unit: 1℃		●
P007	PID display	Unit: 0.01		●
P010	Fault Log 1	0: No fault 2: Accelerate overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Accelerating overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistor overload 9: Undervoltage 10: Inverter overload 11: Motor overload 14: Module overheating 16: Communication error 24: Low water supply pressure 27: High water supply pressure 28: No water alarm 29: Power-on time has arrived 31: PID feedback lost during runtime		●
P011	Fault Log 2			●
P012	Fault Log 3			●
P013	Rreserve			●
P014	Recent fault setting frequency	Unit: 0.1 Hz		●
P015	Recent fault output frequency	Unit: 0.1 Hz		●
P016	Recent fault output current	Unit: 0.0A		●
P017	Recent fault DC voltage	Unit: 0.1V		●
P018	reserve			●
P0.20	Output power	Unit: 0.1KW		●
P021	Input terminals	Bit0 - S1; Bit1 - S2; Bit2 - S3;		●
P022	Output terminals	Bit0:1 - MA/MB actions; 0-MA /MB No action Bit1:1 - RA/RB actions; 0 - RA/RB No move do		●

Function code	Name	Setting Range	Factory value	Change
P023	AI voltage	0.00~10.00V		●
P027	Fault status	0: No fault 2: Accelerate overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Accelerating overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Buffer resistor overload 9: owe Pressure 10: Inverter overload 11: Motor overload 14: Module overheating 15: External Faults 16: Communication error 24: Low water supply pressure 27: High water supply pressure 28: No water alarm 29: Power-on time has arrived 31: PID feedback lost during runtime		●
P028	Running status	0: Stop 1: Forward rotation 2: Reverse		●
Group P1				
P100	Digital frequency setting	0.0 - P105	0.0 Hz	☆
P101	Main frequency source X selection	0: Digital frequency setting (keyboard UP / DOWN) 1: AI analog input 2: reserve 3: reserve 4: Terminal UP/DOWN 5: RS485 communication frequency setting 6: Multi-segment instructions 7: Simple PLC 8:PID	3	★
P102	Run settings selection	0: Keyboard 1: I O terminal 2: Communication	0	★

Function code	Name	Setting Range	Factory value	Change
P103	Stop button effective setting	0: Stop button is invalid 1: Stop button is active	1	☆
P104	Reverse effective setting	0: Do not reverse 1: Can be reversed	1	☆
P105	Maximum operating frequency	Minimum operating frequency – 999.9Hz	50.0 Hz	☆
P106	Minimum operating frequency	0.00 - Maximum operating frequency	0.0 Hz	☆
P107	Acceleration time 1	0 - 999.9S	change	☆
P108	Deceleration time 1	0 - 999.9S	change	☆
P109	VF highest voltage	VF intermediate voltage - 500.0V	change	★
P110	VF reference frequency	VF intermediate frequency - maximum operating frequency	50.0Hz	★
P111	VF intermediate voltage	VF minimum voltage - VF maximum voltage	change	★
P112	VF intermediate frequency	VF minimum frequency - VF reference frequency	2.5 Hz	★
P113	VF minimum voltage	0 - VF intermediate voltage	change	★
P114	VF minimum frequency	0 - VF intermediate frequency	1.2 Hz	★
P115	carrier frequency	1.0K - 15.0K	change	☆
P116	reserve	reserve		
P117	Parameter initialization	8: Initial factory output value	0	★
P118	Parameter locking	1: Parameter Locking 0: Parameter Unlock	0	★
P119	Direction of movement	0: Same direction 1: Opposite direction	0	☆

Function code	Name	Setting Range	Factory value	Change
P120	Auxiliary frequency Y source	0: Digital frequency setting (keyboard UP / DOWN) 1: AI analog input 2: Retain 3: Retain 4:Terminal UP/DOWN 5: RS485 communication frequency setting 6: Multi-segment instructions 7: Simple PLC 8:PID	0	★
P121	Frequency source selection	Units: Frequency source selection 0: Main frequency source X 1: The result of primary and secondary operations (the operational relationship is determined by...) (Ten digits determined) 2: Switching between main frequency source X and auxiliary frequency source Y Change 3: Main frequency source X and main-auxiliary operation results Switch 4: Auxiliary frequency source Y and main/ auxiliary operation structure Fruit switch Tens: Frequency source master-slave operation relationship 0: Primary + Secondary 1: Main - Secondary 2: The maximum value of both 3: Minimum of the two	0	☆
P122	Auxiliary frequency source Y range choose	0: relative to the maximum frequency 1: Relative to frequency source X	0	☆
P123	Auxiliary frequency source Y range	0%~150%	100%	☆

Function code	Name	Setting Range	Factory value	Change
P124	Auxiliary frequency source during superposition bias frequency	0.0Hz - Maximum frequency P1.05	0.0Hz	☆
P125	Runtime frequency instructions UP/DOWN benchmark	0: Operating frequency; 1: Set frequency	1	★
P126	Upper limit frequency	Lower limit frequency P1.06 - Maximum frequency P1.05	50.0 Hz	☆
P127	Acceleration/ deceleration time reference frequency Rate	0: Maximum frequency 1: Set frequency 2:100Hz	0	★
		Group P2		
P200	Startup method	0: Normal Startup 1: Speed detection and restart	0	☆
P201	Parking methods	0: Decelerate and stop 1: Free Parking	0	☆
P202	Startup frequency	0.0 - 50.0 Hz	0.5 Hz	☆
P203	Parking frequency	0.0 - 50.0Hz	0.5 Hz	☆
P204	DC braking output during startup Output voltage	0 - 10.0% of the motor's rated voltage	0.0%	★
P205	DC braking during startup between	0.0 - 100.0S	0.0	☆
P206	DC braking output when stopped Output voltage	0 - 10.0% of the motor's rated voltage	0.0%	☆
P207	DC braking during stop between	0.0 - 100.0S	0.0	☆

Function code	Name	Setting Range	Factory value	Change
P208	Torque boost	0 - 30.0%	change	☆
P209	Motor rated voltage	0 - 500.0V	change	☆
P210	Motor rated current	0.0-999.9A (inverter > 30 kW) 0.00-99.99A (Inverter <= 30 kW)	change	☆
P211	Motor no-load current ratio	0-100%	50%	☆
P212	Motor rated speed	0 - 9999r/min	1460	☆
P213	Number of electrodes	2 - 20	4	☆
P214	Motor rated slip	0 - 10.0 Hz	2.5 Hz	☆
P215	Motor rated frequency	0-P105 (Maximum operating frequency)	50.0 Hz	☆
P216 - P219	reserve			
P3 Group				
P300	AI minimum input	0.00V - P301 (When selecting the current, 4 mA corresponds to 1 V)	0.00V	☆
P301	AI maximum input	P300 - 10.00V (When selecting the current, 20 mA corresponds to 5V)	10.00V	☆
P302	AI input filtering time	0.00 - 10.00S	0.10S	☆
P310	Analog low-end frequency	0-P105 (Maximum operating frequency)	0.0Hz	☆
P311	Analog signal low end direction	0/1: Forward/Reverse	0	☆
P312	High-end frequency of analog signals	0-P105 (Maximum operating frequency)	50.0Hz	☆
P313	High-end analog direction	0/1: Forward/Reverse	0	☆

Function code	Name	Setting Range	Factory value	Change
P314	reserve	0: No function 1: Inch movement 2: Forward rotation inching 3: Reverse inching 4: Front/Back 5: Run 6: Forward Rotation (FWD) 7: Reverse operation (REV) 8: Stop (Three-wire operation control) 9: Multi-segment instruction terminal 1 10: Multi-segment instruction terminal 2 11: Multi-segment instruction terminal 3 12: Multi-segment instruction terminal 4 13: Acceleration/deceleration time selection terminal 1 14: Acceleration/deceleration time selection terminal 2 15: Terminal UP ; 16: Terminal DOWN 17: Free parking; 18: Fault Reset (RESET) 19: PID control is put into operation; 20: PLC put into operation 21: Timer 1 start signal 22: Timer 2 start signal 23: Counter pulse signal 24: Counter reset signal 25: Operation paused 26: Frequency source x and y switching 27: Retain		
P315	S1		6	★
P316	S2		7	★
P317	S3		18	★
P318	S4		9	★
P319 ~ P322	reserve		0	

Function code	Name	Setting Range	Factory value	Change
P323	MA MB	0: No output 1: Inverter in operation 2: Frequency arrives 3: Fault Output (Fault Shutdown) 4: Zero-speed operation (shutdown effective) 5: Frequency reaches 1 6: Frequency reaches 2 7: Accelerating 8: Decelerating 9: Undervoltage output 10: Timer 1 arrives 11: Timer 2 arrives 12: PLC cycle completion indicator 13: Retain 14: PID upper limit 15: PID Lower Limit 16: 4-20mA disconnection 17: Motor overload warning 18: Inverter overload pre-alarm 27: Set the count pulse value to reach 28: The specified count pulse value has arrived. 29: Constant pressure water supply power frequency relay output 30: Ready to run 31- 32: Retained	1	☆
P324	reserve		0	
P325	RA RB		3	☆
P328	Switching quantity filtering time	0.000s - 1.000s	0.010s	☆
P329	Terminal command method	0: Two-line type 1 1: Two-line type 2 2: Three-line type 1 3: Three-line type 2	0	★
P330	Terminal UP/ DOWN rate of change	0.01Hz/s - 99.99Hz/s	1.00Hz/s	☆

Function code	Name	Setting Range	Factory value	Change
P331	Output terminal active status choose	0: Positive logic 1: Anti-logic Units digit: MA MB Tens: RA RB Hundreds: Reserved Thousands: Reserved	0000	☆
P332	S1 delay time	0.0s - 999.9s	0.0s	☆
P333	S2 delay time	0.0s - 999.9s	0.0s	☆
P334	S3 delay time	0.0s - 999.9s	0.0s	☆
P335	Input terminal valid mode choose	0: High level is active 1: Active low Units digit: S1 Tens: S2 Hundreds: S3 Thousands: Reserved	0000	★
Group P4				
P400	Jog frequency setting	0.0 - Maximum operating frequency	5.0Hz	☆
P401	Acceleration Time 2	0 - 999.9S	10.0s	☆
P402	Deceleration time 2	0 - 999.9S	10.0s	☆
P403	Acceleration Time 3	0 - 999.9S	10.0s	☆
P404	Deceleration time 3	0 - 999.9S	10.0s	☆
P405	Acceleration time 4/jog Acceleration time	0 - 999.9S	2.0s	☆
P406	Deceleration time 4/jog deceleration time	0 - 999.9S	2.0s	☆
P407	Set counter value	0 - 9999	100	☆
P408	Specify counter value	0 - 9999	50	☆

Function code	Name	Setting Range	Factory value	Change
P409	Acceleration torque limit level	50 - 200%	150%	☆
P410	Overflow rate suppression gain	0 - 100%	10%	☆
P411	Deceleration overvoltage prevention selection	0: Invalid 1: Effective	1	☆
P412	VF overexcitation gain	0 - 100%	10	☆
P413	Overvoltage stall suppression gain	0 - 200%	50%	☆
P414	Brake tube operating voltage	220V rating: 370.0V 380V class: 700.0V	change	☆
P415	reserve			☆
P416	Start Protection Selection	0: Protection 1: No protection P416=0 when FWD input and GND are connected Connect (short circuit), turn off the power and then reconnect. The power is off, and the frequency converter is not running.	1	☆
P417	Instantaneous power outage action selection	0: Invalid 1: Deceleration 2: Deceleration and Stop	0	☆
P418	Car start torque limit level	0 - 200%	150%	☆
P419	Speed of starting the car	1-100	20	☆
P420	automatic fault resets (	0 - 20	0	☆

Function code	Name	Setting Range	Factory value	Change
P421	Automatic fault reset interval time	0.1s - 100.0s	1.0s	☆
P422	reserve		0	☆
P423	Overcurrent detection level	0 - 200.0%(If the current continues for the duration of P424 and exceeds P423, an overload fault motor OL 1 will be reported.)	0.0%	☆
P424	Overcurrent detection time	0 - 999.9S	10.0S	☆
P425	Frequency one reaches frequency setting Set (FDT 1)	0.0Hz - Maximum frequency	0.0Hz	☆
P426	Frequency 2 Arrival Frequency Setting Set (FDT 2)	0.0Hz - Maximum frequency	0.0Hz	☆
P427	Timer 1 setting	0.0S - 999.9S	10.0S	☆
P428	Timer setting #2	0.0S - 999.9S	20.0S	☆
P430	Frequency detection hysteresis (FDT1)	0.0% - 100.0%(FDT 1 or FDT 2 level)	5.0%	☆
P431	Jump frequency 1	0.00Hz - Maximum frequency	0.00Hz	☆
P432	Jump frequency 2	0.00Hz - Maximum frequency	0.00Hz	☆
P433	Jump frequency amplitude	0.00Hz - Maximum frequency	0.00Hz	☆
P5 Group				

Function code	Name	Setting Range	Factory value	Change
P500	PLC shutdown, power failure record Memory Choice	Units: Stop memory selection 0: No memory of shutdown 1: Shutdown memory Tens: Power-off memory selection 0: No memory after power failure 1: Power-off memory	00	☆
P501	PLC activation method	0: If P101=7, then the PLC is turned on. Otherwise, the PLC will not start. 1: PLC open start	0	☆
P502	PLC operation mode	0 or 1: Shutdow after a single run 2 or 3: Keep looping 4: Retain final value after a single run	0	☆
P503	Multi-speed frequency 1	0.0 - Maximum operating frequency	10.0 Hz	☆
P504	Multi-speed frequency 2	0.0 - Maximum operating frequency	15.0 Hz	☆
P505	Multi-speed frequency 3	0.0 - Maximum operating frequency	20.0 Hz	☆
P506	Multi-speed frequency 4	0.0 - Maximum operating frequency	25.0 Hz	☆
P507	Multi-speed frequency 5	0.0 - Maximum operating frequency	30.0 Hz	☆
P508	Multi-speed frequency 6	0.0 - Maximum operating frequency	35.0 Hz	☆
P509	Multi-speed frequency 7	0.0 - Maximum operating frequency	40.0 Hz	☆
P510	Multi-speed frequency 8	0.0 - Maximum operating frequency	45.0 Hz	☆
P511	Multi-speed frequency 9	0.0 - Maximum operating frequency	50.0 Hz	☆
P512	Multi-speed frequency 10	0.0 - Maximum operating frequency	10.0 Hz	☆

Function code	Name	Setting Range	Factory value	Change
P513	Multi-speed frequency 11	0.0 - Maximum operating frequency	10.0 Hz	☆
P514	Multi-speed frequency 12	0.0 - Maximum operating frequency	10.0 Hz	☆
P515	Multi-speed frequency 13	0.0 - Maximum operating frequency	10.0 Hz	☆
P516	Multi-speed frequency 14	0.0 - Maximum operating frequency	10.0 Hz	☆
P517	Multi-speed frequency 15	0.0 - Maximum operating frequency	10.0 Hz	☆
P518	PLC running time 1	00s(h) - 9999 s(h)	100s(h)	☆
P519	PLC running time 2	00s(h) - 9999 s(h)	100s(h)	☆
P520	PLC running time 3	00s(h) - 9999 s(h)	100s(h)	☆
P521	PLC running time 4	00s(h) - 9999 s(h)	100s(h)	☆
P522	PLC running time 5	00s(h) - 9999 s(h)	100s(h)	☆
P523	PLC running time 6	00s(h) - 9999 s(h)	Os(h)	☆
P524	PLC running time 7	00s(h) - 9999 s(h)	0s(h)	☆
P525	PLC running time 8	00s(h) - 9999 s(h)	0s(h)	☆
P526	PLC running time 9	00s(h) - 9999 s(h)	Os(h)	☆
P527	PLC running time 10	00s(h) - 9999 s(h)	0s(h)	☆
P528	PLC running time 11	00s(h) - 9999 s(h)	0s(h)	☆
P529	PLC running time 12	00s(h) - 9999 s(h)	Os(h)	☆
P530	PLC running time 13	00s(h) - 9999 s(h)	0s(h)	☆

Function code	Name	Setting Range	Factory value	Change
P531	PLC running time 14	00s(h) - 9999 s(h)	0s(h)	☆
P532	PLC running time 15	00s(h) - 9999 s(h)	0s(h)	☆
P533	PLC operating direction low position	0 - 9999	0	☆
P534	reserve		0	☆
P535	reserve			☆
P536	PLC operation direction high position	0 - 6	0	☆
P537	PLC running time unit	0: s (seconds) 1: h (hour)	0	☆
P538	Multi-speed 0 selection	0: P5.03 (Frequency when P101=6 multi-segment instruction 0) Rate)	0	☆
P539	PLC Stage 1 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P540	PLC Stage 2 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P541	PLC Stage 3 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P542	PLC Stage 4 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P543	PLC Stage 5 Acceleration/ Deceleration Time selection	0 - 3	0	☆

Function code	Name	Setting Range	Factory value	Change
P544	PLC Stage 6 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P545	PLC Stage 7 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P546	PLC Stage 8 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P547	PLC Stage 9 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P548	PLC Stage 10 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P549	PLC Stage 11 Acceleration/ Deceleration Time selection	0 – 3	0	☆
P550	PLC Stage 12 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P551	PLC Stage 13 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P552	PLC Stage 14 Acceleration/ Deceleration Time selection	0 - 3	0	☆
P553	PLC acceleration/ deceleration at stage 15 Time selection	0 - 3	0	☆

Function code	Name	Setting Range	Factory value	Change
P554	Swing frequency setting method	0: relative to the center frequency 1: Relative to the maximum frequency	0	☆
P555	Swing frequency amplitude	0.0% - 100.0%	0.0%	☆
P556	Jump frequency amplitude	0.0% - 50.0%	0.0%	☆
P557	Oscillation period	0.1s - 999.9s	10.0s	☆
P558	The rising of the triangular wave of the oscillation frequency time	0.1% - 100.0%	50.0%	☆
Group P6				
P600	PID enabling method	0: If P101=8, the PID is valid; otherwise... none effect ; 1: PID effective 2: PID Conditional Operation	0	☆
P601	PID operating mode	0: Negative Feedback Mode 1: Positive Feedback Mode	0	☆
P602	PID target selection	0: Numerical setting P6.04 given 1: Select AI as the target value 2: Retain	0	☆
P603	PID feedback selection	0: Choose AI as feedback 1: Retain 2: Retain 3: Retain	0	☆
P604	PID numerical value given	0.0Bar - P614	2.50 Bar	☆
P605	PID upper limit	P6.06 - P614	10.00 Bar	☆
P606	PID lower limit	0.0Bar - P6.05	0.00Bar	☆
P607	PID-P	0.0 - 600.0%	100.0%	☆
P608	PID-I	0.1 - 10.00S	2.00S	☆
P609	PID-D	0.0 - 9.999S	0.000S	☆

Function code	Name	Setting Range	Factory value	Change
P610	Positive deviation between two outputs Maximum value	0.00% - 99.99%	2.00%	☆
P611	Sleep frequency	0.00 - Maximum frequency If the sleep frequency is 0, then no sleep occurs.	25.0HZ	☆
P612	hibernation time	0.00 - 9999S	10S	☆
P613	wake-up percentage	Target value: 0.0 - 100.0%	90.0%	☆
P614	range	0.00 - 99.99 bar	10.00 bar	☆
P615	PID display bit depth	1 - 4	4	☆
P616	PID display decimal point	0 - 4	2	☆
P617	PID upper limit frequency	0.00 - Maximum frequency	48.0Hz	☆
P618	PID lower limit frequency	0.00 - Maximum frequency	20.0 Hz	☆
P619	PID detection time	0.0 - 9999S	20s	☆
P620	PID Deviation Limit	Measuring range P614: 0.0 - 100.0%	0.1%	☆
P621	PID feedback loss alarm model	0: No alarm is triggered; 1: Alarm continues despite interruption, alarm code "20" The frequency converter should remain in the state before the signal interruption. The last frequency. 2: Alarm shutdown: Fault code "20" The frequency converter should be stopped.	0	☆
P622	PID feedback loss detection value	Range: 0-10.00V (If you choose 4 - 20mA, less than 2mA is...) Broken wire ; Then set P622 = 2 mA * 250 ohms =0.50V)	0.50V	☆

Function code	Name	Setting Range	Factory value	Change
P623	PID feedback loss detection time	0.0s - 20.0s	1.0s	☆
P624	PID reverse cutoff frequency	0.00 - Maximum frequency	0.00Hz	☆
P625	PID derivative limiting	0.00% - 99.99%	0.10%	☆
P626	PID given change time	0.00 - 99.99s	0.00s	☆
P627	PID feedback filter time	0.00 - 60.00s	0.00s	☆
P628	PID output filtering time	0.00 - 60.00S	0.00s	☆
P629	reserve			
P630	PID proportional gain P2	0.0 - 600.0%	200.0%	☆
P631	PID proportional gain I2	0.1 - 10.00S	0.50S	☆
P632	PID proportional gain D2	0.0 - 9.999S	0.000S	☆
P633	PID parameter switching conditions	0: Do not switch 1: Switch via S-Video 2: Automatic switching based on deviation	0	☆
P634	PID parameter switching deviation 1	0.0% - P6.35	5.0%	☆
P635	PID parameter switching deviation 2	P6.34 - 100.0%	10.0%	☆
P636	PID initial value	0.0% - 100.0%	0.0%	☆
P637	PID initial value hold time	0.00 - 99.99s	0.00s	☆
P638	reserve			☆

Function code	Name	Setting Range	Factory value	Change
P639	PID integral attribute	Units digit: Separation of integrals 0: Invalid 1: Effective Tens digit: Whether to stop the product after reaching the limit. point 0: Continue accumulating points 1: Stop scoring	00	☆
P640	PID Stop Calculation	0: No calculation during shutdown; 1: Calculation during shutdown	0	☆
P641	Water pressure test value	0.00 bar - P604 (If set to 0.00 bar , no detection will be performed)	0.50 bar	☆
P642	High or low voltage alarm After the police arrived, after the delay P642, Automatic Reset High voltage fault	3) After a high-pressure alarm, wait until the pressure returns to normal. After a normal delay, P642 automatically resets to high. Pressure failure, 4) After a low-pressure alarm, P642 will activate after a delay. Dynamic reset low voltage fault, If P642=0, a high-pressure or low-pressure alarm will be triggered. Afterwards, it will not reset, ranging from 0 to 9999 seconds.	10S	☆
P643	Low-voltage alarm detection time	Range 0 - 9999S During operation, the pressure is lower than P606, continuously P643 will report a "low voltage fault" and stop. Machine, fault code " LP "; if P643=0, Low-voltage fault not detected	10S	☆
P644	Water shortage alarm detection time	0 - 9999S	100S	☆

Function code	Name	Setting Range	Factory value	Change
P645	Automatic operation upon power-on delay Time settings	0: Invalid; 1: Valid	0	☆
P646	10 days before water shortage self-reset Times, interval	0 - 9999s	600S	☆
P647	Water pressure self-reset 10 times After that, the interval time	0 - 1000 points	60 points	☆
P648	Effective against frostbite	1 - Valid, 0 - Invalid	0	☆
P649	Hibernation, waiting for freezing protection time	0 - 9999s	900s	☆
P650	In hibernation mode, anti-freeze operation.time	0 - 9999s	30s	☆
P651	In hibernation mode, anti-freeze operation. frequency	0 - 50.0Hz	15.0Hz	☆
P652	Sleep mode detection: Frequency change <P652/S, only then did it open Initial judgment of hibernation	0 - 10.0Hz	0.5Hz	☆
P653	Hibernation detection: frequency reduction Allowable pressure to drop	0.0 - 10.0%	0.60%	☆

Function code	Name	Setting Range	Factory value	Change
P654	Sleep determination: per second frequency of decline	0 - 10.0Hz	0.3Hz	☆
P655	Hibernation detection: the number of times the frequency of descent is measured.	0 - 1000	10 times	☆
P657	Pid sampling time	0 - 1000 ms	4ms	☆
P666	FI is below the minimum input setting Choose	Units digit: AI is below the minimum input setting selection. 0: Corresponds to the minimum input setting of 1: 0.0%. Tens: Reserved	H0.0	☆
P7 Group				
P700	baud rate	0: 4800 BPS 1: 9600 BPS; 2:19200; 3:38400;	1	☆
P701	Data format	0: No checksum (8-N-1) for ASC 1: Even parity (8-E-1) for ASCII 2: Odd parity (8-0- 1) for A SC 3: No checksum (8-N-) 1) for RTU 4: Even parity (8-E-) 1) for RTU 5: Odd parity (8-0- 1) for RTU	3	☆
P702	Local address	1 - 249,0 are broadcast addresses	1	☆
P703	Communication error handling	0: No Report police 1: Alarm, displaying Co 2: Trigger fault Co and stop the machine.	0	☆
P704	Communication timeout	0.0 (invalid), 0.1s~60.0s	0.0	☆

Function code	Name	Setting Range	Factory value	Change
P8 Group				
P800	User password	0: Locked 1: Not locked	1	☆
P802	Model Selection	0 : Heng change Rectangle G type 1: Change change Rectangle P type	change	☆
P803	Overvoltage protection level setting Certainly	410V (220V level) 810V (380V level)	change	☆
P804	Low voltage protection level setting Certainly	150V (220V level) 310V (380V level)	change	☆
P805	Temperature alarm value		change	☆
P807	Communication frequency setting decimal point	0: 1 Bit Small number: 5 0 Table 0 Show 50.0 Hz; 1: 2 decimal places: 5000 express 50.0HZ	0	☆
P812	Digital setting frequency Shutdown memory selection	0: Memory 1: No memory	0	☆
P813	reserve		0	
P814	Motor overload coefficient	0.20 - 10.00	1.00	☆
P815	PWM switching frequency	0.0~999.9Hz	1.0Hz	☆
P816	Motor overload protection selection	0: Prohibited; 1: Allowed	1	☆

Chapter 7
Detailed Explanations of Functional Parameters

7-1 Parameters for monitoring

Parameters	Name	Setting Range	Descrption
P000	Main display data selection (Initial value: 00) Setting range (00-32)	00	Displays the set frequency
		01	Displays the inverter output frequency
		02	Displays the inverter output current
		03	Displays the motor speed
		04	Displays the DC bus voltage
		05	Displays the inverter temperature
		09	Displays record of last faults (1)
		10	Displays record of last faults (2)
		11	Displays record of last faults (3)
		12	Displays record of last faults (4)
		13	Displays the recently set frequency of the inverter when the fault occured
		14	Displays the recently output frequency of the inverter when the fault occured
		15	Displays the recently output current of the inverter when the fault occured
		16	Displays the recently output voltage of the inverter when the fault occured
		17	Displays the recently DC bus voltage of the inverter when the fault occured
		18	Displays the recently temperature of the inverter when the fault occured

User can set the initial display of the inverter through parameter P000.

For example, in order to monitor rotation speed through the operation panel , user can set parameter P000 to "03".

Initial value of P000 is "00", therefore , if not been changed, inverter will display the set frequency .

P001	Display the set frequency
	It displays the set frequency of inverter.

You can monitor the set frequency of inverter by examining the content of this parameter.

P002	Display the output frequency
	It displays the present output frequency of inverter.

You can monitor the present output frequency of the inverter by examining parameter P002.

P003	Display the output current
	It displays the output current of inverter.

You can monitor the actual output current by examining parameter P003.

P004	Display the motor speed
	It displays the actual rotation speed of motor.

You can monitor the actual rotation speed of motor by examining parameter P004.

P005	Display the DC bus voltage value
	It displays the voltage of DC bus in main circuit of inverter.

You can monitor the actual voltage of DC bus by examining parameter P005.

P006	Display temperature of inverter
	It displays the actual temperature of inverter.

You can monitor the actual temperature of inverter by examining parameter P006, which will help you make judgment on the running condition of inverter.

P010	Alarm record 1
P011	Alarm record 2

P012	Alarm record 3
P013	Alarm record 4
	It records the latest four faults of inverter.

You can check the conditions of latest four faults by examining P010 to P013. These four parameters can help user make judgment on the running condition of inverter and find the cause of fault and eliminate hidden trouble.

P014	Displays the recently set frequency of the inverter when the fault occured
P015	Displays the recently output frequency of the inverter when the fault occured
P016	Displays the recently output current of the inverter when the fault occured
P017	Displays the recently output voltage of the inverter when the fault occured
P018	Displays the recently DC bus voltage of the inverter when the fault occured
	They display the detailed status when the latest fault occurs. You can check the actual frequency setting, actual output frequency, actual output voltage, and dc voltage of main circuit in inverter by examining these parameters respectively.

You can check the detailed status when the latest fault occurs by examining the content of P014--P018. You can examine the frequency setting, actual output frequency, and actual output current, actual output voltage, DC bus voltage of main circuit. According to the above data, you can analyze the cause of fault and find a solution quickly, which will help maintenance personnel in repair work.

For NZS series inverter, you can use parameter “F.00” to set the main display data. It’s also possible to monitor the data directly through the parameters “P001~P018”.

You may monitor the data by pressing the switching key as shown in below table:

Procedure	Press key	Display	Explanation
1	Turn on power	STOP FWD F50.0	① Inverter is in standby mode. ② The keypad displays frequency setting. FREE light is on, which means that the keypad is displaying frequency setting
2	Press RUN	RUN FWD F50.0	Start inverter ① Inverter is in running and RUN light is on. ② The image displays frequency setting. Forward light is on; inverter is in Forward state.
3	Press ENTER DISP for once	RUN FWD H50.0	Switch display; stop switching when actual output frequency is displayed. Inverter is in Forward running state. ① The actual output frequency is 50.0Hz.
4	Press ENTER DISP for once	STOP FWD A00.0	Switch display; stop switching when actual output current is displayed. ① The actual current output is 0A
5	Press ENTER DISP for once	RUN FWD Frd	Display running state.

7-2 Basic parameters

P100	Digital frequency setting		(Initial value: 0.00Hz)	
	Setting range	0.00-Maximum frequency	Unit	0.01

When P101 is set to 0, inverter works in Digital frequency setting mode. The frequency value is set by P100.

During running, you can change frequency by modifying the content of parameter P100 or by pressing " ▲ " key or " ▼ " key to change frequency. If you change frequency by modifying P100, when the inverter stops running or when power is off, the modified content can be remembered.

If you change frequency by pressing " ▲ " key or " ▼ " key, when the inverter stops running or power is off, the modified content will not be remembered; instead the original P100 will be remembered. When the inverter is started next time, it will operate at the original value of P100.

P101	Frequency setting selection		Initial value : 0	
	Setting range	0-5	Unit	1
	Explanation	0: Digital frequency setting (P100) 1: AI (0-10V/4-20mA)/FIV 2: Reserved 3. Setting dial (Operation panel) 4. UP/DOWN frequency setting 5: RS485 communication frequency setting		

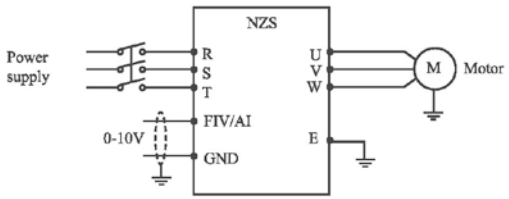
Frequency setting selection can be used to decide the output frequency of inverter.

0: Digital frequency setting

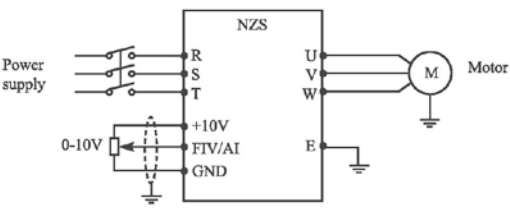
The output frequency of inverter is decided by P100. Generally speaking, you can change output frequency by pressing the " ▲ "or " ▼ " key on Keypad. Refer to P100 for details.

1: Analog voltage mode AI (0~10VDC/4-20mA)/FIV (0-10V).

The output frequency of inverter is decided by external voltage signal (0-10V), which is put into inverter through AI/FIV terminal . There are two modes of external voltage signal: one is setting signal ranging from 0 to 10V; the other is setting by potentiometer. Refer to the following diagram for connection method.



Explanation: control the output frequency through terminal FIV/ AI (0~10V).



Explanation: control output frequency of inverter by FIV voltage signal sent by external POT (10k Ω)

3: Setting dial mode (Operation panel)

You can control the running of NZS series inverter by the POT knob on Keypad.

Pay attention to the POT knob in Keypad which enables you to switch between monitoring images.

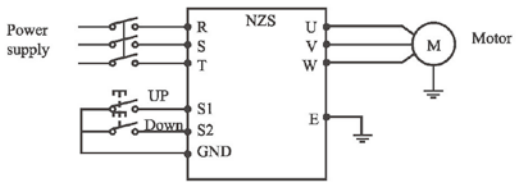
Turn the 

change the output frequency

4 UP/DOWN setting mode

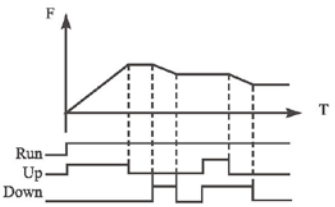
The output frequency of inverter is controlled by external UP/DOWN terminals. External terminals can be selected from P315 to P322 , been selected one of external terminals as UP/DOWN. When UP is valid, the frequency will go up. When DOWN is valid, the frequency will go down. When UP and DOWN are both valid, the frequency

will remain the same.



Parameter: P317=15, S1 terminal will be set in UP mode.

P318=16, S2 terminal will be set in DOWN mode.



Explanation: when UP is valid (UP is closed), frequency will go up. When DOWN is valid (DOWN is closed), frequency will go down.

P102	Start signal selection		Initial value : 0	
	Setting range	0-2	Unit	1
	Explanation	0: Operation panel (FWD/REV/STOP) 1: I/O terminal 2: Communication (RS485)		

Start signal selection are used to set running signal source.

0: Operation panel (FWD/REV/STOP)

Operation panel gives the running signal. The running of inverter can be controlled by the " RUN " key (Forward reverse) key on the operation panel. Press " STOP/RESET " key to stop running of inverter.

1: I/O terminal

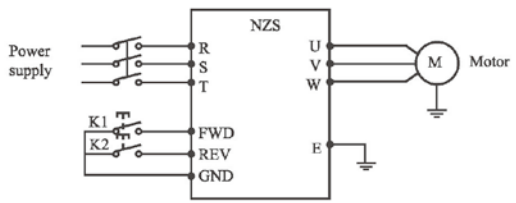
In the initial setting ,the forward/reverse rotation signals are used

as start and stop signals .Turn on either of the forward and reverse rotation signals to start the motor in the corresponding direction. If both are turned off (or on) during operation , the inverter decelerates to a stop (or Keep the original running condition)

You can make two-wire type or three-wire type control mode by using I/O terminal

① Two-wire type

A two-wire type connection is shown below :



Parameter: P102=1 P315=6 P316=7

Operation Instruction of NT3000 Series Inverter

Actuating explanation:

Input Status		Status of inverter
K1	K2	
ON	OFF	Forward
OFF	OFF	Stop
OFF	ON	Reverse
ON	ON	Keep the original running condition

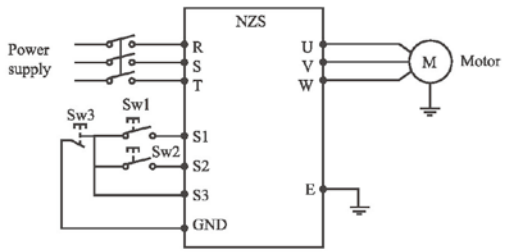
② Three-wire type

A three-wire type connection is shown below.

The start self-holding selection becomes valid when the STOP signal is turned on. In this case, the forward/reverse rotation signal functions only as a start signal.

If the start signal (S1/S2) is turned on and then off, the start signal is held and makes a start. When changing the direction of rotation, turn S1(S2) on once and then off.

The stop the inverter, turning off the STOP signal once decelerates it to a stop.



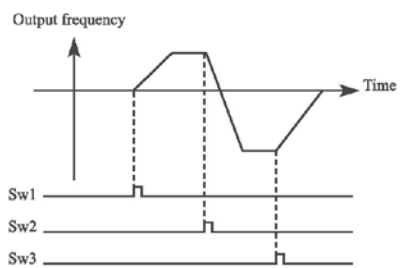
Use S1, S2, or S3 as input terminal for external signal

Parameter: P317=6 S1 is in forward

P318=7 S2 is in reverse

P319=9 S3 is in stop mode

P102=1 external terminal input



2: RS485 mode

Inverter can receive command and exchange data with computer by serial communication.

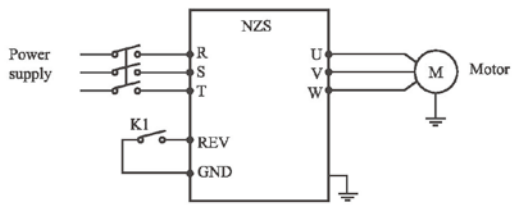
P103	"stop" key lock operation selection		nitial value : 1	
	Setting range	0-1	Unit	1
	Explanation	0: "Stop"key lock mode invalid 1: "Stop" key lock mode valid		

The "STOP"key operation of the operation panel can be made

invalid to prevent unexpected stop.

Set "0" in P103,then press "ENTER" for 2s to make the "STOP" key operation invalid, and "STOP" key can not stop running of inverter

Set "1" in P103,then press "ENTER" for 2s to make the "STOP" key operation valid, and "STOP" key can stop running of inverter



Procedure	Input	Explanation
1	K1 close	Reverse of inverter is started
2	(K1 open) press stop key	Inverter stops
3	K1 open	Running signal is removed
4	K1 close	Reverse of inverter is started

P104	Reverse prevention setting		Initial value : 1	
	Setting range	0-1	Unit	1
	Explanation	0: Reverse prohibited 1: Reverse allowed		

Many devices only allow rotation in single direction. In this case, you can set the machine in single rotation mode by this parameter.

0: Reverse prohibited

Reverse of motor is prohibited. When P104 is set at reverse prohibited, switch between Forward and reverse is invalid.

1: Reverse allowed

Reverse of motor is enabled, switching between forward and reverse is valid.

P105	Max. frequency	Initial value: 50.00
	Setting range	Min. output frequency ~ 599Hz

The output frequency range of inverter is 0.1~599Hz. Therefore, inverter can drive the motor higher than 50/60Hz, which could cause mechanical damage or accident.

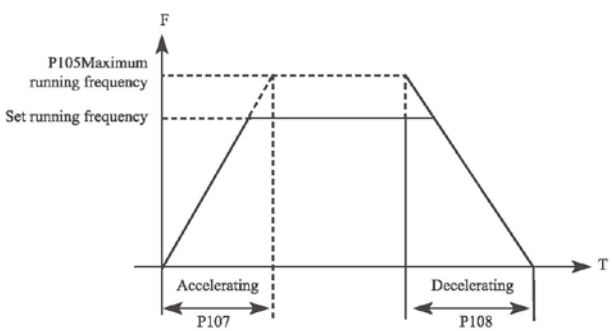
This parameter is to limit the inverter output frequency in order to prevent motor operating at too higher speed.

P106	Min. frequency		Initial value: 0.00
	Setting range	0.00 ~ max. frequency	

This parameter is to set the minimum output frequency of the inverter. If the setting frequency is lower than the Min. frequency, inverter will output on the Min. frequency. In some application, this function could avoid motor overheating due to the low speed operation.

P107	Acc time		Initial value: change
P108	Dec time		Initial value: change
	Setting range	0.1~999.9s	

Acc time refers to the time for inverter to reach the max. frequency from 0.00Hz. Dec time refers to the time for inverter to lower to 0.00Hz from max. frequency.



The Default Acc/Dec time is the primary Acc time/ Dec. time. Other Acc time or Dec time can be selected via external terminal.

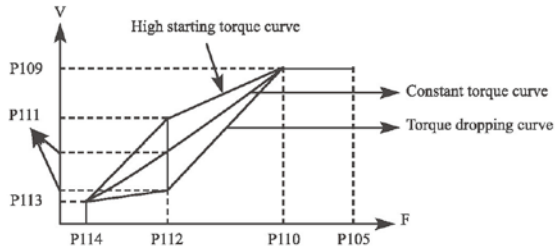
P109	V/F maximum voltage		Initial value : 380
	Setting range	V/F intermediate voltage~500.00	Unit 0.01
P110	V/F fundamental frequency		Initial value : 50
	Setting range	V/F intermediate frequency ~ max. frequency	Unit 0.01
P111	V/F intermediate voltage		Initial value : change
	Setting range	V/F minimum voltage ~ V/F maximum voltage	Unit 0.1
P112	V/F intermediate frequency		Initial value : 2.5
	Setting range	V/F minimum frequency ~ V/F fundamental frequency	Unit 0.01
P113	V/F minimum voltage		Initial value : 15
	Setting range	0.0 ~ V/F intermediate voltage	Unit 0.1
P114	V/F minimum frequency		Initial value : 1.25
	Setting range	0.0 ~ V/F intermediate frequency	Unit 0.01

Parameters from P109 to P114 determine the V/F curve of inverter. Set corresponding V/F curves according to different loads.

Constant torque curve: application for constant torque load, output voltage and output frequency are in linear relation.

Down (variable) torque curve: application for variable torque load, like fan and pump. Load will increase with the increase of rotation speed.

High start torque curve: application for heavy load and load need high starting torque.



P109: V/F maximum voltage, V/F maximum voltage can be set according to the motor connected. Generally, it will be set at the rated voltage of motor. When motor is very near to inverter, usually within 30m, it should be set at a higher value.

P110: V/F fundamental frequency

V/F fundamental frequency, please set it at the running voltage frequency of motor. Generally, do not change V/F fundamental frequency setting; or else, it is very likely to damage motor.

P111: V/F intermediate voltage

Set V/F intermediate voltage according to the specific load. Improper setup can cause over current of motor or insufficient torque output, or even cause inverter protection. Increasing the value of P111 can increase output torque and output current. Please monitor output current while changing the value of P111. While changing the value of P111, adjust the value slowly until the necessary output torque is reached. Too higher setting may cause inverter protection or fault.

P112: V/F intermediate frequency

V/F intermediate frequency determines the intermediate point of V/F curve. Improper setup can cause insufficient torque or over current protection of inverter. Generally, do not change the setup value of this parameter while using.

P113: V/F minimum voltage

V/F minimum voltage setup is relevant to start torque to a certain extend. Increasing the value of this parameter properly can increase

the torque of starting, it can also cause over current. Generally, it's not necessary to change the value of P113.

P114: V/F minimum frequency

V/F minimum frequency determines the initial point of V/F curve, it is the minimum value in V/F curve.

Please refer to the following table for the specific Default setting of each model:

parameter / Model	P107	P108	P111	P115
NZS-0R7T2P-B1(2)	8	8	14	10
NZS-1R5T2P-B1(2)	9	9	14	9
NZS-0R7T4P-B1(2)	8	8	27	5
NZS-1R5T4P-B1(2)	9	9	26	5
NZS-2R2T4P-B1(2)	10	10	25	5

P115	Carrier frequency	Factory Setting
	Setting range 1-15 unit 1	

Carrier frequency decides the switching frequency of internal power module. The factory setting of inverters with different capacity are different because will affect motor noise, motor heating and disturbance.

Carrier frequency P115	Motor Noise	Motor Heating	Disturbance
Small → Big	Big → Small	Small → Big	Small → Big

Therefore, when the environment demands running without noise, you shall increase the value of P115, the maximum load of inverter will decrease. If motor is far from inverter, you shall lower the value of P115 so as to lower the leakage current between wires and wire to ground.

When the environment temperature or motor load is high, you shall lower the value of P115 to reduce the heating of the inverter. Refer to table in P114 for the factory set of P115.

P117	Initialization of parameters	Initial value : 0
	Setting range 0-8	Unit: 1
	Explanation	8: Initialization of parameters

When the parameter setup is not proper or when false running leads to improper setup of parameter, you can set P117 at 08 to restore all parameters to the Factory Setting, and then you can set them again according to actual need.

Attention: when locked up of parameters is valid, that is when P118=1, you cannot carry out initialization of parameters and change them. Please unlock first, and then set these parameters.

P118	Initialization of parameters		Initial value: 0
	Setting range 0-1	Unit: 1	
	Explanation	0: Unlocked	

1: Locked

You can lock the parameter by P118 to prevent unexpected change of the inverter setup.

When P118 is valid, all the other parameters except P100 (main frequency setting) cannot be changed.

7-3 Parameters of basic applications

P200	Start mode selection			Initial value : 0
	Setting range	0-1	Unit	1
	Explanation		0: Start at start frequency 1: Tracing start	

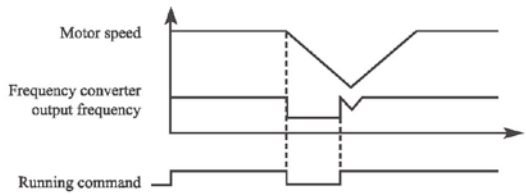
There are two start modes for NZS series inverter. You can choose from the two by setup of parameter P200 and the condition of machinery.

0: Start at start frequency

Most loads do not have special requirement in start. Inverter output from the start frequency.

1: Tracing start

Tracing start is application for start after fault reset or instantaneous power failure. Using tracing start function, inverter can automatically detect the rotation speed and rotation direction of motor, the output the starting frequency and voltage accordingly.



Attention: when inverter starts in tracing start mode, inverter will have speed tracing in the sequence of high to low frequency. High current is likely in start, it is also possible to cause current. Therefore, you need to have over current level setup (4.09 setup). The specific value depends on the load.

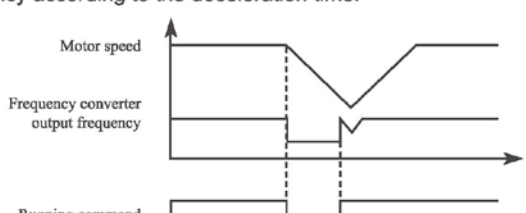
In addition, when the value of 4.09 is too low, it may lead to a long start time. If over current in the speed tracing, inverter will pause the speed tracing.

P201	Stop mode selection		Initial value : 0	
	Setting range	0-1	Unit	1
	Explanation	0: Deceleration to stop 1: Coasting stop		

You can choose a suitable stop mode according to the actual load.

0: Deceleration to stop

Once inverter receives stop command, it will reduce the output frequency according to the deceleration time.

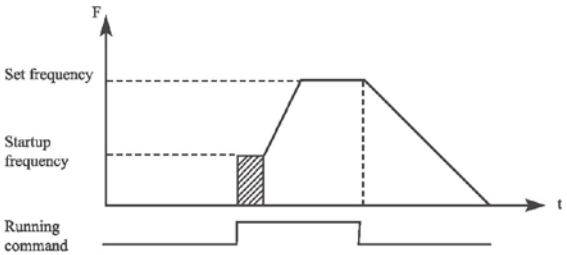


With regard to stop mode after stop frequency is reached, you can choose DC injection brake and other options. If you do not choose DC injection braking, it will stop in coasting stop mode.

1: Coasting stop

When inverter receives stop command, it will stop frequency output and it will have free running with load until it stops.

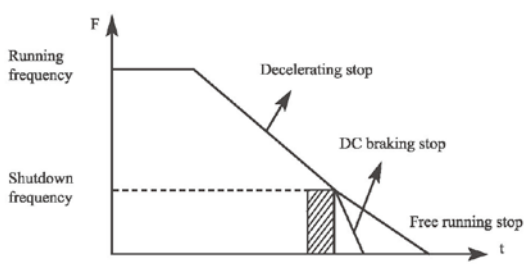
P202	Start frequency setting		Initial value : 0.5	
	Setting range	0.10-10.00	Unit	0.01



Start frequency is the initial frequency when inverter starts. For device with heavy load or requires large starting torque, increasing start frequency can make start easier. However, if the start frequency is too high, it may cause over current protection.

P203	Stop frequency setting		Initial value : 0.5Hz	
	Setting range	0.10-10.00Hz	Unit	0.01Hz

When inverter receives stop command, it reduce the output frequency until the stop frequency, then it will start coasting stop or DC injection brake stop according to the setting.

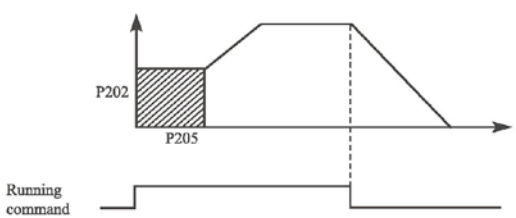


P204	Dc braking current in start Initial value : 100			
	Setting range	0-150	Unit	1
P205	Dc braking time in start Initial value : 0			
	Setting range	0-250	Unit	1

Dc braking in start is application for fan in stop mode and moving load. Because before inverter starts, motor is in free running mode and the rotation direction is unknown. It is easy to cause over current protection in start. Therefore, before start, you shall use DC injection brake to stop the motor in advance.

Dc braking current in start is the ratio of rated current of inverter, adjusting P204 can have different braking torques. While setting value of parameter, you can adjust it from low to high until a sufficient braking torque is reached according to the actual load.

Dc braking time is the period DC injection brake lasts. When it is 0, DC injection brake is invalid.



P206	Dc braking current in stop Initial value : 100			
	Setting range	0-150	Unit	1
P207	Dc braking time in stop Initial value : 0			
	Setting range	0-250	Unit	1

Dc braking in stop is application for load which has requirement on braking.

Dc braking current in stop is the ratio of rated current of inverter. Adjusting this parameter can have different braking torques.

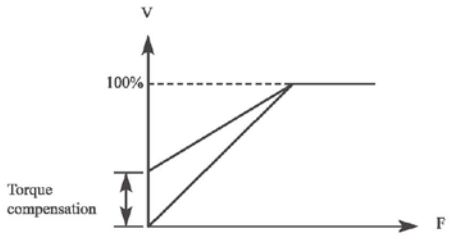
Dc braking time in stop is the period DC injection brake mode lasts. When it is 0, DC injection brake is invalid.

Refer to the explanations of P203, P204 and P205 for relevant details.

P208	Torque boost		Initial value : 5%	
	Setting range	0.1-20%	Unit	0.1

Adjusting parameter P208 can increase voltage and obtain higher torque.

Attention: Too big setting may cause motor overheating. Increase the setting step by step until you get the requested starting torque.



P209	Rated motor voltage		Initial value : 380.00V	
	Setting range	0-500.00	Unit	0.01
P210	Rated Motor current		Initial value : *	
	Setting range		Unit	0. 1
P211	No load current ratio of motor		Initial value : 40	
	Setting range	0-100	Unit	1
P212	Rated motor rotation speed		Initial value : 1420	
	Setting range	0-6000	Unit	1
P213	Numher of motor poles		Initial value : 4	
	Setting range	0-10	Unit	1
P214	Rated motor slip		Initial value : 2.5	
	Setting range	0-100	Unit	0. 1

Please set above parameters according to the motor rating.

P209 Rated voltage motor

Please set rated voltage of motor according to voltage value on motor nameplate.

P210 Rated motor current

Please set rated current of motor according to the current value on nameplate. If the running current exceeds the value of rated current, inverter will trip to protect the motor.

P211 No load current ratio of motor

The value of rated no load current of motor can affect slip compensation. Rated no load current is the percentage of motor current.

P212 Rated motor rotation speed

The value of parameter P112 is the rotation speed at 50Hz. It is related to rotation speed display. Generally, it shall be set according to the value on nameplate.

To display the actual rotation speed of motor, you can set parameter P212 at the actual rotation speed at 50Hz.

P213 Number of motor poles

Set the number of pole pairs of motor by adjusting this parameter according to the value on nameplate

P214 Rated motor slip

When inverter drives motor, slip will increase when load increase. Adjusting P214 can compensation the slip and make motor speed close to the synchronization speed.

P215	Rated motor frequency		Initial value: 50Hz	
	Setting range	0.00-400.00	Unit	0.01
P216	Resistance of stator		Initial value: 0	
	Setting range	0-100.00	Unit	0.01
P217	Resistance of rotor		Initial value: 0	
	Setting range	0-100.00	Unit	0.01
P218	Self inductance of rotor		Initial value: 0	
	Setting range	0-1.000	Unit	0.001
P219	Mutual inductance of rotor		Initial value: 0	
	Setting range	0-1.000	Unit	0.001

The above parameters are parameters of motor.

P215 Rated frequency of motor

Please set rated frequency of motor according to motor nameplate.

P216 Resistance of stator

P217 Resistance of rotor

P218 Self inductance of rotor

P219 Mutual inductance of rotor

Set the above parameters according to the actual condition of motor.

7-4 Parameters for input and output application

P300	AI/FIV minimum voltage input		Initial value: 0	
	Setting range	0~10V: 0V 4-20mA: 1V	Unit	0.1
P301	AI/FIV maximum voltage input		Initial value: 10.0	
	Setting range	0~10V: 0V 4-20mA: 5V	Unit	0.1
P302	AI/FIV input filter time		Initial value: 1.0	
	Setting range	0-25.0	Unit	1

P300 AI/FIV minimum voltage input

AI/FIV minimum voltage input value is related to frequency of lowest analogue input. Voltage command below this value is deemed as invalid command.

P301 AI/FIV maximum voltage input

AI/FIV maximum voltage input value is related to frequency of highest analogue input. For voltage higher than this value, the machine will still operate at this value.

The value of P300 and that of P301 decide the range of input voltage.

P302 Input filter time

Value of input filter time decides the response speed of inverter to analogue change. With the increase of value of P302, the inverter will get slower for responding to analogue change.

P310	Frequency of low analog		Initial value: 0.00	
	Setting range	0.0-600.00	Unit	0.01
P311	Direction of of low analog		Initial value: 0	
	Setting range	0-1	Unit	1
	Explanation	0: Positive direction 1: Negative direction		
P312	Frequency of high analog		Initial value: 50	
	Setting range	0.00-600.00	Unit	0.01
P313	Direction of high analog		Initial value: 0	
	Setting range	0-1	Unit	1
	Explanation	0: Positive direction 1: Negative direction		
P314	Analogue reverse options		Initial value: 0	
	Setting range	0-1	Unit	1
	Explanation	0: No reverse at negative bias voltage 1: Reverse allowed at negative bias voltage		

The parameter group of P310-P314 decides the running condition of analogue, including output frequency and direction. According to actual need of user, they can form various control curves.

P310 Frequency of low analog

Frequency of lower analogue decides the output frequency of lowest analogue input, corresponding to analogue minimum voltage (current) input.

P311 Direction of low analog

Direction of lower analogue decides the running condition at low frequency, whether it is Forward or reverse.

P312 Frequency of high analog

Analogue high-end frequency determines high-end output frequency, and is corresponding to analogue maximum voltage (current) input.

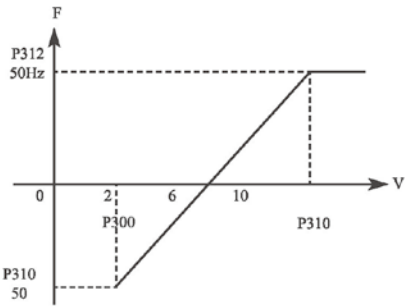
P313 Direction of high analog

Analogue high-end direction determines whether the running status of high-end frequency is forward or reverse.

P314 Analog input reverse selection

Analogue reverse selection determines running status of analog negative bias voltage, satisfied curve needed by customer can be constituted by using above parameter.

Example 1: upper computer output 2-10 V signal to control inverter, 50Hz reverse to 50Hz forward running.



Introduction: P300=2 FIV minimum voltage input: 2V (inverter regards signals below 2V as invalid signals);

P301=10 FIV maximum voltage input: 10V (signals over 10V are regarded and handled as 10V);

P310=50 Analogue low-end frequency: 50Hz;

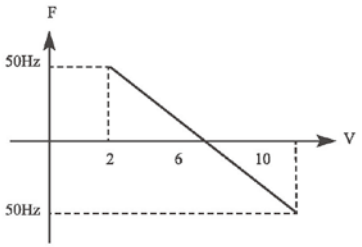
P311=1 Analogue low-end direction: 1 (reverse);

P312=50 Analogue high-end frequency: 50Hz;

P313=0 Analogue high-end direction: 0 (Forward);

P314=1 Analogue reverse selection: 1 (negative bias voltage can be reversed).

Attention: In various curves, switching instructions of forward and reverse remain effective, when forward and reverse are switched, the curve will be reversed, and the diagram of curve is as follows:



P315	Multifunction input terminal---FWD/S1 terminal	Default value 6
P316	Multifunction input terminal---REV/S2 terminal	Default value 7
P317	Multifunction input terminal---S1/S terminal	Default value 1
P318	Multifunction input terminal---S2/S4 terminal	Default value 18
P319	Multifunction input terminal---S3 terminal	Default value 15
P320	Multifunction input terminal---S4 terminal	Default value 16
P321	Multifunction reserved	Default value 8

P322	Multifunction reserved		Default value 9	
	Range	0-32	Unit	1
	Settings	0: Invalid 1: Jog 2: Jog Forward 3: Jog reverse 4: Forward/ reverse 5: Running 6: Forward 7: Reverse 8: Stop 9: Multi-speed selection 1 10: Multi-speed selection 2 11: Multi-speed selection 3 12: Multi-speed selection 4 13: Acceleration/ deceleration selection 1 14: Acceleration/ deceleration selection 2 15: Frequency increasing signal Up 16: Frequency decreasing signal Down 17: Coasting stop 18: Fault reset 19: PID function enable 20: PLC function enable 21: Timer 1 start up 22: Timer 2 start up 23: Counter pulse input 24: Counter reset 25: PLC memory clear 26: Winding operation start		

0: Invalid

Set as empty terminal, no function

1: Jog

Set as JOG (inching), usually used in trial running, common inching is operated by 5Hz,

2: Jog Forward

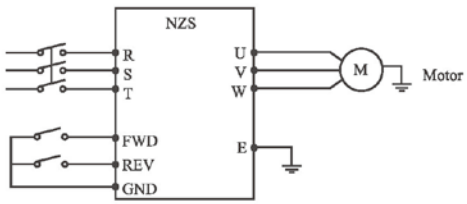
Set as JOG forward.

3: Jog reverse

Set as JOG reverse.

4: Forward/ reverse

Set as forward/ reverse switching, when the terminal is defined to be valid, running status reverse.



Parameter: P102=1, P315=6, P316=4

Terminal status		Running condition
FWD	REV	
ON	OFF	Forward
ON	ON	Reverse
OFF	OFF	Stop

5: Running

Set terminal as running signal.

6: Forward

When terminal is valid, motor run forward.

7: Reverse

When terminal is valid, motor run reverse.

8: Stop

When terminal is valid, motor run reverse.

9: Multi-speed 1

10: Multi-speed 2

11: Multi-speed 3

12: Multi-speed 4

15-speed can be selected by terminal multi-speed 1, 2, 3 and 4 as below table:

Multi-function terminal				Status and explanation
Multi-speed 1	Multi-speed 2	Multi-speed 3	Multi-speed 4	
0	0	0	0	Primary frequency, Primary frequency is determined by P100 or potentiometer
1	0	0	0	Multi-speed 1 (P503)
0	1	0	0	Multi-speed 2 (P504)
0	0	1	0	Multi-speed 3(P505)
0	0	0	1	Multi-speed 4 (P506)
1	1	0	0	Multi-speed 5 (P507)
1	0	1	0	Multi-speed 6 (P508)
1	0	0	1	Multispeed 7(P509)
0	1	1	0	Multi-speed 8 (P510)
0	1	0	1	Multi-speed 9 (P511)
0	0	1	1	Multi-speed 10 (P512)
1	1	1	0	Multi-speed 11 (P513)
1	1	0	1	Multi-speed 12 (P514)
1	0	1	1	Multi-speed 13 (P515)
0	1	1	1	Multi-speed 14 (P516)
1	1	1	1	Multi-speed 15 (P517)

Remarks: 0: terminal invalid 1: terminal invalid

13: acceleration / deceleration selection 1

14: acceleration / deceleration selection 2

4 kinds of acceleration / deceleration times can be selected by acceleration / deceleration selection terminal 1and 2.

Multi-function terminal		Acceleration / deceleration status and result
Acceleration/ deceleration selection 1	Acceleration/ deceleration selection 2	
0	0	Acceleration/ deceleration time 1 (P107, P108)
1	0	Acceleration/ deceleration time 2 (P401, P402)

Multi-function terminal		Acceleration / deceleration status and result
Acceleration/ deceleration selection 1	Acceleration/ deceleration selection 2	
0	1	Acceleration/ deceleration time 3 (P403, P404)
1	1	Acceleration/ deceleration time 4 (P405, P406)

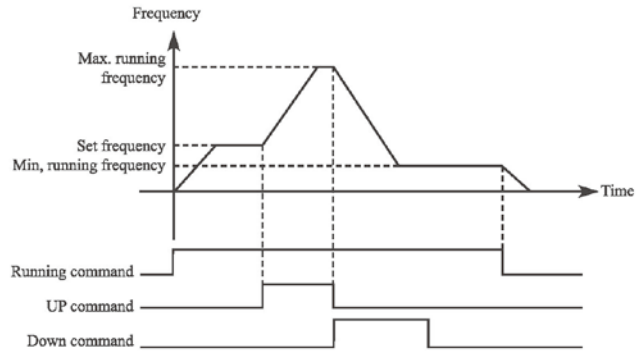
15. Frequency increasing signal (Up signal)

When this terminal is valid, the frequency increases at a constant speed, until operative frequency is highest.

16. Frequency decreasing signal (Down signal)

When this terminal is valid, the frequency decreases at a constant speed, until operative frequency is lowest.

Attention: Inverter will not memorize the frequency setting changed by "UP" and "DOWN" signal. When power is turned off and reset again, inverter still memorizes the set value in P100.



17: Coasting stop

When this terminal is valid, inverter coasting to stop.

18. Fault reset

Reset the inverter when alarm occurs, this terminal function is same to that of the RESET key on the Keypad.

19. PID function enable

When this contact closes, PID function is enabled. When P601 is set as 2, PID is invalid when this contact is disconnected.

20. PLC function enable

When this contact closes, PLC function starts up, and corresponding PLC function opens.

21. Timer 1 starts up

22. Timer 2 starts up

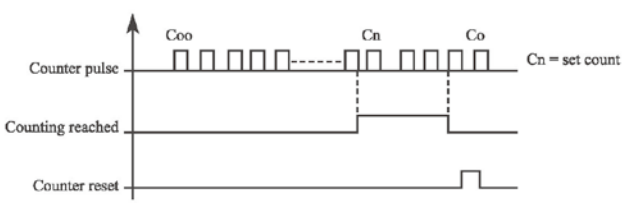
When this contact closes, timer starts up and begins timing, when the timer reaches set value, corresponding multifunction output contacting action.

23. Counter pulse input

This terminal may accept pulse signals of no more than 250 Hz.

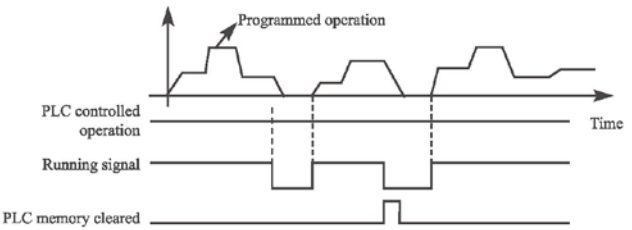
24. Counter resetting

The counted values may be reset and cleared through this terminal.



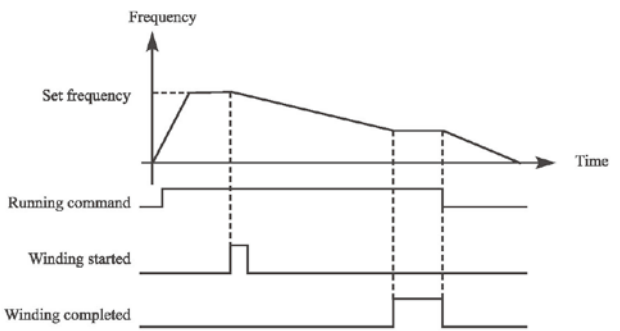
25. PLC memory removal

In the running process of PLC program, owing to fault or stopping, inverter will record status of the program automatically, after the fault is cured and the inverter is switched on again, the inverter will continue running according to the program, when memory removal is valid, program may be reset, and inverter operates from the beginning.



26. Winding function enable

When this signal is valid, winding function is enabled.



Introduction:

① Winding function is activated, and winding begins;

② Winding operation complete, inverter output according to the frequency that winding is completed. The multifunction terminal output the winding complete signal;

③ Inverter stops, the winding complete signal reset.

P324	Output terminal MA, MA		Default value 02	
P325	Output terminal RA, RB, YC		Default value 03	
	Range	0-32	Unit	1
	Setting	0: Invalid 1: In running 2: Frequency reached 3: In fault 4: Zero-speed 5: Frequency 1 reached 6: Frequency 2 reached 7: Accelerating 8: Decelerating 9: Under voltage 10: Timer 1 reached 11: Timer 2 reached 12: Indication for completion of phase 13: Indication for completion of procedure 14: PID upper limit 15: PID lower limit 16: 4-20mA cable open 17: Overload 18: Over torque 26: Winding function complete 27: Counter reached 28: Intermediate counter reached		

0: Invalid

Set as invalid terminal, prevent false operation.

1. In running

Terminal is defined to be in running, when inverter is output, this terminal is ON.

2. Frequency reached

When frequency arrives at setting value, this contact is ON

3. In fault

When inverter detects abnormal existing, this contact is ON.

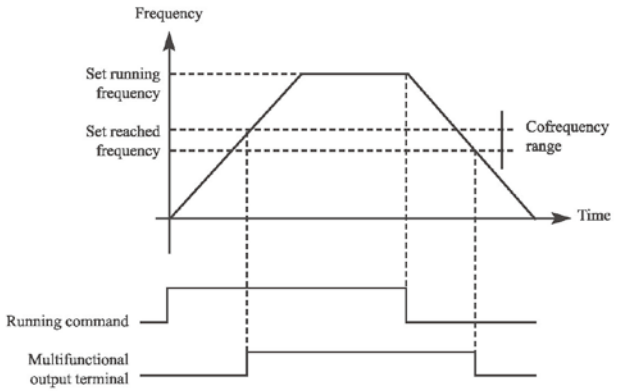
4. Zero-speed

When frequency output by inverter is less than start-up frequency, this contact is ON.

5. Frequency 1 reached

6. frequency 2 reached

When frequency arrives at setting value, this contact is ON.

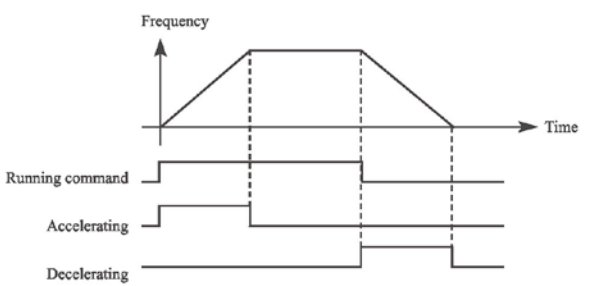


7: Accelerating

When inverter is in the status of accelerating, this contact is ON.

8: Decelerating

When inverter is in the status of decelerating, this contact is ON.



9. Under voltage alarming

When inverter detects that DC bus voltage is lower than setting value, this contact is ON and alarm. Under voltage alarming setting value can be changed through advanced application parameter group.

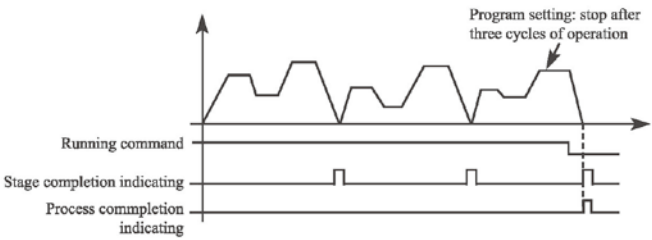
10: Timer 1 reached

11: Timer 2 reached

When inverter arrives at setting value, this contact is ON, when timer start-up signal is removed, this contact is reset.

12: Stage completion indication

In the PLC operation mode, inverter output this pulse signal when inverter finished a section of program.



13. Process completion indication

In the PLC operation mode, inverter output this pulse signal when inverter finished the entire program.

14. PID upper limit

When PID feedback quantity exceeds setting value of upper limit, this contact is ON.

15: PID lower limit

When PID feedback quantity is lower than setting value, this contact is ON.

16: 4-20mA cable open

When FIC input signal is disconnected, this contact is ON and alarms.

17: Overload detection

When inverter detects that motor overloads, this contact is ON.

18: Over torque detection

When inverter detects over torque, this contact is ON.

26: Winding function complete

When winding function is complete, this contact is ON. When inverter stops, this contact is reset.

27: Set counter reached

When inverter implements external counter, and when count value arrives at setting value (P425), this contact is ON.

28: Middle counter reached

When inverter counts, if count value arrives at setting value (P426), this contact is ON.

7-5 Secondary application group

P400	Jog frequency setting		Default value 5.00	
	Range	0.00---max. frequency	Unit	0.01

Jog frequency setting is usually applied to trial run. This function can only be through external terminal.

When JOG function is achieved, other instruction is invalid. When JOG signal is open, inverter decelerate to stop, JOG acceleration/ deceleration time is set in the 4th acceleration/ deceleration parameter.

Control priority level:

Jog→ external multi-speed→PLC operation means→ PID means→ triangle wave (traverse function) → winding→ frequency conversion setting means.

P401	Acceleration time 2		Default value 10.0	
P402	Decelerate time 2		Default value 10.0	
P403	Acceleration time 3		Default value 20.0	
P404	Decelerate time 3		Default value 20.0	
P405	Acceleration time 4		Default value 2.0	
P406	Decelerate time 4		Default value 2.0	
	Range	0-999.9s	Unit	0.1

NZS series inverters can set 4 acceleration / deceleration time. For normal operation, the default selection is the acceleration / deceleration time 1. For JOG operation, the default selection is

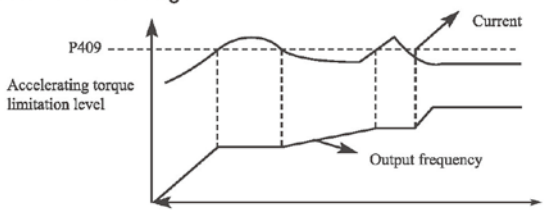
acceleration / deceleration time 4.

P407	Setting value of counter		Default value 100	
P408	Middle value of counter		Default value 50	
	Range	0-999.9s	unit	1

NZS series inverter designs 2 groups of counters, pulse signal less than 250Hz can be accepted through multi-function terminal, when count value reaches setting value, corresponding multi-function output terminal is ON, input terminal of counter resets signal through counter, counter resets and begins counting again.

P409	Acceleration torque limiting level		Default value 150	
	Range	0-200	Unit	1

Parameter P409 is the torque limit level during acceleration. When output current reaches the setting value, inverter will stop accelerating, and when current is below the set value, inverter resume the accelerating.



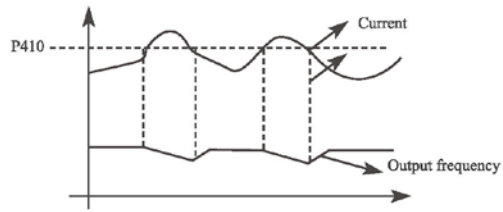
100% current is the rated current of inverter, when P409 is set to be 0, then accelerating torque limit is invalid, and it does not have protecting function.

P410	Constant-speed torque limiting level		Default value 00	
	Range	0-200	Unit	1

Parameter P409 is the torque limit level during constant speed. When output current reaches the setting value, inverter automatically reduce the output frequency in order to reduce the load. When the output current drops, inverter increase output frequency to the setting (100% current is rated current of inverter).

When P410 is set to be 0, constant-speed torque limiting level is

invalid and cannot protect.



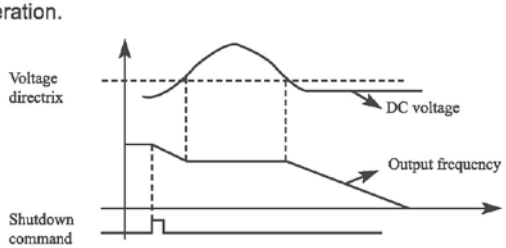
P411	Deceleration over-voltage prevention selection		Default value 1	
	Range	0-1	Unit	
	Settings	0:Invalid 1:Valid		

0: Invalid

During deceleration, the DC-bus voltage may increase, when over-voltage prevention selection is invalid, inverter may trip for over voltage.

1: Valid

During deceleration, when DC-bus voltage reaches the setting value, inverter will stop the deceleration procedure. When DC-bus voltage returns to allowable value, inverter will resume the deceleration.



P412	Automatic voltage regulation selection		Default value 1	
	Range	0-2	Unit	1
	Settings	0: Invalid 1: Valid 2: Invalid when decelerating		

If the input voltage is not stable, temperature of the machinery will

increase, insulation may be damaged, and output torque will be instable.

0: Invalid

Select automatic voltage regulation to be invalid, inverter output voltage fluctuates.

1: Automatic voltage regulation is valid.

Automatic voltage regulation function is selected, and under the condition that input electric source is instable, inverter output stable voltage automatically.

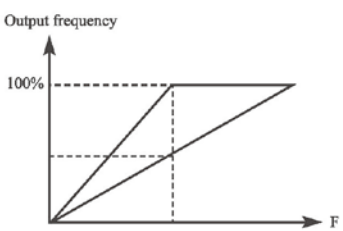
2: Invalid when decelerating: when this function is selected, braking function of inverter can be strengthened.

P413	Automatic energy-saving selection		Default value 0.0	
	Range	0-100	Unit	1
P414	DC Braking voltage Default value:650V for H3400 / 375V for H3200			
	Range	H3400 series: 650V~800V H3200 series: 360V~400V	Unit	1
P415	Braking duty		Default value: 50	
	Range	40-100	Unit	1

P413 Automatic energy-saving selection

In constant-speed running of automatic energy-saving selection, best voltage value may be calculated by loading condition and provided to load, in order to achieve best energy-saving.

Attention: for running that load changes frequently or is almost at full load, this function is not suitable.

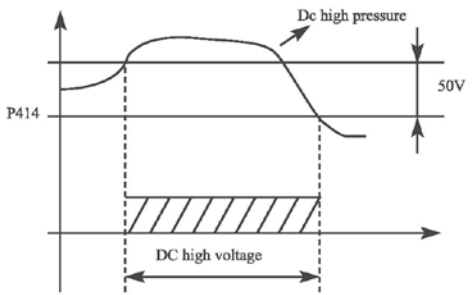


P414 and P415 are only useful for inverter with built-in braking units, and are invalid for inverter with external braking units.

The two parameters adjust internal DC braking voltage level and braking ratio of inverter.

P414 DC Braking voltage

When inverter DC high voltage is higher than set value of P414, built-in braking unit is ON. Energy is released through braking resistor, then DC voltage falls back, when DC voltage falls to a certain value, built-in braking unit stop.



If P414 is too high, DC voltage may be too high and may cause inverter protection.

If P414 is too low, braking resistor maybe too hot.

P415 Braking duty

This parameter decides the working duty of the braking resistor. Higher duty needs high power of braking resistor.

P416	Restart after instant power off		Default value 0	
	Range	0-1	Unit	1
	Settings	0: Invalid: no restart after instant power failure 1: Valid: frequency tracing start-up		

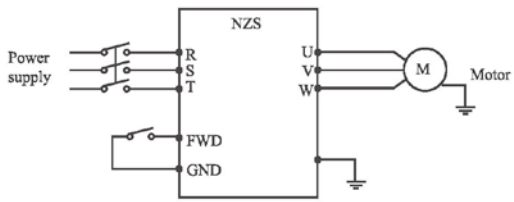
0: Invalid

Inverter clears the running command after power failure. After power is recovered, inverter will not start automatically.

1: Frequency tracing enable

When power is shut-off in short time, inverter keeps the running command as effective. When power is recovered in time, inverter will tracing the motor speed and resume output.

Attention: when instant power failure restarting is enabled, inverter may start the motor automatically. Please take care of the safety when use this function.



Example:

Use K1 (FWD), control running of inverter.

K1 closes, frequency conversion operates, when K1 is cut off, inverter stops. When power is shut off and K1 remains closed, if power is on, inverter starts up suddenly and it may be very dangerous. Please use other control methods, such as three-wire system connection method.

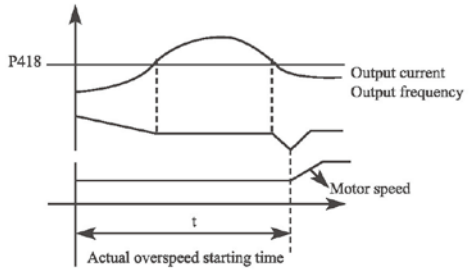
P417	Allowable time of power off		Default value 5.0	
	Range	0-10.0	unit	0.1

P417 sets allowable time of power failure, if time of power failure exceeds set value, power failure restart is invalid.

P418	Flank restart current limiting level		Default value 150	
	Range	0-200	Unit	1

When inverter implements flying restart, inverter tracing downwards from setting frequency by highest speed, output current of inverter increases relatively rapid and may exceeds protection unit setting by inverter, at this time, inverter stops tracing, and output current of inverter falls back to common, inverter continues tracing, setting value 100% of this parameter is rated current of inverter, and

protection unit when inverter searching may be set through P418.



P419	Flank restart time		Default value 5
	Range	0-10	Unit

When inverter enabled the flying restart function, inverter tracing motor speed downwards within the setting time. If it is not completed within setting time, inverter protects.

In above example, when t value > P419 setting value, inverter protects.

P420	Fault restart times		Default value 0	
	Range	0-5	Unit	1
P421	Delay time for restart after fault		Default value 2	
	Range	0-100	Unit	1

After alarm (such as current, over-voltage and so on) occurs, inverter resets automatically (valid when non-zero as set by P420), after the period of time set by P421, inverter starts up according to setting start-up means (P200).

After start-up, if no alarm happens within 60 seconds, inverter resets P420 automatically, after start-up,

If alarm happens again within 60 seconds, inverter records number of alarms, and when number of alarms reaches set value of P420, inverter stops output.

Attention: If P420=0, fault restart is invalid.

When fault restart function is valid, motor may start suddenly, so

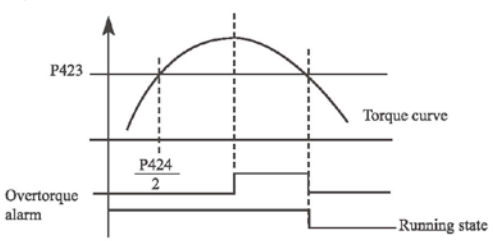
when this function is used, please pay attention to safety.

P422	Over torque action		Default 0	
	Range	0-3	unit	1
	Settings	0: Inverter start detecting over torque only in constant speed, inverter continues operation during over torque 1: Inverter start detecting over torque only in constant speed, inverter stop during over torque 2: Inverter always detecting over torque, inverter continues operation during over torque 3: Inverter always detecting over torque, inverter stop during over torque		

P423	Over torque detection level		Default 0	
	Range	0-200%	Minimum	1
P424	Over torque detection time		Default 0	
	Range	0-200s	Minimum	1

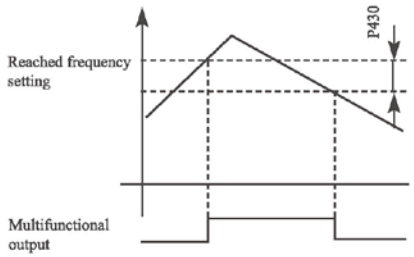
When output current of inverter exceeds setting value of P423, inverter start calculate the over torque time. When the duration exceeds half of setting value of P424, inverter output pre-alarm signal. Inverter continues output until the over torque time exceeds P424 setting, and then inverter protects and output alarm signal.

If P423=0. over torque detection is invalid, and 100% is inverter rated current.



P425	Reaching frequency 1		Default value 100	
	Range	0-Max. frequency	Unit	0.1
P426	Reaching frequency 2		Default value 5.0	
	Range	0- Max. frequency	Unit	0.1

NZS series sets two groups of frequencies arrive, when output frequency arrive the setting value of P425 and P426, corresponding multi-function output terminal is ON. Frequency arrive width is of a hysteresis loop, which is set by P430.



P427	No. 1 timer		Default value 0	
	Range	0.0-10.0s	Unit	0.1
P428	No. 2 timer		Default value 0	
	Range	0.0-100s	Unit	1

NZS series have two timers, when time of the timers reaches setting value (set by P427 and P428), corresponding multi-function terminal is ON.

Timer start is controlled by external multi-function input terminal.

Some simple program may be made by using these two timers.

P429	Constant-speed torque limiting time		Default value 0.50	
	Range	0-999.9s	unit	0.1

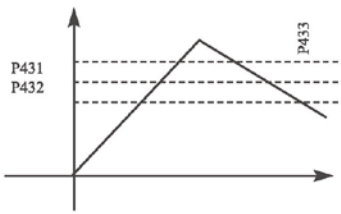
P430	Width of arrive of frequency in hqsteretic loop Default value 0.50			
	Range	0.00-2.00	unit	0.01

This parameter sets frequency reached width, for details, refer to P425-F426 introductions.

P431	Jump Frequency 1		Default value 0	
	Range	0.00-frequency upper limit	unit	0.01
P432	Jump Frequency 2		Default value 0	
	Range	0.00-frequency upper limit	unit	0.01

P433	Jump frequency hysteresis loop width		Default value 0.50	
	Range	0.00-2.00	unit	0.01

If machine resonance occurred at a certain frequency, we can use the frequency jump function to skip the resonance point. NZS support 2 jump frequencies by parameter P431 and P432. Frequency jump hysteresis loop width can be set through P433 as below:



7-6 Special operation (PLC Control)

P500	PLC memory mode		Initial value: 0	
Range	0-1	Unit	1	
	Content:	0: Do not remember 1: Remember		

0: Do not remember

In the operational process of PLC program, P500 will choose not to remember. When machinery stops because of fault or other reasons, inverter will not remember status before the stopping. After restart, running begins from initial state.

1: Remember

In the running of PLC program, P500 will select to remember. When it stops because of fault or other reasons, inverter will remember status before stopping. After restart, inverter will continue operating according to program. Attention: power cannot be cut off.

Stop,power cut and power on, inverter will not remember status before power cut off. After restarting, inverter will run according to initial state of program.

P501	PLC start mode		Initial value: 0	
	Range	0-1	Unit	1
	Content:	0: Invalid (PLC can not start) 1: Valid (PLC start)		

P501 determines PLC start mode of inverter.

P501=0, means PLC is invalid. The inverter is operated by common mode.

When P501=1, PLC will start. The inverter select PLC program to run.

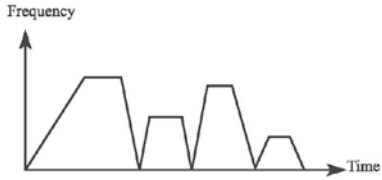
Under the status of PLC start, when various running orders and programs, inverter will choose the highest level to run according to priority level.

Precedence level	Priority level	Item
High→ low	1	Jog
	2	External multi-speed
	3	Internal multi-speed
	4	PID
High→ low	5	Triangular wave
	6	Winding
	7	Inverter setting mode

P502	PLC running mode		Initial value: 0	
	Range	0-4	Unit	1
	Content:	0: PLC stop running after a week 1: PLC pause mode, stop running after a week 2: PLC cycle running 3: Cycle running of PLC pause mode 4: After running for a week, PLC continues running by the end of running frequency		

PLC running mode determines running status of internal multi-speed, either running one circle or cycle running. P502 is only valid when PLC starts up.

PLC pause mode means that when completing every speed in the running process of internal multi-speed, the speed will be down, stop, and accelerate to the next speed. The illustration is as below:



Users may select proper running mode according to actual conditions.

P503	Multi-speed 1		Initial value: 10.0	
P504	Multi-speed 2		Initial value: 15.0	
P505	Multi-speed 3		Initial value: 20.0	
P506	Multi-speed 4		Initial value: 25.0	
P507	Multi-speed 5		Initial value: 30.0	
P508	Multi-speed 6		Initial value: 35.0	
P509	Multi-speed 7		Initial value: 40.0	
P510	Multi-speed 8		Initial value: 45.0	
P511	Multi-speed 9		Initial value: 50.0	
P512	Multi-speed 10		Initial value: 10.0	
P513	Multi-speed 11		Initial value: 10.0	
P514	Multi-speed 12		Initial value: 10.0	
P515	Multi-speed 13		Initial value: 10.0	
P516	Multi-speed 14		Initial value: 10.0	
P517	Multi-speed 15		Initial value: 10.0	
	Setting range	0.00 ----- Max. frequency	Unit	0.01

P503 ----- P517 are set of 15 speed of rated frequency in the running. Regarding relationship multi speed and external terminal please refer to rated instruction 1,2,3,4 of multifunctional terminal.

P518	PLC operation time 1	Initial value: 100
P519	PLC operation time 2	Initial value: 100
P520	PLC operation time 3	Initial value: 100
P521	PLC operation time 4	Initial value: 100
P522	PLC operation time 5	Initial value: 100

P523	PLC operation time 6		Initial value: 0	
P524	PLC operation time 7		Initial value: 0	
P525	PLC operation time 8		Initial value: 0	
P526	PLC operation time 9		Initial value: 0	
P527	PLC operation time 10		Initial value: 0	
P528	PLC operation time 11		Initial value: 0	
P529	PLC operation time 12		Initial value: 0	
P530	PLC operation time 13		Initial value: 0	
P531	PLC operation time 14		Initial value: 0	
P532	PLC operation time 15		Initial value: 0	
	Setting range	0-9999s	Unit	1

PLC operation time determines internal controlling varying rated running duration for each segment, and the running duration for each segment is corresponding to its rate.

P533	PLC operation time 15		Initial value: 0	
	Setting range	0-9999	Unit	1

P533 setting running direction of each segment

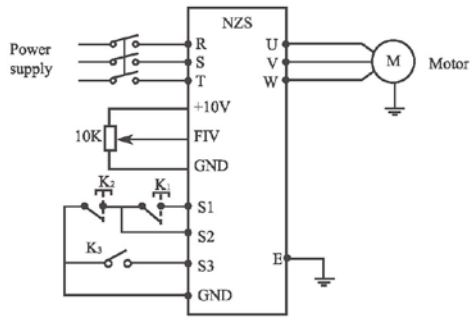
Method of setting running direction:

The way of setting running direction: by means of 16-bit binary system, and then transfer to decimal system value; every bit decides the corresponding running direction: 0 is running forward and 1 is running backward, and this parameter is only valid when the PLC is on.

For example: there is a five-segment rate, the circling running is required as follow:

Items	Output frequency	Running direction	Running duration
Dominant frequency	Potentiometer is adjustable	Forward	
Segment 1	20.0	Reverse	20
Segment 2	60.0	Forward	25
Segment 3	40.0	Reverse	30
Segment 4	15.0	Forward	20

Two buttons, one is for running, the other one is for ceasing; the main frequency requires adjustable potentiometer.



(1) Connection illustration

(2) Parameter setting

PLC operation direction setting: (P533 setting)

Rate of segment 1	Rate of segment 2	Rate of segment 3	Rate of segment 4	Dominant frequency	
4	3	2	1	0	→ position (bit)
0	1	0	1	0	→ run direction <0 is forward, 1 is Reverse
0×24	1×23	0×22	1×21	0×20	→ transfer to decimal system

The binary system number 01010 is transferred to decimal system number: 1×21+1×23+8=10

Define to: P533=10

The parameter defines to:

P101=3 (Keyboard potentiometer setting mode: dominant frequency is controlled by potentiometer)

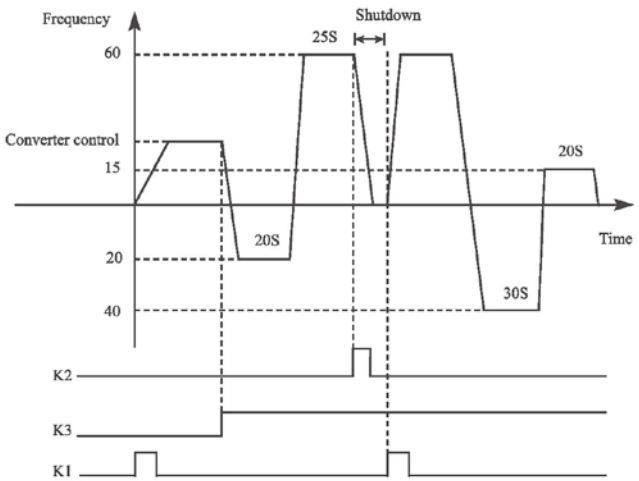
P102=2 (Running setting option: Multifunction end input)

P105=60 (The max. frequency is 60HZ)

P107=10 P108=10 (acceleration/deceleration time 10S)

P314=6 (S1 end is running forward)

P318=8	(S2 end is ceasing)
P319=20	S3 end is PLC starting to running
P500=1	PLC programming memory
P501=1	PLC is on
P502=0	PLC operation one circle and then ceasing
P503=1	Segment 1 rated 20Hz
P504=60	Segment 1 rated 60Hz
P505=40	Segment 1 rated 40Hz
P506=15	Segment 1 rated 15Hz
P518=10	Segment 1 rated running duration is 10s
P519=20	Segment 1 rated running duration is 20s
P520=25	Segment 1 rated running duration is 25s
P521=30	Segment 1 rated running duration is 30s



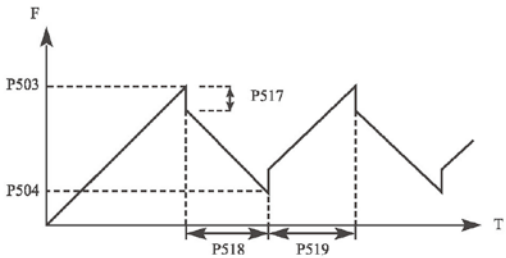
Action instruction: ① Press K1 to startup the inverter and the potentiometer will set output frequency.

② Press K3, PLC to startup, and from the segment 1 PLC program running one circle

and then ceasing

③ If the program is running, press K3, or if there is a fault, and the inverter is ceasing, when the fault is solved, press K1 and the inverter will running forward as the program.

④ If P500 is 1 and the program is not memory, so the running will start from the very beginning.



7-7 Special operation (PID Control)

The inverter can be used to exercise process control, e.g. flow rate, air volume or pressue.

The terminal FIV/FIC input signal or parameter setting is used as a set point and the terminal FIV/FIC input signal also can used as a feedback value to constitute a feedback system for PID control.

P600	PID starting mode		Initial value: 0	
	Setting range	0-1	Unit	1
	Content:	0: PID disable 1: PID start 2: PID start by external terminal		

0: PID disable

PID can not use.

1: PID start

PID is working despite the external signal input, and keeps being valid without external input.

2: PID starts up on condition; PID will start when certain external

input is ON.

P601	PID operation mode selection		Initial value: 0	
	Setting range	0-1	Unit	1
	Content:	0: Negative feedback mode 1: Positive feedback mode		

0: Negative feedback mode

If feedback value(P603)>setting value(P602), inverter decrease output frequency

If feedback value(P603)<setting value(P602), inverter increase output frequency

1: Positive feedback mode

If feedback value(P603)>setting value(P602), inverter decrease output frequency

If feedback value(P603)<setting value(P602), inverter increase output frequency

P602	PID action set point		Initial value:0	
	Setting range	0-2	Unit	1
	Content:	0: figure mode (P604) 1: AI/FIV		

0: Select figure mode as the set point (P604)

Set the set value (P604) from the operation panel or parameter unit.

1: AI/FIV

Terminal AI/FIV input is the set point (0—10DCV).

P603	PID feedback value selection		Initial value: 0	
	Setting range	0-3	Unit	1
	Content:	0: AI/FIV		

0:FIV/AI

Input the signal from the detector (measured value signal (0—10DCV))

P604	PID figure target value setting		Initial value:0	
	Setting range	0.0-100%	Unit	0.01
	Content:	Select FIV as feedback value		

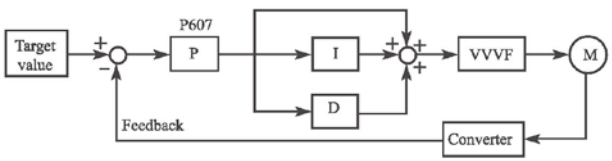
100% setting is corresponding to analog input 10V voltage.

PID closed-loop control is widely used to control the process such as pressure and temperature.

Feedback signal is given from temperature transmitter or pressure transmitter. In case of PID control, the channel of feedback signal input is of analog signal (4 – 20mA or 0 – 10V). There are two channels available for setting.

Block diagram of PID control:

General regulation method for PID control:



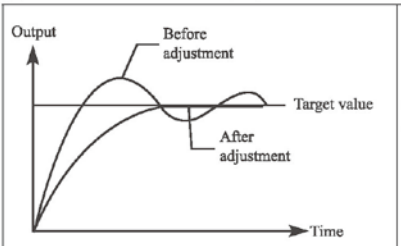
(1) Select sensor/transmitter correctly, for which the standard signal of 4 – 20mA or 0 – 10V shall be selected as output specification.

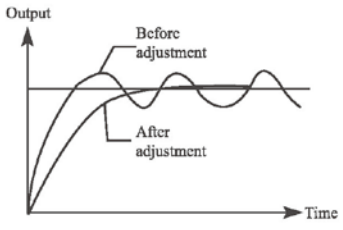
(2) Set PID action set point correctly.

(3) Increase proportional constant (P), in case of non-oscillating output.

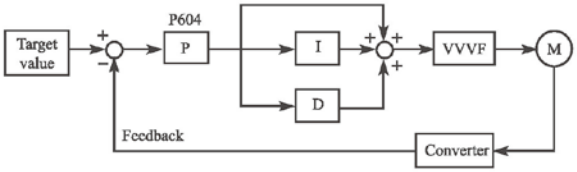
(4) Decrease integration time (Ti), in case of non-oscillating output.

(5) Increase differential (Td), in case of non-oscillating output.

	1. Restraint output from exceeding specific value a: Decrease differential time (D value) b: Increase integration time (I value)



2. Restraint output from oscillating
a: Decrease differential time (D value) or set it as 0
b: Decrease the value of proportional constant (P)



P605	PID upper limit alarm value		Initial value :100	
	Setting range	0.0 – 100%	Unit	0.1

Set the upper limit value. If the feedback value exceeds the setting, the alarm signal is output. The maximum input (20mA/10V) of the measured value (Terminal FIVFIC) is equivalent to 100%.

P606	PID lower limit alarm value		Initial value : 0	
	Setting range	0.0 – 100%	Unit	0.1

Set the lower limit value. If the feedback value falls below the setting range, the alarm signal is output. The maximum input (20mA/10V) of the measured value (Terminal FIVFIC) is equivalent to 100%.

P607	PID proportional band		Initial value :100%	
	Setting range	0.0 – 200%	Unit	0.1

If the proportional band is narrow (parameter setting is small), the manipulated variable varies greatly with a slight change of the measured value. Hence, as the proportional band narrows, the response sensitivity (gain) improves but the stability deteriorates, e.g.hunting occurs.

P608	PID integral time		Initial value : 0.3s	
	Setting range	0.0 – 200.0S	Unit	0.1

For deviation step input, time(Ti) required for only the integal (I) action to provide the same manipulated variable as that for the proportional (P) action. As the integral time decreases, the set point is reached earlier but hunting occurs more easily.

P609	PID differential time		nitial value :0	
	Setting range	0.00 – 20.0	Unit	0.01

For deviation lamp input, time (Td) required for providing only the manipulated variable for the proportional (P) action. As the differential time increases, greater response is made to a deviation change.

P610	PID action step-length		Initial value : 0.10	
	Setting range	0.00 – 1.00HZ	Unit	0.01

PID is figured out once every 10ms. Frequency increment will be figured out (△FHz) every time. While frequency increment is more than value of P610 in maximum of frequency increment, P610 will work.

P611	PID standby frequency		Initial value : 0.00	
	Setting range	0.00 – 120.00HZ	Unit	0.01
P612	PID standby duration		Initial value : 10.0	
	Setting range	0.0 – 200.0	Unit	0.1
P613	PID wake-up value value: 0.0%			Initial
	Setting range	0.0 – 100%		

P611 PID standby frequency.

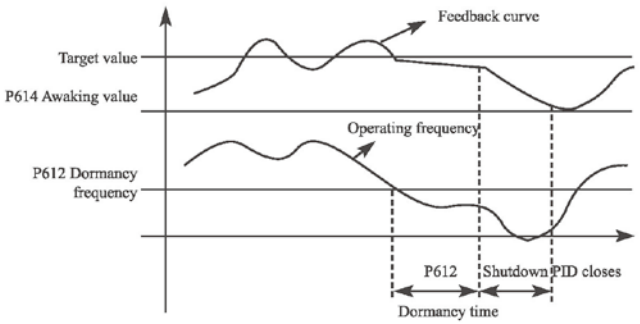
P611 must reach minimum frequency in PID standby. When running frequency is less than value of P610 standby duration will begin counting.

P612 PID standby duration.

When running duration of inverter is more than standby frequency the value (standby duration) of P612, the inverter will be standby. Then stop output, and disconnect with PID, but monitor the feedback of P613 PID.

P613: PID wake-up value.

When the inverter detects that feedback value less than wake-up value (P613), PID function will be taken action, and then inverter will start.



Example: PID action set point is 60% (0 – 100% is corresponding to 0 – 10V), and the wake-up value is 80%, which is actually corresponding to 0 – 10V, then the actual wake-up value is 60% × 80% = 48% (corresponding to 0 – 10V).

P614	PID corresponding value of display		Initial value : 1000	
	Setting range	0 – 1000	Unit	1
P615	PID digit of display		Initial value : 4	
	Setting range	0 – 5	Unit	1
	0: Not display PID feedback value 1: Display 1 digit 2: Display 2 digits		3: Display 3 digits 4: Display 4 digits 5: Display 5 digits	
P616	PID decimal digit of display		Initial value : 1	
	Setting range	0 – 4	Unit	1
	Content:	0: Not display after decimal point 1: Display 1 digit after decimal point 2: Display 2 digits after decimal point 3: Display 3 digits after decimal point 4: Display 4 digits after decimal point		

P614 PID corresponding value of display.

P614 setting value is corresponding to + 10V analog voltage.

If P614 is set as 200, then it indicates that full span is 200,

corresponding to + 10V voltage.

P615 sets the digit display.

0 indicates not displaying feedback value. Users may select the digit displayed according to actual need.

P616 PID decimal digit of display.

P616 sets the digit displayed after decimal point.

For example: Four-digit display is required, with 1 digit displayed after decimal point, target value is set as 50%, and PID corresponding value of display is 200.

Then, the display value is 200 × 50% = 100.0 and the parameter group is convenient for users to monitor.

Parameter: P614 = 200; P615 = 4; P616 = 1.

7-8 Initial settings and specifications of RS-485 communication

Used to perform required setting for communication between the inverter and personal computer.

P700	RS-485 Communication speed		Initial value: 0	
	Setting range	0 – 3	Unit	1
	Content:	0: 4800bps 2: 19200bps	1: 9600bps 3: 38400bps	

For example, the communication speed is 19200bps when the setting value is "2".

P701	Communication mode		Initial value: 0	
	Setting range	0 – 5	Unit	1
	Content:	0: 8N1 For ASCII 2: 8E1 For ASCII 4: 8O1 For RTU	1: 8O1 For ASCII 3: 8N1 For RTU 5: 8E1 For RTU	

P701 sets the format of communication data. Please see related communication specification in detail.

P702	RS-485 communication station		Initial value: 0	
	Setting range	0 – 240	Unit	1

Each inverter must have a station number, which will be defined

through P702. Communication control of inverter can connect with 240 others.

If P702 is set to " 0 " , means communication function is invalid.

NZS series MODBUS communication protocol

NZS series communication agreement is with MODBUS ASCII (American standard code for information inter change) mode: Each byte consists of 2 ASCII characters, for example: The expression of the numerical value of 54Hex ASCII is that "54" consists of "5" (35Hex) and 4(34 Hex).

1. Definition of coding

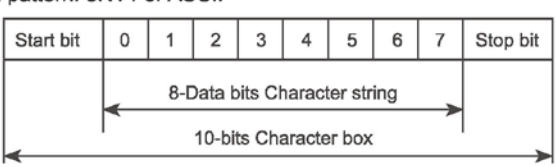
Communication agreement belongs to hexadecimal system, of which each character represents the following information.

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

2. Character structure

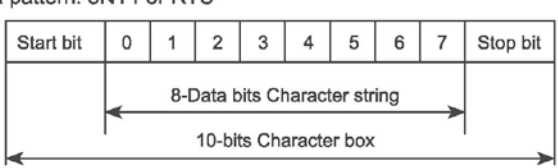
10 – Bit character box (For ASCII)

Data pattern: 8N1 For ASCII

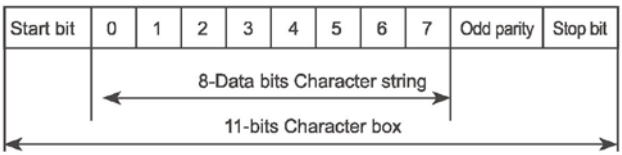


10 – Bit character box (For RTU)

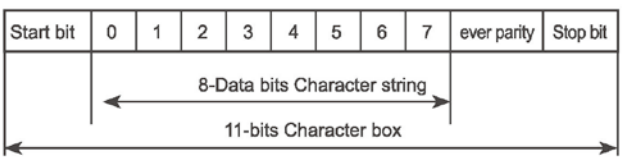
Data pattern: 8N1 For RTU



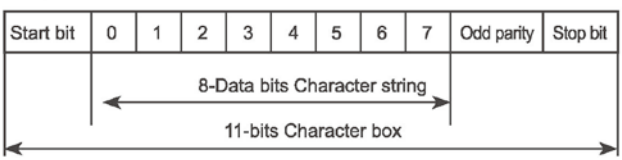
Data pattern: 8O1 For ASCII



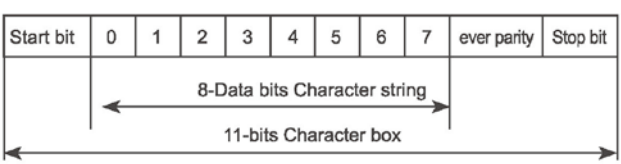
Data pattern: 8E1 For ASCII



Data pattern: 8O1 For RTU



Data pattern: 8E1 For RTU



3. Structure of communication data

Data format box

ASCII mode:

STX	Start character = ':'(3AH)
Address Hi	Communication address:
Address Lo	8-bit address consists of 2 ASCII codes
Function Hi	Function code:

Function Lo	8-bit function code consists of 2 ASCII codes
DATA (n-1)	Data characters:
……	n × 8-bit data content consists of 2n ASCII codes
DATA 0	n ≤ 16, with the maximum of 32 ASCII codes
LRC CHK Hi	LRC Check:
LRC CHK Lo	8-bit LRC Check consists of 2 ASCII codes
END Hi	End character:
END Lo	END Hi = CR (0DH), END Lo = LF (0AH)

RTU mode:

START	Keep that zero-input signal is more than or equal to 10 ms
Address	Communication address: 8-bit binary address
Function	Function code: 8-bit binary address
DATA (n-1)	Data characters: n × 8-bit data, n = 16
……	
DATA 0	
CRC CHK Low	CRC Check:
CRC CHK High	16-bit CRC Check consists of 2 8-bit binary systems
END	Keep that zero-input signal is more than or equal to 10 ms

Communication Address

00H: All driver Broadcasts

01H: For inverter with 01st address

0FH: For inverter with 15th address

10H: For inverter with 16th address, by analogy, the maximum could reach 240.

Function code and Data Characters

03H: Read out the content of temporary storage

06H: Write a WORD into temporary storage; Function code 03H: Read out the content of temporary storage.

For example: Driver address 01H, reads out the data characters in 2 successive temporary storages as follows: Initial temporary storage

address 2102H

Function code 06H: Write a WORD into temporary storage.

Format of enquiry message character string:

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

Format of response message character string:

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

LRC Check	'7'
	'1'
END	CR
	LF

ASCII mode:

RTU mode:
Format of enquiry message:

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

Format of response message:

Address	01H
Function	03H
Number of data (count by byte)	04H
Content of data address 8102H	17H
	70H
Content of data address 8103H	00H
	00H
CRC CHK Low	FEH
CRC CHK High	5CH

For example: Driver address 01H, writes 6000 (1770H) into the internal setting parameter 0100H of driver.

LRC Check of ASCII mode

ASCII mode:
Format of enquiry message character string:

STX	':'
Address	'0'
	'1'

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

Format of response message character string:

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

RTU mode:
Format of enquiry message:

Address	01H
Function	06H
Data address	01H
	00H

Data content	17H
	70H
CRC CHK Low	86H
CRC CHK High	22H

Format of response message:

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

LRC Check is the value added from Address to Data Content. For example, the LRC Check of the above 3.3.1 enquiry message is as: 01H + 03H + 21H + 02H + 00H + 02H = 29H, then the complement of 2 (D7H) is taken.

CRC Check of RTU mode

CRC Check is from Address to Data content, and its running rule is as follows:

Step 1: Make 16-bit temporary storage (CRC temporary storage) = FFFFH.

Step 2: Exclusive OR first 8-bit byte message instruction and low 16-bit CRC temporary storage: Perform Exclusive OR, and store the result into CRC temporary storage.

Step3: Move CRC temporary storage one more bit, and fill 0 into high bit position.

Step 4: Check right shift value, if being 0, store the new value for step 3 into CRC temporary storage, otherwise in case of Exclusive OR A001H and CRC temporary storage, store the result into CRC temporary.

Step 5: Repeat Step 3 ~ Step 4, and operate completely for 8-bit.

Step 6: Repeat Step 2 ~ Step 5, and take the message instruction for next 8-bit, till all message instructions are operated completely. Finally, the value gotten of CRC temporary storage is CRC Check. It is noteworthy that, CRC Check must be placed into the check mode of message instruction interchangeably.

The following is the example of CRC Check running written in C language:

Unsigned char * data ←//Message instruction pointer

Unsigned char length ←//Length of message instruction

```
unsigned int crc_chk (unsigned char*data, unsigned char length)
{
  int j;
  unsigned int reg_crc=OXffff;
  while( 1ength--) {
    reg_crc^=*data   ;
    for (j = 0; j<8; j   ) {
      if (reg_crc & Ox01) {  /*LSB (b0) =1 */
      reg_ere= (reg_crc>>1) ^OXa001;
    }else{
      reg_cre=reg_crc>>1;
          }
        }
      retum reg_crc; //Finally feedback the value of CRC temporary storage
      }
```

7-9 Advanced application parameters

P800	Advanced application parameter lock		Initial value: 1	
	Setting range	0 – 1	Unit	1
	content	0: Lock 1: Unlock		

If P800 is set to "0",you can not use the advanced parameters.

P801	System 50Hz/60Hz selection		Initial value: 0	
	Setting range	0 – 1	Unit	1
	content	0: 50Hz 1: 60Hz		

50Hz/60Hz system could be set via the parameter according the condition of electric network.

P802	constant and variable torque selection		Initial value : 0	
	Setting range	0 – 1	Unit	1
	content	0: Constant torque 1: Variable torque		

For fan and pump load, you can select "variable torque" for better energy saving.

P803	Overvoltage protection setting		Initial value: change	
	Setting range	760 – 820	Unit	1

P803 sets DC-bus overvoltage protection level. This function could be used to avoid over voltage protection during deceleration.

P804	Undervoltage protection setting		Initial value: change	
	Setting range	380 – 450	Unit	1

P804 sets voltage protection level.

If the input voltage is low, inverter is easy to trip for undervoltage. This function could be used to avoid inverter protection undervoltage .

P805	Over temperature protection setting		Initial value: change	
	Setting range	40 – 120	Unit	1

P805 sets the over temperature protection level of inverter. In high temperature environment, the protection level could be improved appropriately, to guarantee the normal running of inverter. However, too high setting value will result in IGBT damage, so the only solution is to improve the effect of heat elimination, so as to achieve the goal of cooling-down.

P806	Current display filter time		Initial value: 2.0	
	Setting range	0 – 100	Unit	1

This parameter setting is relevant to the stabilization of current

display, and shall not be modified in general. If the setting is too small, current display will fluctuate.

P807	0-10V analogue output low end calibration coefficient Initial value: *			
	Setting range	0 – 9999	Unit	1
P808	0-10V analog output high end calibration coefficient Initial value : *			
	Setting range	0 – 9999	Unit	1
P809	0-20mA analogue output low end calibration coefficient Initial value: *			
	Setting range	0 – 9999	Unit	1
P810	0-20mA analog output high end calibration coefficient Initial value: *			
	Setting range	0 – 9999	Unit	1

The above parameters are factory default setting, normally shall not be adjusted, otherwise it may cause abnormal operation.

Chapter 8
Precautions for Maintenance and Inspection

The inverter is a static unit mainly consisting of semiconductor devices. Daily inspection must be performed to prevent any fault from occurring due to the adverse effects of the operating environment. Such as temperature, humidity, dust, dirt and vibration, changes in the parts with time, service life,and other factors.

• Precautions for maintenance and inspection

For some short time after the power is switched off, a high voltage remains in the somoothing capacitor. When accessing the inverter for inspection, wait for at least 10 minutes after the power supply has been switched off, and then make sure that the voltage across the main circuit terminals P/+--N/- of the inverter is not more than 30VDC using a tester, etc.

8-1 Inspection

8-1-1 Daily inspection

Basically, check for the following faults during operation.

(1) Motor operation fault

(2) Improper installation environment

(3) Cooling system fault

(4) Unusual vibration and noise

(5) Unusual overheat and discoloration

During operation, check the inverter input voltages using a tester.

8-1-2 Periodic inspection

Check the areas inaccessible during operation and requiring periodic inspection.

Consult us for periodic inspection.

(1) Check for cooling system fault ..... Clean the air filter, etc.

(2) Tightening check and retightening.....The screws and bolts may become loose due to vibration, temperature changes, etc.

(3) Check the conductors and insulating materials for corrosion and damage.

(4) Measure insulation resisitance.

(5) Check and change the cooling fan and rely.

8-1-3 Daily and periodic inspection

Inspection item	Description	Corrective Action at Alarm Occurrence
Surrounding environment	Check the ambient temperature, humidity, dirt, corrosive gas, oil mist, etc.	Improve environment
Overall unit	Check for unususal vibration and noise	Check alarm location and retighten
Power supply voltage	Check that the main circuit voltages and control voltages are normal.	Inspect the power supply
General	1. Check with megger(across main circuit terminals and earth terminal). 2. check for loose screws and bolts. 3. check for overheat traces on the parts. 4. check for stain	Cnotact thr manufacturer Retighten Contact the manufacturer Clean
Aluminum electrolytic capacitor	1. check for liquid leakage in a capacitor and deformation trance 2. Visual check and judge by the life check of the control circuit capacitor.	Contact the manufacturer
Cooling system	Air filter, fan, etc.	Clean
Load motor	Check for vbration and abnormal increase in operation noise	Stop the device and contact the manufacturer

8-2 Replacement of parts

The inverter consists of many electronic parts such as semiconductor devices.

The following parts may deteriorate with age because of their structures or physical characteristics

leading to reduced performance or fault of the inverter. For preventive maintenance, the parts must

be replaced periodically.

Use the life check function as a guidance of parts replacement.

Part name	Standard replacement interval	Description
Cooling fan	3-5 years	Replace (as required)
Smoothing capacitor	5 years	Replace (as required)
Fuse (18.5kw or more)	10 years	Replace (as required)
Relays	---	as required

Replacement years for when the yearly average ambient temperature is 40℃ (Without corrosive gas, flammable gas, oil mist, dust and dirt etc.)

8-3 Trouble shooting

When an alarm (major failures) occurs in the inverter, the protective function is activated bringing the inverter to an alarm stop and the operation panel dispay automaitically changes to any of the following error (alarm)indications.

If your fault does not correspond to any of the following errors or if you have any other problem, please contact your sales representative.

• Alarm display..... when the protective function is activated, the operation panel display automatically switches to the above indication.

• Resetting method.....when the protective function is activated, the inverter output is kept stopped. Unless reset, therefore, the

inverter cannot restart.

• When the protective function is activated, take the corresponding corrective action, then reset the inverter, and resume operation. Not doing so may lead to the inverter fault and damage.

List of alarm display

Fault Codes	Fault details	Possible causes of the malfunction	Solution
OC1(2)	Accelerated overcurrent	1: Acceleration time is too short 2: V/F curve settings are inappropriate reason 3: Motor wire short circuit to ground 4: Torque boost setting is too high 5: The mains voltage is too low 6: Directly adjust the operating motor Start 7: Inverter configuration is not up to standard 8: Inverter failure	1: Extend acceleration time 2: Correctly set the VF curve 3: Check the insulation of the motor wires. condition 4: Reduce torque boost setting value 5: Check the power grid condition 6: Check the load 7: Set speed tracking start 8: Increase the capacity of the frequency converter 9: Send for repair
OC2(3)	Overcurrent during deceleration	1: Deceleration time set too short 2: Inverter capacity configuration is not... when 3: Is there any interference?	1: Extend deceleration time 2: Increase the capacity of the frequency converter 3: Solve the source of interference

Fault Codes	Fault details	Possible causes of the malfunction	Solution
OC3(4)	Overcurrent during operation	1: Motor and motor output wires Poor insulation 2: Large load fluctuations or slight variations Micro-freezing situation 3: Fluctuations in grid voltage 4: Inverter capacity configuration is not... when 5: Are there any high-power motors starting in the system , causing a drop in grid voltage? 6: Are there any sources of interference? frequency converter	1: Inspect the motor and motor wiring Insulation condition 2: Check the load condition. jammed or poorly lubricated wait 3: Check the mains voltage 4: Increase the capacity of the frequency converter 5: Approaching the source of interference
OU1(5)	Accelerated overvoltage	1: Power supply malfunction 2: Improper configuration of external lines (e.g., using an air switch to control the start) (Stop waiting) 3: Inverter failure	1: Check the power supply voltage 2: Do not use a circuit breaker to control it. Control the start and stop of frequency converter 3: Send for repair
OU2(6)	Deceleration overvoltage	1: The deceleration time is too short. 2: Abnormal power supply voltage 3: Large load inertia 4: Improper configuration of braking resistor 5: Inappropriate braking parameter settings reason	1: Extend deceleration time 2: Check the power supply. 3: Add a braking unit, brake Dynamic resistance 4: Reconfigure the braking resistor 5: Set the parameters correctly, such as Brake tube operating voltage, etc.

Fault Codes	Fault details	Possible causes of the malfunction	Solution
OU3(7)	Operating overvoltage	1: Abnormal power supply voltage 2: Loads with energy feedback 3: Improper configuration of braking resistor	1: Check the power supply voltage 2: Install the braking unit and braking resistor. 3: Reconfirm the braking resistor Configuration
POF(8)	buffer resistor overload	1: Abnormal power supply voltage 2: Phase loss in power supply voltage	1: Check the power supply voltage 2: Check the power supply, circuit breakers, etc. Is there a phase loss?
LU(9)	Undervoltage		
OL1 (11)	Motor overload	1: Overload 2: Acceleration time is too short 3: Excessive torque increase 4: Inappropriate VF curve settings 5: The mains voltage is too low 6: The motor did not stop completely, and the inverter... Device starts directly 7: Load fluctuations or freezes Condition	1: Reduce the load or replace with a more suitable one. One level higher frequency inverter 2: Extend acceleration time 3: Reduce torque increase 4: Reset the VF curve 5: Check the mains voltage and apply... Large frequency converter capacity 6: Use the tracking startup method 7: Check the load status
OL2 (12)	Inverter overload		

Fault Codes	Fault details	Possible causes of the malfunction	Solution
OH(14)	Module overheating	1. The ambient temperature is too high. 2. Duct blockage 3. Fan malfunction 4. Damaged thermistor 5. Inverter module damaged	1. Lower the ambient temperature 2. Clean the air ducts 3. Replace the fan 4. Replace the thermistor 5. Replace the inverter module
CO(16)	Communication timeout	1. The host computer is not working properly. 2. The communication line is faulty. 3. Communication Parameter P D Group Settings Incorrect	1. Check the wiring of the host computer. 2. Check the inverter communication connection. wiring 3. Correctly set communication parameters
TE(29)	Power-on time reached	1. The cumulative power-on time has reached [time limit]. Setting value	1. Contact the manufacturer
LP(24)	Low water pressure alarm (operation) When walking, the pressure is lower than P606, continuing with P643 The report then states "low pressure". The machine stopped due to a "malfunction". "Barrier code " LP . If P643=0, no detection This fault)	1. Incorrect wiring of the pressure sensor error 2. Inappropriate parameter settings	1. Check the pressure sensor connection. Wire 2. Set parameters correctly

Fault Codes	Fault details	Possible causes of the malfunction	Solution
HP(27)	High water pressure alarm (pressure) If the force is greater than P605, then Report " high Pressure force Therefore The machine stopped due to a "malfunction". "Barrier code " HP . If P605=P614, no check (Test this fault)		
LL(28)	Water shortage alarm (running) At that time, the frequency reached its highest High frequency, low pressure On page 641, and continuing Time greater than P644, but "Report" lack water Therefore The machine stopped due to a "malfunction". Barrier code " LL ", if P641=0, no detection This fault)	1. Incorrect wiring of the pressure sensor 2. Inappropriate parameter settings 3. There is no water in the pipes.	1. Check the pressure sensor connection. Wire 2. Set parameters correctly 3. Inspect the pipes

Fault Codes	Fault details	Possible causes of the malfunction	Solution
SLP	Inverter hibernation prompt This is not a malfunction.		

8-4 Common parameters for NZS water supply

function code	NZS Backpack Setting Values First P117 = 8, then P117 = 5	illustrate8-4 Check first when you have troubles
P000	7	Displays the PID target value and feedback value.
P104	0	Do not reverse
P201	1	Free parking
P300	1.2V	Used for backpack pressure sensors
P301	5.0V	Used for backpack pressure sensors
P303	4.0mA	For H2000 pressure sensor
P600	1	PID enabled
P603	0: Select AI (1.2-5.0V)	PID feedback
P604	25.0%	PID target
P611	25.0HZ	PID sleep frequency
P612	10S	hibernation time
P613	90%	Sleep wake-up value
P620	1.0%	Pid Deviation Limit
P624	100.0s	Low-voltage alarm detection time
P631	600.0s	The interval between the first 10 high and low voltage self-reset cycles
P635	0.5HZ	Sleep mode detection: Detection only begins when the frequency change is <P635/S. Disruption of hibernation
P636	0.6%	Hibernation Detection: Pressure to Reduce Frequency
P637	0.3HZ	Hibernation Detection: Frequency of decrease per second
P638	10 times	Hibernation detection: the number of times the frequency of descent is measured.

function code	NZS Backpack Setting Values First P117 = 8, then P117 = 5	illustrate8-4 Check first when you have troubles
P639	42.0HZ	Hibernation detection: If the frequency is greater than P639, hibernation is not detected.
P640	900.0S	Antifreeze interval
P641	30.0S	Anti-freeze operation time
P642	1-Effective	Antifreeze effective: 1 - effective, 0 - ineffective

If the causes is still unknown after every check, it is recommended to initialize the parameters (initial value) then reset the required parameter values and check again.

(1) Parameter write cannot be performed

Causes and corrective actions:

a: Check P118 parameter write selection.

b: Check P101Frequency setting/P102 Operation mode setting selection.

c: Make sure that operation is not being performed. Please stop the inverter and set.

(2) Motor does not rotate as commanded

Causes and corrective actions:

a: Check that the P102 Operation mode selection setting is correct.

b: Check that the starting frequency setting is not greater than the running frequency.

c: Check the main circuit and control circuit.

d: Check that the output stop signal or reset signal is not on.

e: Check that P104 Reverse rotation prevention selection is not selected.

f: Check that frequency setting of each running frequency (such as multi-speed operation) are not zero.

g:Check that especially the P105 Maximum frequency setting in not zero.

h: Check that the P400 Jog frequency setting is not lower than the

P202 starting frequency setting.

i: Check that the load is not too heavy.

(3) Motor generates heat abnormally

Causes and corrective actions:

a: Check that the load is not too heavy. Lighten the load.

b: Is the fan for the motor is running ? (check for accumulated dust.)

c: Check that the P208 Torque boost setting is correct.

d: Was the motor type set? Check the setting of P209 to P219 applied motor.

e: When using any other manufacturer's motor ,perform offline auto tuning.

(4) Motor generates abnormal noise

Causes and corrective actions:

a: No carrier frequency noises (metallic noises) are generated.
Check the setting of P115 applied motor.

b: Check for any mechanical looseness.

c: Contact the motor manufacturer.

(5) Motor rotates in opposite direction

Causes and corrective actions:

a: Check that the phase sequence of output terminals U,V and W is correct.

b: Check that the start signals (forward rotation, reverse rotation)are connected properly.

(6) Speed does not increase

Causes and corrective actions:

a: Check that the maximum frequency (P105)setting is correct. (If you want to run the motor at 120Hz or more, set P105 High speed maximum frequency.)

b: Check that the load is not too heavy. (In agitators, etc, load may

become heavier in winter.)

c: Check that the brake resistor is not connected to terminals P/+- -P/- accidentally.

(7) Inverter may interfere with other devices.

Causes and corrective actions:

The input/output (main circuit) of the inverter includes high frequency components, which may interfere with the communication devices used near the inverter. In this case ,set EMC filter valid to minimize interference.

a: Decrease carrier frequency (P115).

b: Install a noise filter on the inverter output side to reduce the electromagnetic nois generated from the inverter.

c: Install a noise filter on the inverter input side.

d: For reduction of induction noise from the power line of the inverter,it is recommended to wire the earth cable by returning it to the earth terminal of the inverter.

e: To prevent a malfunction due to noise, keep the signal cables more than 10cm away from the power cables.

f: Control circuit cable should use shielded cable, and the cable should be installed in metal tube

8-6 Inverter-generated noises and their reduction techniques

Some noises enter the inverter to malfunction it and others are radiated by the inverter to malfunction peripheral devices. Though the inverter is designed to be insusceptible to noises, it handles low-level signals, so it requires the fllowing basic techniques. Also, since the inverter chops outputs at high carrier frequency, that could generate noises. If these noises cause peripheral devices to malfunction, measures should be taken to suppress noises. These techniques differ slightly depending on noise propagation paths.

① Basic techniques

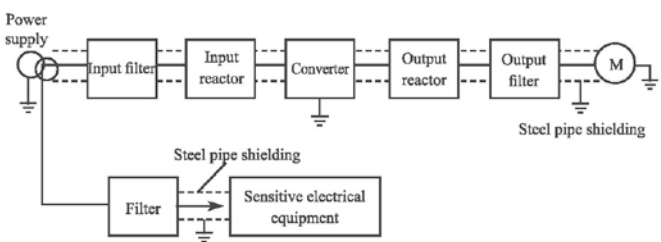
- Do not run the power cables (I/O cables) and signal cables of the inverter in parallel with each other and do not bundle them.
- Use twisted pair shielded cables for the detector connection and control signal cables, and connect the sheathes of the shield cables to terminal SC.
- Earth the inverter, motor, etc, at one point.

② Techniques to reduce noises that enter and malfunction the inverter

When devices that generate many noises (which use magnetic contactors, magnetic brakes, many relays, for example) are installed neat the inverter and the inverter may be malfunctioned by noises, the following measures must be taken:

- Provide surge suppressors for devices that generate many noises to suppress noises.
- Fit data line filters to signal cables.
- Earth the shields of the detector connection and control signal cables with Cable clamp metal.

③ Noise reduction examples



Chapter 9 External accessories selection

9-1 The Purpose of Accessory

Name	Function
Air and residual current circuit breakers	Protect the inverter's wiring for easy installation, maintenance, and upkeep.
electromagnetic contactor	To facilitate the switching of the frequency converter and power supply, ensuring safety.
Surge absorber	Absorbing surge currents from relays used for electromagnetic contact and control
Isolation transformer	It isolates the input and output of the frequency converter, reducing interference.
DC reactor	Protect the frequency converter and suppress high-order harmonics.
AC reactor	Protects the frequency converter, suppresses high-order harmonics, and prevents surge voltage impacts.
Braking resistor, braking unit	Absorb and regenerate energy
Noise filter	Reduce electromagnetic interference caused by frequency converters
Magnetic ring	Reduce electromagnetic interference caused by frequency converters

9-2 Braking resistance

Inverter Model	Braking resistance		CDBR	Torsion (10% ED)	(KW)
	W	Ω			
NZS-0R7T2P-B1	80	150	built-in	125	0.75
NZS-1R5T2P-B1	100	100		125	1.5
NZS-2R2T2P-B1	100	70		125	2.2
NZS-0R7T4P-B1(2)	250	300		125	0.75
NZS-1R5T4P-B1(2)	300	220		125	1.5
NZS-2R2T4P-B1(2)	400	200	built-in	125	2.2
NZS-3R7T4P-B1(2)	500	130		125	3.7
NZS-5R5T4P-B1(2)	800	90		125	5.5
NZS-7R5T4P-B1(2)	1000	65		125	7.5
NZS-11TT4P-B1(2)	1500	43		125	11
NZS-15TT4P-B2	2000	32		125	15
NZS-18.5TT4P-B2	4000	24		125	18.5
NZS-22TT4P-B2	4500	24		125	22
NZS-30TT4P-B2	6000	19.2		125	30
NZS-37TT4P-B2	7000	14.8		125	37
NZS-45TT4P-B2	9000	12.8		125	45
NZS-55TT4P-B2	11000	9.6		125	55
NZS-75TT4P-B2	15000	6.8		125	75
NZS-90TT4P-B2	9000*2	9.3*2		125	90
NZS-110TT4P-B2	11000*2	9.3*2		125	110
NZS-132TT4P-B2	13000*2	6.2*2		125	132
NZS-160TT4P-B2	16000*2	6.2*2		125	160

Note: *2 indicates that two braking units are used in parallel with their respective braking resistors.

Braking resistor calculation :

The braking resistor value is related to the DC voltage during inverter braking. For example : 380V The power supply level is

800V - 820V DC during braking . 220V system, DC voltage is 400V. Additionally, braking resistance and braking torque The braking resistance value is related to Mbr% , and different braking torques result in different braking resistance values. The calculation formula is as follows :

$$R = \frac{U_{dc}^2 \times 100}{P_{\text{Motor}} \times M_{br}\% \times \eta_{\text{Transducer}} \times \eta_{\text{Motor}}}$$

Thereinto: U_{dc}——Braking DC voltage;

P_{Motor}——Motor power;

M_{br}——Braking torsion;

η_{Motor}——Motor efficiency;

$\eta_{Transducer}$——Transducer efficiency.

Braking power is related to braking torque and braking frequency. The braking torque given in the table above is 125% and the frequency is 10%. Due to different load conditions, the data in the table is for reference only.

Communication Protocol

1: Register Instruction Description

RTU pattern	explain
Frame header START	3.5 character time
Address of Device (ADR)	Address: 1–247,0: Broadcast address
command code CMD	03: Read slave parameters; 06: Write slave parameters
Data Content DATA (N-1)	Content: Function code parameter addresses, number of function code parameters, function code parameter values, etc. N × 8-bit data, n = 16
Data Content DATA (N-2)	
.....	
Data Content DATA0	
CRC CHK Low	Detection value: CRC value.
CRC CHK High	

RTU pattern	explain
END	3.5 character time

2: Rule for expressing function code parameter addresses

1) 2000H: Run the stop command. Refer to the table below for details.

2) 2001H: Set frequency (0–400.00 Hz),

P101=5; the frequency is derived from 2001H

P101=0 frequency originates from F100H.

3) The function code for inverter parameters is also a register address, as shown in the following example.

a) Function code P001 (frequency setting), address: 1 (hexadecimal two-byte value 00H 01H);

b) Function code P002 (operating frequency), address: 2 (hexadecimal two-byte value 00H 02H);

c) Function code P003 (Current), Address: 3 (hexadecimal two-byte value 00H–03H);

d) Function code P004 (rotational speed), address: 4 (hexadecimal two-byte value 00H 04H);

e) Function code P005 (DC bus voltage), address: 5 (hexadecimal two-byte value 00H 05H)

f) Function code P009 (output voltage), address: 9 (hexadecimal two-byte value 00H 09H); one decimal place, unit: V;

g) Function code P020 (output power), address: 20 (hexadecimal two-byte representation 00H–14H), one decimal place, unit: KW;

h) Function code P1.00 (main frequency), address: 100 (hexadecimal two-byte value 00H–64H);

i) Function code P101 (frequency source), address: 101 (hexadecimal two-byte value 00H–65H);

j) Function code P107 (acceleration time), address: 107 (hexadecimal two-byte representation: 00H 6BH);

k) Function code P108 (deceleration time), address: 108 (hexadecimal two-byte value 00H 6CH).

3: Other functional data addresses

data address	bit address	content	read-write	postal address
2000H	BIT1-BIT0	00B: No action 01B: Stop 10B: Start 11B: JOG Start	write	2000H
	BIT2-BIT3	00B: No action 01B:Reverse Direction Instruction 10B: Forward direction instruction 11B: Change direction	write	
	BIT4	0B: No action 1B: Reset failure	write	
	BIT5-BIT15	Keep		
2001H	BIT0-BIT15	Communication Frequency Directive 00000-40000 First decimal place (P1.01=5; this data is valid only)	write	2001H
P009 (16-bit address 0008H)	Output voltage: one decimal place, in V		read only	0009H
P0.20 (16-bit hex address 0014H)	Power: one decimal place, unit: kW		read only	0014H
P0.22 (16-bit address 0016H)	Bit0: 1-MA/MB action; 0-MA/MB no action Bit1: 1-RA/RB action; 0-RA/RB no action		read only	0016H
P0.23AI/FIV percentage	Range 0–1000 (minimum P3.00 to maximum P3.01 corresponds to 0–100.0%)		read only	0017H

data address	bit address	content	read-write	postal address
P027 (Address 001BH)	fault message 0: No fault 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant-speed overcurrent 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Constant-speed overvoltage 8: Buffer resistor overload 9: Undervoltage 10: Inverter overload 11: Motor overload 14: Module overheating 15: External fault 16: Communication abnormal 24: Low water supply pressure 27: High water supply pressure 28: Water shortage alarm 29: The power-on time has arrived. 31: PID feedback loss during operation		read only	001BH
P0.28 (Address 001CH)	0: Stop; 1: Forward; 2: Reverse		read only	001CH

4: Application example:

First, set the following values:

P101 = 5 (frequency source); P102 = 2 (control method).

P700 = 1 (baud rate 9600); P701 = 3 (8N1 FOR RTU)

P702 = 1 (Address)

1) First, set the frequency:

Write 50.00 Hz (1388 H) to unit 2001H

Send: 01 06 20 01 13 88 DE 9C

Return: 01 06 20 01 13 88 DE 9C

2) Issue operation commands

Write 0AH to the 2000H unit

Send: 01H 06H 2000H 00H 0AH 02H(CRCL) 0DH(CRCH)

Sendback: 01H 06H 2000H 00H 0AH 02H(CRCL) 0DH(CRCH)

3) Issue a stop order

Write 01H to the 2000H unit

Send: 01H 06H 2000H 00H 01H 43H (CRCL) CAH (CRCH)

Return: 01H 06H 2000H 00H 01H 43H (CRCL) CAH (CRCH)

4) Read the fault status

Read the P027 value (001B) from slave address 01

Send: 01H 03H 00H 1BH 00H 01H F4H 0DH

Sendback: 01H 03H 02H 00H 00H B8H 44H

5) Simultaneously measure the output frequency, output voltage, and output speed

Read the P002 value (0002) from slave address 01 and read three values.

Send: 01H 03H 00H 02H 00H 03H A4H 0BH

Sendback: 01H 03H 06H 01H F4H 00H 00H 05H B4H 92H 56H

Chapter 10
Peripheral Devices Selection

Check the motor capacity of the inverter you purchased. Appropriate peripheral devices must be selected according to the capacity. Refer to the following list and prepare appropriate peripheral devices:

10-1 Peripheral Devices Description

Peripheral Devices Name	Description
Moulded case circuit break (MCCB) or earth leakage circuit break (ELB),fuse	The breaker must be selected carefully since an In-rush curreH flows in the inverter at power on.
Magnetic coHactor (MC)	Install the MC to ensure safety. Do not use this MC to start and stop the inverter. Doing so will cause the inverter life to be shorten.
AC/DC Reactor	Reactor (option) should be used when power harmonics measures are taken, the power factor is to be improved or thr inverter is installed near a large power supply system (1000KVA or more). The inverter may be damaged if you do not use reactors. Select the reactor according to the model. For the 160KW or less, remove the jumpers across terminals P/+--P/-to connect to the DC reactor. For the 185KW or more , a DC reactor is supplied. Please always install the reactor.
Noise filter	Install a noise filter to reduce the electromagnetic noise generated from the inverter. Effective in the rang from about 1MHz to 10MHz. When more wires are passed throug, a more effective result can be obtained.
Brake resistor and brake unit	To improve the brake capability at deceleration.
Ferrite ring	To reduce the disturbance which is generated by inverter.

Appendix 1 Intelligent Pump Controller Selection Guide

Function:

1) To achieve the water supply control system with more than 6 sets of Pumps, one set is the Main Engine, others 5 sets are machine as attached engine

2) The function for the main engine: Any set can be the main engine. Once the current main engine occur the breakdown ,can exchange another set to be the main engine. But the signal line of the Pressure Sensor must be moved to the new main engine accordingly .

3) The function of Adding Pump and reducing Pump: Finish the several Pump according to the Adding and Reducing.

4) With the resting state and Awaken Function

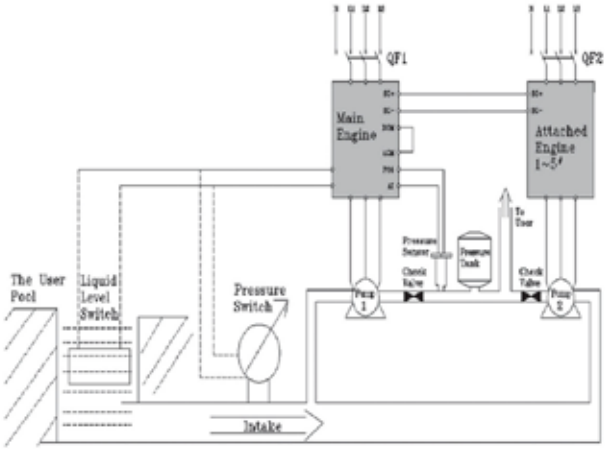
5) With the function of exchange Pump on timely

6) With the function of Antifreeze and waterproof.

7)With the function for exchanging the Pump automatically when occur the breakdown. Once any set of the machine appears the mistake, the system will overleap this part automatically .To be ensure the stability of the system .

8) Alarm for watering :With the alarming function for HO,LO ,LP

System Structure FIG

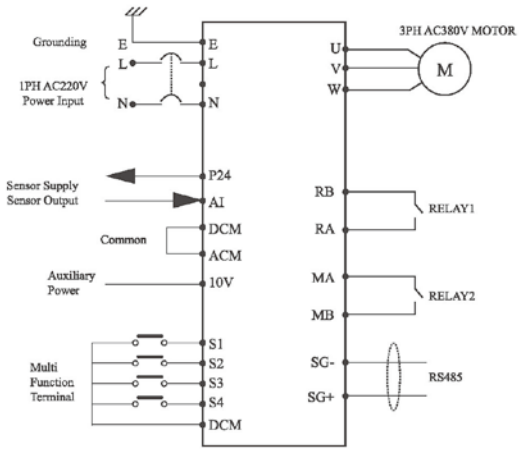


Terminal Description

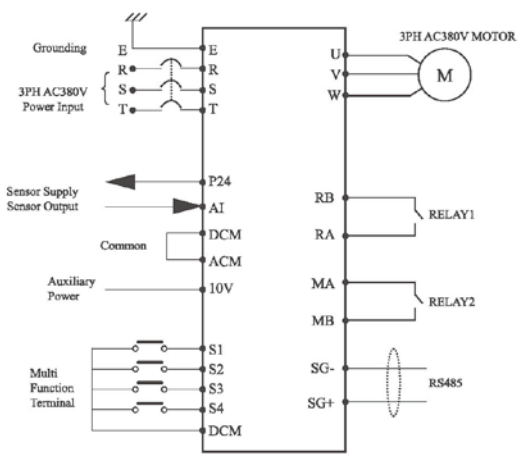
Name of the terminal	Instruction	Remark
S1	Multi Function of Input Terminal P315	Multifunctional Terminal S1-S4 can setting according to the P315-P318, when the terminal is cut with DCM, it can worked effectively
S2	Multi Function of Input Terminal P316	
S3	Multi Function of Input Terminal P317	
S4	Multi Function of Input Terminal P318	
DCM	Digital Signal of Public Terminal	
P24	DC24V Maximum 100mA	
10V	Frequency Setting Power	
AI (FIV)	The Analog Voltage of Input Terminal	0~10V/0-20MA
ACM	Analogous earth terminal	
MA,MB	Output Terminal (opening)	250VAC/3A
RA, RB	Output Terminal (opening)	250VAC/3A
SG+ SG-	RS485 Protocol	

Wiring Diagram

1. 1PH 220V Input /3PH 220V Output



2. 3PH 380V Input/3PH 380V Output



Function Parameters

1. Setting of the main engine

Parameter	Code	Name	Instruction Of The Setting Range	Minimum Unit	Value From Factory
P I D	P600	Maintance			
	P601	Attached engine OR Main engine	0: Attached engine 1: Main engine	1	0
	P602	PID Target Selection	0:F6.04; 1:AI	1	0
	P603	PID Feedback Value Selection	0:AI (4-20mA for F3.00=2.0V F3.01=10.0V)	1	0
	P604	The pressure setting of the outlet	0.00-50.00kgf/cm^2	0.01	5.00kg f/cm^2
	F605	The Range of the Pressure display	0.00-50.00kgf/cm^2 (10kgf/cm^2=1MPa)	0.01	5.00kg f/cm^2
	F606	Maintance			
	P607	Value from PID to P	0-200	1.0	100.0
	P608	Value from PID to I	0.1~10.0S	0.1	0.3S
	P609	Value from PID to D	0-1.0S	0.1	0.0S
	P610	PID The length of the each step	0-5.0Hz	0.1	2.0Hz
	P611	Frequency for Resting state	0.0~50.0HZ Frequency for Resting state =0; No function of Resting Sate	0.1	30.0HZ
	P612	Timing for Resting State	0~200S	1	60S
	P613	The value for resting state and awaken	0~100% Percentage	1	60%
	P614	PID timing for awaken	0~200S	1	10S
	P615	Alarm For High Voltage	0.00-50.00kgf/cm2	0.01	10.00
	P616	Alarm For Low Voltage	0.00-50.00kgf/cm2	0.01	0.00

Parameter	Code	Name	Instruction Of The Setting Range	Minimum Unit	Value From Factory
P I D	P617	Alarm Time for the High Pressure Of The Outlet	0-600S	1	10S
	P618	Alarm Time for the Low Pressure Of The Outlet	0-600S	1	10S
	P619	Judgment For the Level of Low Water (Sensor is connected to S1-S4)	0.1-60.0S Checking of multi function	0.1	10.0S
	P620	Allow the Tolerance		0.1	0.1
	P630	1 Pump Types	0: No effective 1: No effective	1	1
	P631	2 Pump Types		1	1
	P632	3 Pump Types		1	1
	P633	4 Pump Types		1	1
	P634	5 Pump Types		1	0
	P635	6 Pump Types		1	0
	P640	Frequency of Adding Pump	0~ Maximum of the frequency	1%	49.0Hz
	P641	Delay of Adding Pump	0~600.0S	0.1	30.0S
	P642	Frequency of reducing Pump	0~ Maximum of the frequency	0.1Hz	30.0Hz
	P643	Delay of Reducing Pump	0~600.0S	0.1S	30.0S
	P644	Ability of Exchanging the Pump	0-No effective; 1-effective;	1	0
	P645	Changing Pump On Timely	1-9999	1	600
	F646	Antifreeze Effectively	0 No effective 1 effective	1	0
	F647	Period for Antifreeze	0-6000	1	10
	F648	Frequency for Antifreeze	0-FMAX	0.1	5.0Hz

Parameter	Code	Name	Instruction Of The Setting Range	Minimum Unit	Value From Factory
PID	F649	Timing for Antifreeze	0-600	1	3
Input Terminal	P315	S1Terminal	0: No effective 1~27: According to instruction 29:Low water level	1	6
	P316	S2 Terminal		1	7
	P317	S3 Terminal		1	29
	P318	S4 Terminal		1	0
Analogue Input	P300	Ai The lower limit of the Input	0-P301	0.1	2.0
	P301	Ai The Top limit of the Input	0-10.0	0.1	10.0
	P420	Restart			5
	P421	Using time of the restart			10.0S

setting for attached engine

attached engine		
F1.01	Frequency setting method	5: RS485
F1.02	Set selection	2: RS485

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