Foreword

Thank you for choosing POWTRAN PI9000 Series Frequency Inverter. This product made by POWTRAN is based on years of experience in professional production and sale, and designed for variety of industrial machinery, fan and water pump drive unit and IF heavy-duty grinding unit.

This manual provides user the relevant precautions on installation, operational parameter setting, abnormal diagnosis, routine maintenance and safe use. In order to ensure correct installation and operation of the frequency converter, please carefully read this manual before installing it.

For any problem when using this product, please contact your local dealer authorized by this company or directly contact this company, our professionals are happy to serve you.

The end-users should hold this manual, and keep it well for future maintenance & care, and other application occasions. For any problem within the warranty period, please fill out the warranty card and fax it to the our authorized dealer.

The contents of this manual are subject to change without prior notice. To obtain the latest information, please visit our website.

For more product information, please visit: http:// www.Powtran.com。

POWTRAN

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Chapter 1.Inspection and safety precautions

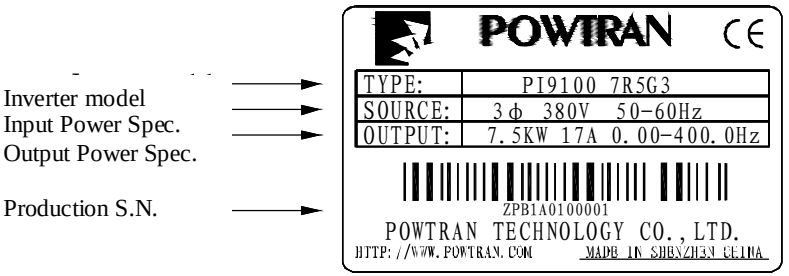
POWTRAN frequency inverters have been tested and inspected before leaving factory. After purchasing, please check if its package is damaged due to careless transportation, and if the specifications and model of the product are consistent with your order requirements. For any problem, please contact your local authorized POWTRAN dealer or directly contact this company.

1-1.Inspection after unpacking

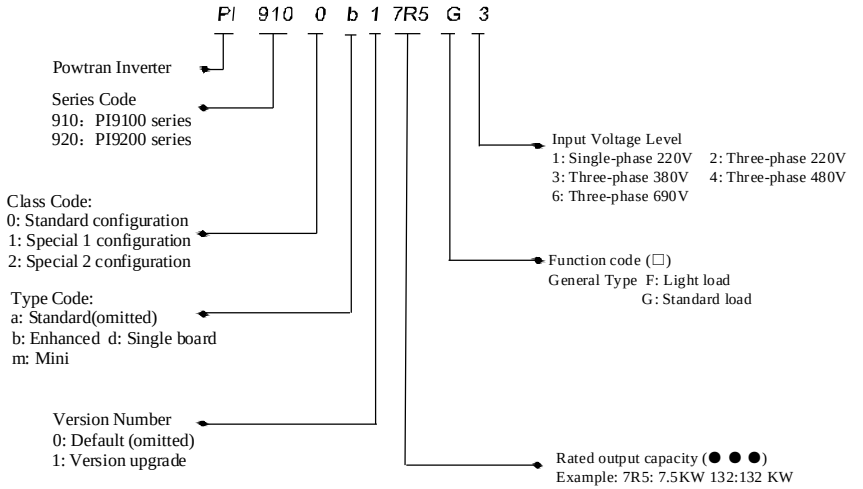
※ Check if that packing container contains this unit, one manual and one warranty card.

※ Check the nameplate on the side of the frequency inverter to ensure that the product you have received is right the one you ordered.

1-1-1.Instructions on nameplate



1-1-2.Model designation



1-2.Safety precautions

Safety precautions in this manual are divided into the following two categories:

⚠Danger: the dangers caused by failure to perform required operation, may result in serious injury or even death;

⚠Caution:the dangers caused by failure to perform required operation, may result in moderate injury or minor injury, and equipment damage;

Process	Type	Explanation
Before installation	⚠Danger	● When unpacking, if control system with water, parts missed or component damaged are found, do not install! ● If packing list does not match the real name, do not install! ● Gently carry with care, otherwise there is the risk of damage to equipment! ● Please do not use the damaged driver or the frequency inverter with missed pieces, otherwise there is the risk of injury! ● Do not use your hand to touch the control system components, otherwise there is the risk of electrostatic damage!
When installing	⚠Danger	● Please install the unit on the metal or flame retardant objects; away from combustible material. Failure to do so may cause a fire! ● Never twist the mounting bolts of the equipment components, especially the bolt with the red mark!
	⚠Note	● Do not let the lead wires or screws fall into the driver. Otherwise which may cause damage to the driver! ● Keep the driver installed in the place where less vibration, avoid direct sunlight. ● When two or more converters are installed in a cabinet, please pay attention to the installation location, ensure the good heat dissipation effect.
When wiring	⚠Danger	● Must comply with this manual's guidance, any construction shall be performed by a professional electrician, otherwise there would be the unexpected risk ! ● A circuit breaker must be set between the inverter and the power supply to separate them, otherwise it may cause a fire! ● Verify if power is a zero-energy status before wiring, otherwise there is a risk of electric shock! ● The inverter shall be grounded correctly according to standard specifications, otherwise there is a danger of electrical shock! ● Never connect the input power to the inverter output terminals (U, V, W). Note that the mark of the

		terminals, do not incorrectly connect wires! Otherwise which may cause damage to the driver! ● Ensure that the distribution line meets the regional safety standards of EMC requirements. The diameter of used wire shall refer to the recommendations of this manual. Otherwise it may cause an accident! ● Never directly connect braking resistor to the DC bus (+) and (-) terminals. Otherwise it may cause a fire! ● Encoder must use the shielded wire, and the shielding layer must ensure the single-ended grounded!
Before energizing	⚠Note	● Please confirm whether the input power voltage is same as the inverter rated voltage; wiring positions of power input terminals(R, S, T) and output terminals(U, V, W) are correct or not; and note that if there is a short circuit in the peripheral circuit connected to driver, if the connected lines are tight, otherwise it may cause damage to the driver! ● Do not need to perform withstand voltage test for any part of the inverter, this product has been tested before leaving factory. Otherwise it may cause an accident!
	⚠Danger	● The inverter's cover plate must close before power on. Otherwise it may cause an electric shock! ● Wiring of all external accessories must comply with the guidance of this manual, please correctly wiring in accordance with the circuit connection methods described in this manual. Otherwise it may cause an accident!
After energizing	⚠Danger	● Do not open cover plate after energizing. Otherwise there is a risk of electric shock! ● Do not touch the driver and peripheral circuits with wet hands. Otherwise there is a risk of electric shock! ● Do not touch any input and output terminals of the inverter. Otherwise there is a risk of electric shock! ● The inverter automatically perform the safety testing for the external strong electrical circuit in the early stages of energizing, therefore never touch the driver terminals(U, V, W) or motor terminals, otherwise there is a risk of electric shock! ● If you need to identify the parameters, please pay attention to the danger of injury during motor rotation. Otherwise it may cause an accident! ● Please do not change the inverter manufacturer parameters. Otherwise it may cause damage to this unit!
During operation	⚠Danger	● Do not touch the cooling fan and the discharge resistor to feel the temperature. Otherwise it may cause burns! ● Non-professional personnel is not allowed to detect signal when operating. Doing so may cause personal

		injury or damage to this unit!
	⚠Note	● When the inverter is operating, you should avoid that objects fall into this unit.Otherwise cause damage to this unit! ● Do not start/stop the driver by switching on/off contactor. Otherwise cause damage to this unit!
When maintaining	⚠Danger	● Do not perform repairs and maintenance for the live electrical equipment. Otherwise there is a risk of electric shock! ● The repairs and maintenance task can be performed only when the inverter voltage is lower than AC36V, generally that is two minutes after powering off. Otherwise, the residual charge from capacitor would cause personal injury! ● Non-well-trained professional personnel is not allowed to perform repairs and maintenance of inverter. Doing so may cause personal injury or damage to this unit! ● After replacing the inverter, parameter settings must be redone, all pluggable plugs can be operated only in the case of powering off!

1-3.Precautions

No.	Type	Explanation
1	Motor insulation inspection	Please perform motor insulation inspection for the first time use, re-use after leaving unused for a long time as well as regular check, in order to prevent damage to the inverter because of the motor's winding insulation failure. Wiring between motor and inverter shall be disconnected, it is recommended that the 500V voltage type megger should be adopted and insulation resistance shall be not less than 5MΩ.
2	Motor thermal protection	If the rated capacity of the selected motor does not match the inverter, especially when the inverter rated power is greater than the motor rated power, be sure to adjust the motor protection parameter values inside inverter or install thermal relay in the front of motor for motor protection.
3	Run over power frequency	The inverter output frequency rang is 0Hz to 3200Hz(Maz.vector control only supports 300Hz). If the user is required to run at 50Hz or more, please consider the endurance of your mechanical devices.
4	Vibrations of mechanical device	Inverter output frequency may be encountered mechanical resonance point of the load device, you can set jump frequency parameter inside inverter to avoid the case.
5	Motor heat and noise	The inverter output voltage is PWM wave that contains a certain amount of harmonics, so the temperature rise, noise and vibration of motor show a slight higher than frequency power frequency operation.

6	Output side with piezoresistor or capacitor for improving power factor	The inverter output is PWM wave, if the piezoresistor for lightning protection or the capacitor for improving power factor is installed in the output side, which easily cause the inverter instantaneous overcurrent or even cause damage to the inverter. Please do not use.
7	Contactor or switch used in the inverter input/output terminals	If contactor is installed between power supply and inverter, the contactor is not allowed to start/stop the inverter. Necessarily need to use the contactor to control the inverter start/stop, the interval should not be less than one hour. Frequent charging and discharging may reduce the service life of the inverter capacitor. If the contactor or switch is equipped between output terminals and motor, the inverter should be turned on/off without output status, otherwise which easily lead to damage to the inverter module.
8	Use other than the rated voltage	PI series inverter is not suitable for use beyond the allowable operating voltage described in this manual, which easily cause damage to the parts inside inverter. If necessary, please use the corresponding transformer to change voltage.
9	Never change 3-phase input to 2-phase input	Never change PI series 3-phase inverter to 2-phase one for application. Otherwise it will lead to malfunction or damage to the inverter.
10	Lightning surge protection	The series inverter is equipped with lightning overcurrent protection device, so it has the ability of self-protection to lightning induction. For the area where lightning is frequent, user should also install the extra protection in the front of the inverter.
11	High altitude and derating application	When the inverter is used in areas over 1000m altitude, it is required to reduce frequency because the thin air will decrease the cooling effect of inverter. Please consult our technician for details on the application.
12	Special use	If the user need to use methods other than the suggested wiring diagram provided in this manual, such as common DC bus, please consult our technician.
13	Precautions for scrap disposal of the inverter	When electrolytic capacitors on the main circuit and printed circuit board as well as plastic parts are burned, it may produce toxic gases.Please disposing as industrial waste.
14	Adaptive motor	1) Standard adaptive motor shall be four-pole asynchronous squirrel-cage induction motor or permanent magnet synchronous motor. Apart from the said motors, please select the inverter according to the motor rated current. 2) The cooling fan and the rotor shaft for non-inverter motor are coaxially connected, the fan cooling effect is reduced when the rotational speed is reduced, therefore, when the motor works in overheating occasions, a strong exhaust fan should be retrofitted or replace non-inverter motor with the inverter

		motor; 3) The inverter has built-in the adaptive motor standard parameters, according to the actual situation, please identify motor parameters or accordingly modify the default values to try to meet the actual value, otherwise it will operation affect and protection performance; 4) When short-circuit of cable or motor internal will activate the inverter alarm, even bombing. Therefore, firstly perform insulation short-circuit test for the initial installation of the motor and cable, routine maintenance often also need to perform such test. Note that the parts to be tested and the inverter shall be disconnected completely when testing.
15	Others	1) Never connect the AC power to the inverter output terminals(U, V, W). 2) Properly fix and lock the panel before powering on, so as to avoid hurting the personal safety due to internal poor capacitors. 3) Never perform wiring, checking and other operations after power is turned on. 4) Do not touch the internal circuit board and its components in order to avoid the risk of electric shock after this unit is powered, 5) Do not touch internal circuit board and any parts after powering off and within five minutes after keyboard indicator lamp goes out, you must use the instrument to confirm that internal capacitor has been discharged fully, otherwise there is a danger of electric shock. 6) Body static electricity will seriously damage the internal MOS field-effect transistors, etc., if there are not anti-static measures, do not touch the printed circuit board and IGBT internal device with hand, otherwise it may cause a malfunction. 7)The ground terminal of the inverter(E or ⏚) shall be earthed firmly according to the provisions of the National Electrical Safety and other relevant standards. Do not shut down(power off) by pulling switch, and only cut off the power until the motor stopping operation. 8) It is required to add the optional input filter attachment so as to meet CE standards

1-4.Scope of applications

※ This inverter is suitable for three-phase AC asynchronous motor and permanent magnet synchronous motor.

※ This inverter can only be used in those occasions recognized by this company, an unapproved use may result in fire, electric shock, explosion and other accidents.

※ If the inverter is used in such equipments(e.g: equipments for lifting persons, aviation systems, safety equipment, etc.) and its malfunction may result in personal injury or even death. In this case, please consult the manufacturer for

your application.

Only the well-trained personnel can be allowed to operate this unit, please carefully read the instructions on safety, installation, operation and maintenance before use. The safe operation of this unit depends on proper transport, installation, operation and maintenance!

Chapter 2 Standard specifications

2-1.Technical specifications

Inverter model	Input voltage	Rated output power(kW)	Rated input current(A)	Rated output current(A)	Adaptive motor	Base No.
PI9100-0R4G2	3-phase 220V ±15%	0.4	3.4	2.1	0.4	9S2
PI9100-0R7G2		0.75	5	3.8	0.75	9S2
PI9100-1R5G2		1.5	5.8	5.1	1.5	9S2
PI9100-2R2G2		2.2	10.5	9	2.2	9S3
PI9100-3R7G2		3.7	14.6	13	3.7	9S3
PI9200-5R5G2		5.5	26	25	5.5	9L1
PI9200-7R5G2		7.5	35	32	7.5	9L1
PI9200-011G2		11	46.5	45	11	9L1
PI9200-015G2		15.0	62	60	15.0	9L2
PI9200-018G2		18.5	76	75	18.5	9L2
PI9200-022G2		22.0	91	90	22.0	9L3
PI9200-030G2		30.0	112.0	110	30.0	9L3
PI9200-037G2		37.0	157	152	37.0	9L3
PI9200-045G2		45.0	180	176	45.0	9L4
PI9200-055G2		55.0	214	210	55.0	9L4
PI9200-075G2		75	307	304	75	9L4
PI9100-0R7G3	3-phase 380V ±15%	0.75	3.4	2.1	0.75	9S2
PI9100-1R5G3		1.5	5.0	3.8	1.5	9S2
PI9100-2R2G3		2.2	5.8	5.1	2.2	9S2
PI9100-3R7G3		3.7	10.5	9	3.7	9S3
PI9100-5R5G3/ PI9100-5R5F3		5.5	14.6	13	5.5	9S3/9S3
PI9100-7R5G3/ PI9100-7R5F3		7.5	20.5	17	7.5	9S4/9S4
PI9200-011G3/ PI9200-011F3/ PI9200-015F3		11/11/15	26/26/35	25/25/32	11/11/15	9L1/9L1/9L1

Inverter model	Input voltage	Rated output power(kW)	Rated input current(A)	Rated output current(A)	Adaptive motor	Base No.
PI9200-015G3/ PI9200-018F3		15/18.5	35/38.5	32/37	15/18.5	9L1/9L1
PI9200-018G3/ PI9200-022F3		18.5/22	38.5/46.5	37/45	18.5/22	9L2/9L2
PI9200-022G3/ PI9200-030F3		22/30	46.5/62	45/60	22/30	9L2/9L2
PI9200-030G3/ PI9200-037F3		30/37	62/76	60/75	30/37	9L3/9L3
PI9200-037G3/ PI9200-045F3		37/45	76/91	75/90	37/45	9L3/9L3
PI9200-045G3/ PI9200-055F3		45/55	91/112	90/110	45/55	9L4/9L4
PI9400-045G3/ PI9400-055F3		45/55	91/112	90/110	45/55	9P4/9P4
PI9200-055G3/ PI9200-075F3		55/75	112/157	110/150	55/75	9L4/9L4
PI9400-055G3/ PI9400-075F3		55/75	112/157	110/150	55/75	9P4/9P4
PI9200-075G3/ PI9200-090F3		75/90	157/180	150/176	75/90	9L4/9L4
PI9400-075G3/ PI9400-090F3		75/90	157/180	150/176	75/90	9P5/9P5
PI9200-090G3/ PI9200-110F3		90/110	180/214	176/210	90/110	9L5/9L5
PI9400-090G3/ PI9400-110F3		90/110	180/214	176/210	90/110	9P5/9P5
PI9200-110G3/ PI9200-132F3		110/132	214/256	210/253	110/132	9L5/9L5
PI9400-110G3/ PI9400-132F3		110/132	214/256	210/253	110/132	9P6/9P6
PI9200-132G3/ PI9200-160F3		132/160	256/307	253/304	132/160	9L6/9L6
PI9400-132G3/ PI9400-160F3		132/160	256/307	253/304	132/160	9P6/9P6
PI9200-160G3/ PI9200-187F3		160/187	307/345	304/340	160/187	9L6/9L6
PI9400-160G3/ PI9400-187F3		160/187	307/345	304/340	160/187	9P6/9P6
PI9300-187G3/ PI9300-200F3		187/200	345/385	340/380	187/200	9C1/9C1
PI9300-187G3/ PI9300-200F3		187/200	345/385	340/380	187/200	9C2/9C2
PI9300-200G3/		200/220	385/430	380/426	200/220	9C1/9C1

Inverter model	Input voltage	Rated output power(kW)	Rated input current(A)	Rated output current(A)	Adaptive motor	Base No.
PI9300-220F3						
PI9300-200G3/ PI9300-220F3		200/220	385/430	380/426	200/220	9C2/9C2
PI9400-187G3/ PI9400-200F3		187/200	345/385	340/380	187/200	9P7/9P7
PI9400-200G3/ PI9400-220F3		200/220	385/430	380/426	200/220	9P7/9P7
PI9300-220G3		220	430	426	220	9C1
PI9300-220G3/ PI9300-250F3		220/250	430/468	426/465	220/250	9C2/9C2
PI9400-220G3		220	430	426	220	9P7
PI9300-250G3/ PI9300-280F3		250/280	468/525	465/520	250/280	9C3/9C3
PI9300-280G3/ PI9300-315F3		280/315	525/590	520/585	280/315	9C3/9C3
PI9300-315G3/ PI9300-355F3		315/355	590/665	585/650	315/355	9C3/9C3
PI9300-355G3/ PI9300-400F3		355/400	665/785	650/725	355/400	9C3/9C3
PI9100-0R7G4	3-phase 480V ±15%	0.75	3.4	2.1	0.75	9S2
PI9100-1R5G4		1.5	5.0	3.8	1.5	9S2
PI9100-2R2G4		2.2	5.8	5.1	2.2	9S2
PI9100-3R7G4		3.7	10.5	9	3.7	9S3
PI9100-5R5G4/ PI9100-5R5F4		5.5	14.6	13	5.5	9S3/9S3
PI9100-7R5G4/ PI9100-7R5F4		7.5	20.5	17	7.5	9S4/9S4
PI9200-011G4/ PI9200-011F4/ PI9200-015F4		11/11/15	26/26/35	25/25/32	11/11/15	9L1/9L1/9L1
PI9200-015G4/ PI9200-018F4		15/18.5	35/38.5	32/37	15/18.5	9L1/9L1
PI9200-018G4/ PI9200-022F4		18.5/22	38.5/46.5	37/45	18.5/22	9L2/9L2
PI9200-022G4/ PI9200-030F4		22/30	46.5/62	45/60	22/30	9L2/9L2
PI9200-030G4/ PI9200-037F4		30/37	62/76	60/75	30/37	9L3/9L3
PI9200-037G4/ PI9200-045F4		37/45	76/91	75/90	37/45	9L3/9L3

Inverter model	Input voltage	Rated output power(kW)	Rated input current(A)	Rated output current(A)	Adaptive motor	Base No.
PI9200-045G4/ PI9200-055F4		45/55	91/112	90/110	45/55	9L4/9L4
PI9400-045G4/ PI9400-055F4		45/55	91/112	90/110	45/55	9P4/9P4
PI9200-055G4/ PI9200-075F4		55/75	112/157	110/150	55/75	9L4/9L4
PI9400-055G4/ PI9400-075F4		55/75	112/157	110/150	55/75	9P4/9P4
PI9200-075G4/ PI9200-090F4		75/90	157/180	150/176	75/90	9L4/9L4
PI9400-075G4/ PI9400-090F4		75/90	157/180	150/176	75/90	9P5/9P5
PI9200-090G4/ PI9200-110F4		90/110	180/214	176/210	90/110	9L5/9L5
PI9400-090G4/ PI9400-110F4		90/110	180/214	176/210	90/110	9P5/9P5
PI9200-110G4/ PI9200-132F4		110/132	214/256	210/253	110/132	9L5/9L5
PI9400-110G4/ PI9400-132F4		110/132	214/256	210/253	110/132	9P6/9P6
PI9200-132G4/ PI9200-160F4		132/160	256/307	253/304	132/160	9L6/9L6
PI9400-132G4/ PI9400-160F4		132/160	256/307	253/304	132/160	9P6/9P6
PI9200-160G4/ PI9200-187F4		160/187	307/345	304/340	160/187	9L6/9L6
PI9400-160G4/ PI9400-187F4		160/187	307/345	304/340	160/187	9P6/9P6
PI9300-187G4/ PI9300-200F4		187/200	345/385	340/380	187/200	9C1/9C1
PI9300-187G4/ PI9300-200F4		187/200	345/385	340/380	187/200	9C2/9C2
PI9300-200G4/ PI9300-220F4		200/220	385/430	380/426	200/220	9C1/9C1
PI9300-200G4/ PI9300-220F4		200/220	385/430	380/426	200/220	9C2/9C2
PI9400-187G4/ PI9400-200F4		187/200	345/385	340/380	187/200	9P7/9P7
PI9400-200G4/ PI9400-220F4		200/220	385/430	380/426	200/220	9P7/9P7
PI9300-220G4		220	430	426	220	9C1
PI9300-220G4/ PI9300-250F4		220/250	430/468	426/465	220/250	9C2/9C2

Inverter model	Input voltage	Rated output power(kW)	Rated input current(A)	Rated output current(A)	Adaptive motor	Base No.
PI9400-220G4	3-phase 690V ±15%	220	430	426	220	9P7
PI9300-250G4/ PI9300-280F4		250/280	468/525	465/520	250/280	9C3/9C3
PI9300-280G4/ PI9300-315F4		280/315	525/590	520/585	280/315	9C3/9C3
PI9300-315G4/ PI9300-355F4		315/355	590/665	585/650	315/355	9C3/9C3
PI9300-355G4/ PI9300-400F4		355/400	665/785	650/725	355/400	9C3/9C3
PI9200-055G6/ PI9200-075F6		55/75	70/90	62/85	55/75	9L4/9L4
PI9200-075G6/ PI9200-090F6		75/90	90/105	85/102	75/90	9L4/9L4
PI9200-090G6/ PI9200-110F6		90/110	105/130	102/125	90/110	9L5/9L5
PI9200-110G6/ PI9200-132F6		110/132	130/170	125/150	110/132	9L5/9L5
PI9200-132G6/ PI9200-160F6		132/160	170/200	150/175	132/160	9L6/9L6
PI9200-160G6/ PI9200-187F6		160/187	200/210	175/198	160/187	9L6/9L6
PI9300-187G6/ PI9300-200F6		187/200	210/235	198/215	187/200	9C2/9C2
PI9300-200G6/ PI9300-220F6		200/220	235/247	215/245	200/220	9C2/9C2
PI9300-220G6/ PI9300-250F6		220/250	247/265	245/260	220/250	9C2/9C2
PI9300-250G6/ PI9300-280F6		250/280	265/305	260/299	250/280	9C3/9C3
PI9300-280G6/ PI9300-315F6		280/315	305/350	299/330	280/315	9C3/9C3
PI9300-315G6/ PI9300-355F6		315/355	350/382	330/374	315/355	9C3/9C3
PI9300-355G6/ PI9300-400F6		355/400	382/435	374/410	355/400	9C3/9C3
PI9300-400G6/ PI9300-450F6		400/450	435/490	410/465	400/450	9C3/9C3
PI9300-450G6/ PI9300-500F6		450/500	490/595	465/550	450/500	9C3/9C3
PI9300-500G6		500	595	550	500	9C3
PI9300-550G6		550	605	590	550	9C3

2-2.Standard specifications

Items		Specifications
Power	Voltage and frequency levels	Single-phase 220, 50/60Hz Three-phase 220V, 50/60Hz Single-phase 380, 50/60Hz Three-phase 480V, 50/60Hz Three-phase 690V, 50/60Hz
	Allowable fluctuation	Voltage:±15% Frequency:±5%
Control system	Control system	High performance vector control inverter based on DSP
	Output frequency	Vector control:0 to 300Hz V/F control:0 to 3200Hz
	Control method	V/F control, vector control W/O PG, vector control W/ PG
	Automatic torque boost function	Realize low frequency (1Hz) and large output torque control under the V/F control mode.
	Acceleration/deceleration control	Straight or S-curve mode. Four times available and time range is 0.0 to 6500.0s.
	V/F curve mode	Linear, square root/m-th power, custom V/F curve
	Over load capability	G type:rated current 150% - 1 minute, rated current 180% - 2 seconds F type:rated current 120% - 1 minute, rated current 150% - 2 seconds
	Maximum frequency	Vector control:0 to 300Hz V/F control:0 to 3200Hz
	Carrier Frequency	0.5 to 16kHZ; automatically adjust carrier frequency according to the load characteristics.
	Input frequency resolution	Digital setting: 0.01Hz Analog setting: maximum frequency×0.025%
	Start torque	G type: 0.5Hz/150% (vector control W/O PG) F type: 0.5Hz/100% (vector control W/O PG)
	Speed range	1:100 (vector control W/O PG) 1:1000 (vector control W/ PG)
	Steady-speed precision	Vector control W/O PG: ≤ ± 0.5% (rated synchronous speed) Vector control W/ PG: ≤ ± 0.02% (rated synchronous speed)
	Torque response	≤ 40ms (vector control W/O PG)
	Torque boost	Automatic torque boost; manual torque boost(0.1% to 30.0%)
	DC braking	DC braking frequency: 0.0Hz to max. frequency, braking time: 0.0 to 36.0 seconds, braking current value: 0.0% to 100.0%
	Jogging control	Jog Frequency Range: 0.00Hz to max. frequency; Jog Ac/deceleration time: 0.0s to 3600.0s
	Multi-speed operation	Achieve up to 16-speed operation through the control terminal
	Built-in PID	Easy to realize closed-loop control system for the process control.
	Automatic voltage regulation(AVR)	Automatically maintain a constant output voltage when the voltage of electricity grid changes
	Torque limit and control	"Excavator" feature - torque is automatically limited during the operation to prevent frequent overcurrent trip; the closed-loop vector mode is used to control torque.
Personalization function	Self-inspection of peripherals after power-on	After powering on, peripheral equipment will perform safety testing, such as ground, short circuit, etc.
	Common DC bus function	Multiple inverters can use a common DC bus.
	Cycle-by-cycle current limiting	The current limiting algorithm is used to reduce the inverter overcurrent probability, and improve whole unit anti-interference capability.
	Timing control	Timing control function: time setting range(0m to 6500m)
Running	Input signal: Running method	Keyboard/terminal/communication
	Input signal: Frequency setting	10 frequency settings available, including adjustable DC(0 to 10V), adjustable DC(0 to 20mA), panel potentiometer, etc.
	Input signal: Start signal	Rotate forward/reverse
	Input signal: Multi-speed	At most 16-speed can be set(run by using the multi-function terminals or program)
	Input signal: Emergency stop	Interrupt controller output
	Input signal: Wobbulate run	Process control run
	Input signal: Fault reset	When the protection function is active, you can automatically or manually reset the fault condition.
	Input signal: PID feedback signal	Including DC(0 to 10V), DC(0 to 20mA)
	ut: Running status	Motor status display, stop, ac/deceleration, constant speed, program running status.

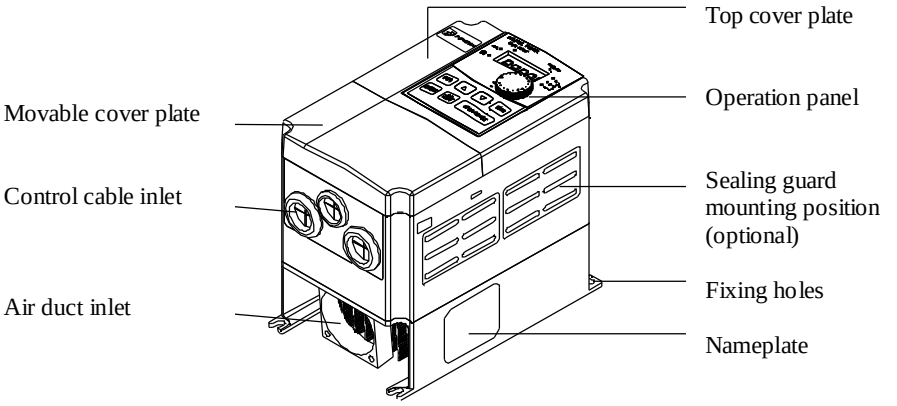
Items			Specifications
		Fault output	Contact output - AC 250V 5A, DC 30V 5A
		Analog output	Two-way analog output, 16 signals can be selected such as frequency, current, voltage and other, output signal range (0 to 10V / 0 to 20mA).
		Output signal	At most 3-way output, there are 40 signals each way
	Run function		Limit frequency, jump frequency, frequency compensation, auto-tuning, PID control
	DC current braking		Built-in PID regulates braking current to ensure sufficient braking torque under no overcurrent condition.
	Running command channel		Three channels: operation panel, control terminals and serial communication port. They can be switched through a variety of ways.
	Frequency source		Total 5 frequency sources: digital, analog voltage, analog current, multi-speed and serial port. They can be switched through a variety of ways.
	Input terminals		6 digital input terminals, compatible with active PNP or NPN input mode, one of them can be for high-speed pulse input(0 to 100KHZ square wave); 2 analog input terminals for voltage or current input.
	Output terminals		2 digital output terminals, one of them can be for high-speed pulse output(0 to 100KHZ square wave); one relay output terminal; 2 analog output terminals respectively for optional range (0 to 20mA or 0 to 10V), they can be used to set frequency, output frequency, speed and other physical parameters.
Protection function	Inverter protection		Overvoltage protection, undervoltage protection, overcurrent protection, overload protection, overheat protection, overcurrent stall protection, overvoltage stall protection, losting-phase protection (optional), external fault, communication error, PID feedback signal abnormalities, PG failure and short circuit to ground protection.
	IGBT temperature display		Displays current temperature IGBT
	Inverter fan control		Can be set
	Instantaneous power-down restart		Less than 15 milliseconds: continuous operation. More than 15 milliseconds: automatic detection of motor speed, instantaneous power-down restart.
	Speed start tracking method		The inverter automatically tracks motor speed after it starts
	Parameter		Protect inverter parameters by setting administrator

Items			Specifications
	protection function		Password and decoding
Display	LED/OLED display keyboard	Running information	Monitoring objects including: running frequency, set frequency, bus voltage, output voltage, output current, output power, output torque, input terminal status, output terminal status, analog AI1 value, analog AI2 value, motor actual running speed，PID set value percentage, PID feedback value percentage.
		Error message	At most save three error message, and the time, type, voltage, current, frequency and work status can be queried when the failure is occurred.
	LED display		Display parameters
	OLED display		Optional, prompts operation content in Chinese/English text.
	Copy parameter		Quickly copy parameters by using the special keyboard(only for OLED)
	Key lock and function selection		Lock part or all of keys, define the function scope of some keys to prevent misuse.
Communication	RS485/RS232		The optional completely isolated RS485/RS232 communication module can communicate with the host computer.
Environment	Environment temperature		-10 ℃ to 40 ℃ (temperature at 40 ℃ to 50 ℃, please derating for use)
	Storage temperature		-20 ℃ to 65 ℃
	Environment humidity		Less than 90% R.H, does not exceed 90% R.H
	Height and vibration		Below 1000m, below 5.9m/s² (= 0.6g)
	Application sites		Indoor where no sunlight or corrosive, explosive gas and water vapor, dust, flammable gas, oil mist, water vapor, drip or salt, etc.
	Altitude		Below 1000m
	Pollution degree		2
Product standard	Product adopts safety standards.		IEC61800-5-1:2007
	Product adopts EMC standards.		IEC61800-3:2005
Cooling method			Forced air cooling and natural air cooling

Chapter 2

2-3.Dimensions

2-3-1.Appearance and installation holes size



2-3-2.PI9100 series

1. 9S2 to 9S4

1) 9S2

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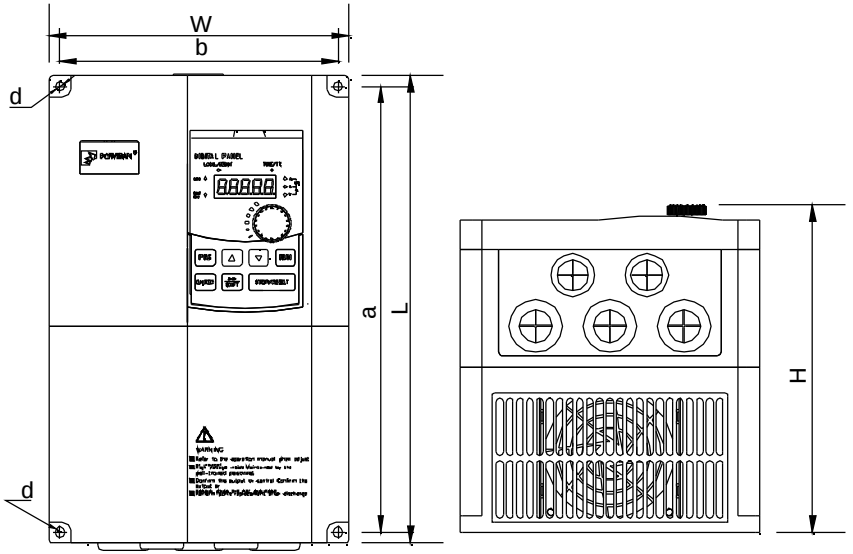
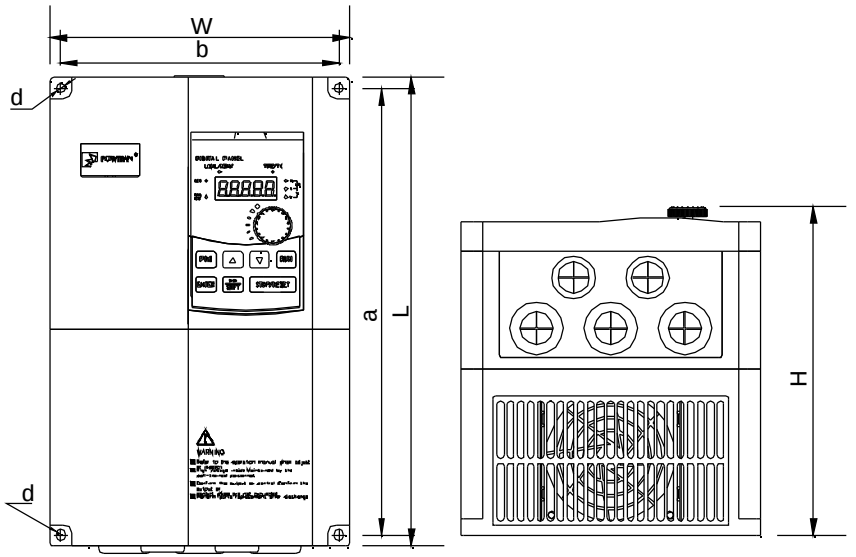


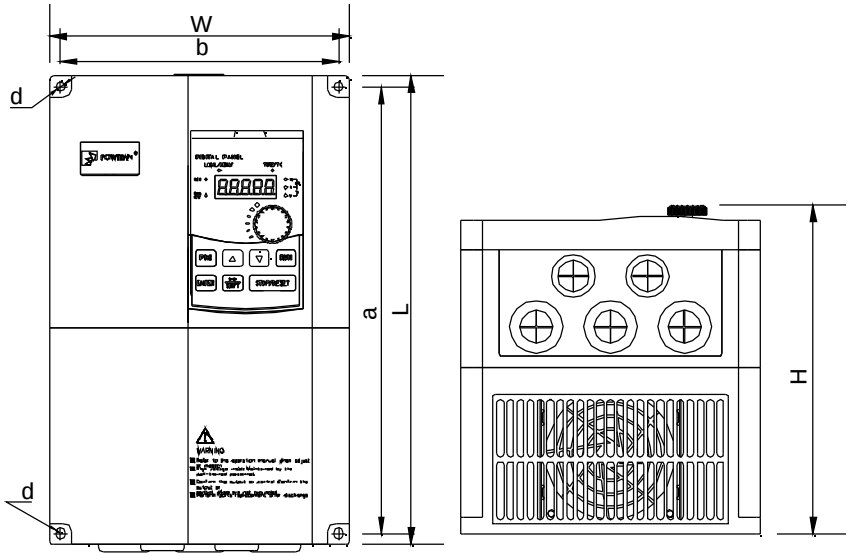
Power supply level	Type	Power (kW)	Dimensions			Installation size		
			L	W	H	a	b	d
3-phase 220V	**G**	0.4 to 1.5	185	120	178.5	174	108	Ø5.3
3-phase 380V	**G**	0.75 to 2.2						

2) 9S3



Power supply level	Type	Power (kW)	Dimensions			Installation size		
			L	W	H	a	b	d
3-phase 220V	**G**	2.2 to 4	220	150	185.5	209	138	Ø5.3
3-phase 380V	**F**	5.5						
	G	4 to 5.5						

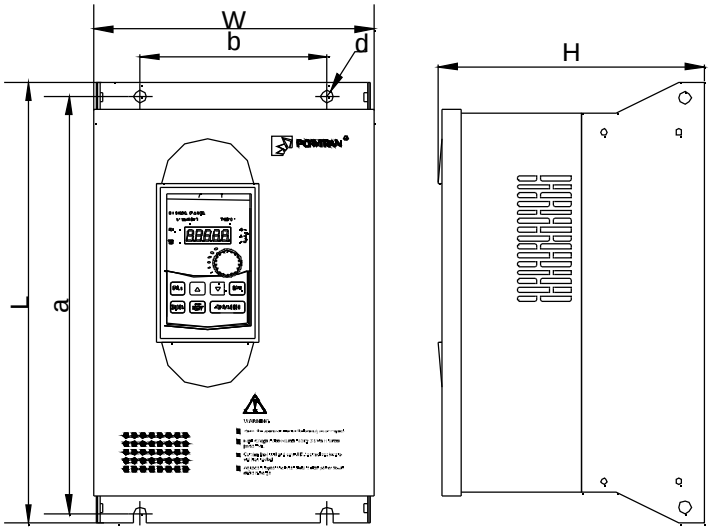
3) 9S4



Power supply level	Type	Power (kW)	Dimensions			Installation size		
			L	W	H	a	b	d
3-phase 380V	**F**	7.5	285	180	200	272	167	Ø5.5
	G	7.5						

2-3-3.PI9200 series

2. 9L1 to 9L6



1) 9L1

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	11 to 18.5	9L1	360	220	210	340	150	Ø10
	G	11 to 15							

2) 9L2

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	22 to 30	9L2	435	225	242	415	165	Ø10
	G	18.5 to 22							

3) 9L3

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	37 to 45	9L3	480	296	246	460	200	Ø10
	G	30 to 37							

4) 9L4

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	55 to 90	9L4	660	364	280	640	250	Ø10
	G	45 to 75							

5) 9L5

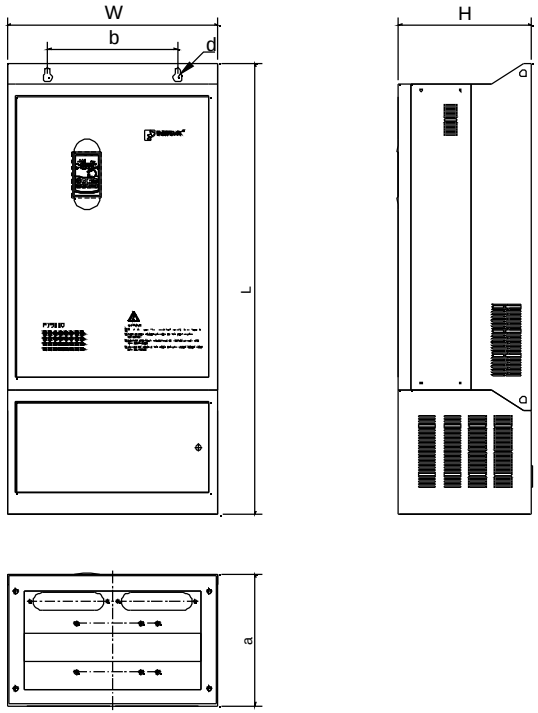
Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	110 to 132	9L5	710	453	280	690	350	Ø10
	G	90 to 110							

6) 9L6

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	160	9L6	910	480	323	890	350	Ø10
	G	132 to 160							

2-3-4.PI9300 series

3. 9C1 to 9C3



1） 9C1

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	200 to 220	9C1	1300	600	380	550	280	Ø13
	G	200 to 220							

2） 9C2

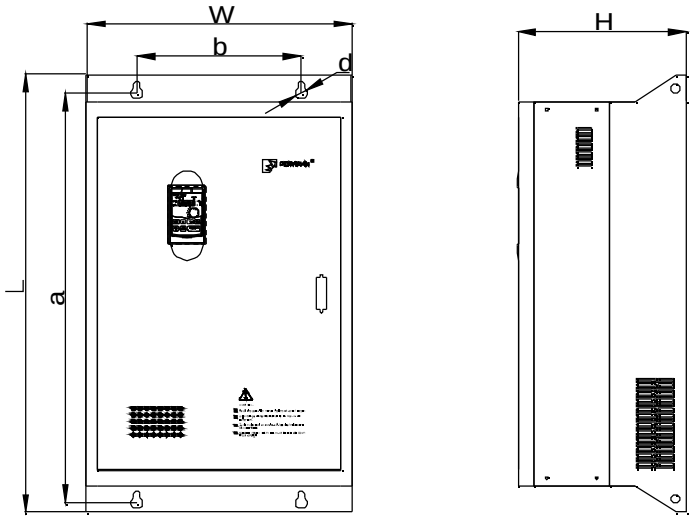
Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	200 to 250	9C2	1540	515	421	464.5	367	Ø13
	G	200 to 220							

3） 9C3

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	280 to 400	9C3	1698	851	470	640	260	Ø13
	G	250 to 355							

2-3-5.PI9400 series

4. 9P4 to 9P7



1) 9P4

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	45 to 75	9P4	620	360	300	600	250	Ø10
	G	45 to 55							

2) 9P5

Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	90 to 110	9P5	680	323	320	660	250	Ø10
	G	75 to 90							

3) 9P6

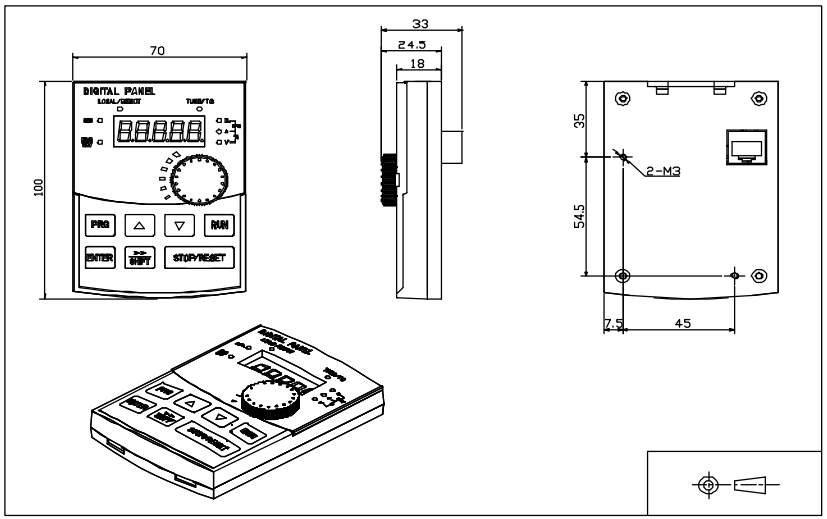
Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	132 to 160	9P6	750	472	324	730	350	Ø10
	G	110 to 160							

4) 9P7

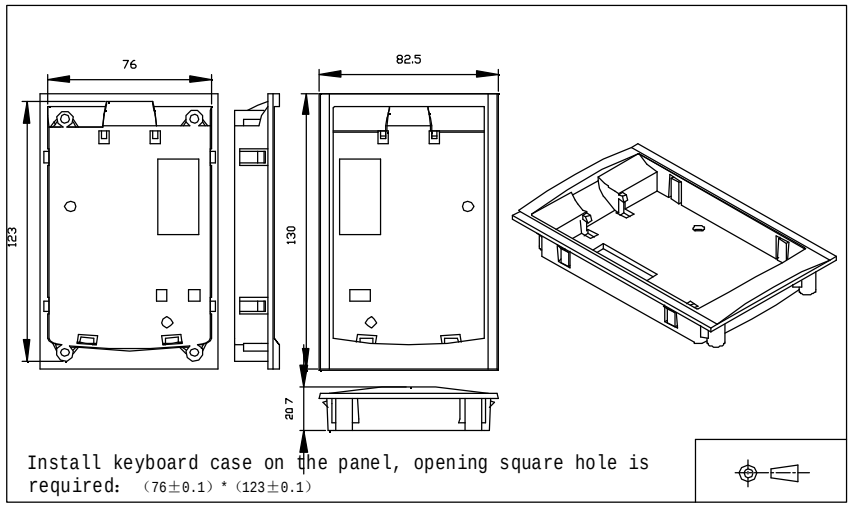
Power supply level	Type	Power (kW)	Base No.	Dimensions			Installation size		
				L	W	H	a	b	d
3-phase 380V	**F**	200 to 220	9P7	1000	600	383	938	370	Ø14
	G	200 to 220							

2-3-6.Keyboard size diagram

JP6E9100 size diagram:



JP6E9100 keyboard case size diagram
:



Chapter 3 Keyboard

3-1.Keyboard description

JP6E9100 keyboard control panel

Figure 3-1 Operation panel display

3-2.Keyboard Indicators

Indicator flag		Name
Status lamp	RUN	Running indicator * ON:means that inverter is in the operating status. * OFF:means that inverter is in the stopped status.
	LOCAL/REMOT	Command source indicator That is the indicator for keyboard operation, terminal operation and remote operation (communication control) * ON: terminal operation control status * OFF: keyboard operation control status * Flashing: in remote operation control status
	FWD/REV	Forward/reverse running lamp * ON: in forward status
	TUNE/TC	Tuning/fault indicator * ON: in torque control mode * Slow flashing: in the tuning status * Quick flashing: in the fault status
Units combination indicator	HzAV	Units indicator

3-3.Description of operation panel keys

Sign	Name	Function
PRG	Parameter Setting/Exit Key	* Enter top menu parameter change status * Exit from function option change * Return to status display menu from sub-menu or function option menu
SHIFT	Shift Key	* Select circularly parameters under run or stop interface; select parameters when modifying the parameters.
▲	Ascending Key	* Data or function code ascending
▼	Decending Key	* Data or function code decending
RUN	Run Key	Used for running operation in the keyboard mode.
STOP RESET	Stop/Reset Key	* Press the key to stop running in running status; press the key to reset in fault alarm status, can be used to reset the operation, the key is subject to function code U7.00.
ENTER	Enter Key	* Enter into levels of menu screen, confirm settings.
	Keyboard potentiometer	* U0.03 is set to 4, keyboard potentiometer is used to set the running frequency.

3-4.Examples of parameter settings

3-4-1.Instructions on viewing and modifying function code

PI9000 inverter operation panel has three levels of menu structure for parameter settings and other operations. Three levels of menu is as follows: function parameter group (first level menu) → function code (second level menu) → function code settings (third level menu). The operation flow is as shown in Fig.

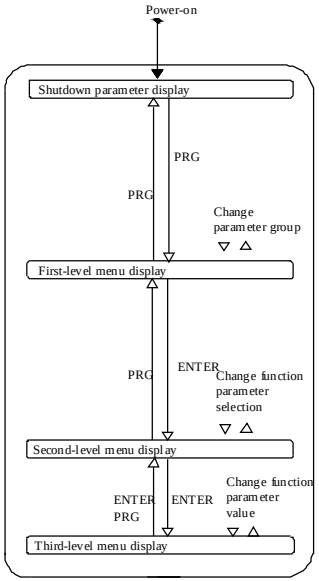
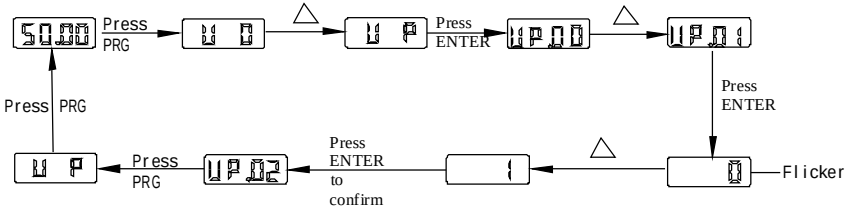


Figure 3-2 Display status and operation processes

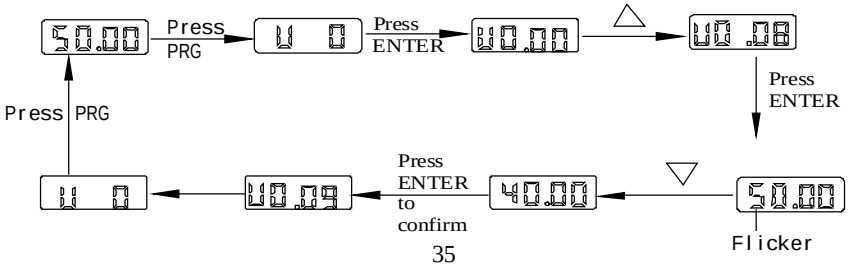
Description: return to the second-level menu from the third-level menu by pressing PRG key or ENTER key. The difference between the two keys : press ENTER to return the second-level menu and save parameters setting before returning, and automatically transfer to the next function code; press PRG to return directly to the second-level menu, do not save parameters setting, and return to current function code .

Example 1 :restore factory settings



Example 2 :change U0.08 from 50.00Hz to 40.00Hz

In the third-level menu status, if the parameter has not blinking bit, it means that the function code can not be modified, the possible causes include:



1) The function code can not be used to modify the parameters. Such as actual detection parameters, run record parameters.

2) The function code can not be modified in the running status, can be modified only after this unit is stopped.

3-4-2.How to view status parameters

In stop or run status, operate shift key SHIFT to display a variety of status parameters respectively. Parameter display selection depends on function code U7.01 (run parameter 1), U7.02 (run parameter 2) and U7.03 (stop parameter 3).

In stop status, there are total 16 stop status parameters that can be set to display/not display: set frequency, bus voltage, DI input status, DO output status, analog input AI1 voltage, analog input AI2 voltage, panel potentiometer input voltage, actual count value, actual length value, PLC running step number, actual speed display, PID settings, high-speed pulse input frequency and reserve, switch and display the selected parameter by pressing key orderly.

In run status, there are 5 run status parameters: running frequency, set frequency, bus voltage, output voltage, output current default display, and other display parameters: output power, output torque, DI input status, DO output status, analog input AI1 voltage, analog input AI2 voltage, panel potentiometer input voltage, actual count value, actual length value, linear speed, PID settings and PID feedback, etc, their display depends on function code U7.01 and U7.02 switch and display the selected parameter by pressing key orderly.

Inverter powers off and then powers on again, the displayed parameters are the selected parameters before power-off.

3-4-3.Password settings

The inverter has password protection, when UP.00 is non-zero value, that is user password, password protection will enter into force when you exit from function code editing status, press the PRG key again , it will display "-----", you must enter correct user password before entering regular menus, otherwise inaccessible.

To cancel the password protection function, firstly enter correct password to access and then set UP.00 to 0.

3-4-4.Motor parameter auto tunning

Select the operating mode of vector control, you must accurately input parameters of the motor's nameplate before inverter operation, PI9000 frequency inverter will match the standard motor parameters according to the nameplate parameters; the vector control method is highly dependent on motor parameters, in order to get good control performance, the accurate parameters of the controlled motor must be required

Motor parameter auto tunning steps are as follows:

Firstly select command source (U0.02) as the comment channel for operation panel, then input the following parameters according to the actual motor parameters (selection is based on the current motor):

Motor Selection	Parameters
Motor	U1.00: motor type selection U1.01: motor rated

	power U1.02: motor rated voltage U1.03: motor rated current U1.04: motor rated frequency U1.05: motor rated speed

For asynchronous motors

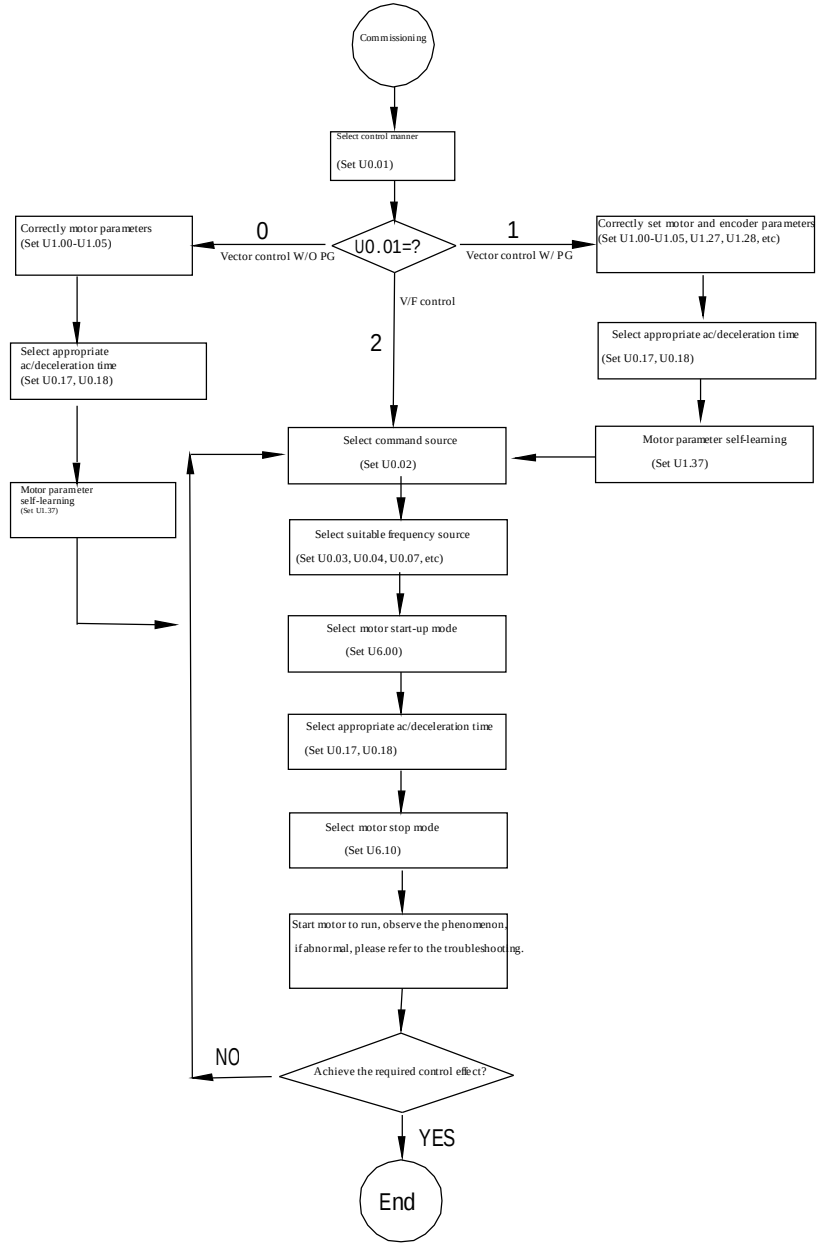
If the motor can completely disengage its load, please select 2 (asynchronous motor parameter comprehensive auto tunning) for U1.37, and then press the RUN key on the keyboard panel, the inverter will automatically calculate the motor's following parameters:

Motor Selection	Parameters
Motor	U1.06:asynchronous motor stator resistance U1.07:asynchronous motor rotor resistance U1.08:asynchronous motor leakage inductance U1.09: asynchronous motor mutual inductance U1.10: asynchronous motor no-load current

Complete motor parameter auto tunning

If the motor can NOT completely disengage its load, please select 1 (asynchronous motor parameter static auto tunning) for U1.37, and then press the RUN key on the keyboard panel.

Chapter 4 Commissioning



- **Firstly confirm that AC input power supply voltage shall be within inverter rated input voltage range before connecting power supply to the inverter.**
- **Connect power supply to the R, S and T terminals of the inverter.**
- **Select the appropriate operation control method.**

Chapter 5 Function parameter

5-1. Menu grouping

Note:

"★": In run status, the set value of the parameter can not be changed;

"●": The actual measured value can not be changed;

"☆": In stop and run statuses, both can be changed;

"▲": "Factory parameters" , prohibit the user to operate;

"-" Indicates that the default factory value of the parameter is related to power or model, please see the corresponding parameter description. for the specific value

Change limit refers to whether the parameters are adjustable.

UP.00 is used to set parameters protection password, you can enter into parameter menu only after inputing correct password under function parameters mode and user modified parameters mode Password protection is canceled when UP.00 is set to 0.

Parameter menu is not protected by password under user customized parameters mode

U group and E group are the basic function parameters , D group is to monitoring function parameters.

Code	Parameter name	Functional Description	Quantity	Reference page
d0	Monitoring function group	Monitoring frequency, current, etc	36	41
U0	Basic function group	Frequency setting, control mode, acceleration and deceleration time	25	44
U1	Motor parameters	To set motor parameter	23	49
U2	Vector control parameters	Vector control parameters	10	51
U3	V/F control parameters	V/F control parameters	12	53
U4	Input terminals group	Analog and digital input functions	40	54
U5	Output terminals group	Analog and digital output functions	20	59
U6	Start and stop control group	Start and stop control parameters	16	62

Code	Parameter name	Functional Description	Quantity	Reference page
U7	Keyboard and display	To set key and display function parameters	13	64
U8	Auxiliary function group	To set Jog, jump frequency and other auxiliary function parameters	48	66
U9	Fault and protection	To set fault and protection parameters	57	71
UA	PID function group	To set Built-in PID parameters	29	78
Ub	Wobbulate, fixed-length and counting	To set Wobbulate, fixed-length and counting function parameters	10	81
UC	Multi-stage command, simple PLC	Multi-speed setting, PLC operation	52	81
Ud	Communication parameter group	To set MODBUS communication function	7	86
UP	Function code management	To set password, parameter initialization and parameter group display	5	87
E0	Torque control parameters	To set parameters under torque control mode	9	88
E5	Control optimization parameters	To set parameters of optimizing the control performance	10	89

5-1-1. d0 Group - Monitoring function group

No.	Code	Parameter name	Setting range	Factory setting	Reference page
0.	d0.00	Running frequency	Actual set frequency	0.01Hz	90
1.	d0.01	Set frequency	Actual output frequency	0.01Hz	90
2.	d0.02	DC bus voltage	Detected value for DC bus voltage	0.1V	90
3.	d0.03	Inverter output voltage	Actual output voltage	1V	90

No.	Code	Parameter name	Setting range	Factory setting	Reference page
4.	d0.04	Inverter output current	Effective value for actual motor current	0.01A	90
5.	d0.05	Motor output power	Calculated value for motor output power	0.1kW	90
6.	d0.06	Motor output torque	Motor output torque percentage	0.1%	90
7.	d0.07	DI input status	DI input status	1	91
8.	d0.08	DO output status	IO output status	1	91
9.	d0.09	AI1 voltage (V)	AI1 input voltage value	0.01V	91
10.	d0.10	AI2 voltage (V)	AI2 input voltage value	0.01V	91
11.	d0.11	Panel potentiometer voltage	Panel potentiometer voltage	0.01V	91
12.	d0.12	Count value	Actual pulse count value in counting function	1	91
13.	d0.13	Length value	Actual length in fixed length function	1	91
14.	d0.14	Actual operating speed	Motor actual running speed	1	91
15.	d0.15	PID setting	Reference value percentage when PID runs	1	91
16.	d0.16	PID feedback	Feedback value percentage when PID runs	1	91
17.	d0.17	PLC stage	Stage display when PLC runs	1	91
18.	d0.18	High-speed pulse input frequency	High-speed pulse input frequency display, unit: 0.01Khz	0.01kHz	91
19.	d0.19	Feedback speed(unit:0.1Hz)	PG feedback speed, to an accuracy of 0.1hz	0.1Hz	91
20.	d0.20	Remaining run time	Remaining run time display, it is for timing run control	0.1Min	92

No.	Code	Parameter name	Setting range	Factory setting	Reference page
21.	d0.24	Linear speed	Linear speed calculated from angular speed and diameter is used for controlling constant tension and constant linear speed.	1m/Min	92
22.	d0.25	Current power-on time	Total time of current inverter power-on	1Min	92
23.	d0.26	Current run time	Total time of current inverter run	0.1Min	92
24.	d0.27	High-speed pulse input frequency	High-speed pulse input frequency display, unit: 1hz	1Hz	92
25.	d0.28	Communication set value	Frequency, torque or other command values set by communication port	0.01%	92
26.	d0.29	Encoder feedback speed	PG feedback speed, to an accuracy of 0.1hz	0.01Hz	92
27.	d0.30	Master frequency A display	Frequency set by U0.03 master frequency setting source	0.01Hz	92
28.	d0.31	Auxiliary frequency B display	Frequency set by U0.04 auxiliary frequency setting source	0.01Hz	92
29.	d0.33	Synchro rotor position	Synchro rotor position angle	0.0°	92
30.	d0.35	Command torque (%)	Observe the set command torque under the torque control mode	0.1%	92
31.	d0.36	Resolver position	Rotor position when rotary transformer is used as a speed feedback	1	92
32.	d0.38	ABZ position	Position information calculated from when ABZ incremental feedback encoder is adopted	0.0	92
33.	d0.58	Z signal counter	Encoder Z-phase signal count		92

No.	Code	Parameter name	Setting range	Factory setting	Reference page
34.	d0.61	Inverter status	Display run, standby and other statuses	1	92

5-1-2. U0 Group - Basic function group

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
35.	U0.00	Inverter type	1.G type (constant torque load type) 2.F type (fans/pumps load type)	-	●	93
36.	U0.01	Motor control manner	0.Vector control W/O PG 1.Vector control W/ PG 2.V/F control	2	★	93
37.	U0.02	Command source selection	0.Keyboard control (LED off) 1.Terminal block control (LED on) 2.Communications command control (LED flashes)	0	☆	93
38.	U0.03	Frequency source master setting	0: Keyboard set frequency (U0.08, UP/DN can be modified, power-down without memory) 1: Keyboard set frequency (U0.08, UP/DN can be modified, power-down with memory) 2: Analog AI1 setting 3: Analog AI2 setting 4: Panel potentiometer setting 5: High-speed pulse setting 6: Multi-speed operation setting 7: Simple PLC program setting 8: PID control setting 9: Remote communications setting	0		93

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
39.	U0.04	Frequency source auxiliary setting	0: Keyboard set frequency (U0.08, UP/DN can be modified, power-down without memory) 1: Keyboard set frequency (U0.08, UP/DN can be modified, power-down with memory) 2: analog AI1 setting 3: Analog AI2 setting 4: Panel potentiometer setting 5: High-speed pulse setting 6: Multi-speed operation setting 7: Simple PLC program setting 8: PID control setting 9: Remote communications setting	0	★	95
40.	U0.05	Reference object selection for frequency source auxiliary setting	0. relative to maximum frequency 1.relative to master frequency source A	0	☆	96
41.	U0.06	Frequency source auxiliary setting range	0% to 150%	100%	☆	96

Chapter 5 Function parameter

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
42.	U0.07	Frequency source superimposed selection	Units digit: frequency source selection 0: Frequency source master setting 1: Arithmetic result of master and auxiliary(arithmetic relationship depends on tens digit) 2: switch between frequency source master setting and auxiliary setting 3: switch between frequency source master setting and arithmetic result of master and auxiliary 4: switch between frequency source auxiliary setting and arithmetic result of master and auxiliary Tens digit: arithmetic relationship of master and auxiliary for frequency source 0: master+auxiliary 1: master-auxiliary 2: Max(master, auxiliary) 3: Min (master, auxiliary)	0	☆	96
43.	U0.08	Keyboard set frequency	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆	97
44.	U0.09	Running direction	0: same direction 1: opposite direction	0.00Hz	☆	97
45.	U0.10	Maximum output frequency	50.00Hz to 320.00Hz	50.00Hz	★	98
46.	U0.11	Upper limit frequency source	0: U0.12 setting 1: AI1 2: AI2 3: Panel potentiometer setting 4: High-speed pulse setting 5: communications reference	0	★	98

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
47.	U0.12	Upper limit frequency	U0.14 (lower limit frequency) to U0.10 (maximum frequency)	50.00Hz	☆	98
48.	U0.13	Upper limit frequency offset	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆	98
49.	U0.14	Lower limit frequency	0.00Hz to U0.12 (lower limit frequency)	0.00Hz	☆	98
50.	U0.15	Carrier Frequency	0.5kHz to 16.0kHz	Depends on models	☆	98
51.	U0.16	Carrier frequency adjustment as per temperature	0: NO 1: YES	1	☆	99
52.	U0.17	Acceleration time 1	0.01s to 36000s	Depends on models	☆	99
53.	U0.18	Deceleration time 1	0.01s to 36000s	Depends on models	☆	99
54.	U0.19	Ac/Deceleration time unit	0:1 second 1:0.1 second 2:0.01 second	1	★	99
55.	U0.21	Frequency source offset frequency when superimposing	0.00Hz to U0.10(maximum frequency)	0.00Hz	☆	100
56.	U0.22	Frequency command resolution	1: 0.1Hz 2: 0.01Hz	2	★	100

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
57.	U0.23	Shutdown memory selection for digital set frequency	0: W/O memory 1: W/ memory	0	☆	100
58.	U0.25	Ac/deceleration time reference frequency	0: U0.10(maximum frequency) 1: Set frequency 2: 100Hz	0	★	100
59.	U0.26	Frequency command UP / DOWN reference when running	0: Running frequency 1: Set frequency	0	★	100
60.	U0.27	Binding frequency source for command source	Units digit: binding frequency source selection for operation panel command 0: not binded 1: keyboard set frequency 2: AI1 3: AI2 4: Panel potentiometer 5: High-speed pulse setting 6: Multi-stage command 7: Simple PLC 8: PID 9: Communications reference Tens digit: terminal command binding frequency source selection (0 to 9, same as units digit) Hundreds digit: communication command binding frequency source selection (0 to 9, same as units digit)	000	☆	101

5-1-3. **U1 Group - First motor parameters**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
61.	U1.00	Motor type selection	0: general asynchronous motor 1: asynchronous inverter motor 2: permanent magnet synchronous motor	0	★	102
62.	U1.01	Rated power	0.1kW to 1000.0kW	Depends on models	★	102
63.	U1.02	Rated voltage	1V to 2000V	Depends on models	★	102
64.	U1.03	Rated current	0.01A to 655.35A (inverter power ≦ 55kW) 0.1A to 6553.5A (inverter rate> 55kW)	Depends on models	★	102
65.	U1.04	Rated frequency	0.01Hz to U0.10 (maximum frequency)	Depends on models	★	102
66.	U1.05	Rated speed	1rpm to 36000rpm	Depends on models	★	102
67.	U1.06	Asynchronous motor stator resistance	0.001Ω to 65.535Ω (inverter power <= 55kW) 0.0001Ω to 6.5535Ω (inverter power> 55kW)	Motor parameters	★	102
68.	U1.07	Asynchronous motor rotor resistance	0.001Ω to 65.535Ω (inverter power <= 55kW) 0.0001Ω to 6.5535Ω (inverter power> 55kW)	Motor parameters	★	102

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
69.	U1.08	Asynchronous motor leakage inductance	0.01mH to 655.35mH (inverter power <= 55kW) 0.001mH to 65.535mH (inverter power> 55kW)	Motor parameters	★	102
70.	U1.09	Asynchronous motor mutual inductance	0.1mH to 6553.5mH (inverter power <= 55kW) 0.01mH to 655.35mH (inverter power> 55kW)	Motor parameters	★	102
71.	U1.10	Asynchronous motor no-load current	0.01A to U1.03 (inverter power <= 55kW) 0.1A to U1.03 (inverter power> 55kW)	Motor parameters	★	102
72.	U1.16	Synchronous motor stator resistance	0.001Ω to 65.535Ω (inverter power <= 55kW) 0.0001Ω to 6.5535Ω (inverter power> 55kW)	.	★	103
73.	U1.17	Synchronous D-axis inductance	0.01mH to 655.35mH (inverter power <= 55kW) 0.001mH to 65.535mH (inverter power> 55kW)	.	★	103
74.	U1.18	Synchronous Q-axis inductance	0.01mH to 655.35mH (inverter power <= 55kW) 0.001mH to 65.535mH (inverter power> 55kW)	-	★	103
75.	U1.20	Synchronous motor back-EMF	0.1V to 6553.5V	0.1	★	103

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
76.	U1.28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Rotational transformer 3: Sine and cosine encoder 4: Wire-saving UVW encoder	0.00	★	103
77.	U1.30	ABZ incremental encoder AB phase sequence	0: forward 1: reverse	0	★	104
78.	U1.31	Encoder installation angle	0.00 to 359.90	0.00	★	104
79.	U1.32	UVW encoder UVW phase	0: forward 1: reverse	0	★	104
80.	U1.33	UVW encoder offset angle	0.00 to 359.90	0.0	★	104
81.	U1.34	Pole-pairs of rotary transformer	1 to 65535	1	★	104
82.	U1.36	peed feedback PG disconnection	0.0s: OFF 0.1s to 10.0s	0	★	104
83.	U1.37	Motor parameter auto tunning	0: no operation 1: asynchronous motor parameters still auto tunning 2: asynchronous motor parameters comprehensive auto tunning 11: synchronous motor parameters still auto tunning 12: synchronous motor parameters comprehensive auto tunning	0	★	104

5-1-4. U2 Group - Vector control parameters

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
84.	U2.00	Speed loop low low P	1 to 100	30	☆	106
85.	U2.01	Speed loop low integral time	0.01s to 10.00s	0.50	☆	106
86.	U2.02	Speed loop low switching frequency	0.00 to U2.05	5.00Hz	☆	106
87.	U2.03	Speed loop high P	0 to 100	20	☆	106
88.	U2.04	Speed loop high integral time	0.01s to 10.00s	1.00s	☆	106
89.	U2.05	Speed loop high switching frequency	U2.02 to U0.10 (max.frequency)	10.00Hz	☆	106
90.	U2.06	Vector control differential gain	50% to 200%	100%	☆	107
91.	U2.07	Speed loop filter time constant	0.000s to 0.100s	0.000s	☆	107
92.	U2.08	Vector control overexcitation gain	0 to 200	64	☆	107
93.	U2.09	Torque limit source under speed control mode	0: function code U2.10 setting 1: AI1 2: AI2 3: Panel potentiometer settin 4: High-speed pulse setting 5: Communications reference 6: Min (AI1, AI2) 7: Max (AI1, AI2) options 1-7 full sca correspondence U2.10	0	☆	107
94.	U2.10	Upper limit digital setting for lower torque under speed control mode	0.0% to 200.0%	150.0%	☆	107

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
95.	U2.13	Excitation regulator proportional gain	0 to 60000	2000	☆	108
96.	U2.14	Excitation regulator integral gain	0 to 60000	1300	☆	108
97.	U2.15	Torque regulator proportional gain	0 to 60000	2000	☆	108
98.	U2.16	Torque regulator integral gain	0 to 60000	1300	☆	108

5-1-5. U3 Group - V/F control parameters

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
99.	U3.00	V/F curve setting	0: linear V/F 1: multi-point V/F 2: square V/F 3:1.2th power V/F 4:1.4th power V/F 6:1.6th power V/F 8:1.8th power V/F	0	★	108
100.	U3.01	Torque boost	0.0%(Automatic torque boost)	10	★	109
101.	U3.02	Torque boost cut-off frequency	0.00Hz to U0.10 (maximum	15.00Hz	★	109
102.	U3.03	VF frequency point 1	0.00Hz to U3.05	0.00Hz	★	109
103.	U3.04	VF voltage point 1	0.0% to 100.0%	0.0	★	109
104.	U3.05	VF frequency point 2	U3.03 to U3.07	0.00Hz	★	109
105.	U3.06	VF voltage point 2	0.0% to 100.0%	0.0%	★	109
106.	U3.07	VF frequency point 3	U3.05 to U1.04 (rated motor frequency)	0.00Hz	★	110

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
107.	U3.08	VF voltage point 3	0.0% to 100.0%	0.0%	★	110
108.	U3.09	Slip compensation coefficient	0% to 200.0%	0.0%	☆	110
109.	U3.10	Overexcitation gain	0 to 200	64	☆	110
110.	U3.11	Oscillation suppression gain	0 to 100	0	☆	111

5-1-6. U4 Gruop - Input terminals group

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
111.	U4.00	DI1 terminal function selection	0: No function 1: Forward run 2: Reverse run 3: Three-wire operation control 4: Forward Jog 5: Reverse Jog 6: Terminal UP 7: Terminal DN 8: Free stop 9: Fault reset (RESET) 10: Run pausing 11: External fault normally open input 12: Multi-stage command terminal 1 13: Multi-stage command terminal 2 14: Multi-stage command terminal 3 15: Multi-stage command terminal 4 16: Ac/deceleration time selection terminal 1 17: Ac/deceleration time selection terminal 2 18: Frequency source switching	1	★	111
112.	U4.01	DI2 terminal function selection		2	★	111
113.	U4.02	DI3 terminal function selection		8	★	111
114.	U4.03	DI4 terminal function selection		9	★	111
115.	U4.04	DI5 terminal function selection		12	★	111
116.	U4.05	DI6 terminal function selection		13	★	111
117.	U4.06	DI7 terminal function selection		2	★	111
118.	U4.07	DI8 terminal function selection		0	★	111
119.	U4.08	DI9 terminal function selection		0	★	111
120.	U4.09	DI10 terminal function selection		0	★	111

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			19: Clear UP/DN setting (terminal, keyboard) 20: Run command switch terminal 21: Ac/deceleration prohibited 22: PID pause 23: PLC status reset 24: Wobbulate pause 25: Counter input 26: Counter reset 27: Counter length count input 28: Length reset 29: Torque control prohibited 30: High-speed pulse input (only valid for DI5) 31: Reserved 32: Immediately DC braking 33: External fault normally closed input 34: Frequency change enable 35: PID action direction as reverse 36: External parking terminal 1 37: Control command switch terminal 2 38: PID integral pause 39: Switch between frequency source master setting and preset frequency 40: Switch between frequency source auxiliary setting and preset frequency 41: Reserved 42: Reserved 43: PID parameter switching			

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			44: Custom fault 1 45: Custom fault 2 46 Speed control / torque control switching 47: Emergency parking 48: External parking terminal 2 49: Deceleration DC braking 50: Clear current running time			
121.	U4.10	DI filter time	0.000s to 1.000s	0.01s	☆	117
122.	U4.11	Terminal command mode	0: Two-wire type 1 1: Two-wire type 2 2: Three-wire type 1 3: Three-wire type 2	0	★	117
123.	U4.12	Terminal UP / DOWN change rate	0.001Hz/s to 50.000Hz/s	1.00	☆	120
124.	U4.13	Minimum input value for AI curve 1	0.00V to U4.15	0.00V	☆	120
125.	U4.14	Minimum input setting for AI curve 1	-100.00% to +100.0%	0.0%	☆	120
126.	U4.15	Maximum input for AI curve 1	U4.13 to +10.00V	10.00V	☆	120
127.	U4.16	Maximum input setting for AI curve 1	-100.00% to +100.0%	100.0%	☆	120
128.	U4.17	AI1 filter time	0.00s to 10.00s	0.10s	☆	120
129.	U4.18	Minimum input value for AI curve 2	0.00V to U4.20	0.00V	☆	121
130.	U4.19	Minimum input setting for AI curve 2	-100.00% to +100.0%	0.0%	☆	121

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
131.	U4.20	Maximum input for AI curve 2	U4.18 to +10.00V	10.00V	☆	121
132.	U4.21	Maximum input setting for AI curve 2	-100.00% to +100.0%	100.0%	☆	121
133.	U4.22	AI2 filter time	0.00s to 10.00s	0.10s	☆	122
134.	U4.23	Minimum input value for AI curve 3	-10.00V to U4.25	0.00V	☆	122
135.	U4.24	Minimum input setting for AI curve 3	-100.00% to +100.0%	0.0%	☆	122
136.	U4.25	Maximum input for AI curve 3	U4.23 to +10.00V	10.00V	☆	122
137.	U4.26	Maximum input setting for AI curve 3	-100.00% to +100.0%	100.0%	☆	122
138.	U4.27	Filtering time of panel potentiometer	0.00s to 10.00s	0.10s	☆	122
139.	U4.28	Minimum pulse input frequency	0.00kHz to U4.30	0.00	☆	122
140.	U4.29	Minimum pulse input frequency setting	-100.00% to +100.0%	0.0%	☆	122
141.	U4.30	Maximum pulse input frequency	U4.28 to 100.00kHz	50.00	☆	122
142.	U4.31	Maximum pulse input frequency setting	-100.00% to +100.0%	100.0%	☆	122
143.	U4.32	Filter time of pulse input	0.00s to 10.00s	0.1	☆	122
144.	U4.33	AI curve selection	Units digit: AI1 curve selection	0x0321	☆	122

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			1: curve 1 (see U4.13 to U4.16) 2: curve 2 (see U4.18 to U4.21) 3: curve 3 (see U4.23 to U4.26) Tens digit: AI2 curve selection			
145.	U4.34	Setting selection for AI less than minimum input	Units digit: setting selection for AI1 less than minimum input 0: the corresponding minimum input setting 1: 0.0% Tens digit: setting selection for AI2 less than minimum input, ditto	0x0000	☆	123
146.	U4.35	DI1 delay time	0.0s to 3600.0s	0.0s	★	123
147.	U4.36	DI2 delay time	0.0s to 3600.0s	0.0s	★	124
148.	U4.37	DI3 delay time	0.0s to 3600.0s	0.0s	★	124
149.	U4.38	DI terminal valid mode selection 1	Units digit: DI1 0: high level active 1: low level active Tens digit: DI2 Hundreds digit: DI3 Thousands digit: DI4 Ten thousands digit: DI5	0	★	124
150.	U4.39	DI terminal valid mode selection 2	Units digit: DI6 0: high level active 1: low level active Tens digit: DI7 Hundreds digit: DI8 Thousands digit: DI9 Ten thousands digit: DI10	0	★	124

5-1-7. **U5 Group - Output terminals group**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
151.	U5.00	SPB terminal output mode selection	0: High-speed pulse output 1: switching quantity output	0	☆	125
152.	U5.01	Switching quantity output function selection	0: No output 1: Inverter in service 2: Fault output (fault shutdown) 3: Frequency level detection FDT1 output 4: Frequency arrival 5: Zero speed running (shutdown without output) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8. Set count value arrival 9. Specified count value arrival 10: Length arrival 11: PLC cycle completed 12: Cumulative running time arrival 13: Frequency being limited 14: Torque being limited 15: Ready for operation 16: AI1> AI2 17: Upper limit frequency arrival 18: Lower limit frequency arrival 19: Undervoltage status output 20: Communications setting 21: Positioning	0	☆	125
153.	U5.02	Relay 1 output function selection (TA1.TB1.TC1)		2	☆	125
154.	U5.03	Undefined		0	☆	125
155.	U5.04	SPA output function selection (collector Open circuit output terminals)		1	☆	125
156.	U5.05	Relay 2 output function selection (TA2.TB2.TC2)		4	☆	125

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			completed (reserved) 22: Positioning approached (reserved) 23: Zero speed running 2 (shutdown with output) 24; Accumulated power-on time arrival 25: Frequency level detection FDT2 output 26: Frequency 1 reaches output value 27: Frequency 2 reaches output value 28: Current 1 reaches output value 29: Current 2 reaches output value 30: Timer reaches output value 31: AI1 input exceed limit 32: Load droping 33: Reverse running 34: Zero current status 35: Module temperature arrival 36: Output current exceed limit 37: Lower limit frequency arrival(stop with output) 38: Alarm output (continued running) 39: Motor overtemperature pre-alarm 40: Current running time arrival 41: Reserved			
157.	U5.06	High-speed pulse output function selection	0: Running frequency 1: Set frequency 2: Output current	0	☆	128

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
158.	U5.07	DA1 output function selection	3: Output torque 4: Output power 5: Output voltage 6: High-speed pulse input (100.0% corresponds to 100.0kHz) 7: AI1 8: AI2 9: Reserved 10: Length 11: Count value 12: Communications setting 13: Motor speed 14: Output current (inverter power ≦ 55kW, 100.0% correspond to 100A; inverter rate> 55kW, 100.0% corresponds to 1000A) 15: DC bus voltage (100.0% corresponding 1000.0V)	0	☆	128
159.	U5.08	DA2 output function selection		1	☆	128
160.	U5.09	Maximum output frequency of high-speed pulse	0.01kHz to 100.00kHz	50.00	☆	129
161.	U5.10	DA1 zero bias coefficient	-100.0% to +100.0%	0.0%	☆	129
162.	U5.11	DA1 gain	-10.00 to +10.00	1.00	☆	129
163.	U5.12	DA2 zero bias coefficient	-100.0% to +100.0%	0.00%	☆	129
164.	U5.13	DA2 gain	-10.00 to +10.00	1.00	☆	129
165.	U5.17	SPB switching quantity output delay time	0.0s to 3600.0s	0.0s	☆	129

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
166.	U5.18	Relay 1 output delay time	0.0s to 3600.0s	0.0s	☆	129
167.	U5.19	Expansion card DO output delay time	0.0s to 3600.0s	0.0s	☆	129
168.	U5.20	SPA output delay time	0.0s to 3600.0s	0.0s	☆	129
169.	U5.21	Relay 2 output delay time	0.0s to 3600.0s	0.0s	☆	129
170.	U5.22	DO output terminal active status selection	0: positive logic 1: anti-logic Units digit: SPB switching quantity Tens digit: Relay 1 Hundreds digit: Expansion DO Thousands digit: SPA Ten thousands digit: Relay 2	0.0%	☆	129

5-1-8. U6 Group - Start and stop control group

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
171.	U6.00	Start-up mode	0: Direct startup 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous motor)	0	☆	130
172.	U6.01	Speed tracking mode	0: start from stop frequency 1: start from zero speed 2: start from maximum frequency	0	★	131

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
173.	U6.02	Speed tracking value	1 to 100	20	☆	131
174.	U6.03	Start frequency	0.00Hz to 10.00Hz	0.00Hz	☆	131
175.	U6.04	Hold time for start frequency	0.0s to 100.0s	0.0s	★	131
176.	U6.05	Start DC braking current	0% to 100%	0%	★	131
177.	U6.06	Start DC braking time	0.0s to 100.0s	0.0s	★	132
178.	U6.07	Ac/deceleration mode	0: Linear acceleration and deceleration 1: S curve acceleration and deceleration A 2: S curve acceleration and deceleration B	0	★	132
179.	U6.08	Proportion of S curve start-section	0.0% to (100.0%.to U6.09)	30.0%	★	132
180.	U6.09	Proportion of S curve end-section	0.0% to (100.0%. to U6.08)	30.0%	★	132
181.	U6.10	Stop mode	0: Deceleration parking 1: Free stop	0	☆	133
182.	U6.11	Initial frequency of stop DC braking	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆	134
183.	U6.12	Waiting time of stop DC braking	0.0s to 100.0s	0.0s	☆	134
184.	U6.13	Stop DC braking current	0% to 100%	0%	☆	134

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
185.	U6.14	Stop DC braking time	0.0s to 100.0s	0.0s	☆	134
186.	U6.15	Braking utilization rate	0% to 100%	100%	☆	135

5-1-9. U7 Group - Keyboard and display

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
187.	U7.00	STOP/RESET key functions	0: STOP/RES key is enabled only under keyboard operation mode 1: STOP/RES key is enabled under any operation mode	1	☆	135
188.	U7.01	Running status display parameters 1	0000 to FFFF Bit00: running frequency 1 (Hz) Bit01: set frequency (Hz) Bit02: bus voltage (V) Bit03: output voltage (V) Bit04: output current (A) Bit05: output power (kW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: panel potentiometer voltage Bit12: count value Bit13: length value Bit14: load speed display Bit15: PID setting	1F	☆	135

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
189.	U7.02	Running status display parameters 2	0000 to FFFF Bit00: PID feedback Bit01: PLC stage Bit02: high-speed pulse input frequency (kHz) Bit03: running frequency 2 (Hz) Bit04: remaining run time Bit05: AI1 voltage before correction (V) Bit06: AI2 voltage after correction (V) Bit07: panel potentiometer voltage before correction (V) Bit08: linear speed Bit09: current power-on time (Hour) Bit10: current running time (Min) Bit11: high-speed pulse input frequency (Hz) Bit12: communication set value Bit13: encoder feedback speed (Hz) Bit14: master frequency A display (Hz) Bit15: auxiliary frequency B display (Hz)	0	☆	135
190.	U7.03	Stop status display parameters	0000 to FFFF Bit00: set frequency (Hz) Bit01: bus voltage (V) Bit02: DI terminal input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: panel potentiometer voltage (V)	33	☆	136

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			Bit07: count value Bit08: length value Bit09: PLC stage Bit10: load speed Bit11: PID setting Bit12: high-speed pulse input frequency (kHz)			
191.	U7.04	Load speed display coefficient	0.0001 to 6.5000	1.0000	☆	136
192.	U7.05	Inverter module radiator temperature	0.0℃ to 100.0℃	0	●	136
193.	U7.07	Total run time	0h to 65535h	0	●	137
194.	U7.08	Part number		-	●	137
195.	U7.09	Software version number		-	●	137
196.	U7.10	Decimal places for load speed display	0:0 decimal places 1:1 decimal places 2:2 decimal places 3:3 decimal places	1	●	137
197.	U7.11	Total power-on time	0h to 65535h	-	●	137
198.	U7.12	Total power consumption	0 to 65535 kwh	-	●	137

5-1-10. U8 Group - Auxiliary function group

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
199.	U8.00	Jog running frequency	0.00Hz to U0.10 (maximum frequency)	2.00Hz	☆	137

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
200.	U8.01	Jog acceleration time	0.1s to 3600.0s	20.0s	☆	138
201.	U8.02	Jog deceleration time	0.1s to 3600.0s	20.0s	☆	138
202.	U8.03	Acceleration time 2	0.1s to 3600.0s	Depends on models	☆	138
203.	U8.04	Deceleration time 2	0.1s to 3600.0s	Depends on models	☆	138
204.	U8.05	Acceleration time 3	0.1s to 3600.0s	Depends on models	☆	138
205.	U8.06	Deceleration time 3	0.1s to 3600.0s	Depends on models	☆	138
206.	U8.07	Acceleration time 4	0.1s to 3600.0s	Depends on models	☆	138
207.	U8.08	Deceleration time 4	0.1s to 3600.0s	Depends on models	☆	138
208.	U8.09	Jump frequency 1	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆	138
209.	U8.10	Jump frequency 2	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆	138
210.	U8.11	Jump frequency range	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆	138
211.	U8.12	Forward/reverse rotation deadband	0.00s to 3600.0s	0.0s	☆	138
212.	U8.13	Reverse rotation control	0: Enable 1: Disable	0	☆	138

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
213.	U8.14	Set frequency lower than lower limit frequency mode	0: running at lower limit frequency 1: stop 2: zero speed running	0	☆	139
214.	U8.15	Droop control	0.00Hz to 10.00Hz	0.00Hz	☆	139
215.	U8.16	Setting cumulative power-on arrival time	0h to 36000h	0h	☆	139
216.	U8.17	Setting cumulative running arrival time	0h to 36000h	0h	☆	139
217.	U8.18	Start protection	0: OFF 1: ON	0	☆	140
218.	U8.19	Frequency detection value (FDT1)	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆	140
219.	U8.20	Frequency detection hysteresis value (FDT1)	0.0% to 100.0% (FDT1 level)	5.0%	☆	140
220.	U8.21	Frequency reaches detection width	0.00 to 100% (maximum frequency)	0.0%	☆	141
221.	U8.22	Jump frequency availability during ac/deceleration process	0: Invalid 1: Valid	0	☆	141
222.	U8.25	Switching frequency point between acceleration time 1 and acceleration time 2	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆	142
223.	U8.26	Switching frequency point between deceleration time 1 and deceleration time 2	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆	142
224.	U8.27	Terminal jog priority	0:Invalid 1: Valid	0	☆	142

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
225.	U8.28	Frequency detection value (FDT2)	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆	142
226.	U8.29	Frequency detection hysteresis value (FDT2)	0.0% to 100.0% (FDT2 level)	5.0%	☆	142
227.	U8.30	Random arrivals frequency detection value 1	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆	142
228.	U8.31	Random arrivals frequency detection width 1	0.00% to 100.0% (maximum frequency)	0.0%	☆	142
229.	U8.32	Random arrivals frequency detection value 2	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆	142
230.	U8.33	Random arrivals frequency detection width 2	0.00% to 100.0% (maximum frequency)	0.0%	☆	143
231.	U8.34	Zero current detection level	0.0% to 300.0% (rated motor current)	5.0%	☆	143
232.	U8.35	Zero current detection delay time	0.01s to 360.00s	0.10s	☆	143
233.	U8.36	Overrun value of output current	0.0% (not detected) 0.1% to 300.0% (rated motor current)	200.0%	☆	144
234.	U8.37	Output Current overrun detection delay time	0.00s to 360.00s	0.00s	☆	144
235.	U8.38	Random arrivals current 1	0.0% to 300.0% (rated motor current)	1000	☆	144
236.	U8.39	Random arrivals current 1 width	0.0% to 300.0% (rated motor	0.0%	☆	144

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			current)			
237.	U8.40	Random arrivals current 2	0.0% to 300.0% (rated motor current)	1000	☆	144
238.	U8.41	Random arrivals current 2 width	0.0% to 300.0% (rated motor current)	0.0%	☆	144
239.	U8.42	Timing function selection	0: Invalid 1: Valid	0	☆	145
240.	U8.43	Timing run time selection	0: U8.44 setting 1: AI1 2: AI2 3: Panel potentiometer Analog input range corresponds to U8.44	0	☆	145
241.	U8.44	Timing run time	0.0Min to 3600.0Min	0.0Min	☆	145
242.	U8.45	AI1 input voltage protection lower limit	0.00V to U8.46	3.1	☆	145
243.	U8.46	AI1 input voltage protection upper limit	U8.45 to 10.00V	6.8	☆	145
244.	U8.47	Module temperature arrival	0℃ to 100℃	75℃	☆	145
245.	U8.48	Cooling fan control	0: Fan running only when running 1: Fan always running	0	☆	145
246.	U8.53	Current running reaches the set time.	0.0Min to 3600.0Min	0.0Min	☆	146

5-1-11. **U9 Group - Fault and protection**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
247.	U9.00	Motor overload protection	0: Disable 1: Enable	1	☆	146
248.	U9.01	Motor overload protection gain	0.20 to 10.00	1	☆	146
249.	U9.02	Motor overload pre-alarm coefficient	50% to 100%	80%	☆	146
250.	U9.03	Overvoltage stall gain	0 to 100	0	☆	146
251.	U9.04	Overvoltage stall protection voltage / energy consumption brake voltage	120% to 150%	130%	☆	147
252.	U9.05	Overcurrent stall gain	0 to 100	20	☆	147
253.	U9.06	Overcurrent stall protection current	100% to 200%	150%	☆	147
254.	U9.07	Power-on short circuit to ground	0:Invalid 1: Valid	1	☆	147
255.	U9.09	Number of automatic fault reset	0 to 20	0	☆	147
256.	U9.10	Fault DO action selection during automatic fault reset	0: OFF 1: ON	0	☆	148

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
257.	U9.11	Automatic fault reset interval	0.1s to 100.0s	1.0s	☆	148
258.	U9.12	Input phase loss protection selection	0: Disable 1: Enable	1	☆	148
259.	U9.13	Output phase loss protection selection	0: Disable 1: Enable	1	●	148
260.	U9.14	Type of the first fault	0: No fault 1: Reserved 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant speed overcurrent 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Constant speed overvoltage 8: Reserved 9: Undervoltage 10: Inverter overload 11: Motor Overload 12: Input phase loss 13: Output phase loss 14: Module overheating 15: External fault 16: Communication abnormal 17: Contactor abnormal 18: Current detection abnormal 19: Motor tuning abnormal 20: Reserved 21: Parameter read and	-	●	148
261.	U9.15	Type of the second fault		-	●	148
262.	U9.16	Type of the third(at last) fault		-	●	148

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			write abnormal 22: Inverter hardware abnormal 23: Motor short to ground 24: Reserved 25: Reserved 26: Running time arrival 27: Custom fault 1 28: Custom fault 2 29; Power-on time arrival 30: Load drop 31: PID feedback loss when running 40: Fast current limiting timeout 41: Reserved 42: Too large speed deviation 43: Motor overspeed			
263.	U9.17	Frequency of the third(at last) fault		-	☆	150
264.	U9.18	Current of the third(at last) fault		-	●	150
265.	U9.19	Bus voltage of the third(at last) fault		-	●	150
266.	U9.20	Input terminal status of the third(at last) fault		-	●	150
267.	U9.21	Output terminal status of the third(at last) fault		-	●	150
268.	U9.22	Inverter status of the third(at last) fault		-	●	150

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
269.	U9.23	Power-on time of the third(at last) fault		-	●	150
270.	U9.24	Running time of the third(at last) fault		-	●	150
271.	U9.27	Frequency of the second fault		-	●	150
272.	U9.28	Current of the second fault		-	●	151
273.	U9.29	Bus voltage of the second fault		-	●	151
274.	U9.30	Input terminal status of the second fault		-	●	151
275.	U9.31	Output terminal status of the second fault		-	●	151
276.	U9.32	Inverter status of the second fault		-	●	151
277.	U9.33	Power-on time of the second fault		-	●	151
278.	U9.34	Running time of the second fault		-	●	151
279.	U9.37	Frequency of the first fault		-	●	151
280.	U9.38	Current of the first fault		-	●	151
281.	U9.39	Bus voltage of the first fault		-	●	151

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
282.	U9.40	Input terminal status of the first fault		-	●	151
283.	U9.41	Output terminal status of the first fault		-	●	151
284.	U9.42	Inverter status of the first fault		-	●	152
285.	U9.43	Power-on time of the first fault		-	●	152
286.	U9.44	Running time of the first fault		-	●	152
287.	U9.47	Fault protection action selection 1	Units digit: Motor overload (11) 0: Free stop 1: Stop at the selected mode 2: Continue to run Tens digit: input phase loss (12) Hundred digit: output phase loss (13) Thousand digit: external fault (15)	0	●	152
288.	U9.48	Fault protection action selection 2	Units digit: encoder/PG card abnormal (20) 0: Free stop Tens digit: function code read and write abnormal (21) 0: Free stop 1: Stop at the selected mode Hundreds digit: Reserved	0	☆	152

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			Thousands digit: Motor overheating (25)			
289.	U9.49	Fault protection action selection 3	Units digit: Custom fault 1(27) 0: Free stop 1: Stop at the selected mode 2: Continue to run Tens digit: Custom fault 2 (28) 0: Free stop 1: Stop at the selected mode 2: Continue to run Hundreds digit; Power-on time arrival (29) 0: Free stop 1: Stop at the selected mode 2: Continue to run Thousands digit: Load drop (30) 0: Free stop 1: Deceleration parking 2: Deceleration up to 7% of the rated motor frequency, and then continue running, automatically restore to the set frequency for when the load drop does not happen. Ten thousands digit: PID feedback loss when running (31) 0: Free stop 1: Stop at the selected mode 2: Continue to run	0	☆	153
290.	U9.50	Fault protection action selection 4	Units digit: Too large speed deviation (42) 0: Free stop	0	☆	153

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			1: Stop at the selected mode 2: Continue to run Tens digit: Motor overspeed (43) Hundreds digit: Initial position error (51)			
291.	U9.54	Continue running frequency selection when failure happens	0: running at current frequency 1: running at set frequency 2: running at upper limit frequency 3: running at lower limit frequency 4: running at abnormal spare frequency	0	☆	154
292.	U9.55	Abnormal spare frequency	60.0% to 100.0% (100.0% corresponds to maximum frequency U0.10)	100	☆	154
293.	U9.59	Momentary power cut action selection	0: Invalid 1: Deceleration 2: Deceleration and stop	0	☆	154
294.	U9.60	Recovery judgment voltage of momentary power cut	80.0% to 100.0%	90%	☆	154
295.	U9.61	Recovery voltage judgment time of momentary power cut	0.00s to 100.00s	0.5	☆	154
296.	U9.62	Judgment voltage of momentary power cut action	60.0% to 100.0% (standard bus voltage)	80%	☆	155
297.	U9.63	Load drop protection selection	0: Invalid 1: Valid	0	☆	156

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
298.	U9.64	Load drop detection level	0.0 to 100.0%	10%	☆	156
299.	U9.65	Load drop detection level	0.0 to 60.0s	1	☆	156
300.	U9.67	Overspeed detection value	0.0 to 50.0% (maximum frequency)	20%	☆	156
301.	U9.68	Overspeed detection time	0.0 to 60.0s	1	☆	156
302.	U9.69	Detection value for too large speed deviation	0.0 to 50.0% (maximum frequency)	20%	☆	156
303.	U9.70	Detection time for too large speed deviation	0.0 to 60.0s	5	☆	156

5-1-12. UA Group - PID function

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
304.	UA.00	PID setting source	0: UA.01 setting 1: Analog AI1 reference 2: Analog AI2 reference 3: Panel potentiometer setting 4: High-speed pulse setting 5: Communications reference 6: Multi-stage command reference	0	☆	157
305.	UA.01	PID keyboard setting	0.0% to 100.0%	50.0%	☆	158
306.	UA.02	PID feedback source	0: AI1 1: AI2 2: Panel	0	☆	158

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			potentiometer setting 3: AI1－AI2 4: High-speed pulse setting 5: Communications setting 6: AI1+AI2 7: MAX(|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)			
307.	UA.03	PID action direction	0: positive 1: negative	0	☆	158
308.	UA.04	PID setting feedback range	0 to 65535	1000	☆	158
309.	UA.05	Proportional gain KP1	0.0 to 100.0	20.0	☆	158
310.	UA.06	Integration time Ti1	0.01s to 10.00s	2.00s	☆	158
311.	UA.07	Differential time Td1	0.00s to 10.000s	0.000s	☆	158
312.	UA.08	PID inversion cutoff frequency	0. 00 to U0.10(maximum frequency)	0.00Hz	☆	159
313.	UA.09	PID deviation limit	0.0% to 100.0%	0	☆	159
314.	UA.10	PID differential limiting	0. 00% to 100.00%	0.10%	☆	159
315.	UA.11	PID reference change time	0.00s to 650.00s	0.00s	☆	159
316.	UA.12	PID feedback filter time	0.00s to 60.00s	0.00s	☆	159
317.	UA.13	PID output filter time	0.00s to 60.00s	0.00s	☆	159
318.	UA.15	Proportional gain KP2	0.0 to 100.0	20.0	☆	159
319.	UA.16	Integration time Ti2	0.01s to 10.00s	2.00s	☆	160
320.	UA.17	Differential time Td2	0.00 to 10.000	0.000s	☆	160

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
321.	UA.18	PID parameter switching conditions	0: no switching 1: switching via terminals 2: automatically switching according to deviation.	0	☆	160
322.	UA.19	PID parameter switching deviation 1	0.0% to UA.20	20.0%	☆	160
323.	UA.20	PID parameter switching deviation 2	UA.19 to 100.0%	80.0%	☆	160
324.	UA.21	PID initial value	0.0% to 100.0%	0.0%	☆	161
325.	UA.22	PID initial value hold time	0.00s to 360.00s	0.00s	☆	161
326.	UA.23	Maximum deviation of twice outputs(forward)	0.00% to 100.00%	1.00%	☆	161
327.	UA.24	Maximum deviation of twice outputs(backward)	0.00% to 100.00%	1.00%	☆	161
328.	UA.25	PID integral properties	Units digit: integral separation 0: Invalid 1: Valid Tens digit: whether stop integration when output reaches limit 0: continue 1: stop	00	☆	161
329.	UA.26	PID feedback loss detection value	0.0%: not judged feedback loss 0.1% to 100.0%	0.0%	☆	162
330.	UA.27	PID feedback loss detection time	0.0s to 20.0s	0.0s	☆	162
331.	UA.28	Computing status after PID stop	0: stop without computing 1: stop with computing	0	☆	162

5-1-13. **Ub Group - Wobbulate, fixed-length and counting**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
332.	Ub.00	Swing setting manner	0: relative to center frequency 1: relative to maximum frequency	0	☆	163
333.	Ub.01	Wobbulate range	0.0% to 100.0%	0.0%	☆	163
334.	Ub.02	Sudden jump frequency range	0.0% to 50.0%	0.0%	☆	163
335.	Ub.03	Wobbulate cycle	0.1s to 3000.0s	10.0s	☆	164
336.	Ub.04	Triangle wave rise time coefficient	0.1% to 100.0%	50.0%	☆	164
337.	Ub.05	Set length	0m to 65535m	1000m	☆	164
338.	Ub.06	Actual length	0m to 65535m	0m	☆	164
339.	Ub.07	Pulse per meter	0.1 to 6553.5	100.0	☆	164
340.	Ub.08	Set count value	1 to 65535	1000	☆	164
341.	Ub.09	Specified count value	1 to 65535	1000	☆	164

5-1-14. **UC Group - Multi-stage command, simple PLC**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
342.	UC.00	0-stage speed setting 0X	-100.0% to 100.0%	0.0%	☆	165

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
343.	UC.01	1-stage speed setting 1X	-100.0% to 100.0%	0.0%	☆	165
344.	UC.02	2-stage speed setting 2X	-100.0% to 100.0%	0.0%	☆	165
345.	UC.03	3-stage speed setting 3X	-100.0% to 100.0%	0.0%	☆	165
346.	UC.04	4-stage speed setting 4X	-100.0% to 100.0%	0.0%	☆	165
347.	UC.05	5-stage speed setting 5X	-100.0% to 100.0%	0.0%	☆	165
348.	UC.06	6-stage speed setting 6X	-100.0% to 100.0%	0.0%	☆	165
349.	UC.07	7-stage speed setting 7X	-100.0% to 100.0%	0.0%	☆	165
350.	UC.08	8-stage speed setting 8X	-100.0% to 100.0%	0.0%	☆	165
351.	UC.09	9-stage speed setting 9X	-100.0% to 100.0%	0.0%	☆	165
352.	UC.10	10-stage speed setting 10X	-100.0% to 100.0%	0.0%	☆	165
353.	UC.11	11-stage speed setting 11X	-100.0% to 100.0%	0.0%	☆	165
354.	UC.12	12-stage speed setting 12X	-100.0% to 100.0%	0.0%	☆	165
355.	UC.13	13-stage speed setting 13X	-100.0% to 100.0%	0.0%	☆	165
356.	UC.14	14-stage speed setting 14X	-100.0% to 100.0%	0.0%	☆	165
357.	UC.15	15-stage speed setting 15X	-100.0% to 100.0%	0.0%	☆	165
358.	UC.16	Simple PLC running mode	0: stop after single running	0	☆	166

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
359.	UC.17	Simple PLC power-down memory selection	Units digit: power-down memory selection 0: power-down without memory 1: power-down with memory Tens digit: stop memory selection 0: stop without memory 1: stop with memory	00	☆	167
360.	UC.18	0 stage running time T0	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	167
361.	UC.19	0 stage ac/deceleration tim selection	0 to 3	0	☆	167
362.	UC.20	1 stage running time T1	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	167
363.	UC.21	1 stage ac/deceleration tim selection	0 to 3	0	☆	167
364.	UC.22	2 stage running time T2	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	167
365.	UC.23	2 stage ac/deceleration tim selection	0 to 3	0	☆	167
366.	UC.24	3 stage running time T3	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	167
367.	UC.25	Simple PLC 3 stag ac/deceleration tim selection	0 to 3	0	☆	167
368.	UC.26	Simple PLC 4 stag running time selection	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	167

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
369.	UC.27	4 stage ac/deceleration tim selection	0 to 3	0	☆	168
370.	UC.28	5 stage running time T5	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
371.	UC.29	5 stage ac/deceleration tim selection	0 to 3	0	☆	168
372.	UC.30	6 stage running time T6	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
373.	UC.31	6 stage ac/deceleration tim selection	0 to 3	0	☆	168
374.	UC.32	7 stage running time T7	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
375.	UC.33	7 stage ac/deceleration tim selection	0 to 3	0	☆	168
376.	UC.34	8 stage running time T8	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
377.	UC.35	8 stage ac/deceleration tim selection	0 to 3	0	☆	168
378.	UC.36	9 stage running time T9	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
379.	UC.37	9 stage ac/deceleration tim selection	0 to 3	0	☆	168
380.	UC.38	10 stage running time T10	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
381.	UC.39	10 stage ac/deceleration tim	0 to 3	0	☆	168

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
		selection				
382.	UC.40	11 stage running time T11	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
383.	UC.41	11 stage ac/deceleration tim selection	0 to 3	0	☆	168
384.	UC.42	12 stage running time T12	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	168
385.	UC.43	12 stage ac/deceleration tim selection	0 to 3	0	☆	169
386.	UC.44	13 stage running time T13	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	169
387.	UC.45	13 stage ac/deceleration tim selection	0 to 3	0	☆	169
388.	UC.46	14 stage running time T14	0.0s(h) to 6500.0s(h)	0.0s(h)	☆	169
389.	UC.47	14 stage ac/deceleration tim selection	0 to 3	0	☆	169
390.	UC.48	15 stage running time T15	0.0s(h) to 6553.5s(h)	0.0s(h)	☆	169
391.	UC.49	15 stage ac/deceleration tim selection	0 to 3	0	☆	169
392.	UC.50	Simple PLC run-time unit	0: S (seconds) 1: H (hours)	0	☆	169
393.	UC.51	Multi-stage command 0 setting mode	0: function code UC.00 reference 1: analog AI1 setting 2: analog AI2 setting 3: panel	0	☆	169

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			potentiometer setting 4: High-speed pulse setting 5: PID control setting 6: keyboard set frequency (U0.08) setting, UP/DN can be modified			

5-1-15. Ud Group - Communication parameter

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
394.	Ud.00	Baud rate	0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS	5	☆	170
395.	Ud.01	Data format	0: no parity (8-N-2) 1: even parity (8-E-1) 2: odd parity (8-O-1) 3: no parity (8-N-1)	0	☆	170
396.	Ud.02	This unit address	1-247, 0 for broadcast address	1	☆	170
397.	Ud.03	Response delay	0ms-20ms	2	☆	170
398.	Ud.04	Communication timeout time	0.0 (invalid), 0.1s-60.0s	0.0	☆	170
399.	Ud.05	Data protocol selection	Units digit: MODBUS 0: non-standard MODBUS protocol	30	☆	170

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
			1: standard MODBUS protocol Tens digit: Profibus-DP 0: PPO1 format 1: PPO2 format 2: PPO3 format 3: PPO5 format			
400.	Ud.06	Communication read current resolution	0: 0.01A 1: 0.1A	0	☆	170

5-1-16. **UP Group - Function code management**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
401.	UP.00	User password	0 to 65535	0	☆	171
402.	UP.01	Parameter initialization	0: no operation 1: restore default parameter values, not including motor parameters 2: clear history 3: restore default parameter values, including motor parameters 4: backup current user parameters 501: restore from backup user parameters	0	★	171
403.	UP.02	Function parameter group display selection	Units digit: U group display selection 0: not displays 1: displays Tens digit: E group display selection 0: not displays 1: displays	11	★	171

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
404.	UP.04	Function code modification properties	0: modifiable 1: not modifiable	0	☆	172

5-1-17. **E0 Group - Torque control parameters**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
405.	E0.00	Speed/torque control mode selection	0: speed control 1: torque control	0	★	172
406.	E0.01	Torque setting source selection under torque control mode	0: keyboard setting (E0.03) 1: Analog AI1 setting 2: Analog AI2 setting 3: Panel potentiometer setting 4: High-speed pulse setting 5: Communications reference 6: MIN (AI1, AI2) 7: MAX (AI1, AI2)	0	★	172
407.	E0.03	Torque keyboard setting under torque control mode	-200.0% to 200.0%	150%	☆	173
408.	E0.04	Torque filter time	0.00s to 10.00s	0	☆	173
409.	E0.05	Torque control forward maximum frequency	0.00Hz to U0.10 (maximum frequency)	50	☆	173
410.	E0.06	Torque control backward maximum frequency	0.00Hz to U0.10 (maximum frequency)	50	☆	173
411.	E0.07	Torque control acceleration time	0.00s to 36000s	0.00s	☆	173
412.	E0.08	Torque control deceleration time	0.00s to 36000s	0.00s	☆	173

5-1-18. **E5 Group - Control optimization parameters**

No.	Code	Parameter name	Setting range	Factory setting	Change	Reference page
413.	E5.00	Upper limiting frequency for DPWM switching	0.00Hz to 15.00Hz	12	☆	173
414.	E5.01	PWM modulation manner	0: asynchronous 1: synchronou	0	☆	174
415.	E5.02	Deadband compensation mode selection	0: no compensation 1: compensation mode 1 2: compensation mode 2	1	☆	174
416.	E5.03	Random PWM depth	0: Invalid 1 to 10: PWM carrier frequency random depth	0	☆	174
417.	E5.04	Fast current limiting manner	0: disable 1: enable	1	☆	174
418.	E5.05	Current detection compensation	0 to 100	5	☆	174
419.	E5.06	Undervoltage point setting	60.0% to 140.0%	100.0%	☆	175
420.	E5.07	Vector optimization without PG mode selection	0: no optimization 1: optimization mode 1 2: optimization mode 2	1	☆	175
421.	E5.08	Deadband time adjustment	100% to 200%	150%	☆	175
422.	E5.09	Overvoltage point setting	200.0V to 2500.0V	810	☆	175

5-2. Function parameter description

5-2-1.Basic monitoring parameters: d0.00-d0.61

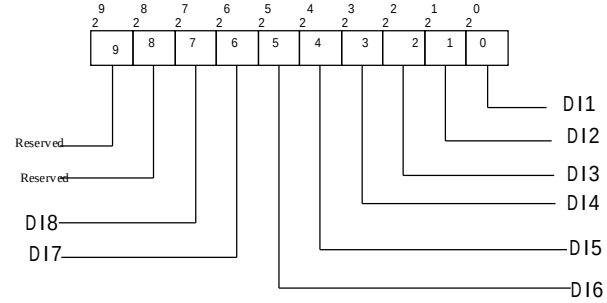
d0 parameters group is used to monitor the inverter running status information, user can view those information through the panel to facilitate on-site commissioning, also read parameters group value via communication for host computer monitoring. Among them, d0.00 to d0.31 are defined as run and stop monitoring parameters in U7.03 and U7.04

For the specific parameters function code, name and the smallest unit , see Table 5-2.

Function code	Name	Unit
d0.00	Set frequency (Hz)	0.01Hz
Actual set frequency		
d0.01	Running frequency (Hz)	0.01Hz
Actual output frequency		
d0.02	Bus voltage (V)	0.1V
Detected value for DC bus voltage		
d0.03	Output voltage (V)	1V
Actual output voltage		
d0.04	Output current (A)	0.01A
Effective value for actual motor current		
d0.05	Output power (kW)	0.1kW
Calculated value for motor output power		
d0.06	Output torque (%)	0.1%
Motor output torque percentage		
d0.07	DI input status	1

DI input status, this value is a hexadecimal digits. The table listed each input terminal status sequence for each bit:

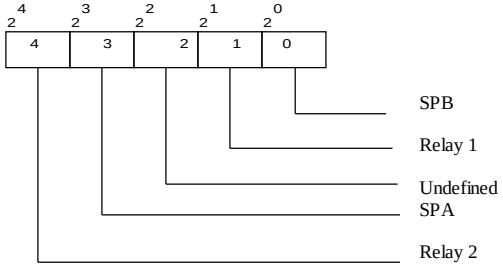
0 to 10 bits	Input terminal status
0	Invalid
1	Valid



d0.08	DO output status	1

DO output status, this value is a hexadecimal digits. The table listed each output terminal status sequence for each bit:

0 to 10 bits	Output terminal status
0	Invalid
1	Valid



d0.09	AI1 voltage (V)	0.01V
AI1 input voltage value		
d0.10	AI2 voltage (V)	0.01V
AI2 input voltage value		
d0.11	Panel potentiometer voltage (V)	0.01V
Panel potentiometer input voltage value		
d0.12	Count value	1
Actual pulse count value in counting function		
d0.13	Length value	1
Actual length in fixed length function		
d0.14	Actual speed	1
Motor actual running speed display		
d0.15	PID setting	1
Reference value percentage under PID adjustment mode		
d0.16	PID feedback	1
Feedback value percentage under PID adjustment mode		
d0.17	PLC stage	1
Stage display when PID program is running		
d0.18	High-speed pulse input pulse frequency (Hz)	0.01kHz
High-speed pulse input frequency display, unit: 0.01Khz		
d0.19	Feedback speed(unit:0.1Hz)	0.1Hz

PG feedback speed, to an accuracy of 0.1hz		
d0.20	Remaining run time	0.1Min
Remaining run time display, it is for timing run control		
d0.24	Linear speed	1m/Min
Linear speed calculated from angular speed and diameter is used for controlling constant tension and constant linear speed.		
d0.25	Current power-on time	1Min
Total time of current inverter power-on		
d0.26	Current run time	0.1Min
Total time of current inverter run		
d0.27	High-speed pulse input pulse frequency	1Hz
High-speed pulse input frequency display, unit: 1hz		
d0.28	Communication set value	0.01%
Frequency, torque or other command values set by communication port		
d0.29	Encoder feedback speed	0.01Hz
PG feedback speed, to an accuracy of 0.1hz		
d0.30	Master frequency setting display	0.01Hz
Frequency set by U0.03 master frequency setting source		
d0.31	Auxiliary frequency setting display	0.01Hz
Frequency set by U0.04 auxiliary frequency setting source		
d0.33	Synchro rotor position	0.0°
Current position angle of synchronous motor rotor		
d0.35	Command torque (%)	0.1%
Display the set target torque under torque control mode		
d0.36	Resolver position	1
Rotor position when rotary transformer is used as a speed feedback		
d0.38	ABZ position	0.0
Displays AB phase pulse count of the current ABZ or UVW encoder		
d0.58	Z signal counter	
Displays Z phase pulse count of the current ABZ or UVW encoder		
d0.61	Inverter status	

Displays inverter running status information
Data definition format is as follows:

d0.61	Bit0	0: stop; 1: forward; 2: reverse
	Bit1	
	Bit2	0: constant; 1: acceleration; 2

	Bit3	deceleration
	Bit4	0: bus voltage normal; 1: undervoltage

5-2-2.Basic function group: U0.00-U0.28

Code	Parameter name	Setting range		Factory setting	Change Limit
U0.00	Inverter type	G type (constant torque load type)	1	1	●
		F type (fans/pumps load type)	2		
The parameters is only for user to view the factory model and can not be changed. 1: Suitable for constant torque load 2: Suitable for variable torque load (fans, pumps load)					
U0.01	Motor control mode	Vector control without PG	2	2	★
		Vector control with PG			
		V/F control			
U0.02	Command source selection	Keyboard control (LED off)	0	0	☆
		Terminal block control (LED on)	1		
		Communications command control (LED flashes)	2		
Select inverter control command input channel. Inverter control commands include: start, stop, forward, reverse and jog, etc. 0: keyboard control ("LOCAL / REMOT" lights out); Operate command control by using RUN, STOP/RST Keys on the operation panel. 1: terminal block control ("LOCAL / REMOT" lights up); Operate command control by using multi-function input terminals FWD, REV or FJOG. 2: communication command control("LOCAL / REMOT" flashes) Gives the run command from the host computer through the means of communication. Select this option, the optional communication card(Modbus card) is required .					
U0.03	Frequency source master setting	Keyboard set frequency (U0.08, UP/DN can be modified, power-down without memory)	0	0	☆
		Keyboard set frequency (U0.08, UP/DN can be modified, power-down with memory)	1		
		Analog AI1 setting	2		

		Analog AI2 setting	3		
		Panel potentiometer setting	4		
		High-speed pulse setting	5		
		Multi-speed operation setting	6		
		Simple PLC program setting	7		
		PID control setting	8		
		Remote communications setting	9		

Select inverter master reference frequency input channels. There are 10 master reference frequency channels in all:

0: Keyboard set frequency (U0.08, UP/DN can be modified, power-down without memory)

Initial value for the set frequency is U0.08 "preset frequency" value. The set frequency value of the inverter can be changed by using the ▲ key and ▼ key on the keyboard (or multi-function input terminals UP, DOWN).

The Inverter powers down and then powers on again, the set frequency value will be recovered as U0.08 "digital preset frequency value".

1: Keyboard set frequency (U0.08, UP/DN can be modified, power-down with memory)

Initial value for the set frequency is U0.08 "preset frequency" value. The set frequency value of the inverter can be changed by using the ▲ key and ▼ key on the keyboard (or multi-function input terminals UP, DOWN).

The Inverter powers down and then powers on again, the set frequency value is same as the frequency of the last power-down

Please note that U0.23 is for "digital set frequency stop memory selection ", U0.23 is used to select SAVE or CLEAR frequency correction when the inverter stops Besides, U0.23 is not related to the power-down memory but shutdown.

2: Analog AI1 setting

3: Analog AI2 setting

4: Panel potentiometer setting

Refers to that the frequency is determined by the analog input terminal, PI9000 control panel provides two analog input terminals (AI1, AI2).

Either 0V to 10V voltage input or 4mA to 20mA current input, it is selected by the jumper on the control board.

The corresponding relationship between AI1, AI2 input voltage value and the target frequency can be set through U4 function code by user.

Panel potentiometer analog input voltage of 0V to 5V.

5: High-speed pulse setting

Frequency reference is achieved via terminal pulse reference. Pulse reference signal specifications: voltage range of 9V to 30V, frequency range of 0 kHz to 100kHz. Pulse reference only can be inputted from the multi-function input terminal DI5. The relationship between DI5 terminal input pulse frequency and its corresponding setting can be set by U4.28 to U4.31, the correspondence is based on a straight line between 2 points, the pulse input corresponds to the set 100.0%, , it refers to the percent of U0.10 relative to maximum frequency

6: Multi-speed operation setting

When multi-stage command operation mode is selected, the different input state combination of DI terminal correspond to the different set frequency value. PI9000 can set up more than 4 multi-stage command terminals and 16 statuses, and any 16 "multi-stage commands "can be achieved correspondence through UC group function code, the "multi-stage command" refers to the percent of U0.10 relative to maximum frequency.

Under the mode, DI terminal function in U4 group parameters will be required to set as the multi-stage command.

7: Simple PLC program setting

Under the mode, the inverter operating frequency source can be switched between 1 to 16 any frequency commands, the user can set hold time and ac/deceleration time for 1 to 16 frequency command , the specific content refers to the related UC group instructions.

8: PID control setting

Select process PID control output as the operating frequency. Generally it is used for closed-loop control, such as constant pressure closed-loop control, constant tension closed-loop control and other occasions.

Select PID as the frequency source, you need to set UA group "PID function" parameters.

9: Remote communications setting

PI9000 supports Modbus communication.

Communication card must be installed when using the function.

U0.04	Frequency source auxiliary setting	Keyboard set frequency (U0.08, UP/DN can be modified, power-down without memory)	0	0	★
		Keyboard set frequency (U0.08, UP/DN can be modified, power-down with memory)	1		
		Analog AI1 setting	2		
		Analog AI2 setting	3		
		Panel potentiometer setting	4		
		High-speed pulse setting	5		
		Multi-speed operation setting	6		
		Simple PLC program setting	7		
		PID control setting	8		
		Remote communications setting	9		

The instructions for use refers to U0.03.

When the frequency source auxiliary setting is used as overlays reference (select frequency source as master+auxiliary , master to master+auxiliary or auxiliary to master+auxiliary), you need to pay attention to:

1) When the frequency source auxiliary setting is set to digital reference, the preset frequency (U0.08) does not work, user can adjust frequency by using ▲, ▼ keys (or multi-function input terminals UP, DOWN) on the keyboard, adjust directly on the basis of master frequency source.

2) When the frequency source auxiliary setting is set to analog input reference (AI1, AI2, panel potentiometer) or pulse input reference, the frequency source auxiliary setting

range for the set 100% can be set by U0.05 and U0.06.

3) When the frequency source is set to pulse input reference, it is similar to analog reference . Tip: Both master and auxiliary setting of frequency source can not be set in the same channel, ie U0.03 and U0.04 can not be set as the same value, otherwise easily lead to confusion.

U0.05	Reference object selection for frequency source auxiliary setting	Relative to maximum frequency	0	0	☆
		Relative to master frequency source A	1		
U0.06	Frequency source auxiliary setting range	0% to 150%	100%		☆

When the frequency source is set to "frequency overlay"(i.e. U0.07 is set to 1, 3 or 4), these two parameters are used to determine the range of adjustment of frequency source auxiliary setting.

U0.05 is used to determine the object corresponding to frequency source auxiliary setting range, either the maximum frequency or the frequency source master setting, if the frequency source master setting is selected, so the frequency source auxiliary setting range will be subject to the change of the frequency source master setting.

U0.07	Frequency source superimposed selection	Units digit	Frequency source selection	0		☆
		Frequency source master setting		0		
		Arithmetic result of master and auxiliary(arithmetic relationship depends on tens digit)		1		
		switch between frequency source master setting and auxiliary setting		2		
		Switch between frequency source master setting and arithmetic result of master and auxiliary		3		
		Switch between frequency source auxiliary setting and arithmetic result of master and auxiliary		4		
		Tens digit	Arithmetic relationship of master and auxiliary for frequency source			
		Master+auxiliary		0		
		Master-auxiliary		1		
		Max(master, auxiliary)		2		
		Min (master, auxiliary)		3		

Frequency source reference is achieved by compounding frequency source master setting and frequency source auxiliary setting

Units digit: frequency source selection:

0: Frequency source master setting

Frequency source master setting is used as command frequency

1: Arithmetic result of master and auxiliary is used as command frequency, for the arithmetic relationship of master and auxiliary, please see the instructions of function code "tens digit".

2: Switch between frequency source master setting and auxiliary setting, when multi-function input terminal 18 (frequency switching) is invalid, the frequency source master setting is selected as command frequency. when multi-function input terminal 18 (frequency switching) is valid, frequency source auxiliary setting is selected as command frequency.

3: Switch between the frequency source master setting and the arithmetic result of master and auxiliary, when multi-function input terminal 18 (frequency switching) is invalid, the frequency source master setting is selected as command frequency. When multi-function input terminal 18 (frequency switching) is valid, the arithmetic result of master and auxiliary is selected as command frequency.

4: Switch between the frequency source auxiliary setting and the arithmetic result of master and auxiliary, when multi-function input terminal 18 (frequency switching) is invalid, the frequency source auxiliary setting is selected as command frequency. When multi-function input terminal 18 (frequency switching) is valid, the arithmetic result of master and auxiliary is selected as command frequency.

Tens digit: arithmetic relationship of master and auxiliary for frequency source

0: frequency source master setting + frequency source auxiliary setting

The sum of frequency source master setting plus frequency source auxiliary setting is used as command frequency Achieve frequency overlay reference function.

1: frequency source master setting - frequency source auxiliary setting

The difference of frequency source master setting minus frequency source auxiliary setting is used as command frequency

2: MAX (master and auxiliary) take the largest absolute value in frequency source master setting and frequency source auxiliary setting as command frequency.

3: MIN (master and auxiliary) take the smallest absolute value in frequency source master setting and frequency source auxiliary setting as command frequency. In addition, when the arithmetic result of master and auxiliary is selected as frequency source, you can set offset frequency by U0.21 and overlay offset frequency to the arithmetic result of master and auxiliary, so as to respond flexibly to various needs.

U0.08	Keyboard set frequency	0.00Hz to U0.10(maximum frequency)	50.00Hz	☆

When "Digital Setting" or "Terminal UP/DOWN " is selected as frequency source, the parameter value is the initial value of the inverter frequency digital setting.

U0.09	Running direction	Same direction	0	0	☆
		Opposite direction	1		

By changing the parameters, the motor steering can be achieved without changing the motor wiring, which acts as the adjustment of any two lines(U, V, W) of the motor to achieve the conversion of the motor rotation direction.

Tip: after the parameter is initialized, the motor running direction will be restored to its original status. When the system debugging is completed, please use with caution where the change of motor steering is strictly prohibited

U0.10	Maximum output frequency	50.00Hz to 320.00Hz	50.00Hz	★

If analog input, pulse input (DI5) or multi-stage command in PI9000 is selected as frequency source, the respective 100.0% is calibrated relative to the parameter.

When PI9000 maximum output frequency reaches up to 3200Hz, in order to take into account the two indexes of frequency command resolution and frequency input range, the number of decimal places for frequency command can be selected by U0.22 .

When U0.22 selects 1, the frequency resolution is 0.1Hz, at this time U0.10 can be set in the range from 50.0Hz to 3200.0Hz; When U0.22 selects 2, the frequency resolution is 0.01Hz, at this time U0.10 can be set in the range from 50.00Hz to 320.00Hz.

U0.11	Upper limit frequency source	U0.12 setting	0	0	★
		AI1	1		
		AI2	2		
		Panel potentiometer setting	3		
		High-speed pulse setting	4		
		Communications reference	5		

Setting upper limit frequency. The upper limit frequency can be set from either digital setting (U0.12) or analog input channels. If the upper limit frequency is set from analog input, the set 100% of analog input is relative to U0.12.

To avoid the "Runaway", the setting of upper limit frequency is required, when the inverter reaches up to the set upper limit frequency value, the inverter will remain operation at the upper limit frequency, no further increase.

U0.12	Upper limit frequency	U0.14 (lower limit frequency) to U0.10 (maximum frequency)	50.00Hz	☆
U0.13	Upper limit frequency offset	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆

When the upper limit frequency is set from the analog or the high-speed pulse, U0.13 will be used as the offset of set value, the overlay of the offset frequency and U0.11 is used as the set value of the final upper limit frequency.

U0.14	Lower limit frequency	0.00Hz to U0.12 (lower limit frequency)	0.00Hz	☆

When the frequency command is lower than the lower limit frequency set by U0.14, the inverter can shut down, and then run at the lower limit frequency or the zero speed, the running mode can be set by U8.14.

U0.15	Carrier Frequency	0.5kHz to 16.0kHz	-	☆

This function is mainly used for improving the noise and vibration phenomena that the inverter operation may occur If the carrier frequency is higher, there are more ideal current waveform and less motor noise. It is very applicable in the place to be muted. But at this time, the switching loss of main components is large, the whole unit fevers, the efficiency decreases and the output reduces. At the same time, there is a bigger radio interference, another problem is that the capacitive leakage current increases when running at the high carrier frequency, the equipped leakage protective device may cause malfunction or overcurrent.

When running at the low carrier frequency, the above-mentioned phenomenon are opposite.

There are different responds to carrier frequency for the different motors. The best carrier frequency can be obtained based on the actual situation adjustment. However, with the increase of motor capacity, the smaller carrier frequency should be selected. This company reserves the right to limit the maximum carrier frequency.

The adjustment of carrier frequency will have impacts on the following performances:

Carrier Frequency	Low → high
Motor noise	Large → small
Output current waveform	Poor → good
Motor temperature	High → low
Inverter temperature	Low → high
Leakage current	Small → large
External radiation and interference	Small → large

Note: the larger the carrier frequency, the higher the whole unit temperature

U0.16	Carrier frequency adjustment as per temperature	NO	0	0	☆
		YES	1		

The adjustment of carrier frequency refers to that the inverter automatically adjusts the carrier frequency according to the radiator temperature, so as to reduce the carrier frequency when the radiator temperature rises, and to restore the carrier frequency when the radiator temperature reduces.

U0.17	Acceleration time 1	0.01s to 36000s	-	☆
U0.18	Deceleration time 1	0.01s to 36000s	-	☆

Acceleration time refers to the required time when the inverter accelerates from zero frequency to U0.25.

Deceleration time refers to the required time when the inverter decelerates from U0.25 to zero frequency.

PI9000 provides four groups of ac/deceleration time, user can select by using the digital input terminal DI, as follows:

The first group: U0.17, U0.18;

The second group: U8.03, U8.04;

The third group: U8.05, U8.06;

The fourth group: U8.07, U8.08.

U0.19	Ac/Deceleration time unit	1 second	0	1	★
		0.1 second	1		
		0.01 second	2		

To meet the demand of the various on-site, PI9000 provides three kinds of time unit: 1 second, 0.1 second and 0.01 second respectively.

Note: when modifying the function parameters, the number of decimal places that the

four groups of ac/deceleration time displayed will change displayed, the ac/deceleration time will change accordingly.

U0.21	Frequency source offset frequency when superimposing	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆

The function code is only valid when the arithmetic result of master and auxiliary is selected as frequency source.

When the arithmetic result of master and auxiliary is selected as frequency source, U0.21 is used as offset frequency, and it overlays with the arithmetic result of master and auxiliary as the set value of final frequency so that the frequency setting can be more flexible.

U0.22	Frequency command resolution	0.1Hz	1	2	★
		0.01Hz	2		

This parameter is used to determine the resolution of all related frequency parameters.

When the frequency resolution is 0.1Hz, PI9000 maximum output frequency can reach 3200Hz, when the frequency resolution is 0.01Hz , PI9000 maximum output frequency is 320.00Hz.

Note: when modifying the function parameters, the number of decimal places of all related frequency parameters will change displayed, the frequency value will change accordingly.

U0.23	Shutdown memory selection for digital set frequency	W/O memory	0	0	☆
		W/ memory	1		

This feature is only frequency source for the digital set.

"W/O memory" refers to that the digital set frequency value will recovered to U0.08 (preset frequency) value when the inverter stops, and the frequency correction by the ▲/▼ key on the keyboard or terminals UP, DOWN is cleared.

"W/ memory" refers to that the digital set frequency is reserved when the inverter stops, and the frequency correction by the ▲/▼ key on the keyboard or terminals UP, DOWN remains valid.

U0.25	Ac/deceleration time reference frequency	Maximum frequency(U0.10)	0	0	★
		Set frequency	1		
		100Hz	2		

Ac/deceleration time refers to the required time from zero frequency to U0.25 or from U0.25 to zero frequency.

When U0.25 selects 1, the ac/deceleration time depends on the set frequency, if the set frequency change frequently, and the acceleration of the motor is varied, please use with caution.

U0.26	Frequency command UP / DOWN reference when running	Running frequency	0	0	★
		Set frequency	1		

This parameter is valid only when the frequency source is the digital set value.

when determining the keyboard ▲ ▼ keys or terminal UP/DOWN action, the method to correct the set frequency that is, the target frequency decreases or increases on the basis of the operating frequency or the set frequency.

The obvious difference between two settings appears when the inverter is in the process of ac/deceleration, that is, if the inverter operating frequency is not same as the set frequency, the different choices of the parameters has very different effect.

U0.27	Binding frequency source for command source	Units digit	Keyboard command binding frequency source selection	000	☆
		Not binded		0	
		Keyboard set frequency		1	
		AI1		2	
		AI2		3	
		Panel potentiometer		4	
		High-speed pulse setting		5	
		Multi-speed		6	
		Simple PLC		7	
		PID		8	
		Communications reference		9	
		Tens digit	Terminal block command binding frequency source selection (0 to 9, same as units digit)		
		Hundreds digit	Communication command binding frequency source selection (0 to 9, same as units digit)		

Define the combination of 3 operation command channels and 9 frequency reference channels for easily synchronously switching.

The principle for above frequency source reference channel is same as frequency source master setting selection U0.03, please see the description of U0.03 function code. The different running command channel can be bundled with the same frequency reference channel. When command source has the available frequency source for bundling, in the valid period of command source , the set frequency source by U0.03 to U0.07 is no longer valid.

5-2-3.Motor parameters: U1.00-U1.37

Code	Parameter name	Setting range		Factory setting	Change Limit
U1.00	Motor type selection	General asynchronous motor	0	0	★
		Asynchronous inverter motor	1		
		Permanent magnet synchronous motor	2		
U1.01	Rated power	0.1kW to 1000.0kW		-	★
U1.02	Rated voltage	1V to 2000V		-	★
U1.03	Rated current	0.01A to 655.35A (inverter power ≦ 55kW) 0.1A to 6553.5A (inverter rate> 55kW)		-	★
U1.04	Rated frequency	0.01Hz to U0.10 (maximum frequency)		-	★
U1.05	Rated speed	1rpm to 36000rpm		-	★

Above U1.01 to U1.05 are the motor nameplate parameters, which affects the accuracy of the measured parameters. Please set up according to the motor nameplate parameters. The excellent vector control performance needs the accurate motor parameters. The accurate identification of parameters is derived from the correct setting of rated motor parameters.

In order to guarantee the control performance, please configure your motor according to the inverter standards, the motor rated current is limited to between 30% to 100% of the inverter rated current. The motor rated current can be set, but can not exceed the inverter rated current. This parameter can be used to determine the inverter's overload protection capacity and energy efficiency for the motor.

It is used for the prevention of overheating caused by the self-cooled motor at low speed , or to correct for protecting the motor when the little change of the motor characteristics may affect the changes of the motor capacity.

U1.06	Asynchronous motor stator resistance	0.001Ω to 65.535Ω (inverter power <= 55kW) 0.0001Ω to 6.5535Ω (inverter power> 55kW)	-	★
U1.07	Asynchronous motor rotor resistance	0.001Ω to 65.535Ω (inverter power <= 55kW) 0.0001Ω to 6.5535Ω (inverter power> 55kW)	-	★
U1.08	Asynchronous motor leakage inductance	0.01mH to 655.35mH (inverter power <= 55kW) 0.001mH to 65.535mH (inverter power> 55kW)	-	★
U1.09	Asynchronous motor mutual inductance	0.01mH to 655.35mH (inverter power <= 55kW) 0.001mH to 65.535mH (inverter power> 55kW)	-	★
U1.10	Asynchronous motor no-	0.01A to U1.03 (inverter	-	★

	load current	power <= 55kW) 0.1A to U1.03 (inverter power> 55kW)		
U1.06 to U1.10 are the asynchronous motor parameters, and generally these parameters will not appear on the motor nameplate and can be obtained by the inverter auto tunning. Among which, only three parameters of U1.06 to U1.08 can be obtained by Asynchronous Motor Parameters Still Auto Tunning; however, not only all five parameters but also encoder phase sequence and current loop PI parameters can be obtained by Asynchronous Motor Parameters Comprehensive Auto Tunning When modifying the motor's rated power (U1.01) or rated voltage (U1.02), the inverter will automatically calculate and modify the parameter values of U1.06 to U1.10 , and restore these 5 parameters to the motor parameters of commonly used standard Y Series. If the asynchronous motor parameters auto tunning can not be achieved on-site, you can enter the corresponding above parameters according to the parameters provided by the manufacturer.				
U1.16	Synchronous motor stator resistance	0.001Ω to 65.535Ω (inverter power <= 55kW) 0.0001Ω to 6.5535Ω (inverter power> 55kW)	-	★
U1.17	Synchronous D-axis inductance	0.01mH to 655.35mH (inverter power <= 55kW) 0.001mH to 65.535mH (inverter power> 55kW)	-	★
U1.18	Synchronous Q-axis inductance	0.01mH to 655.35mH (inverter power <= 55kW) 0.001mH to 65.535mH (inverter power> 55kW)	-	★
U1.20	Synchronous motor back-EMF	0.1V to 6553.5V	-	★
U1.28	Encoder type	ABZ incremental encoder: 0 UVW incremental encoder: 1 Rotational transformer: 2 Sine and cosine encoder: 3 Wire-saving UVW encoder: 4	0	★
PI9000 supports multiple encoder types, the different encoders need different PG card, please correctly choose PG card. Synchronous motor can choose any of the 5 kinds of encoder, asynchronous motors generally only choose ABZ incremental encoder and rotational transformer. PG card is installed, it is necessary to correctly set U1.28 according to the actual situation, otherwise the inverter may not play correctly.				

U1.30	ABZ incremental encoder AB phase sequence	Forward: 0 Backward: 1		0	★
The function code is only valid to ABZ incremental encoder, that is valid only when U1.28 = 0. It is used to set the AB signal phase sequence of ABZ incremental encoder. The function codes are valid for asynchronous motors and synchronous motors, when preforming asynchronous motor parameters comprehensive auto tunning or synchronous motor parameters comprehensive auto tunning, the AB phase sequence of ABZ incremental encoder can be obtained.					
U1.31	Encoder installation angle	0.00 to 359.90		0.00	★
The parameter is only valid to synchronous motors control, and it is valid to ABZ incremental encoder, UVW incremental encoder, rotational transformer, wire-saving UVW encoder, while invalid to sine and cosine encoders. The parameter can used for obtaining parameters when performing synchronous motor parameters still auto tunning and synchronous motor parameters comprehensive auto tunning, and it is very important to the operation of asynchronous motors, therefore after the asynchronous motor is first installed, the motor parameter auto tunning must be performed for functioning correctly.					
U1.32	UVW encoder UVW phase sequence	Forward: 0 Backward: 1		0	★
U1.33	UVW encoder offset angle	0.00 to 359.90		0.00	★
The two parameters are valid only for synchronous motor with UVW encoder. The two parameters can used for obtaining parameters when performing synchronous motor parameters still auto tunning and synchronous motor parameters comprehensive auto tunning, and the two parameters are very important to the operation of asynchronous motors, therefore after the asynchronous motor is first installed, the motor parameter auto tunning must be performed for functioning correctly.					
U1.34	Pole-pairs of rotary transformer	1 to 65535		1	★
The rotary transformer has pole-pairs, the correct pole-pairs parameters must be set when using the kind of encoder.					
U1.36	peed feedback PG disconnection detection time	0.0s: OFF 0.1s to 10.0s		0.0s	★
It is used to set encoder disconnection fault detection time, when it is set to 0.0s, the inverter does not detect the disconnection fault of encoder. When the inverter detects a disconnection fault, and the fault lasts for more than U1.36 set time, the inverter gives out Alarm Err.20. message.					
U1.37	Motor parameter auto tunning	No operation: 0 Asynchronous motor parameters still auto tunning: 1 Asynchronous motor parameters comprehensive: 2		0	★

		auto tunning			
		Synchronous motor parameters still auto tunning	11		
		Synchronous motor parameters comprehensive auto tunning	12		

If the motor is able to disengage the load, in order to obtain a better operating performance, you can choose comprehensive auto tunning; otherwise, you can only select parameters still auto tunning. Firstly set the parameter according to load condition, and then press RUN key, the inverter will perform parameters auto tunning. Parameters auto tunning can be performed only under keyboard operation mode, is not suitable for terminal operation mode and communication operation mode.

0: no operation, which prohibits parameters auto tunning.

1: asynchronous motor parameters still auto tunning

Motor type and motor nameplate parameters U1.00 to U1.05 must be set correctly before performing asynchronous motor parameters still auto tunning. The inverter can obtain U1.06 to U1.08 three parameters before performing asynchronous motor parameters still auto tunning.

2: asynchronous motor parameters comprehensive auto tunning

During asynchronous motor parameters comprehensive auto tunning, the inverter firstly performs parameters still auto tunning, and then accelerates up to 80% of the rated motor frequency according to the acceleration time U0.17, after a period of time, and then decelerates till stop according to the deceleration time U0.18 to end auto tunning.

Before preforming asynchronous motor parameters comprehensive auto tunning, not only motor type and motor nameplate parameters U1.00 to U1.05 must be set properly, but also encoder type and encoder pulses U1.27, U1.28.

For asynchronous motor parameters comprehensive auto tunning, the inverter can obtain U1.06 to U1.10 five motor parameters, as well as the AB phase sequence U1.30 of encoder, vector control current loop PI parameters U2.13 to U2.16.

11: synchronous motor parameters still auto tunning

Motor type and motor nameplate parameters U1.00 to U1.05 must be set correctly before performing synchronous motor parameters still auto tunning For synchronous motor parameters still auto tunning, the inverter can obtain the initial position angle, and this is the necessary condition of normal operation of synchronous motor, therefore synchronous motor must perform parameters auto tunning for the first installation and before the initial use.

12: synchronous motor parameters comprehensive auto tunning

During synchronous motor parameters comprehensive auto tunning, the inverter firstly performs parameters still auto tunning, and then accelerates up to U0.08 according to the acceleration time U0.17, after a period of time, and then decelerates till stop according to the deceleration time U0.18 to end auto tunning. Please note that U0.08 must be set to a non-zero value when performing identification operation.

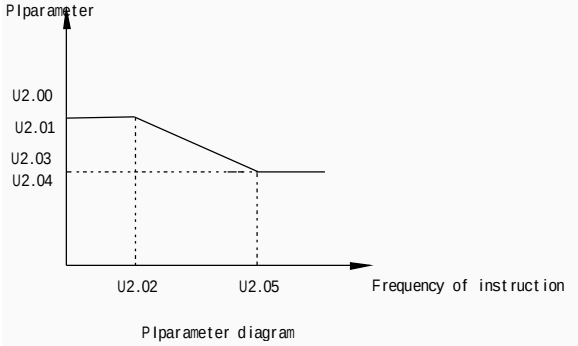
Before preforming synchronous motor parameters comprehensive auto tunning, not only motor type and motor nameplate parameters U1.00 to U1.05 must be set properly, but also encoder pulses U1.27, encoder type U1.28, encoder pole-pairs U1.34 and U1.35.

For synchronous motor parameters comprehensive auto tunning, the inverter can obtain not only U1.16 to U1.20 motor parameters, as well as encoder information U1.30 U1.31 U1.32, U1.33, vector control current loop PI parameters U2.13 to U2.16.

5-2-4.Vector control parameters: U2.00-U2.22

U2 function code is only valid to vector control, invalid to V/F control

Code	Parameter name	Setting range	Factory setting	Change Limit
U2.00	Speed loop low low P	1～100	30	☆
U2.01	Speed loop low integral time	0.01s～10.00s	0.50s	☆
U2.02	Speed loop low switching frequency	0.00～U2.05	5.00Hz	☆
U2.03	Speed loop high P	1～100	20	☆
U2.04	Speed loop high integral time	0.01s～10.00s	1.00s	☆
U2.05	Speed loop high switching frequency	U2.02～U0.10(max frequency)	10.00Hz	☆



PIparameter diagram

Converter operating in different frequency, can choose different speed ring PI parameters. Operating frequency is less than the speed ring low switching frequency (U2.02), speed ring PI control parameters for U2.00 and U2.01. Operating frequency is greater than the speed loop, high speed switching frequency (U2.05), speed in PI control parameters for U2.03 and U2.04. Speed ring low switching frequency and speed ring high speed switching frequency speed loop between the PI parameters, for the two groups of PI parameter linear switching, as shown in figure:

Through the set speed regulator proportion coefficient and the integral time, can adjust the speed of the vector control dynamic response characteristics.

Gain take large, quick response, but will produce oscillation; Gain take hours, response lag.

Integral time is too large, slow response, external interference control variation; Integral time hours, reaction speed, small happen oscillation.

Set this value to considering the control stability and response speed, if the factory parameters can't meet the requirements in the factory value based on parameter adjustment, first increase proportion gain to ensure that the system is not oscillation; Then reduced integration time, make the system has faster response, small overshoot and.

Note: if the PI parameters Settings, may lead to excessive speed overshoot. Even in overshoot back occurs when overvoltage fault.

U2.06	Vector control differential gain	50% to 200%	100%	☆

For the sensorless vector control, the parameter can be used to adjust the motor speed and stability: if the speed of motor with load is low, increases the parameter and vice versa decreases.

U2.07	Speed loop filter time constant	0.000s to 0.100s	0.000s	☆

Under vector control mode, properly increases the filter time when speed fluctuate wildly; but do not excessively increases, or the lag effect will cause shock.

U2.08	Vector control overexcitation gain	0 to 200	64	☆

In the process of the inverter's deceleration, the over-excitation control can suppress the rise of bus voltage to avoid overvoltage fault. The greater overexcitation gain, the stronger the inhibitory effect.

For the occasions that the inverter's deceleration easily cause over pressure alarm , the overexcitation gain needs to be improved. But if overexcitation gain is too large, which easily lead to the increase of output current, you need to weigh in practical applications.

For the small inertia occasions that the inverter's deceleration will not cause voltage rise, it is recommended to set overexcitation gain as 0; the set value is also suitable for the occasions with braking resistor.

U2.09	Torque limit source under speed control mode	Function code U2.10 setting	0	0	☆
		AI1	1		
		AI2	2		
		Panel potentiometer setting	3		
		High-speed pulse setting	4		
		Communication setting	5		
		Min(AI1, AI2)	6		
		Max(AI1, AI2)	7		
U2.10	Upper limit digital setting for lower torque under speed control mode	0.0% to 200.0%		150.0%	☆

In speed control mode, the maximum value of inverter output torque is controlled by the torque upper limit source.

U2.09 is used to select the setting source of torque upper limit, when it is set by analog, high-speed pulse or communication, the set 100% corresponds to U2.10, the 100% of U2.10 is the inverter's rated torque.

U2.13	Excitation regulator proportional gain	0 to 60000	2000	☆
U2.14	Excitation regulator integral gain	0 to 60000	1300	☆
U2.15	Torque regulator proportional gain	0 to 60000	2000	☆
U2.16	Torque regulator integral gain	0 to 60000	1300	☆

The regulator parameters of vector control current loop PI, the parameter will be obtained automatically after performing asynchronous motor parameters comprehensive auto tunning or synchronous motor parameters comprehensive auto tunning and generally do not need to modify it.

It is reminded that the dimension that this current loop integral gain adopted is not the integration time, but the direct set integral gain. Therefore, if the setting of current loop PI gain is too large, which may cause the oscillation of entire control loop, in the event of oscillation, you can manually reduce PI proportional gain and integral gain.

5-2-5.V/F control parameters: U3.00-U3.11

This group of function code is only valid to V/F control, invalid to vector control.

V/F control is suitable for fans, pumps and other universal loads, or one inverter with multiple motors, or for the applications that inverter power is significantly different from the motor power.

Code	Parameter name	Setting range		Factory setting	Change Limit
U3.00	V/F curve setting	Linear V/F	0	0	★
		Multi-point V/F	1		
		Square V/F	2		
		1.2th power V/F	3		
		1.4th power V/F	4		
		1.6th power V/F	6		
		1.8th power V/F	8		

0: linear V/F

Suitable for ordinary constant torque load.

1: multi-point V/F

Suitable for dehydrator, centrifuge and other special loads Any VF relationship curves

can be obtained by setting parameters U3.03 to U3.08.

2: square V/F

Suitable for fans, pumps and centrifugal loads.

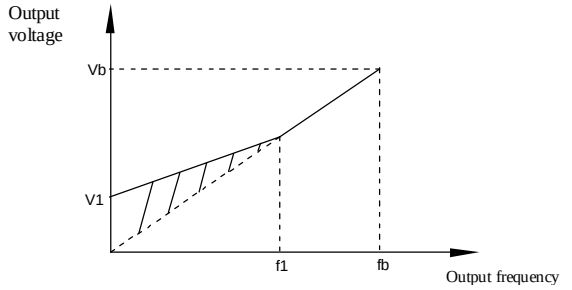
3 to 8: VF relationship curve between linear VF and square VF.

U3.01	Torque boost	0.0%: automatic torque boost 0.1% to 30.0%	10	★
U3.02	Torque boost cut-off frequency	0.00Hz to U0.10 (maximum frequency)	15.00Hz	★

Torque boost is mainly used to improve the characteristics of the torque low-frequency under V/F control mode. If the torque boost is too low, the motor will work at the lower speed and power. If the torque boost is too high, the motor will run with overexcitation, the inverter's output current increases and the efficiency is reduced.

It is recommended to increase this parameter when the motor works with heavy load but without enough torque. The torque boost can be reduced when the load is lighter. When the torque boost is set to 0.0, the inverter will automatically perform torque boost, the inverter can automatically calculates the required torque boost value according to the motor stator resistance parameters.

Torque boost cutoff frequency: torque boost is valid below this frequency, invalid above the set frequency.



V1: Manual torque boost voltage Vb: Maximum output voltage
f1: Manual torque boost cut-off frequency fb: Rated operating frequency

Schematic diagram of manual torque boost voltage

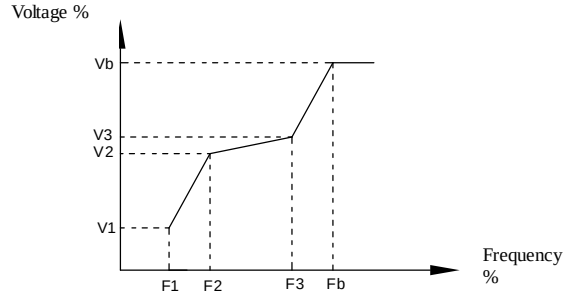
U3.03	Multi-point VF frequency point F1	0.00Hz to U3.05	0.00Hz	★
U3.04	Multi-point VF voltage point V1	0.0% to 100.0%	0.0%	★
U3.05	Multi-point VF frequency point F2	U3.03 to U3.07	0.00Hz	★
U3.06	Multi-point VF voltage point V2	0.0% to 100.0%	0.0%	★

U3.07	Multi-point VF frequency point F3	U3.05 to rated motor frequency(U1.04)	0.00Hz	★
U3.08	Multi-point VF voltage point V3	0.0% to 100.0%	0.0%	★

U3.03 to U3.08 six parameters are used to define multi-point V/F curve.

The multi-point V/F curve is set according to the load characteristics of motor, please be noted that the relationship between three voltage points and three frequency points must be meet: V1 <V2 <V3, F1 <F2 <F3. The setting of multi-point VF curve is as shown in below figure.

In the sate of low frequency, if the voltage is set to a higher value, which may cause motor overheating even burned, the inverter may appear overcurrent stall or overcurrent protection.



V1-V3: Voltage percentage of stage 1-3 to multi-speed V/F F1-F3: Frequency percentage of stage 1-3 to multi-speed V/F
Vb: Rated motor voltage Fb: Rated motor operating frequency

Schematic diagram of multi-point V/F curve setting

U3.09	VF slip compensation gain	0% to 200.0%	0.0%	☆

This parameter is valid only for asynchronous motors.

VF slip compensation can compensate for the speed deviation of asynchronous motor when the load increases, so as to keep stable speed when the load changes.

If VF slip compensation gain is set to 100.0%, it means that the compensated deviation is equal to the rated motor slip under the rated motor load mode, while the rated motor slip can be calculated through U1 group of motor rated frequency and rated speed.

When adjusting VF slip compensation gain, generally it is based on the principle that the motor speed is same as the target speed. When the motor speed is different from target value, it is necessary to appropriately fine-tune the gain.

U3.10	VF overexcitation gain	0 to 200	64	☆

In the process of the inverter's deceleration, the over-excitation control can suppress the rise of bus voltage to avoid overvoltage fault. The greater overexcitation gain, the stronger the inhibitory effect.

For the occasions that the inverter's deceleration easily cause over pressure alarm , the overexcitation gain needs to be improved. But if overexcitation gain is too large, which easily

lead to the increase of output current, you need to weigh in practical applications.

For the small inertia occasions that the inverter's deceleration will not cause voltage rise, it is recommended to set overexcitation gain as 0; the set value is also suitable for the occasions with braking resistor.

U3.11	VF oscillation suppression gain	0 to 100	-	☆

The method of selecting gain is take the value as smaller as possible with the premise that effectively suppressing oscillation, in order to avoid the adverse affect caused by VF running. Please select 0 as the gain when the motor has not oscillation phenomenon. Only increase gain value when the motor has obvious oscillation, the greater gain, the more obvious the suppression of oscillation.

When using the function of oscillation suppression, which requires that the motor's rated current and no-load current parameters must be accurate, otherwise VF oscillation suppression is ineffective.

5-2-6.Input terminals: U4.00-U4.39

PI9000 series inverter of below 11KW is equipped with 6 multi-function digital input terminals, the inverter of above 11KW is equipped with 8 multi-function digital input terminal (of which DI5 can be used as a high-speed pulse input terminal), and 2 analog input terminals.

Code	Parameter name	Setting range	Factory setting	Change Limit
U4.00	DI1 terminal function selection	0 to 59	1	★
U4.01	DI2 terminal function selection	0 to 59	2	
U4.02	DI3 terminal function selection	0 to 59	8	
U4.03	DI4 terminal function selection	0 to 59	9	
U4.04	DI5 terminal function selection	0 to 59	12	
U4.05	DI6 terminal function selection	0 to 59	13	
U4.06	DI7 terminal function selection	0 to 59		
U4.07	DI8 terminal function selection	0 to 59		
U4.08	Undefined			
U4.09	Undefined			

These parameters are used to set the digital multi-function input terminal, the optional functions are shown in the following table:

Set value	Function	Description
0	No function	The terminal for not use can be set to "no function" to prevent accidental operation.
1	Forward run (FWD)	External terminals are used to control the FWD/REV run mode of inverter.
2	Reverse run (REV)	
3	Three-wire operation control	This terminal is used to determine the inverter's three-wire control mode. For details, please refer to the instructions of function code U4.11 ("terminal command mode).
4	Forward JOG(FJOG)	FJOG means Forward JOG running, RJOG means Reverse JOG running. For Jog running frequency and Jog Ac/deceleration time, please refer to the description of the function code U8.00, U8.01, U8.02.
5	Reverse JOG(RJOG)	
6	Terminal UP	Modify frequency increment/decrement command when the frequency is referenced by external terminal. Adjust up/down the set frequency when the digital setting is selected as the frequency source.
7	Terminal DOWN	
8	Free stop	The inverter output is blocked, at the time, the parking process of motor is not controlled by the inverter. This way is same as the principle of free stop described in U6.10.
9	Fault reset (RESET)	The function make use of terminal for fault reset. It has same function with RESET key on the keyboard. This function can be used to realize remote fault reset.
10	Run pausing	The inverter slows down and stops, but all operating parameters are memorized. Such as PLC parameters, wobbulate frequency parameters, and PID parameters. This terminal signal disappears, the inverter reverts to the previous state of running before parking.
11	External fault normally open input	When the signal is sent to the inverter, the inverter reports fault Err.15, and performs troubleshooting according to fault protection action (for details, please refer to the function code U9.47).

12	Multi-speed terminal 1	The setting of 16 stage speed or 16 kinds of other command can be achieved through the 16 states of the four terminals. For details, see Table 1
13	Multi-speed terminal 2	
14	Multi-speed terminal 3	
15	Multi-speed terminal 4	
16	Ac/deceleration time selection terminal 1	The selection of 4 ac/deceleration times can be achieved through the 4 states of the two terminals. For details, see Table 2
17	Ac/deceleration time selection terminal 2	
18	Frequency source switching	Used to switch between different frequency sources. According to frequency source selection function code (U0.07) settings, the terminal is used to switch between two frequency sources.
19	UP/DN setting (terminal, keyboard)	When the frequency reference is the digital frequency, this terminal is used to clear the changed frequency value by terminal UP/DOWN or keyboard UP/DOWN, so that the reference frequency can recover to the set value of U0.08.
20	Run command switch terminal	When the command source is set to the terminal control (U0.02 = 1), the terminal can be used to switch between terminal control and keyboard control. When the command source is set to the communication control (U0.02 = 2), the terminal can be used to switch between communication control and keyboard control.
21	Ac/deceleration prohibited	Ensure the inverter is free from external signals affect (except for shutdown command), maintain current output frequency.
22	PID pause	PID is temporarily disabled, the inverter maintains current output frequency, no longer performs PID adjustment of frequency source.
23	PLC status reset	When PLC pauses and runs again, this terminal is used to reset the inverter to the initial state of simple PLC.
24	Wobbulate pause	When the inverter outputs at center frequency. Wobbulate will pause
25	Counter input	Input terminal of the count pulse
26	Counter reset	Clear counter status

27	Length count input	Input terminal of the length count.
28	Length reset	Clear length
29	Torque control prohibited	When the inverter torque control is prohibited, the inverter will enter speed control mode.
30	High-speed pulse input (only valid for DI5)	DI5 is used as pulse input terminal.
31	Reserve	Reserve
32	Immediately DC braking	If the terminal is active, the inverter switches directly to DC braking status
33	External fault normally closed input	When the signal of external fault normally closed input is inputted into the inverter, the inverter will report fault Err.15 and shutdown.
34	Frequency change enable	If the function is set to be valid, when the frequency changes, the inverter does not respond to frequency changes until the terminal state is invalid.
35	PID action direction as reverse	If the terminal is valid, PID action direction opposites to the direction set by UA.03
36	External parking terminal 1	Under keyboard control mode, the terminal can be used to stop the inverter, same as STOP key on the keyboard.
37	Control command switch terminal 2	Used to switch between terminal control and communication control. If the command source is selected as terminal control, the system will be switched to the communication control mode when the terminal is active; vice versa.
38	PID integral pause	When the terminal is active, the PID integral adjustment function is paused, but the proportion and differential adjustments of PID are still valid.
39	Switch between frequency source master setting and preset frequency	When the terminal is active, the frequency source A is replaced with the preset frequency (U0.08)
40	Switch between frequency source auxiliary setting and preset frequency	When the terminal is active, the frequency source B is replaced with the preset frequency (U0.08)
41	Reserve	
42	Reserve	

43	PID parameter switching	When DI terminal (UA.18 = 1) is used to switch PID parameters, if the terminal is invalid, PID parameters use UA.05 to UA.07; if the terminal is valid, PID parameters use UA.15 to UA.17
44	Custom fault 1	When custom fault 1 and custom fault 2 are active, the inverter respectively alarm fault Err.27 and fault Err.28, and deals with them according to the mode selected by the fault protection action U9.49.
45	Custom fault 2	
46	Speed control / torque control switching	Switch between speed control mode and torque control mode under vector control mode. If the terminal is invalid, the inverter will run at the mode defined by E0.00 (speed/torque control mode); if the terminal is valid, the inverter will be switched to another mode.
47	Emergency parking	If the terminal is valid, the inverter will park at the fastest speed, and the current maintains at the set upper limit during the parking process. This function is used to meet the requirements that the inverter needs to stop as soon as possible when the system is in a emergency state.
48	External parking terminal 2	In any control mode (keyboard control, terminal control, communication control), the terminal can be used to decelerate the inverter until stop, at the time the deceleration time is fixed for deceleration time 4.
49	Deceleration DC braking	If the terminal is valid, firstly the inverter decelerates to the initial frequency of stop DC braking, and then switches directly to DC braking status.
50	Clear current running time	If the terminal is valid, the inverter's current running time is cleared, the function needs to work with Timing run (U8.42) and Current running time arrival(U8.53).
51-59	Reserve	

Table 1 Function description of multi-stage command

The 4 multi-stage command terminals can be combined as 16 status, these 16 status have 16 command set values. As shown in Table 1:

K4	K3	K2	K1	Command setting	Parameters
OFF	OFF	OFF	OFF	0-stage speed setting 0X	UC.00
OFF	OFF	OFF	ON	1-stage speed setting 1X	UC.01
OFF	OFF	ON	OFF	2-stage speed setting 2X	UC.02
OFF	OFF	ON	ON	3-stage speed setting 3X	UC.03
OFF	ON	OFF	OFF	4-stage speed setting 4X	UC.04
OFF	ON	OFF	ON	5-stage speed setting 5X	UC.05
OFF	ON	ON	OFF	6-stage speed setting 6X	UC.06
OFF	ON	ON	ON	7-stage speed setting 7X	UC.07
ON	OFF	OFF	OFF	8-stage speed setting 8X	UC.08
ON	OFF	OFF	ON	9-stage speed setting 9X	UC.09
ON	OFF	ON	OFF	10-stage speed setting 10X	UC.10
ON	OFF	ON	ON	11-stage speed setting 11X	UC.11
ON	ON	OFF	OFF	12-stage speed setting 12X	UC.12
ON	ON	OFF	ON	13-stage speed setting 13X	UC.13
ON	ON	ON	OFF	14-stage speed setting 14X	UC.14
ON	ON	ON	ON	15-stage speed setting 15X	UC.15

When multi-speed is selected as frequency source, the 100.0% of function code UC.00 to UC.15 corresponds to maximum frequency U0.10. Multi-stage command is used for the function of multi-speed, also for PID reference source to meet the need to switch between different reference values.

Table 2 - function description of ac/deceleration time selection terminal

Terminal 2	Terminal 1	Ac/deceleration time selection	Parameters

	OFF	OFF	1 Acceleration time	U0.17, U0.18	
	OFF	ON	2 Acceleration time	U8.03, U8.04	
	ON	OFF	3 Acceleration time	U8.05, U8.06	
	ON	ON	4 Acceleration time	U8.07, U8.08	
U4.10	DI filter time	0.000s to 1.000s		0.010s	☆

Set software filter time for DI terminals status. For the application that input terminals are vulnerable to interference and cause the accidental operation, you can increase this parameter so as to enhance the anti-interference ability. However, the increase of filter time will cause DI terminal slow response.

U4.11	Terminal command mode	Two-wire type 1	0	0	★
		Two-wire type 2	1		
		Three-wire type 1	2		
		Three-wire type 2	3		

This parameter defines four different modes to control inverter operation through external terminals.

0: Two-wire type 1

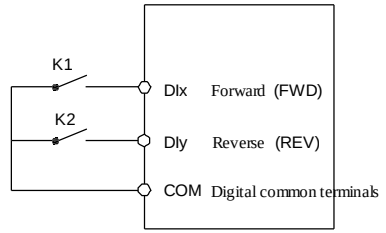
This mode is the most commonly used two-wire mode. The forward/reverse operation of motor is determined by terminal DIx, DIy.

The terminal function is set as follows:

Terminals	Set value	Description
DIx	1	Forward run (FWD)
DIy	2	Reverse run (REV)

Of which, DIx and DIy are the multi-function input terminals of DI1 to DI10, the level is active.

K1	K2	Command
0	0	Stop
0	1	REV
1	0	FWD
1	1	Stop



Two-wire mode 1

1: Two-wire type 2

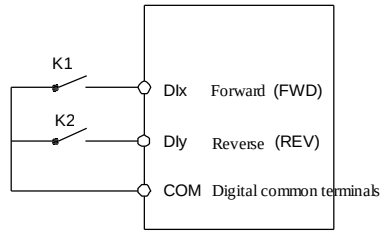
In the mode, DIx terminal is used as running enabled, while DIy terminal is used to determine running direction.

The terminal function is set as follows:

Terminals	Set value	Description
DIx	1	Forward run (FWD)
DIy	2	Reverse run (REV)

Of which, DIx and DIy are the multi-function input terminals of DI1 to DI10, the level is active.

K1	K2	Command
0	1	Stop
0	1	Stop
1	0	FWD
1	1	REV



Two-wire mode 1

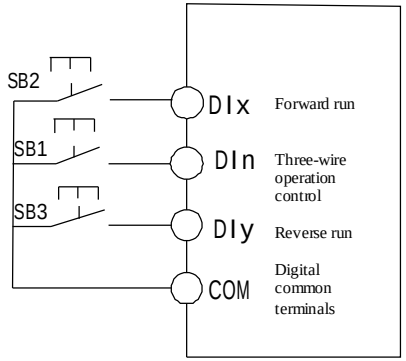
2: Three-wire control mode 1

In the mode, DIn is used as enabled terminal, while DIx, DIy terminal are used to control direction. The terminal function is set as follows:

Terminals	Set value	Description
DIx	1	Forward run (FWD)
DIy	2	Reverse run (REV)
DIn	3	Three-wire operation control

To run, firstly close DIn terminal, the forward or reverse of motor is controlled by the ascendant edge of DIx or DIy pulse

To stop, you must disconnect DIn terminal signals Of which, DIx, DIy and DIn are the multi-function input terminals of DI1 to DI10, DIx and DIy are for active pulse, DIn is for active level.



Three-wire control mode 1

Of which:

SB1: Stop button SB2: Forward button SB3: Reverse button

3: Three-wire control mode 2

In the mode, DIn is the enabled terminal, the running commands are given by DIx, the direction is determined by the state of DIy.

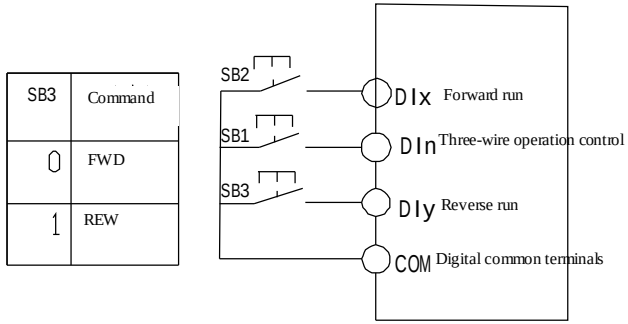
The terminal function is set as follows:

Terminals	Set value	Description
DIx	1	Forward run (FWD)
DIy	2	Reverse run (REV)
DIn	3	Three-wire operation control

To run, firstly close DIn terminal, the motor run signal is generated by the ascendant edge of DIx, the motor direction signal is generated by DIy status

To stop, you must disconnect DIn terminal signals Of which, DIx, DIy and DIn are the multi-function input terminals of DI1 to DI10, DIx is for active pulse, DIy and DIn are for

active level.



Three-wire control mode 1

Of which:

SB1: Stop button SB2: Run button

U4.12	Terminal UP / DOWN change rate	0.01Hz/s to 65.535Hz/s	1.00Hz/s	☆

Used to set terminal UP/DOWN adjustment frequency, the rate of frequency change, i.e. frequency change amount per second.

When U0.22 (frequency decimal point) is 2, the value range is 0.001Hz/s to 65.535Hz/s.

When U0.22 (frequency decimal point) is 1, the value range is 0.01Hz/s to 655.35Hz/s.

U4.13	Minimum input value for AI curve 1	0.00V to U4.15	0.00V	☆
U4.14	Minimum input setting for AI curve 1	-100.00% to 100.0%	0.0%	☆
U4.15	Maximum input for AI curve 1	U4.13 to 10.00V	10.00V	☆
U4.16	Maximum input setting for AI curve 1	-100.00% to 100.0%	100.0%	☆
U4.17	AI1 filter time	0.00s to 10.00s	0.10s	☆

The above function codes are used to set the relationship between analog input voltage and its representatives set value.

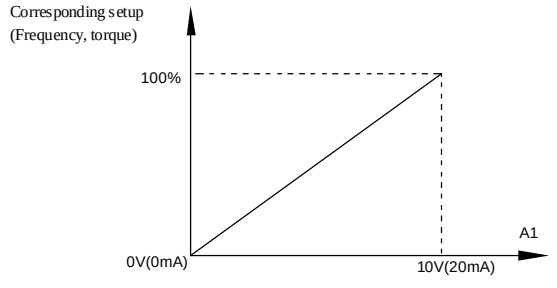
When the analog input voltage is more than the set Maximum Input (U4.15), the analog voltage takes the Maximum Input as the calculated value, Similarly, when the analog input voltage is less than the set Minimum Input (U4.13), according to the Setting Selection For AI Less Than Minimum Input (U4.34), the analog voltage takes Minimal Input or 0.0% as the calculated value.

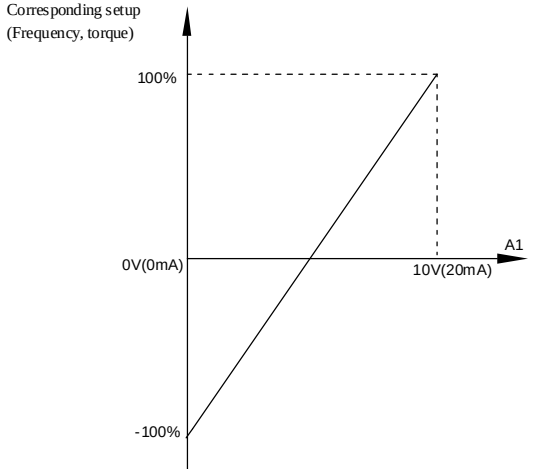
When the analog input is the current input, 1mA current is equivalent to 0.5V voltage.

AI1 input filter time is used to set AI1 software filter time, When the on-site analog quantity is easily interfered, please increase the filter time to stabilize the detected analog quantity, but the greater filter time, the slower analog detection response, the proper setting method depends on the actual application.

In the different applications, the 100.0% of analog setting vary from the meaning of its corresponding nominal value, please refer to the description of each application for details.

The two legends are for two typical settings.





Relationship between analog reference and set amount

U4.18	Minimum input value for AI curve 2	0.00V to U4.20	0.00V	☆
U4.19	Minimum input setting for AI curve 2	-100.00% to 100.0%	0.0%	☆
U4.20	Maximum input for AI curve 2	U4.18 to 10.00V	10.00V	☆
U4.21	Maximum input setting for AI curve 2	-100.00% to 100.0%	100.0%	☆

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U4.22	AI2 filter time	0.00s to 10.00s	0.10s	☆
For the function and use of curve 2, please refer to the description of curve 1.				
U4.23	Minimum input value for AI curve 3	0.00s to U4.25	0.00V	☆
U4.24	Minimum input setting for AI curve 3	-100.00% to 100.0%	0.0%	☆
U4.25	Maximum input for AI curve 3	U4.23 to 10.00V	10.00V	☆
U4.26	Maximum input setting for AI curve 3	-100.00% to 100.0%	100.0%	☆
U4.27	Filtering time of panel potentiometer	0.00s to 10.00s	0.10s	☆
For the function and use of curve 3, please refer to the description of curve 1.				
U4.28	Minimum pulse input frequency	0.00kHz to U4.30	0.00kHz	☆
U4.29	Minimum pulse input frequency setting	-100.00% to 100.0%	0.0%	☆
U4.30	Maximum pulse input frequency	U4.28 to 100.00kHz	50.00kHz	☆
U4.31	Maximum pulse input frequency setting	-100.00% to 100.0%	100.0%	☆
U4.32	Filter time of pulse input	0.00s to 10.00s	0.10s	☆

This group function code is used to set the relationship between DI5 pulse frequency and its corresponding setting.

Pulse frequency can be inputted into the inverter only through DI5 channel. The application on this group of functions is similar to curve 1, please refer to the description of curve 1.

U4.33	AI curve selection	Units digit	AI1 curve selection	321	☆
		Curve 1 (2 points, see U4.13 to U4.16)	1		
		Curve 2 (2 points, see U4.18 to U4.21)	2		
		Curve 3 (2 points, see U4.23 to U4.26)	3		

		Tens digit	AI2 curve selection (1 to 3, as above)		
		Hundreds digit	Panel potentiometer curve selection (1 to 3, as above)		
Units digit, tens digit and hundreds digit the function code are used to respectively select the corresponding set curves of analog input AI1, AI2, AI3. 3 analog input can respectively select any one of 3 curves. Curve 1, curve 2 and curve 3 are 2-point curve, they are set in U4 function code.					
U4.34	Setting selection for AI less than minimum input	Units digit	Setting selection for AI1 less than minimum input	000	☆
		The corresponding minimum input setting	0		
		0.0%	1		
		Tens digit	Setting selection for AI2 less than minimum input(0 to 1, ditto)		
		Hundreds digit	Setting selection for panel potentiometer less than minimum input(0 to 1, ditto)		
The function code is used to set analog quantity and its corresponding setting when the analog input voltage is less than the set Minimum Input. Units digit, tens digit and hundreds digit the function code respectively correspond to the analog input AI1, AI2, panel potentiometer. If 0 is selected, when the analog input is less than the Minimum Input, the setting corresponding to the analog amount is the setting of minimum input of the function code curve (U4.14, U4.19, U4.24). If 1 is selected, when the analog input is less than the minimum input, the setting corresponding to the analog amount is 0.0%.					
U4.35	DI1 delay time	0.0s to 3600.0s		0.0s	★

U4.36	DI2 delay time	0.0s to 3600.0s		0.0s	★
U4.37	DI3 delay time	0.0s to 3600.0s		0.0s	★
Used to set the inverter's delay time for the change of DI terminal status Currently only DI1, DI2, DI3 terminals can set the delay time function.					
U4.38	DI terminal valid mode selection 1	Units digit	DI1 terminal active status setting	0	★
		High level active	0		
		Low level active	1		
		Tens digit	DI2 terminal active status setting (0 to 1, as above)		
		Hundreds digit	DI3 terminal active status setting (0 to 1, as above)		
		Thousands digit	DI4 terminal active status setting (0 to 1, as above)		
		Ten thousands digit	DI5 terminal active status setting (0 to 1, as above)		
U4.39	DI terminal valid mode selection 2	Units digit	DI6 terminal active status setting	0	★
		High level active	0		
		Low level active	1		
		Tens digit	DI7 terminal active status setting (0 to 1, as above)		
		Hundreds digit	DI8 terminal active status setting (0 to 1, as above)		
		Thousands digit	DI9 terminal active status setting (0 to 1,		

			as above)		
		Ten thousands digit	DI10 terminal active status setting (0 to 1, as above)		
Used to set the digital input terminal active status mode. If high level is selected as active, it is active when the corresponding DI terminal and COM are connected, disconnected for inactive. If low level is selected as active, it is inactive when the corresponding DI terminal and COM are connected, disconnected for active.					

5-2-7.Output terminals: U5.00-U5.22

PI9000 series inverter is equipped with 2 multi-function digital output terminals and 2 analog output terminals (one of them can be selected as a high-speed pulse output terminal , the inverter of below 11KW is equipped with one multi-function relay output terminal, and the inverter of above 11KW is equipped with two multi-function relay output terminals.

Code	Parameter name	Setting range		Factory setting	Change Limit
U5.00	SPB terminal output mode selection	High-speed pulse output	0	0	☆
		Switching quantity output	1		
SPB terminal is a programmable complex terminals, it can be used as an output terminal of high-speed pulse, also an switching output terminal of collector open circuit. As a high-speed pulse output, the highest frequency of output pulse is 100kHz, please see the instructions of U5.06 for high-speed pulse output function.					
U5.01	Switching quantity output function selection (collector Open circuit output terminals)	0-40		0	☆
U5.02	Relay 1 output function selection (TA1.TB1.TC1)	0-40		2	☆
U5.03	Undefined	0-40		0	☆
U5.04	SPA output function selection (collector Open circuit output terminals)	0-40		1	☆
U5.05	Relay 2 output function selection (TA2.TB2.TC2)	0-40		4	☆

The above five function codes are used to select five digital output functions. Multifunction output terminal function is described as follows:

Set value	Function	Description
0	No output	No output action
1	Inverter in service	The inverter is in operation with output frequency (zero), and outputs ON signal.
2	Fault output (fault shutdown)	When the inverter occurs failure and stops, and outputs ON signal.
3	Frequency level detection FDT1 output	Please refer to the instructions of function code U8.19, U8.20
4	Frequency arrival	Please refer to the instructions of function code U8.21
5	Zero speed running (shutdown without output)	Outputs ON signal when the inverter is in operation with output frequency (zero) Outputs OFF signal when the inverter is in the sate of stop
6	Motor overload pre-alarm	Before motor overload protection action, it will output ON signal if it exceeds the pre-alarm threshold. Please refer to function code U9.00 to U9.02. for motor overload parameter setting.
7	Inverter overload pre-alarm	Outputs ON signal within 10s before inverter overload protection action
8	Set count value arrival	Outputs ON signal when the count value reaches the value set by Ub.08.
9	Specified count value arrival	Outputs ON signal when the count value reaches the value set by Ub.09. Please refer to the instructions of Ub group for counting function.
10	Length arrival	Outputs ON signal when the detected actual length exceeds the set length by Ub.05.
11	PLC cycle completed	Outputs a width of 250ms pulse signal when simple PLC completes a cycle
12	Cumulative running time arrival	Outputs ON signal when the inverter's cumulative running time exceeds the set time by U8.17.
13	Frequency being limited	Outputs ON signal when the rated frequency exceeds the upper limit frequency or the lower limit frequency, and the output frequency of inverter also reaches the upper limit frequency or the lower limit frequency.
14	Torque being limited	Outputs ON signal when the output torque reaches the torque limit value and the inverter is in the stall protection status under inverter speed control mode
15	Ready for operation	Outputs ON signal when the power supply of the inverter main circuit and control circuit has stabilized, and the inverter has not any fault

		information and is in the runnable status.
16	AI1> AI2	Outputs ON signal when the value of analog input AI1 is greater than the AI2 input value,
17	Upper limit frequency arrival	Outputs ON signal when the operating frequency reaches the upper limit frequency,
18	Lower limit frequency arrival (shutdown without output)	Outputs ON signal when the operating frequency reaches the lower limit frequency Outputs OFF signal when the inverter is in the state of stop
19	Undervoltage status output	Outputs ON signal when the inverter is in the undervoltage condition
20	Communication setting	Please refer to communication protocol.
21	Reserve	Reserve
22	Reserve	Reserve
23	Zero speed running 2 (shutdown with output)	Outputs ON signal when the inverter output frequency is 0. Outputs ON signal too when the inverter is in the state of stop
24	Accumulated power-on time arrival	Outputs ON signal when the inverter's accumulated power-on time(U7.11) exceeds the set time by U8.16.
25	Frequency level detection FDT2 output	Please refer to the instructions of function code U8.28, U8.29
26	Frequency 1 reaches output value	Please refer to the instructions of function code U8.30, U8.31
27	Frequency 2 reaches output value	Please refer to the instructions of function code U8.32, U8.33
28	Current 1 reaches output value	Please refer to the instructions of function code U8.38, U8.39
29	Current 2 reaches output value	Please refer to the instructions of function code U8.40, U8.41
30	Timer reaches output value	Outputs ON signal when timer(U8.42)is active and after the inverter's current running time reaches the set time.
31	AI1 input exceed limit	Outputs ON signal when the analog input AI1 value is greater than U8.46 (AI1 input protection upper limit) or less than U8.45 (AI1 input protection limit)
32	Load droping	Outputs ON signal when the inverter is in the load drop status.
33	Reverse running	Outputs ON signal when the inverter is in the reverse running status.
34	Zero current status	Please refer to the instructions of function code U8.34, U8.35
35	Module temperature arrival	Outputs ON signal when the inverter module radiator temperature(U7.05)reaches the set temperature(U8.47).

36	Software current overrun	Please refer to the instructions of function code U8.36, U8.37
37	Lower limit frequency arrival(stop with output)	Outputs ON signal when the operating frequency reaches the lower limit frequency Outputs ON signal too when the inverter is in the sate of stop
38	Alarm output	When the inverter occurs failure and continues to run, the inverter alarms output.
39	Motor overheat alarm	Outputs ON signal when the motor temperature reaches U9.58 (motor overheat pre-alarm threshold), (The motor's temperature can be viewed through d0.34)
40	Current running time arrival	Outputs ON signal when the inverter's current running time exceeds the set time by U8.53.

U5.06	High-speed pulse output function selection	0-16	0	☆
U5.07	DA1 output function selection	0-16	0	☆
U5.08	DA2 output function selection	0-16	1	☆

High-speed pulse output frequency range is 0.01kHz to U5.09 (maximum frequency of high-speed pulse output), U5.09 can be set between 0.01kHz to 100.00kHz.

Analog output DA1 and DA2 output range is 0V to 10V, or 0mA to 20mA. The range of pulse output or analog output and the corresponding calibration relation are shown in the following table:

Set value	Function	Description
0	Running frequency	0 to maximum output frequency
1	Set frequency	0 to maximum output frequency
2	Output current	0 to 2 times rated motor current
3	Output torque	0 to 2 times rated motor torque
4	Output power	0 to 2 times rated power
5	Output voltage	0 to 1.2 times rated inverter voltage
6	High-speed pulse input	0.01kHz to 100.00kHz
7	AI1	0V to 10V
8	AI2	0V to 10V (or 0 to 20mA)
9	Reserve	
10	Length	0 to maximum set length
11	Count value	0 to maximum count value
12	Communication setting	0.0% to 100.0%

13	Motor speed	0 to speed with maximum output frequency		
14	Output current	0.0A to 100.0A (inverter power ≦ 55kW); 0.0A to 1000.0A (inverter power> 55kW)		
15	DC bus voltage	0.0V to 1000.0V		
U5.09	Maximum output frequency of high-speed pulse	0.01kHz to 100.00kHz	50.00kHz	☆
SPB terminal is selected as pulse output, the function code is used to select the maximum value of output pulse.				
U5.10	DA1 zero bias coefficient	-100.0% to +100.0%	0.0%	☆
U5.11	DA1 gain	-10.00 to +10.00	1.00	☆
U5.12	DA2 zero bias coefficient	-100.0% to +100.0%	0.00%	☆
U5.13	DA2 gain	-10.00 to +10.00	1.00	☆

The above function codes are generally used for correcting the zero drift of analog output and the deviation of output amplitude. It also be used to custom analog output curve.

If b represents the zero-bias, k represents he gain, Y represents the actual output and X represents standard output, then the actual output:

Y=kX＋b。 Which, 100% the zero-bias coefficient of DA1, DA2 corresponds to 10V (or 20mA), the standard output indicates the analog output amount corresponding to output 0V to 10V (or 0mA to 20mA) without zero bias and gain correction.

For example: if the analog output is the operation frequency, it is expected to output 8V with 0 frequency, and output 3V with maximum frequency, then the gain shall be set to "-0.50", zero-bias shall be set to o"80%".

U5.17	SPB switching quantity output delay time	0.0s to 3600.0s	0.0s	☆
U5.18	Relay 1 output delay time	0.0s to 3600.0s	0.0s	☆
U5.19	Expansion DO output delay time	0.0s to 3600.0s	0.0s	☆
U5.20	SPA output delay time	0.0s to 3600.0s	0.0s	☆
U5.21	Relay 2 output delay time	0.0s to 3600.0s	0.0s	☆

Set the delay time from occurrence to actual output for output terminal SPA, SPB, relay 1, relay 2 and expansion DO.

U5.22	DO output terminal active status selection	Units digit	SPB switching quantity active status selection	0	☆
		Positive logic	0		
		Anti-logic	1		
		Tens digit	Relay 1 terminal active status setting (0 to 1, as above)		
		Hundreds digit	Expansion D0 terminal active status setting (0 to 1, as above)		
		Thousands digit	SPA terminal active status setting (0 to 1, as above)		
		Ten thousands digit	Relay 2 terminal active status setting (0 to 1, as above)		

To define the output logic for output terminal SPA, SPB, relay 1, relay 2 and expansion DO .

0: positive logic

It is active status when the digital output terminal is connected with the corresponding common terminal, inactive when disconnected;

1: anti-logic

It is inactive status when the digital output terminal is connected with the corresponding common terminal, active when disconnected;

5-2-8.Start and stop control: U6.00-U6.15

Code	Parameter name	Setting range		Factory setting	Change Limit
U6.00	Start-up mode	Direct startup	0	0	☆
		Speed tracking restart	1		
		Pre-excitation start (AC asynchronous motor)	2		

0: Directly startup

If the start DC braking time is set to 0, the inverter starts running from the start frequency. If the start DC braking time is not set to 0, the inverter firstly performs DC braking and then starts running from the start frequency. Applicable for the small inertia load and the application that the motor may rotate when starting.

1: Speed tracking restart

The inverter firstly judges the speed and direction of motor, and then starts at the tracked motor frequency, smoothly starts the rotating motor without shocks. Applicable for the momentary power cut and restart with high inertia loads. To ensure the performance of Speed Tracking Restart, it is required to accurately set the parameters of motor U1 group.

2: Asynchronous motor pre-excitation start

It is valid only for asynchronous motors, used to firstly create magnetic field before the motor running. Please refer to the instructions of function code U6.05, U6.06 for pre-excitation current and pre-excitation time

If the pre-excitation time is set to 0, the inverter will cancel the pre-excitation process, and starts from the start frequency. If the pre-excitation time is not set to 0, the inverter will firstly perform pre-excitation process and then starts so as to improve the dynamic response performance of motor.

U6.01	Speed tracking mode	Start from stop frequency	0	0	★
		Start from zero speed	1		
		Start from maximum frequency	2		

For the shortest time to complete the process of speed tracking, select the speed mode for inverter tracking motor :

0: track downward from the frequency that power outage happens

Usually select this mode.

1: track upward from 0 frequency

For the case that power outage is for longer time and then restarts.

2: track downward from maximum frequency

For the general power generation load.

U6.02	Speed tracking value	1 to 100	20	☆

When performing speed tracking restart, select speed tracking value.

The larger the parameter value, the faster tracking. But if the value is set to too large, which may cause tracking unreliable.

U6.03	Start frequency	0.00Hz to 10.00Hz	0.00Hz	☆
U6.04	Hold time for start frequency	0.0s to 100.0s	0.0s	★

When the inverter starts, firstly run at the start frequency, the running time is the hold time for start frequency, afterwards run at the frequency reference.

The start frequency U6.03 is not limited by the lower limit frequency. But if the set target frequency is less than the start frequency, the inverter does not start and keeps in the standby state.

The hold time for start frequency is inactive when switching between forward rotation and reverse rotation The hold time for start frequency is not included in the acceleration time, but the simple PLC run-time. Example 1:

U0.03＝0 the frequency source is set to digital reference

U0.08＝2.00Hz the digital set frequency is 2.00Hz

U6.03＝5.00Hz the start frequency is 5.00Hz

U6.04＝2.0s the hold time for start frequency is 2.0s, at this time, the inverter will be in the standby state with the output frequency of 0.00Hz.

Example 2:

U0.03＝0 the frequency source is set to digital reference

U0.08＝10.00Hz the digital set frequency is 10.00Hz

U6.03＝5.00Hz the start frequency is 5.00Hz

U6.04＝2.0s the hold time for start frequency is 2.0s

At this point, the inverter accelerates to 5.00Hz for 2.0s, and then accelerates to the reference frequency of 10.00Hz.

U6.05	Start DC braking current/pre-excitation current	0% to 100%	0%	★

U6.06	Start DC braking time/pre-excitation time	0.0s to 100.0s	0.0s	★

Start DC braking, generally is used to stop and then restart the motor. Pre-excitation is used to create magnetic field for asynchronous motor and then start the motor to improve the response speed.

Start DC braking is only active when the start mode is the direct startup. The inverter firstly performs DC braking at the set start DC braking current, after the start DC braking time is passed, and then start running. If the DC braking time is set to 0, the inverter will directly start and neglect DC braking. The larger DC braking current, the greater braking force.

If the startup mode is the asynchronous motor pre-excitation start, the inverter firstly creates magnetic field at the preset pre-excitation current, after the set pre-excitation time is passed and then start running. If the pre-excitation time is set to 0, the inverter will directly start and neglect pre-excitation.

Start DC braking current/pre-excitation current is the percentage of inverter rater current.

U6.07	Ac/deceleration mode	Linear acceleration and deceleration	0	0	★
		S curve acceleration and deceleration A	1		
		S curve acceleration and deceleration B	2		

Select the frequency change mode in the process of start/stop.

0: Linear acceleration and deceleration

The output frequency increases or decreases linearly. PI9000 provides four kinds of acceleration and deceleration time. You can select by the multi-function digital input terminals (U4.00 to U4.08).

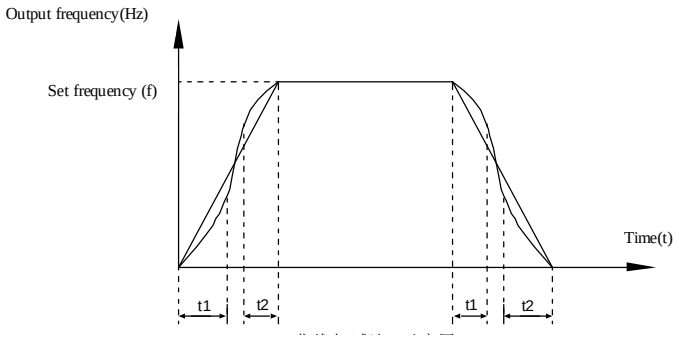
1: S curve acceleration and deceleration A

The output frequency increases or decreases at the S curve. S-curve is used for the occasion that requires to gently start or stop, such as elevators, conveyor belts, etc.. The function code U6.08 and U6.09 respectively defined the proportion of S curve start-section and the proportion of S curve end-section

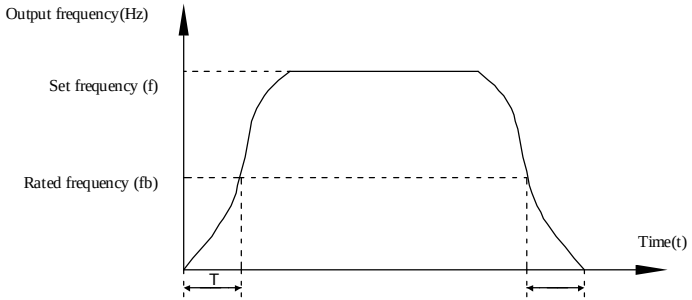
2: S curve acceleration and deceleration B

In the mode of S curve acceleration and deceleration B, the motor rated frequency fb is always the inflection point of S curve. Usually used for the occasion of high-speed regional above the rated frequency that requires rapid acceleration and deceleration.

U6.08	Proportion of S curve start-section	0.0% to (100.0% to U6.09)	30.0%	★
U6.09	Proportion of S curve end-section	0.0% to (100.0% to U6.08)	30.0%	★



Schematic diagram of S curve ac/deceleration A



Schematic diagram of S curve ac/deceleration B

The function code U6.08 and U6.09 respectively defined the proportion of start-section and the proportion of end-section for S curve acceleration and deceleration A, the two function code must meet: U6.08 + U6.09 ≤ 100.0%.

In the Figure S-curve acceleration and deceleration A of, t1 is the time parameter defined by U6.08, the slope of the output frequency variation during this period is gradually increasing. T2 is the time parameter defined by U6.09, the slope of the output frequency variation during the period is gradually changed to 0. Within the time between t1 and t2, the slope of the output frequency variation is fixed, i.e. the linear acceleration and deceleration is achieved in this interval,

U6.10	Stop mode	Deceleration parking	0	0	☆
		Free stop	1		

When the inverter receives the "stop" command, the inverter will set up the motor stop mode according to the parameter.

0: Deceleration parking mode

The inverter will decelerates to the lowest frequency until stop according to the set

deceleration time and mode.

1: Free stop mode

When the inverter receives the "stop" command, it immediately stops output and the motor freely run until stop under the action of inertia.

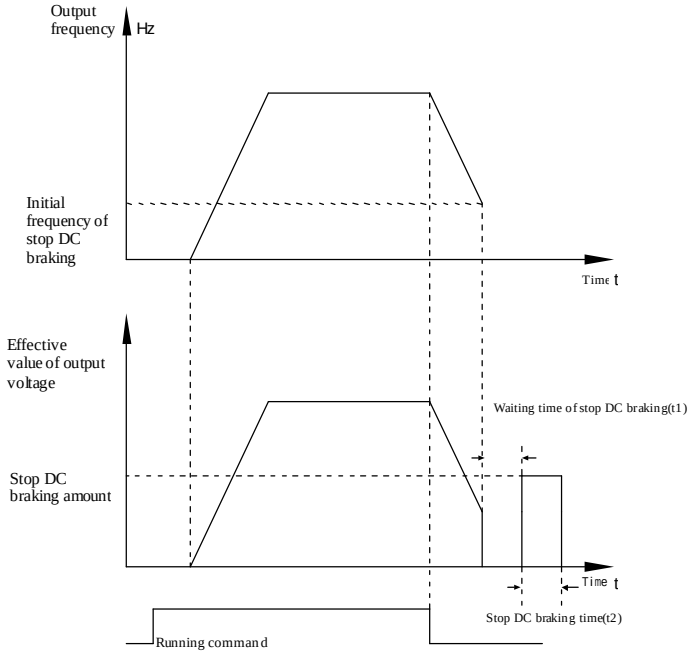
U6.11	Initial frequency of stop DC braking	0.00Hz to U0.10 (maximum frequency)	0.00Hz	☆
U6.12	Waiting time of stop DC braking	0.0s to 100.0s	0.0s	☆
U6.13	Stop DC braking current	0% to 100%	0%	☆
U6.14	Stop DC braking time	0.0s to 100.0s	0.0s	☆

Initial frequency of stop DC braking: if the operating frequency is reduced to the initial frequency when decelerating, DC braking process is started.

Waiting time of stop DC braking: if the operating frequency is reduced to the said initial frequency, the inverter firstly stops output for some time, and then DC braking process is started. In order to prevent overcurrent fault that DC braking may cause at the higher speeds.

Stop DC braking current: it indicates the percentage of the DC braking output current in the rated motor current. The larger this value, the stronger the DC braking effect, but the greater the heat of the motor and the inverter.

Stop DC braking time: If this value is 0, DC braking process is canceled. Please see the schematic diagram for the DC braking process.



Schematic diagram of stop DC braking time

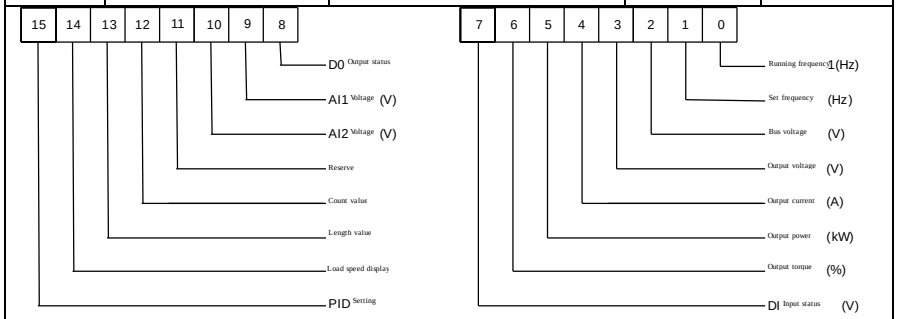
U6.15	Dynamic braking utilization rate	0% to 100%	100%	

Effective only for the inverter with built-in braking unit.

Due to the duty cycle of braking unit is adjusted, if the braking use rate is high, the duty cycle of braking unit is high, the braking effect is stronger, but the inverter's bus voltage fluctuation is larger during the braking process .

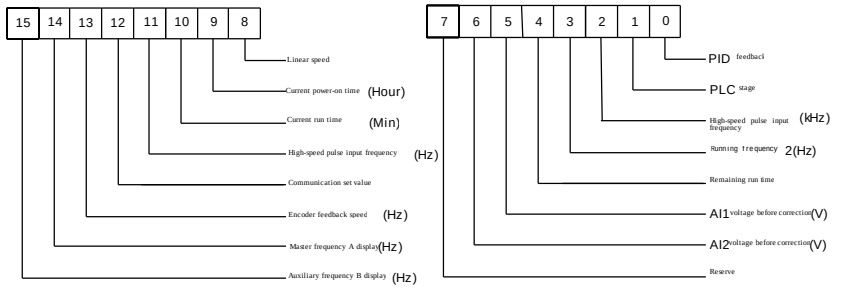
5-2-9.Keyboard and display: U7.00-U7.12

Code	Parameter name	Setting range		Factory setting	Change limits
U7.00	STOP/RESET key functions	STOP/RST key is enabled only under keyboard operation mode	0	1	☆
		STOP/RST key is enabled under any operation mode	1		
U7.01	Running status display parameters 1	0000 to FFFF		1F	☆



If the above parameters need to be displayed in operation, firstly set its position to 1, and then set at U7.01 after converting the binary number to the hexadecimal number.

U7.02	Running status display parameters 2	0000 to FFFF	0	☆

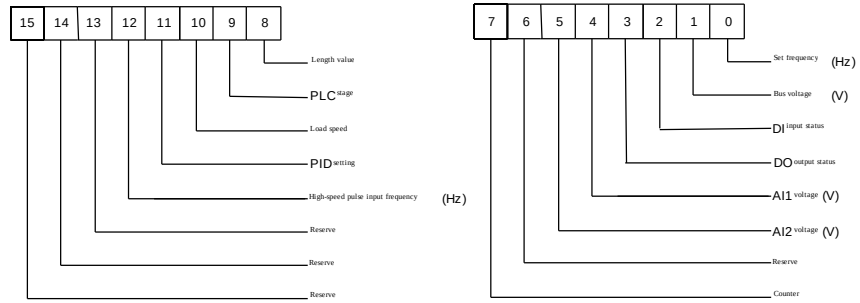


If the above parameters need to be displayed in operation, firstly set its position to 1, and then set at U7.02 after converting the binary number to the hexadecimal number.

Running status display parameters, which is used to set the parameters that can be viewed when the inverter is in operation.

There are 32 parameters available for viewing, select desired status parameters according to U7.01 U7.01, U7.02 binary parameter values, the display order starts from the lowest level of U7.01.

U7.03	Stop status display parameters	0000 to FFFF	33	☆



If the above parameters need to be displayed on operation, firstly set its position to 1, and then set at U7.03 after converting the binary number to the hexadecimal number.

U7.04	Load speed display coefficient	0.0001 to 6.5000	1.0	☆

When load speed needs to be displayed, adjust the inverter's output frequency and load speed by using the parameter.

U7.05	Inverter module radiator temperature	0.0℃ to 100.0℃	-	●

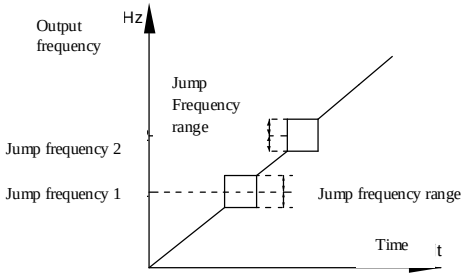
Display the inverter module IGBT temperature

The different models of the inverter module vary IGBT overtemperature protection values.

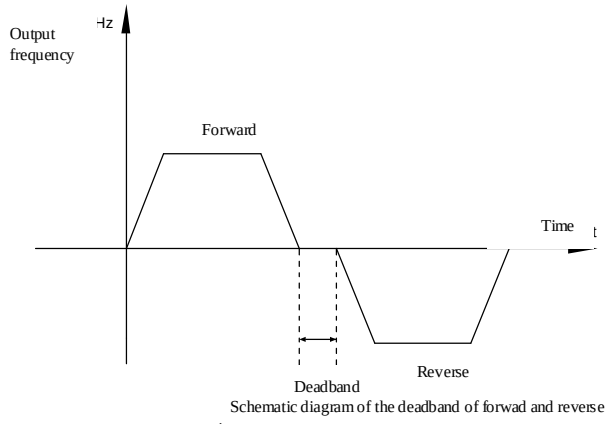
U7.06	Rectifier module radiator temperature	0.0℃ to 100.0℃		-	●
Display the rectifier module temperature The different models of the rectifier module vary overtemperature protection values.					
U7.07	Total run time	0h to 65535h		-	●
Display the total run time of inverter When the run time reaches the set time(U8.17), the inverter's multi-function digital output function (12) outputs ON signal.					
U7.08	Part number	Inverter product number		-	●
U7.09	Software version number	Control panel software version number		-	●
U7.10	Decimal places for load speed display	0 decimal place	0	0	☆
		1 decimal place	1		
		2 decimal places	2		
		3 decimal places	3		
Decimal places for load speed display The below example illustrates the calculation of load speed: If the load speed coefficient(U7.04) is 2.000, the number of decimal places of load speed(U7.10) is 2 (two decimal places), when the inverter operating frequency reaches 40.00Hz, the load speed is : 40.00 * 2.000 = 80.00 (2 decimal places display) If the inverter is shutdown, the load speed displays the speed relative to the set frequency, that is the "set load speed". If the set frequency is 50.00Hz, the load speed under the state of shutdown: 50.00 * 2.000 = 100.00 (2 decimal places display)					
U7.11	Total power-on time	Default		0 hours	
	Setting range	0 to 65535 hours			
Display the total power-on time from the inverter leaving factory. When the time reaches the set time(U8.17), the inverter's multi-function digital output function (24) outputs ON signal.					
U7.12	Total power consumption	Default		-	
	Setting range	0 to 65535 hours			
Display the total power consumption of inverter to date until now					

5-2-10.Auxiliary function: U8.00-U8.53

Code	Parameter name	Setting range	Factory setting	Change Limit
U8.00	Jog running frequency	0.00Hz to U0.10 (maximum frequency)	2.00Hz	☆

U8.01	Jog acceleration time	0.1s to 3600.0s	20.0s	☆
U8.02	Jog deceleration time	0.1s to 3600.0s	20.0s	☆
Defined the inverter's reference frequency and ac/deceleration time when jogging In operation of Jog, the startup mode is fixed as direct startup mode (U6.00 = 0), the shutdown mode is fixed as deceleration parking mode (U6.10 = 0).				
U8.03	Acceleration time 2	0.0s to 3600.0s	-	☆
U8.04	Deceleration time 2	0.0s to 3600.0s	-	☆
U8.05	Acceleration time 3	0.0s to 3600.0s	-	☆
U8.06	Deceleration time 3	0.0s to 3600.0s	-	☆
U8.07	Acceleration time 4	0.0s to 3600.0s	-	☆
U8.08	Deceleration time 4	0.0s to 3600.0s	-	☆
PI9000 provides 4 groups of deceleration time, respectively U0.17\U0.18 and the above 3 groups of deceleration time. The 4 groups of deceleration time are defined exactly the same, please refer to the instructions of U0.17 and U0.18. The 4 groups of deceleration time can be switched through different combinations of the multi-function digital input terminal DI, please refer to the instructions of function code U4.01 to U4.05 for the detailed methods .				
U8.09	Jump frequency 1	0.00Hz to maximum frequency	0.00Hz	☆
U8.10	Jump frequency 2	0.00Hz to maximum frequency	0.00Hz	☆
U8.11	Jump frequency range	0.00Hz to maximum frequency	0.00Hz	☆
When the set frequency is in the jump frequency range, the actual operating frequency will run at the jump frequency close from the set frequency . The inverter can avoid mechanical resonance point of load by setting jump frequency. PI9000 can set two jump frequency points, if the two jump frequencies are set to 0, the jump frequency function will be canceled. For the principle schematic of jump frequency and its range, please refer to the following figure.  Schematic diagram of jump frequency				
U8.12	Forward/reverse rotation deadband	0.00s to 3000.0s	0.0s	☆

It is the waiting time that the inverter reaches zero speed when the parameter is used to switch between forward and reverse rotation.



Schematic diagram of the deadband of forwad and reverse

U8.13	Reverse rotation control	Allow	0	0	☆
		Prohibit	1		

For certain production equipments, the reverse rotation may result in damage to the equipment, the function can disable the reverse rotation. The factory default allows reverse rotation.

U8.14	Set frequency lower than lower limit frequency mode	Running at lower limit frequency	0	0	☆
		Stop	1		
		Zero speed running	2		

When the set frequency is lower than the lower limit frequency, THE inverter operating status can be selected through the parameter. PI9000 provides three modes of operation to meet the needs of a variety of applications.

U8.15	Droop control	0.00Hz to 10.00Hz	0.00Hz	☆

This function is generally used for the load distribution that multiple motors drag the same one load.

The droop control means that the inverter output frequency is decreased as the load is increased, so that when multiple motors drag(work for)the same one load, each motor's output frequency much drops, which can reduce the load of the motor to balance evenly multiple motors' load .

This parameter means the decreased value of output frequency when the inverter outputs the rated load.

U8.16	Setting cumulative power-on arrival time	0h to 65000h	0h	☆

When the total power-on time(U7.11) reaches the time set by U8.16, the inverter multifunction digital DO outputs ON signal.

U8.17	Setting cumulative running arrival time	0h to 65000h	0h	☆

Used to set the running time of inverter.

When the total power-on time(U7.07) reaches the set time, the inverter multifunction digital DO outputs ON signal.

U8.18	Start protection	OFF	0	0	☆
		ON	1		

This parameter relates to the security features of the inverter

If this parameter is set to 1 , and if the running command is active (e.g. the terminal running command is closed before power-on) when the inverter is in power-on, the inverter will not respond to the running command, you must firstly cancel the running command, when the running command is active again, the inverter will respond.

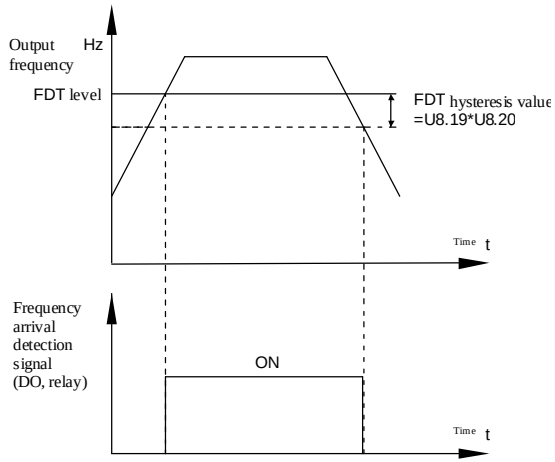
In addition, if the parameter is set to 1, and if the running command is active when the inverter resets fault, the inverter will not respond to the running command, you must firstly cancel the running command in order to eliminate running protection status.

The parameter is set 1, you can prevent the danger caused by that the inverter unknowingly responds to the running command in the event of power-on and fault reset.

U8.19	Frequency detection value (FDT1)	0.00Hz to maximum frequency	50.00Hz	☆
U8.20	Frequency detection hysteresis value (FDT1)	0.0% to 100.0% (FDT1 level)	5.0%	☆

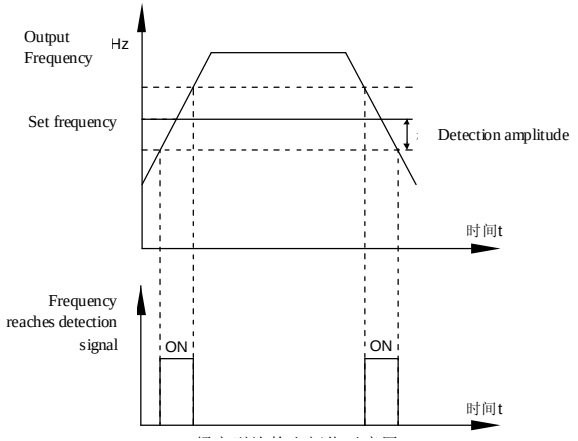
The inverter's multifunction output DO will output ON signal when the operating frequency is higher than the detected value, conversely DO output ON signal is canceled.

The above parameters is used to set the detected value of output frequency, and the hysteresis value after the output is canceled. Of which, U8.20 is the percentage of the hysteresis frequency in the detected value(U8.19). The below figure is the schematic diagram of FDT.



Schematic diagram of FDT level

U8.21	Frequency reaches detection width	0.00 to 100% maximum frequency	0.0%	☆



Schematic diagram of frequency arrival detection amplitude

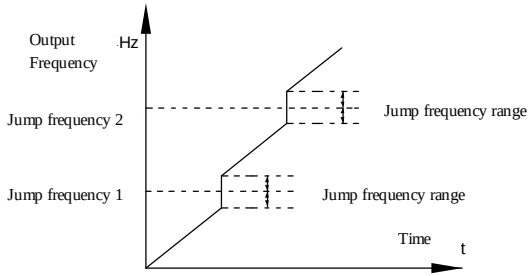
The inverter's multifunction output DO will output ON signal when the inverter's operating frequency is in a certain range of target frequency

This parameter is used to set the frequency arrival detection range, the parameter is the percentage of maximum frequency. The below figure is the schematic diagram of frequency arrival.

U8.22	Jump frequency availability during ac/deceleration process	Invalid	0	0	☆
		Valid	1		

The function code is used to set whether the jump frequency is active or not in the process of acceleration and deceleration.

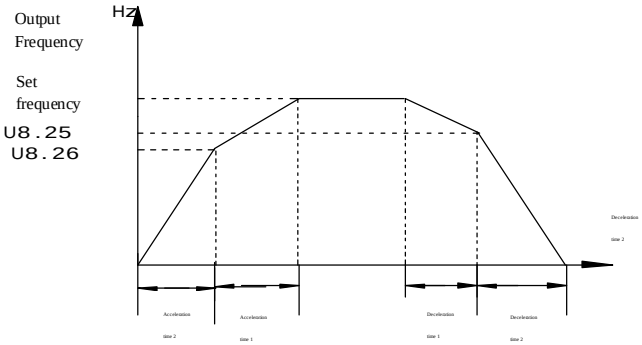
If it is set to active, when the operating frequency is in the jump frequency range, the actual operating frequency will skip the set jump frequency boundary. The below figure below shows the jump frequency status in the process of acceleration and deceleration.



Schematic diagram of jump frequency availability in the process of acceleration and deceleration.

U8.25	Switching frequency point between acceleration time 1 and acceleration time 2	0.00Hz to maximum frequency	0.00Hz	☆
U8.26	Switching frequency point between deceleration time 1 and deceleration time 2	0.00Hz to maximum frequency	0.00Hz	☆

The function is active when motor 1 is selected and DI terminal is not selected to switch between ac/deceleration. It is used to automatically select ac/deceleration time by not DI terminal but the operating frequency range when the inverter is running.



Schematic diagram of switching between acceleration and deceleration

For the above figure in the process of acceleration, if the operating frequency is less than U8.25, select acceleration time 2; otherwise select acceleration time 2.

For the above figure in the process of deceleration, if the operating frequency is more than U8.26, select deceleration time 1; otherwise select deceleration time 2.

U8.27	Terminal jog priority	Invalid	0	0	☆
		Valid	1		

This parameter is used to set whether the priority of terminal jog function is active or not.

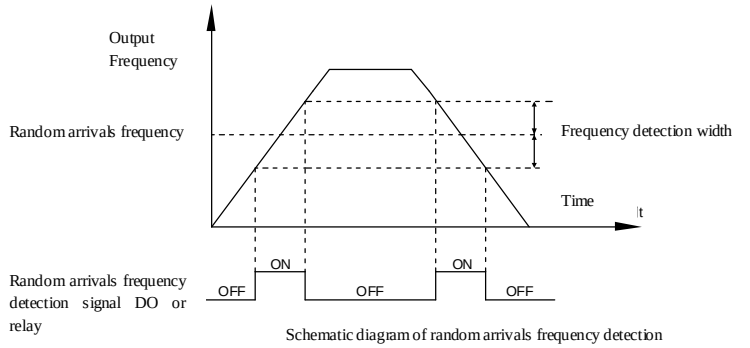
When it is set to active, if the terminal jog command is received by inverter in operation, the inverter will change to jog running status.

U8.28	Frequency detection value (FDT2)	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆
U8.29	Frequency detection hysteresis value (FDT2)	0.0% to 100.0% (FDT2 level)	5.0%	☆

The frequency detection function is same as FDT1 exactly, please refer to the instructions of FDT1 or function codes U8.19, U8.20.

U8.30	Random arrivals frequency detection value 1	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆
U8.31	Random arrivals frequency detection width 1	0.00% to 100.0% (maximum frequency)	0.0%	☆
U8.32	Random arrivals frequency	0.00Hz to U0.10 (maximum frequency)	50.00Hz	☆

	detection value 2			
U8.33	Random arrivals frequency detection width 2	0.00% to 100.0% (maximum frequency)	0.0%	☆

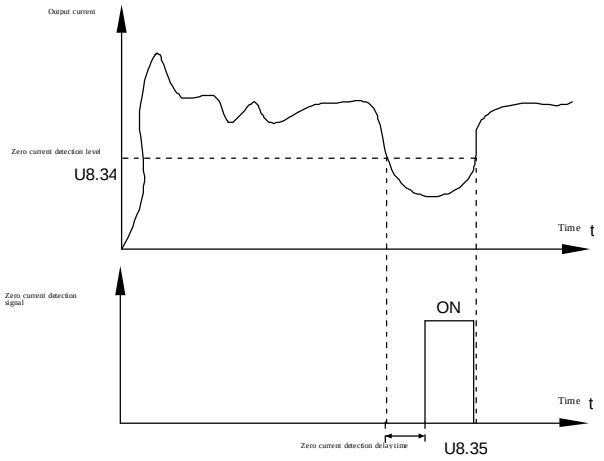


Schematic diagram of random arrivals frequency detection

When the inverter's output frequency randomly reaches the range of the detected value(positive or negative), the multi-function DO will output ON signal.

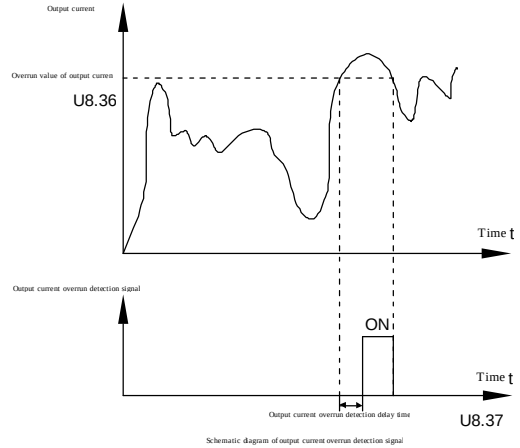
PI9000 provides two groups of parameter to set frequency value and frequency detection range. The below figure is the schematic diagram of the function.

U8.34	Zero current detection level	0.0% to 300.0% (rated motor current)	5.0%	☆
U8.35	Zero current detection delay time	0.01s to 360.00s	0.10s	☆



When the inverter's output current is less than or equal to zero current detection level and lasts for longer than the delay time of zero-current detection, the inverter's multifunction DO will output ON signal. The figure is the schematic diagram of zero current detection.

U8.36	Overrun value of output current	0.0% (not detected) 0.1% to 300.0% (rated motor current)	200.0%	☆
U8.37	Output Current overrun detection delay time	0.01s to 360.00s	0.00s	☆



Schematic diagram of output current overrun detection signal

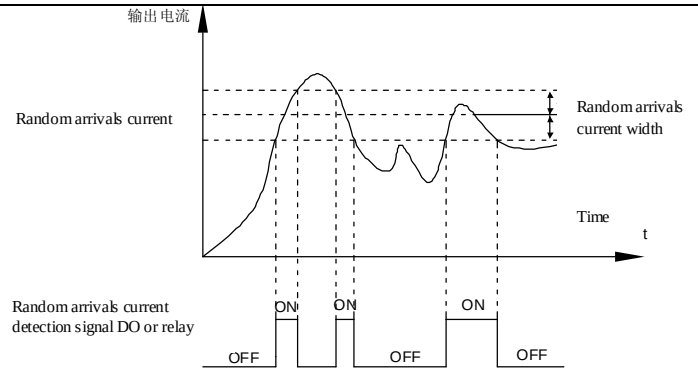
When the inverter's output current is more than or overrun the detection point and lasts for longer than the delay time of software overcurrent point detection, the inverter's multifunction DO will output ON signal.

U8.38	Random arrivals current 1	0.0% to 300.0% (rated motor current)	1000	☆
U8.39	Random arrivals current 1 width	0.0% to 300.0% (rated motor current)	0.0%	☆
U8.40	Random arrivals current 2	0.0% to 300.0% (rated motor current)	1000	☆
U8.41	Random arrivals current 2 width	0.0% to 300.0% (rated motor current)	0.0%	☆

When the inverter's output current randomly reaches the range of the current detection width(positive or negative), the inverter multifunction DO will output ON signal.

PI9000 provides two group of sets of parameter for Randomly Reaches Current and Detection Width, the figure is the functional diagram.

Output current



Schematic diagram of random arrivals current detection

U8.42	Timing function selection	Invalid	0	0	☆
		Valid	1		
U8.43	Timing run time selection	U8.44 setting	0	0	☆
		AI1	1	1	
		AI2	2	2	
		Panel potentiometer	3	3	
		Analog input range 100% corresponds to U8.44			
U8.44	Timing run time	0.0Min to 3600.0Min		0.0Min	☆

The group of parameters are used to complete the inverter timing run function.

If U8.42 timing function is active, the inverter starts as the timer starts, when the set timing run time is reached, the inverter automatically shut down, at the same time the multi-function DO will output ON signal.

Every time the inverter starts, the timer will time from 0, the remaining time can be viewed by U0.20. The timing run time is set by U8.43, U8.44 in minute.

U8.45	AI1 input voltage protection lower limit	0.00V to U8.46	3.10V	☆
U8.46	AI1 input voltage protection upper limit	U8.45 to 10.00V	6.80V	☆

When analog AI1 input is greater than U8.46, or when AI1 input is less than U8.47, the inverter multi-functional DO will output "AI1 input overrun"signal, so as to indicate whether the AI1 input voltage is within the set range or not.

U8.47	Module temperature arrival	0.00 to 100	75℃	☆

When the inverter radiator temperature reaches the temperature, the inverter multifunction DO will output "Module Temperature Arrival" ON signal.

U8.48	Cooling fan control	Fan running only when running	0	0	☆
		Fan always running	1		

Used to select the cooling fan mode, if you select 0, the fan will run when the inverter is running, but in the stop state of inverter, if the radiator temperature is above 40 degrees, the fan will run, otherwise the fan will not run.

If you select 1, when the fan will always running after power-on.

U8.53	Current running arrival time.	0.0Min to 3600.0Min	0.0Min	☆

When current running time reaches this time, the inverter multi-function digital DO will output"Current Running Time Arrival "ON signal.

5-2-11.Fault and protection:U9.00-U9.70

Code	Parameter name	Setting range		Factory setting	Change limits
U9.00	Motor overload protection	Prohibit	0	1	☆
		Allow	1		
U9.01	Motor overload protection gain	0.20 to 10.00		1.00	☆

U9.00 = 0: no motor overload protection function, there may be the risk of damage to the motor due to overheating, it is recommended that the thermal relay is installed between the inverter and the motor;

U9.00 = 1: the inverter will determine whether the motor is overloaded or not according to the inverse time curve of motor overload protection. Inverse time curve of motor overload protection: 220% x (U9.01) x rated motor current, if this lasts for 1 minute, the alarm of motor will be prompted.

Overload fault; 150% x (U9.01) × rated motor current, if this lasts for 60 minute, the alarm of motor overload will be prompted.

User shall correctly set the value of U9.01 according to the actual motor overload capacity, if the value is set to too large , which may easily lead to motor overheating and damage while the inverter will not alarm!

U9.02	Motor overload pre-alarm coefficient	50% to 100%	80%	☆

This function is used in the front of motor overload fault protection, and sends a pre-alarm signal to the control system by DO. The warning coefficient is used to determine the extent of pre-alarm prior to motor overload protection. The higher the value, the smaller the extent of pre-alarm in advance.

When the cumulative amount of inverter output current is greater than the product of the inverse time curve of overload and U9.02, the inverter multi-function digital DO will output "Motor Overload Pre-Alarm" ON signal.

U9.03	Overvoltage	0 (no overvoltage stall) to 100	0	☆

	stall gain			
U9.04	Overvoltage stall protection voltage / energy consumption brake voltage	120% to 150%(three-phase)	130%	☆

In the process of the inverter deceleration, when the DC bus voltage exceeds the overvoltage stall protection voltage/the energy consumption brake voltage, the inverter stops deceleration and maintains at the current operating frequency(if U6.15 is not set to 0, the braking signal is outputted the energy consumption brake can be implemented by an external braking resistor.) and then continues to decelerate upon decline of the bus voltage

Overvoltage stall gain is used for adjusting inhibition overvoltage capability during deceleration. The greater this value, the stronger inhibition overvoltage capability Under the premise that the overvoltage does not occur, the best is the smaller gain setting.

For the small inertia load, the overvoltage stall gain should be small, otherwise which cause the slower system dynamic response. For the big inertia load, the overvoltage stall gain should be large, otherwise the poor inhibitory effect may cause overvoltage fault.

When the overvoltage stall gain is set to 0, the overvoltage stall function will be canceled.

U9.05	Overcurrent stall gain	0 to 100	20	☆
U9.06	Overcurrent stall protection current	100% to 200%	150%	☆

In the process of the inverter acceleration, when the output current exceeds the overcurrent stall protection current, the inverter stops ac/deceleration process and remains in the current operating frequency, and then continues to ac/decelerate upon the decline of the output current.

Overcurrent stall gain is used for adjusting inhibition overcurrent capability during ac/deceleration. The greater this value, the stronger inhibition overcurrent capability Under the premise that the overcurrent does not occur, the best is the smaller gain setting.

For the small inertia load, the overcurrent stall gain should be small, otherwise which cause the slower system dynamic response. For the big inertia load, the overcurrent stall gain should be large, otherwise the poor inhibitory effect may cause overvoltage fault.

When the overcurrent stall gain is set to 0, the overcurrent stall function will be canceled.

U9.07	Power-on short circuit to ground	Invalid	0	1	☆
		Valid	1		

You can detect whether the motor is shorted to ground when the inverter is powered on.

If this function is active, the inverter's UVW terminal will output voltage after power-on for a while.

U9.09	Number of automatic fault reset	0 to 20	0	☆

When the inverter selects automatic fault reset, it is used to set the number of times of automatic fault reset. If the set number of times is exceeded, the inverter remains a failed state.

U9.10	Fault DO action selection during automatic fault reset	OFF	0	1	☆
		ON	1		

If the inverter automatic fault reset function is set, U9.09 can be used to set whether DO action is active or not during the automatic fault reset

U9.11	Automatic fault reset interval	0.1s to 100.0s	1.0s	☆

It is the waiting time from the inverter fault alarm to automatic fault reset.

U9.12	Input phase loss protection selection	Prohibit	0	1	☆
		Allow	1		

Select whether the input phase loss protection is done or not.

The input phase loss protection function is only for PI9000 G type inverter with 18.5kW or above, not for the F type inverter with 18.5kW or below and however U9.12 is set to 0 or 1.

U9.13	Output phase loss protection selection	Prohibit	0	1	☆
		Allow	1		

Select whether the output phase loss protection is done or not.

U9.14	Type of the first fault	0 to 51	-	●
U9.15	Type of the second fault	0 to 51	-	●
U9.16	Type of the third(at last) fault	0 to 51	-	●

Record the type of the last three faults of inverter, 0 for no fault. Please refer to the related instructions for the possible causes and solutions for each fault code.

Failure type table:

No.	Failure type
0	No fault
1	Reserve
2	Acceleration overcurrent

3	Deceleration overcurrent
4	Constant speed overcurrent
5	Acceleration overvoltage
6	Deceleration overvoltage
7	Constant speed overvoltage
8	Buffer resistance overload
9	Undervoltage
10	Inverter overload
11	Motor Overload
12	Input phase loss
13	Output phase loss
14	Module overheating
15	External fault
16	Communication abnormal
17	Contactor abnormal
18	Current detection abnormal
19	Motor auto tunning abnormal
20	Encoder/PG card abnormal
21	Parameter read and write abnormal
22	Inverter hardware abnormal
23	Motor short to ground
24	Reserve
25	Reserve
26	Running time arrival
27	Custom fault 1
28	Custom fault 2
29	Power-on time arrival
30	Load drop
31	PID feedback loss when running

40	Fast current limiting timeout
41	Switch motor when running
42	Too large speed deviation
43	Motor overspeed
45	Motor overtemperature
51	Initial position error

U9.17	Frequency of the third fault	Frequency of the last fault	●
U9.18	Current of the third fault	Current of the last fault	●
U9.19	Bus voltage of the third fault	Bus voltage of the last fault	●
U9.20	Input terminal status of the third fault	Input terminal status of the last fault, the order is: BIT9 BIT8 BIT7 BIT6 BIT5 BIT4 BIT3 BIT2 BIT1 BIT0 DI0 DI9 DI8 DI7 DI6 DI5 DI4 DI3 DI2 DI1 When the input terminal is ON, the corresponding binary bits is 1, OFF is 0, all DI status is converted to the decimal number for display.	●
U9.21	Output terminal status of the third fault	Output terminal status of the last fault, the order is: BIT4 BIT3 BIT2 BIT1 BIT0 REL2 SPA Reserve REL1 SPB When the input terminal is ON, the corresponding binary bits is 1, OFF is 0, all DI status is converted to the decimal number for display.	●
U9.22	Inverter status of the third fault	Reserve	●
U9.23	Power-on time of the third fault	Current power-on time of the last fault	●
U9.24	Running time of the third fault	Current running time of the last fault	●
U9.27	Frequency of the second fault	Frequency of the last fault	●

U9.28	Current of the second fault	Current of the last fault	●
U9.29	Bus voltage of the second fault	Bus voltage of the last fault	●
U9.30	Input terminal status of the second fault	Input terminal status of the last fault, the order is: BIT9 BIT8 BIT7 BIT6 BIT5 BIT4 BIT3 BIT2 BIT1 BIT0 DI0 DI9 DI8 DI7 DI6 DI5 DI4 DI3 DI2 DI1 When the input terminal is ON, the corresponding binary bits is 1, OFF is 0, all DI status is converted to the decimal number for display.	●
U9.31	Output terminal status of the second fault	Output terminal status of the last fault, the order is: BIT4 BIT3 BIT2 BIT1 BIT0 REL2 SPA Reserve REL1 SPB When the input terminal is ON, the corresponding binary bits is 1, OFF is 0, all DI status is converted to the decimal number for display.	●
U9.32	Inverter status of the second fault	Reserve	●
U9.33	Power-on time of the second fault	Current power-on time of the last fault	●
U9.34	Running time of the second fault	Current running time of the last fault	●
U9.37	Frequency of the first fault	Frequency of the last fault	●
U9.38	Current of the first fault	Current of the last fault	●
U9.39	Bus voltage of the first fault	Bus voltage of the last fault	●
U9.40	Input terminal status of the first fault	Input terminal status of the last fault, the order is: BIT9 BIT8 BIT7 BIT6 BIT5 BIT4 BIT3 BIT2 BIT1 BIT0 DI0 DI9 DI8 DI7 DI6 DI5 DI4 DI3 DI2 DI1 When the input terminal is ON, the corresponding binary bits is 1, OFF is 0, all DI status is converted to the decimal number for display.	●
U9.41	Output terminal status of the first fault	Output terminal status of the last fault, the order is: BIT4 BIT3 BIT2 BIT1 BIT0 REL2 SPA Reserve REL1 SPB When the input terminal is ON, the corresponding binary bits is 1, OFF is 0, all DI status is converted to the decimal number for display.	●
U9.42	Inverter status of the first fault	Reserve	●
U9.43	Power-on time of the first fault	Current power-on time of the last fault	●
U9.44	Running time of the first fault	Current running time of the last fault	●
U9.47	Fault protection action selection 1	Units digit: Motor overload (Fault ID Err.11) — 00000 Free stop — 0 Stop at the selected mode — 1 Continue to run — 2 Tens digit: Input phase loss(Fault ID Err.12)(same as units digit) Hundreds digit: Output phase loss(Fault ID Err.13)(same as units digit) Thousands digit: External fault(Fault ID Err.15)(same as units digit) Ten thousands digit: Communication abnormal(Fault ID Err.16)(same as units digit)	☆
U9.48	Fault protection action selection 2	Units digit: Encoder fault(Fault ID Err.20) — 00000 Free stop — 0 Switch to VF and then stop at the selected mode — 1 Switch to VF and continue to run — 2	☆

		Tens digit	Function code read and write abnormal(Fault ID Err.21)		
		Free stop	0		
		Stop at the selected mode	1		
		Hundreds digit	Reserve		
		Thousands digit	Motor overheating(Fault ID Err.45)(same as U9.47 units digit)		
		Ten thousands digit	Running time arrival(Fault ID Err.26)(same as U9.47 units digit)		
U9.49	Fault protection action selection 3	Units digit	Custom fault 1 (Fault ID Err.27)(same as U9.47 units digit)	00000	☆
		Tens digit	Custom fault 2 (Fault ID Err.28)(same as U9.47 units digit)		
		Hundreds digit	Power-on time arrival(Fault ID Err.29)(same as U9.47 units digit)		
		Thousands digit	Load drop(Fault ID Err.30)		
		Free stop	0		
		Stop at the selected mode	1		
		Decelerate to 7% of the rated frequency of motor and continue to run, automatically return to the set frequency to run if the load drop does not happen.	2		
		Ten thousands digit	PID feedback loss when running(Fault ID Err.31)(same as U9.47 units digit)		
U9.50	Fault protection	Units digit	Too large speed deviation(Fault ID Err.42)(same	00000	☆

	action selection 4		as U9.47 units digit)		
		Tens digit	Motor overspeed(Fault ID Err.43)(same as U9.47 units digit)		
		Hundreds digit	Initial position error(Fault ID Err.51)(same as U9.47 units digit)		
		Thousands digit	Reserve		
		Ten thousands digit	Reserve		

When "free stop" is selected, the inverter displays Err. *, and directly stops.

When "Stop at the selected mode" is selected, the inverter displays Arr. *, firstly stops at the selected mode and then displays Err. * When "continue to run" is selected, the inverter continues to run and displays Arr. *, the operating frequency is set by U9.54.

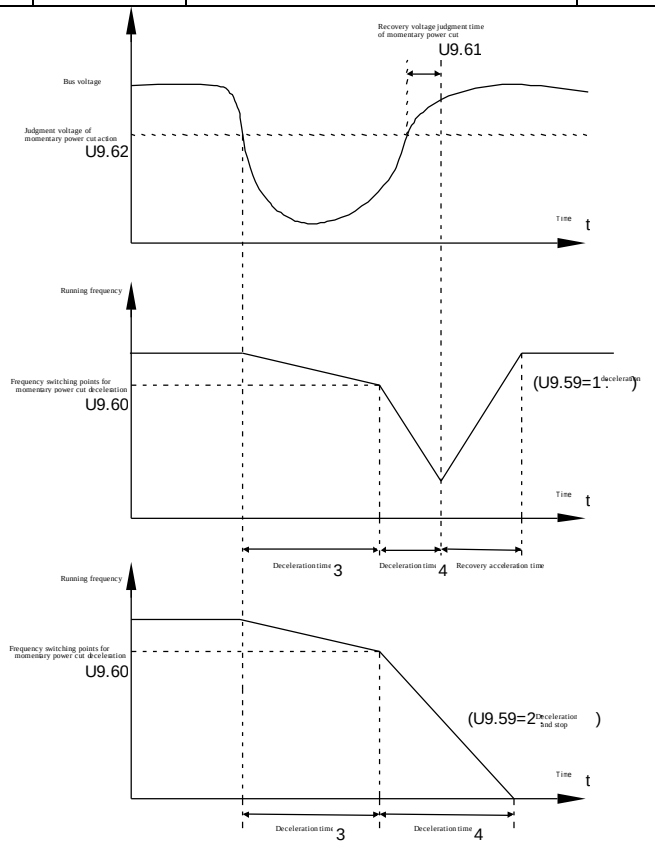
U9.54	Continue running frequency selection when failure happens	Running at current frequency	0	0	☆
		Running at set frequency	1		
		Running at upper limit frequency	2		
		Running at lower limit frequency	3		
		Running at abnormal spare frequency	4		
U9.55	Abnormal spare frequency	60.0% to 100.0%		1000	☆

When the inverter occurs faults during operation, and the troubleshooting mode for the fault is set to "continue to run", the inverter displays Arr. *, and runs at the operating frequency set by U9.54.

When "abnormal spare frequency" is selected, the value set by U9.55 is the percentage of the maximum frequency

U9.59	Momentary power cut action selection	Invalid	0	0	☆
		Deceleration	1		
		Deceleration and stop	2		
U9.60	Frequency switching points for momentary power cut deceleration	0.0% to 100.0%		90%	☆
U9.61	Recovery voltage	0.00s to 100.00s		0.50s	☆

	judgment time of momentary power cut			
U9.62	Judgment voltage of momentary power cut no action	60.0% to 100.0% (standard bus voltage)	80.0%	☆



Schematic diagram of U momentary power cut action

This feature means that when the momentary power cut happens or the voltage suddenly reduces, the drive will reduce the output speed to compensate the reduced value of the inverter DC bus voltage by using load feedback energy, in order to maintain the inverter to continue running.

If U9.59 = 1, when the momentary power cut happens or the voltage suddenly reduces, the inverter will decelerate, when the bus voltage is back to normal, the inverter will normally accelerate to the set frequency to run. To determine whether the bus voltage returns to normal or not, check whether the bus voltage is normal and lasts for longer than the set time by U9.61.

If U9.59 = 2, when the momentary power cut happens or the voltage suddenly reduces, the inverter will decelerate till to stop.

U9.63	Load drop protection selection	Invalid	0	0	☆
		Valid	1		
U9.64	Load drop detection level	0.0% to 100.0% (rated motor current)		10.0%	☆
U9.65	Load drop detection level	0.0s to 60.0s		1.0s	☆

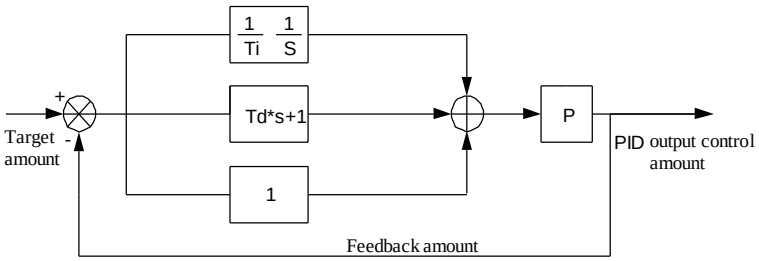
If the load drop protection function is active, when the inverter output current is less than the load drop detection level (U9.64)and the duration is longer than the load drop detection time(U9.65), the inverter output frequency is automatically reduced to 7% of the rated frequency. During the load drop protection, if the load recovers, the inverter automatically resumes to the set frequency to run.

U9.67	Overspeed detection value	0.00% to 50.0% (maximum frequency)	15.0%	☆
U9.68	Overspeed detection time	0.0s to 60.0s	2.0s	☆

This feature is only available when the inverter runs with speed sensor vector control.

When the inverter detects that the actual motor speed exceeds the set frequency, and the excess is greater than the overspeed detection value(P9.67), and the duration is greater than the overspeed detection time(P9.68) the inverter will alarm fault ID Err.43, and troubleshoots according to the protection action.

U9.69	Detection value for too large speed deviation	0.00% to 50.0% (maximum frequency)	20.0%	☆
U9.70	Detection time for too large speed deviation	0.0s to 60.0s	2.0s	☆



Flow diagram of process PID principle

This feature is only available when the inverter runs with speed sensor vector control.

When the inverter detects that the actual motor speed is different from the set frequency, and the deviation is greater than the detection value for too large speed deviation(P9.69), and the duration is greater than the detection time for too large speed deviation(P9.70), the inverter will alarm fault ID Err.42, and troubleshoots according to the protection action.

If the detection time for too large speed deviation is 0.0s, the detection for too large speed deviation is canceled.

5-2-12.PID function: UA.00-UA.28

PID control is a commonly used method of process control, a closed loop system is formed by the proportional, integral and differential operation of difference between the controlled value feedback signal and target value signal and by adjusting the inverter output frequency so as to stabilize the controlled value at the position of the target value.

Suitable for flow control, pressure control and temperature control and other process control applications.

Code	Parameter name	Setting range		Factory setting	Change limits
UA.00	PID reference source	UA.01 setting	0	0	☆`
		Analog AI1 reference	1		
		Analog AI2 reference	2		
		Panel potentiometer reference	3		
		High-speed pulse setting	4		
		Communications setting	5		
		Multi-stage command setting	6		

UA.01	PID keyboard reference	0.0% to 100.0%		50.0%	☆

This parameter is used to select the process PID target value reference channel.

The set target value of process PID is a relative value, the setting range is from 0.0% to 100.0%. The feedback value of PID is also a relative value, the role of PID is to remain the same for the two relative values.

UA.02	PID feedback source	AI1	0	0	☆
		AI2	1		
		Panel potentiometer setting	2		
		AI1－AI2	3		
		High-speed pulse setting	4		
		Communications setting	5		
		AI1+AI2	6		
		MAX(|AI1|, |AI2|)	7		
		MIN (|AI1|, |AI2|)	8		

This parameter is used to select the process PID feedback signal channel.

The feedback value of process PID is also a relative value, the setting range is from 0.0% to 100.0%.

UA.03	PID action direction	Positive	0	0	☆
		Negative	1		

Positive: When PID feedback signal is less than a reference value, the inverter output frequency will rise. Such as rewinding tension control applications.

Negative: When PID feedback signal is less than a reference value, the inverter output frequency will drop. Such as unwinding tension control applications. This feature is affected by the negated PID action direction of multi-function terminals (function 35), please use with caution.

UA.04	PID reference feedback range	0 to 65535	1000	☆

PID reference feedback range is a dimensionsless unit for PID setting display(d0.15) and PID feedback display(d0.16).

The 100.0% of the relative value of PID reference feedback corresponds to a setting feedback range(UA.04). If UA.04 is set to 2000, when PID setting is 100.0%, PID setting display(d0.15) will be 2000.

UA.05	Proportional gain KP1	0.0 to 100.0	20.0	☆
UA.06	Integration time Ti1	0.01s to 10.00s	2.00s	☆
UA.07	Differential time Td1	0.00 to 10.000	0.000s	☆

Proportional gain KP1:

Used to decide the extent of the PID regulator, the greater KP1, the greater adjusting

extent. This parameter 100.0 means that when the deviation of PID feedback value and reference value is 100.0%, the PID regulator will adjust the output frequency command to the maximum frequency.

Integration time Ti1: used to decide the extent of integral adjustment of the PID regulator. The shorter integration time, the greater extent of integral adjustment The integration time means that when the deviation of PID feedback value and reference value is 100.0%, the integration regulator will successively adjust to the maximum frequency for the time.

Differential time Td1: used to decide the extent that the PID regulator adjusts the deviation change rate. The longer differential time, the greater extent of adjustment The differential time means that the feedback value changes 100.0% within the time, the differential regulator will adjust to the maximum frequency.

UA.08	PID inversion cutoff frequency	0.00 to U0.10(maximum frequency)	2.00Hz	☆

In some cases, only when the PID output frequency is negative (i.e.the inverter reverses), PID can control the reference value and the feedback value to the same states, but the excessive inversion frequency is not allowed in some occasions, UA.08 is used to the upper limit of determine inversion frequency.

UA.09	PID deviation limit	0.0% to 100.0%	0.01%	☆

When the deviation between PID reference value and PID feedback value is less than UA.09, PID will stop regulating action. Thus, when the deviation is lesser, the output frequency will be stable, it is especially effective for some closed-loop control occasions.

UA.10	PID differential limiting	0.00% to 100.00%	0.10%	☆

The role of the differential is more sensitive in PID regulator, is likely to cause system oscillation, generally the role is limited to a smaller range, UA.10 is used to set PID differential output range.

UA.11	PID reference change time	0.00s to 650.00s	0.00s	☆

The PID reference change time means the required time that PID reference value changes from 0.0% to 100.0%.

When the PID reference changes, the PID reference value will change linearly according to the reference change time to reduce the adverse effects to the system caused by a sudden reference change.

UA.12	PID feedback filter time	0.00s to 60.00s	0.00s	☆
UA.13	PID output filter time	0.00s to 60.00s	0.00s	☆

UA.12 is used for filtering the PID feedback quantity, the filter helps reduce the influence of interference to the feedback quantity, but will bring the response performance of the process closed loop system.

UA.13 is used for filtering the PID output frequency, the filter will weaken the sudden change of the inverter output frequency, but it will also bring the response performance of the process closed loop system.

UA.15	Proportional gain KP2	0.0 to 100.0	20.0	☆

UA.16	Integration time Ti2	0.01s to 10.00s	2.00s	☆
UA.17	Differential time Td2	0.00 to 10.000	0.000s	☆
UA.18	PID parameter switching conditions	No switching — 0 Switching through DI terminal — 1 Automatically switching according to deviation. — 2	0	☆
UA.19	PID parameter switching deviation 1	0.0% to UA.20	20.0%	☆
UA.20	PID parameter switching deviation 2	UA.19 to 100.0%	80.0%	☆

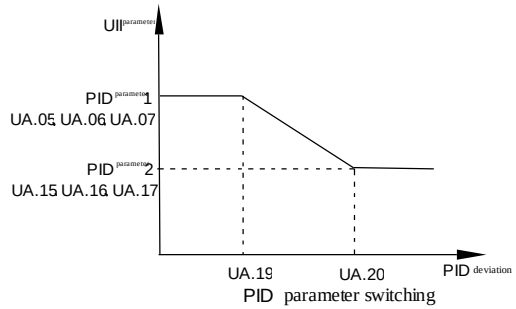
In some applications, only one group of PID parameters can not meet the needs of the entire run, it is required to use different PID parameters under different conditions.

This group of function codes is used to switch between two groups of PID parameters. Which the setting method for regulator parameter(UA.15 to UA.17) is similar to the parameter(UA.05 to UA.07).

The two groups of PID parameters can be switched by the multi-functional digital DI terminal, can also be switched automatically according to the PID deviation.

If you select the multi-functional DI terminal, the multi-function terminal function selection shall be set to 43 (PID parameter switching terminal), select parameter group 1 (UA.05 UA.07) when the terminal is inactive, otherwise select parameter group 2 (UA.15 to UA.17).

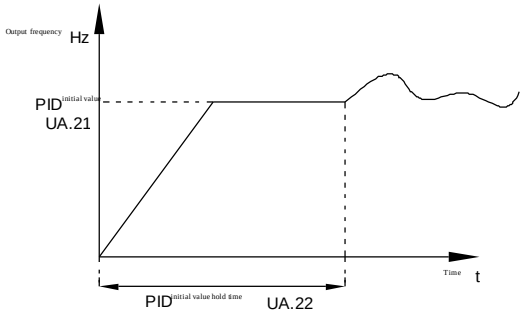
If you select the automatic switch mode, and when the absolute value of deviation between reference and feedback parameters is less than PID parameter switching deviation 1(UA.19), select parameter group 1 for PID parameter. When the absolute value of deviation between reference and feedback parameters is more than PID parameter switching deviation 2(UA.20), select parameter group 2 for PID parameter. If the deviation between reference and feedback parameters is between switching deviation 1 and switching deviation 2, PID parameter is the linear interpolation of the two groups of PID parameters , as shown in the figure.



UA.21	PID initial value	0.0% to 100.0%	0.0%	☆
UA.22	PID initial value hold time	0.00s to 360.00s	0.00s	☆

When the inverter starts, PID output is fixed at PID initial value(UA.21), and then continuous for the PID initial value hold time(UA.22), at last PID begins operation of the closed-loop adjustment.

The figure is functional schematic of PID initial value.



Functional schematic of PID initial value.

This function is used to limit the deviation between two PID output beats(2ms/beats), in order to suppress the too fast changes of PID output so that stabilizing the inverter operation.

UA.23	Maximum deviation of twice outputs(forward)	0.00% to 100.00%	1.00%	☆
UA.24	Maximum deviation of twice outputs(backward)	0.00% to 100.00%	1.00%	☆

UA.23 and UA.24 respectively corresponds to the maximum of the absolute value of output deviation when rotating forward and reverse.

UA.25	PID integral properties	Units digit	Integral separation	00	☆
		Invalid	0		
		Valid	1		
		Tens digit	Whether stop integration when output reaches limit		
		Continue	0		
		Stop	1		

Integral separation:

If the integral separation is set to active, when the integral pause of multifunction digital DI(function 22) is active, PID integral will stop operations, at the time only the proportional and derivative actions of PID is active.

If the integral separation is set to inactive, however the multifunction digital DI is active or inactive, the integral separation will be inactive. Whether stop integration when output reaches limit: you can select whether or not to stop the integral action after PID operation output reaches the maximum or the minimum value If you select to stop the integral action, the PID integral will stop the calculation, which may help to reduce the overshoot of PID.

UA.26	PID feedback loss detection value	0.0%: not judged feedback loss 0.1% to 100.0%	0.0%	☆
UA.27	PID feedback loss detection time	0.0s to 20.0s	1.0s	☆

This function code is used to determine whether the PID feedback is lost or not.

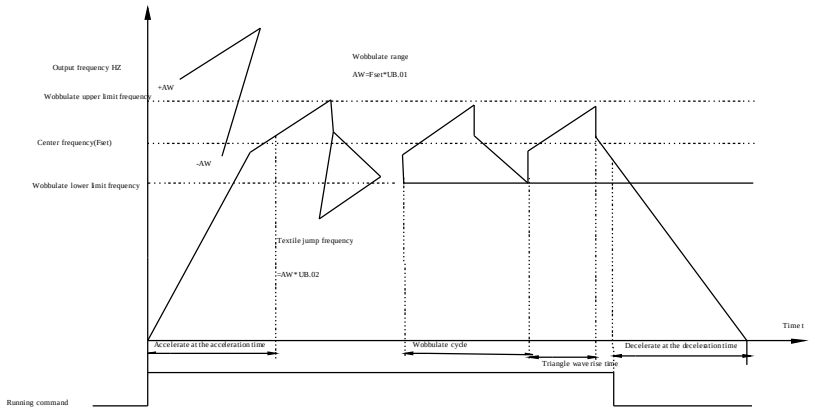
When the PID feedback is less than the PID feedback loss detection value(UA.26), and the duration is longer than the PID feedback loss detection time(UA.27), the inverter will alarm fault ID Err.31, and troubleshoot according to the selected method.

UA.28	Computing status after PID stop	Stop without computing	0	0	☆
		Stop with computing	1		

Used to select whether to continue computing in the state of PID shutdown. Generally, PID will stop computing in the state of shutdown.

5-2-13.Wobbulate, fixed-length and counting:Ub.00-Ub.09

Wobbulate function is suitable for the textile, chemical, and other industries, as well as occasions that needs traverse and winding function. Wobbulate function means that the inverter output frequency swings up and down to set the frequency centering around the set frequency, the locus the operating frequency on the timeline is as shown in figure, which the swing amplitude is set by Ub.00 and Ub.01, when Ub.01 is set to 0, the wobbulate will not work.



Schematic diagram of wobbulate operating

Code	Parameter name	Setting range		Factory setting	Change limits
Ub.00	Swing setting manner	Relative to center frequency	0	0	☆
		Relative to maximum frequency	1		

This parameter is used to determine the baseline of the swing

0: relative to center frequency(U0.07 frequency source)

For the variable swing system. The swing varies with the change of center frequency (the set frequency)

1: relative to maximum frequency(U0.10)

For the fixed swing system, the swing is fixed

Ub.01	Wobbulate range	0.0% to 100.0%	0.0%	☆
Ub.02	Sudden jump frequency range	0.0% to 50.0%	0.0%	☆

The parameter is used to determine the value of swing and the value of sudden jump frequency.

When the swing is set to Relative To Center frequency(Ub.00=0), Swing (AW) = frequency source (U0.07) × swing amplitude((Ub.01). When the swing is set to Relative To Maximum Frequency(Ub.00=1), Swing (AW) = maximum frequency (U0.10) × swing amplitude((Ub.01).

If the sudden jump frequency range is selected for wobbulate operation, the frequency percentage of sudden jump frequency range relative to swing, i.e.: Sudden jump frequency = Swing(AW)×Sudden jump frequency range(Ub.02). When the swing is set to Relative To Center frequency(Ub.00=0), the sudden jump frequency is the variable value. When the swing is set to Relative To Middle Frequency(Ub.00=1), the sudden jump frequency is the fixed value.

The frequency of wobbulate operation is restricted by the upper and lower frequencies.

Ub.03	Wobbulate cycle	0.1s to 3000.0s	10.0s	☆
Ub.04	Triangle wave rise time coefficient	0.0% to 50.0%	0	☆

Wobbulate cycle: the time of a complete wobbulate cycle.

Triangle wave rise time coefficient(Ub.04), the time percentage of Riangle Wave Rise Time relative to Wobbulate Cycle(Ub.03) Triangle wave rise time = Wobbulate cycle(Ub.03) × Triangle wave rise time coefficient(Ub.04), unit: second(s). Triangle wave drop time = Wobbulate cycle(Ub.03) × (1 - Triangle wave rise time coefficient(Ub.04)), unit: second(s).

Ub.05	Set length	0m to 65535m	1000m	☆
Ub.06	Actual length	0m to 65535m	0m	☆
Ub.07	Pulse per meter	0.1 to 6553.5	100.0	☆

The above function codes are used to fixed-length control.

The length information is sampled through the multi-function digital input terminal, the pulse number sampled by terminal divides the pulse per meter(Ub.07), so then the actual length(Ub.06) can be computed out. When the actual length is greater than the set length (Ub.05), the multi-functional digital DO will output "Length Arrival" ON signal.

During the fixed-length control, the multifunction DI terminal can be used to reset length (DI function selects 28), please refer to U4.00 to U4.09 for details.

In some applications, the related input terminal function shall be set to "Length Count Input"(function 27), when the pulse frequency is higher, DI5 port must be used .

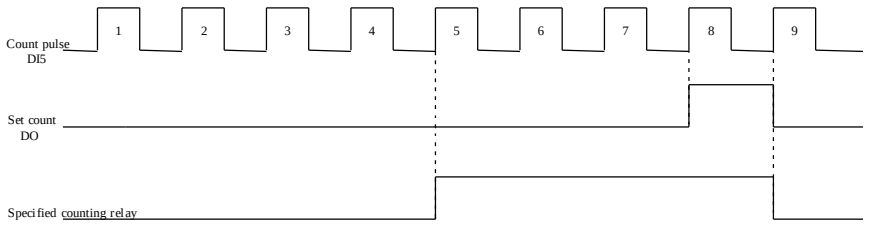
Ub.08	Set count value	1 to 65535	1000	☆
Ub.09	Specified count value	1 to 65535	1000	☆

The count value needs to be sampled through the multi-function digital input terminal. In some applications, the related input terminal function shall be set to "Counter Input"(function 25), when the pulse frequency is higher, DI5 port must be used .

When the count value reaches the set count value(Ub.08), the multifunction digital DO will output "Set Count Value Arrival" ON signal, then the counter stops counting.

When the count value reaches the specified count value(Ub.09), the multifunction digital DO will output "Specified Count Value Arrival" ON signal, then the counter continues to count, and then stop till the set count value.

The figure is the schematic diagram of Ub.08 = 8 and Ub.09 = 4.



Schematic diagram of the set count value reference and the specified count value reference

5-2-14.Multi-stage command, simple PLC: UC.00-UC.51

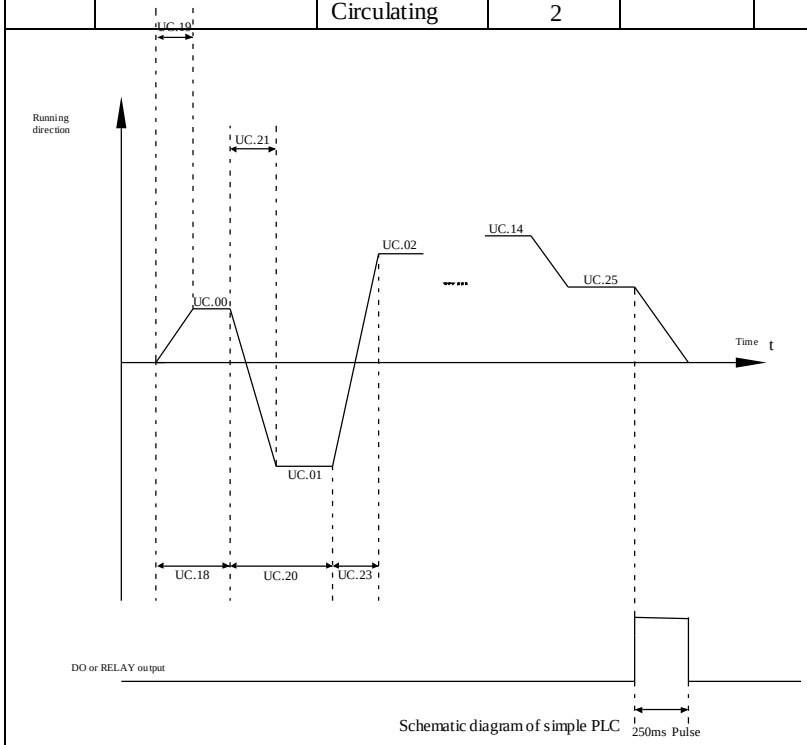
PI9000's multi-stage command has the richer function than the usual multi-speed command, in addition to the multi-speed function , it can also be used as process PID reference source. Therefore, the dimensionl of multi-stage command is a relative value.

Code	Parameter name	Setting range	Factory setting	Change limits
UC.00	0-stage speed setting 0X	-100.0% to 100.0%	0.0%	☆
UC.01	1-stage speed setting 1X	-100.0% to 100.0%	0.0%	☆
UC.02	2-stage speed setting 2X	-100.0% to 100.0%	0.0%	☆
UC.03	3-stage speed setting 3X	-100.0% to 100.0%	0.0%	☆
UC.04	4-stage speed setting 4X	-100.0% to 100.0%	0.0%	☆
UC.05	5-stage speed setting 5X	-100.0% to 100.0%	0.0%	☆
UC.06	6-stage speed setting 6X	-100.0% to 100.0%	0.0%	☆
UC.07	7-stage speed setting 7X	-100.0% to 100.0%	0.0%	☆
UC.08	8-stage speed setting 8X	-100.0% to 100.0%	0.0%	☆
UC.09	9-stage speed setting 9X	-100.0% to 100.0%	0.0%	☆
UC.10	10-stage speed setting 10X	-100.0% to 100.0%	0.0%	☆
UC.11	11-stage speed setting 11X	-100.0% to 100.0%	0.0%	☆
UC.12	12-stage speed setting 12X	-100.0% to 100.0%	0.0%	☆
UC.13	13-stage speed setting 13X	-100.0% to 100.0%	0.0%	☆
UC.14	14-stage speed setting 14X	-100.0% to 100.0%	0.0%	☆
UC.15	15-stage speed setting 15X	-100.0% to 100.0%	0.0%	☆

The multi-stage command can be used as frequency source, can also act as the set source of process PID. The dimension of multi-stage command is the relative values and its range is from -100.0% to 100.0%, when it acts as the frequency source, it is the percentage of maximum frequency; due to the PID reference is originally as a relative value, therefore the multi-stage command acts as the set source of PID and does not need dimension conversion.

The multi-stage command needs to switch according to the different states of multifunction digital DI, please refer to U4 group for specific instructions

UC.16	Simple PLC running mode	Stop after single running	0	0	☆
		Hold final value after single running	1		
		Circulating	2		



The above figure is the schematic diagram of Simple PLC as the frequency source. For Simple PLC as the frequency source, the positive or negative value of UC.00 to UC.15 determines the running direction, the negative value indicates that the inverter runs at the opposite direction.

As the frequency source, PLC operates in three modes, including:

0: stop after single running

After the inverter completes a single cycle, it will automatically shut down , the running command must be given before restart.

1: hold final value after single running

After the inverter completes a single cycle, it will automatically maintain the frequency and direction of the last stage.

2: circulating

After the inverter completes a cycle, it will automatically start next cycle, and stop till the stop command is given.

UC.17	Simple PLC power-down memory selection	Units digit	Power-down memory selection	00	☆
		Power-down without memory	0		
		Power-down with memory	1		
		Tens digit	Stop memory selection		
		Stop without memory	0		
		Stop with memory	1		

PLC "Power-Down With Memory" means that the PLC operating stage and frequency before power-down are memorized, and then it will continue to run from the position of the memorized stage in next power-on. If Power-Down Without Memory is selected, the PLC process will restart from the starting position for each power-on

PLC "Stop With Memory" means that the PLC operating stage and frequency before stop are recorded, and then it will continue to run from the position of the recorded stage in next run. If Stop Without Memory is selected, the PLC process will restart from the starting position for each start.

UC.18	0 stage running time T0	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.19	0 stage ac/deceleration time	0 to 3	0	☆
UC.20	1 stage running time T1	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.21	1 stage ac/deceleration time	0 to 3	0	☆
UC.22	2 stage running time T2	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.23	2 stage ac/deceleration time	0 to 3	0	☆
UC.24	3 stage running time T3	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.25	3 stage ac/deceleration time selection	0 to 3	0	☆
UC.26	4 stage running time T4	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.27	4 stage ac/deceleration time selection	0 to 3	0	☆
UC.28	5 stage running time T5	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.29	5 stage ac/deceleration time selection	0 to 3	0	☆
UC.30	6 stage running time T6	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.31	6 stage ac/deceleration time selection	0 to 3	0	☆
UC.32	7 stage running time T7	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.33	7 stage ac/deceleration time selection	0 to 3	0	☆
UC.34	8 stage running time T8	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.35	8 stage ac/deceleration time selection	0 to 3	0	☆
UC.36	9 stage running time T9	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.37	9 stage ac/deceleration time selection	0 to 3	0	☆
UC.38	10 stage running time T10	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.39	10 stage ac/deceleration time selection	0 to 3	0	☆
UC.40	11 stage running time T11	0.0s(h) to 6500.0s(h)	0.0s(h)	☆
UC.41	11 stage ac/deceleration time selection	0 to 3	0	☆
UC.42	12 stage running time T12	0.0s(h) to 6500.0s(h)	0.0s(h)	☆

UC.43	12 stage ac/deceleration time selection	0 to 3		0	☆
UC.44	13 stage running time T13	0.0s(h) to 6500.0s(h)		0.0s(h)	☆
UC.45	13 stage ac/deceleration time selection	0 to 3		0	☆
UC.46	14 stage running time T14	0.0s(h) to 6500.0s(h)		0.0s(h)	☆
UC.47	14 stage ac/deceleration time selection	0 to 3		0	☆
UC.48	15 stage running time T15	0.0s(h) to 6500.0s(h)		0.0s(h)	☆
UC.49	15 stage ac/deceleration time selection	0 to 3		0	☆
UC.50	Simple PLC run-time unit	S (seconds)	0	☆	☆
		H (hours)	1		
UC.51	Multi-stage command 0 reference manner	Function code UC.00 reference	0	0	☆
		AI1	1		
		AI2	2		
		Panel potentiometer reference	3		
		High-speed pulse reference	4		
		PID control reference	5		
		Keyboard set frequency (U0.08) reference, UP/DN can be modified	6		

This parameter determines the multi-stage command 0 reference channel.

The multi-stage command 0 not only can select UC.00, but also there are a variety of other options so as to facilitate switching between the multi-stage command and the other reference manner.

5-2-15.Communications parameters: Ud.00-Ud.06

Please refer to PI9000 Communication Protocol

Code	Parameter name	Setting range		Factory setting	Change limits
Ud.00	Baud rate	Units digit	MODBUS	5	☆
		300BPS	0		
		600BPS	1		
		1200BPS	2		
		2400BPS	3		
		4800BPS	4		
		9600BPS	5		
		19200BPS	6		
		38400BPS	7		
Ud.01	Data format	No parity (8-N-2)	0	0	☆
		Even parity (8-E-1)	1		
		Odd parity (8-O-1)	2		
		8-N-1	3		
Ud.02	This unit address	1-247, 0 for broadcast address		1	☆
Ud.03	Response delay	0ms-20ms		2	☆
Ud.04	Communication timeout time	0.0 (invalid), 0.1s-60.0s		0.0	☆
Ud.05	Data transfer format selection	Units digit	MODBUS	30	☆
		Non-standard MODBUS protocol	0		
		Standard MODBUS protocol	1		
		Tens digit	Profibus		
		PPO1 format	0		
		PPO2 format	1		
		PPO3 format	2		
		PPO5 format	3		
Ud.06	Communication read current resolution	0.01A	0	0	☆
		0.1A	1		

5-2-16.Function code management:UP.00-UP.04

Code	Parameter name	Setting range		Factory setting	Change limits
UP.00	User password	0 to 65535		0	☆
When UP.00 is set to one any non-zero number, the password protection will take effect. You enter the menu for the next time, you must enter the password correctly, otherwise can not view and modify the function parameters, please keep in mind the set user password. When UP.00 is set to 0, the set user password will be cleared, the password protection function is invalid.					
UP.01	Parameter initialization	No operation	0	0	★
		Restore the factory parameters, not including motor parameters	1		
		Clear history	2		
		Restore default parameter values, including motor parameters	3		
		Backup current user parameters	4		
		Restore user backup parameters	501		
1: restore the factory setting, not including motor parameters After UP.01 is set to 1, most of the inverter function parameters are restored to the factory default parameters, but motor parameters, frequency command decimal point (U0.22), fault recording information, cumulative running time (U7.09), cumulative power-on time(U7.13) and cumulative power consumption(U7.14) will not be restored. 2: clear history To clear the history of the inverter's fault recording information, cumulative running time (U7.09), cumulative power-on time(U7.13) and cumulative power consumption(U7.14) 3: restore default parameter values including motor parameters 4: backup current user parameters Backup the parameters set by the current user. Backup all function parameters. It is easy to restore the default settings when user incorrectly adjust parameters. 501, Restore user backup parameters Restore previous backup user parameters.					
UP.02	Function parameters display properties	Units digit	U group display selection	11	★
			Not display	0	
			Display	1	
		Tens digit	E group display selection		
			Not display	0	
			Display	1	
UP.04	Function code modification properties	Modifiable	0	0	☆
		Not modifiable	1		
User can set whether function code parameter can be modified or not, so as to prevent the risk that function parameters are altered unexpectedly. If the function code is set to 0, all function code can be modified; while it is set to 1, all function code can only be viewed, can not be modified.					

5-2-17.Torque control parameters:E0.00-E0.08

Code	Parameter name	Setting range		Factory setting	Change limits
E0.00	Speed/torque control mode selection	Speed control	0	0	★
		Torque control	1		
Used to select the inverter control mode: speed control or torque control. PI9000 multifunction digital terminal has two related functions on torque control: torque control banned (function 29), and speed control / torque control switching (function 46). The two terminals must use in conjunction with E0.00 so as to switch between speed control and torque control. When the speed control / torque control switching terminal is invalid, the control mode is determined by E0.00, if the terminal is valid, the control manner is equivalent to the E0.00's value negated. In any case, when the torque control ban terminal is valid, the inverter is fixed at speed control mode.					
E0.01	Torque setting source selection under torque control mode	Keyboard setting (E0.03)	0	0	★
		Analog AI1 setting	1		
		Analog AI2 setting	2		
		Panel potentiometer setting	3		
		High-speed pulse setting	4		
		Communications reference	5		
		MIN(AI1, AI2)	6		
		MAX(AI1, AI2)	7		

E0.03	Torque digital setting under torque control mode	-200.0% to 200.0%	150%	☆
E0.04	Torque filter time	0.00s to 10.00s	0	☆

E0.01 is used to select the torque setting source, there are eight torque setting modes in all.

The torque setting adopts the relative value, the 100.0% corresponds to the rated torque of inverter. Setting range is from -200.0% to 200.0%, indicating that the maximum torque of inverter is 2 times of the rated torque of inverter.

When the torque setting adopts mode 1 to 7, the 100% of communications, analog input and pulse input corresponds to E0.03.

E0.05	Torque control forward maximum frequency	0.00Hz to maximum frequency(U0.10)	50.00Hz	☆
E0.06	Torque control reverse maximum frequency	0.00Hz to maximum frequency(U0.10)	50.00Hz	☆

Used to set the maximum operating frequency of inverter forward or reverse running under the torque control mode

Under the torque control mode, if the load torque is less than the motor output torque, the motor speed will continue to rise, in order to prevent "Runaway" and other accidents of mechanical systems, it is necessary to limit the maximum speed of motor under the torque control mode.

E0.07	Torque control acceleration time	0.00s to 36000s	0.00s	☆
E0.08	Torque control deceleration time	0.00s to 36000s	0.00s	☆

Under the torque control mode, the difference between the motor output torque and load torque determines the change rate in speed of the motor and load, therefore, the motor speed may rapidly change, resulting in the problems such as noise or excessive mechanical stress. By setting the torque control ac/deceleration time, you can make a smooth change of motor speed.

But the occasions that needs the rapid response of torque, the torque control ac/deceleration time must be set to 0.00s. For example: when two hardwired motors drag the same one load, in order to ensure that the load is evenly distributed, you must set one inverter as the master unit that works under the speed control mode, the other inverter as the auxiliary unit that works under the torque control mode, the actual output torque of the master unit is used as the torque command of the auxiliary, the torque of the auxiliary needs quickly follow the master unit, so the torque control ac/deceleration time of the auxiliary unit shall be set to 0.00s.

5-2-18.Control optimization parameters: E5.00-E5.09

Code	Parameter name	Setting range	Factory setting	Change limits
E5.00	Upper limiting frequency for DPWM switching	0.00Hz to 15Hz	12.00Hz	☆

PWM waveform generation mode is only valid for VF control. The combination of 7-stage and 5-stage can achieve the purpose of optimizing PWM waveform. Below this value, it is the 7-stage continuous modulation mode, on the contrary, it is the 5-stage interrupted modulation mode.

The inverter with the 7-stage continuous modulation mode has larger switching loss but smaller current ripple; the inverter with the 5-stage continuous modulation mode has smaller switching loss but larger current ripple

Please refer to the function codes U3.11 for the instability on VF running, please refer to the function code U0.15 for the inverter loss and temperature rise;

E5.01	PWM modulation manner	Asynchronous	0	0	☆
		Synchronou	1		

Only valid for VF control. Synchronous modulation refers to that the carrier frequency linearly change with the change of output frequency, in order to ensure the unchanged of their ratio(carrier to noise ratio), generally it is used when the output frequency is higher, is conducive to ensure the output voltage quality.

Under the lower output frequency (100Hz) mode, generally the synchronize modulation is not required, because at the time the ratio of the carrier frequency to the output frequency is relatively high, the asynchronous modulation has more obvious advantages.

When the operating frequency is higher than 85Hz, the synchronous modulation takes effect, the fixed mode is the asynchronous modulation below the frequency.

E5.02	Deadband compensation mode selection	No compensation	0	1	☆
		Compensation mode 1	1		
		Compensation mode 2	2		

Generally do not need to modify this parameter, only when the special requirements to the output voltage waveform quality is required or when the motor oscillation and other abnormal happen, you need to try to switch to select a different mode of compensation.

The compensation mode 2 for high-power is recommended.

E5.03	Random PWM depth	Random PWM invalid	0	0	☆
		PWM carrier frequency random depth	1 to 10		

By setting Random PWM, the monotonous and shrill motor sound can become softer and which helps reduce external electromagnetic interference. When Random PWM Depth is set to 0, Random PWM will be invalid. It will get different results by adjusting different Random PWM Depths,

E5.04	Fast current limiting manner	Disable	0	1	☆
		Enable	1		

Enable Quick Current Limiting function, which can minimize the overcurrent fault of inverter , and ensure the uninterrupted operation of inverter. If the drive is in the state of fast current limiting for a long period of time , the inverter may be damaged by overheating and others, this case is not allowed, so the inverter will alarm fault with fault ID Err.40, it indicates that the inverter exists overload and needs to be shut down.

E5.05	Current detection compensation	0 to 100	5	☆

Used to set the inverter's current sensing compensation, if the set value is too large, which may reduce the control performance. Generally do not need to be modified.					
E5.06	Undervoltage point setting	60.0% to 140.0%		100.0%	☆
Used to set the voltage value of inverter undervoltage fault with fault ID Err.09 , the different voltage levels of inverter 100.0% corresponds to the different voltage points are as follows: Single-phase 220V or three-phase 220V: 200V three-phase 380V: 350V Three-phase 480V: 450V three-phase 690V: 650V					
E5.07	Vector optimization without PG mode selection	No optimization	0	1	☆
		Optimization mode 1	1		
		Optimization mode 2	2		
1: optimization mode 1 Used for the requirements of higher torque control linearity. 2: optimization mode 2 Used for the requirements of higher speed stability.					
E5.08	Deadband time adjustment	100% to 200%		150%	☆
E5.09	Overvoltage point setting	200.0V to 2500.0V		810	☆
Settings for the level of 1140V voltage. The adjustment of this value can improve the effective utilization of voltage, if the value is set to too small, which easily lead to the instability of system running. It's not recommended that user modifies it.					

Chapter 6 EMC (Electromagnetic Compatibility)

6-1.Definition

Electromagnetic compatibility refers to the ability that the electric equipment runs in an electromagnetic interference environment and implements its function stably without interferences on the electromagnetic environment.

6-2.EMC standard

In accordance with the requirements of the Chinese national standard GB/T12668.3, the inverter must comply with the requirements of electromagnetic interference and anti- electromagnetic interference.

Our existing products adopt the latest international standards: IEC/EN61800-3: 2004 (AdjPstable sPeed electrical Power drive systems Part 3: EMC reqPirements and sPecific test methods), which is equivalent to the Chinese national standards GB/T12668.3. EC/EN61800-3 assesses the inverter in terms of electromagnetic interference and anti-electronic interference. Electromagnetic interference mainly tests the radiation interference, conduction interference and harmonics interference on the inverter (necessary for civil inverter)

Anti-electromagnetic interference mainly tests the conduction immunity, radiation immunity, surge immunity, EFTB(Electrical Fast Transient Burs) immunity, ESD immunity and power low frequency end immunity (the specific test items includes: 1. Immunity tests of input voltage sag, interrupt and change; 2.commutation notch immunity; 3. harmonic input immunity ; 4. input frequency change; 5. input voltage unbalance; 6. input voltage fluctuation). The tests shall be conducted strictly in accordance with the above requirements of IEC/EN61800-3, and our products are installed and used according to the guideline of the Section 7.3 and can provide good electromagnetic compatibility in general industry environment.

6-3.EMC directive

6-3-1.Harmonic effect:

The higher harmonics of power supply may damage the inverter. Thus, at some places where the quality of power system is relatively poor, it is recommended to install AC input reactor.

6-3-2.Electromagnetic interference and installation precautions:

There are two kinds of electromagnetic interferences, one is the interference from electromagnetic noise in the surrounding environment to the inverter, and the other is the interference from the inverter to the surrounding equipments.

Installation Precautions:

1) The earth wires of the Inverter and other electric products ca shall be well grounded;

2) The power cables of the inverter power input and output and the cable of weak current signal (e.g. control line) shall not be arranged in parallel but in vertical if possible.

3) It is recommended that the output power cables of the inverter shall use shield cables or steel pipe shielded cables and that the shielding layer shall be grounded reliably, the lead cables of the equipment suffering interferences shall use twisted-pair shielded control cables, and the shielding layer shall be grounded reliably.

4) When the length of motor cable is longer than 100 meters, it needs to install output filter or reactor.

6-3-3.Remedies for the interferences from the surrounding electromagnetic equipments to the inverter:

Generally the electromagnetic interference on the inverter is generated by plenty of relays, contactors and electromagnetic brakes installed near the inverter. When the inverter has error action due to the interferences, the following measures is recommended:

1) Install surge suppressor on the devices generating interference;

2) Install filter at the input end of the inverter, please refer to Section 7.3.6 for the specific operations.

3) The lead cables of the control signal cable of the inverter and the detection line shall use the shielded cable and the shielding layer shall be grounded reliably.

6-3-4.Remedies for the interferences from the inverter to the surrounding electromagnetic equipments:

These noise interferences are classified into two types: one is the radiation interference of the inverter, and the other is the conduction interference of the inverter. These two types of interferences cause that the surrounding electric equipments suffer from the affect of electromagnetic or electrostatic induction. Further, the surrounding equipment produces error action. For different interferences, please refer to the following remedies:

1) Generally the meters, receivers and sensors for measuring and testing have more weak signals. If they are placed nearby the inverter or together with the inverter in the same control cabinet, they easily suffer from interference and thus generate error actions. It is recommended to handle with the following methods: away from the interference source as far as possible; do not arrange the signal cables with the power cables in parallel and never bind them together; both the signal cables and power cables shall use shielded cables and shall be well grounded; install ferrite magnetic ring (with suppressing frequency of 30 to 1, 000MHz) at the output side of the inverter and wind it 2 to 3 turns; install EMC output filter in more severe conditions.

2) When the interfered equipment and the inverter use the same power supply, it may cause conduction interference. If the above methods cannot remove the interference, it shall install EMC filter between the inverter and the power supply (refer to Section 7.3.6 for the selection operation);

3) The surrounding equipment shall be separately grounded, which can avoid the interference caused by the leakage current of the inverter's grounding wire when common grounding mode is adopted.

6-3-5.Remedies for leakage current

There are two forms of leakage current when using the inverter. One is leakage

current to the earth, and the other is leakage current between the cables.

1) Factors of affecting leakage current to the earth and its solutions:

There are the distributed capacitance between the lead cables and the earth. The larger the distributed capacitance, the larger the leakage current; the distributed capacitance can be reduced by effectively reducing the distance

between the inverter and the motor. The higher the carrier frequency, the larger the leakage current. The leakage current can be reduced by reducing the carrier frequency. However, the carrier frequency reduced may result in

the increase of motor noise.Please note that additional installation of reactor is also an effective method to solve leakage current problem.

The leakage current may increase with the increase of circuit current. Therefore, when the motor power is higher, the corresponding leakage current will be higher too.

2) Factors of producing leakage current between the cables and its solutions:

There is the distributed capacitance between the output cables of the inverter. If the current passing lines has higher harmonic, it may cause resonance and thus result in leakage current. If the thermal relay is used, it may generate error action.

The solution is to reduce the carrier frequency or install output reactor. It is recommended that the thermal relay shall not be installed in the front of the motor when using the inverter, and that electronic over current protection function of the inverter shall be used instead.

6-3-6.Precautions on installing EMC input filter at the input end of power supply

1) Note: when using the inverter, please follow its rated values strictly. Since the filter belongs to Classification I electric appliances, the metal enclosure of the filter and the metal ground of the installing cabinet shall be well earthed in a large area, and have good conduction continuity, otherwise there may be danger of electric shock and the EMC effect may be greatly affected. Through the EMC test, it is found that the filter ground end and the PE end of the inverter must be connected to the same public earth end, otherwise the EMC effect may be greatly affected.

2) The filter shall be installed at a place close to the input end of the power supply as much as possible.

Chapter 7 Troubleshooting

PI9000 can provide effective protection when the equipment performance is played fully. The following faults may appear in the process of use, please refer to the following table to analyze the possible causes and then troubleshoot.

In case of damage to the equipment and the reasons that can not solved, please contact with your local dealers/agents, or directly contact with the manufacturers to seek solutions.

7.1 Fault alarm and countermeasures

PI9000 can provide effective protection when the equipment performance is played fully. In case of abnormal fault, the protection function will be invoked, the inverter will stop output, and the faulty relay contact of the inverter will start, and the fault code will be displayed on the display panel of the inverter. Before consulting the service department, user can perform self-check , analyze the fault cause and find out the solution according to the instructions of this chapter. If the fault is caused by the reasons as described in the dotted frame, please consult the agents of inverter or directly contact with our company.

No.	Fault ID	Failure type	Possible causes	Solutions
1	Err.01	Inverter unit protection	1.the short circuit of inverter output happens 2.the wiring for the motor and the inverter is too long 3.module overheating 4.the internal wiring of inverter is loose 5.the main control panel is abnormal 6.the drive panel is abnormal. 7.the inverter module is abnormal	1.eliminate peripheral faults 2.additionally install the reactor or the output filter 3.check the air duct is blocked or not and the fan is working normally or not, and eliminate problems 4.correctly plug all cables 5.seek for technical support
2	Err.02	Acceleration overcurrent	1.the acceleration time is too short 2.manual torque boost or V/F curve is not suitable 3.the voltage is low 4.the short-circuit or	1.increase acceleration time 2.adjust manual torque boost or V/F curve 3.set the voltage to the normal range 4.eliminate peripheral

No.	Fault ID	Failure type	Possible causes	Solutions
			earthing of inverter output happens 5.the control mode is vector and without identification of parameters 6.the motor that is rotating is started unexpectedly. 7.suddenly increase the load in the process of acceleration. 8.the type selection of inverter is small	faults 5.perform identification for the motor parameters 6.select Speed Tracking Start or restart after stopping the motor. 7.cancel the sudden load 8.choose the inverter with large power level
3	Err.03	Deceleration overcurrent	1.the short-circuit or earthing of inverter output happens 2.the control mode is vector and without identification of parameters 3.the deceleration time is too short 4.the voltage is low 5.suddenly increase the load in the process of deceleration. 6.didn't install braking unit and braking resistor	1.eliminate peripheral faults 2.perform identification for the motor parameters 3.increase the deceleration time 4.set the voltage to the normal range 5.cancel the sudden load 6.install braking unit and brake resistor
4	Err.04	Constant speed overcurrent	1.the short-circuit or earthing of inverter output happens 2.the control mode is vector and without identification of parameters 3.the voltage is low 4, whether suddenly increase the load when running 5.the type selection of	1.eliminate peripheral faults 2.perform identification for the motor parameters 3.set the voltage to the normal range 4.cancel the sudden load 5.choose the inverter with large power level

No.	Fault ID	Failure type	Possible causes	Solutions
			inverter is small	
5	Err.05	Acceleration overvoltage	1.didn't install braking unit and braking resistor 2.the input voltage is high 3.there is external force to drag the motor to run when accelerating. 4.the acceleration time is too short	1.install braking unit and brake resistor 2.set the voltage to the normal range 3.cancel the external force or install braking resistor. 4.increase acceleration time
6	Err.06	Deceleration overvoltage	1.the input voltage is high 2.there is external force to drag the motor to run when decelerating. 3.the deceleration time is too short 4.didn't install braking unit and braking resistor	1.set the voltage to the normal range 2.cancel the external force or install braking resistor. 3.increase the deceleration time 4.install braking unit and brake resistor
7	Err.07	Constant speed overvoltage	1.there is external force to drag the motor to run when running 2.the input voltage is high	1.cancel the external force or install braking resistor. 2.set the voltage to the normal range
8	Err.08	Control power fault	The range of input voltage is not within the specification	Adjust the voltage to the range of the requirements of specification
9	Err.09	Undervoltage fault	1.the momentary power cut 2.the inverter's input voltage is not within the specification 3.the bus voltage is not normal 4.the rectifier bridge and buffer resistance are abnormal 5.the drive panel is abnormal.	1.reset fault 2.adjust the voltage to the normal range 3.seek for technical support

No.	Fault ID	Failure type	Possible causes	Solutions
			6.the control panel is abnormal	
10	Err.10	Inverter overload	1.the type selection of inverter is small 2.whether the load is too large or the motor stall occurs	1.choose the inverter with large power level 2.reduce the load and check the motor and its mechanical conditions
11	Err.11	Motor Overload	1.the type selection of inverter is small 2.whether the setting motor protection parameters (U9.01) is appropriate or not 3.whether the load is too large or the motor stall occurs	1.choose the inverter with large power level 2.correctly set this parameter. 3.reduce the load and check the motor and its mechanical conditions
12	Err.12	Input phase loss	1.the drive panel is abnormal. 2.the lightning protection plate is abnormal 3.the main control panel is abnormal 4.the three-phase input power is not normal	1.replace the drive, the power board or contactor 2.seek for technical support 3.check and eliminate the existing problems in the peripheral line
13	Err.13	Output phase loss	1.the lead wires from the inverter to the motor is not normal 2.the inverter's three phase output is unbalanced when the motor is running 3.the drive panel is abnormal. 4.the module is abnormal	1.eliminate peripheral faults 2.check the motor's three-phase winding is normal or not and eliminate faults 3.seek for technical support
14	Err.14	Module overheating	1.the air duct is blocked 2.the fan is damaged 3.the ambient temperature is too high 4.the module thermistor is damaged	1.clean up the air duct 2.replace the fan 3.decrease the ambient temperature 4.replace the thermistor 5.replace the inverter

No.	Fault ID	Failure type	Possible causes	Solutions
			5.the inverter module is damaged	module
15	Err.15	External equipment fault	Input external fault signal through the multi-function terminal DI	Reset run
16	Err.16	Communication fault	1.the communication cable is not normal 2.the settings for communication expansion card U0.28 are incorrect 3.the settings for communication parameters Ud group are incorrect 4.the host computer is not working properly	1.check the communication cable 2.correctly set the communications expansion card type 3.correctly set the communication parameters 4.check the wiring of host computer
17	Err.17	Contactor fault	1.input phase loss 2.the drive plate and the contact are not normal	1.check and eliminate the existing problems in the peripheral line 2.replace the drive, the power board or contactor
18	Err.18	Current detection fault	1.check Hall device 2.the drive panel is abnormal.	1.replace the drive panel 2.replace hall device
19	Err.19	Motor parameter auto tunning fault	1.the motor parameters was not set according to the nameplate 2.the identification process of parameter is timeout	1.correctly set motor parameter according to the nameplate 2.check the lead wire from the inverter to the motor
20	Err.20	Disk code fault	1.the encoder is damaged 2.PG card is abnormal 3.the encoder model does not match 4.the encoder connection has error	1.replace the encoder 2.replace the PG card 3.correctly set the encoder model according to the actual conditions 4.eliminate the line fault
21	Err.21	EEPROM read and write fault	EEPROM chip is damaged	Replace the main control panel
22	Err.22	Inverter hardware	1.overvoltage	1.eliminate overvoltage

No.	Fault ID	Failure type	Possible causes	Solutions
		fault	2.overcurrent	fault 2.eliminate overcurrent fault
23	Err.23	Short-circuit to ground fault	Motor short to ground	Replace the cable or motor
26	Err.26	Cumulative running time arrival fault	Cumulative running time arrival fault	Clear history information by using initialization function parameters
27	Err.27	Custom fault 1	Input custom fault 1 signal through the multi-function terminal DI	Reset run
28	Err.28	Custom fault 2	Input custom fault 2 signal through the multi-function terminal DI	Reset run
29	Err.29	Total power-on time arrival fault	Total power-on time reaches the set value	Clear history information by using initialization function parameters
30	Err.30	Load drop fault	The inverter running current is less than U9.64	Confirm whether the load is removed or not or the settings for parameter(U9.64, U9.65) accord with the actual operating conditions
31	Err.31	PID feedback loss when running fault	PID feedback is less than the set value of UA.26	Check PID feedback signal or set UA.26 to an appropriate value
40	Err.40	Cycle-by-cycle current limiting fault	1.whether the load is too large or the motor stall occurs 2.the type selection of inverter is small	1.reduce the load and check the motor and its mechanical conditions 2.choose the inverter with large power level
41	Err.41	Switch motor when running fault	Change current motor through the terminal when the inverter is running	Switch motor after the inverter stops
42	Err.42	Too large speed deviation fault	1.the setting for Too Large Speed Deviation parameters(U9.69, U9.70) is unreasonable. 2.the setting for encoder parameters is incorrect 3.the parameter was not	1.reasonably set the detection parameters 2.correctly set encoder parameters 3.perform identification for the motor parameters

No.	Fault ID	Failure type	Possible causes	Solutions
			identified	
43	Err.43	Motor overspeed fault	1.the parameter was not identified 2.the setting for encoder parameters is incorrect 3.the setting for motor overspeed detection parameter(U9.67, U9.68) is unreasonable.	1.perform identification for the motor parameters 2.correctly set encoder parameters 3.reasonably set the detection parameters
45	Err.45	Motor overtemperature fault	1.the wiring of temperature sensor is loose 2.the motor temperature is too high	1.detect the wiring of temperature sensor wiring and eliminate fault. 2.decrease carrier frequency or take other cooling measures to cool motor
51	Err.51	Initial position error	the deviation between the motor parameters and the actual parameters is too large	reconfirm the correct motor parameters, focus on whether the rated current is set to too small.

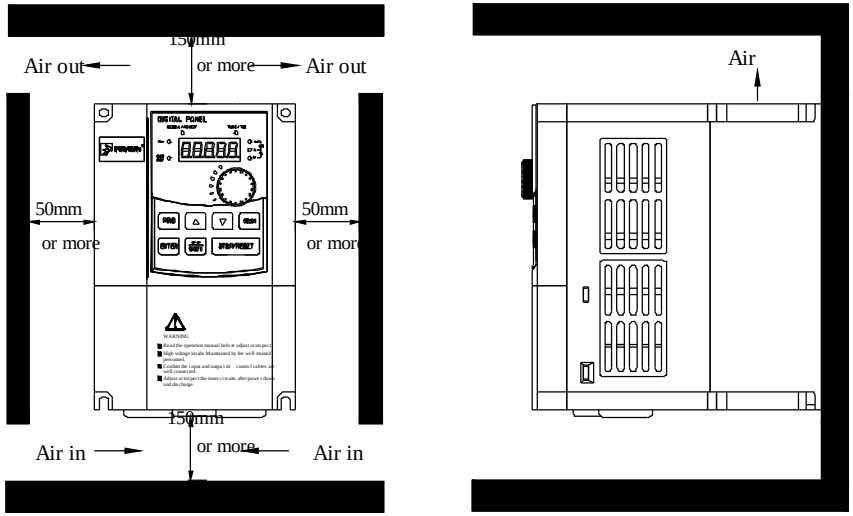
Chapter 8 Installation and spare circuit

8-1.Operating environment

(1) Ambient temperature -10 ℃ to 50 ℃.
(2) Prevent electromagnetic interference, and away from interference sources.
(3) Prevent the ingress of droplets, vapor, dust, dirt, lint and metal fine powder.
(4) Prevent the ingress of oil, salt and corrosive gases.
(5) Avoid vibration.
(6) Avoid high temperature and humidity or exposure to rain, humidity shall be less than 90% RH (non-condensing).
(7) Never use in the dangerous environment of flammable, combustible, explosive gas, liquid or solid.

8-2.Installation direction and space

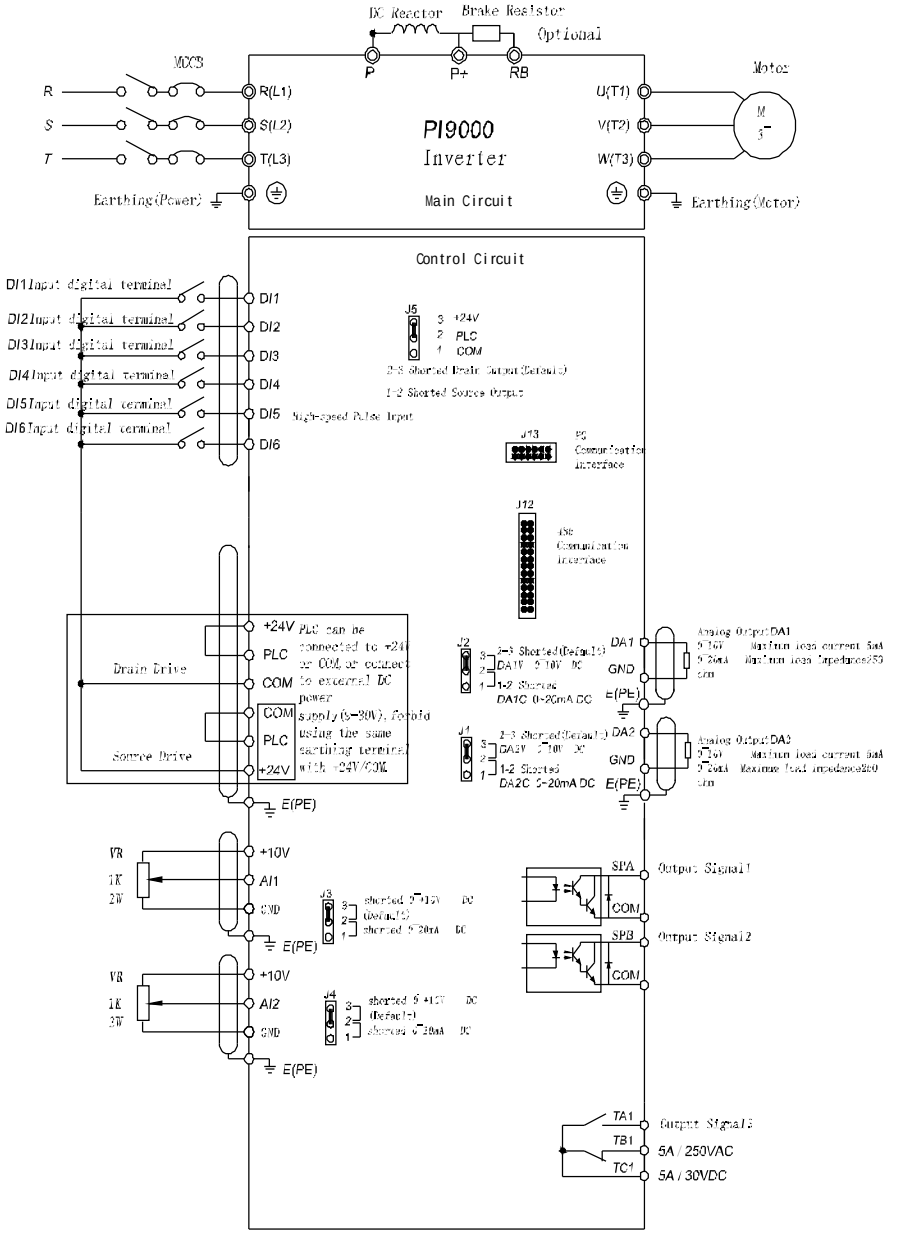
The inverter shall be installed in the room where it is well ventilated, the wall-mounted installation shall be adopted, and the inverter must keep enough space around adjacent items or baffle (wall). As shown below figure:



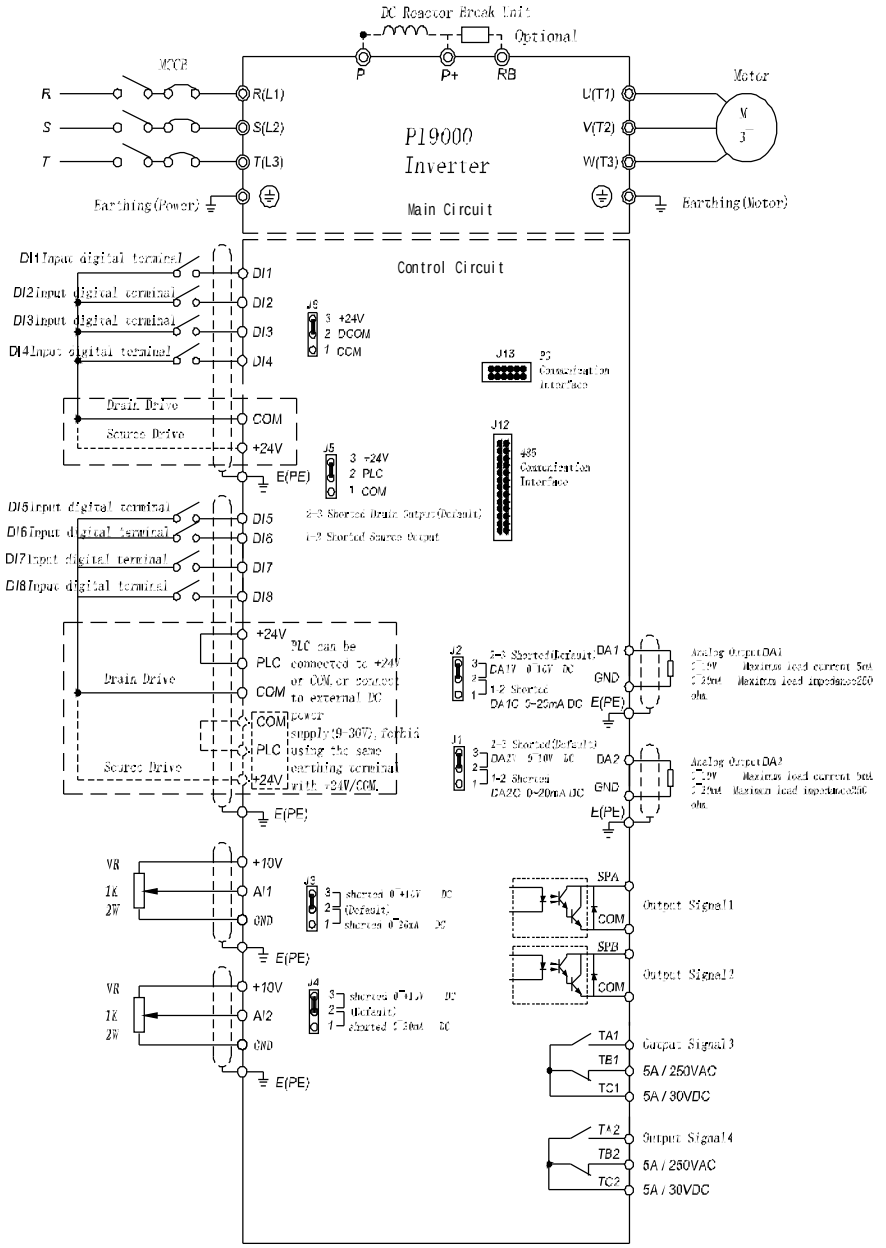
8-3.Wiring diagram

The wiring of inverter is divided into two parts of main circuit and control circuit. User must correctly connect in accordance with the wiring circuit as shown in the following figure.

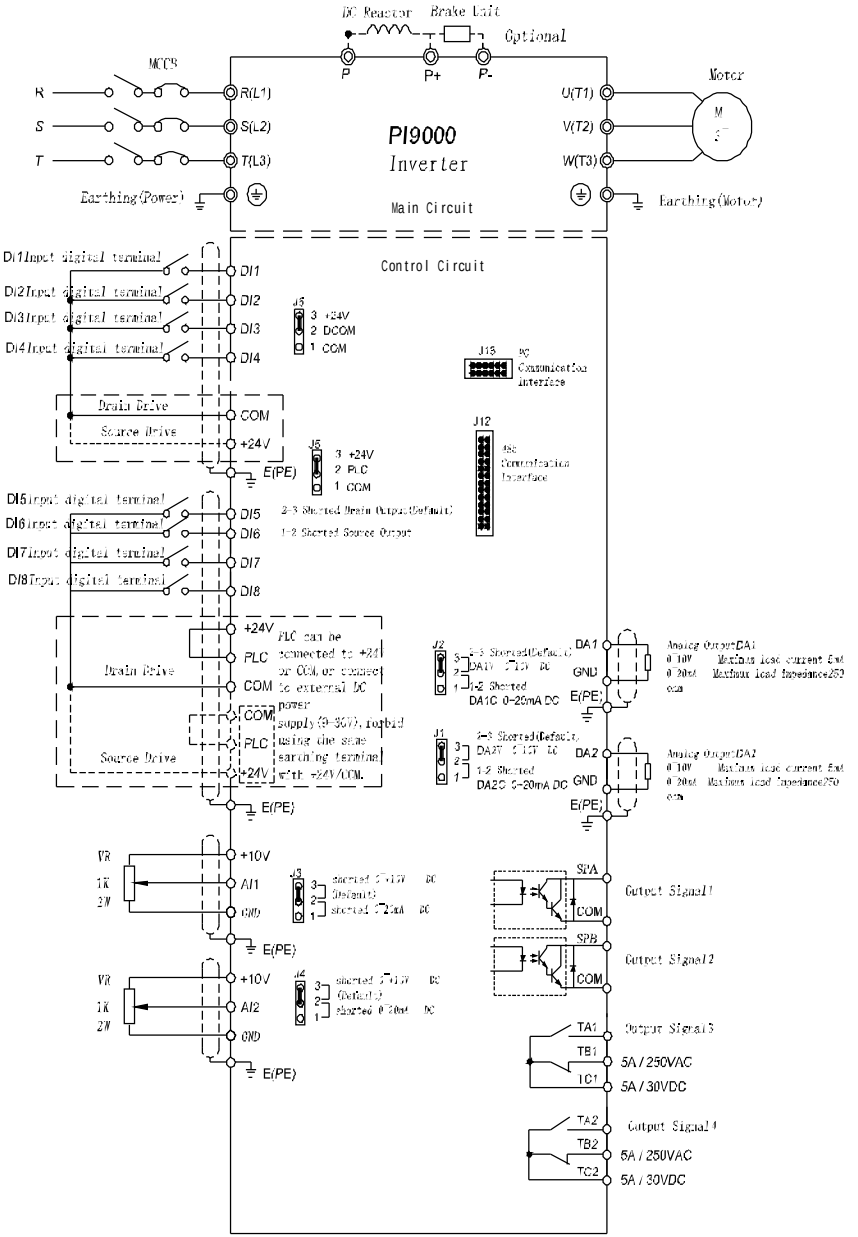
8-3-1.Wiring diagram(< 11kW)



8-3-2.Wiring diagram(11kW to 15kW)



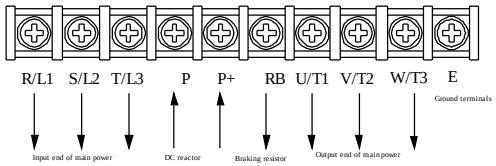
8-3-3.Wiring diagram(18.5kW to 355kW)



8-4.Main circuit terminal (G type)

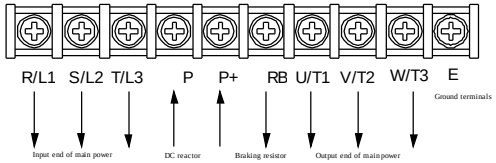
8-4-1.PI9000 main circuit terminal

1. Main circuit terminal(<7.5KW, 380V)

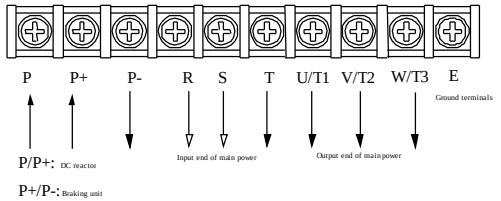


Note: the above power classification is relative to G-type machine.

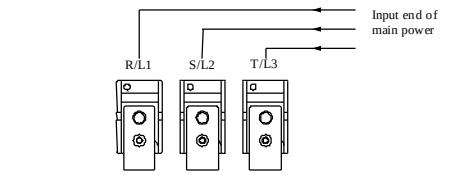
2. Main circuit terminal(11kW to 15kW, 380V)

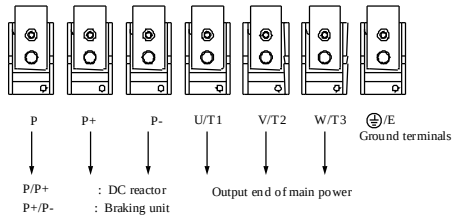


3. Main circuit terminal(18.5kW to 355kW, 380V)(Left In, Right Out)



4. Main circuit terminal(45kW to 220kW, 380V)(Up In, Down Out)





Note: P/P+ standard configuration is for the shorted state; if external DC reactor is connected, firstly disconnect and then reconnect.

8-4-2.Function description of main circuit terminal

Terminals	Name	Description
R/L1	Inverter input terminals	Connect to three-phase power supply, single-phase connects to R, T
S/L2		
T/L3		
⏚/E	Ground terminals	Connect to ground
P+, RB	Braking resistor terminals	Connect to braking resistor
U/T1	Output terminals	Connect to three-phase motor
V/T2		
W/T3		
P+, P-	DC bus output terminals	Connect to braking unit
P, P+	DC reactor terminals	Connect to DC reactor(remove the shorting block)

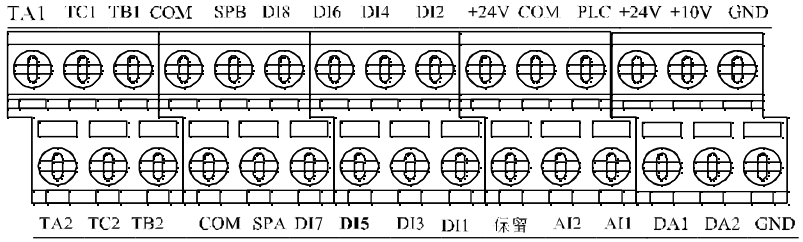
8-5.Control circuit terminals

8-5-1. Description of control circuit terminals

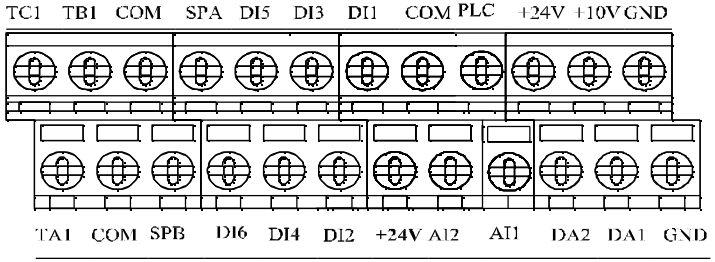
Category	Symbol	Name	Function
Power supply	+10V-GND	External＋10V power supply	Output +10V power supply, maximum output current: 10mA Generally it is used as power supply of external potentiometer, potentiometer resistance range: 1kΩ to 5kΩ
	+24V-COM	External+24V power supply	Output +24V power supply, generally it is used as power supply of digital input and output terminals and external sensor. Maximum output current: 200mA
	PLC	External power input terminal	When external signal is used to drive, please unplug J5 jumpers , PLC must be connected to external power supply, and to +24V (default).
Analog input	AI1-GND	Analog input terminal 1	1.Input range:(DC 0V to 10V/0 to 20mA), depends on the selected J3 jumper on control panel. 2.Input impedance: 22kΩ with voltage input, 500Ω with current input.
	AI2-GND	Analog input terminal 2	1.Input range:(DC 0V to 10V/0 20mA), depends on the selected J4 jumper on control panel. 2.Input impedance: 22kΩ with voltage input, 500Ω with current input.
Digital input	DI1	Digital input 1	1.Opto-coupler isolation, compatible with bipolar input 2.Input impedance: 2.4kΩ 3.Voltage range with level input: 9V to 30V 4. Below 11KW: (DI1 to DI6)drive manner is controlled by J5, when external power supply is used to drive, please unplug J5 jumpers , 5. Above 11KW: (DI1 to DI4)drive manner is controlled by J6, (DI5 to DI8)drive manner is controlled by J5, when external power supply is used to drive, please unplug J5 jumpers ,
	DI2	Digital input 2	
	DI3	Digital input 3	
	DI4	Digital input 4	
	DI5	Digital input 5	
	DI6	Digital input 6	
	DI7	Digital input 7	
	DI8	Digital input 8	
	DI5	High-speed pulse input terminals	DI5 can also be used as high-speed pulse input channels. Maximum input frequency: 100kHz
Analog output	DA1-GND	Analog output 1	The selected J2 jumper on control panel determines voltage or current output. Output voltage range: 0V to 10V , output current range: 0mA to 20mA
	DA2-GND	Analog output 2	The selected J1 jumper on control panel determines voltage or current output. Output voltage range: 0V to 10V , output current range: 0mA to 20mA
Digital output	SPA-COM	Digital output 1	Opto-coupler isolation, bipolar open collector output Output voltage range: 0V to 24V , output current range: 0mA to 50mA
	SPB-COM	Digital output 2	
	SPB-COM	High-speed pulse output	Subject to function code(U5.00)"SPB terminal output mode selection" As a high-speed pulse output, the highest frequency up to 100kHz;
Relay output	T/A1-T/C1	Normally open terminals	Contactor drive capacity: AC250V, 3A, COSø = 0.4.
	T/B1-T/C1	Normally closed terminals	
Auxiliary interface	J12	485 card interface	26-pin terminal
	J13	PG card interface	12-pin terminal

8-5-2.Arrangement of control circuit terminals

1. 9KLCB board control circuit terminals



2. 9KSCB board control circuit terminals



8-6.Wiring Precautions:

Danger
Make sure that the power switch is in the OFF state before wiring operation, or electrical shock may occur! Wiring must be performed by a professional trained personnel, or this may cause damage to the equipment and personal injury! Must be grounded firmly, otherwise there is a danger of electric shock or fire hazard !
Note
Make sure that the input power is consistent with the rated value of inverter, otherwise which may cause damage to the inverter! Make sure that the motor matches the inverter, otherwise which may cause damage to the motor or activate the inverter protection! Do not connect power supply to U/T1, V/T2, W/T3 terminals, otherwise which may cause damage to the inverter! Do not directly connect braking resistor to DC bus (P), (P +) terminals, otherwise which may cause a fire!

※ The U, V, W output end of inverter can not install phase advancing capacitor or RC absorbing device. The inverter input power must be cut off when replacing the motor

※ Do not let metal chips or wire ends into inside the inverter when wiring, otherwise which may cause malfunction to the inverter.

※ Disconnect motor or switch power-frequency power supply only when the inverter stops output

※ In order to minimize the effects of electromagnetic interference, it is recommended that a surge absorption device shall be installed additionally when electromagnetic contactor and relay is closer from the inverter.

※ External control lines of inverter shall adopt isolation device or shielded wire.

※ In addition to shielding, the wiring of input command signal should also be aligned separately, it is best to stay away from the main circuit wiring.

※ If the carrier frequency is less than 3KHz, the maximum distance between the inverter and the motor should be within 50 meters; if the carrier frequency is greater than 4KHz, the distance should be reduced appropriately, it is best to lay the wiring inside metal tube.

※ When the inverter is additionally equipped with peripherals (filter, reactor, etc.), firstly measure its insulation resistance to ground by using 1000 volt megger, so as to ensure the measured value is no less than 4 megohms.

※ When the inverter need to be started frequently, do not directly turn power off, only the control terminal or keyboard or RS485 operation command can be used to control the start/stop operation, in order to avoid damage to the rectifier bridge.

※ Do not connect the AC input power to the inverter output terminals(U, V, W).

※ To prevent the occurrence of an accident, the ground terminal(⏚)must be earthed firmly(grounding impedance should be less than 100 ohms), otherwise the leakage current will occur.

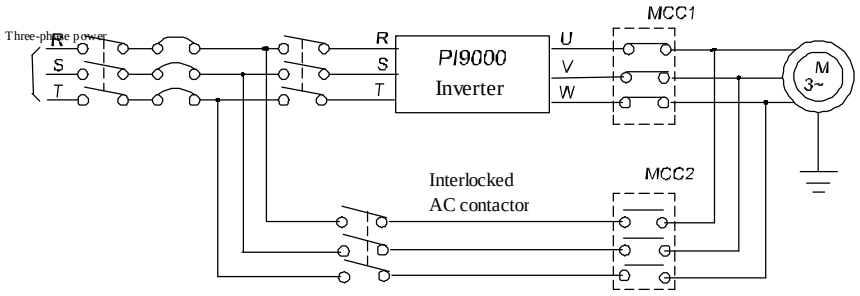
※ The specifications on wires used by the main circuit wiring shall comply with the relevant provisions of the National Electrical Code.

※ The motor's capacity should be equal to or less than the inverter's capacity.

8-7.Spare Circuit

When the inverter occurs the fault or trip, which will cause a larger loss of downtime or other unexpected faults. In order to avoid this case from happening, please additionally install spare circuit to ensure safety.

Note: the characteristics of spare circuit must be confirmed and tested beforehand, and its power-frequency shall be in accordance with the phase sequence of the inverter.



Chapter 9 Maintenance and Repair

9-1.Inspection and Maintenance

During normal use of the inverter, in addition to routine inspections, the regular inspections are required (e.g. the overhaul or the specified interval, and the interval shall not exceed 6 months), please refer to the following table to implement the preventive measures.

Check Date		Check Points	Check Items	Check to be done	Method	Criterion
Routine	Regular					
√		Display	LED display	Whether display is abnormal or not	Visually check	As per use status
√	√	Cooling system	Fan	Whether abnormal noise or vibration exists or not	Visually and audibly check	No abnormal
√		Body	Surrounding conditions	Temperature, humidity, dust, harmful gas.	Visually check with smelling and feeling	As per Section 2-1
√		Input/output terminals	Voltage	Whether input/output voltage is abnormal or not	Test R, S, T and U, V, W terminals	As per standard specifications
	√	Main circuit	Overall	Whether these phenomenon of loose fastenings, overheat, discharging, much dust, or blocked air duct exist or not	Visually check, tighten and clean	No abnormal
			Electrolytic capacitance	Whether appearance is abnormal or not	Visually check	No abnormal
			Wires and conducting bar	Whether they are loose or not	Visually check	No abnormal
			Terminals	If screws or bolts are loose or not	Tighten	No abnormal

"√" means routine or regular check to be needed

Do not disassemble or shake the device gratuitously during check, and never unplug the connectors, otherwise the system will not run or will enter into fault state and lead to component failure or even damage to the main switching device such as IGBT module.

The different instruments may come to different measurement results when measuring. It is recommended that the pointer voltmeter shall be used for measuring input voltage, the rectifier voltmeter for output voltage, the clamp-on ammeter for input current and output current, and the electric wattmeter for power.

9-2.Parts for regular replacement

To ensure the reliable operation of inverter, in addition to regular care and maintenance, some internal mechanical wear parts(including cooling fan, filtering capacitor of main circuit for energy storage and exchange, and printed circuit board) shall be regularly replaced. Use and replacement for such parts shall follow the provisions of below table, also depend on the specific application environment, load and current status of inverter.

Name of Parts	Standard life time
Cooling fan	1 to 3 years
Filter capacitor	4 to 5 years
Printed circuit board(PCB)	5 to 8 years

9-3.Storage

The following actions must be taken if the inverter is not put into use immediately(temporary or long-term storage) after purchasing:

※ It should be store at a well-ventilated site without damp, dust or metal dust, and the ambient temperature complies with the range stipulated by standard specification

※ If the time that the inverter is set aside exceeds one year, a charge test should be made so as to resume the performance of the filtering capacitor of main circuit. When charging, the voltage regulator can be used to slowly rise input voltage of the inverter until the rated input voltage, the charging time is 1 to 2 hours or more. The above test shall be performed at least once a year.

※ Voltage withstand test can not be arbitrarily implemented, it will reduce the life of inverter. Insulation test can be made with the 500-volt megger before using, the insulation resistance shall not be less than 4MΩ.

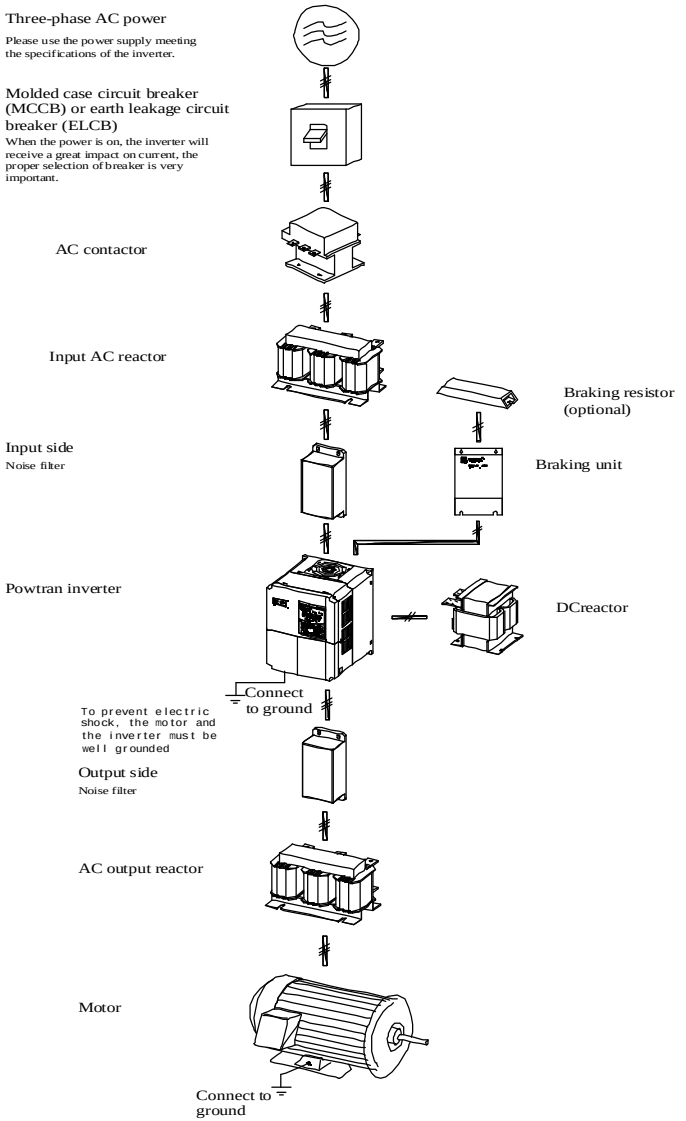
9-4.Measuring and readings

※ If a general instrument is used to measure current, imbalance will exists for the current at the input terminal. generally, the deviation is not more than 10%, that is normal. If the deviation exceeds 30%, please inform the original manufacturer to replace rectifier bridge, or check if the deviation of three-phase input voltage is above 5V or not.

※ If a general multi-meter is used to measure three-phase output voltage, the reading is not accurate due to the interference of carrier frequency and it is only for reference.

Chapter 10 Options

User can additionally install peripheral devices based on the different application conditions and requirements for this series of product, and its wiring diagram is as follows:



10-1.Options

If the extended function (such as RS485 card, PG card, etc.)for other functional modules is needed, please specify the functional module card you want when ordering.

10-2.Molded case circuit breaker (MCCB) or earth leakage circuit breaker (ELCB)

MCCB or ELCB as the power switch of the inverter also plays a protective role to the power supply. Note: do not use MCCB or ELCB to control start/stop of the inverter.

10-3.AC reactor

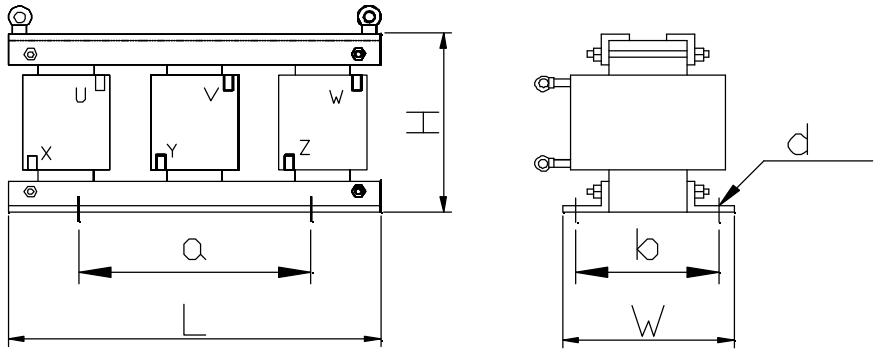
AC reactor can inhibit high harmonics of the inverter input current, significantly improving power factor of the inverter. It is recommended that AC reactor should be used in the following cases.

※ The ratio of the capability of power supply used for the inverter to the inverter own capability is more than 10:1.

※ The thyristor load or the device of power-factor compensation with ON/OFF is connected with the same power supply.

※ The degree of unbalance for three-phase power supply voltage is larger (≥ 3%).

Dimensions for common specifications of AC input reactor are as follows:



Dimensions

Inverter specifications		Size(mm)						Gross weight(kg)
Voltage	Capability(kw)	A	B	C	D	E	F	
200V 230V	0.75	155	125	95	7	89	60	3.0
	1.5	155	125	95	7	89	60	3.0
	2.2	155	125	95	7	89	60	3.0
	4	155	125	95	7	89	60	3.5
	5.5	155	125	100	7	89	60	3.5
	7.5	155	125	112	7	89	70	4.0
	11	155	125	112	7	89	70	6.0
	15	180	140	112	8	90	80	8.0
	18.5	180	140	112	8	90	90	8.0
	22	180	140	112	8	90	90	8.0
	30	230	175	122	10	160	90	12.0
	37	230	175	132	10	160	100	15.0
	45	230	175	150	10	160	110	23.0
	55	230	175	160	10	160	120	23.0
	75	285	220	230	14	180	130	30.0
380V 460V	0.75	155	125	95	7	89	60	3.0
	1.5	155	125	95	7	89	60	3.0
	2.2	155	125	95	7	89	60	3.0
	4	155	125	95	7	89	60	3.5
	5.5	155	125	100	7	89	60	3.5
	7.5	155	125	112	7	89	70	4.0
	11	155	125	112	7	89	70	6.0
	15	180	140	112	8	90	80	8.0
	18.5	180	140	112	8	90	90	8.0
	22	180	140	112	8	90	90	8.0
	30	230	175	122	10	160	90	12.0
	37	230	175	132	10	160	100	15.0
	45	230	175	150	10	160	110	23.0

	55	230	175	160	10	160	120	23.0
	75	285	220	230	14	180	130	30.0
	110	285	250	230	14	210	140	33.0
	160	360	260	230	14	210	140	40.0
	200	360	270	230	14	210	140	45.0
	250	400	330	240	14	240	140	55.0
	315	400	350	285	14	270	160	90.0

10-4.Noise filter

This filter is used to inhibit the conduction of electromagnetic interference noise generated from the inverter, and also inhibit the interference of external radio and instantaneous surge to this unit.

Before using, firstly confirm that the power supply is three-phase three-wire or three-phase four-wire; if it's a single-phase, the grounding wire should be chunky, the filter should be close to the inverter as much as possible.

The filter shall be used in the following occasions of residential area, commercial area, scientific & research units, and the occasion that requires higher protection to radio interference, or the conditions that meets CE, PL, CSA standards and is inadequate on the peripheral anti-interference equipments.

To purchase it, please contact this company.

10-5.Contactor

It's used to cut off power supply to prevent the failure to be expanded when the protection function of the system is activated. The contactor can not be used to control the stop/start of the motor.

10-6.Braking unit and braking resistor

If user chooses the model with braking function, that is, the inverter contains a built-in braking unit and the maximum braking torque is 50%. Users can separately purchase the matched braking resistor with the reference of below table.

Inverter specifications	Power of inverter(kW)	Resistance of braking resistor(Ω)	Power of braking resistor(kW)
220V	0.75	200	120
	1.5	100	300
	2.2	70	300
	4	40	500
	5.5	30	500
	7.5	20	780

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	11	13.6	2000
	15	10	3000
	18	8	4000
	22	6.8	4500
380V	0.75	750	120
	1.5	400	300
	2.2	250	300
	4	150	500
	5.5	100	500
	7.5	75	780
	11	50	1000
	15	40	1500

If you needs greater torque of built-in braking unit, Powtran braking unit is your best choice, please see the manual of Powtran braking unit manual for details.

Other high-power models do not contain built-in braking unit. If the high-power machine needs braking unit, Powtran braking unit is the best choice.

10-7.Output EMI filter

It is used to inhibit noise interference and leakage current generated in the inverter output side.

10-8.AC output reactor

When the connection wire from the inverter to the motor is longer (over 20 meters), it is used to inhibit overcurrent caused due to the distributed capacitance. Meanwhile, it can also inhibit the radio interference of the inverter.

10-9.Input filter

10-9-1.Intput filter(380V)

No.	Model	Voltage(V)	Power(KW)	Current(A)	Net weight(kg)	Dimensions L/W/H(mm)	Installation size a/b/d(mm)
1	NFI-005	380	0.75 to 1.5	5	0.7	130/105/44	51/95
2	NFI-010	380	2.2 to 4	10	1.3	202/86/58	184/60
3	NFI-020	380	5.5 to 7.5	20	2.5	261/100/90	243/70
4	NFI-036	380	11 to 15	36	2.7	261/100/90	243/70

5	NFI-050	380	18.5 to 22	50	3.5	261/100/90	243/70
6	NFI-065	380	30	65	4.5	240/190/90	180/175
7	NFI-080	380	37	80	6.6	390/200/90	260/185
8	NFI-100	380	45	100	7	390/200/90	260/185
9	NFI-150	380	55 to 75	150	7.7	400/200/90	260/185
10	NFI-200	380	90	200	5.2	340/190/90	180/175
11	NFI-250	380	110 to 132	250	7.7	380/210/90	180/195
12	NFI-300	380	160	300	7.7	380/210/90	180/195
13	NFI-400	380	200	400	9	470/260/128	165/245

10-9-2.Intput filter(690V)

No.	Model	Voltage(V)	Power(KW)	Current(A)	Net weight(kg)	Dimensions L/W/H(mm)	Installation size a/b/d(mm)
1	NFI-005	690	0.75 to 1.5	5	0.7	130/105/44	51/95
2	NFI-010	690	2.2 to 4	10	1.3	202/86/58	184/60
3	NFI-020	690	5.5 to 7.5	20	2.5	261/100/90	243/70
4	NFI-036	690	11 to 15	36	2.7	261/100/90	243/70
5	NFI-050	690	18.5 to 22	50	3.5	261/100/90	243/70
6	NFI-065	690	30	65	4.5	240/190/90	180/175
7	NFI-080	690	37	80	6.6	390/200/90	260/185
8	NFI-100	690	45	100	7	390/200/90	260/185
9	NFI-150	690	55 to 75	150	7.7	400/200/90	260/185
10	NFI-200	690	90	200	5.2	340/190/90	180/175

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11	NFI-250	690	110 to 132	250	7.7	380/210/90	180/195
12	NFI-300	690	160	300	7.7	380/210/90	180/195
13	NFI-400	690	200	400	9	470/260/128	165/245
14	NFI-600	690	215 to 250	600	14.2	470/245/128	165/245

10-10.Output filter

10-10-1.Output filter(380v)

No.	Model	Voltage(V)	Power(KW)	Current(A)	Net weight(kg)	Dimensions L/W/H(mm)	Installation size a/b/d(mm)
1	NF0-005	380	0.75 to 1.5	5	0.75	135/105/44	51/95
2	NF0-010	380	2.2 to 4	10	1.25	202/86/58	184/60
3	NF0-020	380	5.5 to 7.5	20	1.47	202/86/58	184/60
4	NF0-036	380	11 to 15	36	2.35	215/100/70	200/70
5	NF0-050	380	18.5 to 22	50	2.37	215/100/70	200/70
6	NF0-065	380	30	65	2.73	261/100/90	243/70
7	NF0-080	380	37	80	3.19	261/100/90	243/70
8	NF0-100	380	45	100	3.34	261/100/90	243/70
9	NF0-150	380	55 to 75	150	5.04	320/190/90	180/175
10	NF0-200	380	90	200	4.58	320/190/90	240/175
11	NF0-250	380	110 to 132	250	6.9	380/210/90	180/195
12	NF0-300	380	160	300	7.2	380/210/90	180/195
13	NF0-400	380	200	400	13.2		
14	NF0-600	380	215 to 250	600	13.4	320/260/128	165/245

10-10-2.Output filter(690v)

No.	Model	Voltage(V)	Power(KW)	Current(A)	Net weight(kg)	Dimensions L/W/H(mm)	Installation size a/b/d(mm)
1	NF0-005	690	0.75 to 1.5	5	0.75	135/105/44	51/95
2	NF0-010	690	2.2 to 4	10	1.25	202/86/58	184/60
3	NF0-020	690	5.5 to 7.5	20	1.47	202/86/58	184/60
4	NF0-036	690	11 to 15	36	2.35	215/100/70	200/70
5	NF0-050	690	18.5 to 22	50	2.37	215/100/70	200/70
6	NF0-065	690	30	65	2.73	261/100/90	243/70
7	NF0-080	690	37	80	3.19	261/100/90	243/70
8	NF0-100	690	45	100	3.34	261/100/90	243/70
9	NF0-150	690	55 to 75	150	5.04	320/190/90	180/175
10	NF0-200	690	90	200	4.58	320/190/90	240/175
11	NF0-250	690	110 to 132	250	6.9	380/210/90	180/195
12	NF0-300	690	160	300	7.2	380/210/90	180/195
13	NF0-400	690	200	400	13.2		
14	NF0-600	690	215 to 250	600	13.4	320/260/128	165/245

10-11.Input reactor

10-11-1.Input reactor(380V)

No.	Model	Voltage(V)	Power(KW)	Rated Current(A)	Net weight(kg)	Voltage drop(V)	Inductance(mH)	Installation size a/b/d(mm)
1	ACL-0005-EISC-E3M8B	380	1.5	5	2.48	2.00%	2.8	91/65

2	ACL-0007-EISC-E2M5B	380	2.2	7	2.54	2.00%	2	91/65
3	ACL-0010-EISC-E1M5B	380	3.7	10	2.67	2.00%	1.4	91/65
4	ACL-0015-EISH-E1M0B	380	5.5	15	3.45	2.00%	0.93	95/61
5	ACL-0020-EISH-EM75B	380	7.5	20	3.25	2.00%	0.7	95/61
6	ACL-0030-EISH-EM60B	380	11	30		2.00%	0.47	95/61
7	ACL-0040-EISH-EM42B	380	15	40		2.00%	0.35	95/61
8	ACL-0050-EISH-EM35B	380	18.5	50		2.00%	0.28	95/61
9	ACL-0060-EISH-EM28B	380	22	60		2.00%	0.24	95/61
10	ACL-0080-EISC-EM19B	380	30	80	7.55	2.00%	0.17	120/72
11	ACL-0090-EISC-EM19B	380	37	90	7.55	2.00%	0.16	120/72
12	ACL-0120-EISH-EM13B	380	45	120	10.44	2.00%	0.12	120/92
13	ACL-0150-ELSH-EM11B	380	55	150	14.8	2.00%	0.095	182/76

14	ACL-0200-ELSH-E80UB	380	75	200	19.2	2.00%	0.07	182/96
15	ACL-0250-ELSH-E65UB	380	110	250	22.1	2.00%	0.056	182/96
16	ACL-0290-ELSH-E50UB	380	132	290	28.3	2.00%	0.048	214/100
17	ACL-0330-ELSH-E50UB	380	160	330	28.3	2.00%	0.042	214/100
18	ACL-0390-ELSH-E44UB	380	185	390	31.8	2.00%	0.036	243/112
19	ACL-0490-ELSH-E35UB	380	220	490	43.6	2.00%	0.028	243/122
20	ACL-0530-ELSH-E35UB	380	240	530		2.00%	0.026	
21	ACL-0600-ELSH-E25UB	380	280	600		2.00%	0.023	
22	ACL-0660-ELSH-E25UB	380	300	660	52	2.00%	0.021	243/137
23	ACL-0800-ELSH-E25UB	380	380	800	68.5	2.00%	0.0175	260/175
24	ACL-1000-ELSH-E14UB	380	450	1000	68.5	2.00%	0.014	260/175
25	ACL-1200-ELSH-E11UB	380	550	1250	106	2.00%	0.0011	275/175

26	ACL-1600-ELSH-E12UB	380	630	1600	110	2.00%	0.0087	275/175

10-11-2.Input reactor(690V)

No.	Model	Voltage(V)	Power(KW)	Rated Current(A)	Net weight(kg)	Voltage drop(V)	Inductance(mH)	Installation size a/b/d(mm)
1	ACL-005	690	1.5	5		4.00%		
2	ACL-007	690	2.2	7		4.00%		
3	ACL-0010	690	3.7	10		4.00%		
4	ACL-0015	690	5.5	15		4.00%		
5	ACL-0020	690	7.5	20		4.00%		
6	ACL-0030	690	11	30		4.00%		
7	ACL-0040	690	15	40		4.00%		
8	ACL-0050	690	18.5	50		4.00%		
9	ACL-0060	690	22	60		4.00%		
10	ACL-0080	690	30	80		4.00%		
11	ACL-0090	690	37	90		4.00%		
12	ACL-0120	690	45	120		4.00%		
13	ACL-0150	690	55	150		4.00%		
14	ACL-0200	690	75	200		4.00%		
15	ACL-0250	690	110	250		4.00%		
16	ACL-0290	690	132	290		4.00%		
17	ACL-0330	690	160	330		4.00%		

18	ACL-0390	690	185	390		4.00%		
19	ACL-0490	690	220	490		4.00%		
20	ACL-0530	690	240	530		4.00%		
21	ACL-0600	690	280	600		4.00%		
22	ACL-0660	690	300	660		4.00%		
23	ACL-0800	690	380	800		4.00%		
24	ACL-1000	690	450	1000		4.00%		
25	ACL-1200	690	550	1250		4.00%		
26	ACL-1600	690	630	1600		4.00%		

10-12.Output reactor

10-12-1.Output reactor(380V)

No.	Model	Voltage(V)	Power(KW)	Rated Current(A)	Net weight(kg)	Voltage drop(V)	Inductance(mH)	Installation size a/b/d(mm)
1	OCL-0005-ELSC-E1M4	380	1.5	5	3.48	0.50%	1.4	91/65
2	OCL-0007-ELSC-E1M0	380	2.2	7	2.54	0.50%	1	91/65
3	OCL-0010-ELSC-EM70	380	3.7	10	2.67	0.50%	0.7	91/65
4	OCL-0015-ELSC-EM47	380	5.5	15	3.45	0.50%	0.47	95/61
5	OCL-0020-ELSC-EM35	380	7.5	20	3.25	0.50%	0.35	95/61

6	OCL-0030-ELSC-EM23	380	11	30		0.50%	0.23	95/81
7	OCL-0040-ELSC-EM18	380	15	40		0.50%	0.18	95/81
8	OCL-0050-ELSC-EM14	380	18.5	50		0.50%	0.14	95/81
9	OCL-0060-ELSC-EM12	380	22	60		0.50%	0.12	120/72
10	OCL-0080-ELSC-E87U	380	30	80	6.5	0.50%	0.087	120/72
11	OCL-0090-ELSC-E78U	380	37	90	6.5	0.50%	0.078	120/72
12	OCL-0120-ELSC-E5U	380	45	120	9.6	0.50%	0.058	120/92
13	OCL-0150-EISH-E47U	380	55	150	15	0.50%	0.047	182/87
14	OCL-0200-EISH-E35U	380	75	200	17.3	0.50%	0.035	182/97
15	OCL-0250-EISH-E28U	380	110	250	17.8	0.50%	0.028	182/97
16	OCL-0290-EISH-E24U	380	132	290	24.7	0.50%	0.024	214/101
17	OCL-0330-EISH-E21U	380	160	330	26	0.50%	0.021	214/106

18	OCL-0390-EISH-E18U	380	185	390	26.5	0.50%	0.018	214/106
19	OCL-0490-EISH-E14U	380	220	490	36.6	0.50%	0.014	243/113
20	OCL-0530-EISH-E13U	380	240	530		0.50%	0.013	
21	OCL-0600-EISH-E12U	380	280	600	43.5	0.50%	0.012	243/128
22	OCL-0660-EISH-E4U0	380	300	660	44	0.50%	0.011	243/128
23	OCL-0800-EISH-E5U0	380	380	800	60.8	0.50%	0.0087	260/175
24	OCL-1000-EISH-E4U0	380	450	1000	61.5	0.50%	0.007	260/175
25	OCL-1200-EISH-E4U0	380	550	1200	89	0.50%	0.0058	275/175
26	OCL-1600-EISH-E3U0	380	630	1600	92	0.50%	0.0043	275/175

10-12-2.Output reactor(690V)

No.	Model	Voltage(V)	Power(KW)	Rated Current(A)	Net weight(kg)	Voltage drop(V)	Inductance(mH)	Installation size a/b/d(mm)
1	OCL-005	690	1.5	5		2.00%		
2	OCL-007	690	2.2	7		2.00%		
3	OCL-0010	690	3.7	10		2.00%		

4	OCL-0015	690	5.5	15		2.00%		
5	OCL-0020	690	7.5	20		2.00%		
6	OCL-0030	690	11	30		2.00%		
7	OCL-0040	690	15	40		2.00%		
8	OCL-0050	690	18.5	50		2.00%		
9	OCL-0060	690	22	60		2.00%		
10	OCL-0080	690	30	80		2.00%		
11	OCL-0090	690	37	90		2.00%		
12	OCL-0120	690	45	120		2.00%		
13	OCL-0150	690	55	150		2.00%		
14	OCL-0200	690	75	200		2.00%		
15	OCL-0250	690	110	250		2.00%		
16	OCL-0290	690	132	290		2.00%		
17	OCL-0330	690	160	330		2.00%		
18	OCL-0390	690	185	390		2.00%		
19	OCL-0490	690	220	490		2.00%		
20	OCL-0530	690	240	530		2.00%		
21	OCL-0600	690	280	600		2.00%		
22	OCL-0660	690	300	660		2.00%		
23	OCL-0800	690	380	800		2.00%		
24	OCL-1000	690	450	1000		2.00%		

25	OCL-1200	690	550	1250		2.00%		
26	OCL-1600	690	630	1600		2.00%		

10-13.AC reactor

No.	Model	Voltage(V)	Power(KW)	Rated Current(A)	Net weight(kg)	Inductance(mH)	Installation size a/b/d(mm)
1	DCL-0003-EIDC-E28M	380	0.4	3	1.5	28	80/65/110
2	DCL-0003-EIDC-E28M	380	0.8	3	1.5	28	80/65/110
3	DCL-0006-EIDC-E11M	380	1.5	6	2.3	11	80/65/110
4	DCL-0006-EIDC-E11M	380	2.2	6	2.3	11	80/65/110
5	DCL-0012-EIDC-E6M3	380	3.7	12	3.2	6.3	100/100/125
6	DCL-0023-EIDH-E3M6	380	5.5	23	3.8	3.6	110/120/135
7	DCL-0023-EIDH-E3M6	380	7.5	23	3.8	3.6	110/120/135
8	DCL-0033-EIDH-E2M0	380	11	33	4.3	2	110/120/135
9	DCL-0033-EIDH-E2M0	380	15	33	4.3	2	110/120/135
10	DCL-0040-EIDH-E1M3	380	18.5	40	4.3	1.3	110/120/135

11	DCL-0050-EIDH-E1M08	380	22	50	5.5	1.08	120/135/145
12	DCL-0065-EIDH-EM8	380	30	65	7.2	0.8	138/150/170
13	DCL-0078-EIDH-EM7	380	37	78	7.5	0.7	138/150/170
14	DCL-0095-EIDH-EM54	380	45	95	7.8	0.54	138/150/170
15	DCL-0115-EIDH-EM45	380	55	115	9.2	0.45	155/160/195
16	DCL-0160-EIDH-EM36	380	75	160	10	0.36	165/130/215
17	DCL-0180-PIDH-EM33	380	90	180	20	0.33	165/130/215
18	DCL-0250-EIDH-EM26	380	110	250	23	0.26	210/150/255
19	DCL-0250-PIDH-EM26	380	132	250	23	0.26	210/150/255
20	DCL-0340-PIDH-EM17	380	160	340	23	0.17	210/150/255
21	DCL-0460-EIDH-E90U	380	185	460	28	0.09	220/150/280
22	DCL-0460-PIDH-E90U	380	220	460	28	0.09	220/150/280

23	DCL-0650-PIDH-E72U	380	300	650	33	0.072	235/160/280

10-14.Specifications of circuit breakers, cables and contactors

Model	Circuit breaker(A)	Input line/output line (Copper cable) mm2	Rated operational current A of contactor (voltage 380V or 220V)
R40G2	10A	1.5	10
R75G2	16A	2.5	10
1R5G2	20A	2.5	16
2R2G2	32A	4	20
004G2	40A	6	25
5R5G2	63A	6	32
7R5G2	100A	10	63
011G2	125A	10	95
015G2	160A	25	120
018G2	160A	25	120
022G2	200A	25	170
030G2	200A	35	170
037G2	250A	35	170
045G2	250A	70	230
055G2	315A	70	280
R75G3	10A	1.5	10
1R5G3	16A	1.5	10
2R2G3	16A	2.5	10
004G3	25A	2.5	16
5R5G3	25A	4	16
7R5G3	40A	4	25
011G3	63A	6	32
015G3	63A	6	50
018G3	100A	10	63

022G3	100A	10	80
030G3	125A	16	95
037G3	160A	25	120
045G3	200A	35	135
055G3	250A	35	170
075G3	315A	70	230
093G3	400A	70	280
110G3	400A	95	315
132G3	400A	95	380
160G3	630A	150	450
187G3	630A	185	500
200G3	630A	240	580
220G3	800A	150x2	630
250G3	800A	150x2	700
280G3	1000A	185x2	780
315G3	1200A	240x2	900
355G3	1280A	240x2	960
400G3	1380A	185x3	1035
500G3	1720A	185x3	1290

Chapter 11 Warranty

The warranty of this product follows the following provisions:

1.The warranty that liabilities shall be beared by the manufacturer:

1-1. For use at home (subject to date of shipment)

※ The refunding, replacement and repair are guaranteed within one(1) month after the shipment.

※ The replacement and repair are guaranteed within three(3) months after the shipment.

※ The repair is guaranteed within twelve(12) months after the shipment.

1-2.For use at abroad(excluding domestic), the repair is guaranteed at the place of purchase within six(6) months after the shipment.

2. Whenever and wherever you use our brand of products, you can enjoy a paid service for life.

3.Our distributors, manufacturers and agencies across the country can provide after-sales service of this product, the conditions of service are:

3-1. The service of inspection is provided locally at a inspection standard of level 3.

3-2. All services shall comply with the related after-sale service terms and conditions stated on theagency agreement between Powtran and distributors.

3-3. A paid after-sale service from distributors or agencies of Powtran(whether or not within warranty period) can be requested.

4. We only bear the above terms 1-1 or 1-2 at most regarding to the responsibility of product quality or incidents. if users need more liability guarantee, please apply for insurance company in advance to insure your own property safety.

5. The warranty period of this product is one year from the date of shipment.

6. The failure caused by following causes will even during the warranty period, their repair will be charged too:

6-1.Incorrect operation (subject to the user manual) or unauthorized repair or renovation.

6-2.Non-following standard specification to use the inverter.

6-3.Drop or improper carry after purchase.

6-4.Aging or failure caused by the adverse environmental.

6-5.Damage caused by earthquake, fire, wind and water disasters, lightning, abnormal voltage or othernatural disasters and accompanied disasters.

6-6.Damage during transport (Note: The mode of transport is specified by the customer, this company can assist customer to transfer goods).

6-7.The brand, trademark, serial number, nameplate labeled by the manufacturer are damaged or illegible.

6-8.The full money for this product has not been paid up according to purchase

agreement

6-9.The actual situation for installation, wiring, operation, maintenance or other uses could not be objectively reported to the service department of this company.

7.The refunding, replacement or repair only can be performed after the defective product is returned to this company and its responsible party is confirmed.

Appendix I RS485 Communication protocol

I-1 Communication protocol

I-1-1 Communication content

This serial communication protocol defines the transmission information and use format in the series communication Including: master polling(or broadcast) format; master encoding method, and contents including: function code of action, transferring data and error checking. The response of slave also adopts the same structure, and contents including: action confirmation, returning the data and error checking etc. If slave takes place the error while it is receiving information or cannot finish the action demanded by master, it will send one fault signal to master as a response.

Application Method

The inverter will be connected into a “Single-master Multi-slave” PC/PLC control network with RS232/RS485 bus.

Bus structure

(1) Interface mode

RS232/RS485 hardware interface

(2) Transmission mode

Asynchronous series and half-duplex transmission mode. For master and slave, only one of them can send the data and the other only receives the data at the same time. In the series asynchronous communication, the data is sent out frame by frame in the form of message

(3) Topological structure

Single-master and multi-slave system. The setting range of slave address is 0 to 247, and 0 refers to broadcast communication address. The address of slave for network must be exclusive.

I-1-2 Communications connection

Installation of RS485 communication module:

I-1-3 Protocol description

PI9000 series inverter communication protocol is a asynchronous serial master-slave communication protocol, in the network, only one equipment(master) can build a protocol (known as “Inquiry/Command”). Other equipment(slave) only can response the "Inquiry/Command"of master by providing data or perform the corresponding action according to the "Inquiry/Command"of master. Here, the master refers to a Personnel Computer(PC), an industrial control device or a programmable logic controller (PLC), etc. and the slave refers to PI9000 inverter. Master can communicate with individual slave, also send broadcasting information to all the lower slaves. For the single "Inquiry/Command"of master, slave will return a signal(that is a response) to master; for the broadcasting information sent by master, slave does not need to feedback a response to master.

Communication data structure PI9000 series inverter's Modbus protocol communication data format is as follows: in RTU mode, messages are sent at a silent interval of at least 3.5 characters. There are diverse character intervals under network baud rate,

which is easiest implemented (as shown in Figure T1-T2-T3-T4). The first field transmitted is the device address.

The allowable characters for transmitting are hexadecimal 0 ... 9, A ... F. The networked devices continuously monitor network bus, including during the silent intervals. When the first field (the address field) is received, each device decodes it to find out if it is sent to their own. Following the last transmitted character, a silent interval of at least 3.5 characters marks the end of the message. A new message can begin after this silent interval.

The entire message frame must be transmitted as a continuous stream. If a silent interval of more than 1.5 characters occurs before completion of the frame, the receiving device will flushes the incomplete message and assumes that the next byte will be the address field of a new message. Similarly, if a new message begins earlier than the interval of 3.5 characters following a previous message, the receiving device will consider it as a continuation of the previous message. This will result in an error, because the value in the final CRC field is not right.

RTUframe format :

Frame headerSTART	Time interval of 3.5characters
Slave address ADR	Communication address: 1 to 247
Command codeCMD	03: read slave parameters；06: write slave parameters
Data contentDATA(N-1)	Data content: address of function code parameter, numbers of function code parameter, value of function code parameter, etc.
Data contentDATA(N-2)	
……	
Data contentDATA0	
CRC CHKhigh-order	Detection Value:CRC value.
CRC CHKlow-order	
END	Time interval of 3.5characters

CMD (Command) and DATA (data word description)

Command code: 03H, reads N words (max.12 words), for example: for the inverter with slave address 01, its start address U0.02 continuously reads two values.

Master command information

ADR	01H
CMD	03H
Start address high-order	F0H
Start address low-order	02H
Number of registers high-order	00H
Number of registers low-order	02H

CRC CHKlow-order	CRC CHK values are to be calculated
CRC CHKhigh-order	

Slave responding information

When Ud.05 is set to 0:

ADR	01H
CMD	03H
Byte number high-order	00H
Byte number low-order	04H
DataU002Hhigh-order	00H
DataU002Hlow-order	00H
DataU003Hhigh-order	00H
DataU003Hlow-order	01H
CRC CHKlow-order	CRC CHK values are to be calculated
CRC CHKhigh-order	

When Ud.05is set to **1**:

ADR	01H
CMD	03H
Byte number	04H
DataU002Hhigh-order	00H
DataU002Hlow-order	00H
DataU003Hhigh-order	00H
DataU003Hlow-order	01H
CRC CHKlow-order	CRC CHK values are to be calculated
CRC CHKhigh-order	

Command Code: 06H, write a word. For example:Write 5000(1388H)into the address F00AH of the inverter with slave address 02H.

Master command information

ADR	02H
CMD	06H
Data address high-order	F0H
Data address low-order	0AH
Data content high-order	13H
Data content low-order	88H
CRC CHKlow-order	CRC CHK values are to be calculated
CRC CHK high-order	

Slave responding information

ADR	02H
CMD	06H
Data address high-order	F0H

Data address low-order	0AH
Data content high-order	13H
Data content low-order	88H
CRC CHKlow-order	CRC CHK values are to be calculated
CRC CHK high-order	

I-2 Check mode:

Check mode - CRC mode: CRC (Cyclical Redundancy Check) adopts RTU frame format, the message includes a an error-checking field that is based on CRC method. The CRC field checks the whole content of message. The CRC field has two bytes containing a 16-bit binary value. The CRC value calculated by the transmitting device will be added into to the message. The receiving device recalculates the value of the received CRC, and compares the calculated value to the actual value of the received CRC field, if the two values are not equal, then there is an error in the transmission.

The CRC firstly stores 0xFFFF and then calls for a process to deal with the successive eight-bit bytes in message and the value of the current register. Only the 8-bit data in each character is valid to the CRC, the start bit and stop bit, and parity bit are invalid.

During generation of the CRC, each eight-bit character is exclusive OR(XOR) with the register contents separately, the result moves to the direction of least significant bit(LSB), and the most significant bit(MSB) is filled with 0. LSB will be picked up for detection, if LSB is 1, the register will be XOR with the preset value separately, if LSB is 0, then no XOR takes place. The whole process is repeated eight times. After the last bit (eighth) is completed, the next eight-bit byte will be XOR with the register's current value separately again. The final value of the register is the CRC value that all the bytes of the message have been applied.

When the CRC is appended to the message, the low byte is appended firstly, followed by the high byte. CRC simple functions is as follows:

```
unsigned int crc_chk_value（unsigned char *data_value,unsigned char length）
{
    unsigned int crc_value=0xFFFF;
    int i;
    while（length--）
    {
        crc_value^=*data_value++;
        for（i=0;i<8;i++）
        {
            if（crc_value&0x0001）
            {
              crc_value=（crc_value>>1）^0xa001;
            }
            else
            {
```



```
                crc_value=crc_value>>1;
            }
        }
    }
    return（crc_value）;
}
```

I-3 Definition of communication parameter address

The section is about communication contents, it's used to control the operation, status and related parameter settings of the inverter. Read and write function-code parameters (Some functional code is not changed, only for the manufacturer use or monitoring): the rules of labeling function code parameters address:

The group number and label number of function code is used to indicate the parameter address:

High byte: F0 to FF (U group), A0 to AF (E group), 70 to 7F (d group) low byte: 00 to FF

For example: address U3.12 indicates F30C; Note: UF group parameters: neither read nor change; d group parameters: only read, not change.

Some parameters can not be changed during operation, but some parameters can not be changed regardless of the inverter is in what state.When changing the function code parameters, please pay attention to the scope, units, and relative instructions on the parameter.

Besides, due to EEPROM is frequently stored, it will reduce the life of EEPROM, therefore under the communication mode some function code do not need to be stored and you just change the RAM value.

If U group parameters need to achieve the function, as long as change high order F of the function code address to 0. If E group parameters need to achieve the function, as long as change high order F of the function code address to 4. The corresponding function code addresses are indicated below: high byte: 00 to 0F(U group), 40 to 4F (E group), low byte:00 to FF

For example:

Function code U3.12 can not be stored into EEPROM, address indicates as 030C; function code U0.05 can not be stored into EEPROM, address indicates as 4005; the address indicates that only writing RAM can be done and reading can not be done, when reading, it is invalid address. For all parameters, you can also use the command code 07H to achieve the function.

Stop/Run parameters section:

Parameter address	Parameter description
1000	*Communication set value(-10000 to 10000)(Decimal)
1001	Running frequency
1002	Bus voltage
1003	Output voltage
1004	Output current
1005	Output power
1006	Output torque
1007	Operating speed
1008	DI input flag
1009	DO output flag
100A	AI1 voltage

100B	AI2 voltage
100C	Reserve
100D	Count value input
100E	Length value input
100F	Load speed
1010	PID setting
1011	PID feedback
1012	PLC step
1013	High-speed pulse input frequency, unit: 0.01kHz
1014	Feedback speed, unit:0.1Hz
1015	Remaining run time
1016	AI1 voltage before correction
1017	AI2 voltage before correction
1018	Reserve
1019	Linear speed
101A	Current power-on time
101B	Current run time
101C	High-speed pulse input frequency, unit: 1Hz
101D	Communication set value
101E	Actual feedback speed
101F	Master frequency A display
1020	Auxiliary frequency B display

Note:

the communication set value is the percentage of the relative value, 10000 corresponds to 100.00%, -10000 corresponds to -100.00%. For frequency dimension data, it is the percentage of the maximum frequency (U0.10); for torque dimension data, the percentage is U2.10, E2.48 (torque upper limit digital setting, respectively corresponding to the first and second).

Control command is input to the inverter: (write only)

Command word address	Command function
2000	0001: Forward run
	0002: Reverse run
	0003: Forward Jog
	0004: Reverse Jog
	0005: Free stop

	0006: Deceleration and stop
	0007: Fault reset

Inverter read status: (read-only)

Status word address	Status word function
3000	0001: Forward run
	0002: Reverse run
	0003: Stop

Parameter lock password verification: (If the return code is 8888H, it indicates that password verification is passed)

Password address	Enter password
1F00	*****

Digital output terminal control: (write only)

Command address	Command content
2001	BIT0: SPA output control BIT1: RELAY2 output control BIT2 RELAY1 output control BIT3: Undefined BIT4: SPB switching quantity output control

Analog output **DA1** control: (write only)

Command address	Command content
2002	0 to 7FFFindicates0% to 100%

Analog output **DA2** control: (write only)

Command address	Command content
2003	0 to 7FFFindicates0% to 100%

SPB high-speed pulse output control: (write only)

Command address	Command content
2004	0 to 7FFFindicates0% to 100%

Inverter fault description:

Inverter fault address:	Inverter fault information:

8000	0000: No fault 0001: Reserved 0002: Acceleration overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Acceleration overvoltage 0006: Deceleration overvoltage 0007: Constant speed overvoltage 0008: Buffer resistance overload 0009: Undervoltage fault 000A: Inverter overload 000B: Motor Overload 000C: Input phase loss 000D: Output phase loss 000E: Module overheating 000F: External fault 0010: Communication abnormal 0011: Contactor abnormal 0012: Current detection fault 0013: Motor parameter auto tunning fault 0014:Encoder/PG card abnormal 0015: Parameter read and write abnormal 0016: Inverter hardware fault 0017: Motor short to ground fault 0018: Reserved 0019: Reserved 001A:Running time arrival 001B: Custom fault 1 001C: Custom fault 2 001D: Power-on time arrival 001E: Load drop 001F: PID feedback loss when running 0028: Fast current limiting timeout 0029: Switch motor when running fault 002A: Too large speed deviation 002B: Motor overspeed 002D: Motor overtemperature 005A: Encoder lines setting error 005B: Missed encoder 005C: Initial position error 005E: Speed feedback error

Data on communication failure information description (fault code):

Communication fault address	Fault function description
8001	0000: No fault 0001: Password error 0002: Command code error 0003: CRC check error 0004: Invalid address 0005: Invalid parameters 0006: Invalid parameter changes 0007: System locked 0008: EEPROM in operation

UdGroup - Communication parameter description

Ud.00	Baud rate	Default	6005
	Setting range	Units digit: MODUBUS baud rate 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS	

This parameter is used to set the data transfer rate between the host computer and the inverter. Note: the baud rate must be set to the same for the host computer and the inverter, otherwise communication can not be achieved. The larger baud rate, the faster communication speed.

Ud.01	Data format	Default	0
	Setting range	0: no parity: data format <8, N, 2> 1: even parity: data format <8, E, 1> 2: odd parity: data format <8, O, 1> 3: no parity: data format <8-N-1>	

Note: the set data for the host computer and the inverter must be the same.

Ud.02	This unit address	Default	1
	Setting range	1 to 247, 0for broadcast address	

When the address of this unit is set 0, that is broadcast address, the broadcasting function for the host computer can be achieved.

The address of this unit has uniqueness (in addition to the broadcast address), which is the basis of peer-to-peer communication for the host computer and the inverter.

Ud.03	Response delay	Default	2ms
	Setting range	0 to 20ms	

Response delay: it refers to the interval time from the end of the inverter receiving data to the start of it sending data to the host machine. If the response delay is less than the system processing time, then the response delay time is subject to the system processing time; If the response delay is longer than the system processing time, after the system finises the data processing, and continues to wait until the response delay time, and then sends data to the host computer.

Ud.04	Communication	Default	0.0 s
	Setting range	0.0 s(invalid) 0.1 to 60.0s	

Communication time-out parameter is not valid when the function code is set to 0.0s.

Whenthe function code is set to valid, if the interval time between one communication and the next communication exceeds the communication time-out time, the system will report communication

failure error (Fault ID Err.16). Generally, it is set to invalid. If the parameter can be set to monitor the communication status in continuous communication system.

Ud.05	Communication	Default	0
	Setting range	0: non-standard Modbus protocol 1: standard Modbus protocol	

Ud.05=1: select standard Modbus protocol.

Ud.05=0: when reading command, the number of bytes returned by slave is more 1 byte than standard Modbus protocol.

Ud.05	Communication read	Default	0
	Setting range	0: 0.01A 1: 0.1A	

Used to determine the current output units when communication reads output current.

Appendix II How to use universal encoder expansion card

(applicable for all series of Powtran frequency inverters)

II-1 Overview

PI9000 is equipped with a variety of universal encoder expansion card (PG card), as an optional accessory, it is necessary part for the inverter closed-loop vector control, please select PG card according to the form of encoder output, the specific models are as follows:

Options	Description	Others
PI9000_PG1	Differential input PG card, without frequency dividing output	Terminal wiring
PI9000_PG3	UVW differential input PG card, without frequency dividing output	Terminal wiring
PI9000_PG4	Rotational transformer PG card	Terminal wiring
PI9000_PG5	OC input PG card, with 1:1 frequency dividing output	Terminal wiring

II-2 Description of mechanical installation and control terminals function

The expansion card specifications and terminal signals for each encoder are defined as follows:

Table 1 Definitions of specifications and terminal signals

Differential PG card(PI9000_PG1)		
PI9000_PG1 specifications		
User interface	Terminal block	
Spacing	3.5mm	
Screw	Slotted	
Swappable	NO	
Wire gauge	16-26AWG	
Maximum frequency	500kHz	
Input differential signal amplitude	≤7V	
PI9000_PG1 terminal signals		
No.	Label no.	Description
1	A+	Encoder output A signal positive
2	A-	Encoder output A signal negative
3	B+	Encoder output B

		signal positive
4	B-	Encoder output B signal negative
5	Z+	Encoder output Z signal positive
6	Z-	Encoder output Z signal negative
7	5V	Output 5V/100mA power
8	COM	Power ground
9	PE	Shielded terminal
UVWdifferential PG card		
PI9000_PG3 specifications		
User interface	Terminal block	
Swappable	NO	
Wire gauge	>22AWG	
Maximum frequency	500kHz	
Input differential signal amplitude	≤7V	
PI9000_ PG3 terminal description		
No.	Label no.	Description
1	A+	Encoder output A signal positive
2	A-	Encoder output A signal negative
3	B+	Encoder output B signal positive
4	B-	Encoder output B signal negative
5	Z+	Encoder output Z signal positive
6	Z-	Encoder output Z signal negative
7	U+	Encoder output P signal positive
8	U-	Encoder output P signal negative
9	V+	Encoder output V signal positive
10	V-	Encoder output V signal negative
11	W+	Encoder output W

		signal positive
12	W-	Encoder output W signal negative
13	+5V	Output 5V/100mA power
14	COM	Power ground
15	-	
Rotational transformer PG card(PI9000_ PG4)		
PI9000_PG4 specifications		
User interface	Terminal block	
Swappable	NO	
Wire gauge	>22AWG	
Resolution	12-bit	
Excitation frequency	10kHz	
VRMS	7V	
VP-P	3.15±27%	
PI9000_PG4 terminal description		
No.	Label no.	Description
1	EXC1	Rotary transformer excitation negative
2	EXC	Rotary transformer excitation positive
3	SIN	Rotary transformer feedback SIN positive
4	SINLO	Rotary transformer feedback SIN negative
5	COS	Rotary transformer feedback COS positive
6	-	
7	-	
8	-	
9	COSLO	Rotary transformer feedback COS negative
OC PG card(PI9000_PG5)		
PI9000_PG5 specifications		
User interface	Terminal block	
Spacing	3.5mm	
Screw	Slotted	
Swappable	NO	
Wire gauge	16-26AWG	
Maximum	100KHz	

frequency		
PI9000_PG5 terminal description		
No.	Label no.	Description
1	A	Encoder output A signal
2	B	Encoder output B signal
3	Z	Encoder output Z signal
4	15V	Output 15V/100mA power
5	COM	Power ground
6	COM	Power ground
7	A1	PG card A 1:1 feedback output A signal
8	B1	PG card A 1:1 feedback output B signal
9	PE	Shielded terminal

Warranty Card

Sincerely thank you purchase Powtran products !

This product has passed the strict quality inspection by Powtran. According to the instructions of this warranty card, Powtran will be responsible for free maintenance for all hardware failures caused by product quality problem under normal use during the warranty period.

Product Model:	Serial Number:		
Warranty period:			
Date of purchase:	Year	Month	Day
Invoice Number:			
User Name: (Or company name)			
Address:			
Zip:	Phone:	Fax:	
Dealer Name:			
Address:			
Zip:	Phone:	Fax:	
Dealer stamp			

Customer Feedback Form of Powtran Inverter

Failure

Dear Customer: please fill out the form below in details so that we may better serve you:

Load and control situation					
Electrical power and poles		Rated motor current		Frequency range under normal working	
Load type	□Fan□Textile machine□Extruder □Pump□Injection machine□Other load		Speed control mode	□Keyboard □Terminal □PID □Host computer	
Control method	□V/F control without PG □V/F control with PG □Vector control with PG				
Failure phenomenon					
When failure occurs	□power-on □start run □in operation □accelerate □decelerate				
Failure type					
Abnormal current	□Err.02 □Err.03 □Err.04□Err.40				
Abnormal voltage	□Err.05 □Err.06 □Err.07 □Err.09				
Other display failure	□Err.14 □Err.15 □Err.20□Err.21□Err.31				
Board failure	□no display after power on □smoking after power on □power board relay does not pull-in				
Keyboard failure	□button malfunction □parameter can not be modified □imperfect display □knob malfunction				
Device failure	□burnt □fan does not work □main circuit relay or contactor does not pull-in □power resistors burned out				
Abnormal output	□no output voltage □output voltage unbalance □motor with large vibrations □motor power inadequate				
If your failure is not listed above, Please describe in the following:					
Failure description:					

The following fields shall be filled out by maintenance agency

Maintenance records:

1st time	Full name of maintenance agency		Tel	
	Address		Zip Code	
	Maintenance voucher number		Signature of the	
2nd time	Full name of maintenance agency		Tel	
	Address		Zip Code	
	Maintenance voucher number		Signature of the	
3rd time	Full name of maintenance agency		Tel	
	Address		Zip Code	
	Maintenance voucher number		Signature of the	

Product Information Feedback

Dear user:

Thank you for your interest in and purchasing Powtran products! In order to better serve you, we want to be able to timely get your personal information and the related information of the purchased Powtran products so as to understand your current and future further demand to Powtran products, we would appreciate your valuable feedback. For your convenience, please visit our websitehttp://www.powtran.com and then click "Technologies and Services"and "Download" columns to submit your feedback information.

1) Download the update product manuals you need
2) View the technical information on products, such as operation instructions, specifications and features, FAQ, etc.
3) Share application cases.
4) Technical advisory and online feedback
5) Feedback the product and demand information for via e-mail
6) Inquire the latest products and access to various types of warranty and extend additional services