Shihlin Electric

SE2 Series

High Quality

Innovation

High Tech

www.seec.com.tw

High Performance Vector control
SE2 Series Inverter

ISO 14001 ISO 9001

The Shihlin electric SE2-TYPE inverters have been designed with many complex parameterized functions to meet most of the application requirements from the market. For customers who contact inverters for the first time, such a complex inverter may cause troubles when using it. So the users are expected to read each part of this manual carefully so as to master the operating method of the inverter. In case there is any question, please feel free to contact us.

In Chapter 2 of this manual, all the series and the corresponding specifications of Shihlin electric SE2-TYPE inverters are listed in detail. Section 2-5 guids customers how to install the inverter and emphasizes on **precautions for safety** that much attention should be paid to when utilizing the inverter.

Chapter 3 guides customers how to use the inverter. In Section 3-1, the **operating mode of the inverter** is outlined briefly; in Section 3-2, how to use the **operation panel** is described, and in Section 3-3, simple operating steps are explained. Chapter 4 explains the functions of each parameter in detail.

The definitions of terminologies in this manual are as follows:

1. Output frequency, target frequency, steady output frequency

- The actual output current frequency of the inverter is called ‘output frequency’.
- The frequency set by user (through an operation panel, multi-speed terminals, voltage signal or current signal) is called ‘target frequency’.
- When the motor starts running, the output frequency of the inverter will gradually accelerate to the target frequency, and finally run steadily at the target frequency. The output frequency at this time is called ‘steady output frequency’.

2. There are detailed instructions on parameter settings in Chapter 4. In case users are not familiar with these settings, arbitrary adjustment of the parameter may result in abnormal operations. All parameters can be reset to their default values by the parameter of P.998. For the setting procedure of this parameter, please refer to P.998 in Chapter 4.

3. The ‘operation mode’ of inverter, and the ‘working mode’ of operation panel:
The operating mode determines the reference source for the target frequency and the signal source for starting. The Shihlin inverter has totally 9 operating modes. Please refer to Section 3-1 for details.
The operation panel mainly concerns monitoring of numeric values, setting of parameters and setting of target frequency. The Shihlin operation panel has totally 5 working modes. Please refer to Section 3-2 for details.

4. The difference between ‘terminal name’ and ‘function name’:
Near the terminals of the control board or the main board, printed letters can be found. These letters are used to distinguish each terminal, and thus called ‘terminal name’.
For ‘multi-function control terminal’ and ‘multi-function output terminal’, besides the terminal name, the ‘function name’ is also necessary to be defined. The function name indicates the actual functions of the terminal.

When explaining the function for a terminal, the name used is its ‘function name’.

5. The difference between ‘on’ and ‘turn on’:

When explaining the function of the ‘multi-function control terminal’, the word ‘on and turn on’ are often used.

The ‘on’ is used to indicate that the external switch of the terminal is in close state, and thus belongs to the description of the state.

The ‘turn on’ is employed to describe the action that the external switch of the terminal is shut on from the open state to the close state, and thus belongs to the description of action.

6. All the ‘P.’s mentioned in this manual mean ‘parameter’.

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1. Delivery Check

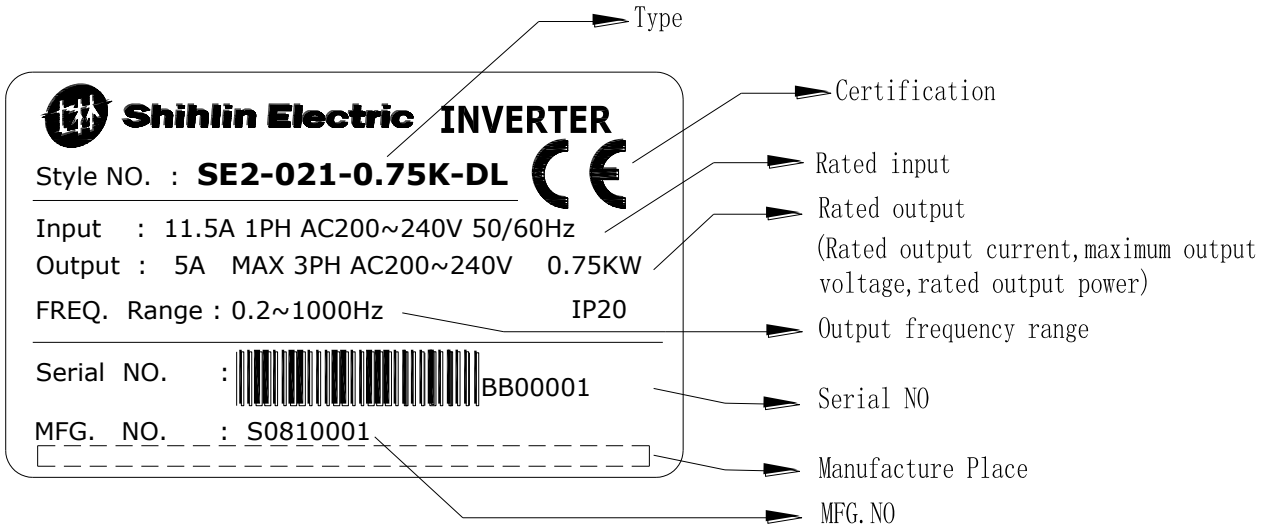
Product Examination

Each SE2-TYPE inverter has been checked strictly before delivery and packed carefully to prevent from mechanical damage. Please check as follows after opening the package.

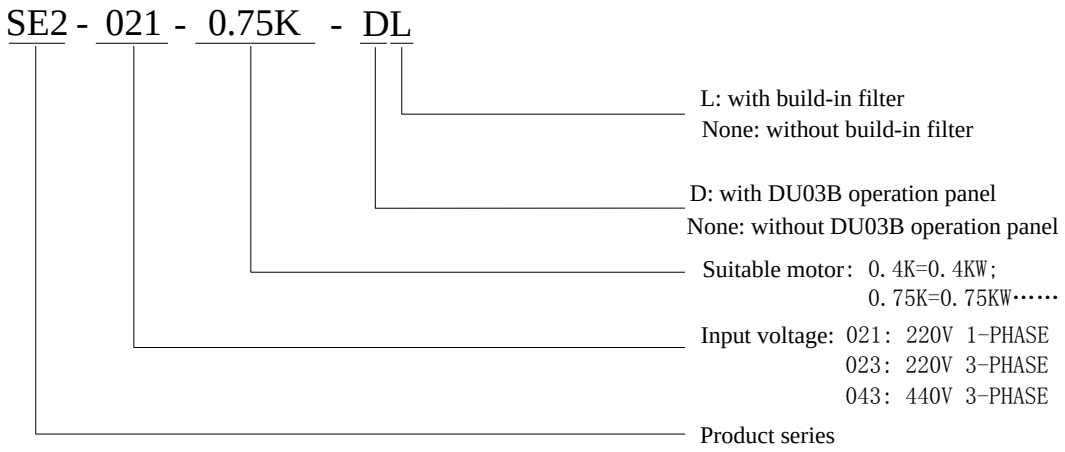
• Please check whether it is damaged during transport.

• Please check whether the inverter type is identical with which shown on the package.

1.1 Nameplate instruction:



1.2 Type instruction:



1.3 Order Code Description:

For example:

Customer requirement			Order code
Inverter specification	Operation panel	Build-in filter	
SE2-021-0.4K（SE2 Series Single-Phase 220V 0.5HP）	Yes	Yes	SNKSE20210R4KDL
SE2-023-1.5K（SE2 Series Three-Phase 220V 2HP）	Yes	No	SNKSE20231R5KD
SE2-043-2.2K（SE2 Series Three-Phase 440V 3HP）	No	Yes	SNKSE20432R2KL
SE2-043-3.7K（SE2 Series Three-Phase 440V 5HP）	No	No	SNKSE20433R7K

2. Introduction of Shihlin Inverter

2.1 Electric specification

2.1.1 220V Series Single-Phase

Model SE2-021-☐☐☐K		0.4K	0.75K	1.5K	2.2K
applicable motor capacity	HP	0.5	1	2	3
	kW	0.4	0.75	1.5	2.2
Output	Rated output capacity kVA (Note)	1.2	1.9	3.0	4.2
	Rated output current A (Note)	3.0	5.0	8.0	11.0
	Overload current rating	150% 60 seconds; 200% 1 second (inverse time characteristics)			
	Maximum output voltage	3 Phase 200~240V AC			
Power supply	Rated power voltage	single phase 200~240V 50Hz / 60Hz			
	Power voltage permissible fluctuation	single phase 180~264V 50Hz / 60Hz			
	Power frequency permissible fluctuation	±5%			
	Power source capacity kVA	1.8	3	4.5	6.4
Cooling method		Self cooling	Forced air cooling		
Weight kg		1.2	1.2	1.9	1.9

2.1.2 220V Series Three-Phase

Model SE2-023-☐☐☐K		0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K
applicable motor capacity	HP	0.5	1	2	3	5	7	10
	kW	0.4	0.75	1.5	2.2	3.7	5.5	7.5
Output	Rated output capacity kVA (Note)	1.2	1.9	3.0	4.2	6.7	9.2	12.6
	Rated output current A (Note)	3.0	5.0	8.0	11.0	17.5	24	33
	Overload current rating	150% 60 seconds; 200% 1 second (inverse time characteristics)						
	Maximum output voltage	3 Phase 200~240V AC						
Power supply	Rated power voltage	3 Phase 200~240V 50Hz / 60Hz						
	Power voltage permissible fluctuation	3 Phase 170~264V 50Hz / 60Hz						
	Power frequency permissible fluctuation	±5%						
	Power source capacity kVA	1.8	3	4.5	6.4	10	13.8	19
Cooling method		Self cooling	Forced air cooling					
Weight kg		1.2	1.2	1.2	1.9	1.9	3.8	3.8

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2.1.3 440V Series Three-Phase

Model SE2-043-☐☐☐K		0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K
applicable motor capacity	HP	0.5	1	2	3	5	7	10	15
	kW	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11
Output	Rated output capacity kVA (Note)	1.2	2.0	3.2	4.6	6.9	9.2	13	18
	Rated output current A (Note)	1.5	2.6	4.2	6.0	9.0	12	17	23
	Overload current rating	150% 60 Seconds; 200% 1 Second (inverse time characteristics)							
	Maximum output voltage	3 Phase 380~480V							
Power supply	Rated power voltage	3 Phase 380~480V 50Hz / 60Hz							
	Power voltage permissible fluctuation	323~506V 50Hz / 60Hz							
	Power frequency permissible fluctuation	±5%							
	Power source capacity kVA	1.8	3	4.8	6.9	10.4	13.8	19.5	27
Cooling method		Self cooling	Forced air cooling						
Weight kg		1.2	1.2	1.2	1.9	1.9	3.8	3.8	3.8

2. Introduction of Shihlin Inverter

2.2 Common specification (Inverter characteristics)

Control method		SVPWM control, V/F control, facility vector control, Sensorless vector control.
Output frequency range		0.2~1000Hz (The starting frequency setting range is 0~600Hz). Please refer to P.187 in Chapter 4.
Resolution for setting frequency	Digital setting	When P.187=0, if the frequency set value is below 100Hz, the resolution will be 0.01Hz. If the frequency set value is above 100Hz, the resolution will be 0.1Hz. When P.187=1, the resolution of frequency will be 0.1Hz.
	Analog setting	When setting DC 0~5V signals, the resolution will be 1/500; When setting DC 0~10V or 4~20mA signals, the resolution will be 1/1000.
Output frequency accuracy		0.01Hz
Voltage / frequency output characteristics		Base frequency voltage (P.19), base frequency (P.3) can be arbitrarily set in available range. Constant torque model, applicable load model can be selected (P.14).
Start torque		150% (1Hz): When the sensorless vector control is started.
Torque boost		The torque boost setting range is 0~30% (P.0), auto boost, slip compensation.
Acceleration/deceleration curve characteristics		The resolution (0.01s/0.1s) of acceleration/deceleration time (P.7, P.8) is switched by P.21. The setting range has 0~360s or 0~3600s for selection. And different acceleration/deceleration curve model can be selected by P.29.
DC braking		The DC braking action frequency is 0~120Hz (P.10); the DC braking time is 0~60 Seconds (P.11); and the DC braking voltage is 0~30% (P.12). Linear braking and Idling braking selection (P.71).
Stalling protection		The stalling protection level can be set to 0~400% (P.22).
Target frequency setting		Operation panel setting; DC 0~5V signal setting, DC 0~10V signal setting and DC 4~20mA signal setting, 2 voltage input or one voltage and one current input can be selected; Multi-speed stage levels setting; Communication setting.
PID control		Please refer to P.170~P.183 in Chapter 4.
Multi-function control terminals		Motor starting (STF, STR), the second function (RT), the 16-speed operation (RL, RM, RH, REX), external thermal relay (OH), reset (RES) , etc. (they can be set by the user with P.80~P.84, P.86)
Multi-function output terminals	Multi-function output terminals (SO, SE)	P.40	Inverter running (RUN), output frequency detection (FU), Up to frequency (SU), overload alarm (OL), zero current detection (OMD), alarm (ALARM), Section detection (PO1), Periodical detection (PO2), and Pause detection (PO3), Inverter output (BP), Commercial power-supply output (GP).
	Multi-function output relay	P.85	
	Multi function analogy meter	Multi-function DC (0~10V)(AM) Output: output frequency, output current (P.54).	

2. Introduction of Shihlin Inverter

Operation panel	Running status monitoring	Output frequency monitoring, output current monitoring, and output voltage monitoring.
	HELP mode	Alarm history monitoring, alarm history clear, all parameters clear, and firmware version read.
	LED indication lamp(6)	Run indication lamp, frequency monitoring indication lamp, voltage monitoring indication lamp, current monitoring indication lamp, mode switching indication lamp, and PU/external terminals control indication lamp.
Communication function	RS485	Internal RS485 communication.
	Communication expansion board	Optional accesssories: Terminal type, RJ11, RJ-45, Profibus or Device Net communication expansion board.
Protection mechanism / Alarm function		Output short circuit protection, Over-current protection, P-N over-voltage protection, under-voltage protection, motor over heat protection (P.9), IGBT module over heat protection, braking transistor abnormality protection, communication abnormality protection, etc.
Environmental condition	Ambient temperature	-10 ~ +50℃ (non-freezing)
	Ambient humidity	Below 90%Rh (non-condensing)
	Storage temperature	-20 ~ +65℃
	Environment around	In room, no corrosive gas, no flammable gas, no flammable dust
	Altitude and vibration	Altitude below 1000 meters, Vibration below 5.9m/s2 (0.6G).
Certification		Meet the requirements of CE certification standards (the –DL type).

Note: 1.If several multi-function output relays are needed, you can choose the I/O expansion board, on which there are 2 multi-function output relays. For detailed instruction, please refer to appendix 5.

2. Communications expansion board option details, please refer to Appendix 5.

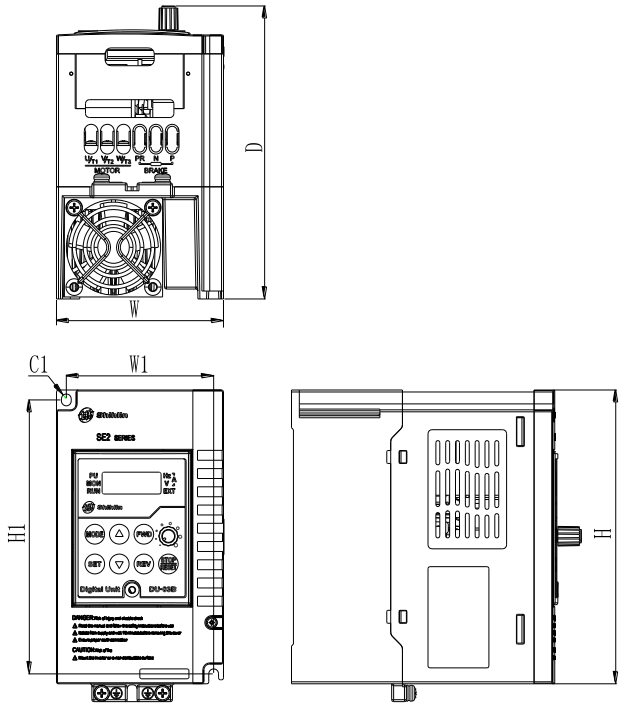
3. Profibus is the registered trademark of Profibus international.

4. Device Net is the registered trademark of ODVA (Open Device Vendor Association).

2. Introduction of Shihlin Inverter

2.3 Mechanical Dimensions

2.3.1 Outline



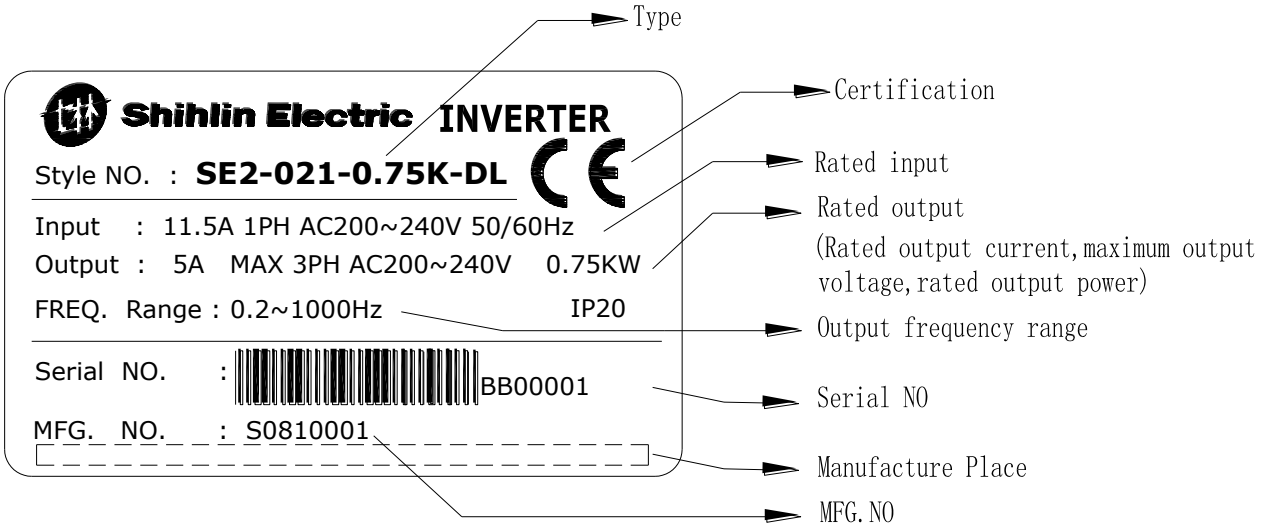
2.3.2 Dimension

Model	H(mm)	W(mm)	D(mm)	W1(mm)	H1(mm)	C1(mm)
SE2-021-0.4K	148	85	148	75	138	Φ 5
SE2-021-0.75K	148	85	148	75	138	Φ 5
SE2-021-1.5K	186	100	157	90	176	Φ 5
SE2-021-2.2K	186	100	157	90	176	Φ 5
SE2-023-0.4K	148	85	148	75	138	Φ 5
SE2-023-0.75K	148	85	148	75	138	Φ 5
SE2-023-1.5K	148	85	148	75	138	Φ 5
SE2-023-2.2K	186	100	157	90	176	Φ 5
SE2-023-3.7K	186	100	157	90	176	Φ 5
SE2-023-5.5K	266	141	201.5	126	244	Φ 6
SE2-023-7.5K	266	141	201.5	126	244	Φ 6
SE2-043-0.4K	148	85	148	75	138	Φ 5
SE2-043-0.75K	148	85	148	75	138	Φ 5
SE2-043-1.5K	148	85	148	75	138	Φ 5
SE2-043-2.2K	186	100	157	90	176	Φ 5
SE2-043-3.7K	186	100	157	90	176	Φ 5
SE2-043-5.5K	266	141	201.5	126	244	Φ 6
SE2-043-7.5K	266	141	201.5	126	244	Φ 6
SE2-043-11K	266	141	201.5	126	244	Φ 6

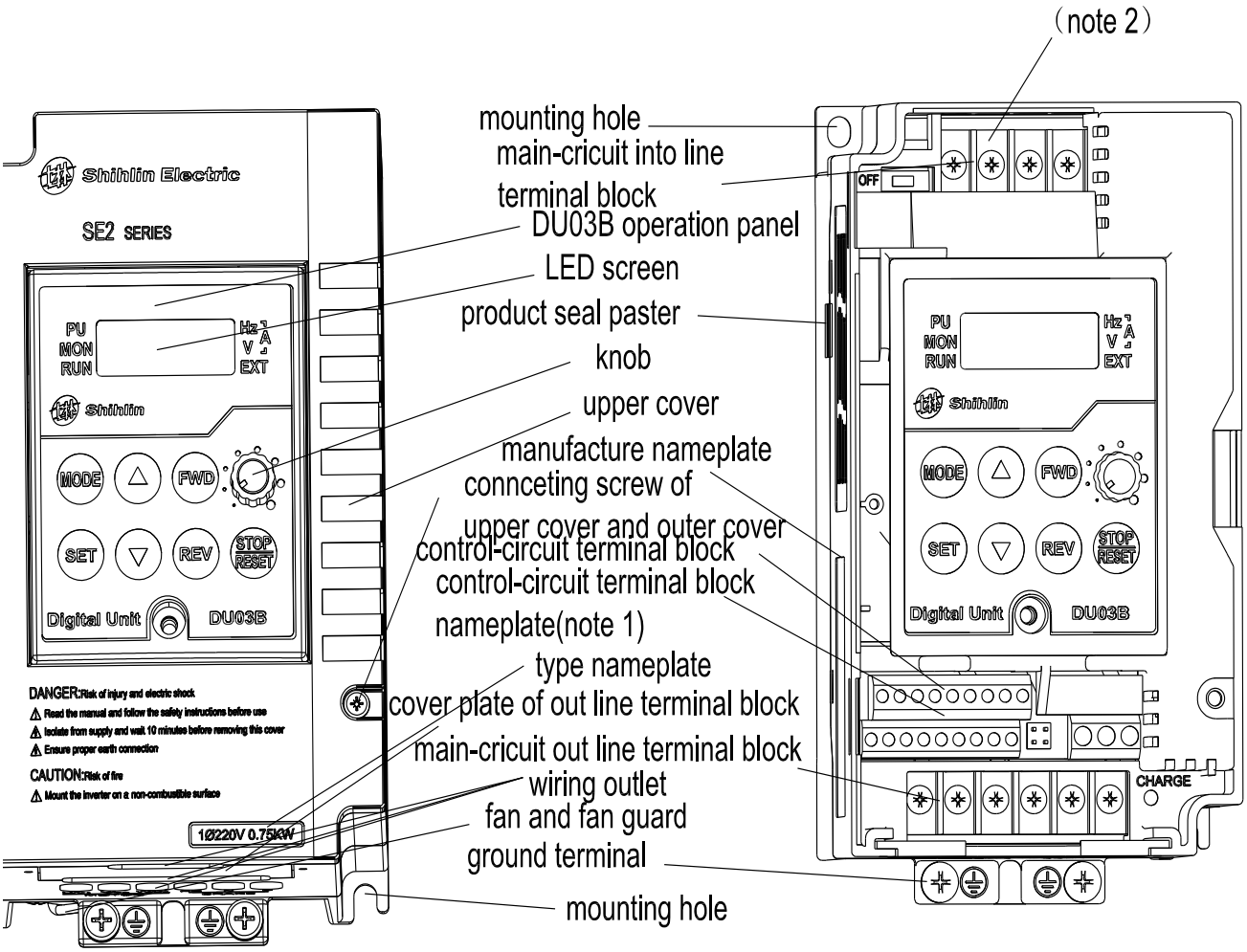
2. Introduction of Shihlin Inverter

2.4 Name of each part

2.4.1 Nameplate and model



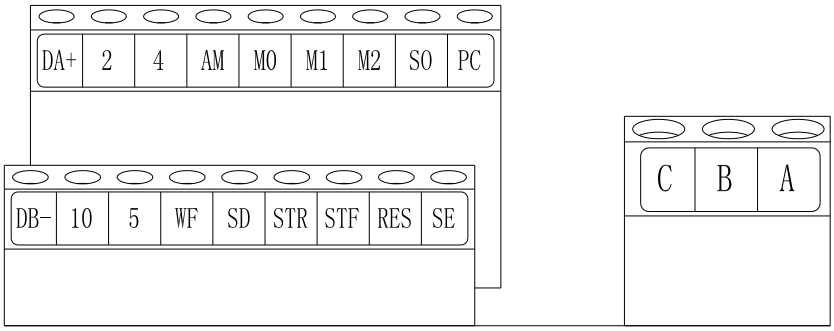
2.4.2 SE2-0XX-0.4K~11K (0.5HP~15HP)



When wiring, the wire must go through the 'wiring outlet' before connecting with the terminal bank.

2. Introduction of Shihlin Inverter

Note: 1. The enlarge figure of the control-circuit terminal block nameplate is as follows:



2. There’s no screw for the 1-Phase type.

2. Introduction of Shihlin Inverter

2.5 Installation and wiring

2.5.1 Transport

Take the pedestal when carrying and don't only take the cover or any part of the inverter, otherwise it may drop down.

2.5.2 Stockpile

This product before installing must be placed in the packaging, if not use, in order to meet the company's warranty scope and future maintenance, you must pay attention to the following matters when storage:

1. Must be placed in dry and without dirt place.
2. The environment temperature for storage position must range from -20℃ to +65℃.
3. The relative humidity for storage position must range from 0% to 95%, and no condensation.
4. Avoid storing in the environment which contains corrosion gas or liquid.
5. It had better be packed properly and kept on shelf or table.

Note: 1. Even if the humidity meets the standard requirements, icing and condensation can also occur when the temperature changes rapidly. And the place should avoid.
2. Don't place it on the ground, and it should be placed on appropriate shelf. If in the bad surroundings, the desiccant should be placed in the packaging bag.
3. If the custody period is more than 3 months, the ambient temperature should not be higher than 30℃. It is to consider that the character will easily degrade in high temperature when the electrolytic capacitors are deposited without electricity.
4. If the inverter is installed in device or control board when not in use (especially in construction site or the humid and dusty place), the inverter should be removed and put in suitable environment according with the above storage conditions.
5. If the electrolytic capacitors are long-term no electricity, the character will degrade. Do not place it in the state of no electricity for more than one year.

2.5.3 EMC Installation instructions

Inverter is the same as other electrical and electronic equipment, when working in a distribution system, it is both the electromagnetic interference sources and the electromagnetic receiver. The working principle of inverter determines that it will produce certain electromagnetic interference noise. In order to guarantee the inverter working reliably in the electromagnetic environment, it must have a certain abilitily of anti-electromagnetic interference in design. In order to make the drive system work normaly, and meet CE declared requirements, please meet the following several aspects requirements in installation:

1. Field wiring

Power line supply electric independently from power transformer, five core or four core line are generally used, null line and ground sharing a single line is forbidden.

2. Introduction of Shihlin Inverter

Commonly signal wire (weak) and power wire (heavy) are in control cabinet, for the inverter, power wire is divided into input line and output line. Signal wire is easily interfered by power wire, so that causing the misoperation of the device. When wiring, signal wire and power wire should be distributed in different areas, parallel lines and interlaced lines are forbidden at close range(within 20cm), and especially don't bundle up the two lines. If the signal cables must pass through the power lines, the two should keep 90 degree Angle. Interlace lines and banding together is also forbidden for the input and output line of power wire, especially on the occasions which noise filter is installed. It will cause the coupling of electromagnetic noise through the distributed capacitance of the input and output lines, thus the noise filter will out of action.

Generally a control cabinet has different electric equipments such as inverter, filter, PLC, measurement instrument, their ability of emitting and bearing electromagnetic noise are diverse from each other, and this requires classifing these equipments. The classification can be divided into strong noise equipment and noise sensitive equipment, Install the similar equipments in the same area and, and keep a distance more than 20cm among inhomogeneous equipments.

2. Input noise filter, input and output magnet ring (zero phase reactor)

Adding noise filter to the input terminal, the inverter will be isolated from the other equipments, and its ability of conduction and radiation will be reduced effectively. The better EMI suppression effect will be obtained by installing the input reactor recommended by this manual. By adding winding ferrite bead to the input and output terminal and coordinating with internal filter, the inverters will meet the CE declared and have a better effect.

3. Shielding

Good shielding and grounding can greatly reduce the interference of inverter, and can improve the anti-interference ability of the inverter. Sealing off the inverter with the good conductive sheet metal and connecting the sheet metal to ground, the limit value of radiation which CE declared will be met.

4. Grounding

The inverter must be connected to the ground safely and reliably. Grounding is not only for equipment and personal safety, but also the simplest, the most efficient and the lowest cost method to solving the EMC problem, so it should be prioritized. Please refer to the section of "terminal wiring".

5. Carrier

The leakage current contains the leakage current from line to line or over the ground. It depends on the size of the distributed capacitance when wiring and the carrier frequency of the frequency. The higher the carrier frequency, the longer the motor cable, and the larger the cable cross-sectional area is, the larger the leakage current is. Reducing the carrier frequency can effectively reduce the leakage current. When the motor line is long (50m above), the output side should be installed with ac reactor or sine wave filter, when the motor line is longer, a reactor should be installed every other distance. At the same time, reducing carrier frequency can effectively reduce the conduction and radiation interference, and the limits value of the conduction and radiation which CE declared can be met in 2K carrier frequency.

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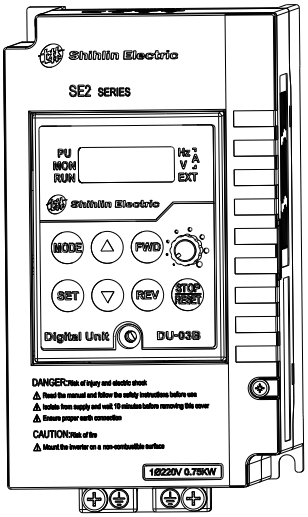
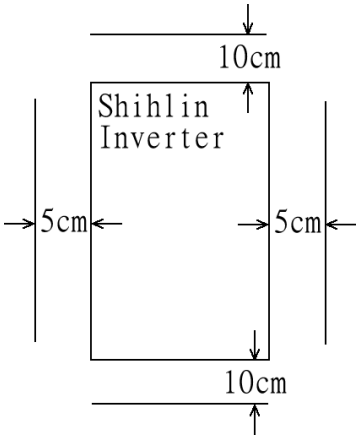
2.5.4 Installation notice

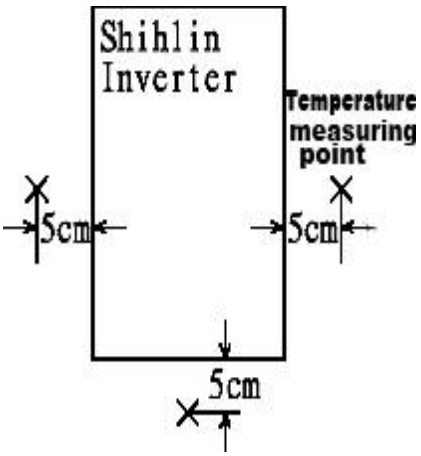
1. Please install in an upright direction



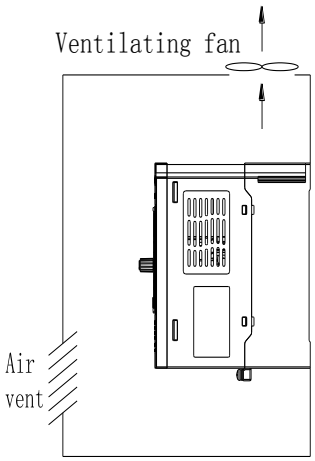
2. Proper clearance shall be kept from surroundings when installing



3. The ambient temperature shall not exceed the permissible value.



4. Correct position for installing in a protection case.

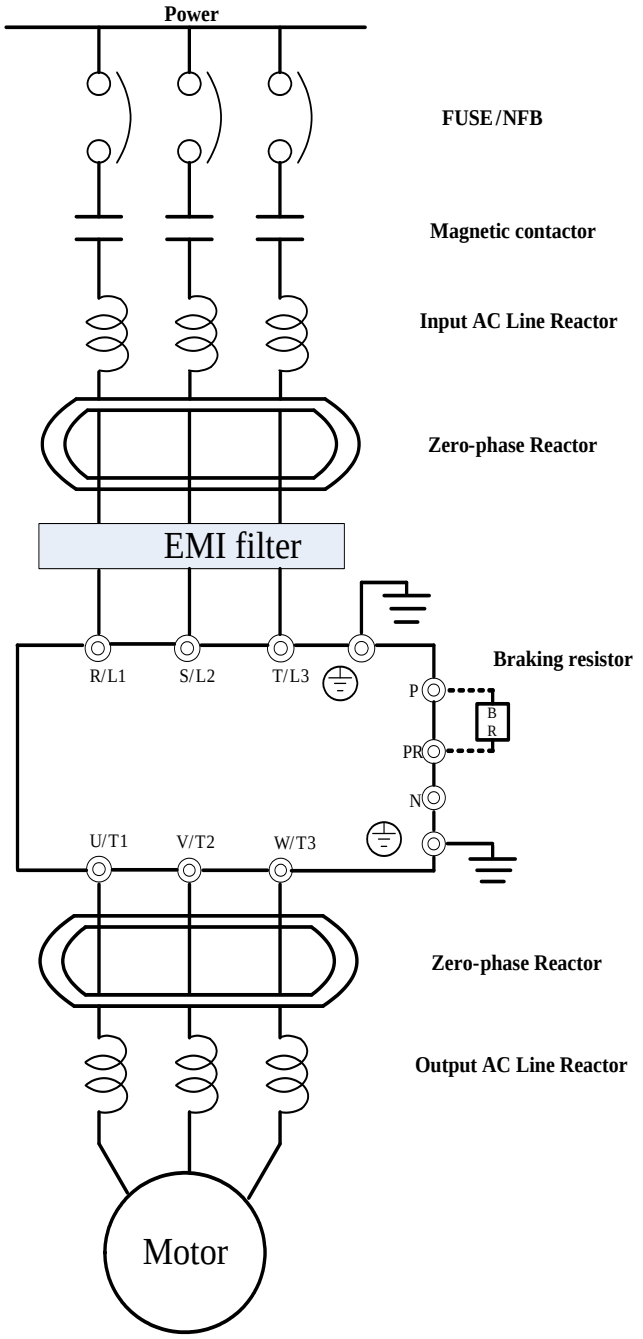


5. Please do not install the inverter on a surface of inflammable material such as wood etc.
6. Please do not install the inverter at places exposed to explosive gas, inflammable dust.
7. Please do not install the inverter at places with airborne oil mist and dust.
8. Please do not install the inverter at places exposed to corrosive gas or high salt air.
9. Please do not install the inverter in the environment of high temperature and high humidity.

Note: 1.Only qualified electrical professional personnel can carry out the installation, wire arrangement, dismounting and maintenance.

2. Please ensure to comply with the installation notice. In case the installation notice has not been fully complied with and damage of the inverter or dangerous accidence thus be resulted in, our company will not undertake any legal responsibility. In case there is any question when installing, please feel free to contact us.

2.5.5 System wire arrangement of SE2-0XX-0.4K~11K (0.5HP~15HP) series



Power supply	Please follow the specific power supply requirement shown in this manual.
Fuse/NFB	There may be an inrush current during power up. Please refer to 2.7.1 and select the correct fuse /NFB.
Magnetic contactor	Please do not use a Magnetic contactor as the I/O switch of the inverter, as it will reduce the operating life cycle of the inverter.
Input AC Line Reactor	AC line reactor should be installed to improve the input power factor. The wiring distance should be less than 10m. Please refer to 2.7.6.
Zero-phase Reactor	Zero-phase reactors are used to reduce radio noise especially when audio equipment installed near the inverter. Effective for noise reduction on both the input and output sides. Attenuation quality is good for a wide range from AM band to 10Mhz. Please refer to 2.7.5.
EMI filter	Used to reduce electromagnetic interference.
Braking unit	Used to reduce stopping time of the motor.
Output AC Line Reactor	Motor surge voltage amplitudes depending on motor cable length. The output AC line reactor is necessary to install on the inverter output side. Please refer to 2.7.6.

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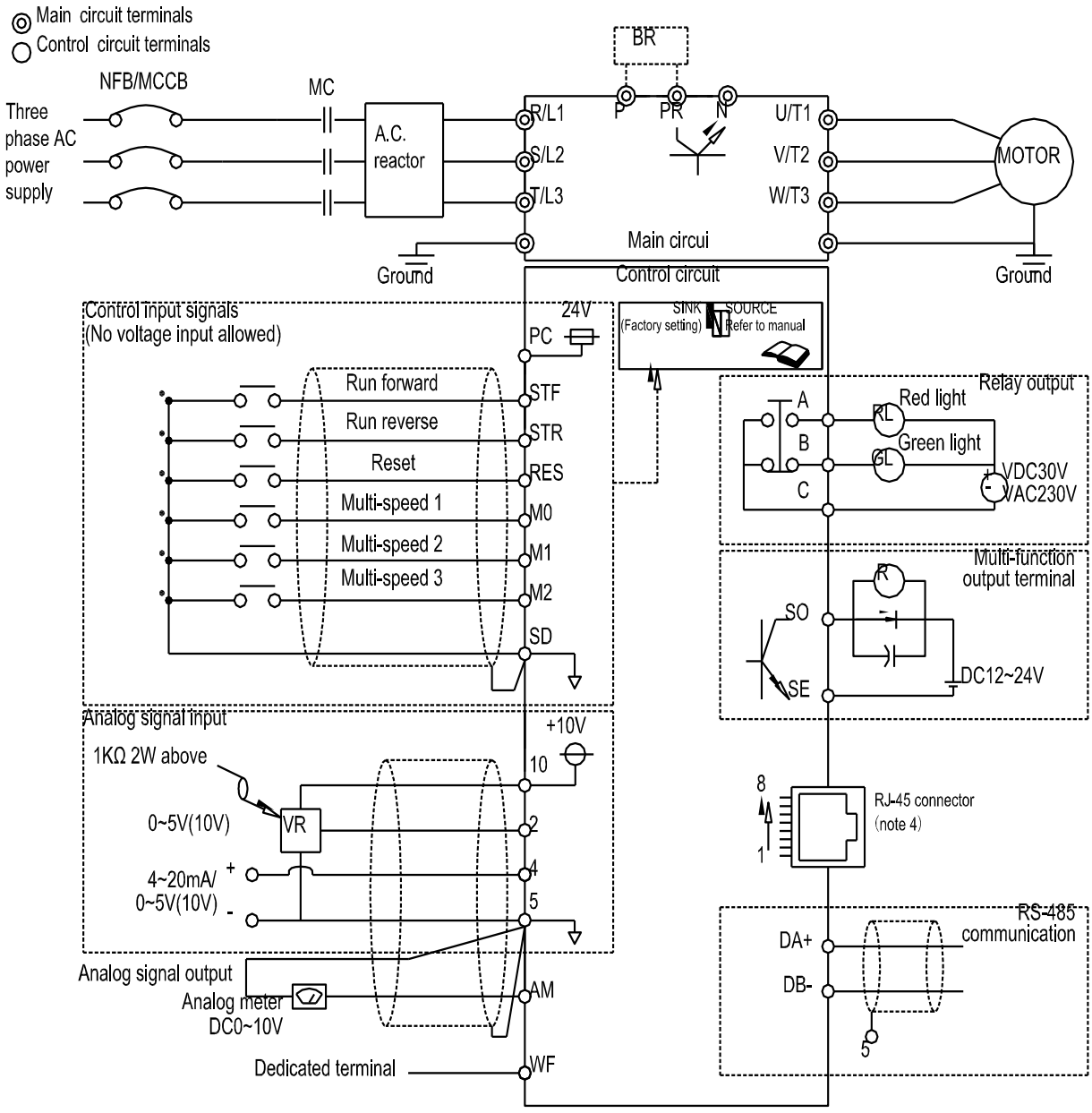
2.5.6Terminal wire arrangement of SE2-0XX-0.4K~11K(0.5HP~15HP)series



===== Note: ==========

1. For the usage of external thermal relay, please refer to P.80~P.84, P.86 in Chapter 4.
2. Make sure do not to short PC and SD.
3. In the above figure, Dotted line metal, please refer 2.5.7
4. The SE2-TYPE inverter have internal RS485 communication, and can also uses pluggable communications expansion boards CB01, CB02, CB03, PD01, DN01; For detailed instructions, please refer to appendix 5.

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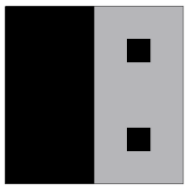
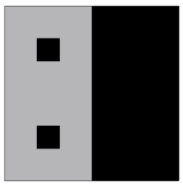
2. Introduction of Shihlin Inverter

Note: 1. For the multi-function control terminals, please refer to P.80~P.84, P.86, and for the multi-function output terminals, please refer to P.40 in Chapter 4.

2. For SE2-0XX-0.4K~11K (0.5HP~15HP) series, the multi-function control terminals can select the 'Sink Input' mode or the 'Source Input' mode by the jumper. When the Jumper is on the left side, 'Sink Input' mode is chosen, and 'Source Input' mode is chosen when on the right side. Shown as follows:



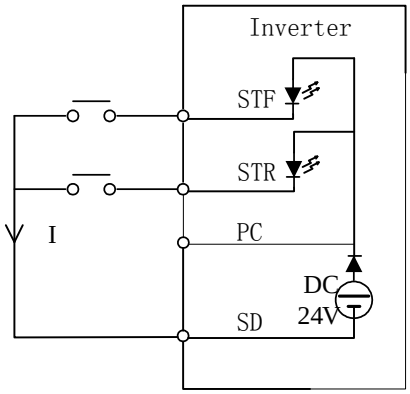
Sink Input



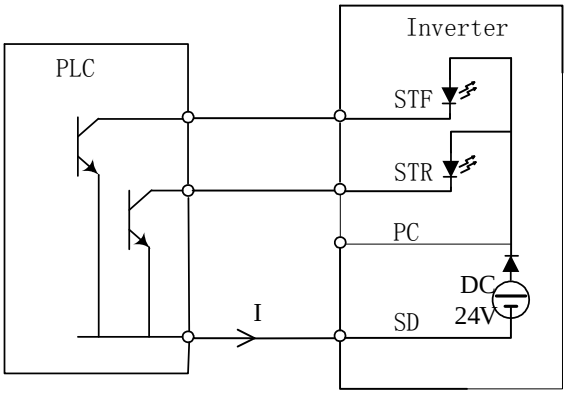
Source Input

No matter what kind of multi-function control terminal is, all of its outside wire arrangement can be considered as a simple switch. If the switch is 'on', the control signal will be put into the terminal, if the switch is 'off', the control signal is shut off.

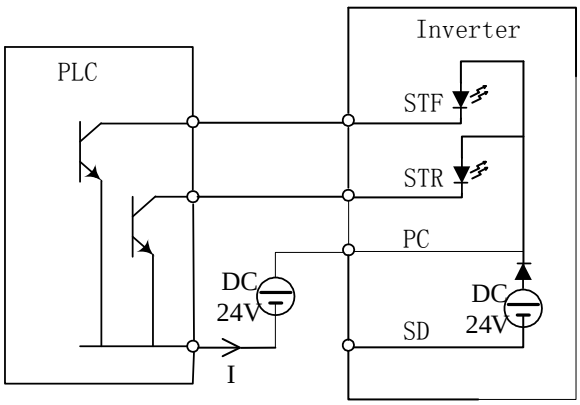
If 'Sink Input' mode is selected, the function of the terminal is active when it is shorted with SD or connected with the external PLC. In this mode, the current flows out of the corresponding terminal when it is 'on'. Terminal SD is common to the contact input signals. When using an external power supply for output transistor, please use terminal PC as a common to prevent misoperation caused by leakage current.



Sink Input: the multi-function control terminal is shorted directly with SD



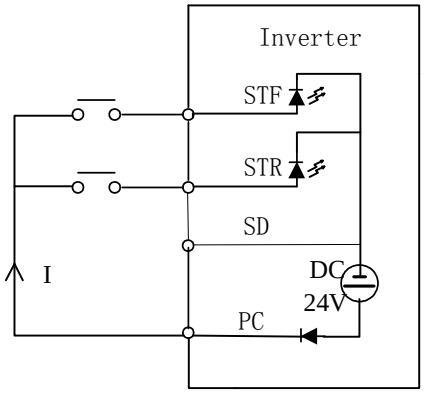
Sink Input: the multi-function control terminal is connected directly with open-collector PLC



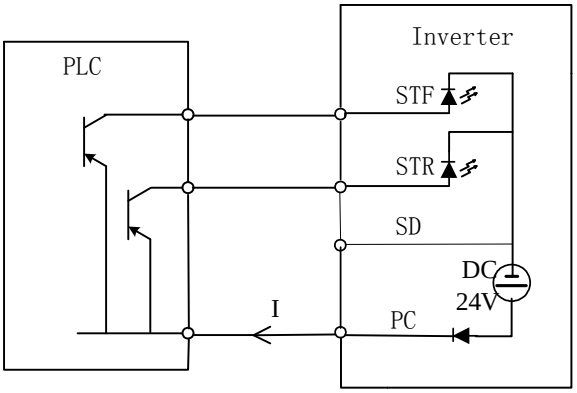
Sink Input: the multi-function control terminal is connected with open-collector PLC and external power supply

2. Introduction of Shihlin Inverter

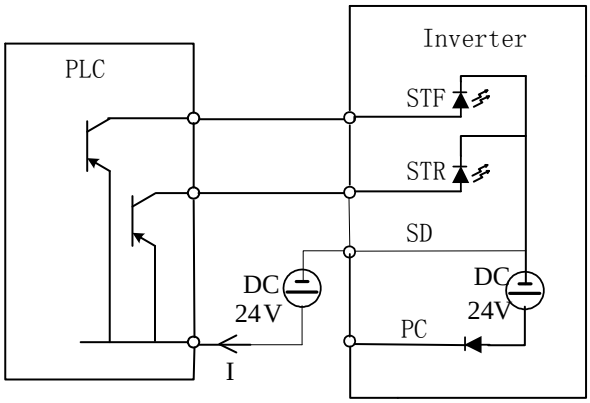
If 'Source Input' mode is selected, the function of the multi-function control; terminal is active when it is shorted with PC or connected with the external PLC. In this mode, the current flows into the corresponding terminal when it is 'on'. Terminal PC is common to the contact input signals. When using an external power supply for transistor output, please use terminal SD as a common to prevent misoperation caused by leakage current.



Source Input: the multi-function control terminal is shorted directly with PC



Source Input: the multi-function control terminal is connected directly with open-emitter PLC



Source Input: the multi-function control terminal is connected with open-emitter PLC and external power supply

Main-circuit terminals	
Terminal name	Remarks
R/L1- S/L2- T/L3	Connect to the commercial power supply.
U/T1-V/T2-W/T3	Connect to three-phase squirrel-cage motor.
P- PR	Connect to brake resistors. (Note1, 2)
P-N	Connect to brake unit. (Note3)
⏚	Connect the enclosure of the inverter to ground. For 220V series, the third type of grounding shall be adopted. For 440V series, special type of grounding shall be adopted. (Note 4)

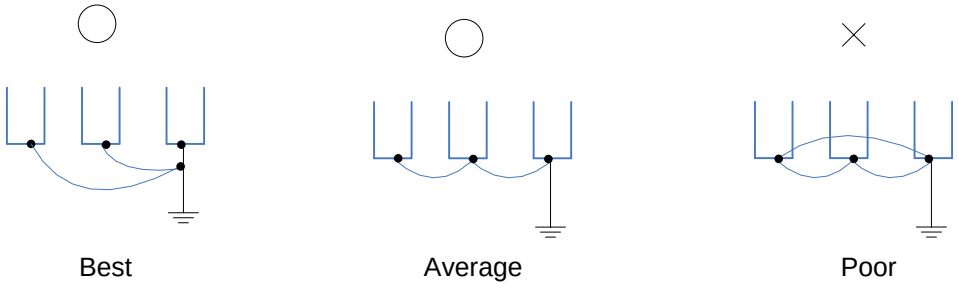
2. Introduction of Shihlin Inverter

Note: 1. For SE2-0XX-0.4K~11K (0.5HP~15HP) series of inverters, the brake resistor isn't appended when sales.

2. For the related knowledge on regenerative voltage, please refer to P.30 in Chapter 4.

3. P and N are the positive and negative terminals of the internal DC voltage of the inverter. In order to strengthen the braking capability during deceleration, it is suggested to purchase the option of 'brake unit' which is mounted between the terminals P and N. The 'brake unit' can effectively dissipate the feedback energy from the motor to the inverter when decelerating. In case there is any problem on purchasing of the 'brake unit', please feel free to contact us.

4. For safety and reduce noise, grounding terminals of inverter must to be good grounded. To avoid electric shocks and fire accident, external metal wire of electrical equipment should be short and thick and it should be connected to the special grounding terminals of inverter. If many of the inverters are placed together, all inverters must be connected to the common ground. Please refer to the following picture and determine not formed circuit between grounding terminal.



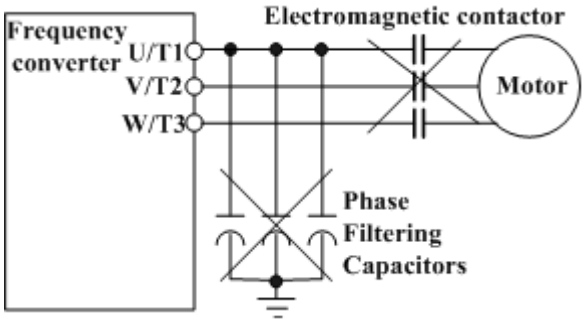
2. Introduction of Shihlin Inverter

Control terminals				
Terminal type	Terminal name	Function name	Remarks and function description	
On-off signal input	STF	Optional	These terminals are multi-function control terminals (SINK/SOURCE mode switchable). For detailed descriptions, please refer to P.80~P.84, P.86 in Chapter 4.	
	STR	Optional		
	M0	Optional		
	M1	Optional		
	M2	Optional		
	RES	Optional		
	SD	SD	Common reference Ground for STF, STR, M0, M1, M2 and RES	
	PC	PC	In the 'Source input' mode, it provides a common power supply for the terminals referred above.	
Analog signal input	10	---	The internal power is DC 10V at this terminal.	
	2	---	The input of voltage signal 0~5V or 0~10V, is used to set the target frequency.	P.38
	4	---	The input of voltage signal 0~5V or 0~10V / input of current signal 4mA~20mA (switch with P.17), is used to set the target frequency. (Note 1)	P.39
	5	---	The common reference ground of 2, 4, 10 and AM.	
Relay output	A	---	Normally, A-C are normal open, and B-C are normal closed. Contact capacity is VDC30V / VAC230V-0.3A	
	B	---		
	C	---		
Open collector output	SO	Optional	The terminal can also be called 'multi-function output terminal'. The function name can be set by P.40. For detailed description, please refer to P.40 in Chapter 4.	
	SE	SE	Open collector output reference ground.	
Analog signal output	AM	---	Connected with an external analog meter to indicate the output frequency or current. Contact capacity is 0~10VDC/2mA. Please refer to **P.54**, **P.55**, **P.56**, **P.191**, and **P.192** in Chapter 4.	
Communication terminal	DA+	DA+	RS485 serial communication terminal	
	DB-	DB-		
Dedicated terminals	WF	WF	Do not connect it during normal operation, otherwise may cause a malfunction.	

2.5.7 Wiring precautions

Main circuit wiring:

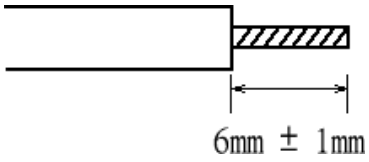
1. Do not connect the power supply wires to the 'inverter's output terminals (U/T1)-(V/T2)-(W/T3) which are designed for connecting motors, otherwise, the inverter may be damaged.
2. Please do not mount filtering capacitors, surge absorbers and electromagnetic contactors at the output end of the inverter.



3. Please do not use 'electromagnetic contactors' or 'no-fuse switches' with an online power to start or stop the motor.
4. Please ensure that the case of inverter and the motor are grounded, to avoid personnel electric shock.
5. To appropriately select the diameter of the main wires and the corresponding wire terminals, the no-fuse switches and the electromagnetic contactors, please refer to Section 2.7. And if the inverter is far away from the motor, please employ a wire with larger diameter to ensure the voltage drop along the wire within 2V. (The total length of the wire shall not exceed 500 meters)
6. 'Pressing connection terminals with insulated sleeve' shall be utilized for the wiring at the power source side and the load side.
7. In a short period after the power supply is shut off, high voltage still exists between the terminals P-N, thus please do not touch them within 10 minutes to avoid getting an electric shock.

Control circuit wire arrangement:

1. For wiring of signal input, 'insulated wires' must be used， and the 'metal mesh' of which must be put to earth.
2. For wiring of the control board, wires with a diameter of 0.75mm^2 are suggested to be used. And for the stripping of the insulating layer, please comply with the instruction of the following figure.



3. The control board wire (including signal input wire) shall be far away from the main circuit board wire. Binding the control board wires together with the main circuit wires is strictly forbidden.
4. In the inverter, the 'terminal SD', 'terminal SE' and the 'terminal 5' are the referencing grounds for the inner power sources which are isolated from each other.

2. Introduction of Shihlin Inverter

Note: 1. The terminal block screws must be screwed up tightly. Especially the wire cut pieces shall not be left in the inverter.

2. Only qualified electrical professional personnel can carry out the installation, wire arrangement, dismounting and maintenance.

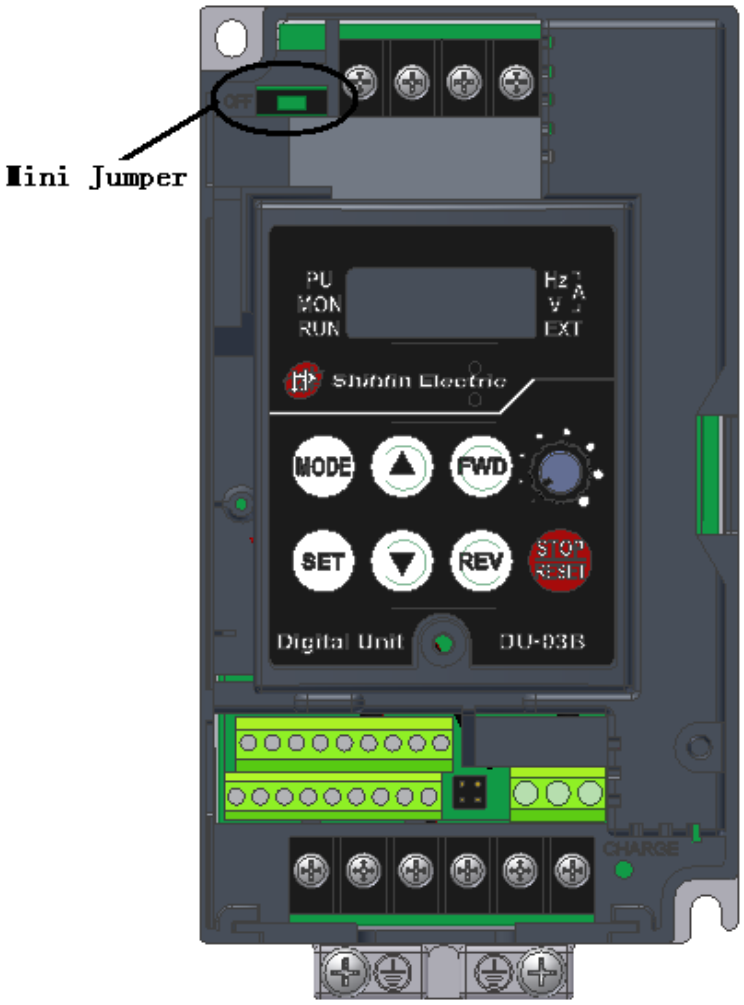
3. Please comply with the wire arrangement notice. In case the installation has not been fully complied with, and damage of the inverter or dangerous accidence thus be resulted in, our company will not undertake any legal responsibility. In case there is any question on the wire arrangement, please feel free to contact us.

2. Introduction of Shihlin Inverter

2.6 Mini Jumper instruction

Main power isolated from earth:

1. **If the inverter is supplied with a non-grounded power system (IT power), the Mini jumper must be cut off to prevent damaging center circuit (according to IEC61800-3) and reducing earth leakage current.**
2. **Please switch the Mini jumper to "On" if the inverter has a build-in filter, but that time, the earth leakage current will be increased. Please switch the Mini jumper to "Off" if the inverter has not a build-in filter.**
3. The Mini jumper is shown as follows:



==== Note: ==========

1. After applying power to the inverter, do not cut off the Mini jumper. Therefore, please make sure that main power has been switched off before cutting off the Mini jumper.
2. The gap discharge may occur when transient voltage is high than 1000V. Besides, electro-magnetic compatibility of the inverter will be lower after cutting the Mini jumper.
3. Do not cut the Mini jumper when main power is grounded. To prevent drive damage, the Mini jumper shall be cut off if the inverter is installed on an ungrounded power system or a high resistance-grounded (over 30 ohms) power system or a corner grounded TN system.
4. The Mini jumper cannot be cut when Hi-pot tests are performed.

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2. Introduction of Shihlin Inverter

2.7 Selection of peripheral equipments

2.7.1 No-fuse switch

Inverter type	Motor capacity	Power source capacity	Applicable NFB/MCCB type (Shihlin)		Applicable MC type (Shihlin)
			Taiwan	Motherland	Taiwan/ Motherland
SE2-021-0.4K	220V 0.5HP	1.8kVA	NF30 5A	BM30SN3P5A	S-P11
SE2-021-0.75K	220V 1HP	3kVA	NF30 10A	BM30SN3P10A	S-P11
SE2-021-1.5K	220V 2HP	4.5kVA	NF30 15A	BM30SN3P15A	S-P11
SE2-021-2.2K	220V 3HP	6.4kVA	NF30 20A	BM30SN3P20A	S-P11/ S-P12
SE2-023-0.4K	220V 0.5HP	1.8kVA	NF30 5A	BM30SN3P5A	S-P11
SE2-023-0.75K	220V 1HP	3kVA	NF30 10A	BM30SN3P10A	S-P11
SE2-023-1.5K	220V 2HP	4.5kVA	NF30 15A	BM30SN3P15A	S-P11
SE2-023-2.2K	220V 3HP	6.4kVA	NF30 20A	BM30SN3P20A	S-P11 / S-P12
SE2-023-3.7K	220V 5HP	10kVA	NF30 30A	BM30SN3P30A	S-P21
SE2-023-5.5K	220V 7.5HP	13.8kVA	NF50 50A	BM60SN3P50A	S-P21
SE2-023-7.5K	220V 10HP	19kVA	NF100 60A	BM60SN3P60A	S-P21
SE2-043-0.4K	440V 0.5HP	1.8kVA	NF30 3A	BM30SN3P3A	S-P11
SE2-043-0.75K	440V 1HP	3kVA	NF30 5A	BM30SN3P5A	S-P11
SE2-043-1.5K	440V 2HP	4.8kVA	NF30 10A	BM30SN3P10A	S-P11
SE2-043-2.2K	440V 3HP	6.9kVA	NF30 15A	BM30SN3P15A	S-P21
SE2-043-3.7K	440V 5HP	10.4kVA	NF30 20A	BM30SN3P20A	S-P21
SE2-043-5.5K	440V 7.5HP	13.8kVA	NF30 30A	BM30SN3P30A	S-P21
SE2-043-7.5K	440V 10HP	19.5kVA	NF50 50A	BM60SN3P50A	S-P21
SE2-043-11K	440V 15HP	27kVA	NF100 60A	BM60SN3P60A	S-P21

2.7.2 Power cable specification/pressing connection terminals specification

Inverter type	Power cable specification		Pressing connection terminal specification (used by power cables)	
	Cables for the power supply R/L1.S/L2.T/L3 (mm^2)	Cables for the output U/T1.V/T2.W/T3 (mm^2)	Cables for the power supply R/L1.S/L2.T/L3 (mm^2)	Cables for the output U/T1.V/T2.W/T3 (mm^2)
SE2-021-0.4K	2	2	2 - 4	2 - 4
SE2-021-0.75K	2	2	2 - 4	2 - 4
SE2-021-1.5K	2	2	2 - 4	2 - 4
SE2-021-2.2K	3.5	3.5	5.5 - 4	5.5 - 4
SE2-023-0.4K	2	2	2 - 4	2 - 4
SE2-023-0.75K	2	2	2 - 4	2 - 4
SE2-023-1.5K	2	2	2 - 4	2 - 4
SE2-023-2.2K	2	2	2 - 4	2 - 4
SE2-023-3.7K	3.5	3.5	5.5 - 4	5.5 - 4
SE2-023-5.5K	5.5	5.5	5.5 - 5	5.5 - 5
SE2-023-7.5K	14	8	14.5 - 5	8 - 5
SE2-043-0.4K	2	2	2 - 4	2 - 4
SE2-043-0.75K	2	2	2 - 4	2 - 4
SE2-043-1.5K	2	2	2 - 4	2 - 4
SE2-043-2.2K	2	2	2 - 4	2 - 4
SE2-043-3.7K	2	2	2 - 4	2 - 4
SE2-043-5.5K	3.5	2	5.5 - 4	2 - 4
SE2-043-7.5K	3.5	3.5	5.5 - 4	5.5 - 4
SE2-043-11K	5.5	5.5	5.5 - 5	5.5 - 5

2. Introduction of Shihlin Inverter

2.7.3 Brake resistors

Inverter type	Brake resistor specification	Inverter type	Brake resistor specification
SE2-021-0.4K	100W 220Ω	SE2-023-5.5K	1000W 25Ω
SE2-021-0.75K	150W 120Ω	SE2-023-7.5K	1200W 20Ω
SE2-021-1.5K	300W 60Ω	SE2-043-0.4K	80W 1000Ω
SE2-021-2.2K	300W 60Ω	SE2-043-0.75K	100W 800Ω
SE2-023-0.4K	100W 220Ω	SE2-043-1.5K	200W 320Ω
SE2-023-0.75K	150W 120Ω	SE2-043-2.2K	300W 160Ω
SE2-023-1.5K	300W 60Ω	SE2-043-3.7K	500W 120Ω
SE2-023-2.2K	300W 60Ω	SE2-043-5.5K	1000W 75Ω
SE2-023-3.7K	400W 40Ω	SE2-043-7.5K	1200W 75Ω
		SE2-043-11K	1800W 40Ω

Note: 1. The brake resistor capacity listed in the above table is based on the condition that the regenerative brake duty is 10% (that is, in case braking lasts for 5 seconds, another 45 seconds must be provided for heat dissipation). The brake resistor wattage can be reduced according to the user's application (quantity of heat) and the regenerative brake duty. But the resistance must be larger than the value list in the above table (otherwise damage of the inverter thus be resulted in).

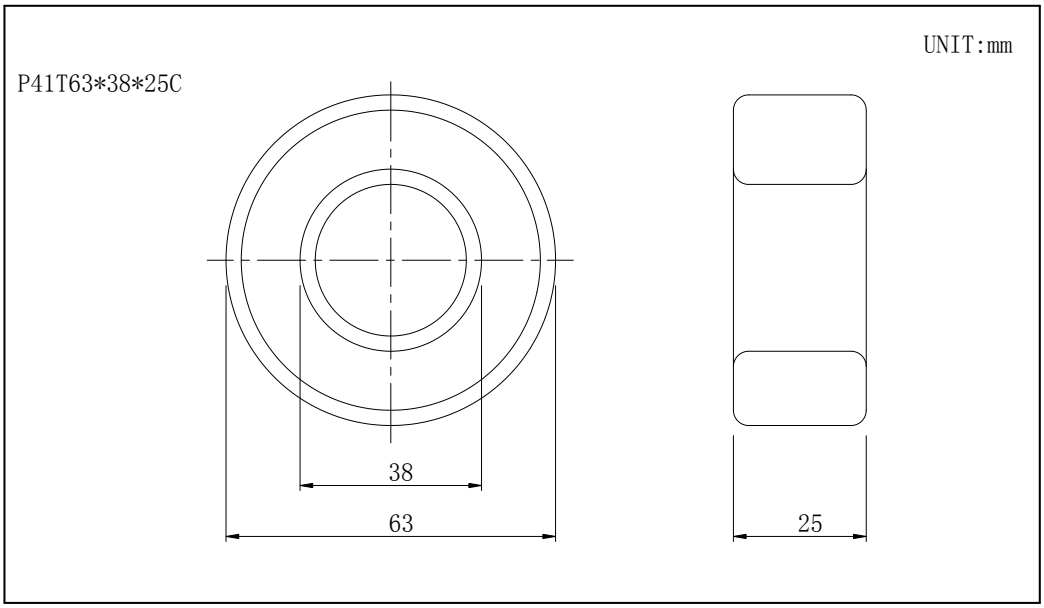
2. In case frequent start and stop operations are required, a larger regenerative brake duty should be set; meanwhile, a larger brake resistor should be employed correspondingly. If there is any problem about selection of brake resistors, please feel free to contact us.

2.7.4 EMI filter

Inverter type	DUOJI filter type	Inverter type	DUOJI filter type
SE2-021-0.4K	NF211B10/01	SE2-043-0.4K	NF311A5/01
SE2-021-0.75K		SE2-043-0.75K	
SE2-021-1.5K	NF211B20/01	SE2-043-1.5K	
SE2-021-2.2K		SE2-043-2.2K	NF311A10/01
SE2-023-0.4K	NF311A5/01	SE2-043-3.7K	
SE2-023-0.75K		SE2-043-5.5K	NF311A20/05
SE2-023-1.5K	NF311A10/01	SE2-043-7.5K	
SE2-023-2.2K	NF311A20/05	SE2-043-11K	NF311A30/05
SE2-023-3.7K			
SE2-023-5.5K	NF311A30/05		
SE2-023-7.5K	NF311A36/05		

Note: Products of CHANGZHOU DUOJI EME TECHNICAL CO., LTD are recommended for the filter used here.

2.7.5 Zero-phase Reactor



	Motor capacity		Qty.	Recommended Wire Size (mm^2)	Wiring Method
	HP	kW			
220V series	1/2	0.4	1	0.5-5.5	Diagram A
	1	0.75			
	2	1.5			
	3	2.2		3.5-5.5	
	5	3.7		5.5	
	7.5	5.5	4	8	Diagram B
	10	7.5			
440V series	1/2	0.4	1	0.5-5.5	Diagram A
	1	0.75			
	2	1.5			
	3	2.2			
	5	3.7			
	7.5	5.5		3.5-5.5	
	10	7.5		5.5	
	15	11	4	8-14	Diagram B

2. Introduction of Shihlin Inverter

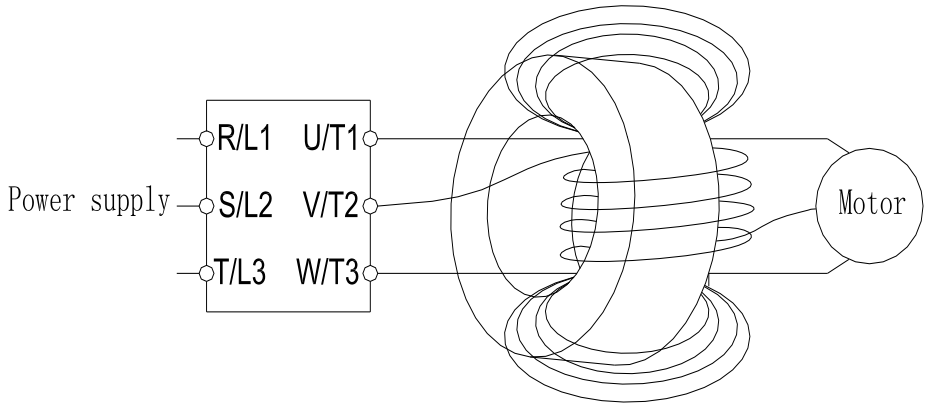


Diagram A: Please wind each 4 times around the core.

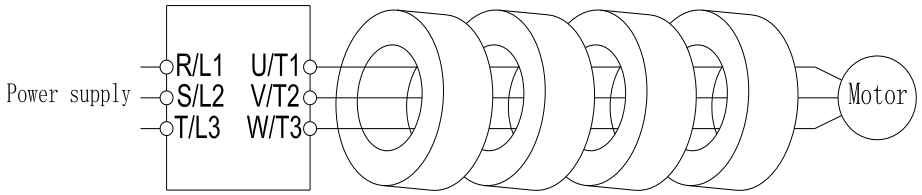


Diagram B: Please put all wires through 4 cores in series without winding.

2.7.6 Input/Output Reactor

Input AC Line Reactor

220V，50/60Hz，Three-phase

kW	Rated Amps of inverter	2% impedance reactor types	4% impedance reactor types
0.4	3	ACL-0005-EISC-E3M8	ACL-0005-EISC-E5M6
0.75	5	ACL-0005-EISC-E3M8	ACL-0005-EISC-E5M6
1.5	8	ACL-0010-EISC-E1M5	ACL-0010-EISC-E2M8
2.2	11	ACL-0015-EISC-E1M0	ACL-0015-EISC-E1M9
3.7	17.5	ACL-0020-EISC-EM75	ACL-0020-EISC-E1M4
5.5	24	ACL-0030-EISC-EM60	ACL-0030-EISC-EM93
7.5	33	ACL-0040-EISC-EM42	ACL-0040-EISC-EM70

440V，50/60Hz，Three-phase

kW	Rated Amps of inverter	2% impedance reactor types	4% impedance reactor types
0.4	1.5	ACL-0005-EISC-E3M8	ACL-0005-EISC-E5M6
0.75	2.6	ACL-0005-EISC-E3M8	ACL-0005-EISC- E5M6
1.5	4.2	ACL-0005-EISC-E3M8	ACL-0005-EISC- E5M6
2.2	6	ACL-0007-EISC-E2M5	ACL-0007-EISC-E3M5
3.7	9	ACL-0010-EISC-E1M5	ACL-0010-EISC-E2M8
5.5	12	ACL-0015-EISC-E1M0	ACL-0015-EISC-E1M9
7.5	17	ACL-0020-EISC-EM75	ACL-0020-EISC-E1M4
11	23	ACL-0030-EISC-EM60	ACL-0030-EISC-EM93

Output AC Line Reactor

220V，50/60Hz，Single-phase

kW	Rated Amps of inverter	1% impedance reactor types	2% impedance reactor types
0.4	3	OCL-0005-EISC-E1M4	OCL-0005-EISC-E2M8
0.75	5	OCL-0005-EISC-E1M4	OCL-0005-EISC-E2M8
1.5	8	OCL-0010-EISC-EM70	OCL-0010-EISC- E1M4
2.2	11	OCL -0015-EISC-EM47	OCL -0015-EISC-EM93

2. Introduction of Shihlin Inverter

220V，50/60Hz，Three-phase

kW	Rated Amps of inverter	1% impedance reactor types	2% impedance reactor types
0.4	3	OCL-0005-EISC-E1M4	OCL-0005-EISC-E2M8
0.75	5	OCL-0005-EISC-E1M4	OCL-0005-EISC-E2M8
1.5	8	OCL-0010-EISC-EM70	OCL-0010-EISC- E1M4
2.2	11	OCL -0015-EISC-EM47	OCL -0015-EISC-EM93
3.7	17.5	OCL -0020-EISC-EM35	OCL -0020-EISC-EM70
5.5	24	OCL -0030-EISC-EM23	OCL -0030-EISC-EM46
7.5	33	OCL-0040-EISC-EM18	OCL-0040-EISC-EM35

440V，50/60Hz，Three-phase

kW	Rated Amps of inverter	1% impedance reactor types	2% impedance reactor types
0.4	1.5	OCL-0005-EISC-E1M4	OCL-0005-EISC-E2M8
0.75	2.6	OCL-0005-EISC-E1M4	OCL-0005-EISC-E2M8
1.5	4.2	OCL-0005-EISC-E1M4	OCL-0005-EISC-E2M8
2.2	6	OCL-0007-EISC-E1M0	OCL-0007-EISC-E1M9
3.7	9	OCL-0010-EISC-EM70	OCL-0010-EISC- E1M4
5.5	12	OCL -0015-EISC-EM47	OCL -0015-EISC-EM93
7.5	17	OCL -0020-EISC-EM35	OCL -0020-EISC-EM70
11	23	OCL -0030-EISC-EM23	OCL -0030-EISC-EM46

Note: : It is recommended to use the AC input / output reactor which produced by SHANGHAI EAGTOP ELECTRONIC TECHNOLOGY CO., LTD.

3. Primary operation

3.1 Operating modes of the inverter

- The operation modes are related to the **reference source of the target frequency** and the **signal source of the motor starting**. The Shihlin SE2-TYPE inverter totally has 9 kinds of operation modes which are the **'PU mode'**, **'JOG mode'**, **'external mode'**, **'communication mode'**, **'combined mode 1'**, **'combined mode 2'** , **' combined mode 3'** , **'combined mode 4'** and **'combined mode 5'**.

Related parameters	values	Operation mode	The reference source of target frequency	The signal source of motor starting	Remarks
Operation mode selection P.79	0	PU mode (PU)	**DU03B** operation panel	Press the key FWD or REV on the **DU03B** operation panel	The 'PU mode', 'External mode' and 'JOG mode' are valid and interchangeable.
		JOG mode (JOG)	The set value of **P.15**	Press the key FWD or REV on the **DU03B** operation panel	
		External mode (OPnd)	**'External voltage/current signal'**, **'combination of multi-speed stage levels'** or **External JOG**	**External terminals**	
			Frequency of each section in Programmed operation mode (P.131~P.138)	**External terminal STF**	
	1	PU mode (PU)	Equal to the 'PU mode' when P.79=0		The 'PU mode' and 'JOG mode' are valid and interchangeable.
		JOG mode (JOG)	Equal to the 'JOG mode' when P.79=0		
	2	External mode (OPnd)	Equal to the 'External mode' when P.79=0		
	3	Communication mode (CU)	**Communication**	**Communication**	(Note)
	4	Combined mode 1 (H1)	**DU03B** operation panel	**External terminals**	
	5	Combined mode 2 (H2)	**'External voltage/current signal'** or **'combination of multi-speed stage levels'**	Press the key FWD or REV on the **DU03B** operation panel	

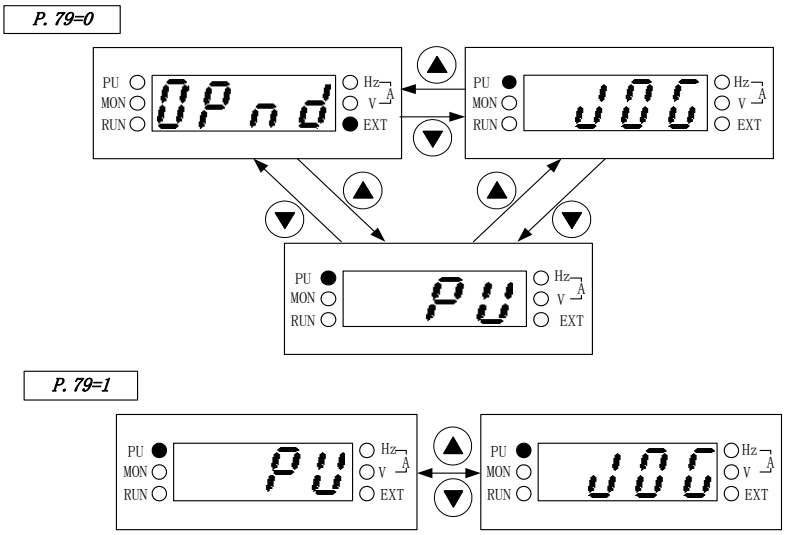
3. Primary operation

Related parameters	values	Operation mode	The reference source of target frequency	The signal source of motor starting	Remarks
Operation mode selection P.79	6	Combined mode 3 (H3)	**Communication**, **'combination of multi-speed stage levels'** or **External JOG（P.15）**	**External terminals**	(Note)
	7	Combined mode 4 (H4)	**'External voltage/current signal'** or **'combination of multi-speed stage levels'**	**Communication**	
	8	Combined mode 5 (H5)	**DU03B operation panel**, **'combination of multi-speed stage levels'** or **external JOG(P.15)**	**External terminals**	

Note: If P.79=0, the inverter is in external mode (OPnd) when it is started, and the operating mode can be shifted by setting P.79.

4. 3. Primary operation

3.1.1 The flow charts for transferring operation modes with DU03B

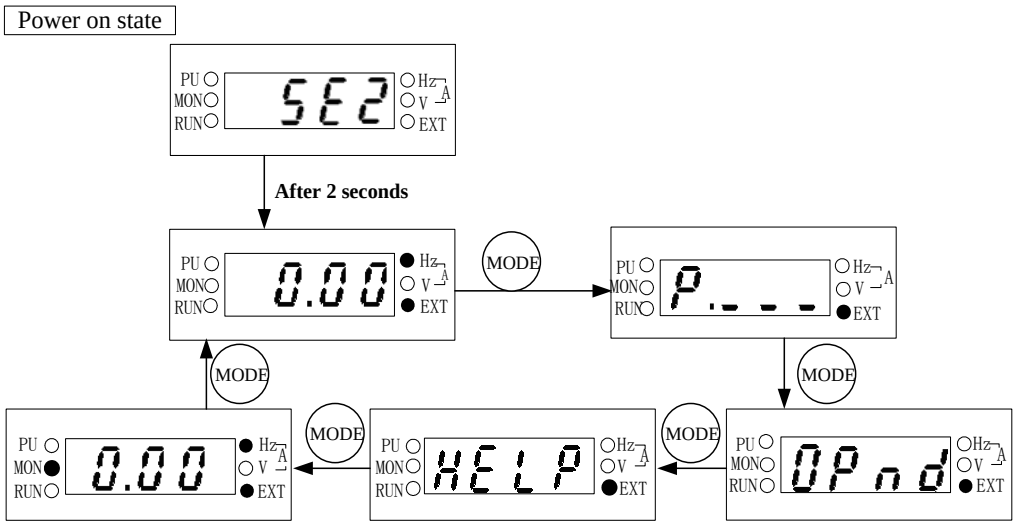


Note: 1. In 'PU mode', the indicating lamp PU in the operation panel will be lit.
2. In 'external mode' the indicating lamp EXT will be lit.
3. In 'combined mode 1, 2, 3, 4 or 5', the indicating lamp PU will be flickered
4. In 'JOG mode', the indicating lamp PU will be lit, and at the same time the display screen will display JOG while the motor is not running.
5. If P.79=2, 3, 4, 5, 6, 7 or 8, the operation mode will be constant, so there are no flow charts for it.

3.2 Working modes of a operation panel

● The DU03B operation panel can be used to monitor the output frequency, output current, and output voltage, browse the alarming information, set parameters and target frequency, etc. Therefore, there are totally 5 working modes for a operation panel, namely, **'operating mode'**, **'monitoring mode'**, **'frequency setting mode'**, **'parameter setting mode'**, **and 'HELP mode'**.

3.2.1 The flow charts for transferring working modes with DU03B

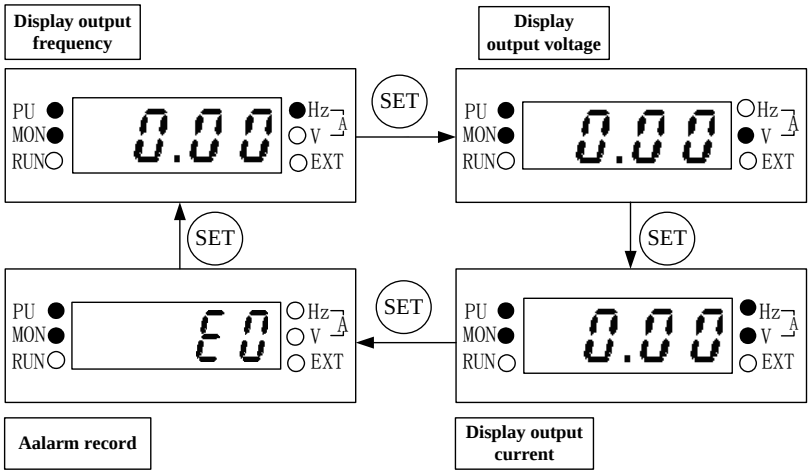


3. Primary operation

Note: 1. For detailed operating flow in monitoring mode, please refer to Section 3.2.2.
2. For detailed operating flow in frequency setting mode, please refer to Section3.2.3.
3. For detailed operating flow in parameter setting mode, please refer to Section 3.2.4.
4. For detailed operating flow in operating mode, please refer to Section 3.1.1.
5. For detailed operating flow in **HELP** mode, please refer to Section 3.2.5.

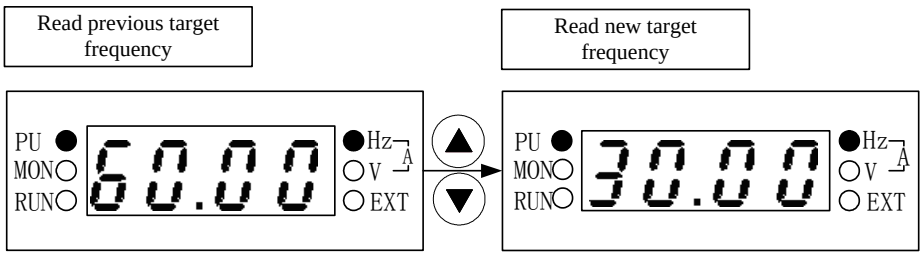
3.2.2 The operating flow charts for monitoring mode with DU03B

• PU mode as an example:



Note: 1. When in 'monitoring output frequency' mode, the indicating lamp of MON and Hz will be lit, and at the same time the screen will display the current output frequency.
2. When in 'monitoring output voltage' mode, the indicating lamp of MON and V will be lit, and the screen will display the current output voltage value.
3. When in 'monitoring output current' mode, the indicating lamp of MON and A will be lit, and the screen will display the current output current value.
4. When in 'browsing alarm record' mode, the indicating lamp of MON will be lit, and the screen will display the current alarm code.
5. For the alarm codes, please refer to Appendix 2.

3.2.3 The operating flow charts for frequency setting mode with DU03B



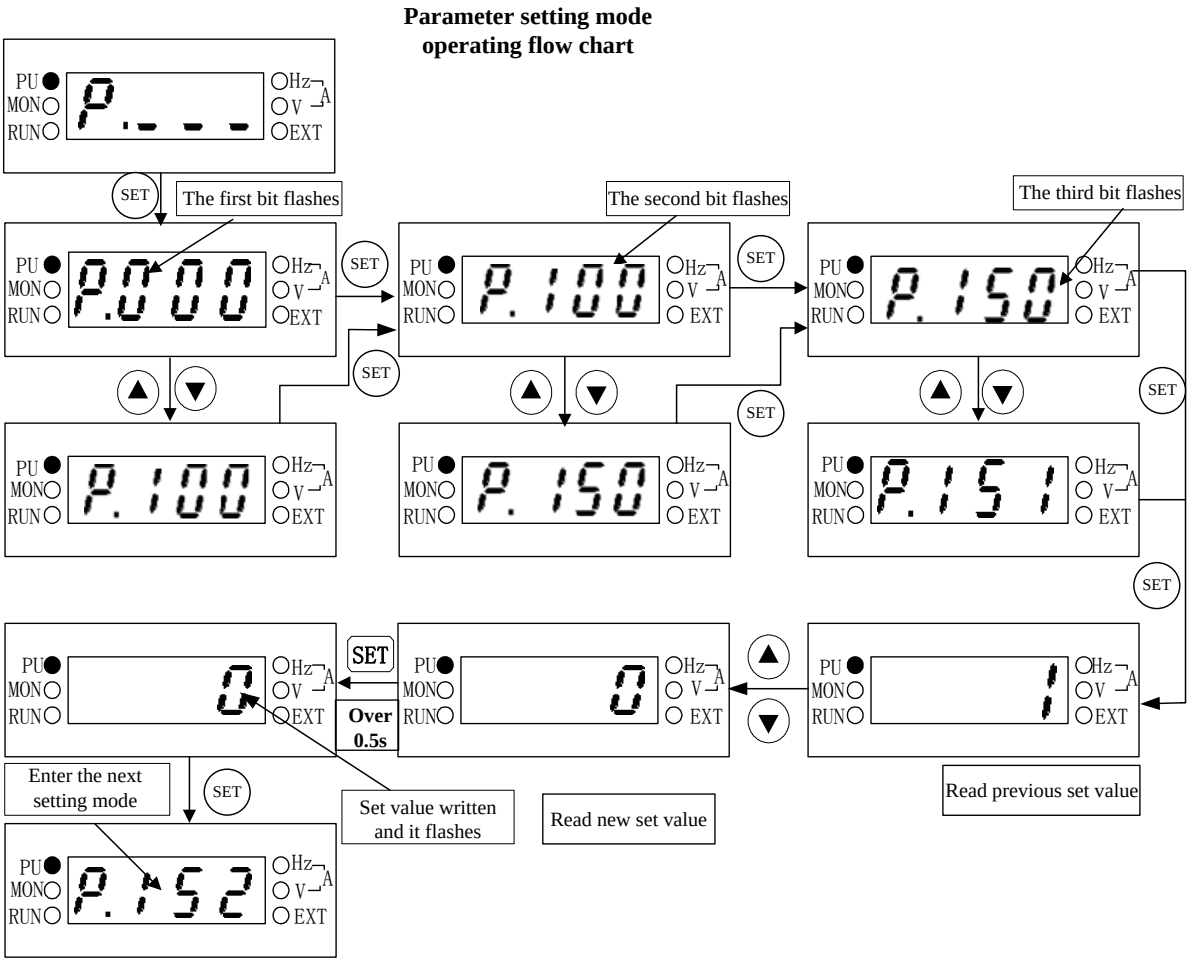
3. Primary operation

Note: 1. When the inverter runs, the frequency can be changed by pressing ▲ and ▼.

2. In the frequency setting mode, the indicating lamp Hz will be lit, but MON will not be lit.

3. When setting frequency in PU mode, the set value can not exceed the upper frequency. When high frequency is needed, the upper frequency should be changed first.

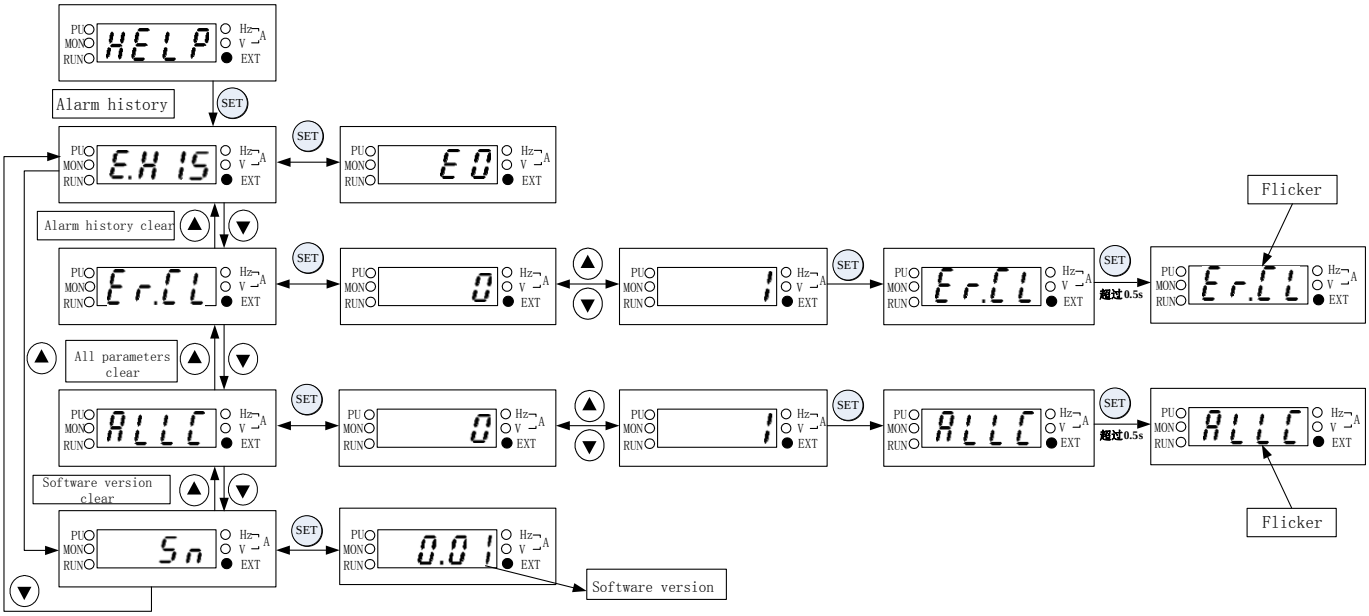
3.2.4 The operating flow charts for parameter setting mode with DU03B

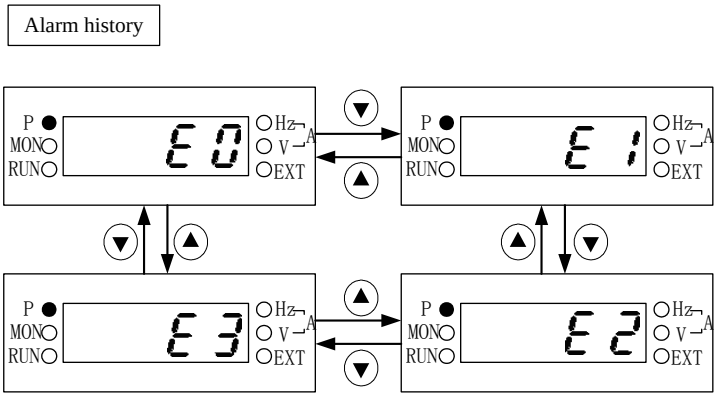


Note: In the parameter setting mode, both the indicating lamp of Hz and MON will turn off. Please make sure to hold down the SET key for more than 0.5s when writing the set value of the parameters.

3. Primary operation

3.2.5 The operating flow charts for HELP mode with DU03B





Note: 1. In E.HIS monitoring mode, press down the SET key to display the alarm code (press down the SET key again to return to E.HIS monitoring mode), then four latest alarm codes can be displayed by pressing down the ▲ ▼ key. For the alarm code, please refer to appendix 2.

2. In Er.CL monitoring mode, press down the SET key and the screen will display "0" (press down the SET key again to return to Er.CL monitoring mode), then change it to "1" with ▲, the screen will display Er.CL, Hold down the SET key again for more than 0.5s and the screen will display Er.CL and flicker, indicating that all the alarm records are being cleared. At this time, you should press MODE to return to HELP mode again.

3. In ALLC monitoring mode, press down the SET key and the screen will display "0" (press down the SET key again to return to ALLC monitoring mode), then change it to "1"with ▲, the screen will display ALLC, Hold down the SET key again for more than 0.5s and the screen will display ALLC and flicker, indicating that all the parameter values are being initialized to the factory default. At this time, you should press MODE to return to HELP mode again.

4. In Sn monitoring mode, the software version of the inverter can be read.

3.3 The basic operation procedure for PU mode (P.79=0 or 1)

Steps	Description
1	• Change the operation mode to PU mode, and the indicating lamp of PU will be lit. Note: 1. When P.79=0, after the power is switched on or the inverter is reset, the inverter will enter external mode first. 2. For selection and shifting of operation modes, please refer to Section 3.1.
2	• Enter frequency setting mode, and write the target frequency into the memory. Note: For the detailed setting procedure, please refer to Section 3.2.
3	• Press FWD or REV, then the motor will run. • At this time, the indicating lamp of RUN will flicker, indicating that the motor is running. The DU03B operation panel then enters the monitoring mode automatically. (For detailed descriptions, please refer to P.110 in Chapter 4.) Note: 1. For the operating flow of monitoring mode, please refer to Section 3.2. 2. While the motor is running, the frequency setting mode is also valid, and thus the target frequency can be changed to regulate the motor speed.
4	• Press STOP RESET, then the motor will decelerate, till it stops. • The indicating lamp of RUN will not turn off until the inverter stops outputting voltages.

3.4 The basic operation procedure for external mode (, P.79=0 or 2)

Steps	Description
1	• Change the operation mode to the external mode, and then the indicating lamp of EXT will be lit.

3. Primary operation

Steps	Description
1	Note: 1. When P.79=0, after the power is turned on or the inverter is reset, press MODE to shift to 'operating mode'. The inverter will enter the external mode first, then press ▲ or ▼ to shift to PU mode. 2. When P.79=2, the inverter will always in external mode. 3. For selection and shifting of operation modes, please refer to Section 3.1.
2	• If the target frequency is set by the input signal across terminal 4-5, please refer to P.39 in Chapter 4. • If the target frequency is set by multi-speed stage levels, please refer to P.4 in Chapter 4. • If the target frequency is set by the input signal across terminal 2-5, please refer to P.38 in Chapter 4. • If programmable operating mode is chosen, please refer to multi-function terminals P.80~P.84、P.86 in Chapter 4.
3	• Turn on STF or STR, the motor will run. • At this time, the indicating lamp of RUN will flicker which indicates that the motor is running. Note: 1. For advanced setting of the starting terminals STF and STR, please refer to P.78 and multi-function terminal P.80~P.84、P.86 in Chapter 4. 2. For the operating procedure of the monitoring mode, please refer to Section 3.2. 3. If programmed operation mode is chosen, STF becomes starting signal and STR becomes pause signal, they are not Run Forward or Run Reverse terminals anymore.
4	• Turn off STF or STR, and the motor will decelerate till it stops. • The indicating lamp of RUN will not turn off until the inverter has stopped putting out voltages.

3.5 The basic operation procedure for JOG mode (JOG, Pr79=0 or 1)

Steps	Description
1	• Change the operation mode to the JOG mode; and the indicating lamp of PU will be lit, and the screen will display JOG before the motor runs. Note: For selection and shifting of the operation modes, please refer to Section 3.1.
2	• Press down FWD or REV, then the motor will run. At this time, the indicating lamp of RUN will flicker which indicates that the motor is running. • When releasing FWD or REV, the motor will decelerate, till it stops. The indicating lamp RUN will not turn off until the motor has stopped putting out voltages. Note: 1. For the operating procedure of the monitoring mode, please refer to Section 3.2. 2. In the JOG mode, the target frequency is the value of P.15, and the acceleration/deceleration time is the value of P.16. Please refer to P.15 in Chapter 4.

3.6 The basic operation procedure for communication mode (CU, P.79=3)

- In communication mode, the user can set parameters, run/stop, and reset the inverter by communication. Please refer to **P.33** for details.

3.7 The basic operation procedure for Combined mode 1 (H1, P.79=4)

Steps	Description
1	• In Combined mode 1, the indicating lamp of PU will flicker. Note: For selection and shifting of operation modes, please refer to Section 3.1.
2	• Enter the frequency setting mode, and write the target frequency into the memory. Note: For the operating procedure of the frequency setting mode, please refer to Section 3.2.
3	• Set the target frequency by **DU03B operation panel** and start the inverter by the **external terminals**. • At this time, the indicating lamp of RUN will flicker which indicated that the motor is running. Note: For the operating procedure of the monitoring mode, please refer to Section 3.2.
4	• Turn off STF or STR, and then the motor will decelerate, till it stops. • The indicating lamp of RUN will not turn off until the inverter has stopped putting out voltages.

3.8 The basic operation procedure for Combined mode 2 (H2, P.79=5)

Steps	Description
1	• In Combined mode 2, the indicating lamp of PU will flicker. Note: For selection and shifting of the operation mode, please refer to Section 3.1.
2	• The **target frequency** is set by **external terminals**: • If the target frequency is set by the input signal across terminal 4-5, please refer to P.39 in Chapter 4. • If the target frequency is set by multi-speed stage levels, please refer to P.4 in Chapter 4. • If the target frequency is set by the input signal across terminal 2-5, please refer to P.38 in Chapter 4.
3	• Press down FWD or REV, and then the motor start running. At this time, the indicating lamp of RUN will flicker, which indicates that the motor is running. Note: 1. For the operating procedure of the monitoring mode, please refer to Section 3.2. 2. In case the motor is running, the frequency setting mode is also valid, and thus the target frequency can be changed to regulate the motor speed.
4	• After pressing down STOP RESET, the motor will decelerate, till it stops. • indicating lamp of RUN will not turn off until the inverter has stopped putting out voltages.

3.9 The basic operation procedure for Combined mode 3 (H3, P.79=6)

● The target frequency is determined by **communication**. When M0, M1, M2 and REX are 'on', the target frequency is determined by **combination of multi-speed stage levels** (Please refer to P.4~P.6, P.80~P.84, P.86). When **EXJ** is 'on', the target frequency is determined by the set value of P.15. Acceleration/deceleration time is set by the value of P.16. The inverter **starting** is determined by **external terminals**. The functions of P.996, P.998 and P.999 can be accomplished by **communication**.

3.10 The basic operation procedure for Combined mode 4 (H4, P.79=7)

● The **target frequency** of the inverter is determined by the **external terminals**, 'external voltage signal', 'external current signal' or 'combination of multi-speed stage levels' terminals. The inverter **starting** is determined by **communication** (including '**Reset**').

3.11 The basic operation procedure for Combined mode 5 (H5, P.79=8)

● The target frequency is determined by **DU03B operation panel**. When M0, M1, M2 and REX are 'on', the target frequency is determined by **combination of multi-speed stage levels** (Please refer to P.4~P.6, P.80~P.84, P.86). When **EXJ** is 'on', the target frequency is determined by the set value of P.15. Acceleration/deceleration time is set by the value of P.16. The inverter **starting** is determined by **external terminals**.

3.12 Operation

3.12.1 Check and preparation before operation

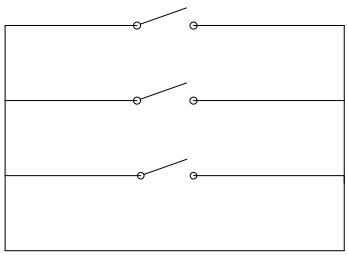
Before the start of operation shall examine the following several aspects:

1. Check the wiring is true or not. Especially check ac motor driver output terminals (V/T1, U/T2, W/T3) cannot be connected to the power, confirm grounding terminals ground well.
2. Confirm the terminal or the exposure of charged have short circuit or not.
3. Confirm terminal connections, plug connector (optional) and screw fastening are all fastening or not.
4. Confirm motor have not connect the mechanical device.
5. All switch must disconnected before power on. Ensure the inverter won't start and without abnormal action when power on.
6. Turn on the power must after cover installation.
7. Wet hand prohibit operation switch.
8. Ensure the following several aspects after power on:
   1). Operation panel should be shown no fault.
   (1). If the keyboard panel is not chosen, the indicating lamp of POWER is lit, and indicating lamp of ALARM is not lit。
   (2). If the keyboard panel is n chosen, the indicating lamp of Hz and EXT are all lit。

3. Primary operation

3.12.2 Operating methods

Various operating methods，please refer to the basic operating procedures of chapter 3 and parameter description of chapter 4. According to the application requirements and regulations to select the most appropriate operation method, usually with operating methods are shown below:

<table>
<tr><td>Operating methods</td><td>The reference source of target frequency</td><td>The signal source of motor starting</td></tr>
<tr><td>Operation panel</td><td>▲ or ▼</td><td>FWD or REV</td></tr>
<tr><td rowspan="2">External terminals signal operation</td><td> 

Parameter seting：
P.4=40
P.5=30
P.6=10</td><td rowspan="2">Input by external terminals：STF-SD
STR-SD</td></tr>
<tr><td>2-5,4-5</td></tr>
</table>

3.12.3 Trial Run

Confirm cables and no abnormalities before the operation you can try running. After power on, the inverter is in the external mode.

1. After power on, ensure the indicating lamp of power is lit.
2. Please pick a switch between STF and SD or STR and SD.
3. Please pick a potentiometer among 2-5-10 or provide 0 ~ 5V dc between 2 and 5.
4. Please adjust potentiometer or 0 ~ 5V dc a minimum value (under 1V).
5. If STF on, forward rotation; if STR on, reverse rotation; Turn off STF or STR, and the motor will decelerate till it stops.
6. Ensure the following several aspects:
   1). Motor rotation direction is correct or not.
   2). Motor rotating smoothly (whether there is no abnormal noise and vibration).
   3). Whether or not smooth for acceleration/deceleration.

If there is operation panel, commissioning as follows:

1. Operation panel connected to inverter properly.
2. Change the operation mode to PU mode after power on, and the screen will display 50/60Hz.
3. Press ▼ button to set the target frequency is about 5Hz.
4. Press FWD, forward rotation; press REV, reverse rotation; press STOP RESET then the motor will decelerate till it stops.

3. Primary operation

5. Ensure the following several aspects:
   1). Motor rotation direction is correct or not.
   2). Motor rotating smoothly (whether there is no abnormal noise and vibration).
   3). Whether or not smooth for acceleration/deceleration.

If there is no abnormal condition, increasing frequency to test run continue, through the above commissioning, without any abnormal situation, can be put into operation.

Note: If inverter and motor running anomalies, shall be stopped working immediately, and according to the "fault diagnosis," check anomalies causes. After inverter stop output, but the power terminal ((R/L1)/(S/L2)/(T/L3)) of main circuit is not disconnected, if you touching the output terminals ((U/T1)/(V/T2)/(W/T3)) of inverter, may occur shock. Otherwise, even cut off major loop power, because the filter capacitor has recharging voltage, discharge end need some time, After cutting off major loop power, wait for the indicating lamp of power burn out, and use a dc voltage meter to test intermediate dc loop, confirm below safe voltage value, then you can contact the circuit which inside inverter.

4. Parameter description

4.1 Torque Boost (P.0, P.46)

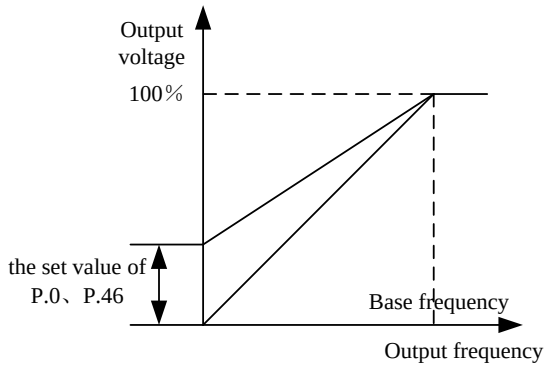
P.0 "Torque boost"

P.46 "The second torque boost"

Related parameters
P.3 "Base frequency"
P.19 "Base frequency voltage"
P.47 "The second base frequency"
P.80~P.84, P.86
"Multi-function terminals selection"

- For an inverter controlled by V/F mode, when the motor starts up, the output voltage of the inverter is so inadequate that the starting torque is usually inadequate. In this case, the output voltage can be improved by properly setting the torque boost (P.0), and thus a better starting torque can be acquired.

Parameter	Factory setting	Setting range	Remarks
0	6%(0.2Kw~0.75Kw)	0~30%	---
	4%(1.5Kw~3.7Kw)		
	3%(5.5Kw~7.5Kw)		
	2%(11Kw)		
46	9999	0~30%, 9999	9999: function invalid



<Setting>

• If P.0=6% and P.19=220V, and when output frequency of the inverter is 0.2Hz, the output voltage is:

$$P.19 \times \left(\frac{0.2Hz}{50Hz} + P.0\right) = 220V \times (0.004 + 6\%) = 14.08V$$

• If RT is 'on', P.46 "The Second Torque Boost" is valid.

Note: 1. If the set value of P.0 is too high, it will result in the action of the current protection of the inverter or the inverter will be disabling to start smoothly.
2. The Second Function is valid only when P.44≠9999.
3. RT referred in this paragraph is the name of 'multi-functional control terminal'. For the selection of the function and use of the multi-function control terminal, please refer to P.80~P.84, P.86. For the wiring, please refer to section 2-5.

4.2 The Output Frequency Range (P.1, P.2, P.18)

P.1 "Maximum frequency"

P.2 "Minimum frequency"

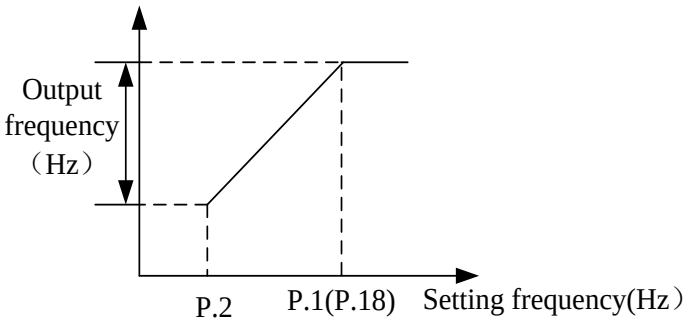
P.18 "High-speed maximum frequency"

Related parameters

P.13 "Starting frequency"

The upper limit and the lower limit of the output frequency can be restricted.

Parameter	Factory setting	Setting range	Remarks
1	120Hz	0~120Hz (Note 2)	---
2	0Hz	0~120Hz (Note 2)	---
18	120Hz	120~400Hz (Note 2)	---



<Setting>

- If the target frequency ≦ P.2, the steady output frequency equals to P.2.
- If P.2 < target frequency ≦ P.1 (P.18), the steady output frequency equals to target frequency.
- If P.1 (P.18) <target frequency, the steady output frequency equals to P.1.

Note: 1. The 'maximum frequency' and the 'high-speed maximum frequency 'are related with each other. If the target upper limit frequency is in the range of 0~120Hz, P.1 must be used (the setting range of P.1 is 0~120Hz); if the target upper limit frequency is in the range of 120~400Hz, then P.18 must be employed (the setting range of P.18 is 120~400Hz).

2. If P.187=1, P.1 and P.2 are in the range of 0~1000Hz, P.18 is in the range of 120~1000Hz
3. If P.1 < P.2, the steady output frequency will be clamped to P.1.
4. The set frequency value can not exceed the value of P.1.

4.3 Base Frequency and Base Frequency Voltage (P.3, P.19, P.47)

P.3 "Base frequency"

P.19 "Base frequency voltage"

P.47 "The second base frequency"

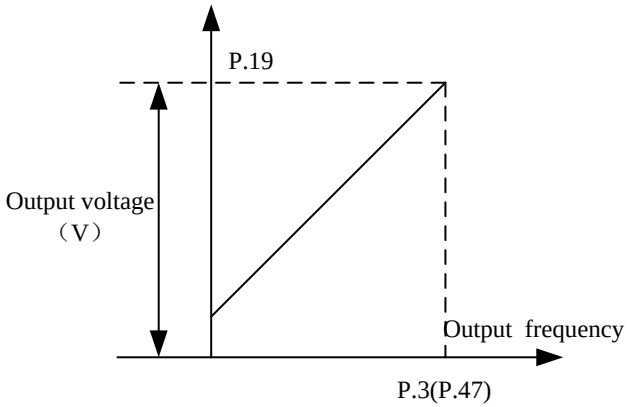
Related parameters

P.14 "Load pattern selection"
P.80~P.84, P.86
"Multi-function terminals selection"
P.189 "Factory setting function"

4. Parameter description

- The maximum output voltage of the inverter is called ‘base frequency voltage’.
- If the output frequency is lower than the base frequency, the output voltage of the inverter will increase with the output frequency; if the output frequency has reached the base frequency (P.3/P.47), the output voltage will just be equal to the base frequency voltage. If the output frequency exceeds the base frequency and increase continuously, the output voltage will be clamped to the base frequency voltage.

Parameter	Factory setting	Setting range	Remarks
3	50Hz	0~400Hz (Note 4)	When P.189=1
	60Hz		When P.189=0
19	220V/440V	0~1000V, 9999	220V series inverters: factory setting is 220 440V series inverters: factory setting is 440 9999: function invalid
47	9999	0~400Hz (Note 4)	9999: function invalid



<Setting>

- The Base Frequency is set through P.3 and P.47.
- If RT is on, P.47 ‘The Second Base Frequency’ is valid. (Note 1)
- The Base frequency voltage is set through P.19. (Note 2)

Note: 1. The Second Function is valid only when P.44≠9999.

2. If P.19=9999, the maximum output voltage of the inverter will depend on the value of the power supply voltage.
3. RT referred in this paragraph is the name of ‘multi-functional control terminal’. For the selection of the function and use of the multi-function control terminal, please refer to P.80~P.84, P.86. For the wiring, please refer to section 2-5.
4. If P.187=1, P.3 and P.47 are in the range of 0~1000Hz.

4.4 Multi-speed (P.4~P.6, P.24~P.27, P.142~P.149)

P.4 “speed 1(high speed)”

P.5 “speed 2(medium speed)”

P.6 “speed 3 (low speed)”

P.24~P.27 “speed 4 to 7”

P.142~P.149 “speed 8 to 15”

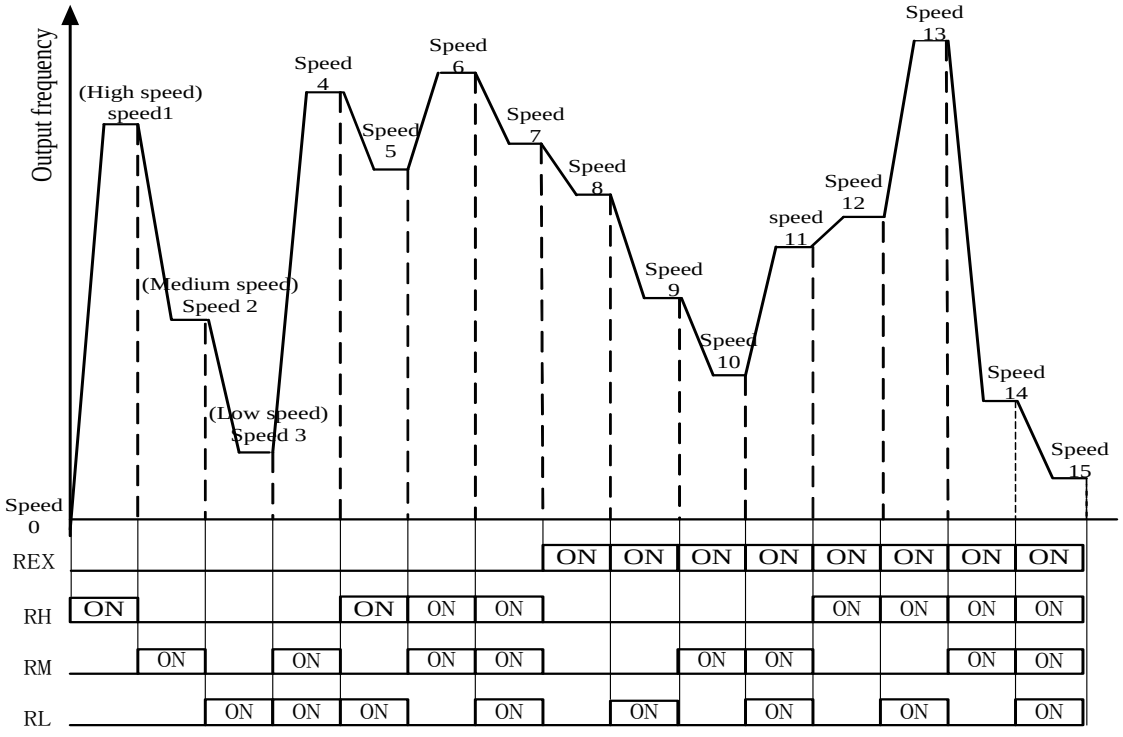
Related parameters

P.1 “Maximun frequency”
P.2 “Minimum frequency”
P.29 “ Acceleration /deceleration curve selection”
P.79 “Operation mode selection”
P.80~P.84, P.86 “Multi-function terminals selection”

Parameter	Factory setting	Setting range	Remarks
4	60Hz	0~400Hz (Note 3)	---
5	30Hz	0~400Hz (Note 3)	---
6	10Hz	0~400Hz (Note 3)	---
24~27	9999	0~400Hz, 9999 (Note 3)	9999, is not chosen
142	0Hz	0~400Hz (Note 3)	---
143~149	9999	0~400Hz, 9999 (Note 3)	9999, is not chosen

<Setting>

• If all the setting values of P.24~P.27 and P.142~P.149 are not 9999, ‘16-speed operation’ is active. It means that with the combination of RL, RM, RH and REX, there are 16 kinds of speeds in all. For the setting of the target frequency of the inverter, please refer to the figure below.



• Provided that the values of P.24~P.27 and P.142~P.149 are all defaulted, '3-speed operation' is active. In this case, the target frequency can be set as follows (the priority for the terminals is RL>RM>RH):

Parameter / Target frequency	P.24=9999	P.25=9999	P.26=9999	P.27=9999	P.142=9999	P.143=9999	P.144=9999	P.145=9999	P.146=9999	P.147=9999	P.148=9999	P.149=9999
RL (P.6)	○	○		○	○	○		○		○		○
RM (P.5)			○				○				○	
RH (P.4)									○			

For example: if P.26=9999, the target frequency is determined by RM (the setting value of P.5).

Note: 1. Only in 'external mode', 'combined mode 2' or 'combined mode 4', the multi-speed is valid.
2. RL, RM, RH and REX mentioned in this section are the function names of the 'multi-function control terminal'. (For example: P.80=2, M0 terminal is chosen to perform the RL function). Please refer to P.80~P.84, P.86 for multi-function selection, and refer to section 2-5 for wiring.
3. If P.187=1, the parameters from P.4 to P.6, from P.24 to P.27 and from P.142 to P.149 are in the range of 0~1000Hz.

4.5 "Acceleration/deceleration Time (P.7, P.8, P.20, P.21, P.44, P.45)

P.7 "Acceleration time"

P.8 "Deceleration time"

P.20 "Acceleration/deceleration reference frequency"

P.21 Acceleration/deceleration time increments

P.44 "The second acceleration time"

P.45 "The second deceleration time"

Related parameters
P. 3 "Base frequency"
P. 29 "Acceleration/deceleration curve selection"
P. 47 "The second base frequency"
P.80~P.84, P.86 "Multi-function terminal selection"
P. 189 "Factory setting function"

- When the output frequency of the inverter is accelerated from 0Hz to P.20, the required time is defined as 'acceleration time (P.7)'.
- When the output frequency of the inverter is decelerated from P.20 to 0Hz, the required time is defined as 'deceleration time (P.8)'.
- P.21 is used to set the acceleration/deceleration time and minimum setting increments.

4. Parameter description

Parameter	Factory setting	Setting range	Remarks	
7	5s	0~360s	When P.21=0	
		0~3600s	When P.21=1	
8	5s	0~360s	When P.21=0	
		0~3600s	When P.21=1	
20	50Hz	1~400Hz (Note 2)	When P.189=1	
	60Hz		When P.189=0	
21	0	0, 1	0	Minimum setting increments:0.01s
			1	Minimum setting increments:0.1s
44	9999	0~360s	When P.21=0	
		0~3600s	When P.21=1	
		9999	Not chosen	
45	9999	0~360s	When P.21=0	
		0~3600s	When P.21=1	
		9999	Not chosen	

<Setting>

- If P.21=0, the acceleration/deceleration time（P.7, P.8, P.16, P.44, P.45, and P.111~P.118）minimum increments is 0.01 seconds.
- If P.21=1, the acceleration/deceleration time（P.7, P.8, P.16, P.44, P.45, and P.111~P.118）minimum increments is 0.1 seconds.
- If RT is ‘on’, the second function is valid. In this case the running characteristics of the motor refer to the second function.
- If P.44=9999 (default value), all the second function is disabled. In this case, even though RT is ‘on’, the acceleration time is still the set value of P.7, and the deceleration time is still the set value of P.8, the torque boost is still the set value of P.0, and the base frequency is still the set value of P.3.
- If P.44≠9999 and P.45=9999, when RT is ‘on’, the acceleration/deceleration time is the ‘set value of P.44’.
- If P.44≠9999 and P.46=9999, when RT is ‘on’, the torque boost is the ‘set value of P.0’.
  If P.44≠9999 and P.46≠9999, when RT is ‘on’, the torque boost is the ‘set value of P.46’.
- If P.44≠9999 and P.47=9999, when RT is ‘on’, the base frequency is the ‘set value of P.3’.
  If P.44≠9999 and P.47≠9999, when RT is ‘on’, the base frequency is the ‘set value of P.47’.

Note: 1. The mentioned RT in this paragraph is the function name of ‘multi-function control terminal’. Please refer to P.80~P.84, P.86 for function selection and features and refer to Section 2-5 for wiring.
2. If P.187=1, P.20 is in the range of 0~1000Hz.

4. Parameter description

4.6 Electronic Thermal Relay Capacity (P.9)

P.9 "Electronic thermal relay capacity"

Related parameters
P.80~P.84, P.86
"Multi-function terminals selection"

● The 'electronic thermal relay' employed the built-in program to simulate a thermal relay to prevent the motor from overheating.

Parameter	Factory setting	Setting range	Remarks
9	Rated output current (refer to the note of appendix 1)	0~500A	---

<Setting>

- Please set P.9 as the rated current of the motor at its rated frequency. The rated frequency of a squirrel-cage inductive motor that made in different countries and areas is different. Please refer to the nameplate instruction of the motor.
- If P.9=0, the electronic thermal relay is disabled.
- In case the calculated heat by the electronic thermal relay exceeds the upper limit, an alarm will be output (at this time, the alarm lamp will be lit.), the screen of DU03B will display "rHA", and the output will be stopped.

Note: 1. After the inverter is reset, the thermal accumulating record of the electronic thermal relay will be reset to zero. Attention should be paid attention to it.
2. When two or more motors are connected to the inverter, they cannot be protected by the electronic thermal relay. Install an external thermal relay to each motor.
3. When a special motor is employed, the electronic thermal relay is no longer valid. Install an external thermal relay to each motor.
4. About wiring for an external thermal relay, refer to P.80~P.84, P.86.

4.7 DC Injection Brake (P.10, P.11, P.12)

P.10 "DC injection brake operation frequency"

P.11 "DC injection brake operation time"

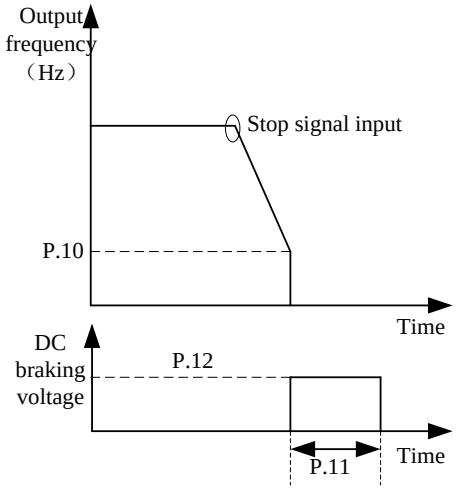
P.12 "DC injection brake operation voltage"

Parameter	Factory setting	Setting range	Remarks
10	3Hz	0~120Hz (Note 2)	---
11	0.5s	0~60s	---
12	4%	0~30%	---

<Setting>

- After a stop signal is put in (please refer to Chapter 3 for the primary operation), the output frequency of the inverter will decrease gradually. In case the output frequency reaches the 'DC injection brake operation frequency (P.10)', the DC injection brake will be active.
- During DC injection brake, a DC voltage will be injected into the motor windings by the inverter, which is used to lock the motor rotor. This voltage is called 'DC injection brake operation voltage (P.12)'. The larger the P.12 value is, the higher the DC brake voltage is, and the stronger the brake capability is.
- The DC brake operation will last a period (the set value of P.11) to overcome the motor inertia. To achieve an optimum control, P.11 and P.12 should be set properly.

As shown as follows:



Note: 1. Users must set P.11 and P.12 appropriately in order to obtain the best control characteristics.
2. If P.187=1, P.10 is in the range of 0~1000Hz.

4.8 Starting Frequency (P.13)

P.13 "Starting frequency"

Related parameters
P.2 "Minimum frequency"

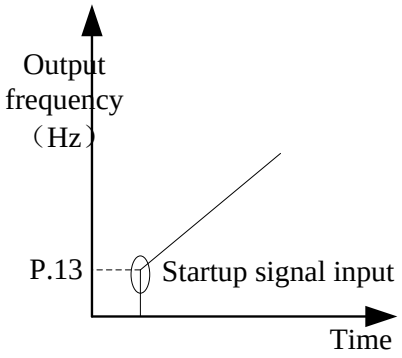
●When the motor starts up, the instant output frequency of the inverter is called 'starting frequency'.

Parameter	Factory setting	Setting range	Remarks
13	0.5Hz	0~60Hz	---

<Setting>

- If the target frequency of the inverter is lower than the setting value of P.13, the motor will not run. When the signal of the motor start, the output frequency will go up begin with the value of P.13.

4. Parameter description



4.9 Load Pattern Selection (P.14, P.98, P.99, P.162~P.169)

P.14 "Load pattern selection"

P.98 "Middle frequency 1"

P.99 "Output voltage 1 of middle frequency"

P.162 "Middle frequency 2"

P.163 "Output voltage 2 of middle frequency"

P.164 "Middle frequency 3"

P.165 "Output voltage 3 of middle frequency"

P.166 "Middle frequency 4"

P.167 "Output voltage 4 of middle frequency"

P.168 "Middle frequency 5"

P.169 "Output voltage 5 of middle frequency"

Related parameters

P. 0 "Torque boost"
P. 46 "The second torque boost"
P.80~P.84 ,P. 86
"Multi-function terminals selection"

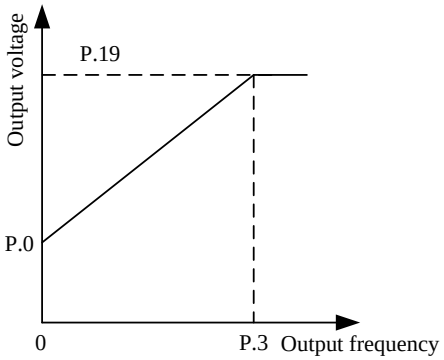
Parameter	Factory setting	Setting range	Remarks
14	0	0~13	When P.14=5~13, it provides 9 kinds of different VF curve.
98	3Hz	0~400Hz (Note 3)	---
99	10%	0~100%	---
162	9999	0~400Hz, 9999 (Note 3)	---
163	0%	0~100%	---
164	9999	0~400Hz, 9999 (Note 3)	---
165	0%	0~100%	---
166	9999	0~400Hz, 9999 (Note 3)	---
167	0%	0~100%	---
168	9999	0~400Hz, 9999 (Note 3)	---
169	0%	0~100%	---

4. Parameter description

<Setting>

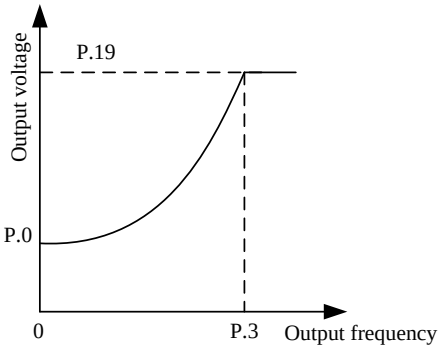
- If P.14=4, suppose that P.19=220V, P.98=5HZ, P.99=10%, when the inverter is running at 5HZ, the output voltage equals P.99×P.19=10%×220V=22V.
- If RT is 'on', P.46 'The Second Torque Boost' is valid.

P.14＝0



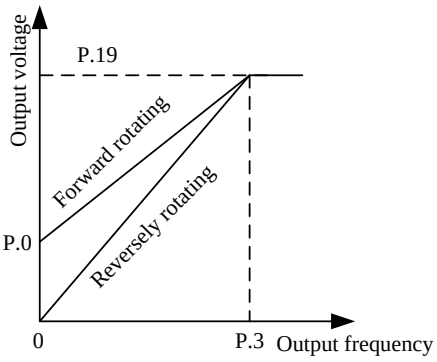
Applicable to Constant torque loads (conveyer belt etc.)

P.14＝1



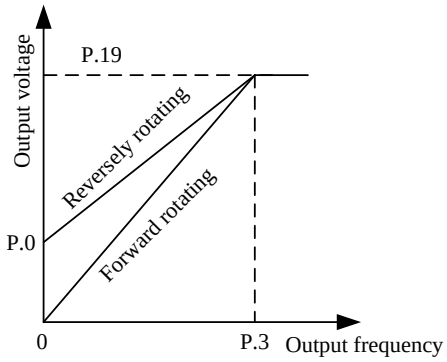
Applicable to Variable torque loads (fans and pumps etc.)

P.14＝2



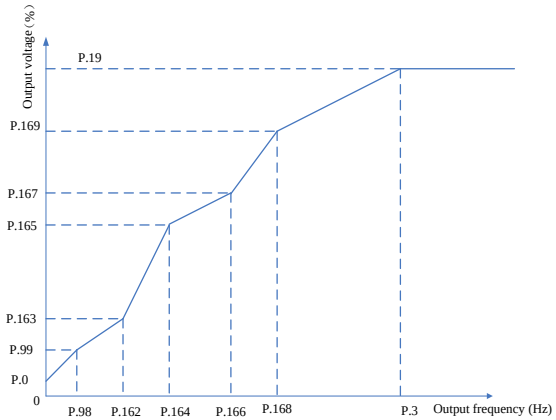
Ascending/descending loads

P.14＝3



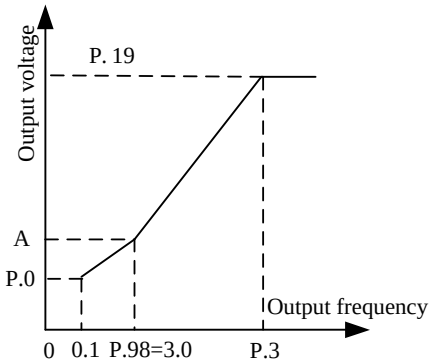
Ascending/descending loads

P.14＝4



Whether it is high startup torque or descending torque is due to the set values（Note 1）

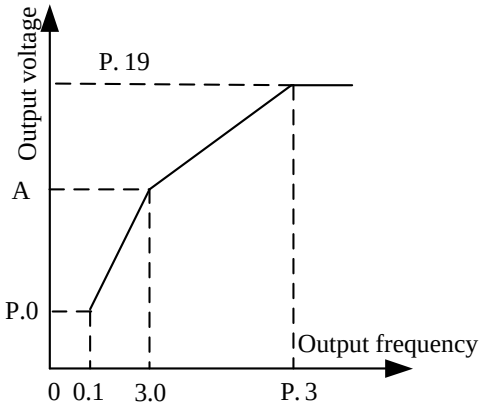
P.14=5



When P.14=5, The value of A is 7.1%.

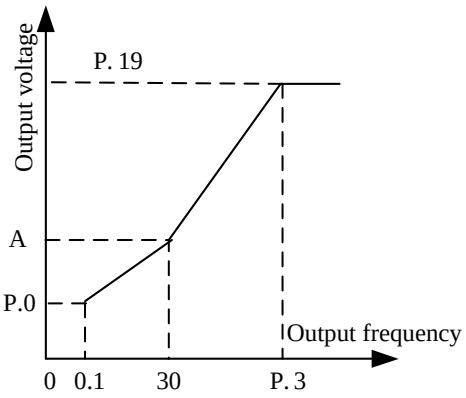
4. Parameter description

P.14＝6，7，8



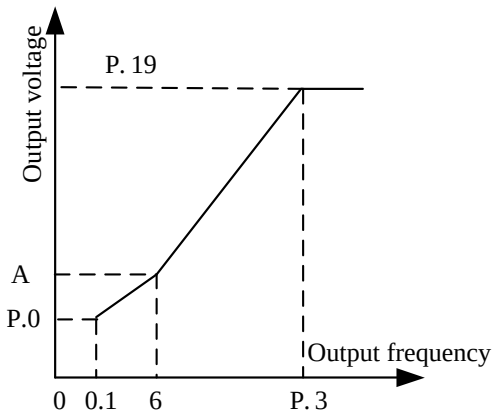
When P.14=6, the value of A is 8.7%; when P.14=7, the value of A is the value of A is 10.4%; when P.14=8, the value of A is 12.0%.

P.14＝9，10



When P.14=9, the value of A is 20.0%; when P.14=10, the value of A is 25.0%.

P.14＝11，12，13



When P.14=11, the value of A is 9.3%; when P.14=12, the value of A is 12.7%; when P.14=13, the value of A is 16.1%.

Note: 1. Refer to the picture above the form, if need the one point, set values of P.98、P.99, if need two points ,set values of P.98、P.99、P162、P.163, if need three points, set values of P.98、P.99、P162、P.163、P164、P.165, like this set every last.

2. If you set value of P.14 from 5 to 13, the curve will invalid when the value of P.0 is larger than the value of A, the value of P.14 will be equal to P.0

3. If P.187=1, P.98, P.162, P.164, P.166 and P.168 are in the range of 0~1000Hz.

4.10 JOG Mode (P.15, P.16)

P.15 "JOG frequency"

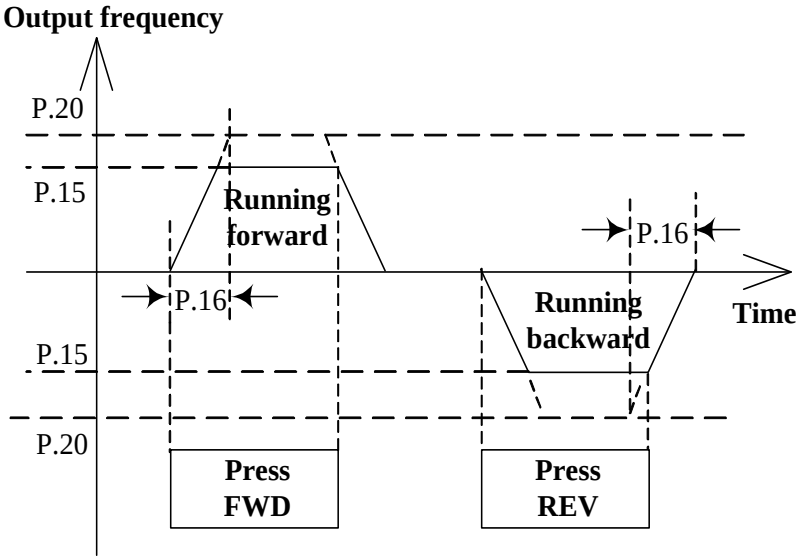
P.16 "JOG acceleration/deceleration time"

Related parameters

P.20 "Acceleration/deceleration reference frequency"
P.21 "Acceleration/deceleration time increments"

- In JOG mode, the output frequency is the set value of P.15, and the acceleration/deceleration time is the set value of P.16.

Parameter	Factory setting	Setting range	Remarks
15	5Hz	0~400Hz (Note 2)	---
16	0.5s	0~360s	When P.21=0
		0~3600s	When P.21=1



Note: 1. Please refer to Section 3-1 for how to enter the JOG mode.
2. If P.187=1, P.15 is in the range of 0~1000Hz.

4.11 Input Signal across Terminal 4-5 Selection Function (P.17)

P.17 "Input signal across terminal 4-5 selection"

- SE2 series inverters have two analog input channels, terminal 2-5 and terminal 4-5. Only voltage signal can enter across terminal 2-5, but both voltage signal and current signal can enter across terminal 4-5, which is switched by P.17.

Parameter	Factory setting	Setting range	Remarks	
17	0	0~1	0	Current signal valid
			1	Voltage signal valid

4.12 Stall Prevention (P.22, P.23, P.66)

P.22 “Stall prevention operation level”

P.23 “Compensation factor at level reduction”

P.66 “Stall prevention operation reduction starting frequency”

Related parameters

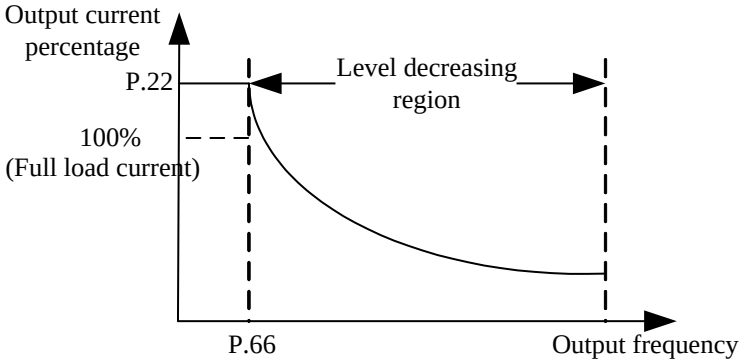
P.189 “Factory setting function”

● With a heavy load, in the case when a motor starts or the target frequency is adjusted (increasing), the motor speed often can not tightly follow the output frequency. If the motor speed is lower than the output frequency, the output current will increase to improve the output torque. However, if the difference between the output frequency and the motor speed is too great, the motor torque will decrease, which is called ‘stall’.

Parameter	Factory setting	Setting range	Remarks
22	200%	0~400%	---
23	9999	0~200%, 9999	---
66	50Hz	0~400Hz (Note 2)	When P.189=1
	60Hz		When P.189=0

<Setting>

• During the period when a motor starts or the output frequency increases, the output current of the inverter will increase. Once the output current exceeds the upper limit pre-set as the following figure, the adjustment of the output frequency is paused automatically and will continue to proceed until the motor captures the output frequency (at this moment the output current of the inverter will decrease correspondingly).



$$\text{Level percentage}=A+B\times\frac{\text{P.22-A}}{\text{P.22-B}}\times\frac{\text{P.23-100}}{100}$$

$$A=\frac{\text{P.66}\times\text{P.22A}}{\text{Output frequency}} \qquad B=\frac{\text{P.66}\times\text{P.22A}}{400}$$

Note: 1.If P.300=3, the real-time sensorless vector control function is selected, P.22 will be the torque limit level as action.

2. If P.187=1, P.66 is in the range of 0~1000Hz.

4.13 Output Frequency Filter Constant (P.28)

P.28 "Output frequency filter constant"

- When the acceleration/deceleration time decreases and the output frequency switches from high-frequency to low-frequency each other, machine vibration may be caused, which will affect the product quality.
- We can filter the output frequency at the moment when high-frequency and low-frequency switches each other by setting output frequency filter constant P.28, in order to reduce the machine vibration. The bigger the set value of P.28, the better the filter effect, but the corresponding response delay will increase. If the set value of P.28 is 0, the filter function is invalid.

Parameter	Factory setting	Setting range	Remarks
28	0	0~31	---

4.14 Acceleration/deceleration Curve Selection (P.29)

P.29 "Acceleration/deceleration curve selection"

Related parameters

P. 3 " Base frequency "
P. 7 " Acceleration time "
P. 8 " Deceleration time "
P. 20 "Acceleration / deceleration reference frequency"
P. 44 "The second acceleration time"
P. 45 "The second deceleration time"

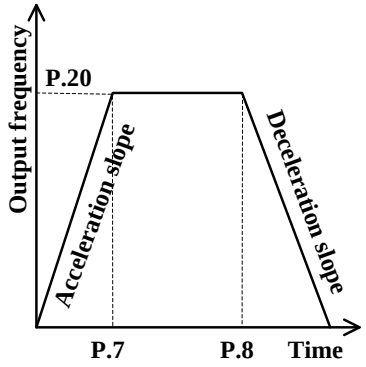
Parameter	Factory setting	Setting range	Remarks
29	0	0~2	---

<Setting>

• When **P.29=0 'Linear acceleration/deceleration curve'**

An acceleration slope is constructed by combination of P.7 and P.20. A deceleration slope is fabricated by combination of P.8 and P.20.

When the target frequency varies, it increases with the 'acceleration slope' or decreases with the 'deceleration slope' linearly. Figure below:



• When **P.29=1, 'S pattern acceleration/deceleration curve 1'**

The acceleration slope is formed by combination of P.7 and P.3. The deceleration slope is formed by combination of P.8 and P.3.

The 'acceleration /deceleration curve' possesses S-shape.

The equation for the ascending S pattern curve between 0 and P.3 is:

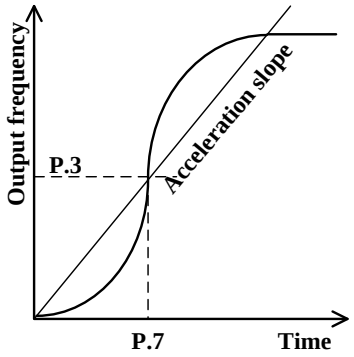
$$f = \left[1 - \cos\left(\frac{90^{\circ} \times t}{P.7}\right)\right] \times P.3$$

The equation for the ascending S pattern curve above P.3 is:

$$t = \frac{4}{9} \times \frac{P.7}{P.3^{2}} \times f^{2} + \frac{5}{9} \times P.7$$

t: time f: output frequency

Figure below:

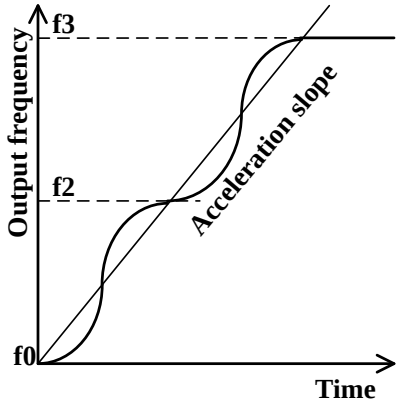


Note: This pattern is applicable to main shafts of the working machines.

• When **P.29=2, 'S pattern acceleration/deceleration curve 2'**

An acceleration slope is formed by combination of P.7 and P.20. A deceleration slope is formed by combination of P.8 and P.20.

When the target frequency varies, it increases with the 'acceleration slope' or decreases with the 'deceleration slope'. As shown in the figure below, when the setting value of the inverter is adjusted from f0 to f2, an acceleration in S pattern is undertook once, and the time is P.7 ×(f2-f0)/P.20; then if the frequency is set from f2 to f3, a second acceleration is experienced, and the time is P.7 ×(f3-f2)/P.20. Figure below:



Note: In this curve the motor vibration can be reduced substantially during acceleration/deceleration, and thus the life span of belts and gears is expanded.

4.15 Regenerative Brake (P.30, P.70)

P.30 "Regenerative brake function selection"

P.70 "Special regenerative brake duty"

- At the moment when the output frequency switches from high to low, due to the load inertia, the motor speed will be higher than the output frequency of the inverter, and thus the generator effect is formed. It results in high voltage between the main-circuit terminals P and N, which will damage the inverter. Therefore, a proper brake resistor shall be mounted between the terminals P and PR to dissipate the fed-back energy.
- There's a built-in transistor (called as brake transistor) in the inverter. The conducting time ratio of the transistor is called as 'regenerative brake duty'. The Higher the regenerative brake duty is, the more energy the brake resistor consumes, and the stronger the brake capability is.

Parameter	Factory setting	Setting range	Remarks	
30	0	0~1	0	If regenerative brake duty is 3% fixedly, the value of parameter 70 is failure.
			1	The regenerative brake duty is the value witch parameter 70 setting.
70	0	0~30%	---	

Note: 1. In occasions where frequent start/stop occurs, a high capacity brake resistor is required.
2. Refer to Section 2-7 for brake resistor selection.

4.16 Soft-PWM (P.31)

P.31 "Soft-PWM selection"

- **Soft-PWM** is a method witch control the motor noise become melody.
- Motor noise modulation control is when the inverter varied its carrier frequency from time to time during operation. The metal noise that generates by motor is not a single frequency. This function selection is to improve the high peak single frequency noise.
- **Soft-PWM** is valid in V/F curve. It means P.300 must be set to 0.

Parameter	Factory setting	Setting range	Remarks
31	0	0	No Soft-PWM selection
		1	When P.72<"5"，with Soft-PWM selection

4.17 Communication Function (P.32, P.33, P.36, P.48~P.53, P.153~P.154)

P.32 “Serial communication baud rate selection”

P.33 “Communication protocol selection”

P.36 “Inverter station number”

P.48 “Data length”

P.49 “STOP bit length”

P.50 “Parity check selection”

P.51 “CR & LF selection”

P.52 “Number of communication retries”

P.53 “Communication check time interval”

P.153 “Communication error handling”

P.154 “Modbus communication data format”

- When the communication parameters are revised, please reset the inverter.
- The SE2-type inverters have two communication protocols to select, Shihlin protocol and Modbus protocol. If the communication expansion board is selected, the corresponding communication protocol is provided. P.32, P.36, P.52, P.53, and P.153 are applied to both of the protocols. P.48~P.51 is only applied to the Shihlin protocol and P.154 is only applied to the Modbus protocol.
- Continuous communication, please make the following listed parameters set correctly, otherwise it will not carry out normal continuous communication.

Parameter	Factory setting	Setting range	Remarks	
32	1	0~2	0	Baud rate: 4800bps
			1	Baud rate: 9600bps
			2	Baud rate: 19200bps
33	1	0, 1	0	Modbus protocol
			1	Shihlin protocol
36	0	0~254	(Note 1)	
48	0	0, 1	0	Data length: 8 bit
			1	Data length: 7bit
49	0	0~1	0	STOP bit length: 1 bit
			1	STOP bit length: 2 bit
50	0	0~2	0	Not Given
			1	odd
			2	even

4. Parameter description

Parameter	Factory setting	Setting range	Remarks	Parameter
51	1	1~2	1	Only CR
			2	CR and LF
52	1	0~10	(Note 2)	
53	9999	0~999.8s, 9999	0~999.8	do communication overtime test according to the set value
			9999	9999: No communication overtime test (Note 3)
153	0	0, 1	0	Warn and coast to stop
			1	No warning and keep running
154	4	0~5	0	Modbus ASCII mode, Protocol<1,7,N,2> (Note 4)
			1	Modbus ASCII mode, Protocol<1,7,E,1>
			2	Modbus ASCII mode, Protocol<1,7,O,1>
			3	Modbus RTU mode, Protocol<1,8,N,2>
			4	Modbus RTU mode, Protocol<1,8,E,1>
			5	Modbus RTU mode, Protocol<1,8,O,1>

Note: 1. The number of inverters which the communication interface enables a host computer to control is due to the wiring method and impedance matching. Once Modbus protocol is selected, please set P.33 to nonzero value.

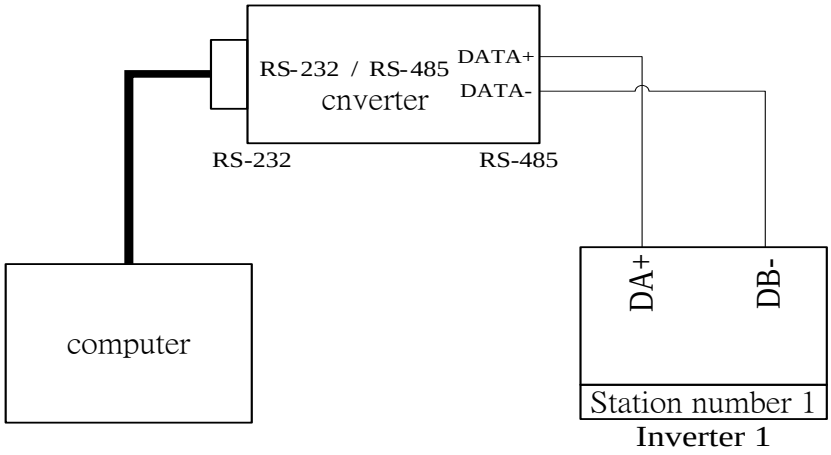
2. If the time of communication error exceeds the set value of P.52, and P.153 is set to 0, an alarm will be output, and the screen of DU03B will display "OPT".

3. When P.53=9999, there is no time limit.

4. Modbus protocol. Protocol<1,7,N,2> means 1 start bit, 7 data bits, No parity bit, and 2 stop bit. N: no parity, E: 1-bit even parity, O: 1-bit odd parity.

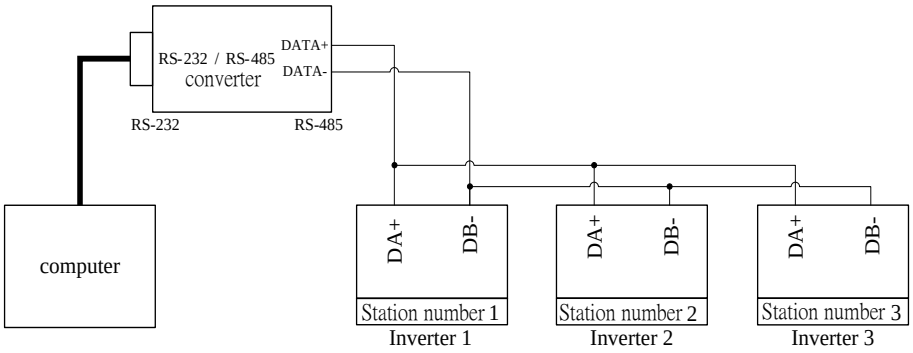
System configuration of SE2-RS485 communications interface

● For only one inverter connecting to computer



4. Parameter description

● For multi-inverter connecting to computer

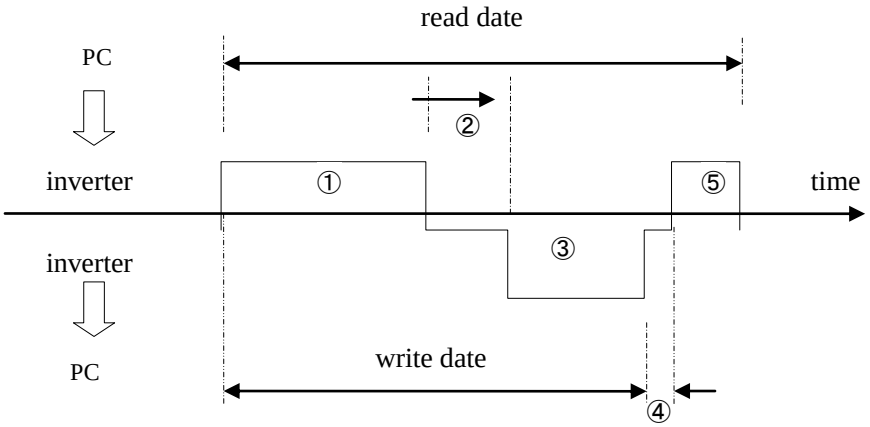


● Two communication protocol of SE2-type inverter, there are Shihlin protocol and Modbus protocol.

1. Shihlin protocol

● Communication between PC and inverter, ASCII code (hexadecimal) converted automatically.

● PC Data communication between the inverter, please follow the steps.



Communication type with or without data format for the step:

No.	Description		Operation Command	Operation Frequency	Write Parameter	Reset	Monitoring	Read Out Parameter
①	Computer send out communication request to inverter		A	A	A	A	B	B
②	Inverter Data Processing time		yes	yes	yes	no	yes	yes
③	Data responded From inverter (check fault of ①)	No error (request accepted)	C	C	C	no	E	E
		Error (request rejected)	D	D	D	no	D	D
④	Computer data processing time		no	no	no	no	no	no
⑤	Data Responded from PC (check fault of ③)	No error (no process)	no	no	no	no	C	C
		Error (output ③)	no	no	no	no	F	F

4. Parameter description

① Communication Request from PC to Inverter

Format	Information number													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A (Write data to Inverter)	ENQ *1)	Station Number		Command Code		Waiting Time *2)	Data				Sum check *7)		Stop Character *3)	
B (Read data from Inverter)	ENQ *1)	Station Number		Command Code		Waiting Time *2)	Sum check *7)		Stop Character *3)					

③ Computer transmit data to inverter, inverter response data

● Write data

Format	Information number					
	1	2	3	4	5	6
C (Data no error)	ACK *1)	Station Number		Stop Character *3)		
D (Data error)	NAK *1)	Station Number		Error Code *5)	Stop Character *3)	

● Readout data

Format	Information number												
	1	2	3	4	5	6	7	8	9	10	11	12	13
E （Data no error）	STX *1）	Station Number		Readout Data				Unit *4）	ETX	Sum check *7）		Stop Character *3）	
D （Data error）	NAK *1）	Station Number		Error Code *5）	Stop Character *3）								

⑤ When computer is in data reading, responding data after data receipt from inverter

Format	Information number				
	1	2	3	4	5
C (Data no error)	ACK *1）	Station Number		Stop Character *3）	
F (Data error)	NAK *1）	Station Number		Stop Character *3）	

4. Parameter description

∗1）Description of Control Code (ASCII CODE)

Control Code	ASCII CODE	Description	Control Code	ASCII码	Description
NUL	H00	NULL	ACK	H06	Acknowledge
STX	H02	Start of Text	LF	H0A	Line Feed
ETX	H03	End of Text	CR	H0D	Carriage Return
ENQ	H05	Enquiry	NAK	H15	Negative Acknowledge

∗2）Wait time setting is from 0 to 15，unit is 10ms, for example 5 means 50ms.

∗3）Stop Character(CR、LF CODE)

From the PC to the inverter for data communication, packet last CR, LF code by way of the PC is automatically set. The inverter with the PC must also make the necessary settings. If you select only the CR, then only one register is needed. If you choose CR and LF, it will account for two registers.

∗4）Unit: 0 means unit is 1, 1 means unit is 0.1, 2 means unit is 0.01, 3 means unit is 0.001.

∗5）Error Code:

Error Code	Error Item	Communication error exception content
H01	Error	Parity check which inverter received is different from the initial set.
H02	Sum Check Error	Inverter side of the calculation of the received data value Sum Check and the Sum Check which received are different.
H03	Protocol Error	The information which the inverter received is syntax errors, or not within the specified time information has been received, or CR and LF code is different from the initial set.
H04	Frame Error	STOP bit which inverter received is different from the initial set.
H05	Overflow Error	When the inverter receives data, has not yet been received, the PC in turn write the incoming data.
H0A	Mode Exceptions	When the inverter is running or does not in right operation mode for writing.
H0B	Command Code Error.	Specifies command code which the inverter can not handle.
H0C	Data Range Error	The data is outside the range of the specified when set parameters and frequency.

∗6）When the parameters have 9999 properties, write or read HFFFF instead of 9999.

∗7）Sum check code

ASCII code data transformed code, Add in binary code; the result (sum) of the next bit (the low 8-bit) is transformed into 2 bit ASCII code (hexadecimal), called the Sum Check Code.

4. Parameter description

● Communications examples

Example 1. PC to send forward command to the inverter:

Step1. FA commands sent by the PC, using the format A:

ENQ	Station number 0	Command Code HFA	Waiting Time	Data H0002	Sum Check	CR
H05	H30 H30	H46 H41	H30	H30 H30 H30 H32	H44 H39	H0D

Calculation Sum Check: H30＋H30＋H46＋H41+H30+H30+H30+H30+H32=H1D9, take the lower 8 bits D9, converted to ASCII code: H44 H39

Step2. After receiving and processing are accurate, the inverter responds to PC, using the format C:

ACK	tation number 0	CR
H06	H30 H30	H0D

Example 2. PC to send stop command to the inverter:

Step1. FA commands sent by the PC, using the format A:

ENQ	Station number 0	Command Code HFA	Waiting Time	Data H0000	Sum Check	CR
H05	H30 H30	H46 H41	H30	H30 H30 H30 H30	H44 H37	H0D

Step2. After receiving and processing accurate, the inverter responds to PC, using the format C:

ACK	Station number 0	CR
H06	H30 H30	H0D

Example 3. PC communication to read P.195:

Step1. PC to send Inputting page changing command to the inverter, using the format A:

ENQ	Station number 0	Command Code HFF	Waiting Time	Data H0001	Sum Check	CR
H05	H30 H30	H46 H46	H30	H30 H30 H30 H31	H44 H44	H0D

⇩

P.195 is in page 1

Step2. After receiving and processing accurate, the inverter responds to PC, using the format C:

ACK	Station number 0	CR
H06	H30 H30	H0D

Step3. PC requests the inverter to read the value of P.195, using the format B:

ENQ	Station number 0	Command Code H5F	Waiting Time	Sum Check	CR
H05	H30 H30	H35 H46	H30	H30 H42	H0D

⇩

195 minus 100 equals 95, then invert 95 to hexadecimal H5F, and convert5 and F to ASCII CODE H35、H46.

Step4. After inverter receives the information and processes without error, it sends value of P.195 to PC, using the format E:

STX	Station number 0	Read data H1770(60Hz)	Unit	ETX	Sum Check	CR
H02	H30 H30	H31 H37 H37 H30	H32	H03	H36 H31	H0D

Example 4. Change value of P.195 to 50 (initial value is 60):
Step1 and step 2 are the same as step1 and step2 of example 3.
Step 3. PC requests the inverter to inputting 50 into P.195, using the format A:

ENQ	Station number 0	Command Code HDF	Waiting Time	Data H1388	Sum Check	CR
H05	H30 H30	H44 H46	H30	H31 H33 H38 H38	H45 H45	H0D

⇩ ⇩

195 minus 100 equal to 95, then converting 95 to hexadecimal H5F, H5F+H80=HDF.

The minimum unit of P.195 is 0.01, therefore 50*100=5000, then converting 5000 to Hexadecimal H1388, and converting 1,3,8,8 to ASCII CODE to send out.

Step 4. After receiving and processing accurate, the inverter responds to PC, using the format C:

ACK	Station number 0	CR
H06	H30 H30	H0D

Example 5. Change value of P.195 to 500 (Parameter range 0~400):
Step1 and step 2 are the same as step1 and step2 of example 3.
Step 3. PC requests the inverter to inputting 500 into P.195, using the format A:

ENQ	Station number 0	Command Code HDF	Waiting Time	Data HC350	Sum Check	CR
H05	H30 H30	H44 H46	H30	H43 H33 H35 H30	H46 H35	H0D

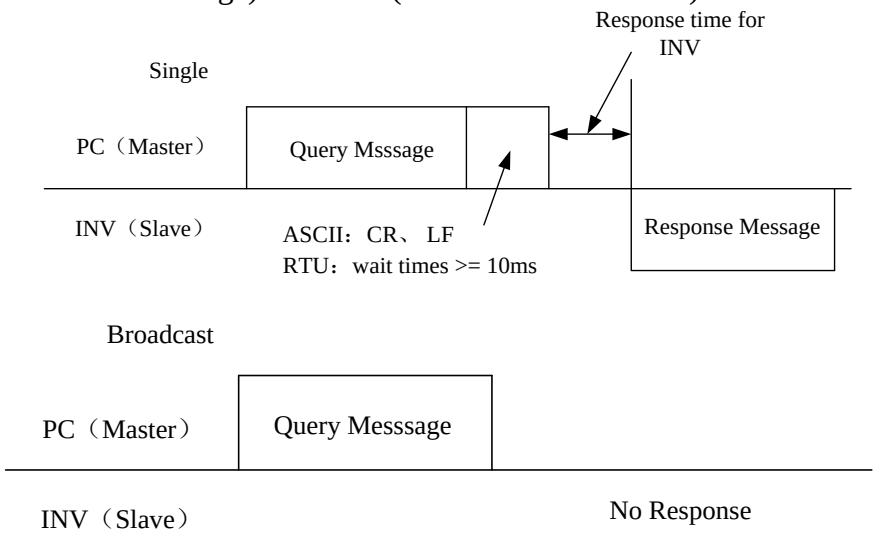
Step 4. After processing, for information out of range, inverter replies to computer that this information is incorrect, using the format D:

NAK	Station number 0	Error Code H0C	CR
H15	H30 H30	H43	H0D

2. Modbus protocol

1). Information form

● Modbus serial transmission can be divided into two kinds. There are ASCII (American Standard Code for Information Interchange) and RTU (Remote Terminal Unit) mod.



(1). Query

PC (primary address) sends a message to the inverter (from the address) which is on the specified address.

(2). Normal Response

After sending a query to receive from PC, inverter to perform the requested function corresponds to the PC and return to the normal response.

(3). Error Response

Inverter received an invalid function code, address, data, response returned to the PC.

(4). Broadcast

PC designated by the address 0, can send a message to all the inverters. All inverters which received information from PC performed the requested function, but do not respond to the PC.

2). Communication format

● The master transmitted the Query Message to inverter, the inverter response message to the PC, the address and function code will be copied when normal communication. Bit 7 of function will be set 1(=H80) and Data Byte will be set by error code when abnormal communication.

● Message form：

Mode	Start	①Address	②Function	③Data	④Error check	End
ASCII	H3A	8 Bit	8 Bit	n×8 Bit	2×8 Bit	0D 0A
RTU	>=10ms					>=10ms

4. Parameter description

<table>
<tr><td>Message</td><td>Details</td></tr>
<tr><td>① Address</td><td>Setting range: 0~254, 0 is the broadcast address, the address of inverter is from 1 to 254.
P.36 can set the address of inverter. When the PC send information from the inverter and the inverter return information to PC, P.36 must be set.</td></tr>
<tr><td>② Function</td><td>SE2-type inverters have three functions. The inverter operated according to the request of the PC, the PC setting function of the table other than the code, the inverter will return an error response. Response returned from the inverter in normal response returns to normal function, when returns the error response the function code should add H80.
<table>
<tr><td>Function name</td><td>Function code</td><td>Details</td></tr>
<tr><td>Read multiple registers</td><td>H03</td><td>From the PC may read straight registers to inverter.</td></tr>
<tr><td>Write single register</td><td>H06</td><td>From the PC may write a single register to inverter.</td></tr>
<tr><td>Write multiple registers</td><td>H10</td><td>From the PC may write straight registers to inverter.</td></tr>
</table></td></tr>
<tr><td>③ Data</td><td>According to the function code, the data will change. Data includes the start address, the number of register and the write message.</td></tr>
<tr><td>④ Error check</td><td>ASCII mode is for the LRC checksum, RTU mode is for the CRC checksum. (On LRC, CRC checksum algorithm detailed instructions please refer to the standard Modbus protocol specification).</td></tr>
</table>

Algorithm of LRC checksum:

LRC check is relatively simple to use. It in ASCII mode to detect the message except the beginning of the colon field and the end of the carriage return line number. It is only necessary to transmit the data of each byte stack, and if the result is greater than hexadecimal H100, after removal of the excess (such as: the results obtained for the hexadecimal H136, only to take H36) can be reversed then plus 1.

Algorithm of CRC checksum:

1. Installation of a 16-bit register, all bits is 1.
2. The 16-bit operation result which exclusive OR between the 16-bit register high byte and the beginning of 8-bit byte was put into the register.
3. The 16-bit register move 1-bit towards of the right.
4. If the number right (mark bit) out of the digital is 1, exclusive OR between the generator polynomial “1010000000000001” and the register operated”, if the number right out of the bit is 0, then return to the step 3.
5. Repeat step 3 and 4, until out of the 8-bit.
6. Exclusive OR between another 8-bit and this 16-bit register.
7. Repeat from step 3 to 6, until all bytes of the packet have exclusive OR the 16-bit register, and shift 8 times.
8. The 2 byte CRC error checking of the 16-bit registers that was added to the most significant bit of the message.

4. Parameter description

CRC added to the message, the low byte first join, and then the high byte.

● Communication format

(1). Read data（H03）

Mode	Start	Address *1）	Function *2）	Initial address *3）	Register number *4）	Check	End
ASCII	H3A	2char	2char	4char	4char	2char	0D 0A
RTU	>=10ms	8bit	8bit	2byte	2byte	2byte	>=10ms

Normal response

Mode	Start	Address *1）	Function *2）	Read data number *5）	Read data *6）		Check	End
ASCII	H3A	2char	2char	2char	4char	…2N×8bit	2char	0D 0A
RTU	>=10ms	8bit	8bit	1byte	2byte	…N×8bit	2byte	>=10ms

Message	Content
*1) Address	Set the address to send information, 0 is in vain.
*2) Function code	H03
*3) Initial address	Set to the address of register to read.
*4) Register number	Set to the number of register to read. The number is most 20 can read.
*5) Read data number	Twice to *4).
*6) Read data	Set information * 4) specified, read the data byte at the level of the order.

(2). Write data（H06）

Mode	Start	Address *1）	Function *2）	Initial address *3）	Write data *4）	Check	End
ASCII	H3A	2char	2char	4char	4char	2char	0D 0A
RTU	>=10ms	8bit	8bit	2byte	2byte	2byte	>=10ms

Normal response

Mode	Start	Address *1）	Function *2）	Initial address *3）	Write data *4）	Check	End
ASCII	H3A	2char	2char	4char	4char	2char	0D 0A
RTU	>=10ms	8bit	8bit	2byte	2byte	2byte	>=10ms

4. Parameter description

Message	Content
∗1）Address	Set the address to send information.
∗2）Function code	H06
∗3）Initial address	Set the beginning address of the register which has write function.
∗4）Write dada	Write data to the specified register which is fixed at 16-bit.

Note: The message of normal response is the same as the query information.

(3). Write Multiple Registers (H10)

Mode	Start	Address ∗1）	Function ∗2）	Initial address ∗3）	Register number ∗4）	Data quantity *5）	Write data ∗6）		Check	End
ASCII	H3A	2char	2char	4char	4char	2char	4char	…2N×8bit	2char	0D 0A
RTU	>=10ms	8bit	8bit	2byte	2byte	1byte	2byte	…N×16bit	2byte	>=10ms

Normal response

Mode	Start	Address ∗1）	Function ∗2）	Initial address ∗3）	Register number ∗4）	Check	End
ASCII	H3A	2char	2char	4char	4char	2char	0D 0A
RTU	>=10ms	8bit	8bit	2byte	2byte	2byte	>=10ms

Message	Content
∗1）Address	Set the address to send information.
∗2）Function code	H10
∗3）Initial address	Set the beginning address of the register which has write function.
∗4）Register number	Set to the number of register to write. The number is most 20 can write.
∗5）Data quantity	Set range is 2 to 40. Twice to ∗4).
∗6）Write dada	Set data ∗ 4) specified, to write data in accordance with the Hi byte, Lo byte order to set and follow the starting address of the data, the starting address +1 of the data, the starting address +2 of the data ... to set the order.

(4). Abnormal response

Query information received from inverter is error which from the functionality, address and data, than operated abnormal response.

4. Parameter description

Mode	Start	Address ∗1）	Function ∗2） H80+ Function code	Error code ∗3）	Check	End
ASCII	H3A	2char	2char	2char	2char	0D 0A
RTU	>=10ms	8bit	8bit	8bit	2byte	>=10ms

Message	Content
∗1）Address	Set the address to send information.
∗2） Function code	Function code＋H80
∗3） Error code	Set the code from the follow table.

List of error codes:

Resource	Code	Meaning	Remarks
Inver response	H01	Illegal function code	The inverter can not handle the code which is from the query message the PC Issued. H03, H06, H08 and H10 are function code.
	H02	Illegal data address	The inverter can not handle the address which is from the query message the PC Issued. (Outside the address listed in the table, retention parameters, parameters are not allowed to read and write.)
	H03	Illegal data	The inverter can not handle the data which is from the query message the PC Issued. (Outside writing range of the parameters, there is a specified mode, and other errors.)

Note: Read more than one parameters, even reading the retention parameters, not as an error.

The data issued by the PC, the inverter will detect the following errors, but when an error is detected no response.
Error detection list:

Error item	Error content
Parity error	Parity which inverter received is different from the inverter initial set.
Frame error	The stop bit lengths of the information which the inverter received do not match the inverter initial set of stop bits.
Overflow error	When the inverter receives data, has not yet been received, the PC in turn write the incoming data.
Check error	Inverter side of the data calculated according to the received LRC / CRC check result is inconsistent with the received LRC / CRC checksum.

4. Parameter description

● Communications examples

Example 1. Write CU (communication) mode by Communication

Step 1.PC to modify the inverter mode

Mode	Start	Address	Function	Initial address		Write data		Check	End
ASCII	H3A	H30 H31	H30 H36	H31H30	H30 H30	H30 H30	H30 H30	H45 H39	0D 0A
RTU	>=10ms	01	06	10	00	00	00	8D 0A	>=10ms

Step 2.After receiving and processing accurate, the inverter responds to PC

Mode	Start	Address	Function	Initial address		Write data		Check	End
ASCII	H3A	H30 H31	H30 H36	H31H30	H30 H30	H30 H30	H30 H30	H45 H39	0D 0A
RTU	>=10ms	01	06	10	00	00	00	8D 0A	>=10ms

Example 2. PC communication to read P.195:

Step 1.PC requests the inverter to read the value of P.195. The address of P.195 is H00C3。

Mode	Start	Address	Function	Initial address		Register number		Check	End
ASCII	H3A	H30 H31	H30 H33	H30H30	H43 H33	H30 H30	H30 H31	H33 H38	0D 0A
RTU	>=10ms	01	03	00	C3	00	01	74 36	>=10ms

Step 2.After inverter receives the information and processes without error; it sends value of P.195 to PC.

Mode	Start	Address	Function	Read data number	Read data		Check	End
ASCII	H3A	H30 H31	H30 H33	H30 H32	H31 H37	H37 H30	H37 H33	0D 0A
RTU	>=10ms	01	03	02	17	70	B6 50	>=10ms

H1770 into decimal is 6000, the unit of P.195 is 0.01，so 6000×0.01＝60，60 is the value of P.195.

Example 3. Change value of P.195 to 50

Step 1.PC requests the inverter to inputting 50 into P.195.

Mode	Start	Address	Function	Initial address		Write data		Check	End
ASCII	H3A	H30 H31	H30 H36	H30H30	H43 H33	H31 H33	H38 H38	H39 H42	0D 0A
RTU	>=10ms	01	06	00	C3	13	88	74 A0	>=10ms

Step 2.After receiving and processing accurate, the inverter responds to PC

Mode	Start	Address	Function	Initial address		Write data		Check	End
ASCII	H3A	H30 H31	H30 H36	H30H30	H43 H33	H31 H33	H38 H38	H39 H42	0D 0A
RTU	>=10ms	01	06	00	C3	13	88	74 A0	>=10ms

4. Parameter description

Example 4. PC communication to read parameter from P.0 to P.195:
Step 1.PC requests the inverter to read the value of P.0~P.11. The initial address is H0000.

Mode	Start	Address	Function	Initial address		Register number		Check	End
ASCII	H3A	H30 H31	H30 H33	H30H30	H30 H30	H30 H30	H30 H43	H46 H30	0D 0A
RTU	>=10ms	01	03	00	00	00	0C	45 CF	>=10ms

Step 2.After receiving and processing accurate, the inverter responds to PC.

Mode	Start	Address	Function	Number of read data	Read data	Check	End
ASCII	H3A	H30 H31	H30 H33	H31 H38	…12×4 char	2char	0D 0A
RTU	>=10ms	01	03	18	…12×2 byte	2byte	>=10ms

Example 5. PC communication to write parameter from P.0 to P.195:
Step 1.PC requests the inverter to write the value of P.0~P.11.

Mode	Start	Address	Function	Mode		Register number		Data quantity	Write data	Check	End
ASCII	H3A	H30 H31	H31 H30	H30 H30	H30 H30	H30 H30	H30 H43	H31 H38	…N×4 char	2char	0D 0A
RTU	>=10ms	01	10	00	00	00	0C	18	…N×2 byte	2byte	>=10ms

Step 2.After receiving and processing accurate, the inverter responds to PC.

Mode	Start	Address	Function	Initial address		Register number		Check	End
ASCII	H3A	H30 H31	H31 H30	H30H30	H30 H30	H30 H30	H30 H43	H45 H33	0D 0A
RTU	>=10ms	01	10	00	00	00	0C	00 18	>=10ms

3. Communication commands list

- Set the following command codes and data, you can control the various operations, surveillance and so on.

Modbus code	Item	Shihlin protocol code	Information content and its functions	Modbus address
H03	Read out operation mode	H7B	H0000：CU； H0001：OPnd； H0002：JOG； H0003：H1，H3，H5； H0004：H2，H4	H1000
H06/H10	Write operation mode	HFB		

4. Parameter description

Modbus code	Item		Shihlin protocol code	Information content and its functions	Modbus address
H03	Inverter State		H7A	H0000~H00FF b8~b15：reserved b7：Alarm occurrence b6：Frequency detection b5：Parameters to default values end. b4：Overload b3：Frequency achieved b2：reverse rotation b1：Forward rotation b0：Operation	H1001
H03	Monitoring	set frequency	H73	H0000~H9C40	H1002
		Output frequency	H6F	H0000~H9C40	H1003
		Output current	H70	H0000~HFFFF	H1004
		Output voltage	H71	H0000~HFFFF	H1005
		Alarm item	H74	H0000~HFFFF: H74/H1007：Error code 1 and 2 b15 b8 b7 b0 Error code 2 | Error code 1	H1007
			H75	H75/H1008：Error code 3 and 4 b15 b8 b7 b0 Error code 4 | Error code 3 Error code can reference the table in page 108.	H1008
H06/H10	Operation command		HFA	H0000~HFFFF b8~b15: reserved b7: scram（MRS） b6: 2nd Acceleration/Declaration Selection(RT) b5: High Speed (RH) b4: Mid Speed (RM) b3: :Low Speed (RL) b2: REV Rotation(STR) b1: FWD Rotation (STF) b0: reserved	H1001
H06/H10	Inverter reset		HFD	H9696：The function of P.997 Communication with the PC, because the inverter is reset, so the inverter can not be returned data to the PC.	H1101

4. Parameter description

Modbus code	Item		Shihlin protocol code	Information content and its functions		Modbus address
H06/H10	Operation frequency write in		HEE	H0000~H9C40		H1002
H06/H10	Inverter parameter and error code erased.		HFC	See parameter recovery description table	H5A5A	H1104
					H9966	H1103
					H9696	H1106
					H55AA	H1105
					HA5A5	H1102
H03	Parameter read out		H00~H63	P.0~P.499，The range and decimal point Please refer to parameter list. Every parameter modbus address is the 16 band parameter number. For example: the modbus address of P.138 is H008A.		H0000 | H01F3
H06/H10	Parameter write in		H80~HE3			
---	Write/read Parameter/ page change	Read	H7F	H0000：P.0~P.99； H0001：P.100~P.199； H0002：P.200~P.299； H0003：P.300~P.399； H0004：P.400~P.499。		---
		Write	HFF			

● Parameter recovery description table

Data content	P operating	Communication parameters (Note)	P.0~P.191(except P.21,P.189 and Communication parameter)	Another parameters	Error code
H5A5A	P.999	o	o	x	x
H9966	P.998	o	o	o	x
H9696	Communication 999	x	o	x	x
H55AA	Communication 998	x	o	o	x
HA5A5	P.996	x	x	x	o

Note: Communication parameter include P.32、P.33、P.36、P.48~P.53、P.79、P.153 and P.154.

4.18 Speed Display (P.37)

P.37 “Speed display”

● In ‘output frequency monitoring mode’, the screen will display the corresponding mechanical speed.

Parameter	Factory setting	Setting range	Remarks
37	0 r/min	0.1~5000r/min	0: output frequency

<Setting>

• The set value of P.37 is the mechanical speed of the inverter when its output frequency is 60Hz.
For example: If the transmitting belt speed is 950 m/minute when the inverter output frequency is 60Hz, P.37 shall be set to 950. In 'output frequency monitoring mode', the screen will display the speed of the transmitting belt.

Note: 1. There's minute discrepancy between the displayed mechanical speed and the actual one.
2. Please refer to Section 3-2 for detailed operation of the 'operation panel working mode'.
3. When the output mechanical speed is more than 9998, the screen will display 9999.

4.19 Voltage Signal Selection and Target Frequency (P.38, P.59, P.73, P.76, P.139, P.140, P.141)

P.38 "The maximum operation frequency (the target frequency is set by the input signal of terminal 2-5)"
P.59 "Selection of frequency sources"
P.73 "Voltage signal selection"
P.76 "Panel knob signal input frequency bias"
P.139 "Voltage signal bias"
P.140 "Voltage signal gain"
P.141 "Voltage signal bias direction and rotational direction setup"

Related parameters
P. 79 " Operation mode selection "
P. 80~P. 84 , P. 86
" Multi - function terminals selection "
P. 189 " Factory setting function "
P. 194 "Frequency corresponds to the minimum input voltage of terminal 2-5"
P. 195 "Frequency corresponds to the maximum input voltage of terminal 2-5"

Parameter	Factory setting	Setting range	Remarks	
38	50Hz	1~400Hz (Note 4)	When P.189=1	
	60Hz		When P.189=0	
59	1	0, 1	---	
73	0	0, 1	0	The range for the input voltage signal (terminal 2-5/4-5) is 0~5V.
			1	The range for the input voltage signal (terminal 2-5/4-5) is 0~10V.
76	0 Hz	0~400Hz (Note 4)	---	
139	0%	0%~100%	---	
140	100%	0.1%~200%	---	
141	0	0~11	---	

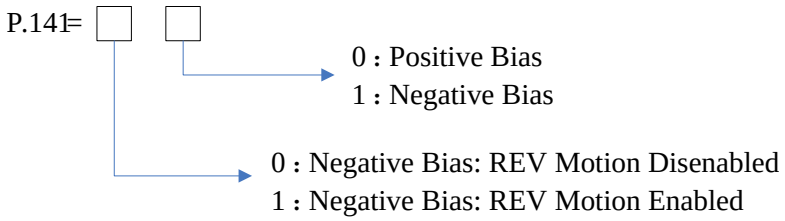
4. Parameter description

< Setting >

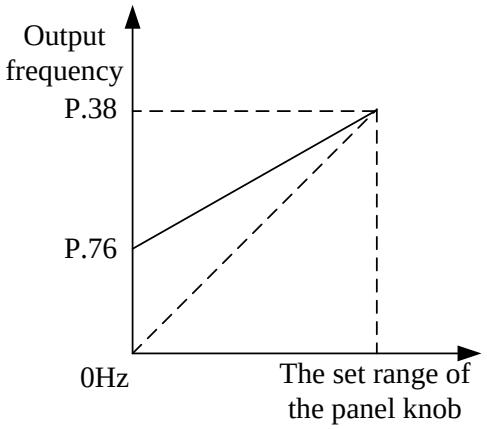
• When P.59=0, the target frequency is set by the knob on DU03B operation panel (the range of the voltage signal given by the knob is 0~5V). The frequency range is set by P.38.

• When P.59=1, the target frequency is set by the button ▲ and ▼ on DU03B operation panel.

• There are 2 digits in P.141, every digit have the different meaning, relevant positions as following:



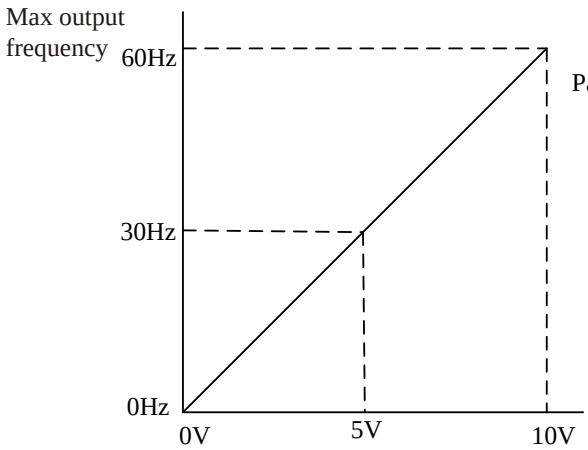
• If you hope that the frequency is not 0Hz when the panel knob is set at 0V when setting frequency with the knob, you can realized that by setting P.76. For example: If you hope that the frequency is 10Hz when the knob is set at 0V, you should set P.76=10, at this time the setting range of the frequency is from 10Hz to the set value of P.38 when you turn the knob. Shown as follows:



• Set the frequency of using negative bias benefits of avoids noise interference greatly. In harsh environments, the user is advised to avoid using the drive signal which is below 1V to set the operating frequency.

Now let's see same examples:

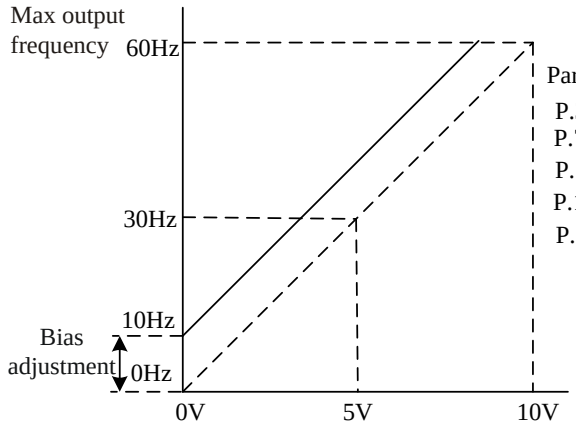
Example 1: This is the most used setting. When the inverter is in 'external mode', 'combined mode 2' or 'combined mode 4', and the frequency is set by terminal 2-5。



Parameter setting:

P.38 = 60Hz Max operation frequency
P.73 = 1 Voltage signal selection
P.139 = 0% Bias adjustment
P.140 = 100% Gain adjustment
P.141 = 0 Positive Bias

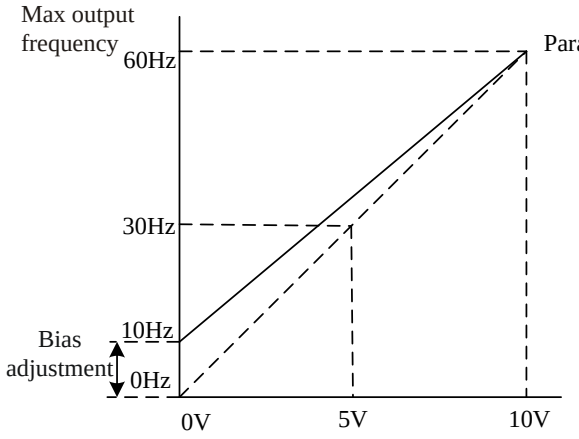
Example 2: This example shows the influence of changing the bias. When the input is 0V the output frequency is 10 Hz. At mid-point a potentiometer will give 40 Hz. Once the Maximum Output Frequency is reached, any further increase of the potentiometer or signal will not increase the output frequency. (To use the full potentiometer range, please refer to Example 3.) The value of external input voltage/current 0~8.33V corresponds to the setting frequency 10~60Hz.



Parameter setting:
P.38 = 60Hz Max operation frequency
P.73 = 1 Voltage signal selection
P.139 = 16.7% Bias adjustment
P.140 = 100% Gain adjustment
P.141 = 0 Positive Bias

$$P.139 = \frac{10Hz}{P.38} * 100\%$$

Example 3: This example also shows a popular method. The whole scale of the potentiometer can be used as desired.

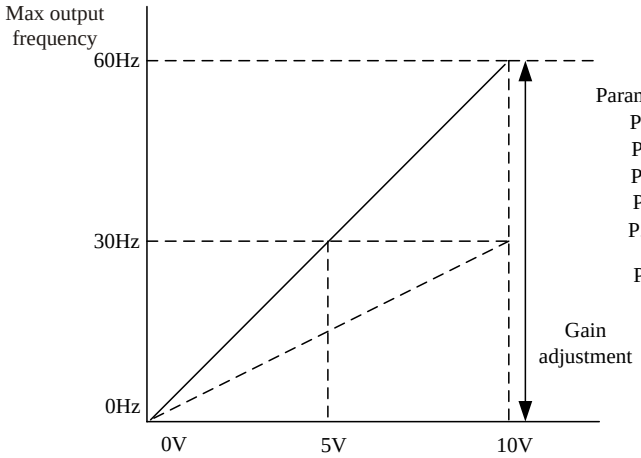


Parameter setting:
P.38 = 60Hz Max operation frequency
P.73 = 1 Voltage signal selection
P.139 =20% Bias adjustment
P.140 = 83.3% Gain adjustment
P.141 = 0 Positive Bias

$$P.140 = \left(1 - \frac{10Hz}{P.38}\right) * 100\%$$

$$P.139 = \frac{10Hz}{P.38*P.140} * 100\%$$

Example 4: This example shows a potentiometer range of 0V to 5 V. Instead of adjusting gain as example below, you can set P.38 to 120Hz or P.73 to 0 to achieve the same results.

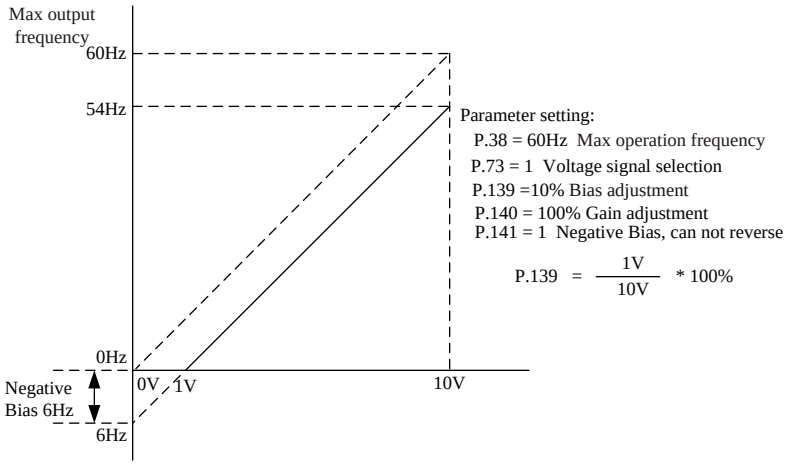


Parameter setting:
P.38 = 60Hz Max operation frequency
P.73 = 1 Voltage signal selection
P.139 =0% Bias adjustment
P.140 = 200% Gain adjustment
P.141 = 0 Positive Bias

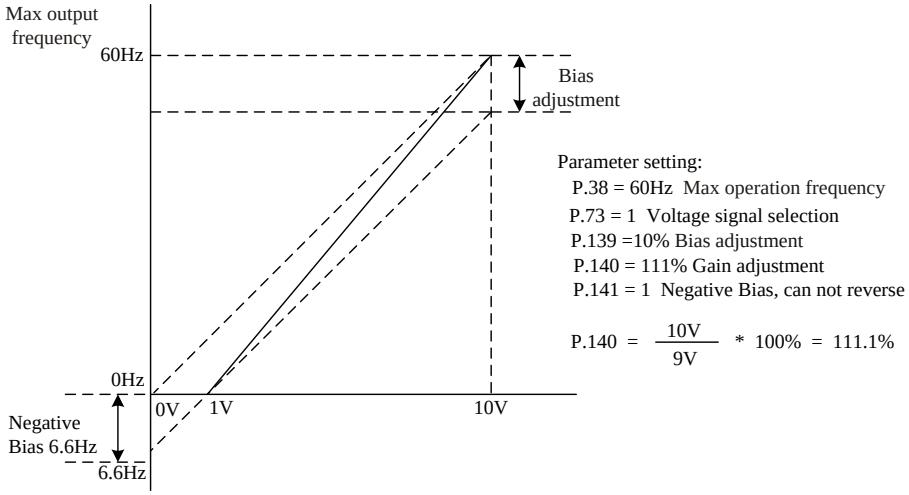
$$P.140 = \frac{10V}{5V} * 100\% = 200\%$$

4. Parameter description

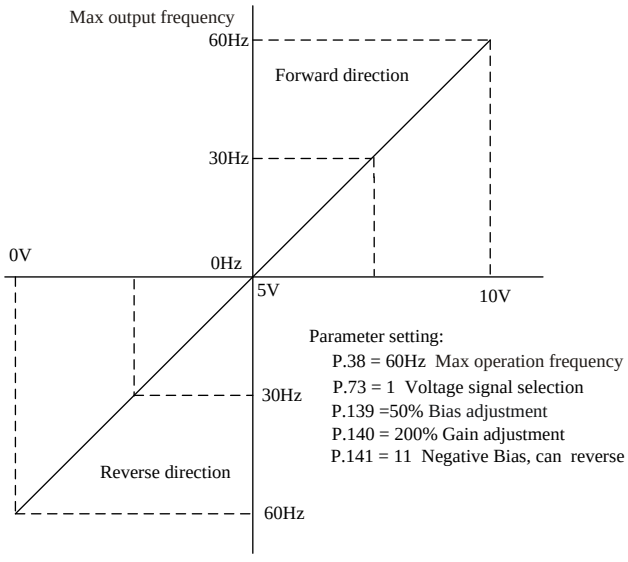
Example 5: In this example, a 1V negative bias is used. In noisy environments it is advantageous to use negative bias to provide a noise margin (1V in this example).



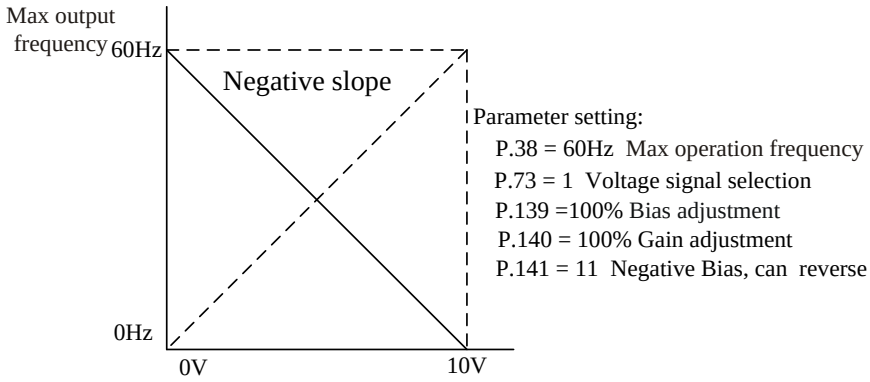
Example 6: In this example, a negative bias is used to provide a noise margin. Also a potentiometer frequency gain is used to allow the Maximum Output Frequency to be reached.



Example 7: In this example, the input is programmed to run a motor in both forward and reverse direction. The motor will be idle when the potentiometer position is at mid-point of its scale. Using the settings in this example disables the external FWD and REV controls.



Example 8: In this example, the use of negative slope is shown. Negative slopes are used in applications for control of pressure, temperature or flow. The sensor that is connected to the input generates a large signal (10V) at high pressure or flow. With negative slope settings, the AC motor drive will slow stop the motor. With these settings the AC motor drive will always run in only one direction (reverse). This can only be changed by exchanging 2 wires to the motor.



Note: 1. In 'external mode', 'combined mode 2' or 'combined mode 4', if RH, RM, RL and REX are all 'off', the inverter target frequency is set by the input signal across terminal 2-5/4-5. If AU is 'on', the input signal across terminal 4-5 has higher priority.

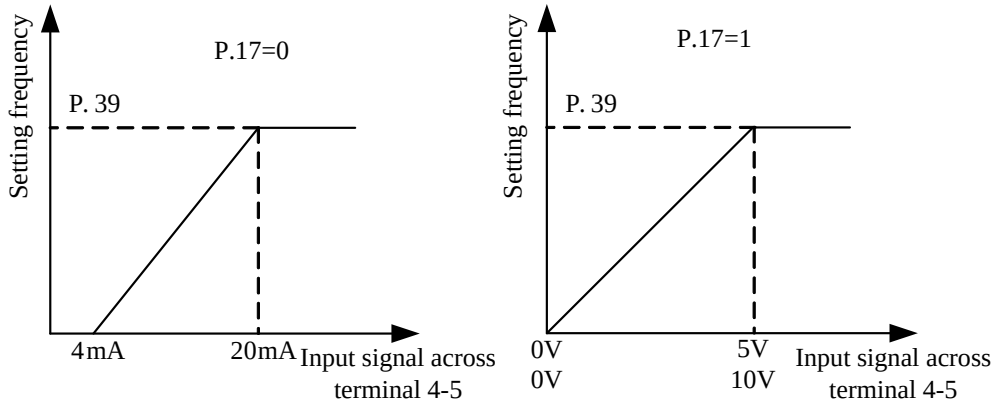
2. RL, RM, RH, REX, AU and RUN referred in this paragraph is the function names of 'multi-function control terminals'. For the corresponding function selection and features, please refer to P.80~84, P.86. For wiring, please refer to Section 2-5.
3. The set value of P.76 must be smaller than the set value of P.38, and if it exceed the set value of P.38, it will be clamped at the set value of P.38.
4. If P.187=1, P.38 is in the range of 1~1000Hz, P.76 is in the range of 0~1000Hz.

4.20 The Maximum Operation Frequency (the target frequency is set by the input signal of terminal 4-5) (P.39)

P.39 "The maximum operation frequency (the target frequency is set by the input signal of terminal 4-5)"

Related parameters
- P.17 "Input signal across terminal 4-5 selection"
- P.73 "Voltage signal selection"
- P.79 "Operation mode selection"
- P.80~P.84, P.86 "Multi-function terminals selection"
- P.189 "Factory setting function"
- P.196 "Frequency corresponds to the minimum input current/ voltage across terminal 4-5"
- P.197 "Gain of the input signal across terminal 4-5"

Parameter	Factory setting	Setting range	Remarks
39	50Hz	1~400Hz(Note 4)	When P.189=1
	60Hz		When P.189=0



Note: 1. In 'external mode', 'combined mode 2' or 'combined mode 4', if AU is 'on', the target frequency of the inverter is set by the input signal across terminal 4-5.

2. In 'external mode', 'combined mode 2' or 'combined mode 4', if AU and one of RH, RM, RL and REX are both valid at the same time, the multi-speed has higher priority.

3. RL, RM, RH, REX and AU referred in this paragraph are function names of 'multi-function control terminal'. For the corresponding function selection and features, please refer to P.80~P.84, P.86. For wiring, please refer to Section 2-5.

4. If P.187=1, P.39 is in the range of 1~1000Hz.

4.21 Multi-function Output (P.40, P.85, P.120)

P.40 "Multi-function output terminal pattern"

P.85 "Function selection for multi-function relay"

P.120 "Output signal delay time"

Related parameters

P.41 "Up-to-frequency sensitivity"
P.42 "Output frequency detection for forward rotation"
P.43 "Output frequency detection for reverse rotation"
P.62 "Zero current detection level"
P.63 "Zero current detection time"

Parameter	Factory setting	Setting range	Remarks	
40	0	0~10	0	RUN (Inverter running): Signal will be output when the output frequency is equal to or higher than the starting frequency.
			1	SU (Up to frequency): Signal will be output once the output frequency has reached within the set region of the set frequency.
			2	FU (Output frequency detection): Signal will be output once the output frequency has reached or exceeded the detection frequency set.

4. Parameter description

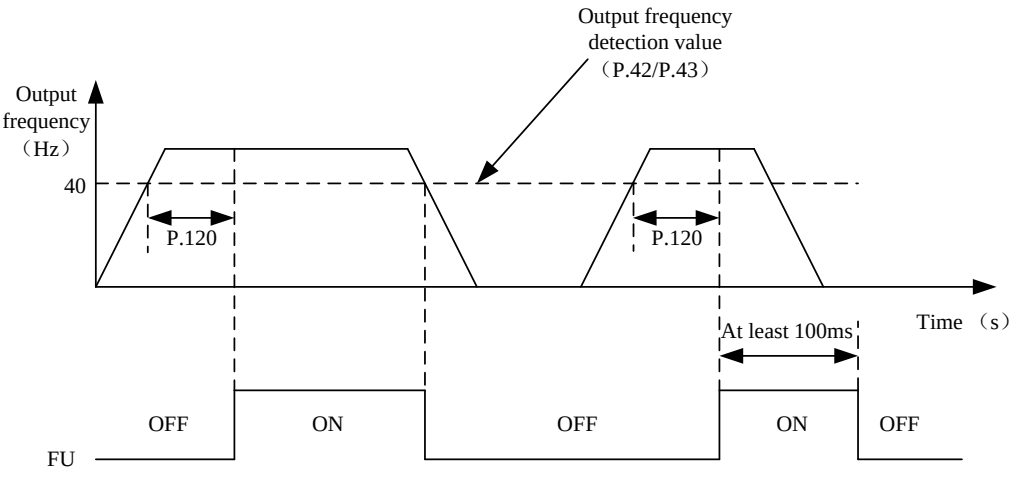
Parameter	Factory setting	Setting range	Remarks	
85	5	0~10	3	OL (Overload detection): Signal will be output once the current limit function is triggered.
			4	OMD (Zero current detection): If the output current percentage of the inverter is less than the set value of P.62, and lasts for the pre-defined time (the setting value of P.63), OMD will output signal.
			5	ALARM (Alarm detection): Alarm detection
			6	PO1 (Section detection): In programmed operation mode, PO1 signal will be output in the end of each section.
			7	PO2 (Periodical detection): In programmed operation mode, PO2 signal will be output in the end of each cycle.
			8	PO3 (Pause detection): In programmed operation mode, PO3 signal will be output when the inverter pauses.
			9	BP (Inverter output): Switch between the inverter operation and commercial power-supply operation function, when the inverter operation, BP will output signal.
			10	GP (Commercial power-supply output): Switch between the inverter operation and commercial power-supply operation function, when the commercial power-supply operation, GP will output signal.
120	0	0.1~3600s	---	

< Setting >

• When P.120=0, if the set condition of P.40 (P.85) is met, the signal will be output directly.

• When P.120=0.1~3600, if the set condition of P.40 (P.85) is met, the signal will be output after the set time.

For example: FU (Output frequency detection) function (For example: P.42/P.43=40Hz)



Note: 1. The multi-function output terminal is SO, SE. When P.40=0 (the default value), it means 'RUN'. When a different value is set, the corresponding function will change as shown in the above table.
2. The internal electrical structures for the multi-function output terminals are 'open collector output'. Please refer to Section 2-5-2 and Section 2-5-3 for wiring.
3. When the set value of P.85 is 5(the default value), the function of the multi-function relay ABC is ALARM. When the value of P.85 is revised, its function changes respectively as the corresponding function list in the table above.

4.22 Up-to-frequency Sensitivity (P.41)

P.41 "Up-to-frequency sensitivity"

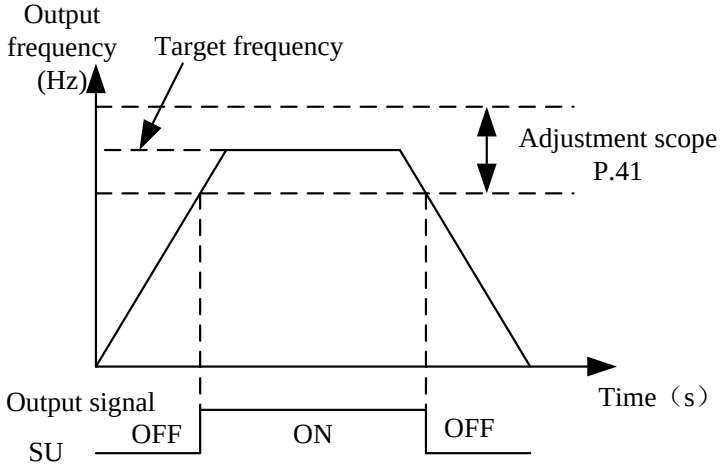
Related parameters

P.40 "Multi-function output terminal pattern"
P.85 "Function selection for multi-function relay"

Parameter	Factory setting	Setting range	Remarks
41	10%	0~100%	---

<Setting>

• If P.41=5%, a signal (SU) is output when the output frequency enter the '5% region near the target frequency'. For example: the target frequency is set to 60Hz, and P.41=5%, then if the output frequency is between 60±60×5%=63Hz and 57Hz region, the SU signal is output.



Note: In this paragraph, SU is the function name of 'multi-function output terminal'. Please refer to P.40 for function selection and features. About wiring, please refer to section 2-5.

4.23 Output Frequency Detection (P.42, P.43)

P.42 "Output frequency detection for forward rotation"

P.43 "Output frequency detection for reverse rotation"

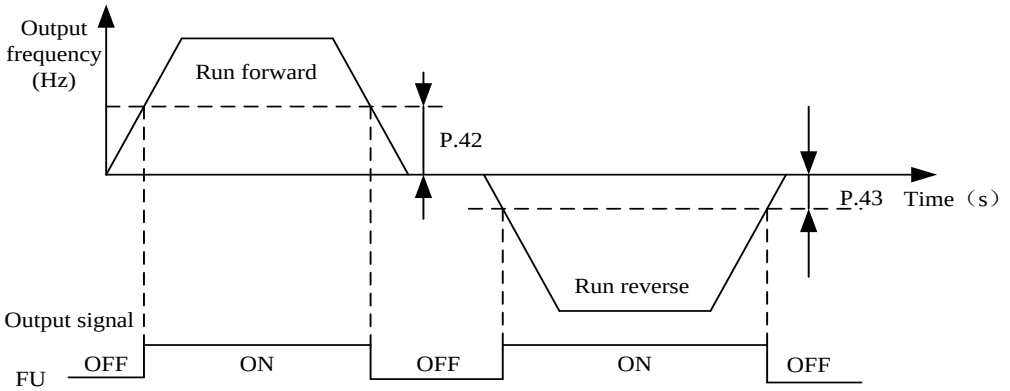
Related parameters

P.40 "Multi-function output terminal pattern"
P.85 "Function selection for multi-function relay"

Parameter	Factory setting	Setting range	Remarks
42	6Hz	0~400Hz (Note 2)	---
43	9999	0~400Hz, 9999 (Note 2)	9999: same as P.42 setting

<Setting>

- If P.42=30 and P.43=20, then a signal (FU) is output when the forward rotation output frequency exceeds 30Hz or when the reverse rotation output frequency exceeds 20Hz.
- If P.42=30 and P.43=9999 (the default value), then a signal (FU) is output when the forward or reverse rotation output frequency exceeds 30Hz.



Note: 1. In this paragraph FU is the function names of 'multi-function output terminals'. Please refer to P.40 for function selection and features. About wiring, please refer to section 2-5.
2. If P.187=1, P.42 and P.43 are in the range of 0~1000Hz.

4.24 AM Terminal (P.54~P.56, P.190, P.191)

P.54 "AM terminal function selection"

P.55 "Frequency display reference"

P.56 "Current monitoring reference"

P.190 "AM output bias"

P.191 "AM output gain"

4. Parameter description

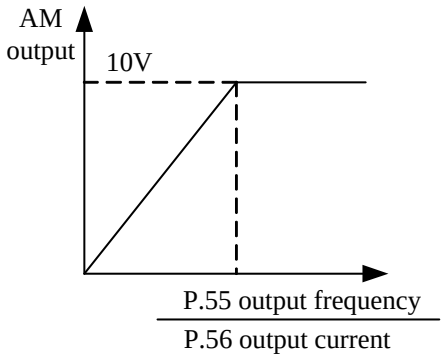
● Between terminals AM and terminal 5, an electric meter can be connected to indicate the output current value or the output frequency.

Parameter	Factory setting	Setting range	Remarks
54	0	0, 1	---
55	50Hz	0~400Hz (Note)	When P.189=1
	60Hz		When P.189=0
56	Rated current	0~500A	---
190	80	0~1024	---
191	900	0~1024	---

<Setting>

• When P.54=0, if the output frequency of the inverter is the set value of P.55, a voltage of 10V is output at terminal AM.

• When P.54=1, if the output current of the inverter is the set value of P.56, a voltage of 10V is output at terminal AM.



• AM terminal checking steps:

1. Connect an electric meter whose full graduation is 10V between terminal A and terminal 5, and set P.54 to 0, then please check the meter because of the difference of the accessory.
2. Set P.13 to 0, then start the motor, and fix the output frequency of the inverter at 0Hz.
3. Read the set value of P.190, then the screen will display the current AM output bias.
4. Press ▲, press SET and hold for 0.5s, the finger of the meter moves upwards, the AM output bias will increase. Press ▼ to change the value of P.190, press SET and hold for 0.5s, the finger of the meter moves downwards, the AM output bias will decrease. When adjusting the scale pointer position to 0 to complete the AM output bias correction work.
5. Adjust and fix the output frequency of the inverter at 60Hz.
6. Read the setting value of P.191, then the screen will display the current AM output gain.
7. Press ▲ ▼ to adjust the AM output gain, press SET and hold for 0.5s, the finger of the meter moves upwards and downwards. When the finger of the meter moves to full range, finish the checking.

Note: If P.187=1, P.55 is in the range of 0~1000Hz.

4.25 Restart Function (P.57, P.58, P.150, P.160)

P.57 “Restart coasting time”

P.58 “Restart cushion time”

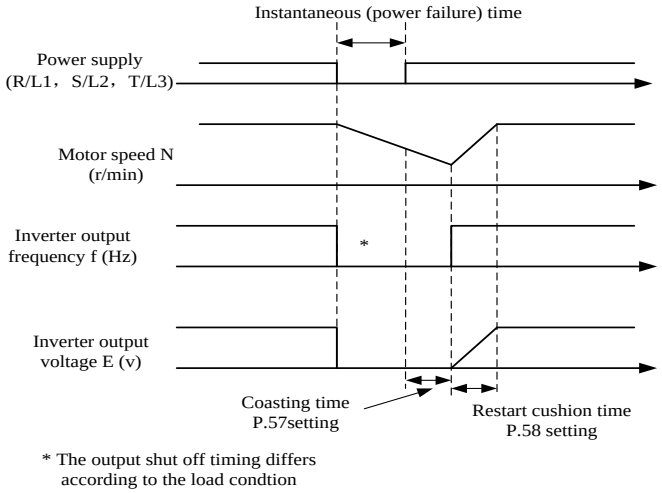
P.150 “Restart mode selection”

P.160 “Stall prevention operation level when restart”

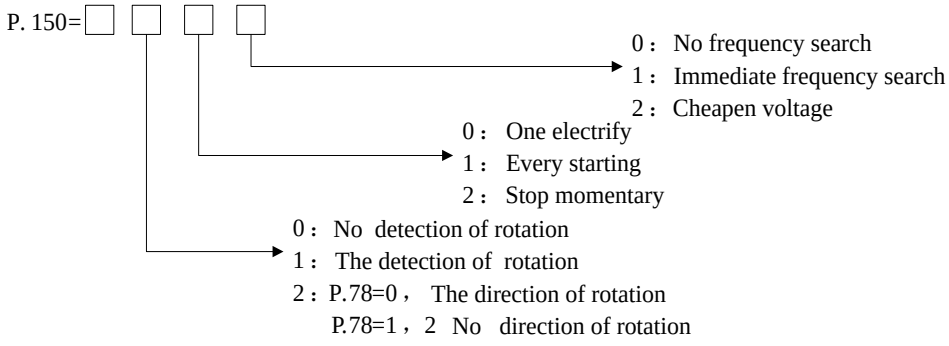
Parameter	Factory setting	Setting range	Remarks
57	9999	0~30s，9999	9999: restart function invalid
58	10s	0~60s	---
150	0	0~221	–––
160	120%	0~200%	When restart, stall prevention operation level

<Setting>

- When the motor is running, once the driving power is interrupted, the output voltage will not be output instantly. When the power is recovered, if P.57=9999, the inverter will not restart automatically, and if P.57=0.1~5, the motor coasts for a while (the set value of P.57), then the inverter will restart the motor automatically.
- Once the motor was automatically restarted, the output frequency of the inverter is the target frequency, but the output voltage is zero. Then the voltage will be increased gradually to the expected voltage value. The period for voltage increasing is called ‘Restart cushion time (P.58)’.



- There are 4 digits in P.150, every digit have the different meaning, relevant positions as following:



Note: 1. When need restart function, P.150 must be set.
2. When the value of P.150 is not 0, default linear acceleration/deceleration curve.
3. The detection of rotation of P.150 is only to immediate frequency search.
4. This function is valid in V/F curve. It means P.300 must be set to 0.

4.26 Input Signal Filter Constant (P.60)

P.60 "Input signal filter constant"

- When the running frequency is set by a voltage signal or a current signal, the voltage/current signal would be processed by an A/D converter. Due to the effect of device accuracy or noises, the external voltage signal or current signal may fluctuate and thus the running frequency fluctuates.
- The 'Input signal filter constant setting P.60' is used to filter the fluctuation of the running frequency caused by the above factors. The larger the P.60 set value is, the better the filter performance, but larger delay is resulted in.

Parameter	Factory setting	Setting range	Remarks
60	31	0~31	---

4.27 Remote Control Function Selection (P.61)

P.61 "Remote setting function selection"

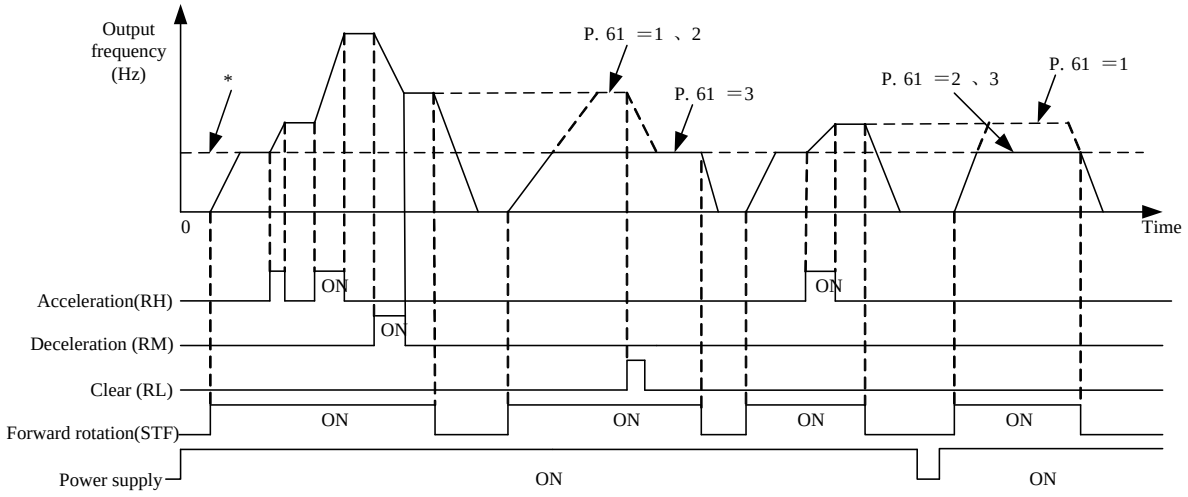
Related parameters

P. 1 " Maximum frequency "
P. 7 " Acceleration time "
P. 8 " Deceleration time "
P. 18 "High- speed maximum frequency "
P. 44 "The second acceleration time"
P. 45 "The second deceleration time"

- If the operation box is located away from the control box, you can use contact signals to perform continuous variable-speed operation, without using analog signals, when in 'external mode', 'combined mode 1' or 'combined mode 5'.

Parameter	Factory setting	Setting range	Remarks		
			Set value	Remote set function	Frequency setting storage function
61	0	0~3	0	No	---
			1	Yes	Yes
			2		No
			3		No (the remote setting frequency is cleaned out by STF/STR 'turn off')

4. Parameter description

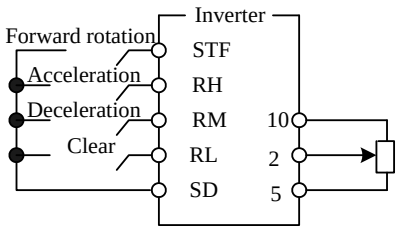


*external target frequency (except multi-speed) or PU target frequency

<Setting>

• Remote setting function

1. Whether the remote setting function is valid and whether the frequency setting storage function in the remote setting mode is used or not is selected by P.61.
   Set P.61=1~3 (remote setting function is valid), the function of terminals RM, RH and RL are changed to acceleration (RH), deceleration (RM) and clear (RL). As shown in the following Figure:



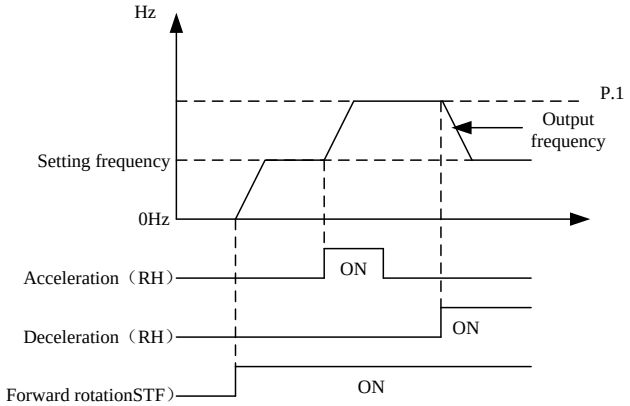
Wiring of remote control setting

2. During remote setting, the output frequency of the inverter is:
   (frequency set by RH/RM operation＋external set frequency other than multi-speeds/PU set frequency)

• Frequency setting storage function

1. The frequency setting storage function is to storage in memory (EEPROM) the remote-set frequency (frequency set by RH/RM operation). Once the power supply is cut off, then on, the inverter can start running again at the remote-set frequency (When P.61=1).
   <Frequency setting storage condition>
   (1). The frequency when the start signal (STF/STR) is ‘off’.
   (2). When the signals RH (acceleration) and RM (deceleration) are both ‘off’(‘on’), the remote-set frequency is storied each minute (The current frequency set value and the last frequency set value are compared each minute. If they are different, then the current frequency set value is written in the memory. If RL is on, write will not perform.).

Note: 1. The frequency can be varied by RH (acceleration) and RM (deceleration) between 0 and the maximum frequency. The upper limit of the setting frequency is the maximum frequency, shown as follows:



2. When the acceleration or deceleration signal is ‘on’, the output frequency acceleration/deceleration times are determined by P.7 (first acceleration time) and P.8 (first deceleration time) (When RT is ‘off’).
3. When P.44 ≠ 9999 (second acceleration time) and P.45 ≠ 9999 (second deceleration time), the acceleration/deceleration times are due to P.44, P.45.
4. When the start signal (STF/STR) is ‘off’, if RH (acceleration)/RM (deceleration) is ‘on’, the target frequency will also change.
5. When the start signal(STF/STR) becomes ‘off’ from ‘on’, or changing the frequency continually through RH/RM, please make the frequency setting storage function invalid (P.61=2,3).
6. If the frequency setting storage function is valid (P.61=1), the life of the EEPROM will be shorten because of frequent write frequency into the EEPROM.
7. Signals RH, RM and RL are determined by P.80~P.84, P.86. If the functions of the terminals are changed, other functions are likely to be affected. Please make sure the functions of the terminals before changing their functions.

4.28 Zero Current Detection (P.62, P.63)

P.62 “Zero current detection level”

P.63 “Zero current detection time”

Related parameters

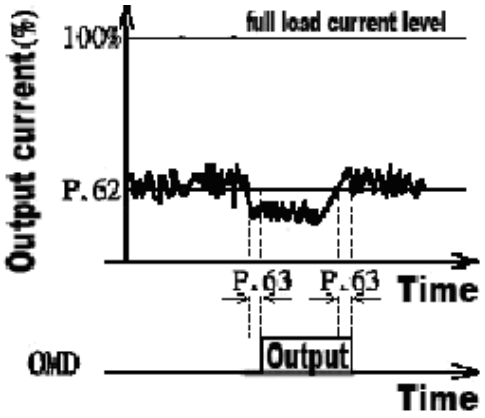
P.40 “Multi-function output terminal pattern”
P.85 “Function selection for multi-function relay”

Parameter	Factory setting	Setting range	Remarks
62	5%	0~200%, 9999	9999: function invalid
63	0.5s	0.05~1s, 9999	9999: function invalid

<Setting>

• Assume that the rated full-load current of the inverter is 20A, P.62=5% and P.63=0.5s, in this case if the output current is lower than 20×5%=1A for more than 0.5s, a signal(OMD) is output, which is depicted in the figure below.

4. Parameter description



• If the set value of P.62 or P.63 is 9999, the zero current detection is disabled.

Note: In this paragraph OMD is one of the function names of 'multi-function output terminal'. Please refer to P.40 for function selection and features, and section 2-5 for wiring.

4.29 Retry (P.65, P.67, P.68, P.69)

P.65 "Retry selection"

P.67 "Number of retries at alarm occurrence"

P.68 "Retry waiting time"

P.69 "Retry accumulation time at alarm"

- When an alarm occurs, the previous states before the alarm will be restored automatically. The phenomenon is called 'retry'.
- The Retry of the inverter is the conditional execution. For example, the first alarm occurs and the retry has been executed. Unfortunately, a second alarm occurs successively within P.68*5 seconds. Such a case is defined as 'continuous alarms'. In case the continuous alarms occur for more times than the pre-defined upper limit, a great malfunction is indicated, thus special measures should be taken manually. At this time, the retry will not be executed any more. The number of pre-defined times is called 'number of retries at alarm occurrence (P.67)'.
- If the alarm doesn't belong to 'Continuous alarm', the inverter can perform unlimited number of times reset.
- The period from the moment of alarm to that of retry is defined 'retry waiting time'.

Parameter	Factory setting	Setting range	Remarks
65	0	0~4	---
67	0	0~10	---
68	6s	0~360s	---

<Setting>

• When P.65=0, retry is invalid. When alarm occurs, the voltage output is stopped, the 'Alarm' lamp is lit, and all the inverter functions are disabled.

• When P.65=1, in case 'over-voltage between P-N' occurs, the voltage output is stopped. After a period of waiting time (the set value of P.68), the retry is executed.

- When P.65=2, once ‘over-current’ occurs, the voltage output is stopped. After a period of waiting time (the set value of P.68), the retry is executed.
- When P.65=3, in case ‘over-voltage or over-current between P-N’ occurs, the voltage output is stopped. After a period of waiting time (the set value of P.68), the retry is executed.
- When P.65=4, retry is effective. When alarm occurs, the voltage output is stopped. After a period of waiting time (the set value of P.68), the retry is executed.
- When P.67=0, Retry is invalid.
- When P.67≠0, given continuous alarm occurs for times within the pre-defined upper limit of P.67, retries will be valid. However, once the upper limit is exceeded, the retry is valid no more.
- For each time the retry occurs, the value of P.69 will be increased by 1 automatically, so the number of P.69 read from the memory just indicates the number of retry accumulation time at alarm.
- If P.69 is rewritten with 0, the number of retry executed is erased.

Note: The inverter will retry until the return wait time of P.68 is past. Therefore, this function is selected, the operator may cause danger, please be careful.

4.30 Brake Selection (P.71)

P.71 “Idling braking and linear braking selection”

Parameter	factory setting	Setting range	Remarks
71	1	0~1	---

<Setting>

- When P.71=0, it is now idling braking. The output of the inverter will terminate immediately after pressing STOP RESET, and the motor will be ‘racing’
- When P.71=1, it is now beeline brake. The output of the inverter will follow the acceleration/deceleration curve after pressing STOP RESET.

4.31 Carrier Frequency (P.72)

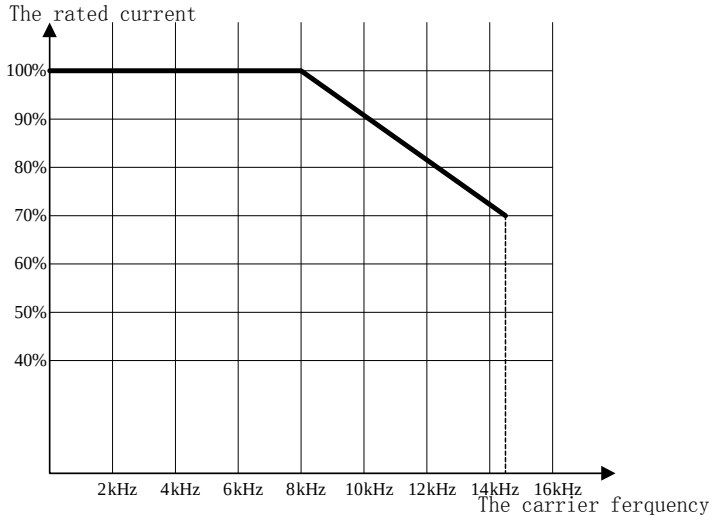
P.72 “Carrier frequency”

Parameter	Factory setting	Setting range	Remarks
72	5.0kHz	0.7~14.5kHz	---

<Setting>

- The higher the carrier frequency is, the lower the motor acoustic noise is. Unfortunately, greater leakage current and larger noises generated by the inverter are resulted in.
- The higher the carrier frequency is, the more energy is dissipated, and the higher the temperature of the inverter is.
- In case a mechanical resonance occurs in a system with the inverter, P.72 is helpful for improved the performance just by adjusting its value.

• When the carrier frequency is increasing, the rated current of the inverter will decrease in order to prevent the inverter being too hot and prolong the using life of IGBT, so it is necessary to take the protective measure. When the carrier frequency is 8 kHZ or smaller than it, the rated current of the inverter is 100%. The rated current of the inverter will decrease with the carrier frequency is increasing, and it will accelerate the heat accumulating in order to protect the inverter. The relation curve of the carrier frequency and the rated current is as figure below:



Note: 1. The optimum carrier frequency shall be over 8 times greater than the target frequency.

2. When selected sensorless vector control (P.300=3), the carrier frequency can set to 2kHz, 6kHz, 10kHz, 14kHz. If the setting value is less 6kHz, the carrier frequency is 2kHz; If the setting value is less than 10kHz, the carrier frequency is 6kHz; If the setting value is less than 14kHz, the carrier frequency is 10kHz; If the setting value is more than 14kHz, the carrier frequency is 14kHz.

4.32 Stop or Reset Function Selection (P.75)

P.75 “Stop or reset function selection”

Parameter	Factory setting	Setting range	Remarks
75	1	0, 1	---

<Setting>

• When P.75=0, it is only suitable for PU mode and H2 mode (combined mode 2). Pressing STOP RESET during running is used to stop the motor. Only at trouble state, we can press STOP RESET for 1.0s to reset the inverter, and then the inverter will show the power on state.

• When P.75=1, it is only suitable for the mode chosen. Pressing STOP RESET during running is used to stop the motor. Only at trouble state, we can press STOP RESET for 1.0s to reset the inverter, and then the inverter will show the power on state.

Note: 1. In normal or abnormal conditions, the reset can be executed by P.997.

2. There are two built-in program emulation thermally-accumulating relay, namely, 'electronic thermal relay' and 'IGBT module thermal relay'. Once reset occurs, the values of the two relay for 'electronic thermal relay' and 'IGBT module thermal relay' will be set to zero.

3. In any modes except External mode or H2 mode, when P.75=1, the motor can be stopped by pressing STOP RESET, then the inverter displays E0, and all the functions of the inverter are disabled. It can restart as follows:

(1). Terminate external STF/STR command (In programmed operation mode, there's no need to terminate the start signal. The inverter will continue to run at the section where it stopped after reset.)

(2). Press STOP RESET for 1.0s.

4.33 Parameters Write Protection (P.77)

P.77 "Parameters write protection"

Parameter	Factory setting	Setting range	Remarks
77	0	0~2	---

<Setting>

- If P.77=0, when the motor stops, all parameters except for P.125 and P.188 can be written, and when the motor runs, only P.4~P.6, P.24~P.27, P.54~P.56, P.77, P.131~P.138, P.142~P.149, P.190~P.199, P.230, P.232, P.288 and P.290 can be written.
- If P.77=1, when the motor runs, the parameter-writing is forbidden except P.77. When the motor stops, only P.77 and P.79 can be written.
- If P.77=2, when motor stops, all parameters except for P.125 and P.188 can be written, and when motor runs, only P.22, P.72, P. 78, P.79, P.125, P.155 and P.188 can not be written.

4.34 Forward/reverse Rotation Prevention Selection (P.78)

P.78 "Forward/reverse rotation prevention selection "

Parameter	Factory setting	Setting range	Remarks	
78	0	0~2	0	Forward rotation and reverse rotation are both permitted.
			1	Reverse rotation is prohibited (Press REV, the motor will stop).
			2	Forward rotation is prohibited (Press FWD, the motor will stop).

4.35 Operation Mode Selection (P.79)

P.79 "Operation mode selection"

Parameter	Factory setting	Setting range	Remarks	
79	0	0~8	0	'PU mode', 'external mode' and 'JOG mode' are valid and interchangeable.
			1	PU mode' and 'JOG mode' are active and interchangeable.
			2	Only 'external mode' is valid.
			3	Only communication mode' is valid.
			4	Only 'combined mode 1' is valid.
			5	Only 'combined mode 2' is valid.
			6	Only 'combined mode 3' is valid.
			7	Only 'combined mode 4' is valid.
			8	Only 'combined mode 5' is valid.

4. Parameter description

4.36 Multi-function Terminals Function Selection (P.80~P.84, P.86)

P.80~P.84, P.86 "Multi-function terminals function selection"

Para-meter	Termi nal	Factory setting	Setting range	Value	Function name	Function description	Remarks
80	M0	2	0~39	0	STF	In 'external mode', 'combined mode 1', or 'combined mode 3', when STF is 'on', the inverter runs forwards.	In programmed operation mode, it is used as start signal terminal.
				1	STR	In 'external mode', 'combined mode 1', or 'combined mode 3', when STF is 'on', the inverter runs reverse.	In programmed operation mode, it is used as pause signal terminal.
				2	RL	Multi-speed	Please refer to P.4~P.6
				3	RM	Multi-speed	
				4	RH	Multi-speed	Please refer to P.4~P.6
81	M1	3	0~39	5	AU	In 'external mode', 'combined mode 2'or 'combined mode 4', when AU is 'on', the inverter target frequency is set by the signal input across terminal 4-5.	Please refer to P.39
				6	OH	(Note 3)	
				7	MRS	When MRS is 'turned on', the output terminates.	
				8	RT	When RT is 'on', the characteristics are the same as the second function.	Please refer to P.44
				9	EXJ （External JOG）	In 'external mode', when EXJ is 'on'，the target frequency is set by P.15, the acceleration/ deceleration time is set by P.16 (Note 4).	

4. Parameter description

Para-meter	Termi nal	Factory setting	Setting range	Value	name	Function	Instruction
82	M2	4	0~39	10	STF+EXJ	Multiplexed function	The multiplexed function is the complex of several basic functions. It means that we can use one multiplexed terminal to realize several basic functions.
				11	STR+EXJ		
				12	STF+RT		
				13	STR+RT		
				14	STF+RL		
				15	STR+RL		
				16	STF+RM		
				17	STR+RM		
83	STF	0	0~39	18	STF+RH		
				19	STR+RH		
				20	STF+RL+RM		
				21	STR+RL+RM		
				22	STF+RT+RL		
				23	STR+RT+RL		
				24	STF+RT+RM		
				25	STR+RT+RM		
				26	STF+RT+RL+RM		
				27	STR+RT+RL+RM		
84	STR	1	0~39	28	RUN	In ‘external mode’, when RUN is ‘on’, the inverter runs.	
				29	STF/STR	In ‘external mode’, it is used with RUN. The inverter runs forwards when STF/STR is ‘on’, and runs reverse when STF/STR is ‘off’.	Run forward /reverse control signal
				30	RES	External Reset	Valid on when alarm occurs
				31	STOP	In ‘external mode’, it can be used as three-wire mode with RUN signal or STF/STR terminal. (note 4)	

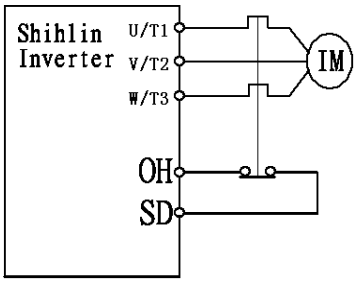
4. Parameter description

Para-meter	Termi nal	Factory setting	Setting range	Value	name	Function	Instruction
86	RES	30	0~39	32	REX	Multi-speed	
				33	PO	In 'external mode', when PO is 'on', programmed operation mode is chosen.	
				34	RES_E	When alarms occur, external Reset became effective	
				35	MPO	In 'external mode', when MPO is 'on', manually operation circle mode is chosen	
				36	TRI	When TRI is on, triangle Wave function is chosen	
				37	GP_BP	Automatic switchover frequency between inverter and commercial power-supply operation	
				38	CS	Manual swicth to commercial power-supply	
				39	STF/STR +STOP	In 'external mode', it is used with RUN. The inverter runs reverse when STF/STR is 'on', stop when STF/STR is 'off'. If you need runs forwards, you should RUN again.	

Note: 1. The default values are: P.80=2 (RL), P.81=3 (RM), P.82=4 (RH), P.83=0 (STF), P.84=1 (STR), P.86=30 (RES).

2. When changing the value of P.80~P.84, P.86, the function of the terminals is changed. For example, P.80=2 means that the function of M0 is RL, but if P.80=8, its function changes to RT, as a second function selection terminal, P.83=0 means that the STR terminal is chosen as running forward terminal, when P.83=6, its function changes to 'OH', it is then external thermal relay terminal.

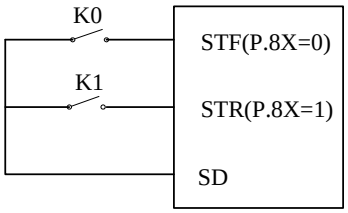
3. Wiring for external thermal relay (OH): In traditional wiring, a thermal relay is added to the motor to prevent the motor from being too hot. Its wring is on the right figure. When the external thermal relay is separated, the inverter will indicate alarm, and 'OHT' will be displayed on the screen.



4. There are 4 kinds of operating modes to drive the inverter ('1' means the terminal closes, '0' means the terminal opens, X=0,1,2,3,4,6):

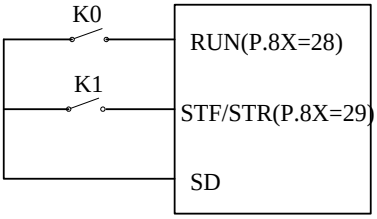
(1). two-wire control mode1:

K0	K1	Operating Instructions
0	0	Stop
1	0	Run Forward
0	1	Run Reverse
1	1	Stop

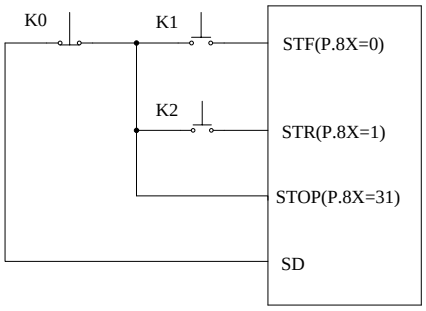


(2). two-wire control mode2:

K0	K1	Operating Instrnctions
0	0	Stop
0	1	Sop
1	0	Run Forward
1	1	Run Reverse

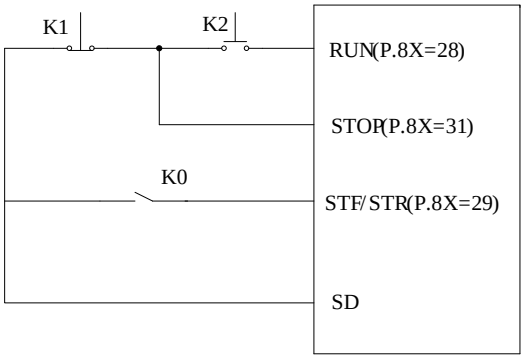


(3). three-wire control mode2 (with self maintaining function):K1: STOP signal, normally close. If it is open, the inverter will stop. K2: RNU signal, normally open, and the pulse signal are active.



(4). three-wire control mode2 (with self maintaining function):K1: STOP signal, normally close. If K1 opened, the inverter will stop. K2: RNU signal, normally open, and the pulse signal are active. If the external terminal corresponding related parameters settings for 39, when reversing, the motor will stop until you start again.

K0	Operating Instruction
0	Run Forward
1	Run Reverse



5. In external mode, when PO is ‘on’, the programmed operation mode is chosen. Terminal STF becomes the start signal. When STF is ‘on’, the inverter begins to run in programmed operation mode at the first section. When STF is ‘off’, the inverter stops running, and STR becomes the pause signal. When STR is ‘on’, the inverter pauses and continues to run at the section where the inverter paused when STR is ‘off’. For details, please refer to P.100, P.101~P.108, P.111~P.118, P.121~P.123 and P.131~P.138.
6. In external mode, when MPO is ‘on’, the manually operation circle mode is chosen. For details, please refer to P.100, P.101~P.108, P.111~P.118, P.121~P.123 and P.131~P.138.

4.37 Slip Compensation Coefficient (P.89)

P.89 "Slip compensation coefficient"

- We can make the speed of the motor, which runs with rated current, to be much closer to the setting speed by setting this parameter properly.
- This function is valid in V/F curve. It means P.300 must be set to 0.

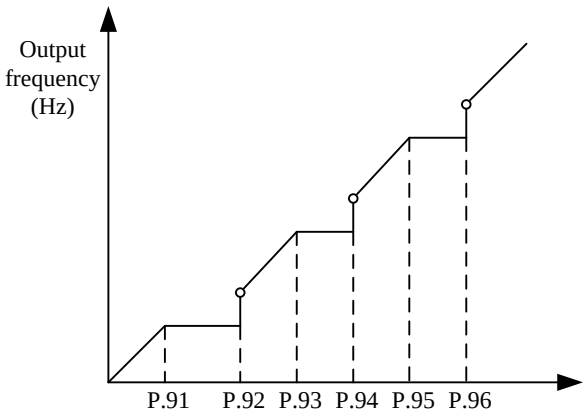
Parameter	Factory setting	Setting range	Remarks	
89	0	0~10	0	slip compensation is forbidden
			10	compensation value is 3% of the target frequency

4.38 Frequency Jump (P.91~P.96)

P.91~P.96 "Frequency jump"

- To avoid the system mechanical resonance frequency, 3 sets of jump frequencies are presented, namely, the first by P.91 and P.92, the second by P.93 and P.94 and the last by P.95 and P.96.

Parameter	Factory setting	Setting range	Remarks
91～96	9999	0~400Hz, 9999(Note 3)	9999, invalid



<Setting>

• For example: Suppose that P.91 = 45 and P.92 = 50

If the target frequency ≦ 45Hz, the steady output frequency = the target frequency.

If 45Hz < target frequency ≦ 50Hz, the steady output frequency = 45Hz.

If 50Hz < target frequency, the steady output frequency = the target frequency.

Note: 1. During acceleration/deceleration, the output frequency of the inverter will still pass through the jump frequency.

2. If P.91=9999 or P.92=9999, the first set of frequency jump is invalid.
If P.93=9999 or P.94=9999, the second set of frequency jump is invalid.
If P.95=9999 or P.96=9999, the third set of frequency jump is invalid.

3. If P.187=1, P.91~P.96 are in the range of 0~1000Hz.

4.39 Programmed Operation Mode (P.100~P.108, P.111~P.118, P.121~P.123, P.131~P.138)

P.100 "Minute/second selection"

P.101~P.108 "Runtime of each section"

P.111~P.118 "Acceleration/deceleration time of each section"

P.121 "Run direction in each section"

P.122 "Cycle selection"

P.123 "Acceleration/deceleration time setting selection"

P.131~P.138 "Frequency of each section"

Related parameters

P.7 "Acceleration time"
P.8 "Deceleration time"
P.21 "Acceleration/deceleration time increments"
P.80~P.84, P.86 "Multi-function terminals selection"

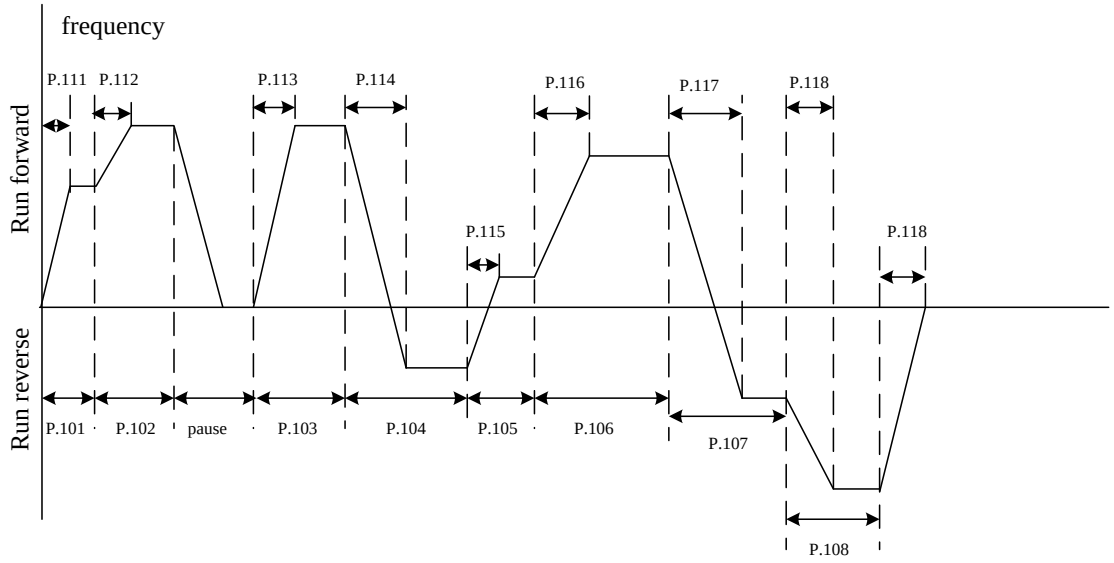
Parameter	Factory setting	Setting range	Remarks	
100	1	0, 1	0	The running time minimum increment is 1 minute.
			1	The running time minimum increment is 1 second.
101~108	0s	0~6000s	---	
111~118	0s	0~600s	When P.21=0	
		0~6000s	When P.21=1	
121	0	0~225	0: cycle function invalid; 1~8: run circularly	
122	0	0~8	---	
123	0	0, 1	---	
131~138	0 Hz	0~400Hz (Note 4)	---	

<Setting>

1. Programmed operation mode

• The calculation method of runtime and acceleration/deceleration time in each section is in the figure below:

4. Parameter description



• The run direction is set in binary form (8-bit), then translated to decimal form and stored in P.121. '1' means run forward, and '0' means run reverse. The highest bit is the run direction of section 8, and the lowest bit is the direction of section 1.

For example: Suppose that section 1: run forward, section 2: run reverse, section 3: run reverse, section 4: run forward, section 5: run reverse, section 6: run forward, section 7: run forward, section 8: run reverse, than the value in binary form is 01101001:

$$P.121=0\times27+1\times26+1\times25+0\times24+1\times23+0\times22+0\times21+1\times20=105$$

• When P.122=0, it won't run circularly.

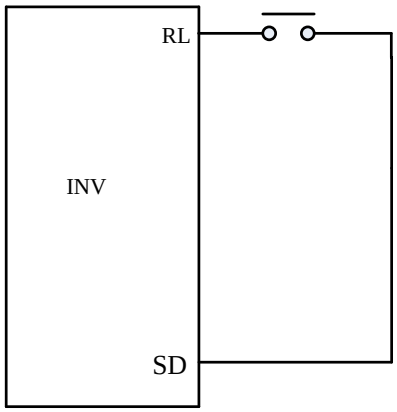
• When the value of P.122 is 1~8, it is the initialization section of the cycle running.

For example: When P.122=3, the inverter will run circularly from the third section to the eighth section after it finishes its running from the first section to the eighth section.

When P.123=0, the acceleration time is determined by P.7, and the deceleration time is determined by P.8.

When P.123=1, the acceleration time and deceleration time are both determined by P.111~P.118.

2. Manually operation circle mode

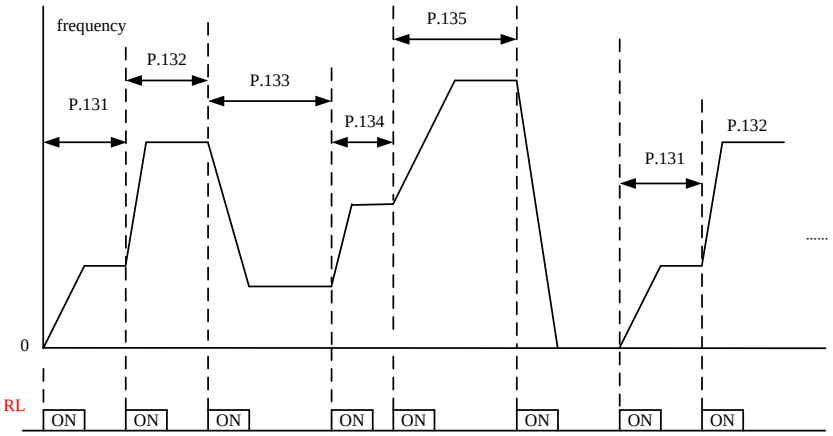


Manually operation circle mode terminals wiring pattern

• Between RL and SD, connect an impulse type switch.

• After power on, setting P.80=35 according to the terminals wiring, in this time, inverter is standby.

• The mode of operation is in the figure below:



Note: 1. The inverter will run the most 8 section, the frequency is determined by P.131~P.138

2. When the frequency is setting, if any section is 0, the inverter will run standby in this section. It means that in this mode the value of P.131 is not 0. Like the figure above, no matter how value of P.137 and P.138, when the press the switch sixth, the inverter will stop.
3. Manually operation circle mode has a single rotation direction. It has nothing to do with P.121 and STF or STR signal.
4. If P.187=1, P.131~P.138 are in the range of 0~1000Hz.

4.40 Operation Panel Monitoring Selection (P.110)

P.110 "Operation panel monitoring selection"

Parameter	Factory setting	Setting range	Remarks	
110	0	0, 1, 2	0	When the inverter starts, the operation panel enters the monitoring mode automatically, and the screen displays the output frequency.
			1	When the inverter starts, the screen of the operation panel displays the target frequency.
			2	When the inverter starts, the operation panel enters the monitoring mode automatically, and the screen displays the output frequency steady.

4.41 Expansion Board Function (P.125~P.130)

P.125 "Expansion board type"

P.126 "I/0 expansion board input terminal M3 function selection"

P.127 "I/0 expansion board input terminal M4 function selection"

P.128 "I/0 expansion board input terminal M5 function selection"

P.129 "I/0 expansion board output relay1 function selection"

P.130 "I/0 expansion board output relay2 function selection"

Parameter	Factory setting	Setting range	Remarks	
125	0	(Note)	---	
126	9999	0~39, 9999	0~39	The function is the same with 'multi-function control terminal'. For detailed description, please refer to P.80~P.84, P.86.
127	9999	0~39, 9999		
128	9999	0~39, 9999	9999	Function invalid
129	9999	0~10, 9999	0~10	The function is the same with multi-function output relay (ABC). For detailed description, please refer to P.85.
130	9999	0~10, 9999	9999	Function invalid

Note: 1. The value of P.125 indicates the type of the expansion board. 0: communication expansion board（include SE-CB01、SE-CB02、SE-CB03）, 1: I/O expansion board (SE-EB01), 2: current source expansion board (SE-IB01), 4. Profibus expansion board (SE-PD01), 6. DeviceNet expansion board (SE-DN01), 7: No expansion board. When there is any expansion board is connected to the main machine, the inverter will detect what kind of expansion board it is. If the first detection result is different from the next one; or they are the same, but not the three types referred, an alarm will be output, and the screen will display EbE. If no expansion board is detected, the corresponding parameters are forbidden to read or write, but they are restored to the default values when we read out P.998 or P.999 and rewrite in them.

2. On the details of the expansion board, refer to optional accessories of Appendix 5.

4.42 Zero-speed Function (P.151~P.152)

P.151 "Zero-speed control function selection"

P.152 "Voltage instruction at zero-speed control"

Related parameters

P.13 "Starting frequency"

●You must set the value of P13 is zero, when you use to this function.

Parameter	Factory setting	Setting range	Remarks	
151	0	0~1	0	There are no output when zero-speed
			1	Control by DC (Note 1)
152	5%	0~30%	(Note 2)	

Note: 1.The output mode selected by the value of P.151, when P.151 is 0 then there is no output, when P.151 is 1 then the value of P152 which is voltage output dc voltage as keep torque.

2. Suppose that P.152=6%, then the output voltage is P.19*6% when zero-speed.

3. This function is valid in V/F curve. It means P.300 must be set to 0.

4.43 Over Torque Detection (P.155~P.156)

P.155 "Over torque detection level"

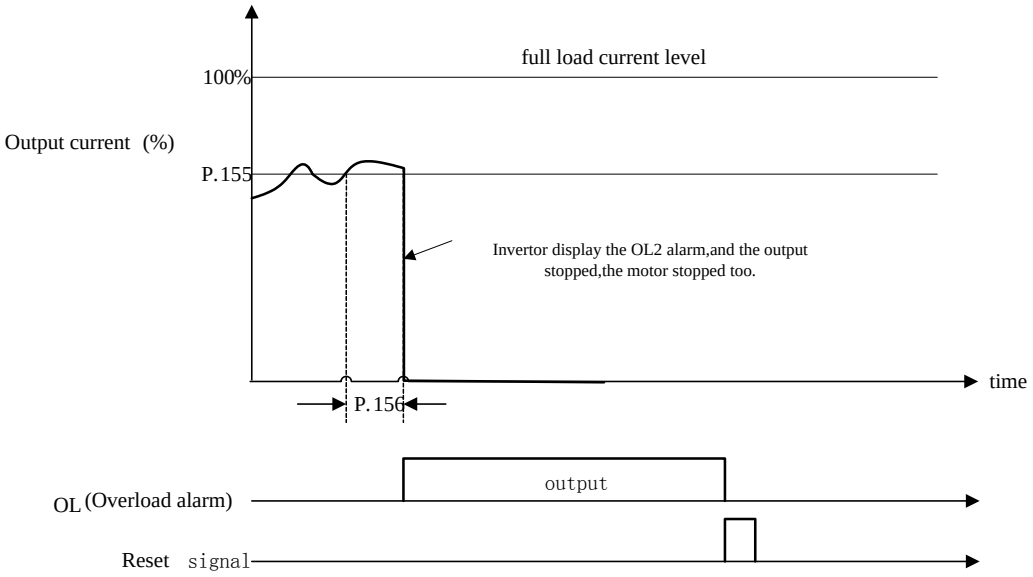
P.156 "Over torque detection time"

Related parameters

P.40 "Multi-function output terminal pattern"
P.85 "Function selection for multi-function relay"

- When the value of P.155 is not 0, the function of over torque detection is selection.
- When the output current is in excess of over torque detection level P.155 and over torque detection time P.156, the display screen of the inverter will display OL2 and the motor stop.

Parameter	Factory setting	Setting range	Remarks	
155	0%	0~200%	0	No detection of over torque
			0.1~200%	When over torque detection, OL2 alarm is display and the motor stop
156	1s	0~60s	---	



4.44 External Terminals Filter Adjusting Function (P.157)

P.157 "External terminals filter adjusting function"

Parameter	Factory setting	Setting range
157	4ms	0~200ms

• P.157 select response time to the signal of external terminal.

4.45 External Terminal Power Enable Function (P.158)

P.158 "External terminal power enable"

Parameter	Factory setting	Setting range
158	0	0~1

- If P.158=1， select the external terminal power enable function. At this situation, if the multi-function terminal function is STF, STR, RUN or MPO witch have been set, and opposite terminal is connected before the power on, the inverter will not run, you should connect the terminal again, the inverter will start running. If P.158=1 the terminal connected before the power on, if power on the inverter running immediately.

4.46 Energy-saving Control Function(P.159)

P.159 "Energy-saving control function"

Parameter	Factory setting	Setting range	Remarks
159	0	0	Normal running mode
		1	energy-saving running mode

- In the energy-saving running mode, the inverter will control the output voltage automatically in order to reduce the output power losses when the inverter is running.

Note: 1.After select the energy-saving running mode, the deceleration time is longer than the setting value probability. Also the regular torque load property will produce abnormal voltage easily, please setting the deceleration time longer.

2. This function is valid in V/F curve. It means P.300 must be set to 0.

3. Big load purposes or frequent deceleration machine, saving energy effect may not too good.

4.47 Multi-function Display (P.161)

P.161 "Multi-function display selection"

Parameter	Factory setting	Setting range	Remarks	
161	0	0~5	0	When in 'monitoring output voltage' mode, the screen will display the current output voltage value.
			1	When in 'monitoring output voltage' mode, the screen will display the current voltage between P and N.
			2	When in 'monitoring output voltage' mode, the screen will display operating condition Frd, rEu and StOP
			3	When in 'monitoring output voltage' mode, the screen will display the value of the input signal across terminal 2-5 (V).

Parameter	Factory setting	Setting range	Remarks	
160	0	0~5	4	When in ‘monitoring output voltage’ mode, the screen will display the value of the input signal across terminal 4-5 (mA/V).
			5	When in ‘monitoring output voltage’ mode, the screen will display the current thermal accumulating record for inverter.

4.48 PID Control (P.170~P.183)

P.170 “PID function selection”

P.171 “PID feedback control method selection”

P.172 “PID proportion Gain ”

P.173 “PID integration Gain ”

P.174 “PID differential Gain”

P.175 “Abnormal deviation level”

P.176 “Exception duration time”

P.177 “Exception handling mode”

P.178 “Sleep detects deviation”

P.179 “ Sleep detects duration time”

P.180 “Revival level”

P.181 “Outage level”

P.182 “Integral upper limit frequency”

P.183 “Deceleration step length with stable pressure”

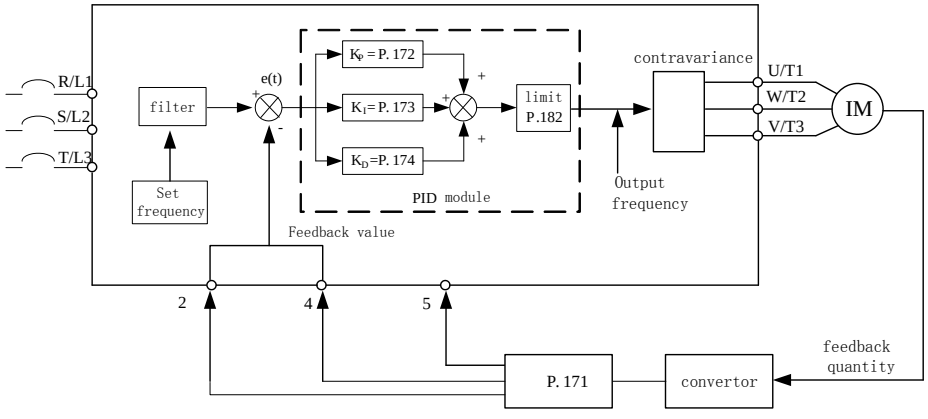
- During the operation of PID control, the frequency displayed on the screen is the output frequency of the inverter.
- The function of Stall Prevention operates according to the setting frequency before PID control. Please pay attention to the Gain setting during the process of PID Gain setting in case that the output current can not be limited absolutely.
- Under PID control, the output frequency is also limited between maximum frequency and minimum frequency.
- Please refer to the instructions of P.60 about the input signal filter on terminal 4-5 and terminal 2-5.
- The sketch map of PID function is as follows:

T_s: Sampling period＝10ms

Parameter	Factory setting	Setting range	Remarks	
170	0	0, 1, 2	0	When P.170 = 0, PID is forbidden
			1	When P.170 = 1, the feedback value is set by voltage which is from terminal 2-5
			2	When P.170 = 2, the feedback value is set by current which is from terminal 4-5
171	100%	0~1000%	---	

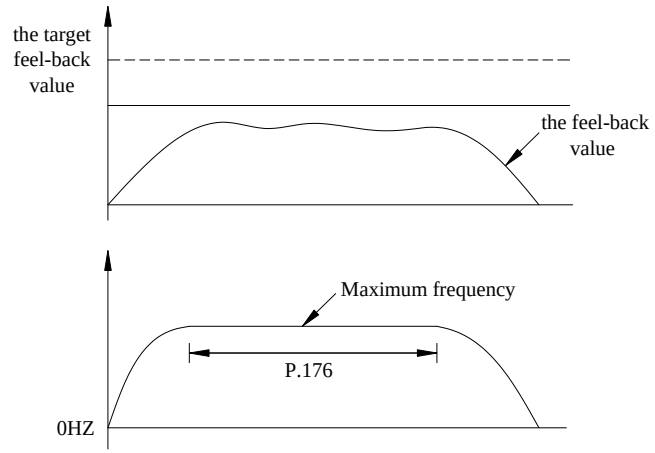
4. Parameter description

Parameter	Factory setting	Setting range	Remarks	
172	20	1~100	This gain determines the proportion controller's impact on feedback deviation. The greater the gain, the faster the impact. Yet a gain that is too big will cause vibration.	
173	1s	0~100s	This parameter is use to set integral controller's integral time. When the integral gain is too big, the integral effect will be too weak to eliminate steady deviation. When the integral gain is too small, the system vibration frequency will increase, and therefore the system may be unstable.	
174	0 ms	0~1000ms	This gain determines deviation controller's impact on the amount of change of the deviation. Appropriate deviation time can reduce the overshooting between the proportion controller and the integral controller. Yet when the deviation time is too large, system vibration may be induced.	
175	70%	0~100%	---	
176	0s	0~600s	---	
177	0	0, 1	0	Coast stop
			1	Deceleration stop
178	0	0~100%	---	
179	10s	0~255s	---	
180	90%	0~100%	---	
181	40Hz	0~120Hz (Note)	---	
182	50Hz	0~120Hz (Note)	P.189=1	When the deviation value accumulated with the integral time, an upper limit for deviation accumulation should be set.
	60Hz		P.189=0	
183	0.5Hz	0~10Hz (Note)	---	



● When the feedback value is lower than exceptional deviation level and continues for exceptional continuance time P.176, the PID is exceptional. At this time the screen will display P10E, and it will select freedom or brakes according to P.177.

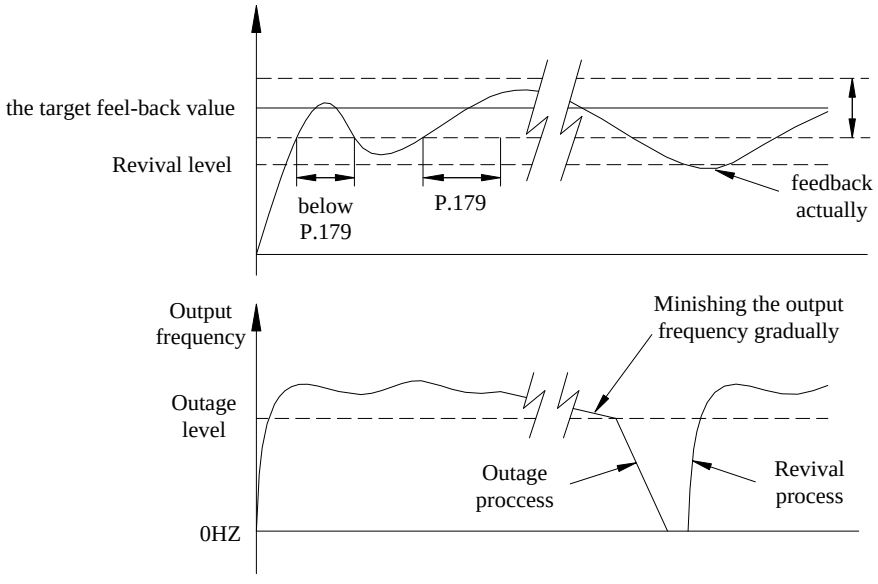
For example: when P.175=60%, P.176=30s, P.177=0, when the feedback value is lower than 60% of the target feedback value and continues for 30s, the screen will display P10E, and the inverter will select freedom stop.



• If P.178=0, the value of P.179, P.180 and P.181 is invalid. If the value of P.178 is not 0, the PID sleep function is selected. When absolute value which the feedback value minus the target feedback value is lower than sleep detect deviation and continues for sleep detect time P.179, the inverter will minish the output frequency gradually, when the output frequency is lower than outage level P.181, the inverter will brakes stop. When the feedback value is lower than revival level P.180, the output frequency of inverter will be controled by PID again.

For example: P.178=5%, P.179= 30s, P.180=90%, P.181=40Hz.

When the feedback value is larger than 95% of the target feedback value and is lower than 105% of the target feedback value, the inverter will minish the output frequency gradually after 10s. When the output frequency is lower than 40Hz, the inverter will brakes stop derictly. When the feedback value is lower than 90% of the target feedback value, the inverter will revive, and the output frequency of inverter will be controlled by PID again.

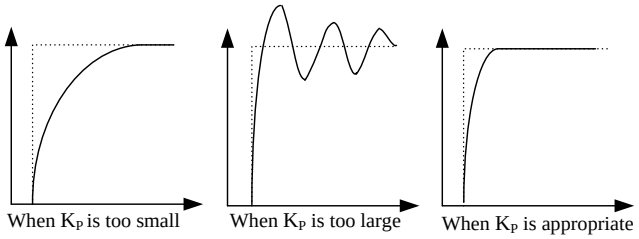


<Setting>

• PID gain easy setting:

(1)After changing target, response is slow **---Increase P-gain (K_P =P.172)**

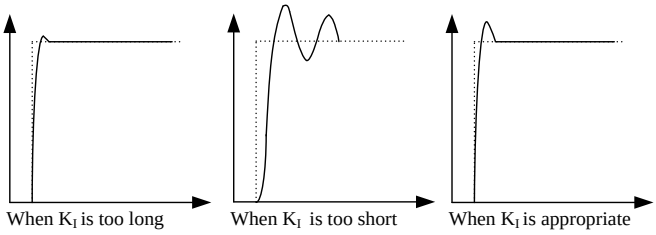
response is quick but unstable **---Decrease P-gain (K_P =P.172)**



(2)Target and feedback

do not become equal **---Decrease Integration time (K_I =P.173)**

become equal after unstable vibration **---Increase Integration time (K_I =P.173)**



(3)Even after increasing K_P, response is still slow **---Increase D-gain (K_D =P.174)**

It is still unstable **---Decrease D-gain (K_D =P.174)**

Note: If P.187=1, P.181 and P.182 are in the range of 0~1000Hz, P.183 is in the range of 0~100Hz.

4.49 4-5 Terminal Disconnection Handling (P.184)

P.184 "4-5 terminal disconnection handling"

Parameter	Factory setting	Setting range	Remarks
184	0	0~3	---

<Setting>

- When P.184 = 0, this function is useless, if the terminal 4-5 is disconnected, the inverter will slow down to 0Hz.
- When P.184 =1, if the terminal 4-5 is disconnected, the keyboard panel should be shown "AErr", the inverter will slow down to 0Hz. If connected the terminal 4-5 again, the alarm code will disappear, the inverter will be accelerated to the current corresponding to the frequency.
- When P.184 = 2, if the terminal 4-5 is disconnected, the keyboard panel should be shown "AErr", the inverter Immediately stop and needs to be reset.
- When P.184 = 3, if the terminal 4-5 is disconnected, the keyboard panel should be shown "AErr", the frequency which is before disconnect of the inverter is continuing operation, reconnect the line, the alarm disappears.

Note: When P.17=1, the terminal 4-5 is setting by current 4-5, this function will be useless.

4.50 Ultra-high-speed Operation Function (P.187)

P.187 "Ultra-high-speed operation function selection"

Parameter	Factory setting	Setting range	Remarks	
187	0	0, 1	0	Frequency-dependent parameters set the minimum unit of 0.01Hz.
			1	Frequency-dependent parameters set the minimum unit of 0.1Hz.

• A detailed explanation for P.187, please refer to Appendix 6, ultra-high-speed operation parameters for frequency.

4.51 Firmware version (P.188)

P.188 "Firmware version"

● Parameter is not writable and only readable.

4.52 Factory Setting Function (P.189)

P.189 "Factory setting function"

Parameter	Factory setting	Setting range	Remarks	
189	1	0, 1	0	Apply to the 60Hz system
			1	Apply to the 50Hz system

● The user can select the frequency witch factory setting is 50Hz or 60Hz according to the different power frequency and the frequency witch motor factory setting. Correlation parameter directions are in the chart below:

Parameter	Name	Setting range	Minimum setting unit
P.3	Base frequency	0~400Hz	0.01Hz
P.20	Acceleration/deceleration reference frequency	1~400Hz	0.01Hz
P.38	The maximum output frequency(the target frequency is set by the input signal across terminal 2-5/panel knob)	1~400Hz	0.01Hz
P.39	The maximum output frequency(the target frequency is set by the input signal across terminal 4-5)	1~400Hz	0.01Hz
P.55	Frequency display reference	0~400Hz	0.01Hz
P.66	Stall prevention operation reduction starting frequency	0~400Hz	0.01Hz
P.182	Integral upper limit frequency	0~120Hz	0.01Hz
P.195	Frequency corresponds to the maximum input voltage across the terminal 2-5.	0~400Hz	0.01Hz
P.197	Frequency corresponds to the maximum input voltage/current across the terminal 4-5.	0~400Hz	0.01Hz
P.305	Motor rated frequency	0~400Hz	0.01Hz

Note: 1. If the customer have some problem in adjusting the factory setting which in the chart above, deceleration time , output voltage, voltage signal and setting frequency will be affected probability

2. If the customer need to adjustment the factory setting to 60Hz, the step is below:
   (1). Setting P.189=0;
   (2).Setting P.998 to resume the factory setting (This time, the factory setting of interrelated parameter is 60Hz, P.189=0) Please refer to P.998 in section 4.
3. If the customers need to resume the 50Hz system, you should set P.189=1, then implement the step 2 in Note 2 (this time, the factory setting of P.189 is 1).
4. The minimum setting value, you can select P.187 to set. When P.187=1, the minimum setting value of the above parameters are 0.01Hz. When P.187=0, the minimum setting value of the above parameters are 0.1Hz.

4.53 Input Signal across Terminal 2-5 (P.192~P.195)

P.192"2-5 terminal minimum input voltage"

P.193"2-5 terminal maximum input voltage"

P.194"Frequency corresponds to the minimum input voltage of terminal 2-5"

P.195"Frequency corresponds to the maximum input voltage of terminal 2-5"

Related parameters

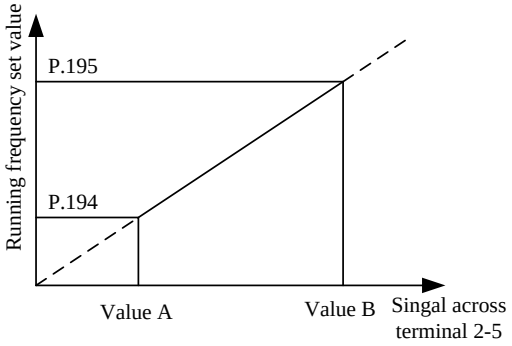
P. 73 "Voltage signal selection"
P.80~P.84, P.86
"Multi-function terminals selection"
P. 189 "Factory setting function"

Parameter	Factory setting	Setting range	Remarks
192	0	0~10	---
193	0	0~10	---
194	0 Hz	0~60Hz(Note4)	---
195	50Hz	0~400Hz(Note 4)	P.189=1
	60Hz		P.189=0

<Setting>

• Emendation steps:

1. Make sure that the voltage signal is correctly put in.
2. Assume that 'the input voltage equals Value A, and the expected output frequency is 20Hz. Then adjust the signal to Value A, and write 20 into P.194, also Value A will be write into P.192.
3. Assume that the input voltage equals Value B, and the expected output frequency is 60Hz. Then adjust the signal to Value B, and write 60 into P.195, also Value B will be write into P.193.



Note: 1. The equation for the above curve is:

$$\frac{\text{Running frequency-P.194}}{\text{Voltage value-Value A}} = \frac{\text{P.195-P.194}}{\text{Value B-Value A}}$$

2. If the user can not provide the actual stability of the signal input, you can manually set the parameters P.192 and P.193. The value of P.192 corresponds to the frequency which P.194 set. The value of P.193 corresponds to the frequency which P.195 set. When set the parameters manually, make sure the range of P.194 and P.195, and then adjust the voltage value of P.192 and P.193.
3. After any of P.192~P.195 is reset, the curve of P.38 is invalid.
4. If P.187=1, P.194 is in the range of 0~600Hz, P.195 is in the range of 0~1000Hz.

4.54 Input Signal across Terminal 4-5 (P.196~P.199)

P.196"Frequency corresponds to the minimum input current/voltage across terminal 4-5"

P.197"Frequency corresponds to the maximum input current/voltage across terminal 4-5"

P.198"Minimum input current/voltage across terminal 4-5"

P.199"Maximum input current/voltage across terminal 4-5"

Related parameters

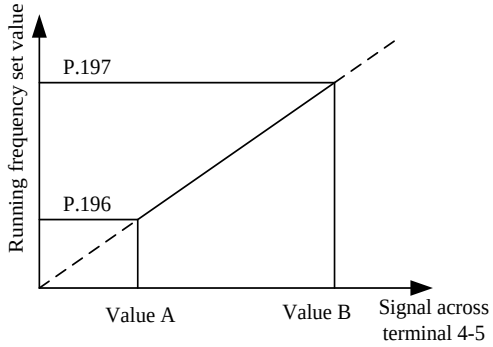
P.80~P.84, P.86 "Multi-function terminals selection"
P. 189 "Factory setting function"

Parameter	Factory setting	Setting range	Remarks
196	0 Hz	0~60Hz(Note5)	---
197	50Hz	0~400Hz(Note5)	P.189=1
	60Hz		P.189=0
198	0	0~20	---
199	0	0~20	---

<Setting>

• Emendation steps:

1. Make sure that the current signal is correctly put in.
2. Assume that the input current equals Value A, and the expected output frequency is 20Hz. Then adjust the signal to Value A, and write 20 into P.196, also Value A will be write into P.198.
3. Assume that the input current equals Value B, and the expected output frequency is 60Hz.Then adjust the signal to Value B, and write 60 into P.197, also Value B will be write into P.199.



Note: 1. The equation for the above figure is:

$$\frac{\text{Running frequency-P.196}}{\text{Current value-Value A}} = \frac{\text{P.197-P.196}}{\text{Value B-Value A}}$$

2. If the user can not provide the actual stability of the signal input, you can manually set the parameters P.198 and P.199. The value of P.198 corresponds to the frequency which P.196 set. The value of P.199 corresponds to the frequency which P.197 set. When set the parameters manually, make sure the range of P.196 and P.197, and then adjust the voltage value of P.198 and P.199.
3. After any of P.196~P.197 is reset, the curve of P.39 is invalid.
4. Select the Input signal across terminal 4-5, please refer to P.17.
5. If P.187=1, P.196 is in the range of 0~600Hz, P.197 is in the range of 0~1000Hz.

4.55 Backlash Compensation Function (P.229~P.233)

P.229 "Backlash compensation function selection"

P.230 "The backlash compensation acceleration interrupt frequency"

P.231 "The backlash compensation acceleration interrupt time"

P.232 "The backlash compensation deceleration interrupt frequency"

P.233 "The backlash compensation deceleration interrupt time"

Parameter	Factory setting	Setting range	Remarks
229	0	0~1	---
230	1Hz	0~400Hz(Note3)	---
231	0.5s	0~360s	---
232	1Hz	0~400Hz(Note3)	---
233	0.5s	0~360s	---

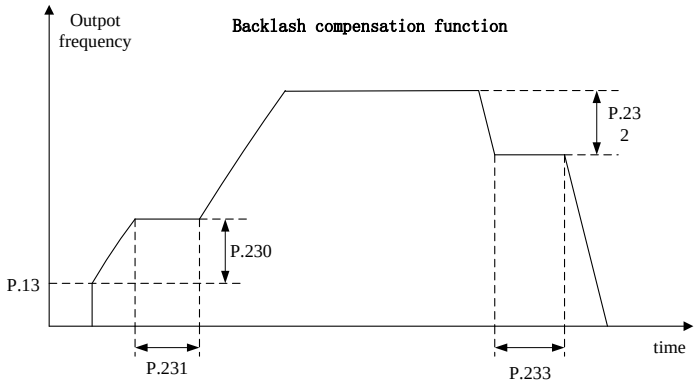
● **Backlash countermeasures**

What is the Backlash compensation?

Reduction gears have an engagement gap and have a dead zone between forward rotation and reverse rotation. This dead zone is called backlash, and this gap disables a mechanical system from following motor rotation.

More specifically, a motor shaft develops excessive torque when the direction of rotation changes or when constant-speed operation shifts to deceleration, resulting in a sudden motor current increase or regenerative status.

To avoid backlash, acceleration/deceleration is temporarily stopped. Set the acceleration/deceleration stopping frequency and time in P.229 to P.233.



Note: 1. When set a backlash compensation, acceleration /deceleration time only in part time longer.
2. This function is valid in V/F curve. It means P.300 must be set to 0.
3. If P.187=1, P.230 and P.232 are in the range of 0~1000Hz.

4.56 Triangular Wave Function (P.234~P.239)

P.234 “Triangular wave function selection”

P.235 “Maximum amplitude”

P.236 “Amplitude compensation for deceleration”

P.237 “Amplitude compensation for acceleration”

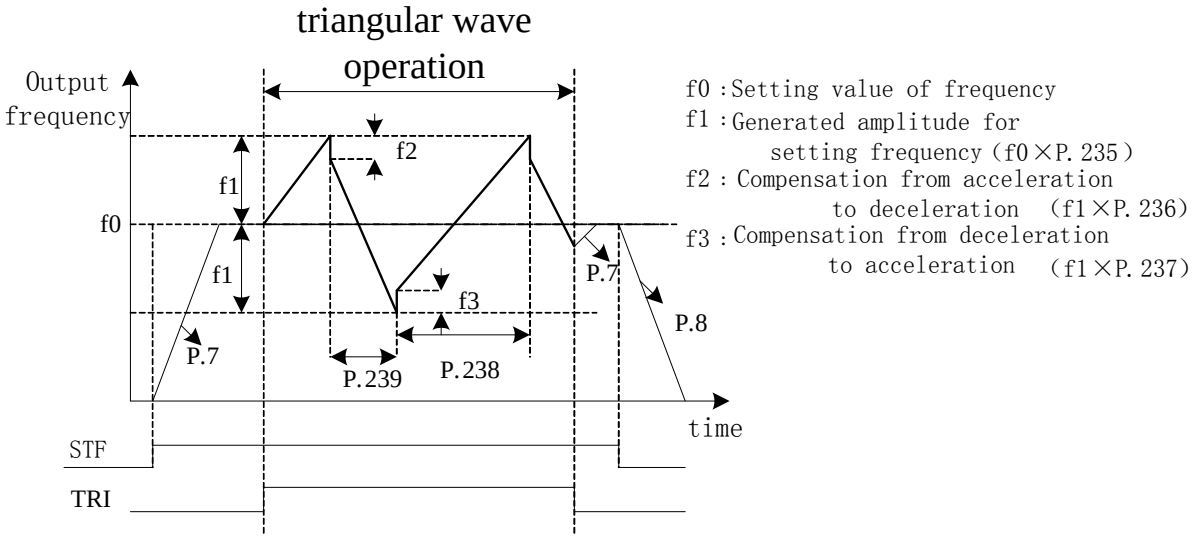
P.238 “Amplitude acceleration time”

P.239 “Amplitude deceleration time”

Parameter	Factory setting	Setting range	Remarks
234	0	0~2	---
235	10%	0~25%	---
236	10%	0~50%	---
237	10%	0~50%	---
238	10s	0~360s/0~3600s	If P.21=0, minimum increments of P.238 and P.239 is 0.01 seconds. If P.21=1, minimum increments of P.238 and P.239 is 0.1 seconds.
239	10s	0~360s/0~3600s	

<Setting>

- If the value of parameter P.234 is 1, and the signal is on, the triangular wave function is effective. Please set 36 to any parameter: P.80 ~P.84, P.86, P.126~P.128, corresponding external terminal assigned for TRI signal.
- If the value of parameter is 2, it means the triangular wave function is effective in anytime.



Note: 1.The output frequency will be limited by the maximum frequency and minimum frequency when the triangular wave function is effective.

2. If the amplitude compensation (P.236 or P.237) is too larger, over-voltage trip and stall prevention operation will automatically run, thus the inverter can not run according to the triangular wave function.

3. This function is valid in V/F curve. It means P.300 must be set to 0.

4.57 Auxiliary Frequency Function (P.240)

P.240 "Auxiliary frequency function selection"

Parameter	Factory setting	Setting range	Remarks
240	0	0~4	---

<Setting>

- When the value of P.240 is 0, auxiliary frequency function is not selected.
- When the value of P.240 is 1, operation frequency = basic frequency + auxiliary frequency (2-5),
- When the value of P.240 is 2, operation frequency = basic frequency + auxiliary frequency (4-5),
- When the value of P.240 is 3, operation frequency = basic frequency - auxiliary frequency (2-5),
- When the value of P.240 is 4, operation frequency = basic frequency - auxiliary frequency (4-5),
- When the operation frequency is less than P.2, the operation frequency should equal to P.2. When the operation frequency is more than P.1, the operation frequency should equal to P.1.

Note: Basic frequency is set by the target frequency reference source DU03B, communications or combination of multi-speed gears, or by 2-5、4-5 terminal.

4.58 DC Injection Brake Function before Starting (P.242~P.244)

P.242 "DC injection brake function before starting selection"

P.243 "DC injection brake time before starting"

P.244 "DC injection brake voltage before starting"

Related parameters

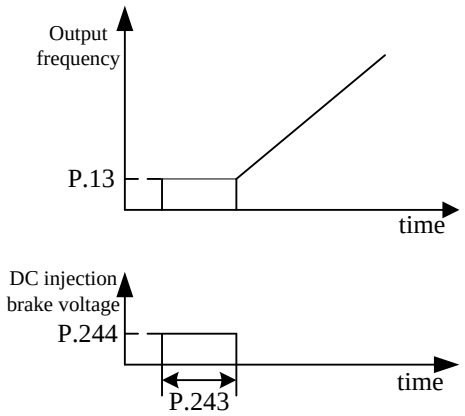
P.13 "Starting frequency"

Parameter	Factory setting	Setting range	Remarks
242	0	0~1	---
243	0.5s	0~60s	---
244	4%	0~30%	---

<Setting>

• If P.242=0, the DC injection brake function before starting is not selected. If P.242=1, the DC brake injection function before starting is selected. When the output frequency reached the starting frequency (P.13), a DC voltage (P.244) will be injected into the motor windings by the inverter, which is used to lock the motor rotor. The DC brake operation will last a period (the set value of P.243), the motor will start.

As shown as follows:



Note: This function is valid in V/F curve. It means P.300 must be set to 0.

4.59 Bypass-inverter Switchover Function (P.247~P.250)

P.247 "MC switchover interlock time"

P.248 "Start waiting time"

P.249 "Automatic switchover frequency from inverter to commercial power supply frequency"

P.250 "Automatic switchover frequency range from commercial power supply to inverter"

4. Parameter description

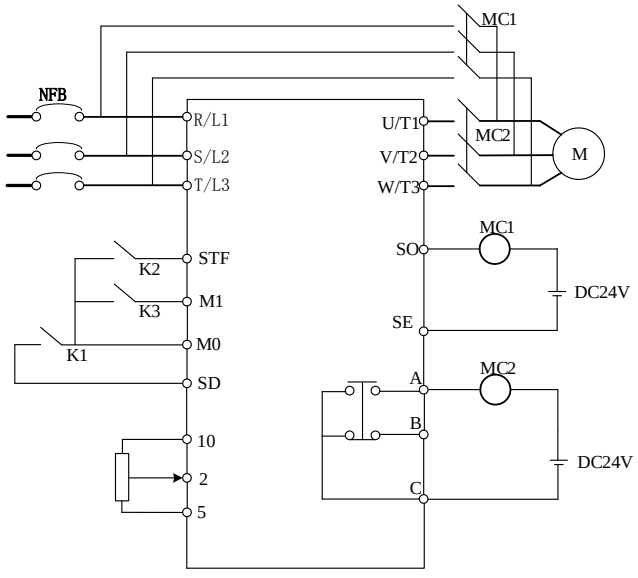
Parameter	Factory setting	Setting range	Remarks
247	1s	0.1~100s	---
248	0.5 s	0.1~100 s	---
249	9999	0~60Hz, 9999 (Note 4)	---
250	9999	0~10Hz, 9999 (Note 4)	---

<Setting>

- Set the frequency to switch inverter operation to bypass operation. Inverter operation is performed from a start until P.249 is reached, and when the output frequency is at or above P.249, inverter operation is automatically switched to bypass operation. If set 9999 to P.249, without automatic switchover.
- If the value of P.250 is not 9999, valid during automatic switchover operation (P.249≠9999). When the frequency command decreases below (P.249 - P.250) after operation is switched from inverter operation to bypass operation. The inverter automatically switches operation to inverter operation and operates at the frequency of frequency command. When the inverter start command (STF/STR) is turned off, operation is switched to inverter operation also.
- If the value of P.250 is 9999, valid during automatic switchover operation (P.249≠9999).When the inverter start command (STF/STR) is turned off after operation is switched from inverter operation to bypass operation, operation is switched to inverter operation and the motor decelerates to stop.

The wiring diagram:

The following is the representative wring diagram of switching the commercial power-supply operation. P.80 = 37, P.81 = 38, P.40 = 10, P.85 = 9.



Please pay attention to the capacity of the output terminals. The terminals which used are according to different settings for P.40 and P.85 (output terminal function selection).When the output terminal function selection is 10, connect the relay which drives the commercial power-supply operation. When the output terminal function selection is 9, connect the relay which drives the inverter operation. When the external input terminal function selection is 37, select the switching inverter to commercial power-supply operation. When the external input terminal function select 38, hand switching signal CS.

4. Parameter description

Warning:

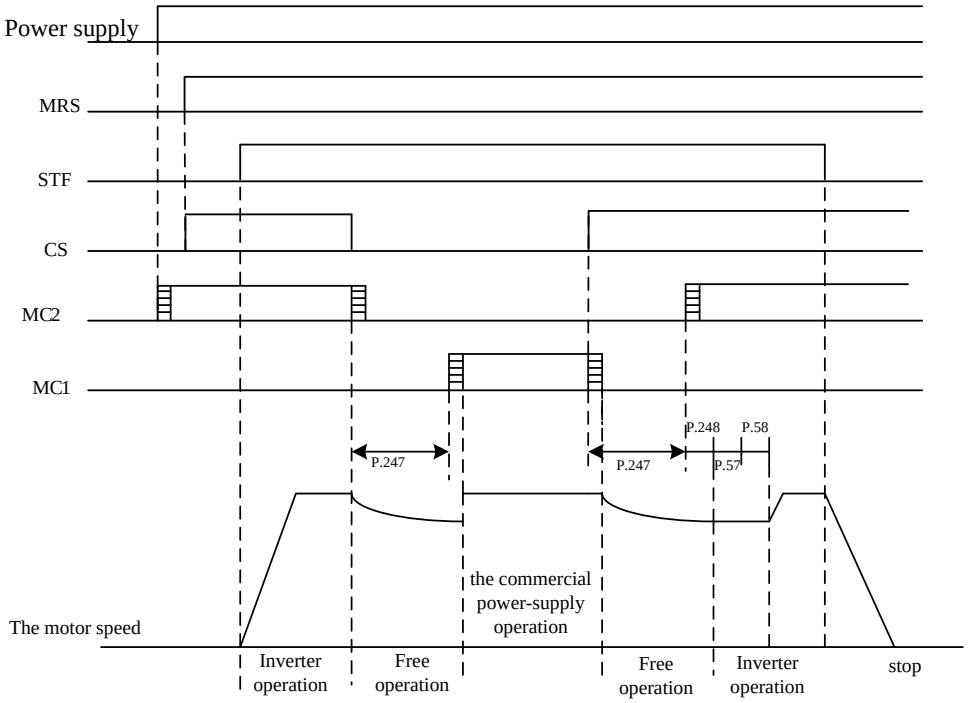
1. MC1 and MC2 must be mechanical interlock, the running direction of the inverter operation and the commercial power-supply operation should be consistent.

2. Bypass-inverter switchover function is effective in external mode.

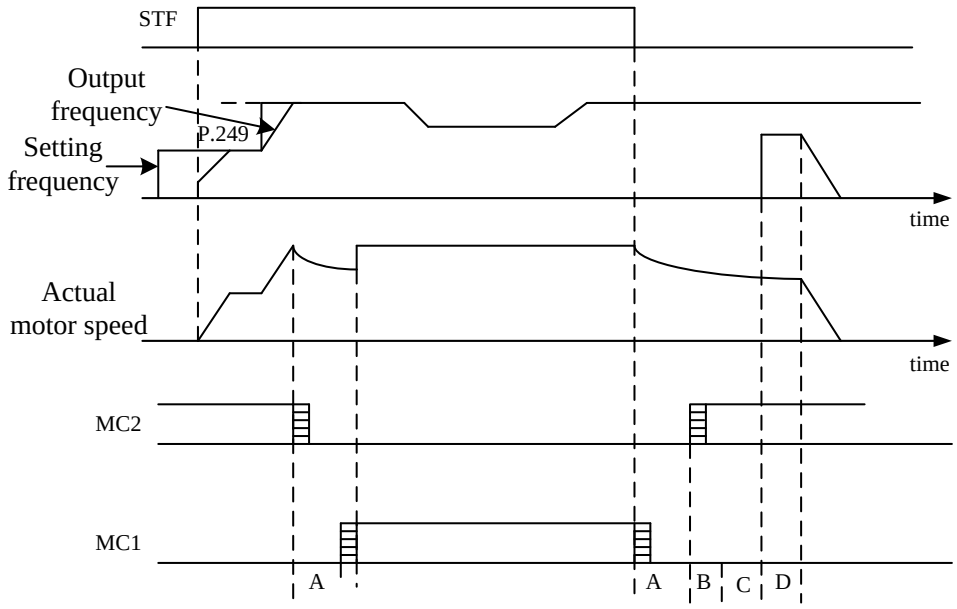
3. So long as the signal "CS" is on, STF or STR is available.

Sequence diagram of switching the commercial power-supply:

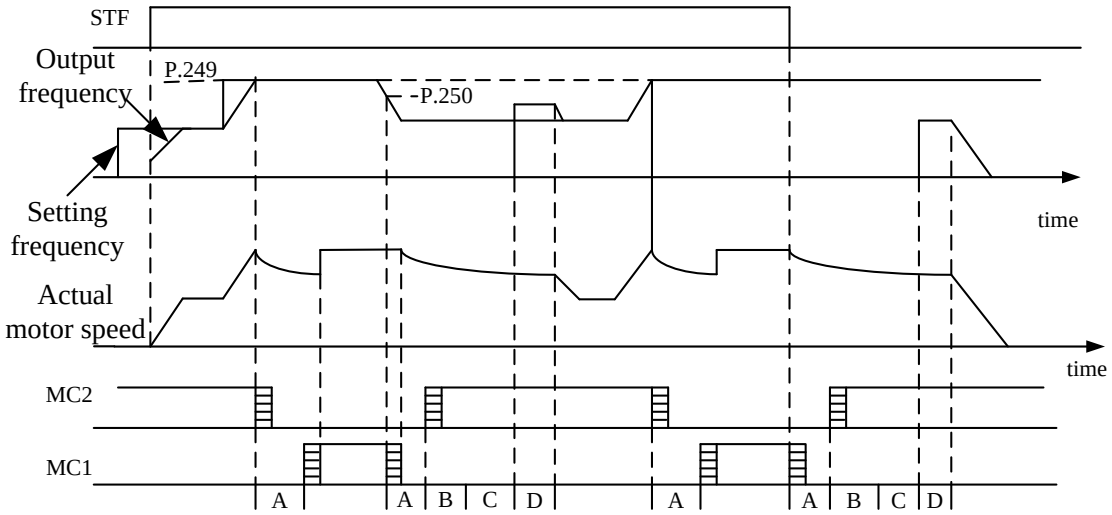
1. Action which has not automatic switching in order.



2. Action which has automatic switching in order (P.249≠9999, P.250=9999).



3. Action which has automatic switching in order (P.249≠9999, P.250≠9999).



When automatically switching, A is P.247, B is P.248, C is P.57 and D is P.58.

Note: 1. When the motor is operated at 60Hz (or 50Hz), more efficient operation can be performed by the commercial power supply than by the inverter. When the motor cannot be stopped for a long time for the maintenance/inspection of the inverter, it is recommended to provide the commercial power supply circuit.

2. To avoid commercial power supply being applied to the inverter output side when switching between inverter operation and commercial power supply operation, provide an interlock which the MC of the commercial power supply side turns on only when the MC of the inverter output side is off. Using the electronic bypass sequence function that outputs the timing signal for operation of the magnetic contactor, a complicated commercial power supply switchover interlock can be provided by the inverter.

3. This function is valid in V/F curve. It means P.300 must be set to 0.

4. If P.187=1, P.249 is in the range of 0~600Hz, P.250 is in the range of 0~100Hz.

4.60 Alarm History (P.288~P.291)

P.288 “Alarm code display option”

P.289 “Alarm code”

P.290 “The latest alarm status selection”

P.291 “The latest alarm message”

● The user can read these paragraph parameters to know the frequency, current, voltage and 12 alarm code which in front of this alarm code when alarm occurred. If execute P.996, this paragraph parameters will been clear.

4. Parameter description

Parameter	Factory setting	Setting range	Remarks
288	0	0~12	1~12 are the value of P.288 which are corresponding to abnormal number of alarm code E1~E12 the P.289 display.
289	0	---	
290	0	0~5	If P.290=1, P.291 correspond to display frequency for the latest alarm occurred. If P.290=2, P.291 correspond to display current for the latest alarm occurred. If P.290=3, P.291 correspond to display output voltage for the latest alarm occurred. If P.290=4, P.291 correspond to display the accumulation rate of temperature for the latest alarm occurred. If P.290=5, P.291*100 correspond to display busbar voltage for the latest alarm occurred.
291	0	---	

If the value of P.288 and P.290 are 0, P.289 and P.291will display 0 too.
The abnormal number of the alarm code:

Abnormal number	Alarm code	Abnormal number	Alarm code	Abnormal number	Alarm code	Abnormal number	Alarm code
00 (H00)	No alarm	33 (H21)	OV2	64 (H40)	EEP	144 (H90)	OHT
16 (H10)	OC1	34 (H22)	OV3	66 (H42)	PIDE	160 (HA0)	OPT
17 (H11)	OC2	35 (H23)	OV0	97 (H61)	OLS	192 (HC0)	CPU
18 (H12)	OC3	48 (H30)	THT	98 (H62)	OL2	193 (HC1)	CPR
19 (H13)	OC0	49 (H31)	THN	179 (HB3)	SCP	194 (HC2)	EBE
32 (H20)	OV1	50 (H32)	NTC	129 (H81)	AErr		

4.61 Accumulative Motor Operation Time Function (P.292, P.293)

P.292 “Accumulative motor operation time (minutes)”

P.293 “Accumulative motor operation time (days)”

Parameter	Factory setting	Setting range	Remarks
292	0 min	0~1439min	---
293	0 day	0~9999day	---

<Setting>

- P.292 means the minutes of accumulative motor operation, execute P.998, cut off the power, updated value cannot change the value of P.292.Only set 0 to P.292, can clear the accumulation of time.

• P.293 means the days, execute P.998, cut off the power, updated value cannot change the value of P.293.Only set 0 to P.293, can clear the accumulation of time.

4.62 Password Protection Function (P.294, P.295)

P.294 "Decryption parameter"

P.295 "Password setup"

Parameter	Factory setting	Setting range	Remarks
294	0	0~9998	---
295	0	2~9998	---

<Setting>

• P.294 is a parameter which can decrypt, after decryption succeed, the value of P.294 is 0. When P.295 is after setting a password-protected, P.294 enters the pre-set the password to unlock the password-protected parameter, then the parameters can modify.

• P.295 is a parameter which can set password. The password must be larger than 1, after succeeding to set password, the value of P.295 is 1, and after removing the password, the value of P.295 is 0. If the password was set, the parameters would not be changed except P.294, and can't execute P.998. After cutting off the power, the password also exists. Only when deciphering is successful, that parameters can be changed.

Note: If the password was forgotten, the inverter must return to factory to decipher.

4.63 Motor Control Mode (P.300, P.301)

P.300 "Motor control mode selection"

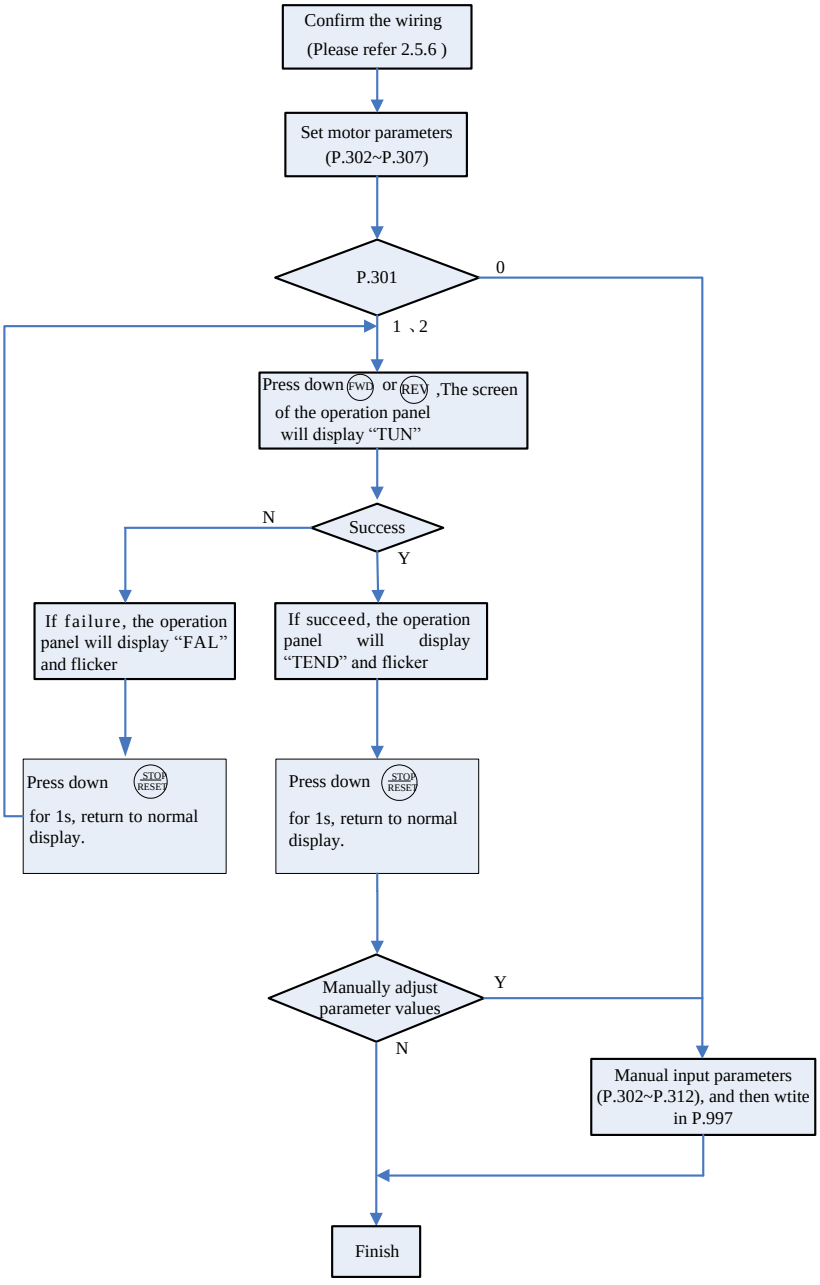
P.301 "Motor parameter auto-tuning function selection"

Parameter	Factory setting	Setting range	Remarks	
300	0	0~3	0	V/F control
			1	---
			2	Facility vector control
			3	Sensorless vector control
301	0	0~3	0	No motor parameter auto measurement function
			1	Motor parameter auto measurement function (Measured of the motor is running)
			2	Motor parameter auto measurement function (Measurement of the motor is not running)
			3	Online auto measurement function

4. Parameter description

<Setting>

- If P.300 = 0, the inverter have no motor parameter auto measurement function, to normal by V / F control operation.
- When select the facility vector control, please setting P.300 to 2. We can use this function to compensate the changes of the frequency when the load of the motor becomes heavier.
- If you need the motor parameter auto-tuning function, you must set P.301 to 1 or 2, then press down FWD or REV. The screen of the operation panel will display "TUN" and flicker when in measurement process. If the measurement is success, the operation panel will display "TEND" and flicker. If the measurement is failure, the operation panel will display "FAL" and flicker. Press down STOP RESET for 1s, return to normal display.
- The step of the motor parameter auto measurement as follow:



• If you need Sensorless vector control, you should set P.300 to 3.

Note: 1. Motor capacity and inverter capacity must be with grade or sub-grade.
2. If P.187=1, the sensorless vector control function is invalid.
3. To do auto measurement function, such as permitting motor rotation, set P.301 to 1 (Dynamic measurement), then it should be made load off the motor completely. Such as loading conditions don't allow the case which the motor rotation when Auto-tuning automatic measurement function, please set P.301 to 2 (Static measurement).
4. Sensorless vector control: measurement by automatic (Auto-tuning) function to enhance the control performance. Set the motor parameters or do auto measurement function before set P.300 to 3, in order to increase the control accuracy

4.64 Motor Parameter (P.302~P.312)

P.302 "Motor rated power"
P.303 "Motor poles"
P.304 "Motor rated voltage"
P.305 "Motor rated frequency"
P.306 "Motor rated current"
P.307 "Motor rated rotation speed"
P.308 "Motor excitation current"
P.309 "Stator resistance"
P.310 "Rotor resistance"
P.311 "Leakage inductance"
P.312 "Mutual inductance"

Parameter	Factory setting	Setting range	Remarks
302	0	0~160	---
303	4	0~8	---
304	220/440V	0~440V	---
305	50Hz	0~400Hz	P.189=1
	60Hz		P.189=0
306	Determined by horsepower	0~500A	---
307	1410r/min	0~9998 r/min	P.189=1
	1710 r/min		P.189=0
308	Determined by horsepower	0~500A	---
309	Determined by horsepower	0~9998	---
310	Determined by horsepower	0~9998	---
311	Determined by horsepower	0~9998	---
312	Determined by horsepower	0~9998	---

<Setting>

• If the motor and load can be completely disengaged, please select P.301=1, when the motor rotation, the motor parameters auto measurement, then press down FWD or REV, the inverter will automatically calculate the following parameters: P.308~P.312.

• If the motor and load can not be fully disengaged, please select P.301=2, when the motor stopped, the motor parameters auto measurement, then press down FWD or REV, the inverter will automatically calculate the following parameters: P.308~P.312.

• Users can also calculate two parameters according to the motor nameplates. Used in the calculation of the motor nameplate parameters: Rated voltage U, rated current I, rated frequency f and power factor η.

• Motor no-load excitation current calculation method and the motor mutual inductance are calculated as follows, including L6 for motor leakage inductance.

No-load excitation current: $I_0 = I \times \sqrt{1-\eta^2}$

Mutual inductance: $L_m = \dfrac{U}{2\sqrt{3} \cdot \pi \cdot f \cdot I_0} - L_6$

I_0 is the no-load excitation current，L_m is the mutual inductance，L_6 is the leakage inductance.

Note: 1. When the inverter and motor with different levels of use, please make sure the input parameters of the motor nameplate from P.302 to P.307. The vector control mode dependent on motor parameters strongly. If you need obtain good control performance, you must obtain the exact parameters of the controlled motor.

2. When any one or more parameters have been manually changed, please make a P.997 function, in order to reload new parameters values.

4.65 Speed Control Gain Adjustment (P.320~P.321)

P.320 “Speed control proportion coefficient”

P.321 “Speed control integral coefficient”

Parameter	Factory setting	Setting range	Remarks
320	100%	0~2000%	---
321	0.30s	0~20s	---

<Setting>

• P.320 set the speed control proportional gain. (The set value is set to a few bigger, for speed changing follow instructions will become better, the speed changing caused by external disturbance will be smaller.)

• P.321 set the speed control integration time. (Because of external disturbance to speed changes, the value will be set to be smaller, so that to reset time of the original speed is shorter.)

Note: 1. If use P.320 to improve the speed control gain, can improve the response time. But if the value is setting too high will produce vibration and noise.
2. Reduce the speed control integral coefficient P.321, the reset time of the speed variation is shorter, but if this value is too small, the overshoot will be produced.

4.66 Parameter Copy Function (P.994, P.995)

P.994 "Parameter copy readout"

P.995 "Parameter copy write-in"

● When set value into P.994, P.995, Motor rotation must be in a stop, this parameter value is only valid when P.77=0 and in PU mode. When using same parameters for several inverter value setting. Use P.994 and P.995 to perform duplication value to other inverter rapidly.

● Procedures of parameter copy:

1. When the first inverter is in PU mode, the value of P.994 is readout (the screen will display ) and then press "Write", at the same time the screen is flickering, it means that the parameter copy from inverter to operation panel is in process. When no more flickering on the screen is means the parameter copy is done.
2. When the second inverter is in PU mode, the value of P.995 is readout (the the screen display ) and then press "write" at the same time, then the screen is flickering it means the parameter copy from operation panel to inverter EEPROM is in process. When the screen is no more flickering, the parameter copy is done.

*** PU series operation panel need to purchase**

Note: 1. Regarding parameter copy function in P.994 and P.995, it is only available on SH-PU series of Inverters.
2. When parameter copy is in process, the value of P.0 to P.390 will be copied and duplicate into Digital Unit and inverter.

4.67 Alarm History Clear (P.996)

P.996 "Alarm history clear"

● Once P.996 is read out (after read out, the screen will display ) and rewritten in, all the abnormal event logs are erased.

4.68 Inverter Reset (P.997)

P.997 “Inverter reset”

- Once P.997 is read out (after read out, the screen will display rESr) and rewritten in, the inverter is reset. Once the inverter is reset, the values of the ‘electronic thermal relay’ and the ‘IGBT module thermal relay’ will be set to zero.

4.69 Parameter Initialization (P.998, P.999)

P.998 “Restoring all parameters to default values”

P.999 “Restoring some parameters to default values”

- Once P.998 is read out (after read out, the screen will display ALLC) and rewritten in, all parameters except P.21, P.125, P.187, P.188, P.189, P.292, P.293 will be restored to the default values.
- Once P.999 is read out (after read out, the screen will display Pr.Cr) and rewritten in, all parameters except P.21, P.125, P.187, P.188, P.189, P.192, P.194~P.197, P.292, P.293, P.300~P.312 will be restored to the default values.
- Please make sure that do not carry out any other operations before the screen displays End, which indicates that the corresponding parameters has been restored to the default values.

5. Inspection and Maintenance

In order to avoid the malfunction and security problems resulting from aging of the devices which is caused by environmental factors such as temperature, oil fog, dust, vibration, humidity and etc., 'daily inspection' and 'periodical inspection' are necessary.

Note: Only fully-qualified electrical professional personnel can carry out installation, wiring, dismounting and maintenance.

5.1 Daily inspection

1. Check whether the surrounding conditions are normal (including temperature, humidity, dust density and etc.) at the installment place.
2. Check whether the power supply voltage is normal (the voltages among R/L1, S/L2 and T/L3).
3. Check whether wiring is ok (whether the external wiring for the main-circuit board and the control-board terminal is loose).
4. Check whether the cooling system is abnormal (Whether there's any abnormal acoustic noise when operating. whether the wiring is ok.).
5. Check the indicating lamp (Whether the control-board indicating LED lamp, the operation panel indicating LED lamp and the operation panel screen LED are normal).
6. Check whether the expected performance is maintained.
7. Check whether there's any abnormal vibration, acoustic noise or smell during running.
8. Check whether there is liquid leaking from the filter capacitors.

5.2 Periodical inspection (during stop)

1. Check the connector and wiring (whether the connector and wiring between the main-circuit board and control board is ok).
2. Check whether components on the main-circuit board and the control board are overheated.
3. Check whether the electrolytic capacitors on the main-circuit board and control board have liquid leaking out.
4. Check the IGBT module on the main-circuit board.
5. Clean the dust and contaminants on the circuit board.
6. Check the insulation resistor.
7. Check whether the cooling system is abnormal (Whether the wiring is firm; clean the air filter, etc).
8. Check screws and belts.
9. Check the external wires and the terminal banks for damage.

5.3 Regular replacement of parts (components)

Items	The corresponding period for replacement	Description
Cooling fan	2 years	For the axle of a fan, the standard lifetime is about 10~35 thousand hours. With reference to the time of 24 hours one day, it is sure that the fan should be replaced every 2 years.

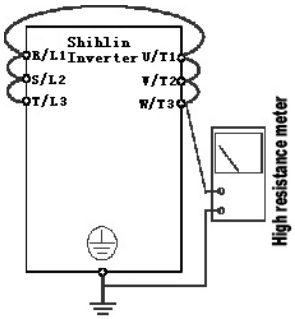
5. Inspection and Maintenance

Items	The corresponding period for replacement	Description
Filter capacitor	5 years	The filter capacitor is an electrolytic capacitor, and will deteriorate with time. The deterioration speed is contingent on the ambient conditions. Generally, it shall be replaced every 5 years.
Relay	---	If bad contact occurs, please replace it immediately.

Note: Please send the inverters to the factory when replacement of the parts is necessary.

5.4 Inverter insulation resistance measurement

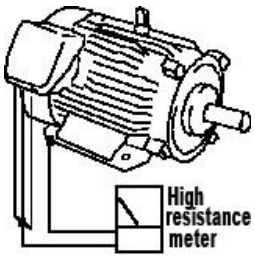
1. Before measurement, first dismount the 'wiring of the main-circuit terminals' and the 'control board'. Then execute wiring in the way of the right picture.
2. The measurement is only suitable for the main circuit. Such measurement is prohibited for control board terminals.
3. The value of the insulation resistance shall be greater than 5MΩ.



Note: Please do not carry out a high-voltage test, because the built-in semiconductor components will be damaged by such a test.

5.5 Motor insulation resistance measurement

1. Before measurement, please dismount the motor, and execute wiring in the way of the right figure.
2. The insulation resistance shall be greater than 5MΩ.



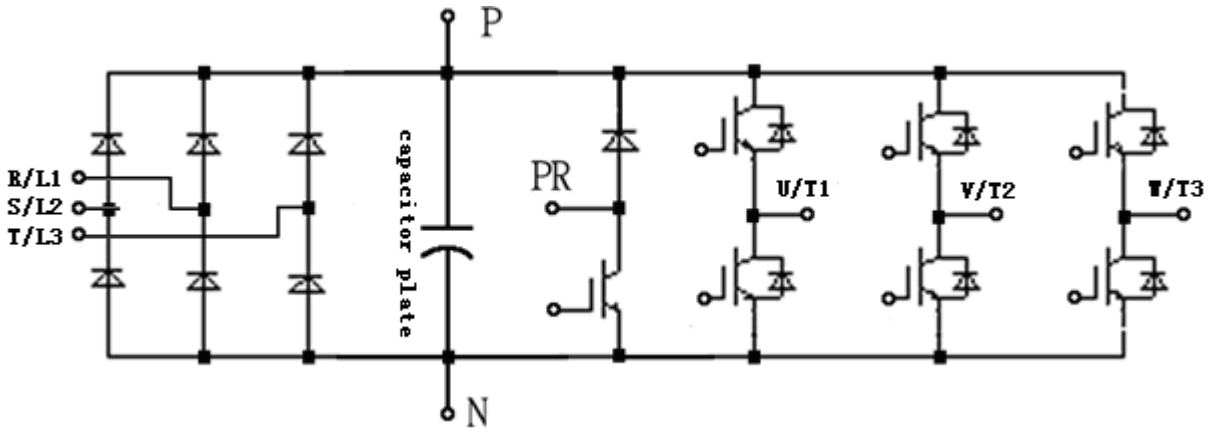
5.6 Motor insulation resistance measurement

Before check, first dismount the external wires for the main-circuit terminals. Then, set your multi-meter to the ohm-testing position.

	Positive voltage	Negative voltage	Normal result		Positive voltage	Negative voltage	Normal result
Terminal mark	R/L1	P	Conducting	Terminal mark	U/T1	P	Conducting
	S/L2	P	Conducting		V/T2	P	Conducting
	T/L3	P	Conducting		W/T3	P	Conducting
	P	R/L1	Not conducting		P	U/T1	Not conducting

5. Inspection and Maintenance

	Positive voltage	Negative voltage	Normal result		Positive voltage	Negative voltage	Normal result
Terminal mark	P	S/L2	Not conducting	Terminal mark	P	V/T2	Not conducting
	P	T/L3	Not conducting		P	W/T3	Not conducting
	R/L1	N	Not conducting		U/T1	N	Not conducting
	S/L2	N	Not conducting		V/T2	N	Not conducting
	T/L3	N	Not conducting		W/T3	N	Not conducting
	N	R/L1	Conducting		N	U/T1	Conducting
	N	S/L2	Conducting		N	V/T2	Conducting
	N	T/L3	Conducting		N	W/T3	Conducting



Appendix 1 Parameter list

Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.0	Torque boost	0~30%	0.1%	(Note 1)		P40
P.1	Maximum frequency	0~120Hz	0.01Hz	120Hz		P41
P.2	Minimum frequency	0~120Hz	0.01Hz	0Hz		P41
P.3	Base frequency	0~400Hz	0.01Hz	50Hz/60Hz (Note 2)		P41
P.4	Speed 1 (high speed)	0~400Hz	0.01Hz	60Hz		P43
P.5	Speed 2 (medium speed)	0~400Hz	0.01Hz	30Hz		P43
P.6	Speed 3 (low speed)	0~400Hz	0.01Hz	10Hz		P43
P.7	Acceleration time	0~360.00s/ 0~3600.0s	0.01s/0.1s	5s		P44
P.8	Deceleration time	0~360.00s/ 0~3600.0s	0.1s/0.01s	5s		P44
P.9	Electronic thermal relay capacity	0~500A	0.01A	Motors rated current (Note 1)		P46
P.10	DC injection brake operation frequency	0~120Hz	0.01Hz	3Hz		P46
P.11	DC injection brake operation time	0~60S	0.1S	0.5S		P46
P.12	DC injection brake operation voltage	0~30%	0.1%	4%		P46
P.13	Starting frequency	0~60Hz	0.01Hz	0.5Hz		P47
P.14	Load pattern selection	0~13	1	0		P48
P.15	JOG frequency	0~400Hz	0.01Hz	5Hz		P51
P.16	JOG acceleration / deceleration time	0~360.00s/ 0~3600.0s	0.1s/0.01s	0.5s		P51
P.17	Input signal across terminal 4-5 selection	0、1	1	0		P51
P.18	High-speed maximum frequency	120~400Hz	0.01Hz	120Hz		P41
P.19	Base frequency voltage	0~1000V, 9999	0.1V	9999		P41
P.20	Acceleration/deceleration reference frequency	1~400Hz	0.01Hz	50Hz/60Hz (Note 2)		P44
P.21	Acceleration/deceleration time increments	0,1	1	0		P44
P.22	Stall prevention operation level	0~400%	0.1%	200%		P52
P.23	compensation factor at level reduction	0~200%, 9999	0.1%	9999		P52
P.24	Speed 4	0~400Hz, 9999	0.01Hz	9999		P43

Appendix 1 Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.25	Speed 5	0~400Hz, 9999	0.01Hz	9999		P43
P.26	Speed 6	0~400Hz, 9999	0.01Hz	9999		P43
P.27	Speed 7	0~400Hz, 9999	0.01Hz	9999		P43
P.28	Output frequency filter constant	0~31	1	0		P53
P.29	Acceleration/deceleration curve selection	0, 1, 2	1	0		P53
P.30	Regenerative brake function selection	0, 1	1	0		P55
P.31	Soft-PWM selection	0、1	1	0		P55
P.32	Serial communication Baud rate selection	0, 1, 2	1	1		P56
P.33	Communication protocol selection	0, 1	1	0		P56
P.34	Reserved					
P.35	Reserved					
P.36	Inverter station number	0~254	1	0		P56
P.37	Speed display	0~5000r/min	0.1r/min	0 r/min		P71
P.38	The maximum operation frequency (the target frequency is set by the input signal of terminal 2-5)	1~400Hz	0.01Hz	50Hz/60Hz (Note 2)		P72
P.39	The maximum operation frequency (the target frequency is set by the input signal of terminal 4-5)	1~400Hz	0.01Hz	50Hz/60Hz (Note 2)		P76
P.40	Multi-function output terminal pattern	0~10	1	0		P77
P.41	Up-to-frequency sensitivity	0~100%	0.1%	10%		P79
P.42	Output frequency detection for forward rotation	0~400Hz	0.01Hz	6Hz		P80
P.43	Output frequency detection for reverse rotation	0~400Hz, 9999	0.01Hz	9999		P80
P.44	The second acceleration time	0~360.00s/ 0~3600.0s、9999	0.01s/0.1s	9999		P44
P.45	The second deceleration time	0~360.00s/ 0~3600.0s、9999	0.01s/0.1s	9999		P44
P.46	The second torque boost	0~30%, 9999	0.1%	9999		P40

Appendix 1 Parameter list

Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.47	The second base frequency	0~400Hz, 9999	0.01Hz	9999		P41
P.48	Data length	0, 1	1	0		P56
P.49	Stop bit length	0, 1	1	0		P56
P.50	Parity check selection	0, 1, 2	1	0		P56
P.51	CR & LF selection	1, 2	1	1		P56
P.52	Number of communication reties	0~10	1	1		P56
P.53	Communication check time interval	0~999.8s, 9999	0.1s	9999		P56
P.54	AM terminal function selection	0, 1	1	0		P80
P.55	Frequency display reference	0~400Hz	0.01Hz	50Hz/60Hz (Note 2)		P80
P.56	Current monitoring reference	0~500A	0.01A	Related output current		P80
P.57	Restart coasting time	0~30s, 9999	0.1s	9999		P82
P.58	Restart cushion time	0~60s	0.1s	10s		P82
P.59	Selection of frequency sources	0, 1	1	1		P72
P.60	Input signal filtering constant	0~31	1	31		P83
P.61	Remote setting function selection	0~3	1	0		P83
P.62	Zero current detection level	0~200%, 9999	0.1%	5%		P85
P.63	Zero current detection time	0.05~1s, 9999	0.01s	0.5s		P85
P.64	Reserved					
P.65	Retry selection	0~4	1	0		P86
P.66	Stall prevention operation reduction starting frequency	0~400Hz	0.01Hz	50Hz/60Hz (Note 2)		P52
P.67	Number of retries at alarm occurrence	0~10	1	0		P86
P.68	Retry waiting time	0~360s	0.1s	6s		P86
P.69	Retry accumulation time at alarm	0	0	0		P86
P.70	Special regenerative brake duty	0~30%	0.1%	0		P55

Appendix 1 Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.71	Idling braking and linear braking selection	0, 1	1	1		P87
P.72	Carrier frequency	0.7~14.5kHz	0.1kHz	5.0 kHz		P87
P.73	Voltage signal selection	0, 1	1	0		P72
P.74	Reversed					
P.75	Stop or Reset function selection	0~1	1	1		P88
P.76	Panel knob signal input frequency bias	0~400Hz	0.01Hz	0Hz		P72
P.77	Parameters write protection	0, 1, 2	1	0		P89
P.78	Forward/reverse rotation prevention selection	0, 1, 2	1	0		P89
P.79	Operation mode selection	0~8	1	0		P90
P.80	Multi-function terminal M0 function selection	0~39	1	2		P91
P.81	Multi-function terminal M1 function selection	0~39	1	3		P91
P.82	Multi-function terminal M2 function selection	0~39	1	4		P91
P.83	Multi-function terminal STF function selection	0~39	1	0		P91
P.84	Multi-function terminal STR function selection	0~39	1	1		P91
P.85	Function selection for multi-function relay	0~10	1	5		P77
P.86	Multi-function terminal RES function selection	0~39	1	30		P91
P.87	Reversed					
P.88	Reversed					
P.89	Slip compensation coefficient	0~10	1	0		P95
P.90	Reserved					
P.91	Frequency jump 1A	0~400Hz, 9999	0.01Hz	9999		P95
P.92	Frequency jump 1B	0~400Hz, 9999	0.01Hz	9999		P95
P.93	Frequency jump 2A	0~400Hz, 9999	0.01Hz	9999		P95
P.94	Frequency jump 2B	0~400Hz, 9999	0.01Hz	9999		P95
P.95	Frequency jump 3A	0~400Hz, 9999	0.01Hz	9999		P95

Appendix 1 Parameter list

Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.96	Frequency jump 3B	0~400Hz, 9999	0.01Hz	9999		P95
P.97	Reserved					
P.98	Middle frequency 1	0~400Hz	0.01Hz	3Hz		P48
P.99	Output voltage 1 of middle frequency	0~100%	0.1	10		P48
P.100	Minute/second selection	0, 1	1	1		P96
P.101	Runtime of section 1 in programmed operation mode	0~6000s	0.1s	0s		P96
P.102	Runtime of section 2 in programmed operation mode	0~6000s	0.1s	0s		P96
P.103	Runtime of section 3 in programmed operation mode	0~6000s	0.1s	0s		P96
P.104	Runtime of section 4 in programmed operation mode	0~6000s	0.1s	0s		P96
P.105	Runtime of section 5 in programmed operation mode	0~6000s	0.1s	0s		P96
P.106	Runtime of section 6 in programmed operation mode	0~6000s	0.1s	0s		P96
P.107	Runtime of section 7 in programmed operation mode	0~6000s	0.1s	0s		P96
P.108	Runtime of section 8 in programmed operation mode	0~6000s	0.1s	0s		P96
P.110	Operation panel monitoring selection	0, 1, 2	1	0		P98
P.111	Acceleration/deceleration time of section 1	0~600s/0~6000s	0.01s/0.1s	0s		P96
P.112	Acceleration/deceleration time of section 2	0~600s/0~6000s	0.01s/0.1s	0s		P96
P.113	Acceleration/deceleration time of section 3	0~600s/0~6000s	0.01s/0.1s	0s		P96
P.114	Acceleration/deceleration time of section 4	0~600s/0~6000s	0.01s/0.1s	0s		P96
P.115	Acceleration/deceleration time of section 5	0~600s/0~6000s	0.01s/0.1s	0s		P96
P.116	Acceleration/deceleration time of section 6	0~600s/0~6000s	0.01s/0.1s	0s		P96
P.117	Acceleration/deceleration time of section 7	0~600s/0~6000s	0.01s/0.1s	0s		P96

Appendix 1 Parameter list

Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.118	Acceleration/deceleration time of section 8	0~600s/0~6000s	0.01s/0.1s	0s		P96
P.119	Reserved					
P.120	Output signal delay time	0～3600s	0.1s	0s		P77
P.121	Run direction in each section	0~255	1	0		P96
P.122	Cycle selection	0~8	1	0		P96
P.123	Acceleration/deceleration time setting selection	0, 1	1	0		P96
P.125	Expansion board type	---	---	0		P98
P.126	I/O expansion board input terminal M3 function selection	0~39, 9999	1	9999		P98
P.127	I/O expansion board input terminal M4 function selection	0~39, 9999	1	9999		P98
P.128	I/O expansion board input terminal M5 function selection	0~39, 9999	1	9999		P98
P.129	I/O expansion board output relay1 function selection	0~10, 9999	1	9999		P98
P.130	I/O expansion board output relay2 function selection	0~10, 9999	1	9999		P98
P.131	Frequency of section 1	0~400Hz	0.01Hz	0Hz		P96
P.132	Frequency of section 2	0~400Hz	0.01Hz	0Hz		P96
P.133	Frequency of section 3	0~400Hz	0.01Hz	0Hz		P96
P.134	Frequency of section 4	0~400Hz	0.01Hz	0Hz		P96
P.135	Frequency of section 5	0~400Hz	0.01Hz	0Hz		P96
P.136	Frequency of section 6	0~400Hz	0.01Hz	0Hz		P96
P.137	Frequency of section 7	0~400Hz	0.01Hz	0Hz		P96
P.138	Frequency of section 8	0~400Hz	0.01Hz	0Hz		P96
P.139	Voltage signal bias	0%~100%	0.1%	0%		P72
P.140	Voltage signal gain	0.1%~200%	0.1%	100%		P72
P.141	Voltage signal bias direction and rotational direction setup	0~11	1	0		P72
P.142	Speed 8	0~400Hz	0.01Hz	0Hz		P43
P.143	Speed 9	0~400Hz, 9999	0.01Hz	9999		P43
P.144	Speed 10	0~400Hz, 9999	0.01Hz	9999		P43

Appendix 1 Parameter list

Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.145	Speed 11	0~400Hz, 9999	0.01Hz	9999		P43
P.146	Speed 12	0~400Hz, 9999	0.01Hz	9999		P43
P.147	Speed 13	0~400Hz, 9999	0.01Hz	9999		P43
P.148	Speed 14	0~400Hz, 9999	0.01Hz	9999		P43
P.149	Speed 15	0~400Hz, 9999	0.01Hz	9999		P43
P.150	Restart mode selection	0~221	1	0		P82
P.151	Zero-speed control function selection	0, 1	1	0		P99
P.152	Voltage instruction at zero-speed control	0~30%	0.1%	5%		P99
P.153	Communication error handling	0, 1	1	0		P56
P.154	Modbus communication data format	0~5	1	4		P56
P.155	Over torque detection level	0~200%	0.1%	0%		P100
P.156	Over torque detection time	0~60s	0.1s	1s		P100
P.157	External terminals filter adjusting function	0~200ms	1ms	4ms		P100
P.158	External terminal power enable	0、1	1	0		P101
P.159	Energy-saving control function	0、1	1	0		P101
P.160	Stall prevention operation level when restart	0~200%	0.1%	120%		P82
P.161	Multi-function display selection	0~5	1	0		P101
P.162	Middle frequency 2	0~400Hz、9999	0.01Hz	9999		P48
P.163	Output voltage 2 of middle frequency	0~100%	0.1%	0		P48
P.164	Middle frequency 3	0~400Hz、9999	0.01Hz	9999		P48
P.165	Output voltage 3 of middle frequency	0~100%	0.1%	0		P48
P.166	Middle frequency 4	0~400Hz、9999	0.01Hz	9999		P48
P.167	Output voltage 4 of middle frequency	0~100%	0.1%	0		P48
P.168	Middle frequency 5	0~400Hz、9999	0.01Hz	9999		P48
P.169	Output voltage 5 of middle frequency	0~100%	0.1%	0		P48
P.170	PID function selection	0、1、2	1	0		P102

Appendix 1 Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.171	PID feedback control method selection	0~1000%	1%	100%		P102
P.172	PID proportion Gain	1~100	1	20		P102
P.173	PID integration Gain	0~100s	0.1s	1s		P102
P.174	PID differential Gain	0~1000ms	1ms	0 ms		P102
P.175	Abnormal deviation level	0~100%	0.1%	70%		P102
P.176	Exception duration time	0~600s	0.1s	0s		P102
P.177	Exception handling mode	0、1	1	0		P102
P.178	Sleep detects deviation	0~100%	0.1%	0		P102
P.179	Sleep detects duration time	0~255s	0.1s	10s		P102
P.180	Revival level	0~100%	0.1%	90%		P102
P.181	Outage level	0~120Hz	0.01Hz	40Hz		P102
P.182	Integral upper limit frequency	0~120Hz	0.01Hz	50HZ/60Hz		P102
P.183	Deceleration step length with stable pressure	0~10Hz	0.01Hz	0.5Hz		P102
P.184	4-5 terminal disconnection handling	0~3	0	0		P105
P.187	Ultra-high-speed operation function selection	0~1	1	0		P106
P.188	Firmware version	---	---	---		P106
P.189	Factory setting function	0, 1	1	1		P106
P.190	AM output bias	0~1024	1	80		P80
P.191	AM output gain	0~1024	1	900		P80
P.192	2-5 terminal minimum input voltage	0~10	0.01	0		P107
P.193	2-5 terminal maximum input voltage	0~10	0.01	0		P107
P.194	Frequency corresponds to the minimum input voltage of terminal 2-5	0~60Hz	0.01Hz	0Hz		P107
P.195	Frequency corresponds to the maximum input voltage of terminal 2-5	0~400Hz	0.01Hz	50Hz/60Hz（Note2）		P107
P.196	Frequency corresponds to the minimum input current/voltage across terminal 4-5	0~60Hz	0.01Hz	0Hz		P108

Appendix 1 Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.197	Frequency corresponds to the maximum input current/voltage across terminal 4-5	0~400Hz	0.01Hz	50Hz/60Hz（Note2）		P108
P.198	Minimum input current/voltage across terminal 4-5	0~20	0.01	0		P108
P.199	Maximum input current/voltage across terminal 4-5	0~20	0.01	0		P108
P.229	Backlash compensation function selection	0~1	1	0		P109
P.230	The backlash compensation acceleration interrupt frequency	0~400Hz	0.01Hz	1Hz		P109
P.231	The backlash compensation acceleration interrupt time	0~360s	0.1s	0.5s		P109
P.232	The backlash compensation deceleration interrupt frequency	0~400Hz	0.01Hz	1Hz		P109
P.233	The backlash compensation deceleration interrupt time	0~360 s	0.1s	0.5s		P109
P.234	Triangular wave function selection	0~2	1	0		P110
P.235	Maximum amplitude	0~25%	0.1%	10%		P110
P.236	Amplitude compensation for deceleration	0~50%	0.1%	10%		P110
P.237	Amplitude compensation for acceleration	0~50%	0.1%	10%		P110
P.238	Amplitude acceleration time	0~360s /0~3600 s	0.01 s/0.1s	10 s		P110
P.239	Amplitude deceleration time	0~360s /0~3600 s	0.01 s/0.1s	10s		P110
P.240	Auxiliary frequency function selection	0~4	1	0		P111
P.242	DC injection brake function before starting selection	0~1	1	0		P112
P.243	DC injection brake time before starting	0~60s	0.1s	0.5s		P112
P.244	DC injection brake voltage before starting	0~30%	0.1%	4%		P112
P.247	MC switchover interlock time	0.1~100s	0.1s	1s		P112
P.248	Start waiting time	0.1~100s	0.1s	0.5s		P112

Appendix 1 Parameter list

Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.249	Automatic switchover frequency from inverter to commercial power supply frequency	0~60Hz,9999	0.01Hz	9999		P112
P.250	Automatic switchover frequency range from commercial power supply to inverter	0~10Hz,9999	0.01Hz	9999		P112
P.288	Alarm code display option	0~12	1	0		P115
P.289	Alarm code	---	---	0		P115
P.290	The latest alarm status selection	0~5	1	0		P115
P.291	The latest alarm message	---	---	0		P115
P.292	Accumulative motor operation time (min)	0~1439min	1min	0min		P116
P.293	Accumulative motor operation time (day)	0~9999day	1day	0day		P116
P.294	Decryption parameter	0~9998	1	0		P117
P.295	Password setup	2~9998	1	0		P117
P.300	Motor control mode selection	0~3	1	0		P117
P.301	Motor parameter auto-tuning function selection	0~3	1	0		P117
P.302	Motor rated power	0~160	0.01	0		P119
P.303	Motor poles	0~8	1	4		P119
P.304	Motor rated voltage	0~440V	1 V	220/440V		P119
P.305	Motor rated frequency	0~400Hz	0.01Hz	50Hz/60Hz（Note 2）		P119
P.306	Motor rated current	0~500A	0.01 A	Determined by horsepower		P119
P.307	Motor rated rotation speed	0~9998 r/min	1 r/min	1410/1710 r/min（Note 2）		P119
P.308	Motor excitation current	0~500A	0.01 A	Determined by horsepower		P119
P.309	Stator resistance	0~9998	0.01	Determined by horsepower		P119
P.310	Rotor resistance	0~9998	0.01	Determined by horsepower		P119
P.311	Leakage inductance	0~9998	0.1	Determined by horsepower		P119
P.312	Mutual inductance	0~9998	0.1	Determined by horsepower		P119

Appendix 1 Parameter list

Parameter number	Name	Setting range	Minimum setting unit	Default value	User setting value	Reference page
P.320	Speed control proportion coefficient	0~2000%	1%	100%		P120
P.321	Speed control integral coefficient	0~20s	0.01s	0.30s		P120
P.994	Parameter copy readout	Refer to Chapter 4	---	---	---	P121
P.995	Parameter copy write-in	Refer to Chapter 4	---	---	---	P121
P.996	Alarm history clear	Refer to Chapter 4	---	---	---	P121
P.997	Inverter reset	Refer to Chapter 4	---	---	---	P122
P.998	Restoring all parameters to default values	Refer to Chapter 4	---	---	---	P122
P.999	Restoring some parameters to default values	Refer to Chapter 4	---	---	---	P122

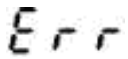
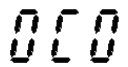
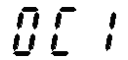
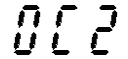
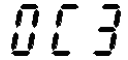
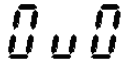
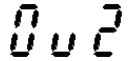
Note: 1.The torque boost, motor rated current and the stator resistance values are in the table as follows:

Inverter Type	P. 0	P. 9(A)
SE2-021-0.4KW	6	3.0
SE2-021-0.75KW	6	5.0
SE2-021-1.5KW	4	8.0
SE2-021-2.2KW	4	11.0
SE2-023-0.4KW	6	3.0
SE2-023-0.75KW	6	5.0
SE2-023-1.5KW	4	8.0
SE2-023-2.2KW	4	11.0
SE2-023-3.7KW	4	17.5
SE2-023-5.5KW	3	24.0
SE2-023-7.5KW	3	33.0
SE2-043-0.4KW	6	1.5
SE2-043-0.75KW	6	2.6
SE2-043-1.5KW	4	4.2
SE2-043-2.2KW	4	6.0
SE2-043-3.7KW	4	9.0
SE2-043-5.5KW	3	12.0
SE2-043-7.5KW	3	17.0
SE2-043-11KW	2	23.0
SE2-021-0.2KW	6	1.6

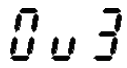
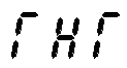
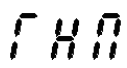
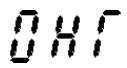
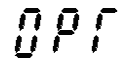
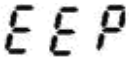
2. The default value is due to the set value of P.189. When P.189=0, the default value is 60Hz, which is applied to the 60Hz system. When P.189=1, when default value is 50Hz, which is apply to the 50Hz system.
3. The minimum value and setting range of all the frequency related parameters can choose by P.187. You can refer to Appendix 6 for details.

Appendix 2 Alarm Code List

Alarm Code

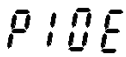
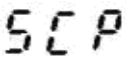
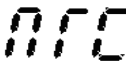
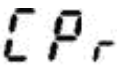
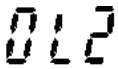
Code	Screen Display	Cause	Troubleshooting
ERR		1. Under-voltage for power supply 2. The RES is 'on' 3. Bad connection between the operation panel and main machine 4. Internal circuit malfunction 5. Wrong operation of CPU	1. Provide a normal power supply 2. Shut off RES 3. Ensure firm connection between the operation panel and the main machine 4. Replace the inverter 5. Restart the inverter
OC1 Over-current when stop		The output current is two times larger than the rated current of the inverter.	The inverter may be disturbed. Please restart the inverter. If the alarm repeated, please send the inverter back to the factory.
OC1 Over-current during acceleration			1. In case the time for acceleration or deceleration is too short, please prolong it. 2. Avoid abrupt increase of load. 3. Check Terminals U/T1, V/T2 and W/T3 for short circuit.
OC2 Over-current at constant speed			
OC3 Over-current during deceleration			
OV0 Over- voltage when stop		Over-voltage between Terminal P and Terminal N	Check whether the power supply is normal or abnormal.
OV1 Over-voltage during acceleration			1. In case the time for acceleration or deceleration is too short, please prolong it. 2. Check the brake resistor between terminal P and PR for loose connection. 3. Check whether the values of P.30 and P.70 are right or not.
OV2 Over-voltage at constant speed			

Appendix 2 Alarm Code List

Code	Screen Display	Cause	Troubleshooting
OV3 Over-voltage during deceleration		Over-voltage between Terminal P and Terminal N	Please refer to OV1, OV2.
THT The IGBT module is overheating		The IGBT module thermal accumulating relay acts	Avoid the inverter long timely operating under overload condition
THN Motor overheating		The electronic thermal relay operates	1. Check whether the set value of the P.9 is correct or not (the set value should comply the actual motor) 2. Reduce load
OHT The external thermal relay operates.		The external thermal relay operates	1. Check the capacity of the external thermal relay and the motor for matching. 2. Reduce the load
OPT Peripheral devices are abnormal		1. Abnormal communication. The maximum communication retry number is violated. 2. Interrupted communication. The maximum communication check time interval is violated.	Correctly set the communication parameters
EEP Memory is abnormal		The memory ROM fails	Send it back to the factory.
CPU CPU error		External electromagnetic disturbance is too strong	Improve external disturbance
OLS Stall prevention protection		The load of the motor is too heavy.	1. Reduce the load of the motor. Increase the value of P.22.

Appendix 2 Alarm Code List

Alarm Code

Code	Screen Display	Cause	Troubleshooting
PIDE PID abnormal		1. The capacity of inverter and motor is not enough. 2. Setting PID target value and feed-back value unreasonable 3. peripheral equipment failure	4. Exchange a larger capacity inverter and motor. 5. Check the value which setting of PID feedback signal Gain，setting the value again according to PID feed-back signal Gain. 3. Check whether the external feedback device (such as sensor, regulation resistance) and circuit is normal or abnormal.
SCP Over-current		The output current is two times larger than the rated current of the inverter.	Check Terminals U/T1, V/T2 and W/T3 for short circuit. (such as the motor wiring)
NTC The IGBT module is overheating		The temperature of IGBT module is too high	1. Reduce the environment temperature and improve the air condition 2. Check whether the fan of the inverter is damaged.
CPR CPU abnormal		CPU software abnormal	1. Check the wiring. 2. Check the parameter setting. 3. Improve external disturbance.
EbE Expansion board abnormal		The inverter's first auto detection result is different from the next one, or they are the same, but not the existing types of expansion board.	Check the connection between the expansion board and the main machine.
OL2 Over torque abnormal		1. Too heavy load of motor. 2. The setting value of P.155 and P.156 is unreasonable.	1. Alleviate the load of motor. 2. Adjustment the setting value of P.155 and P.156 properly

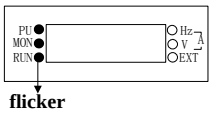
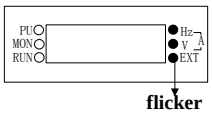
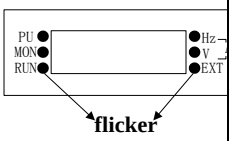
Note: 1. When the above alarms occur, the inverter will stop. Please deal with these alarms according to the methods mentioned above.

2. When the above alarms occur, the inverter will stop. Please deal with these alarms according to the methods mentioned above.

3. The abnormal number of alarm code can refer to page 118.

Appendix 3 Warning code list

Warning code

Code	Screen Display	Cause	Troubleshooting
Current stall		When the output current is larger than Stall prevention operation level, the three lights on the left side of the screen flicker, indicating that the inverter is in current stall mode. In this case the motor may not run smoothly.	1. Check if the values of P.22, P.23, and P.66 are proper. 2. Check if the values of P.7 and P.8 are too small.
Voltage stall		When the voltage between P and N is too high, the three lights on the right side of the screen flicker, indicating that the inverter is in voltage stall mode. Then the motor may not run smoothly.	1. Add a brake resistor between P and PR. 2. Check if the values of P.7 and P.8 are too small
LV Low voltage		Input voltage is low.	Supply with the normal voltage
LT motion		When the output current is more than twice the rated current, but it doesn't reach the stall level, all the six lights on both side of the screen flicker, indicating that the inverter is in LT mode. Then the motor may not run smoothly.	1. Please increase the acceleration/decelerati on time in case of abrupt acceleration/decelera-t ion. 2. Avoid abrupt load increasing. 3. Check whether there is short circuit among U/T1,V/T2 and W/T3.

Note: The above phenomenon is to show the working state of the inverter, and the inverter will not stop. To get around the above troubles, please adjust the parameters properly or check the power supply and load carefully.

Appendix 4 Troubles and Solutions

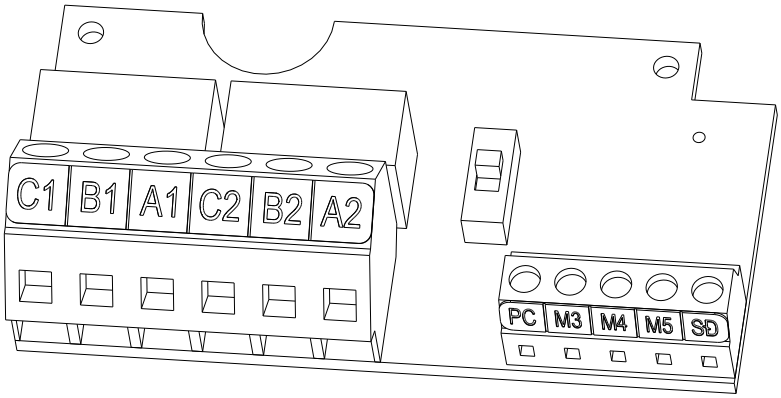
Trouble	Check points	
Motor remains stopped	Check the Main circuit	• Check that a proper power supply voltage is applied. • Check that the Power Lamp is lit. • Check that the motor is connected properly.
	Check the load	• Check that the load is not too heavy. • Check that the shaft is not locked.
	Check the parameter settings	• Check that the starting frequency (P.13) setting is not greater than the target frequency. • Check that the operation mode (P.79) setting is correct. • Check that the maximum frequency (P.1) is not set to 0. • Check that the reverse rotation prevention (P.78) is not selected. • Check that the bias and gain (P.194~P.197) setting is correct. • Check that the frequency jump (P.91~P.96) setting is correct.
	Check the control circuit	• Check that the output stop signal (MRS) is not on. (The related parameter is P.80~P.84, P.86.) • Check that the reset signal (RES) is not on. (The related parameter is P.80~P.84, P.86). • Check that the external thermal relay does not operate. • Check that the ALARM lamp is off and the reset is not executed. • Check that voltage/current start signal is input. • Check that the signal STF/STR is correct.(The related parameter is P.80~P.84, P.86.) • Check that wiring for the control circuit is ok.
Motor rotates in opposite direction	• Check that the phase sequence of output terminals U/T1, V/T2 and W/T3 is correct. • Check that the start signals (STF and STR) are connected properly.	
Speed does not increase.	• Check that the load is not too heavy. • Check that the stall prevention level (P.22) setting is correct. • Check that the torque boost (P.0) setting is correct. • Check that the maximum frequency (P.1) setting is correct.	
Acceleration/ deceleration is not smooth	• Check that the acceleration/ deceleration time (P.7, P.8) settings are not too short. • Check that the acceleration/ deceleration pattern (P.29) setting is correct. • Check that the voltage/current input signal is affected by noises.	
Motor current is large	• Check that the load is not too heavy. • Check that the torque boost setting is not too large. • Check whether the torque boost (P.0) is set too large.	
Speed varies during operation	• Check that the frequency setting signal is not affected by noise. • Check that the load is not varying. • Check that the wiring length for the main circuit is correct.	

Appendix 5 Optional equipment

1. Expansion board (Please according to the choose expansion board and the function to set the parameter from P.126 to P.130)

(1). I/O expansion board（SE-EB01）

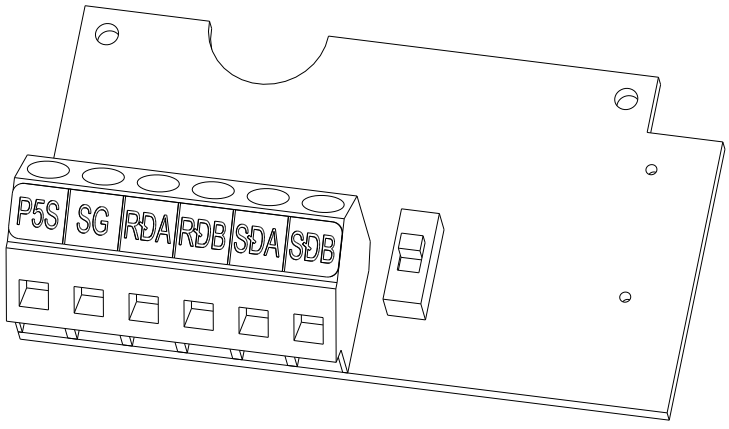
3 On-off signal input and 2 Relay output can be expanded, shown as follows:



Terminal type	Terminal name	Function name	Remarks and function description
On-off signal input	M3	Optional	For detailed descriptions, please refer to P.126~P.128 in Chapter 4.
	M4	Optional	
	M5	Optional	
	SD	SD	Common reference Ground for M3, M4 and M5.
	PC	PC	In the 'source input' mode, it provides a common power supply for the terminals referred above.
Relay output 1	A1	---	Normally, points A-C are always open-circuit; points B-C are always 'short-circuit'. These terminals are multi-function relay output. For detailed description, please refer to P.129~P.130. (Note) Contactor capacity: VDC30V / VAC230V – 0.3A
	B1	---	
	C1	---	
Relay output 2	A2	---	
	B2	---	
	C2	---	

(2). Terminal block communication expansion board（SE-CB01）

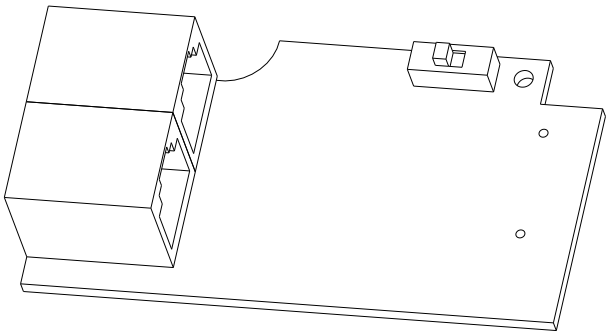
RS485/422 serial communication, both Shihlin protocol and Modbus protocol can be selected, Shown as follows:



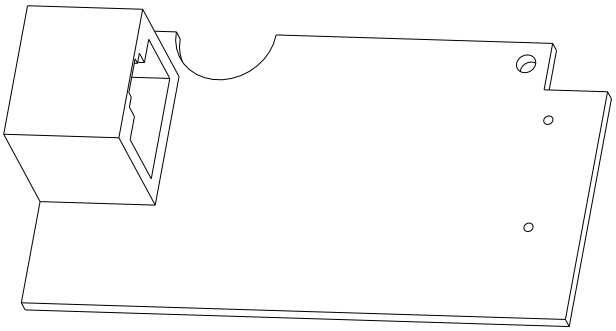
Appendix 5 Optional equipment

Terminal type	Terminal name	Function name	Remarks and function description
485 communication terminal	SDA	SDA	RS485/422 serial communication terminal
	SDB	SDB	
	RDA	RDA	
	RDB	RDB	
	P5S	P5S	5V Source
	SG	SG	5V Ground

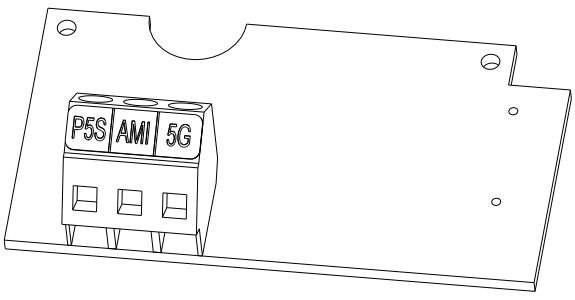
(3). Communication expansion board for RJ-11 connector (SE-CB02)
There are two RJ-11 connectors on the board, please use them with the corresponding transmission cable.



(4). Communication expansion board for RJ-45 connector (SE-CB03)
This communication expansion board use CBL cable to connect DU01.



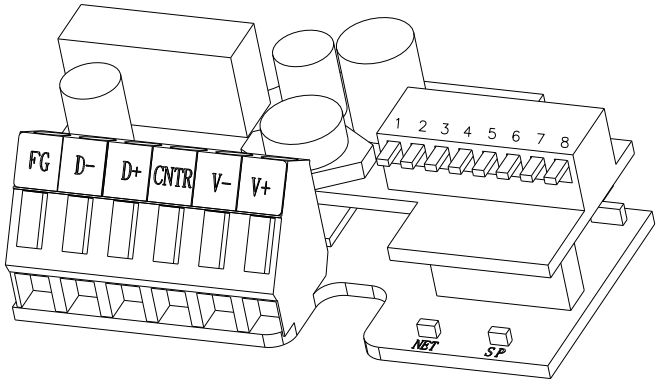
(5). 4~20mA current source expansion board (SE-IB01)



Appendix 5 Optional equipment

Terminal type	Terminal name	Function name	Remarks and function description
Analog signal output	AMI	---	Connected with an external analog meter to indicate the output frequency or current.
	P5S	P5S	5V Source
	5	5	5V Ground

(6). Profibus communication expansion board (SE2-PD01)



1). SE2-PD01 meets EN50170 standards, using profidrive DPV0 standards.
2). SE2-PD01 as a slave for Profibus network, the maximum rate of communication to support 12M.
3). SE2-PD01 using a common terminal form to connect profibus network, addresses is from 1 to 125.
4). Connect SE2-PD01, please use the unshielded twisted pair RS-485 cable (recommended PROFIBUS approved cable).
5). SE2-PD01 power is supplied by the inverter which connected to it.

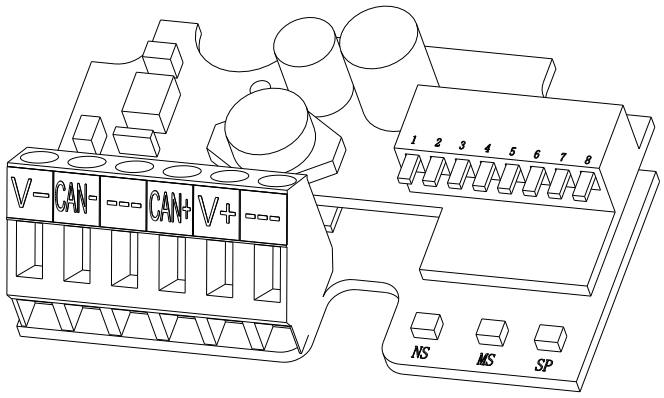
Terminal type	Terminal name	Function name	Remarks and function description
Profibus communication terminal	FG	SHIELD	Shield ground
	D-	RxD/TxD- N	Profibus Data -
	D+	RxD/TxD- P	Profibus Data +
	CNTR	RTS	Profibus request signal
	V-	Data reference potential (C)	5V Ground and reference Ground for data
	V+	+5V	5V Source

SP LED: Instructed the inverter and SE2-PD01 connection status.
NET LED: Instructed SE2-PD01 and the Profibus DP network connection status.

Note: The shihlin inverter can automatically identify the SE2-PD01 communications expansion board, and adjust the corresponding parameters of its own with the SE2-PD01 to make a successful connection, the user in the course of communication do not modify the drive parameters, so as not to affect the SE2-PD01 normal work

Appendix 5 Optional equipment

(7). DeviceNet communication expansion board (SE2-DN01)



1). SE2-DN01 meets ODVA DeviceNet standards.
2). SE2-DN01 as a slave for DeviceNet network, support for 125k, 250k, 500k baud rate of communication
3). SE2-DN01 using a common terminal form to connect DeviceNet network, addresses is from 0 to 63.
4). Connect SE2-DN01, please use the standard DeviceNet specific cable.
5). The power of SE2-DN01 is supplied by the 24V power supply from DeviceNet network.

Terminal type	Terminal name	Function name	Remarks and function description
DeviceNet communication terminal	V+	V+	Isolated 24V power supply
	CAN+	CAN_H	CAN_H signal
	SHIELD	SHIELD	Network cable shield
	CAN-	CAN_L	CAN_L signal
	V-	V-	Isolated ground
	---	Empty	---

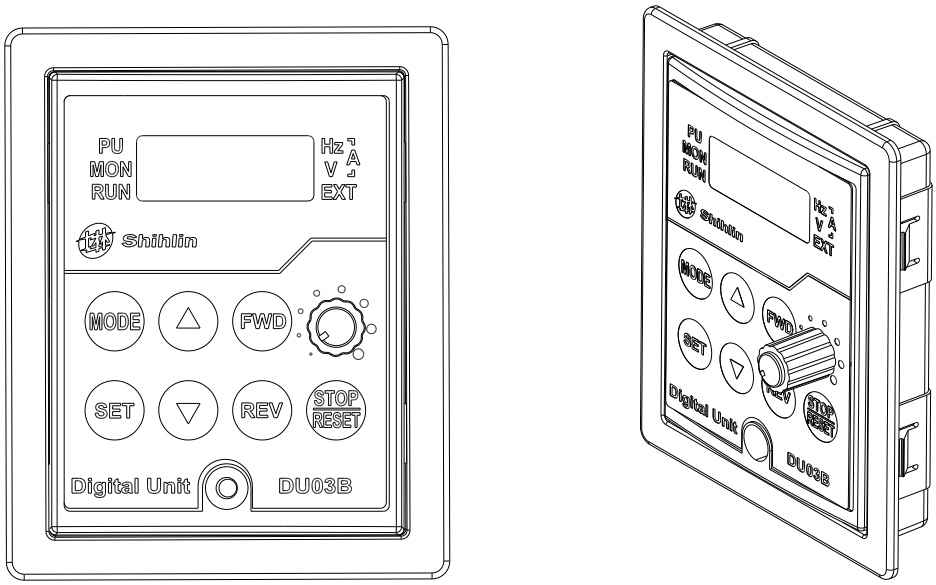
NS LED: Instructed SE2-DN01 and the DeveceNet network connection status.
MS LED: Instructions SE2 - DN01 internal modules working condition.
SP LED: Instructed the inverter and SE2-DN01 Working condition.
Address switch 1~6: Set the communication address of SE2-DN01 in DeviceNet network.
Baud rate setting switch 7~8: Set the communication rate of SE2-DN01.

Note: 1. 00 representative of 125k, 01 representative of 250k, 10 representative of 500k, 11 representative automatically set baud rate.
2. The shihlin inverter can automatically identify the SE2-DN01 communications expansion board, and adjust the corresponding parameters of its own with the SE2-DN01 to make a successful connection, the user in the course of communication do not modify the drive parameters, so as not to affect the SE2-DN01 normal work

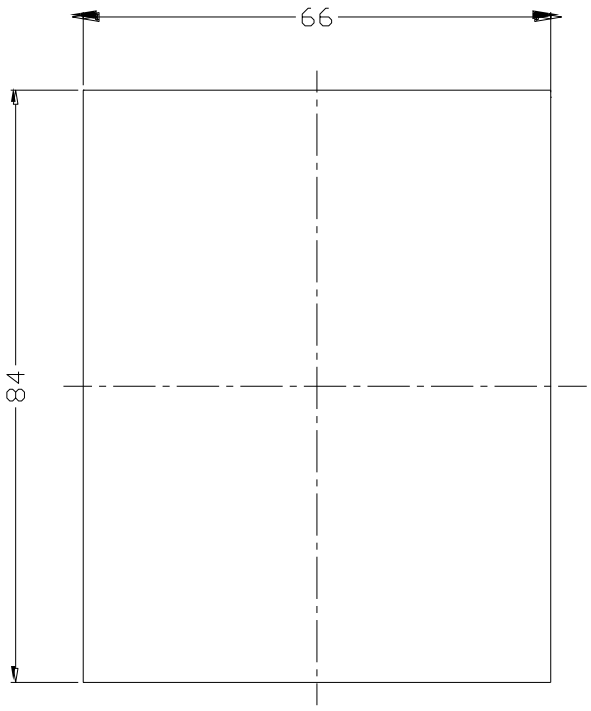
Appendix 5 Optional equipment

2. Operation panel, fixing pedestal and transmission cable

(1). DU03B operation panel sets (operation panel and fixing pedestal, the units in the figure below is mm)



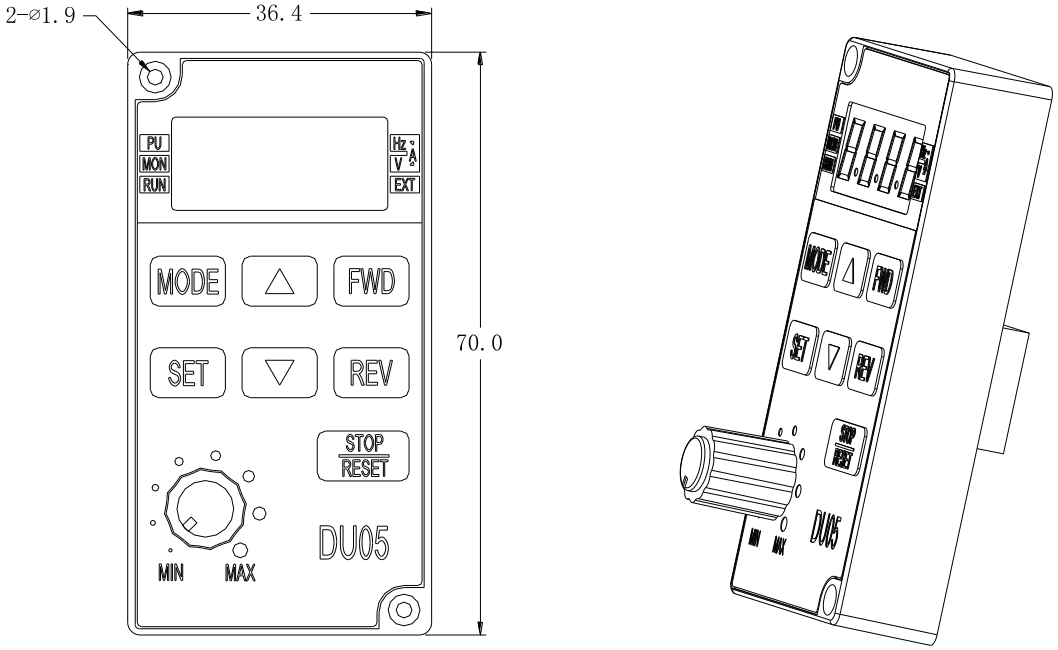
The assembly dimensions of the fixing pedestal are as follows:



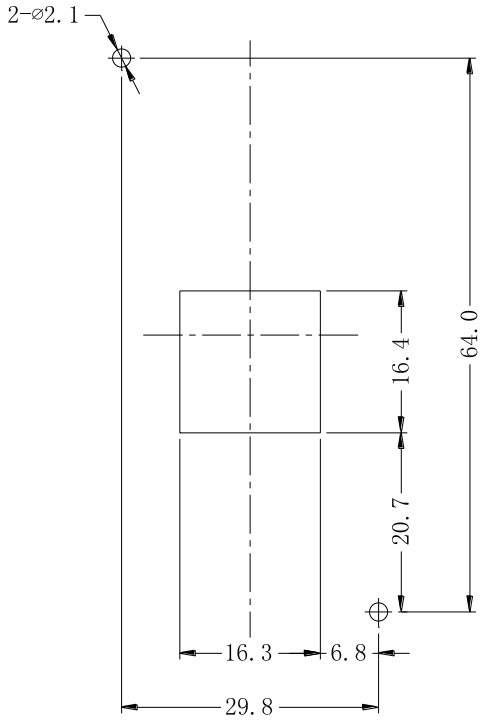
NO.	Model	Name
1	SNKDU03B	DU03B operation panel sets

Appendix 5 Optional equipment

(2). DU05 operation panel



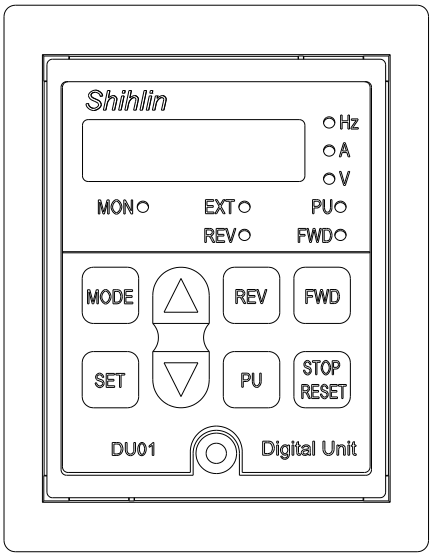
The assembly dimensions of the fixing pedestal are as follows:

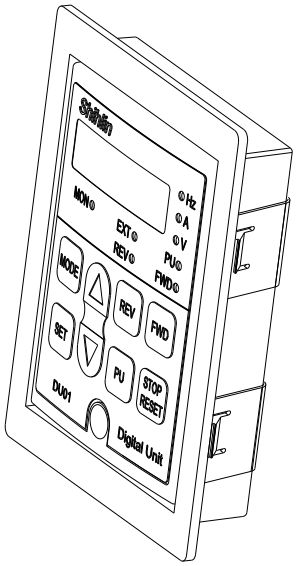


NO.	Model	Name
1	SNKDU05	DU05 operation panel

Appendix 5 Optional equipment

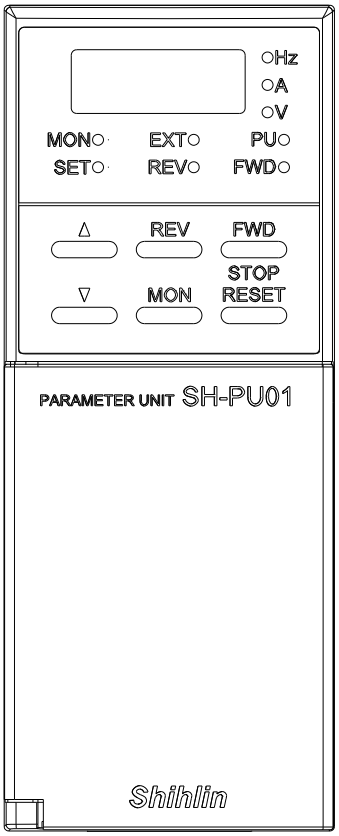
(3). DU01 operation panel sets (operation panel and fixing pedestal)

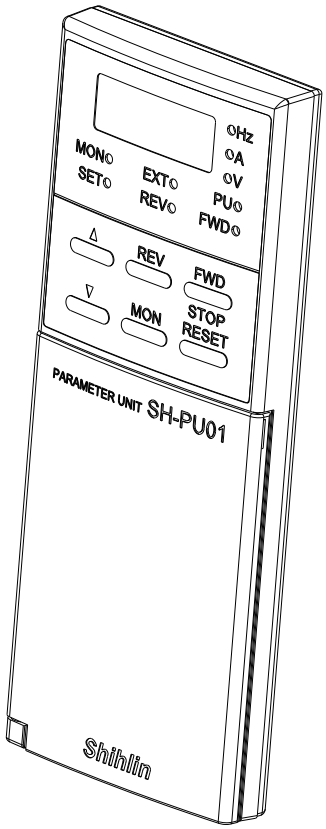




NO.	Model	Name
1	SNKDU01S	DU01 operation panel sets

(4). PU01 operation panel sets

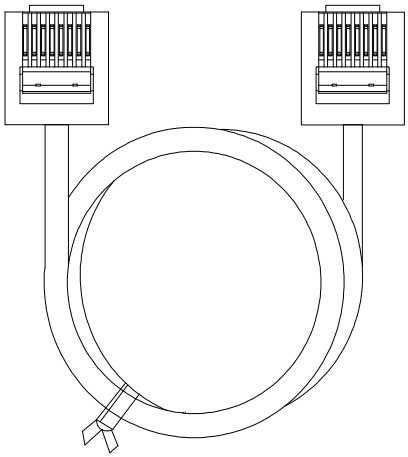




NO.	Model	Name
1	SNKSHPU01	PU01 operation panel sets

Appendix 5 Optional equipment

(5). CBL: Transmission cable used with the above operation panel



Ordering code instructions:

NO.	Model	Name	Ordering code
1	CBL1R5GT	Transmission cable (1.5M)	SNKCBL1R5GT
2	CBL03GT	Transmission cable (3M)	SNKCBL03GT
3	CBL05GT	Transmission cable (5M)	SNKCBL05GT

Appendix 6 Frequency parameters of ultra-high-speed

1. After setting the inverter ultra high-speed operation function parameter P.187, please be sure to set P.998 to adjust the frequency-dependent parameters.
2. In the use of inverter ultra-high-speed operation function, do not use PU series operation panels to achieve parameter copy function by set P.994 and P.995.
3. Inverter ultra-high speed operation function, by the use of communication written in frequency, please pay attention to the size of the set value. Because if P.187 = 1, minimum setting unit is 0.1 Hz.
   For example: Change value of P.195 to 50 (initial value is 60) in communication example 4.
   Step1 and step 2 are the same as step1 and step2 of example 3.
   Step 3. The PC requests the inverter to inputting 50 into P.195, using the format A:

ENQ	Station number 0	Command Code HDF	Waiting Time	Data H1388	Sum Check	CR
H05	H30 H30	H44 H46	H30	H31 H33 H38 H38	H45 H45	H0D

⇩ 195 minus 100 equal to 95, then converting 95 to hexadecimal H5F, H5F+H80=HDF.

⇩ Minimum unit of P.195 is 0.1, therefore 50*10=500, then convert 500 to Hexadecimal H01F4, and convert 0,1,F,4 to ASCII CODE to send out.

4. On the ultra-high-speed operation function, the can not use the sensor vector speed control function.
5. When P.187=1, the minimum value and setting range of all the frequency related parameters is follow in the below table.

Parameter number	Name	Setting range	Minimum setting unit
P.1	Maximum frequency	0~1000Hz	0.1Hz
P.2	Minimum frequency	0~1000Hz	0.1Hz
P.3	Base frequency	0~1000Hz	0.1Hz
P.4	Speed 1 (high speed)	0~1000Hz	0.1Hz
P.5	Speed 2 (medium speed)	0~1000Hz	0.1Hz
P.6	Speed 3 (low speed)	0~1000Hz	0.1Hz
P.10	DC injection brake operation frequency	0~1000Hz	0.1Hz
P.13	Starting frequency	0~600Hz	0.1Hz
P.15	JOG frequency	0~1000Hz	0.1Hz
P.18	High-speed maximum frequency	120~1000Hz	0.1Hz
P.20	Acceleration/deceleration reference frequency	1~1000Hz	0.1Hz
P.24	Speed 4	0~1000Hz、9999	0.1Hz
P.25	Speed 5	0~1000Hz、9999	0.1Hz
P.26	Speed 6	0~1000Hz、9999	0.1Hz
P.27	Speed 7	0~1000Hz、9999	0.1Hz

Appendix 6 Frequency parameters of ultra-high-speed

Frequency parameters

Parameter number	Name	Setting range	Minimum setting unit
P.38	The maximum output frequency(the target frequency is set by the input signal across terminal 2-5/panel knob)	1~1000Hz	0.1Hz
P.39	The maximum output frequency(the target frequency is set by the input signal across terminal 4-5)	1~1000Hz	0.1Hz
P.42	Output frequency detection for forward rotation	0~1000Hz	0.1Hz
P.43	Output frequency detection for reverse rotation	0~1000Hz、9999	0.1Hz
P.47	The second base frequency	0~1000Hz、9999	0.1Hz
P.55	Frequency display reference	0~1000Hz	0.1Hz
P.66	Stall prevention operation reduction starting frequency	0~1000Hz	0.1Hz
P.76	Panel knob signal input frequency bias	0~1000Hz	0.1Hz
P.91	Frequency jump 1A	0~1000Hz、9999	0.1Hz
P.92	Frequency jump 1B	0~1000Hz、9999	0.1Hz
P.93	Frequency jump 2A	0~1000Hz、9999	0.1Hz
P.94	Frequency jump 2B	0~1000Hz、9999	0.1Hz
P.95	Frequency jump 3A	0~1000Hz、9999	0.1Hz
P.96	Frequency jump 3B	0~1000Hz、9999	0.1Hz
P.98	Middle frequency 1	0~1000Hz	0.1Hz
P.131	Frequency of section 1	0~1000Hz	0.1Hz
P.132	Frequency of section 2	0~1000Hz	0.1Hz
P.133	Frequency of section 3	0~1000Hz	0.1Hz
P.134	Frequency of section 4	0~1000Hz	0.1Hz
P.135	Frequency of section 5	0~1000Hz	0.1Hz
P.136	Frequency of section 6	0~1000Hz	0.1Hz
P.137	Frequency of section 7	0~1000Hz	0.1Hz
P.138	Frequency of section 8	0~1000Hz	0.1Hz
P.142	Speed 8	0~1000Hz	0.1Hz
P.143	Speed 9	0~1000Hz、9999	0.1Hz
P.144	Speed 10	0~1000Hz、9999	0.1Hz
P.145	Speed 11	0~1000Hz、9999	0.1Hz
P.146	Speed 12	0~1000Hz、9999	0.1Hz
P.147	Speed 13	0~1000Hz、9999	0.1Hz
P.148	Speed 14	0~1000Hz、9999	0.1Hz
P.149	Speed 15	0~1000Hz、9999	0.1Hz

Appendix 6 Frequency parameters of ultra-high-speed

Frequency parameters

Parameter number	Name	Setting range	Minimum setting unit
P.162	Middle frequency 2	0~1000Hz、9999	0.1Hz
P.164	Middle frequency 3	0~1000Hz、9999	0.1Hz
P.166	Middle frequency 4	0~1000Hz、9999	0.1Hz
P.168	Middle frequency 5	0~1000Hz、9999	0.1Hz
P.181	Outage level	0~1000Hz	0.1Hz
P.182	Integral upper limit frequency	0~1000Hz	0.1Hz
P.183	Deceleration step length with stable pressure	0~100Hz	0.1Hz
P.194	Frequency corresponds to the minimum input voltage across terminal 2-5	0~600Hz	0.1Hz
P.195	Frequency corresponds to the maximum input voltage across terminal 2-5	0~1000Hz	0.1Hz
P.196	Frequency corresponds to the minimum input current/voltage across terminal 4-5	0~600Hz	0.1Hz
P.197	Frequency corresponds to the maximum input current/voltage across terminal 4-5	0~1000Hz	0.1Hz
P.230	The backlash compensation acceleration interrupt frequency	0~1000Hz	0.1Hz
P.232	The backlash compensation deceleration interrupt frequency	0~1000Hz	0.1Hz
P.249	Automatic switchover frequency from inverter to commercial power supply frequency	0~600Hz,9999	0.1Hz
P.250	Automatic switchover frequency range from commercial power supply to inverter	0~100Hz,9999	0.1Hz
P.305	Motor rated frequency	0~1000Hz	0.1Hz

Amendment record

Printing Date	The manual version	Amendment
2011.05	V1.00	The first edition
2012.10	V1.01 (Applicable for V0.40 or above firmware)	1. Unifying names of some parameters 2. Amending some mistakes of the instruction manual

Version: V1.01
Printing Date: October.2012

Shihlin Electric
Factory Automation Products

Human Machine Interface

Temperature Controller

Servo motor and drive

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