

# VNZ100 Series

## User Manual



Thank you for choosing VNZ100 series inverter.

Before installing, operating, maintaining or checking the driver, please read this instruction manual carefully to give full play to the function of the driver and ensure the safety of users.

In this instruction manual, safety is divided into two categories: danger and attention. Please pay special attention to the "⚡ Warning", "⚠ Caution" symbols and related contents.

"⚡ WARNING" Incorrect or incorrect operation can cause hazards that may result in death or serious injury.

"⚠ Caution" of the harm caused by incorrect or wrong operation, which may lead to personal injury or failure of the drive and mechanical system. Depending on the situation, the precautions may also cause serious consequences.

The diagrams in this instruction manual are for the convenience of explanation, and may be slightly different from the production crystals. Due to product upgrades, there may be slight differences. Please refer to the actual product.

Please pay attention to hand this instruction manual to the end user and keep it properly for use in future inspection and maintenance.

If you have any questions, please contact the company or our agent in time, and we will serve you wholeheartedly.

## 1 Safety Precautions

Read this manual carefully before installation, operation, maintenance or inspection.

Precautions for safe operation in the manual are classified as "WARNING" or "CAUTION".



Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or death.



Indicates a potentially critical situation that, if not identified, could result in minor or moderate personal injury and equipment damage.

This can also be used to alert on unsafe operations.

In some cases, even what is stated in the **caution** can lead to major accidents. So, in any case observe these important precautions.

 **Note:**

**The steps taken to ensure proper operation.**

**Warning Marks appear on the front cover of the drive. Please follow these guidelines when using the drive.**



- Risk of injury and electric shock.
- Read the manual and follow the safety instruction before use.
- Isolate from supply and wait 10minutes before removing his cover.
- Ensure proper earth connection.
- Mount the inverter on a non-combustible surface.

## **2 Open box to check**



- Do not install or operate any drive that is damaged or has outdated parts, otherwise there is a risk of injury.

When removing the drive after unpacking, check the following items.

1. Confirm that there is no damage (damage or chip on the body) of the drive during transportation.
2. Confirm that there are instructions and warranty cards in the box.
3. Check the drive nameplate and confirm that it is the product you ordered.
4. If you ordered optional accessories for the drive, please confirm that the optional accessories you received are what you need.

If you find a damaged drive or optional accessories, please call your local dealer immediately.

### 3 Removal and Installation Warnings



The design, installation, commissioning and operation of the equipment must be carried out by trained and qualified professionals; during the work, all the regulations in "Warning" must be followed, otherwise serious personal injury or heavy property damage may be caused.

The input power cord is only allowed to be permanently connected, and the equipment must be grounded reliably.

Even if the drive is not in operation, the following terminals may still carry dangerous voltages:

- Power terminals R, S, T
- Connect the terminals U, V, W of the motor

After the power switch is turned off, you must wait for more than 10 minutes and the drive has been discharged before starting the installation work.

The minimum cross-sectional area of the grounding conductor is at least 10mm<sup>2</sup>, or corresponding to the data in the table below, the maximum value of the two is required to be selected as the area of the grounding conductor:

Power line conductor cross-sectional area S mm<sup>2</sup> Ground conductor cross-sectional area.

$S \leq 6$	$S$
$16 < S \leq 35$	16
$35 < S$	$S/2$



Lift the cabinet by the base, do not hold the panel to lift when moving the drive, otherwise the main unit may fall, which may cause personal injury.

The driver should be installed on flame-retardant materials such as metal, away from heat sources and flammable objects to avoid fire.

When more than two drives are installed in a cabinet, a cooling fan should be installed and the air temperature should be controlled below 40 °C, otherwise overheating will cause fire or damage to the device.

# VNZ100 Series User Manual

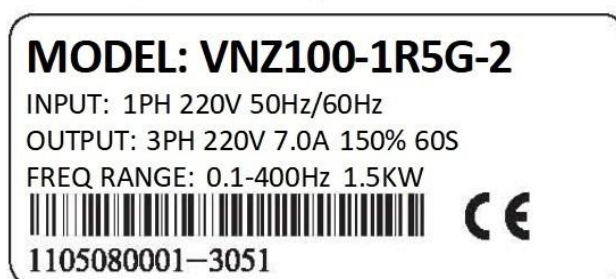
## Chapter 1 Introductions

### 1. Preface

Thank you for choosing the VNZ100 Series of high performance, simple inverter. Diagram of operating instructions, is to facilitate the description, may be slightly different with the product. Please note that this manual will be handed the hands of end users, and retain for future maintenance, use and if in doubt, we will be happy to serve you.

### 2. Nameplate

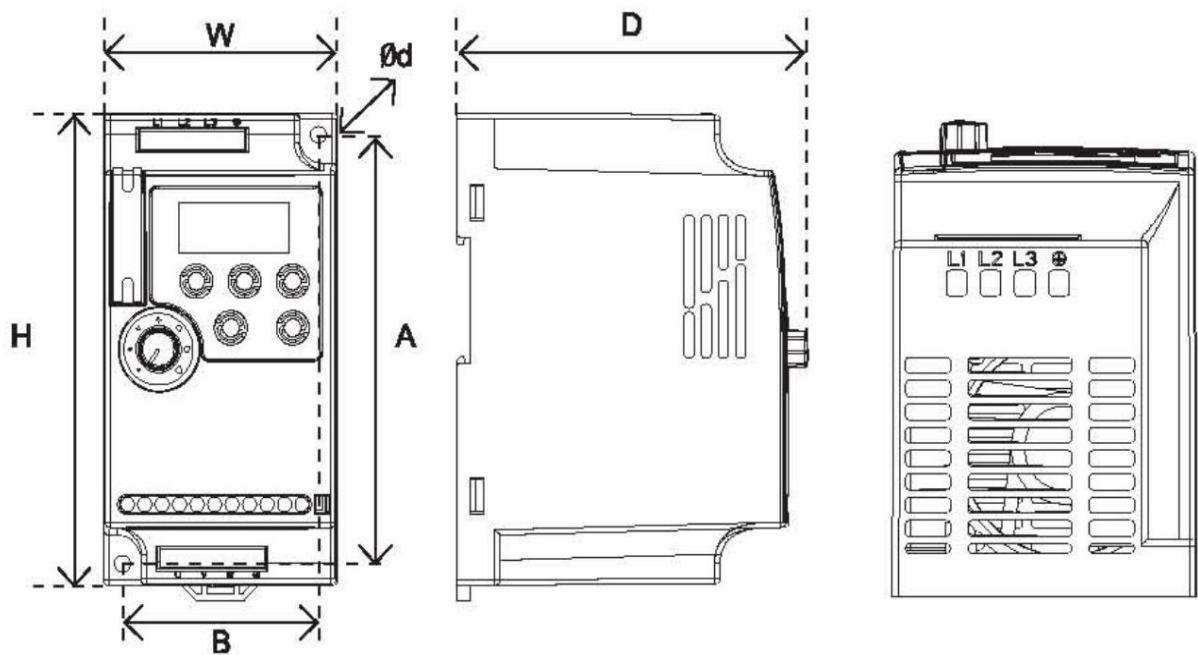
Model:



VNZ100 - 1R5 G - 2  
①            ②   ③   ④

No.	Identification	Description
①	VNZ100	Series name
②	1R5	1R5: 1.5kW
③	G	G: Constant torque
④	2	2: 1PH AC220V INPUT 4: 3PH AC380V INPUT

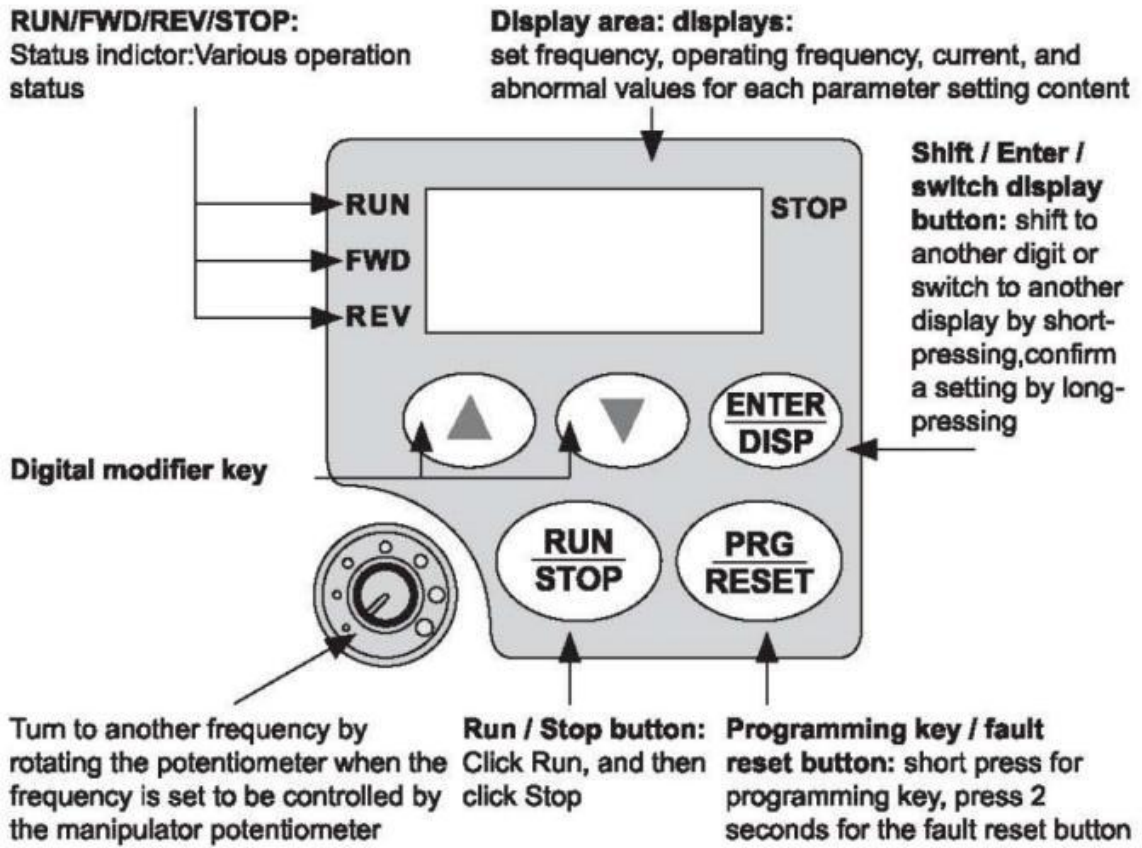
### 3. Dimensions



⚙️ Note: Support for standard 35mm rail mounting (below 5.5kW) Unit: mm

Model	W	H	D	A	B	ϕd
VNZ100-0R4G-2 VNZ100-1R5G-2	68	132	102	120	57	4.5
VNZ100-2R2G-2	72	142	112.2	130	61	4.5
VNZ100-0R4G-4 VNZ100-2R2G-4						
VNZ100-3R7G-4 VNZ100-5R5G-4	85	180	116	167	72	5.5

#### 4. Keyboard Description



## Chapter 2 Product Specifications

Items		VNZ100
Power Supply	Rated voltage frequency	PH/3PH AC 220V 50/60Hz; 3PH AC 380V 50/60Hz
	Voltage Range	220V: 170-240V;380V: 330V-440V
Output	Voltage Range	220V, 0-220V, 380V: 0-380V
	Frequency Range	0.10-400.00Hz

Items		VNZ100
Control method		V/F control
Indication		Operating status/Alarm definition/interactive guidance; e.g., frequency setting, the output frequency/ current, DC bus voltage, the temperature and so on.
Control specifications	Output Frequency Range	0.10Hz-400.00Hz
	Frequency Setting Resolution	Digital input: 0.1Hz, 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	Four 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	1 multi-function output terminals for displaying f running, zero speed, counter, external abnormality, program operation and other information and warnings.
	Acceleration/Deceleration Time Setting	0-999.9s acceleration/deceleration time can be set individually.
Other Functions	PID Control	Built-in PID control
	RS485	Standard RS485 communication function (MODBUS)
	Frequency Setting	Analog input: 0 to 10 V, 0 to 20mA can be selected; Digital input: input using the setting dial of the operation panel or RS485 or UP/DOWN <b>Note: AVI terminals can be used to select an analog voltage input (0-10V) and analog current input(4-20mA) through the switch J2.</b>
	Multi-speed	Four multi-function 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%, 60 seconds (Constant torque)
	Over Voltage	Over voltage protection can be set.
	Under Voltage	Under voltage protection can be set.
	Other Protections	Output short circuit, over current, and Parameter lock and so on.
Environment	Ambient Temperature	-10°C to 40°C(non-freezing)
	Ambient Humidity	Max. 95%(non-condensing)
	Altitude	Lower than 1000m
	Vibration	Max. 0.5G



<b>Structure</b>	Cooling Mode	Forced air cooling
	Protective Structure	IP 20
<b>Installation</b>	Mode	Wall-mounted or standard 35MM rail mounting (Below 5.5kW)

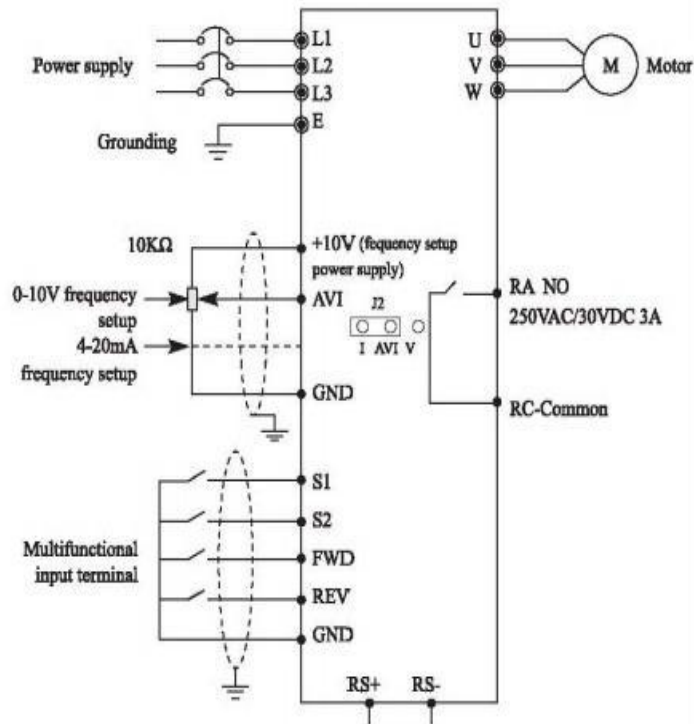
## 1.2 Models

Inverter model	Input voltage	Rated output power (KW)	Rated input current (A)	Rated output current (A)	Applicable motor (KW)
VNZ100-0R4G-2	1PH AC 220V ±15%	0.4	5.4	2.5	0.4
VNZ100-0R75G-2		0.75	7.2	5.0	0.75
VNZ100-1R5G-2		1.5	10.0	7.0	1.5
VNZ100-2R2G-2		2.2	16	11	2.2
VNZ100-3R7G-2		3.7	24	16.5	3.7
VNZ100-0R4G-4	3PH AC 380V ±15%	0.4	3.4	1.2	0.4
VNZ100-0R75G-4		0.75	3.8	2.5	0.75
VNZ100-1R5G-4		1.5	5.0	3.7	1.5
VNZ100-2R2G-4		2.2	5.8	5.0	2.2
VNZ100-3R7G-4		3.7	10	9	3.7
VNZ100-5R5G-4		5.5	15	13	5.5

## Chapter 3 Wiring

**Note:** When using a single-phase power supply, please access from terminals L1 and L2.

RS485



**Note:** AVI terminals can be used to select an analog voltage input(0-10V) and analog current input (4-20mA) through the switch J2.

FWD	REV	S1	S2	S3	S4	10V	FIV	FIC	GND	FOV	MCM	MO1	GND	RS-	RS+
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RA	RB	RC
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## Chapter 4 Parameter list

"☆": The parameter can be modified when the AC drive is in either stop or running state.

"★": The parameter cannot be modified when the AC drive is in the running state.

"●": The parameter is the actually measured value and cannot be modified.

"\*": The parameter is factory parameter and can be set only by the manufacturer.

Parameter	Name	Setting Range	Default	Property
<b>Group P0 Monitor functions</b>				
P000	Main display data selection	0: Setting frequency 1: Running frequency 2: Output current; 3: Rotate speed 4: Bus voltage 5: Output voltage 6: Reserved; 7: Display PID setting feedback; 8: PID setting	0	☆
P001	Display the set frequency	Unit: 0.1Hz		●
P002	Display the output frequency	Unit:0.1Hz		●
P003	Display the output current	Unit: 0.01A		●
P004	Display the motor speed	Unit: RMP		●
P005	Display the DC bus voltage value	Unit: 0.1V		●
P007	Display PID	Unit: 0.01		●
P008	Power on time	Accumulate power on time, unit: hour		●
P009	Output voltage	AC drive Output voltage, unit: 1V		●
P010	Alarm record 1	0: No fault 2: Over-current during		●
P011	Alarm record 2	Acceleration		●
P012	Alarm record 3	3: Over-current during deceleration 4: Over-current at constant speed 5: Over-voltage during acceleration 8: Over-voltage during deceleration 7: Over-voltage at constant speed		●
P013	Reserved	8: Resistor overload 9: Undervoltage 10:AC drive overload 11: Motor overload 14: Module overheat 15: External fault 16: Abnormal communication 24: Water supply low pressure 27: Water supply high		●

		pressure 28: No water warning 29: Power on time reached 31: PID feedback lost during running		
P014	The frequency setting in the last alarm	Unit: 0.1Hz		●
P015	The output frequency n last alarm.	Unit:0.1Hz		●
P016	The output voltage in last alarm.	Unit:0.0A		●
P017	The output voltage in last alarm.	Unit:0.1V		●
P021	Input terminal	Bit0-fwd; Bit1-rev; Bit2-S1; Bit3-82;		●
P022	Output terminal	Bit1: 1- Ra Rc action ;0- Ra Rc no action		●
P023	AI voltage	0.00-10.00V		●
P027	Fault state	0: No fault 2: Over-current during acceleration 3: Over-current during deceleration 4: Over-current at constant speed 5: Over-voltage during acceleration 6: Over-voltage during deceleration 7: Over-voltage at constant speed 8: Resistor overload 9: Undervoltage 10:AC drive overload 11: Motor overload 14: Module overheat 15: External fault 16: Abnormal communication 24: Water supply low pressure 27: Water supply high pressure 28: No water warning 29; Power on time reached 31: PID feedback lost during running		●
P028	Running state	0: Stop 1: Forwarder		●

		2: Reverse		
<b>Group P1 Basic functions</b>				
P100	Digital frequency setting	0.0-P105	0.0 Hz	☆

Parameter	Name	Setting Range	Default	Property
P101	Main frequency source X selection	0: Digital frequency setting (Can modify the UP/DOWN, power lost memory) 1: AI analog input 2: Remote keypad potentiometer setting mode 3: Local keypad potentiometer setting mode 4: UP/DOWN Frequency setting 5: RS485 communication frequency setting 6: Multi-speed reference 7: Simple PLC 8: PID	3	★
P102	Start signal selection	0: Operation panel (FWD/REV/STOP) 1: I/O terminal 2: Communication (RS485)	0	★
P104	Reverse rotation Prevention selection	0: Reverse rotation disallowed 1: Reverse rotation allowed	1	☆
P105	Maximum frequency	Minimum operate frequency-999.9Hz	50.0 Hz	☆
P106	Minimum frequency	0.00-maximum frequency	0.0 Hz	☆
P107	Acceleration Time 1	0-6000.0s	Changing	☆
P108	Deceleration	0-6000.0s	Changing	☆
P109	V/F maximum voltage	V/F intermediate Voltage-500.0V	Changing (380.0 or 220.0)	★
P110	V/F frequency	V/F intermediate frequency-max frequency	50.0Hz	★
P111	V/F intermediate Voltage	V/F minimum voltage - V/F maximum voltage	Changing	★
P112	V/F intermediate frequency	V/F minimum frequency-V/F base frequency	2.5 Hz	★
P113	V/F minimum voltage	0-V/F Intermediate voltage	Changing	★
P114	V/F minimum frequency	0-V/F Intermediate voltage	1.2 Hz	★
P115	Carrier frequency	1.0K-15.0K	Changing	☆
P116	Reserved			
P117	Initialization of parameters	8: Initialization of Factory Setting	0	★
P118	Parameter lock	0: Unlock parameters 1: Lock up parameters	0	★
P119	Rotation direction	0: Same direction 1: Reverse direction	0	☆
P120	Auxiliary frequency source Y selection	0: Digital frequency setting (Can modify the UP/DOWN, power lost memory) 1: AI analog input	0	★

		2: Remote keypad potentiometer setting mode 3: Local keypad potentiometer setting mode 4: UP/DOWN Frequency setting 5: RS485 communication frequency setting 6: Multi-speed reference 7: Simple PLC 8: PID		
P121	Frequency source selection	Unit's digit: Frequency source selection 0: Main frequency source X 1: X and Y operation (operation relationship determined by ten's digit) 2: Switchover between X and Y 3: Switchover between X and "X and Y operation" 4: Switchover between Y and "X and Y operation" Ten's digit (X and Y operation) 0: X+Y 1: X-Y 2: Both the maximum 3: Both the minimum	0	☆
P122	Auxiliary frequency source Y selection	0: Relative to the maximum frequency 1: Relative to the frequency source X	0	☆
P123	Auxiliary frequency source Y range	0%-150%	100%	☆
P124	Frequency offset of auxiliary frequency source for X and Y operation	0.0Hz-Maximum frequency P1.05	0.0Hz	☆
P125	Base frequency for UP/DOWN modification during running	0: Running frequency 1: Set frequency	1	★
P126	Upper limit frequency	Frequency lower limit P1.06-Maximum frequency P1.05	50.0 Hz	☆
P127	Acceleration/ Deceleration time base frequency	0: Maximum frequency 1: Set frequency 2: 100Hz	0	★

Parameter	Name	Setting Range	Default	Property
<b>Group P2 Basic functions</b>				
P200	Start mode selection	0: Regular start	0	☆
P201	Stop mode selection	0: deceleration to a stop 1: coast to stop	0	☆
P202	Starting frequency	0.0-50.00Hz	0.5 Hz	☆
P203	Stopping frequency	0.0-50.00Hz	0.5 Hz	☆
P204	Startup DC braking voltage	0-7.0% rated motor voltage	0.0%	★
P205	Startup DC braking operation time(start)	0-100.0s	0.0	☆
P206	Stop DC braking voltage	0-7.0% rated motor voltage	0.0%	☆
P207	Stop DC braking operation time	0-100.0s	0.0	☆
P208	Torque boost	0-20.0%	3.0%	☆
P209	Rated motor voltage	0-500.0V	380.0V	☆
P210	Rated motor current	0-999.9A	Changing	☆
P211	No load current Ratio of the speed	0-100%	50%	☆
P212	Rated motor rotation speed	0-6000r/min	1460	☆
P213	Number of motor poles	0-20	4	☆
P214	Rated motor slip	0-10.00Hz	2.50 Hz	☆
P215	Rated motor frequency	0-400.00Hz	50.00 Hz	☆
P216	Resistance of stator	0- 100.00Q	Changing	☆
P217	Resistance of rotor	0-100.000	Changing	☆
P218	Self-inductance of rotor	0-100.00H	Changing	☆
P219	Mutual inductance of rotor	0-100.00H	Changing	☆
<b>Group P3 I/O functions</b>				
P300	AI minimum voltage input	0.00V-P301	0.00V	☆
P301	AI maximum voltage Input	P301-10.00V	10.00V	☆
P302	AI input filter time	0.00-10.00S	0.10S	☆
P310	Frequency of low analog	0-999.9Hz	0.0Hz	☆
P31	Direction of low analog	0/1: Forward/Reverse	0	☆
P312	Frequency of high analog	0-999.9Hz	50.0Hz	☆
P313	Direction of high analog	0/1: Forward/Reverse	0	☆



P315	FWD	0: Invalid 1: Jog 2: Jog Forward 3: Jog reverse 4: Forward /reverse 5: Run 6: Forward 7: Reverse 8: Stop 9: Multi -speed 1 10: Multi -Speed 2 11: Multi -speed 3 12: multi-speed 4 13: Acceleration/ Deceleration terminal 1	6	★
P316	REV	4: Acceleration/ Deceleration terminal 2	7	★
P317	S1	15: Terminal (UP) 16: Terminal (DOWN)	18	★
P318	S2	17: Coast to stop 18: Fault reset 19: PID in running 20: PLC in running 21: Start signal for timer1 22: Start signal for timer 2 23: Counter pulse signal 24: Counter reset signal 25: Run pause 26: Switchover between frequency source X and Y	9	★

Parameter	Name	Setting Range	Default	Property
P325	RA, RC	0: Invalid 1: In running 2: Frequency reached 3: Alarm (stop) 4: Zero speed (Valid when stop) 5: Frequency 1 reached 6: Frequency 2 reached 7: Acceleration 8: Deceleration 9: Indication for under voltage 10: Timer 1 reached 11: Timer 2 reached 12: Indication for completion for completion of procedure 13: Indication of procedure 14: PID maximum 15: PID minimum 16: 4-20mA disconnection 17: Motor Overload pre-warning 18: AC drive overload pre-warning 27: Counter pulse setting value reached 28: Intermediate pulse setting value reached 29: Water supply by constant voltage 1" tum on,"0" tum off 30: READY	3	☆
P328	S filter time	0.000s-1.000s	0.010s	☆
P329	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	★
P330	Terminal UP/DOWN rate	0.01Hz/s-99.99Hz/s	1.00Hz/s	☆
P331	DO Output terminal valid mode selection	0: Positive logic 1: Negative logic Unit's digit: Reserved Ten's digit: RA - RC	00000	☆
P332	FWD output delay time	0.0s-999.9s	0.0s	☆
P333	REV output delay time	0.0s-999.9s	0.0s	☆
P334	S1 output delay time	0.0s-999.9s	0.0s	☆
P335	X valid mode selection	0: High level valid 1: Low level valid Unit's digit: FWD Ten's digit: REV Hundred's digit: S1 Thousand's digit: S2	00000	★
<b>Group P4 Secondary application functions</b>				
P400	Jog frequency setting	0.00-maximum frequency	5.0Hz	☆
P401	Acceleration time2	0-999.9s	10.0s	☆
P402	Deceleration time2	0-999.9s	10.08	☆
P403	Acceleration time3	0-899.9s	10.0s	☆
P404	Deceleration time3	0-999.9s	10.0s	☆
P405	Acceleration time4/jog acceleration time	0-999.9s	10.0s	☆

P406	Deceleration time4/Jog deceleration time	0-999.0s	10.0s	☆
P407	Designated value of counter	0-9999	100	☆
P408	Intermediate value of counter	0-9999	50	☆
P409	Limitation of acceleration torque	50-200%	150%	☆
P410	Over-current stall suppression gain	0-100%	20%	☆
P411	Over voltage stall enabled	0: Invalid 1: Valid	1	☆
P412	V/F over-excitation gain	0-100%	10	☆
P413	Over-voltage stall suppression gain	0-200%	50%	☆
P414	Braking action voltage	400V:700.0V 220V:370.0V	Changing	☆
P416	Startup protection	0: Yes 1: No Set P416=0 when connect FWD and GND, after power off, when power on again, AC drive doesn't work.	1	☆
P417	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆
P420	Fault restart times	0-20	0	☆
P421	Time interval of fault auto reset	0.1s-100.0s	1.0s	☆
P423	Over current detection eve	0-200%	0.0%	☆
P424	Over current detection time	0-999.9s	10.0S	☆
P425	Reaching frequency 1 (FDT1)	0.00Hz-Maximum frequency	0.0Hz	☆
<b>Parameter</b>	<b>Name</b>	<b>Setting Range</b>	<b>Default</b>	<b>Property</b>
P426	Reaching frequency 2 (FDT2)	0.00-maximum frequency	0.0Hz	☆
P427	Timer 1 setting	0.0S-999.9S	10.0S	☆
P428	Timer 2 setting	0.0S-999.9S	20.0S	☆
P430	Frequency detection hysteresis (FDT2)	0.0%-100.0% (FDT1 or FDT2) 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 hysteresis loop width	0.00Hz-maximum frequency	0.00Hz	☆
<b>Group P5 PLC operation</b>				
P500	Simple PLC retentive selection	Unit's digit: Retentive upon power stop selection 0: No 1: Yes Ten's digit: Retentive upon power failure selection 0: No 1: Yes	00	☆
P501	PLC starting mode	0: If P101=7, PLC valid		

		1: PLC start		
P502	Simple PLC running mode	0: Stop after the AC drive runs one cycle 1: Keep final values after the AC drive runs one cycle 2: Repeat after the AC drive runs one cycle	0	☆
P503	Multi-speed 1	0.00-maximum frequency	20.0 Hz	☆
P504	Multi-speed 2	0.00-maximum frequency	10.0 Hz	☆
P505	Multi-speed 3	0.00-maximum frequency	20.0 Hz	☆
P506	Multi-speed 4	0.00-maximum frequency	25.0 Hz	☆
P507	Multi-speed 5	0.00-maximum frequency	30.0 Hz	☆
P508	multi-speed 6	0.00-maximum frequency	35.0 Hz	☆
P509	Multi-speed 7	0.00-maximum frequency	40.0 Hz	☆
P510	Multi-speed 8	0.00- maximum frequency	45.0 Hz	☆
P511	Multi-speed 9	0.00-maximum frequency	50.0 Hz	☆
P512	Miti-speed 10	0.00-maximum frequency	10.0 Hz	☆
P513	Multi-speed 11	0.00-maximum frequency	10.0 Hz	☆
P514	Multi-speed 12	0.00-maximum frequency	10.0 Hz	☆
P515	Multi-speed 13	0.00-maximum frequency	10.0 Hz	☆
P516	Multi-speed 14	0.00-maximum frequency	10.0 Hz	☆
P517	Multi-speed 15	0.00-maximum frequency	10.0 Hz	☆
P518	PLC Operation time1	0s(h)-9999s(h)	3s(h)	☆
P519	PLC Operation time2	00s(h)-9999s(h)	4s(h)	☆
P520	PLC operation time3	00s(h)-9999s(h)	5s(h)	☆
P52	PLC operation time4	00s(h)-9999s(h)	0s(h)	☆
P522	PLC operation time5	00s(h)-9999s(h)	0s(h)	☆
P523	PLC operation time6	00s(h)-9999s(h)	0s(h)	☆
P524	PLC operation time7	00s(h)-9999s(h)	0s(h)	☆
P525	PLC operation time8	00s(h)-9999s(h)	0s(h)	☆
P526	PLG operation time9	0s(h)-9999s(h)	0s(h)	☆
P527	PLC operation time10	00s(h)-9999s(h)	0s(h)	☆
P528	PLC operation time11	0s(h)-9999s(h)	0s(h)	☆
P529	PLC operation time12	00s(h)-9999s(h)	0s(h)	☆
P530	PLC operation time13	0s(h)-9999s(h)	0s(h)	☆
P531	PLC operation time14	00s(h)-9999s(h)	0s(h)	☆
P532	PLC operation time15	0s(h)-9999s(h)	0s(h)	☆
P533	PLC operation direction	0-9999s	0	☆
P536	PLC running direction high level	0-6	0	☆
P537	PLC running time unit	0: s 1: h	0	☆
P538	Multi-speed 1 selection	0: P5.03	0	☆
P539	Acceleration/ deceleration time of simple PLC reference 1	0-3	0	☆
P540	Acceleration/ deceleration time of simple PLC reference 2	0-3	0	☆
P541	Acceleration/ deceleration time of simple PLG	0-3	0	☆

	reference 3			
P542	Acceleration/ deceleration time of simple PLC reference 4	0-3	0	☆
P543	Acceleration/ deceleration time of simple PLC reference 5	0-3	0	☆
P544	Acceleration/ deceleration time of simple PLC reference 6	0-3	0	☆
P545	Acceleration/ deceleration time of simple PLC reference 7	0-3	0	☆
Parameter	Name	Setting Range	Default	Property
P546	Acceleration/ deceleration time of simple PLC reference 8	0-3	0	☆
P547	Acceleration/ deceleration time of simple PLC reference 9	0-3	0	☆
P548	Acceleration/deceleration time of simple PLC reference 10	0-3	0	☆
P549	Acceleration/deceleration time of simple PLC reference 11	0-3	0	☆
P550	Acceleration/deceleration time of simple PLC reference 12	0-3	0	☆
P551	Acceleration/deceleration time of simple PLC reference 13	0-3	0	☆
P552	Acceleration/deceleration time of simple PLC reference 14	0-3	0	☆
P553	Acceleration/deceleration time of simple PLC reference 15	0-3	0	☆
P554	Swing frequency setting mode	0: Relative to the central 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	Swing frequency cycle	0.1s-999.9s	10.0s	☆
P558	Triangular wave rising time coefficient	0.1%-100.0%	50.0%	☆
Group P6 PID operation				
P600	PID running mode	0: If 101=8, PID enable, otherwise PID disable 1: PID enable 2: PID start by external terminal	0	☆
P601	PID running mode	0: Negative feedback mode	0	☆

		1: Positive feedback mode		
P602	PID action set point	0: Digital setting (P6.04) 1: AI setting 2-5: Reserved	0	☆
P603	PID feedback selection	0: AI feedback Choose I: 4-20mA P3.00=1.00V; P3.01=5.00V) Choose V: 0-10V (P3.00=0.00V; P3.01=10.00V)	0	☆
P604	PID value setting	0.0Bar-P614	2.50 Bar	☆
P605	PID upper limit	P6.06-P614	10.00 Bar	☆
P606	PID lower limit	0.0Bar-P6.05	0.00 Bar	☆
P607	PID-P	0.0-600.0%	100.0%	☆
P608	PID-I	0.0-10.00S	2.00S	☆
P609	PID-D	0.0-9.9998	0.000S	☆
P610	Forward maximum value of 2 times output	0.00%-100.00%	2.00%	☆
P611	Sleep frequency	0.00-maximum frequency 0 Means sleep function is closed	25.0HZ	☆
P612	Sleep time	0-9999s	10S	☆
P613	Wake-up percent	Target value's 0.0-100.0%	90.0%	☆
P614	Scale	0.00-50.00bar	10.00bar	☆
P615	PID digit of display	1-5	4	☆
P616	PID decimal digits of display	0-4	2	☆
P617	PID upper limit frequency		48.0Hz	☆
P618	PID lower limit frequency		20.0 Hz	☆
P619	PID detection time		20.08	☆
P620	PID deviation limit		0.1%	☆
P621	PID feedback loss warning mode	0: No warning 1: Warning no stop, warning code"20 2: Warning stop, fault code"20"	0	☆
P622	PID feedback loss detection value	Range:0-10.00V If choose 4-20mA, disconnect when less than 2mA, Set P622=2mA*250Q=0.50V)	0.50V	☆
P623	PID feedback loss detection time	0.0s-20.0s	1.0s	☆
P624	Cut-off frequency of PID reverse	0.00-maximum frequency	0.00Hz	☆
P625	PID differential limit	0.00%-99.99%	0.10%	☆
P626	PID setting change time	0.00-99.99s	0.00s	☆
P627	PID feedback filter time	0.00-60.00s	0.00s	☆
P628	PID output filter time	0.00-60.00s	0.00s	☆
P630	PID proportional gain P2	0.0-600.0%	200.0%	☆

Parameter	Name	Setting Range	Default	Property
P631	PID proportional gain 12	0.0-10.00S	0.50S	☆
P632	PID proportional gain D2	0.0-9.999S	0.000S	☆
P633	PID parameter switchover condition	0: No switch 1: Switch through X 2: Auto switch	0	☆
P634	PID parameter switchover deviation 1	0.0%-PA.20	5.0%	☆
P635	PID parameter switchover deviation 2	PA.19-100.0%	10.0%	☆
P636	PID initial value	0.0%-100.0%	0.0%	☆
P637	PID initial value hold time	0.00-99.99s	0.00s	☆
P639	PID integral time	Unit's digit: integral separated 0: Invalid	00	☆
P640	PID stop operation	0: No PID operation at stop 1: PID operation at stop	0	☆
P641	Pressure detection value when short of water	0.00 bar-PA.01 (set as 0.00 bar, no detection)	0.50bar	☆
P642	When AC drive display high/low pressure warning. delay P642, high/low pressure fault is auto reset.	1) When AC drive display high pressure warning, after pressure return to normal, delay P642, high pressure fault is auto reset. 2) When AC drive display low pressure warning. delay P642, low pressure fault is auto reset. If set P642=0, when AC drive display high/low pressure warning, it will not reset, range: 0-9999s	10S	☆
P643	Low pressure warning detection time	Pressure lower than P606 and keep P643 when running, it will stop Display low pressure fault, range: 0-9999S	10S	☆
P644	Short of water warning detection time	0-9999S	100S	☆
P645	Delay time setting of autos running when power on	0: Invalid 1: Valid	0	☆
P646	First 10 times interval time of short of water auto reset	0-9999s	600S	☆
P647	Interval time of first 10 times short of water pressure auto reset	0-1000mins	60 min	☆
P648	Anti-freeze enables	1: Valid 0: Invalid	0	☆
P649	Anti-freeze waiting time while sleeping	0-9999s	900s	☆
P650	Anti-freeze running time while sleeping	0-9999s	30s	☆
P651	Anti-freeze running frequency while sleeping	0-50.0Hz	15.0Hz	☆
P652	Sleep operate level: operate when frequency<P652/s	0-10.0Hz	0.5Hz	☆
P653	Sleep operate level pressure allowed of frequency reduction	0.0-10.0%	0.60%	☆

P654	Sleep operate level: frequency reduction per second	0-10.0Hz	0.3Hz	☆
P655	Sleep operate level: times of frequency reduction	0-1000	10 times	☆
P656	Sleep operate level frequency>P6.56, no operate	0-maximum P1.05	42.0Hz	☆
P657	PID sample time	0-1000ms	4ms	☆
<b>Group P7 RS-485 Communication</b>				
P700	Baud rate	0:4800bps 1:9600bps	1 6005	☆
P701	Data format	0: No check (8-N-1) for ASC 1: Even parity check (8-E-1) for ASC 2: Odd Parity check (8-O-1) for ASC 3: No check (8-N-1) for RTU 4: Even parity check (8-E-1) far RTU 5: Odd Parity check (8-O-1) for RTU	3	☆
P702	Local address	1-247, n0: Broadcast address	1	☆
P703	Communication error processing	0: No warning 1: Warning, display Co 2: Display Co and stop	0	☆
<b>Group P8 Advanced application</b>				
P800	User password	0: Locked 1: Unlocked	1	☆
P802	Model selection	0: G type 1:P type	Changing	☆
P803	Over-voltage protection level setting	400V (220V level) 810V (380V level)	Changing	☆



Parameter	Name	Setting Range	Default	Property
P804	Under-voltage protection level setting	400V (220V level) 810V (380V level)	Changing	☆
P805	Temperature alarm value		Changing	☆
P812	Digital setting frequency stop memory selection	0: No memory 1: Memory	0	☆
P814	Motor overload coefficient	0.20-10.00	1.00	☆
P815	PWM switch frequency	0.0-100.0Hz	12.0 Hz	☆
P816	Motor overload protection selection	0: Prohibit 1: Permit	0	☆

### 8.Fault

Fault Name	Operate panel display	Fault NO.
Over current during acceleration	OC1	2
Over current during deceleration	OC2	3
Over current during constant speed	OC3	4
Over voltage during acceleration	OU1	5
Over voltage during deceleration	OU2	6
Over voltage during constant speed	OU3	7
Resistor overload (Continue entering into under voltage state)	POF	8
Under voltage	LU	9
AC drive overload	OL2	10
Motor overload	OL1	11
Module over heat	OH	14
External equipment fault	EF	15
Communication fault	CO	16
Power on time reached	TE	29
Low water pressure warning	LP	24
High water pressure warning	HP	27
Short of water warning	LL	28
PID feedback lose during running (pressure sensor disconnect detection)	20	31
Tips	Operate panel display	
AG drive sleeping	SLP	
Power on time reached	TE	

<b>Fault code</b>	<b>Name</b>	<b>Possible fault reason</b>	<b>Solutions</b>
OH (14)	Module overheat	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the module is damaged. 5: The AC drive module is damaged.	1: Lower the ambient temperature 2: Clean the air filter 3: Replace the damaged fan 4: Replace the damaged thermally sensitive resistor. 5: Replace the AC drive module.
EF (15)	External equipment fault	External fault signal is input via multi-function terminal	Reset the operation
CO (16)	Communication fault	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: The communication parameters in group PD are set improperly.	1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set the communication parameters properly.
TE (29)	Accumulative power-on time reached	The accumulative power-on time reaches the setting value	Contact the factory
LP (24)	Low water pressure warning	1. Pressure sensor wiring fault 2. Parameter is set improperly	1. Check the wiring of pressure sensor 2. Set the parameter properly
HP (27)	High water pressure warning		
LL (28)	Short of water warning	1. Pressure sensor wiring fault 2. Parameter is set improperly 3. No water in tube	1. Check the wiring of pressure sensor 2. Set the parameter properly 3. Check the tube
20(31)	PID feedback lost during running fault	1. Pressure sensor with problem 2. Pressure sensor wiring fault 3. Parameter is set improperly	1. Replace the pressure sensor 2. Check the wiring of pressure sensor 3. Set the parameter properly
SLP	AC drive is sleeping		

## Chapter 5 Communication Protocol

### 5.1 Communication parameters

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 1: 9600bps 2: 19200bps 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.

### 5.2 Communication protocol

VNZ100 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).

#### 5.2.1 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	35H	36H	37H
Character	8	9	A	B	C	D	E	F
ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

### 5.2.2 Character structure

10-bit character box (For ASCII)

Data pattern: 8N1 For ASCII

Start bit	0	1	2	3	4	5	6	7	Stop bit
	8-Data bits Character string								
	10-bits Character box								

10-bit character box (For RTU)

Data pattern: 8N1 For RTU

Start bit	0	1	2	3	4	5	6	7	Stop bit
	8-Data bits Character string								
	10-bits Character box								

Data pattern: 8O1 For ASCII

Start bit	0	1	2	3	4	5	6	7	Odd parity	Stop bit
	8-Data bits Character string									
	11-bits Character box									

Data pattern: 8E1 For ASCII

Start bit	0	1	2	3	4	5	6	7	even parity	Stop bit
	8-Data bits Character string									
	11-bits Character box									

Data pattern: 8O1 For RTU

Start bit	0	1	2	3	4	5	6	7	Odd parity	Stop bit
	8-Data bits Character string									
	11-bits Character box									

Data pattern: 8E1 For RTU

Start bit	0	1	2	3	4	5	6	7	even parity	Stop bit
	8-Data bits Character string									
	11-bits Character box									

### 5.2.3 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:
.....	$n \times 8\text{-bit data content consists of } 2n \text{ ASCII codes}$
DATA 0	$n \leq 16$ , 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:
.....	$n \times 8\text{-bit data, } n = 16$
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.

ASCII mode:

Format of enquiry message character string:

STX	'.'
Address	0
	1
Function	0
	3
Starting address	2
	1
	0
	2
Number of data (count by word)	0
	0
	0
	2
LRC Check	D

	7
END	CR
	LF

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

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	00H

address 8103H	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.

Step 3: 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)
{
intj;
unsigned int reg_crc=0XFFFF;
while( 1length-- ) {
reg_crc^=*data ;
for (j = 0; j<?; j ) {
if (reg_crc & 0x01) { /*LSB (b0) =1 */
reg_ere= (reg_crc>>1) ^0Xa001;
}else{
reg_cre=reg_crc>>1;
}
}
return reg_crc; //Finally feedback the value of CRC temporary storage
}

```

Data Address	Bit Address	Content	Read /write	Address
2000H (P102=2)	BIT1~ BIT0	00B: No action 01B: Stop 10B: Start 11B: JOG start	Write	2000H
	BIT3~BIT2	00B: No action 01B: Rev 10B: Fwd 11B: Change direction		
	BIT4	0B: No action 1B: Reset alarm		
	BIT15~BIT5	Reserved		
2001H (P101=5)	BIT0~ BIT15	Freq. Command 0000~4000 1 digit after decimal point, unit: Hz	Write	2001H
P027	Alarm code			
	BIT0	1: UC; 0: No alarm		
	BIT1	1: OC; 0: No alarm		
	BIT2	1: Communication err.NF; 0: No alarm		
	BIT3	1: Output loss phase LO; 0: No alarm		
	BIT4	1: OU;		

		0: No alarm	Read only	001BH
	BIT5	Reserved		
	BIT6	1: LU; 0: No alarm		
	BIT7	1: Motor overload OL; 0: No alarm		

	BIT8	1: Over torque OT; 0: No alarm		
	BIT9	1: Overheat OH; 0: No alarm		
	BIT10	1: No 4-20mA signal; 0: No alarm		
	BIT11~ BIT14	Reserved		
	BIT15	1: Alarm; 0: No alarm		
P028	BIT0	0: Forward 1: Reversed	Read only	001CH
	BIT1	0: Stop 1: Run		

#### 5.2.4 List of Function Parameters

Function	Parameters	Name	Command address
Monitor functions	P001	Display the set frequency	0001H
	P002	Display the output frequency	0002H
	P003	Display the output current	0003H
	P004	Display the motor speed	0004H
	P005	Display the DC bus voltage value	0005H
	P006	Display the temperature of inverter	0006H
	P007	Display PID	0007H
	P009	Output voltage	0009H
	P010	Alarm record 1	000AH
	P011	Alarm record 2	000BH
	P012	Alarm record 3	000CH
	P013	Alarm record 4	000DH
	P014	The frequency setting in the last alarm	000EH
	P015	The output frequency in last alarm	000FH
	P016	The output current in last alarm	0010H
	P017	The output voltage in last alarm	0011H
	P018	The output DC bus voltage in last alarm	0012H
		P020	Output power
Basic functions	P100	Digital frequency setting	0064H
	P101	Frequency setting selection	0065H

P102	Start signal selection	0066H
P103	"stop" key lock operation selection	0067H
P104	Reverse rotation prevention selection	0068H
P105	Maximum frequency	0069H
P106	Minimum frequency	006AH
P107	Acceleration time 1	006BH
P108	Deceleration time 1	006CH
P109	V/F maximum voltage	006DH
P110	V/F base frequency	006EH
P111	V/F intermediate voltage	006FH
P112	V/F intermediate frequency	0070H
P113	V/F minimum voltage	0071H
P114	V/F minimum frequency	0072H
P115	Carrier frequency	0073H
P116	Automatic carrier line up	0074H
P117	Initialization of parameters	0075H
P118	Parameter lock	0076H
P200	Start mode selection	00C8H
P201	Stop mode selection	00C9H
P202	Starting frequency	00CAH
P203	Stopping frequency	00CBH
P204	DC injection brake operation current (start)	00CCH
P205	DC injection brake operation time (start)	00CDH
P206	DC injection brake operation current (stop)	00CEH
P207	DC injection brake operation time (stop)	00CFH
P208	Torque boost	00D0H
P209	Rated motor voltage	00D1H
P210	Rated motor current	00D2H
P211	No load current ratio of motor	00D3H
P212	Rated motor rotation speed	00D4H
P213	Number of motor poles	00D5H
P214	Rated motor slip	00D6H
P215	Rated motor frequency	00D7H

	P216	Resistance of stator	00D8H
	P217	Resistance of rotor	00D9H
	P218	Self-inductance of rotor	00DAH
	P219	Mutual inductance of rotor	00DBH
I/O functions	P300	AVI minimum voltage input	012CH
	P301	AVI maximum voltage input	012DH
	P302	AVI input filter time	012EH
	P303	Reserved	012FH
	P304	Reserved	0130H
	P305	Reserved	0131H
	P306	Reserved	0132H
	P307	Reserved	0133H
	P310	Frequency of low analog	0136H
	P311	Direction of low analog	0137H
	P312	Frequency of high analog	0138H
	P313	Direction of high analog	0139H
	P314	Analog input reverse selection	013AH
	P315	Input terminal FWD (0~32)	013BH
	P316	Input terminal REV (0~32)	013CH
	P317	Input terminal S1 (0~32)	013DH
	P318	Input terminal S2 (0~32)	013EH
	P319	Reserved	013FH
	P320	Reserved	0140H
	P321	Reserved	0141H
	P322	Reserved	0142H
	P323	Reserved	0143H
	P324	Reserved	0144H
	P325	Alarm output terminal RA, RB, RC (0-32)	0145H
	P326	Reserved	0146H
P327	Reserved	0147H	
Secondary application	P400	Jog frequency setting	0190H
	P401	Acceleration time 2	0191H
	P402	Deceleration time 2	0192H
	P403	Acceleration time 3	0193H
	P404	Deceleration time 3	0194H
	P405	Acceleration time 4/Jog acceleration time	0195H

P406	Deceleration time 4/Jog deceleration time	0196H
P407	Designated value of counter	0197H
P408	Intermediate value of counter	0198H
P409	Limitation of acceleration torque	0199H
P410	Limitation of constant speed torque	019AH
P411	Over voltage prevention selection in deceleration	019BH
P412	Automatic voltage regulation selection	019CH
P413	Automatic-energy-saving selection	019DH
P414	DC Braking voltage	019EH
P415	Braking duty	019FH
P416	Restart after instant power off	01A0H
P417	Allowable time of power cut	01A1H
P418	Flank restart current limited level	01A2H
P419	Flank restart time	01A3H
P420	Fault restart times	01A4H
P421	Delay time for restart after fault	01A5H
P422	Over torque action	01A6H
P423	Over torque detection level	01A7H
P424	Over torque detection time	01A8H
P425	Reaching frequency 1	01A9H
P426	Reaching frequency 2	01AAH
P427	Timer 1 setting	01ABH
P428	Timer 2 setting	01ACH
P429	Constant-speed torque limiting time	01ADH
P430	Width of arrival of frequency in hysteretic loop	01AEH
P431	Jump frequency 1	01AFH
P432	Jump frequency 2	01B0H
P433	Jump frequency hysteresis loop width	01B1H
P434	UP/DOWN frequency step	01B2H

	P435	UP/DOWN frequency memory options	01B3H
PLC operation	P500	PLC memory mode	01F4H
	P501	PLC starting mode	01F5H
	P502	PLC running mode	01F6H
	P503	Multi-speed 1	01F7H
	P504	Multi-speed 2	01F8H
	P505	Multi-speed 3	01F9H
	P506	Multi-speed 4	01FAH
	P507	Multi-speed 5	01FBH
	P508	Multi-speed 6	01FCH
	P509	Multi-speed 7	01FDH
	P510	Multi-speed 8	01FEH
	P511	Multi-speed 9	01FFH
	P512	Multi-speed 10	0200H
	P513	Multi-speed 11	0201H
	P514	Multi-speed 12	0202H
	P515	Multi-speed 13	0203H
	P516	Multi-speed 14	0204H
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**We reserve the right of this manual contained information change without prior notice.**

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