Contents

Safety Information

Description of safety marks:

⚠Warning: A Warning contains information which is essential for avoiding a safety hazard.

⚠Caution: A Caution contains information which is necessary for avoiding a risk of damage to the product or other equipment.

■ Use

⚠Warning
● This series of drive is used to control the variable speed operation of three-phase motor and cannot be used for single-phase motor or other applications. Otherwise, drive failure or fire may be caused. ● This series of drive cannot be simply used in the applications directly related to the human safety, such as medical equipment. ● This series of drive is produced under strict quality management system. Redundancy or bypass solution is necessary if the drive failure may cause severe accident or loss.

■ Installation

⚠Caution
● If the drive is found to be damaged or parts missing, the drive cannot be installed. Otherwise, accident may be caused. ● When handling and installing the product, please hold the product from bottom. Do not hold the enclosure only. Otherwise, your feet may be injured and the drive may be damaged because of dropping. ● The drive shall be mounted on the fire retardant surface, such as metal, and kept far away from the inflammables and heat source. ● Keep the drilling scraps from falling into the inside of the drive during the installation; otherwise, drive failure may be caused. ● When the drive is installed inside the cabinet, the electricity control

cabinet shall be equipped with fan and ventilation port. And ducts for radiation shall be constructed in the cabinet.

■ Wiring

Warning

- The wiring must be conducted by qualified electricians. Otherwise, there exists the risk of electric shock or drive damage.
- Before wiring, confirm that the power supply is disconnected. Otherwise, there exists the risk of electric shock or fire.
- The grounding terminal PE must be reliably grounded, otherwise, the drive enclosure may become conductive.
- To ensure the safety, the drive and the motor must be grounded. Please do not touch the main circuit terminal. The wires of the drive main circuit terminals must not contact the enclosure. Otherwise, there exists the risk of electric shock.
- The connecting terminals for the braking resistor are （+）and PB. Please do not connect terminals other than these two. Otherwise, fire may be caused.

Caution

- The power supply cannot connect to output terminals U-V-W, otherwise, the drive will be damaged.
- It is forbidden to connect the output terminal of the drive to the capacitor or LC/RC noise filter with phase lead, otherwise, the internal components of the drive may be damaged
- Please confirm that the power supply phases, rated voltage are consistent with that of the nameplate, otherwise, the drive may be damaged.
- The wires of the main circuit terminals and the wires of the control circuit terminals shall be laid separately or in a square-crossing mode, otherwise, the control signal may be interfered.
- When the length of the cables between the drive and the motor is more than 100m, it is suggested to use output reactor to avoid the

drive failure caused by the over-current of the distribution capacitor.

- The drive which equipped with DC reactor must connect with DC reactor between the terminal of P1、(+) otherwise the drive will not display after power on.

■ Operation

Warning

- Power supply can only be connected after the wiring is completed and the cover is installed. It is forbidden to remove the cover in live condition; otherwise, there exists the risk of electric shock.
- When auto failure reset function or restart function is set, isolation measures shall be taken for the mechanical equipment, otherwise, personal injury may be caused.
- When the drive is powered on, even when it is in the stop state, the terminals of the drive are still live. Do not touch the drive terminals; otherwise electric shock may be caused.
- The failure and alarm signal can only be reset after the running command has been cut off. Otherwise, personal injury may be caused.

Caution

- Do not start or shut down the drive by switching on or off the power supply, otherwise the drive may be damaged.
- Before operation, please confirm if the motor and equipment are in the allowable use range, otherwise, the equipment may be damaged.
- The heat sink and the braking resistor have high temperature. Please do not touch such devices; otherwise, you may be burnt.
- When it is used on lifting equipment, mechanical contracting brake shall also be equipped.
- Please do not change the drive parameter randomly. Most of the factory set parameters of the drive can meet the operating requirement, and the user only needs to set some necessary parameters. Any random change of the parameter may cause the damage of the mechanical equipment.

- In the applications with mains frequency and variable frequency switching, the two contactors for controlling the mains frequency and variable frequency switching shall be interlocked.

■ Maintenance & Inspection

Warning

- In the power-on state, please do not touch the drive terminals; otherwise, there exists the risk of electric shock.
- If cover is to be removed, the power supply must be disconnected first.
- Wait for at least 10 minutes after power failure or confirm that the CHARGE indicator is off before maintenance and inspection to prevent the harm caused by the residual voltage of the main circuit electrolytic capacitor to persons.
- The components shall be maintained, inspected or replaced by qualified electricians.

Caution

- The circuit boards have large scale CMOS IC. Please do not touch the board to avoid the circuit board damage caused by static electricity.

Chapter 1 NE200/300 Product Introduction

1.1 Model Description

The digits and letters of the drive model number on the nameplate indicate information such as the product series, power supply class, power ratings and software/hardware versions.

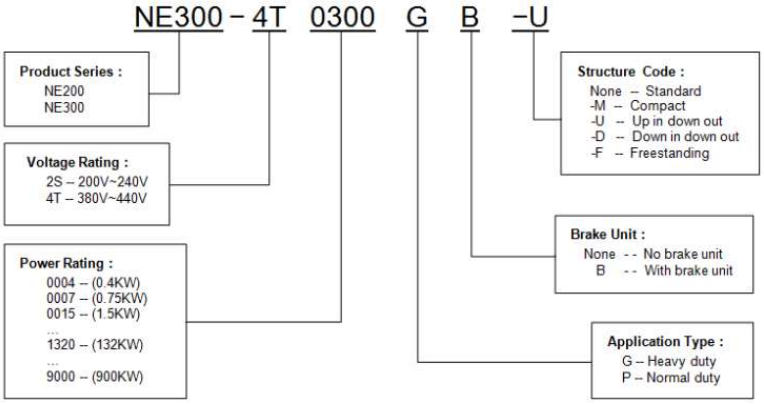


Fig.1-1 Product Model Description

Note：NE300-4T0300G/0370P means this model can be used as 30kW heavy duty and 37kW normal duty.

1.2 Product Nameplate Description

Fig.1-2 Nameplate

1.3 Product Series

1.3.1 NE200 Product Series

- NE200−4T□□□□GB Three-phase 400V Constant torque/heavy-duty application

Power（kW）		0.75	1.5	2.2	4.0
Adapted motor (kW)		0.75	1.5	2.2	4.0
Output	Voltage (V)	3phase 0~rated input voltage			
	Rated current (A)	2.5	4.0	6.0	9.0
	Overload	150% 1min; 180% 20sec.			
Input	Rated Volt/ Freq	3phase 380V/440V; 50Hz/60Hz			
	Voltage range	304V~456V; voltage imbalance ≤3%; Allowable frequency fluctuation ±5%			
	Rated current (A)	3.7	5.4	7.0	10.7
Braking unit		Standard (Built-in)			
IP rating		IP20			
Cooling		Forced air cooling			

- NE200−4T□□□□PB Three-phase 400V Squared torque/normal-duty application

Power（kW）		1.5	2.2	4.0	5.5
Adapted motor (kW)		1.5	2.2	4.0	5.5
Output	Voltage (V)	3phase 0~rated input voltage			
	Rated current (A)	4.0	6.0	9.0	13
	Overload	120% 1min; 150% 1sec.			
Input	Rated Volt/ Freq	3phase 380V/440V; 50Hz/60Hz			
	Voltage range	304V~456V; voltage imbalance ≤3%; Allowable frequency fluctuation ±5%			
	Rated current (A)	5.4	7.0	10.7	15.5
Braking unit		Standard (Built-in)			
IP rating		IP20			
Cooling		Forced air cooling			

■ NE200−2S□□□□GB Single-phase 220V constant torque/heavy duty application

Power（kW）		0.4	0.75	1.5	2.2
Adapted motor (kW)		0.4	0.75	1.5	2.2
Output	Voltage (V)	Single phase 0~rated input voltage			
	Rated current(A)	2.5	4.5	7.0	10
	Overload	150% 1min; 180% 20sec.			
Input	Rated Volt/Freq	1phase 200V/240V; 50Hz/60Hz			
	Voltage range	176V~264V; voltage imbalance ≤3%; Allowable frequency fluctuation ±5%			
	Rated current (A)	5.3	8.3	14	23
Braking unit		Standard (Built-in)			
IP rating		IP20			
Cooling		Forced air cooling			

1.3.2 NE300 Product Series

■ NE300−4T□□□□GB Three-phase 400V Constant torque/heavy-duty application

Power（kW）		1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Adapted Motor（kW）		1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Output	Voltage（V）	3Phase 0~Rated input voltage															
	Rated Current(A)	4	6	9	13	17	25	32	37	45	60	75	90	110	150	176	210
	Overload	150% 1min; 180% 20sec															
Input	Rated Volt/Freq	3Phase 380V/440V; 50Hz/60Hz															
	Voltage Range	304V～456V voltage imbalance ≤3% Allowable frequency fluctuation ±5%															
	Rated Current（A）	5.4	7.0	10.7	15	20.5	27	35	38.5	46.5	62	76	92	113	157	180	214
Brake Unit		Built-in									Built-out						
IP Rating		IP20															
Cooling		Forced air cooling															

Power（kW）		132	160	185	200	220	250	280	315	355	400	450	500	560	630	710	800
Adapted Motor（kW）		132	160	185	200	220	250	280	315	355	400	450	500	560	630	710	800
Output	Voltage（V）	3Phase 0~Rated input voltage															
	Rated Current(A)	250	300	340	380	420	470	540	600	660	730	840	900	950	1160	1300	1460
	Overload	150% 1min; 180% 20sec															
Input	Rated Volt/Freq	3Phase 380V/440V; 50Hz/60Hz															
	Voltage Range	3Phase 380V/440V; 50Hz/60Hz 150% 1min;180% 20sec															
	Rated Current（A）	256	307*	345	385*	430*	480*	548*	610*	670*	740*	850*	910*	960*	1170*	1310*	1470*
Brake Unit		Built-out															
IP Rating		IP20															
Cooling		Forced air cooling															

* NE300−4T1600G-F and above products are equipped with in-built DC reactor as standard.

■ NE300−4T□□□□PB Three-phase 400V Squared torque/normal-duty application

Power（kW）		2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	
Adapted Motor（kW）		2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	
Output	Voltage（V）	3Phase 0~Rated input voltage																
	Rated Current（A）	6.0	9.0	13	17	25	32	37	45	60	75	90	110	150	176	210	250	
	Overload	120% 1min; 150% 1sec																
Input	Rated Volt/Freq	3Phase 380V/440V; 50Hz/60Hz																
	Voltage Range	304V～456V Voltage imbalance ≤3% Allowable frequency fluctuation ±5%																
	Rated Current（A）	7.0	10.7	15.5	20.5	26	35	38.5	46.5	62	76	92	113	157	180	214	256	
Brake Unit		Built-in									Built-out							
IP Rating		IP20																
Cooling		Forced air cooling																

Power（kW）		160	185	200	220	250	280	315	355	400	450	500	560	630	710	800	900	
Adapted Motor（kW）		160	185	200	220	250	280	315	355	400	450	500	560	630	710	800	900	
Output	Voltage（V）	3Phase 0~Rated input voltage																
	Rated Current（A）	300	340	380	420	470	540	600	660	730	840	900	950	1160	1300	1460	1640	
	Overload	120% 1min; 150% 1sec																
Input	Rated Volt/Freq	3Phase 380V/440V; 50Hz/60Hz																
	Voltage Range	304V～456V Voltage imbalance ≤3% Allowable frequency fluctuation ±5%																
	Rated Current（A）	307	345	385*	430*	480*	548*	610*	670*	740*	850*	910*	960*	1170*	1310*	1470*	1650*	
Brake Unit		Built-out																
IP Rating		IP20																
Cooling		Forced air cooling																

* NE300−4T1850P and above products are equipped with external DC reactor as standard.

1.4 Specifications

		NE200			NE300		
Control features	Control mode	Closed-loop vector (VC)	Open-loop vector (SVC)	V/F control	Closed-loop vector (VC)	Open-loop vector (SVC)	V/F control
	Startup torque	----	0.5Hz 150%	1.5Hz 150%	0.00Hz 180%	0.5Hz 150%	1.5Hz 150%
	Speed adjust range	----	1:100	1:50	1:1000	1:100	1:50
	Speed stabilization precision	----	± 0.2%	± 0.5%	± 0.02%	± 0.2%	± 0.5%
	Torque control	----	Y	N	Y	Y	N
	Torque precision	----	± 10%	----	± 5%	± 10%	----
	Torque response time	----	<20ms	----	<10ms	<20ms	----
	Key Function				Length control; Drooping control S curve Acc./Dec; Autotuning; Torque tracking		
		Switching Torque/ Speed control mode; Multi-function I/O terminals Undervoltage adjustment; Torque limit; Multi-steps operation Flying start, Slip compensation; Rich PID; Simple PLC (On board) Manual/auto torque boost; Current limitation; AVR Function; AC operation grounding switching					
	Freq. setting mode				Terminal pulse input (X4, X5)		
		Keypad, terminal up/down, communication (host), analog input AI1 AI2					
	Output Freq.	0.0~550.0Hz					
	Starting frequency	0.0~60.00Hz					
	Acc./Dec. time	0.01~3600s			0.1~3600s		
	Dynamic braking	400V Braking unit action voltage 650~750V 200V Braking unit action voltage 360~390V					

	DC braking	DC braking activation frequency:0.00~550.0Hz; DC braking current: G type 0.0~100.0%; P type 0.0~80.0% DC braking time:0.0~30.0s; Quick DC brake activation without lag time	
	Magnetic flux braking	Decelerating quickly by adding motor magnetic flux	
Unique functions	Multi-function key (MFK)	MFK can exchange operations quickly. Such as JOG, FWD/REV switch, Running command reference modes etc.	
	Parameter copy	Parameter upload & download via keypad User can forbid the overwriting of the uploaded parameters.	
	Common DC bus	----	Yes
	Independent air duct	----	Yes
	Option card	----	Various Option cards including I/O Expansion card, injection molding interface card, ±10V analog Option card, etc.
	Power-on detection	----	Automatic detection of internal and peripheral circuits while power-on
Communication	Rs485 protocol	Equipped with Modbus-RTU communication protocol	
Protections	**Protections for:**	Phase-to-phase short circuit,	
	Auto-tune failure,	Output-to-ground short circuit,	
	Parameter copy error,	Option card connection error,	
	Communication error,	Power supply abnormal,	
	IGBT protection	Temperature sampling abnormal,	
	Output phase lost,	Power supply under/over-voltage,	
	External devices faults,	Analog input/output abnormal, Temperature sampling offline	
	Drives/motor overload	Abnormal power failure in running	
	Over-current,	Under/over voltage,	Relay contact error
	Encoder off-line,	Heat sink over-heat,	EEPROM abnormal

Efficiency		Used as rated power: 7.5kW and below ratings ≥93%, 11kW~45kW ratings ≥95%, 55kW and above ratings ≥98%
Environment	Application Environment	In-door, free from sunshining directly, dust, corrosive gas, combustible gas, oil mist, steam, water drop or salt
	Ambient temperature	-10 ~ +40ºC, derated at 40 ~ 50ºC, the rated output current shall be decreased by 1% for every temperature rise of 1ºC
	Humidity	5~95%,no condensing
	Vibration	3.5mm, 2~9Hz; 10 m/s^2 , 9~200Hz; 15 m/s^2 , 200~500Hz
	Altitude	0~2000m; Derating use above 1000m; Derate 1% every 100m higher.
	Storage temperature	−40~ +70ºC

1.5 Product Outline, Mounting Dimension

（Unit：mm）

Note: NE200 series support 35mm DIN-rail mounting.

Model	Dimensions
NE200-2S0004GB	See Fig. A
NE200-2S0007GB	
NE200-2S0015GB	
NE200-4T0007G/0015PB	
NE200-4T0015G/0022PB	
NE200-4T0022GB-M	
NE200-2S0022GB	See Fig. B
NE200-4T0022G/0040PB	
NE200-4T0040G/0055PB	
NE200-2S0004GB	

Note

-M means mini model

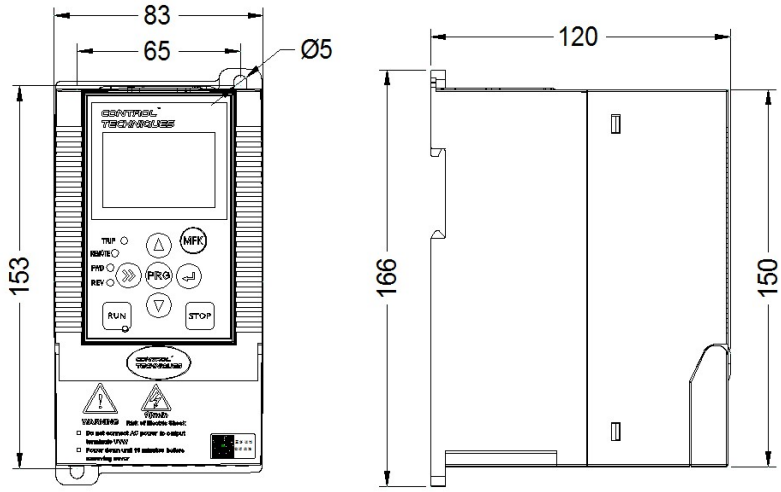


Fig. A

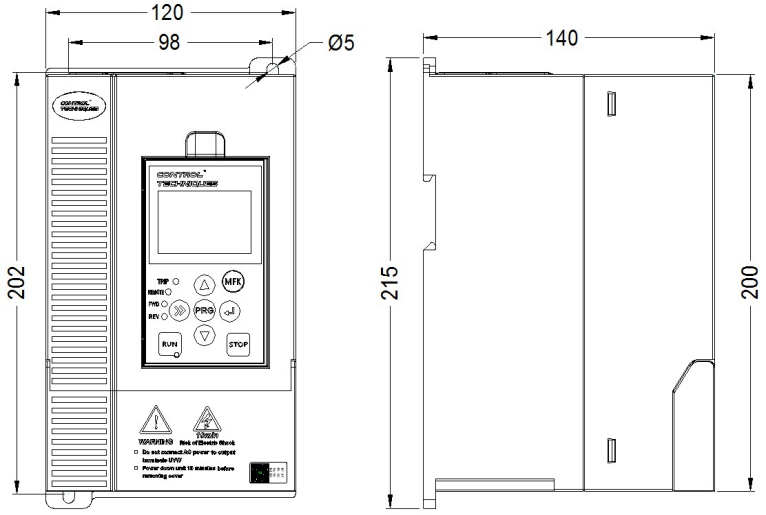


Fig. B

Model	Dimensions
NE300-4T0015G/0022PB NE300-4T0022G/0040PB NE300-4T0040G/0055PB	See Fig. C
NE300-4T0055G/0075PB NE300-4T0075G/0110PB NE300-4T0110G/0150PB	See Fig. D
NE300-4T0150G/0185PB NE300-4T0185G/0220PB NE300-4T0220G/0300PB	See Fig. E
NE300-4T0300G/0370P NE300-4T0370G/0450P	See Fig. F
NE300-4T0450G/0550P NE300-4T0550G/0750P	See Fig. G
NE300-4T0750G/0900P NE300-4T0900G/1100P NE300-4T1100G/1320P	See Fig. H

Model	Dimensions
NE300-4T1320G/1600P-U NE300-4T1320G/1600P-D NE300-4T1600G/1850P-U NE300-4T1600G/1850P-D	See Fig. I
NE300-4T1850G/2000P-U NE300-4T1850G/2000P-D NE300-4T2000G/2200P-U NE300-4T2000G/2200P-D NE300-4T2200G/2500P-U NE300-4T2200G/2500P-D NE300-4T2500G/2800P-U NE300-4T2500G/2800P-D	See Fig. J
NE300-4T1600G/1850P-F NE300-4T1850G/2000P-F NE300-4T2000G/2200P-F NE300-4T2200G/2500P-F	See Fig. K
NE300-4T2500G/2800P-F NE300-4T2800G/3150P-F NE300-4T3150G/3550P-F	See Fig. L
NE300-4T3550G/4000P-F NE300-4T4000G/4500P-F NE300-4T4500G/5000P-F NE300-4T5000G/5600P-F	See Fig. M
NE300-4T5600G/6300P-F NE300-4T6300G/7100P-F NE300-4T7100G/8000P-F NE300-4T8000G/9000P-F	See Fig. N
NE300-4T9000G-F	See Fig. P

Note:

-U means input lines come from upside and output lines come out downside.

-D means input lines come from downside and output lines come out downside.

-F means freestanding models

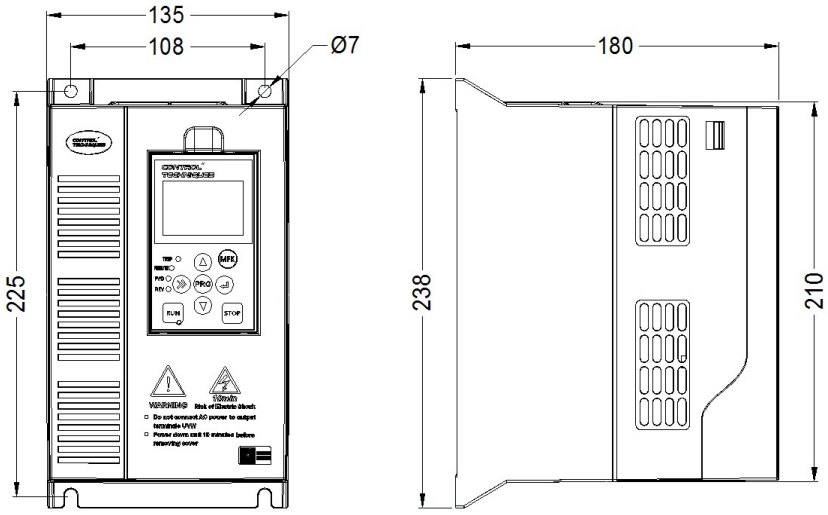


Fig. C

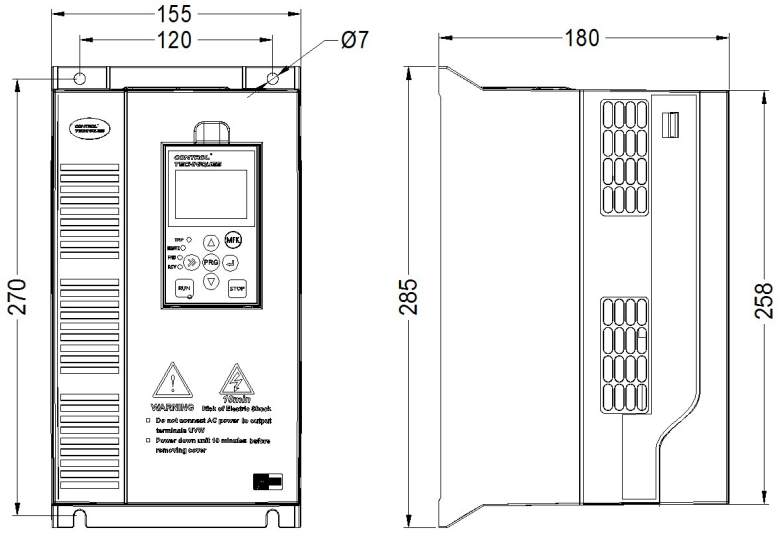


Fig. D

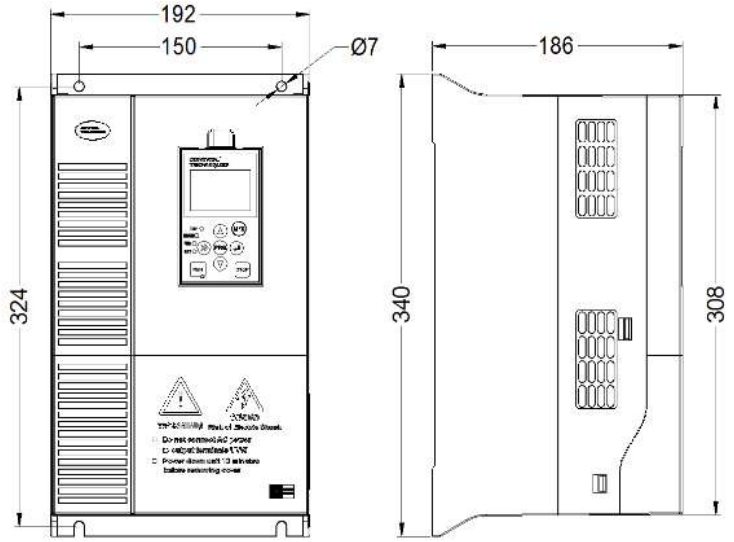


Fig. E

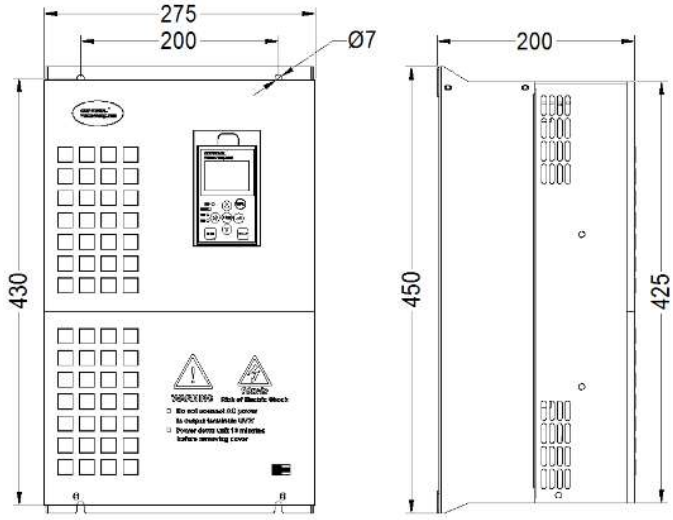


Fig. F

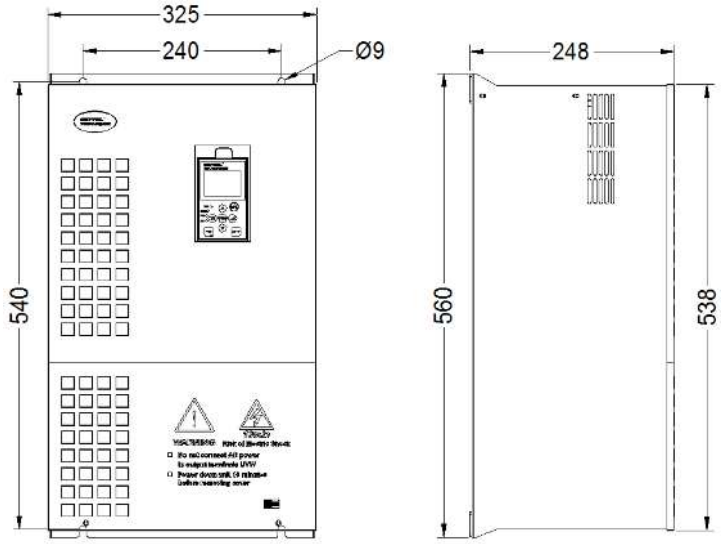


Fig. G

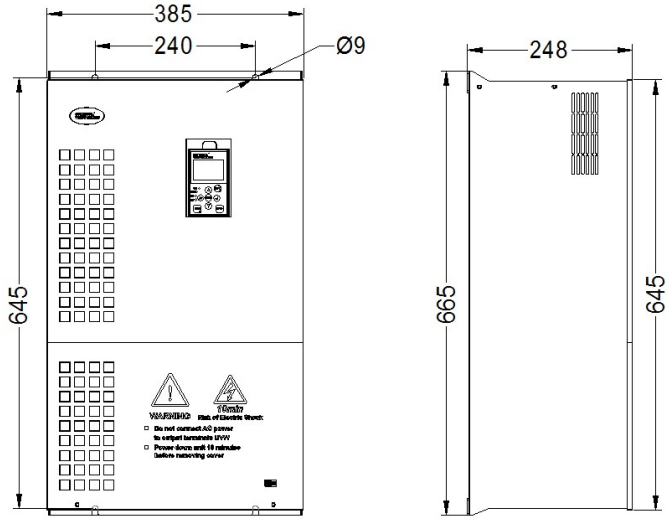


Fig. H

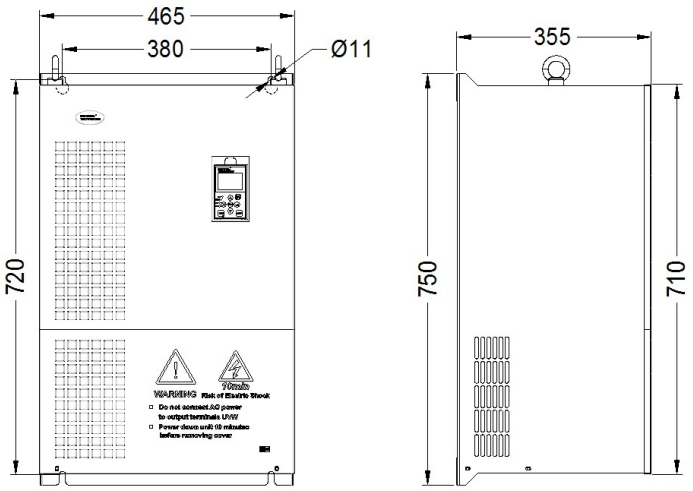


Fig. I

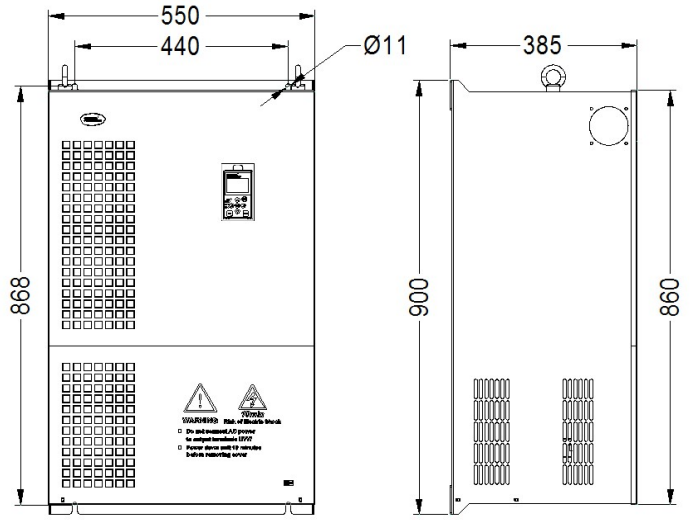


Fig. J

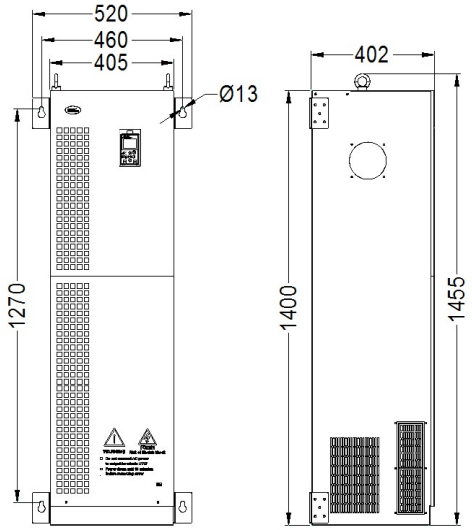

520
460
405
Ø13
402
1270
1400
1455

Fig. K

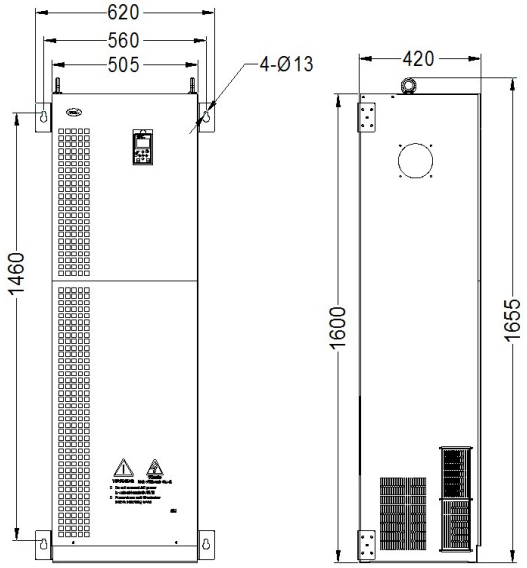

620
560
505
4-Ø13
420
1460
1600
1655

Fig. L

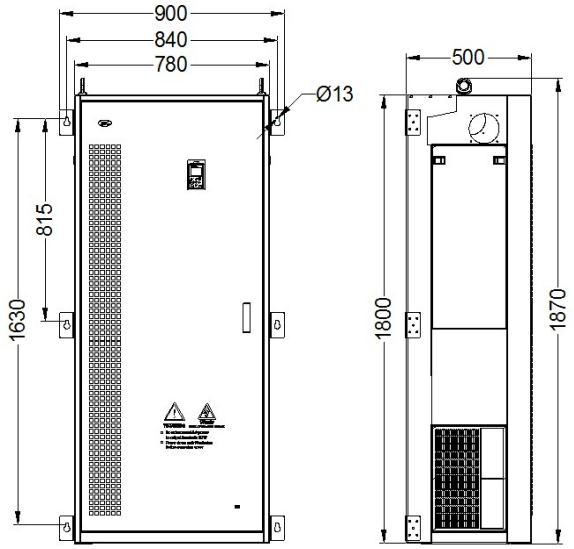


Fig. M

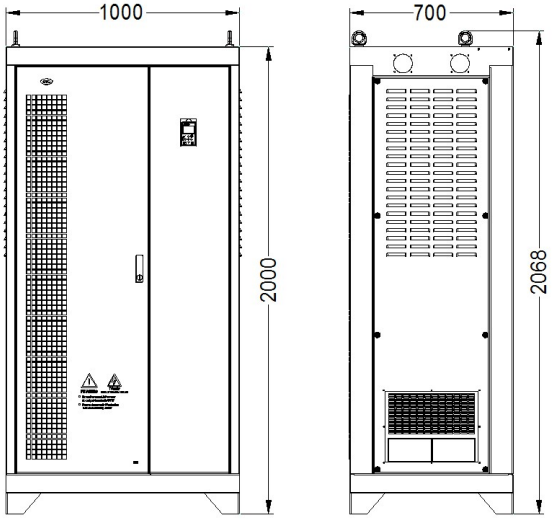


Fig. N

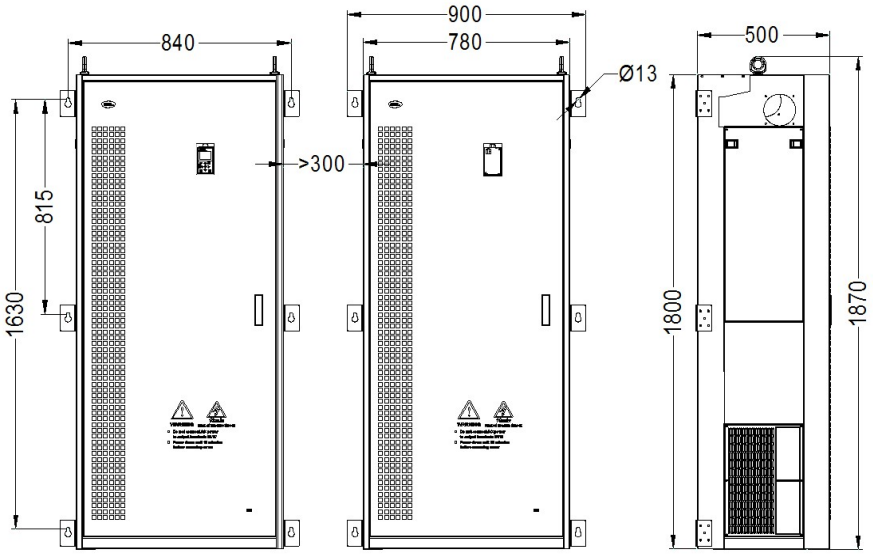


Fig. P

1.6 Operating keypad panel outline and mounting dimensions

(Unit：mm)

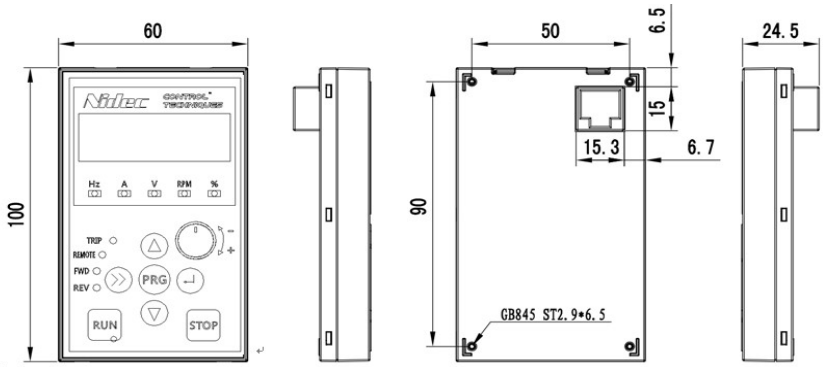


Fig.1-3 LED Operating Panel Outline and Mounting Dimension

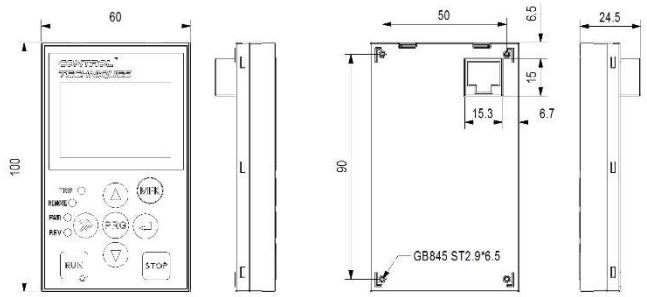
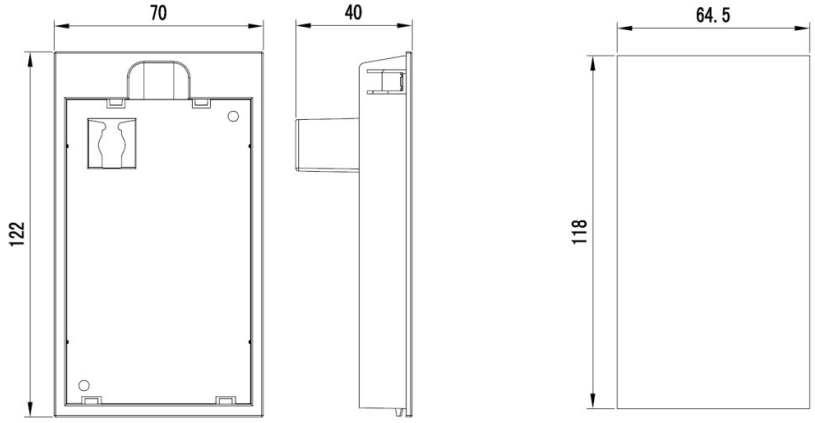


Fig.1-4 LCD Operating Panel Outline and Mounting Dimension

1.7 Keypad holder outline and mounting dimensions

NEF-KB01 is the mounting tray when the keypad is to install on the electric control cabinet. The outline and dimensions are as follows:(Unit：mm)：



Keypad tray dimensions　　Hole size of cut

Fig.1-6 Operating Panel Outline and Mounting Dimension

1.8 Braking resistor applying guide

Model	In or Out?	Brake Resistor Unit			Braking torque%
		Braking Resistor		Qty.	
NE200-2S0004GB	Built-in	100W	200Ω	1	135
NE200-2S0007GB		200W	150Ω	1	135
NE200-2S0015GB		400W	100Ω	1	125
NE200-2S0022GB		300W	70Ω	1	125
NE200-4T0007G/0015PB		400W	300Ω	1	135
NE200-4T0015G/0022PB		400W	300Ω	1	135
NE200-4T0022GB-M		500W	200Ω	1	135
NE200-4T0022G/0040PB		500W	200Ω	1	135
NE200-4T0040G/0055PB		500W	200Ω	1	135
NE300-4T0015G/0022PB	Built-in	400W	300Ω	1	135
NE300-4T0022G/0040PB		500W	200Ω	1	135
NE300-4T0040G/0055PB		500W	200Ω	1	135
NE300-4T0055G/0075PB		500W	100Ω	1	135
NE300-4T0075G/0110PB		800W	75Ω	1	130
NE300-4T0110G/0150PB		1000W	50Ω	1	135
NE300-4T0150G/0185PB		1500W	40Ω	1	125
NE300-4T0185G/0220PB		4000W	30Ω	1	125
NE300-4T0220G/0300PB		4000W	30Ω	1	125
NE300-4T0300G/0370P	Built-out	6000W	20Ω	1	125
NE300-4T0370G/0450P		9000W	16Ω	1	125
NE300-4T0450G/0550P		9000W	13.6Ω	1	125
NE300-4T0550G/0750P		6000W	20Ω	2	135
NE300-4T0750G/0900P		9000W	13.6Ω	2	145
NE300-4T0900G/1100P		6000W	20Ω	3	130
NE300-4T1100G/1320P		6000W	20Ω	3	130
NE300-4T1320G/1600P-U		6000W	20Ω	4	130
NE300-4T1320G/1600P-D		6000W	20Ω	4	130
NE300-4T1600G/1850P-U		9000W	13.6Ω	4	130
NE300-4T1600G/1850P-D		9000W	13.6Ω	4	130
NE300-4T1600G/1850P-F		9000W	13.6Ω	4	130
NE300-4T1850G/2000P-U		9000W	13.6Ω	4	130
NE300-4T1850G/2000P-D		9000W	13.6Ω	4	130
NE300-4T1850G/2000P-F		9000W	13.6Ω	4	130

NE300-4T2000G/2200P-U		9000W	13.6Ω	5	130
NE300-4T2000G/2200P-D		9000W	13.6Ω	5	130
NE300-4T2000G/2200P-F	Built-out	9000W	13.6Ω	5	130
NE300-4T2200G/2500P-U		9000W	13.6Ω	5	130
NE300-4T2200G/2500P-D		9000W	13.6Ω	5	130
NE300-4T2200G/2500P-F		9000W	13.6Ω	5	130
NE300-4T2500G/2800P-U		9000W	13.6Ω	5	130
NE300-4T2500G/2800P-D		9000W	13.6Ω	5	130
NE300-4T2500G/2800P-F		9000W	13.6Ω	5	130
NE300-4T2800G/3150P-F		9000W	13.6Ω	6	130
NE300-4T3150G/3550P-F		9000W	13.6Ω	6	130
NE300-4T3550G/4000P-F		40000W	3Ω	2	130
NE300-4T4000G/4500P-F		40000W	3Ω	2	130
NE300-4T4500G/5000P-F		60000W	2Ω	2	130
NE300-4T5000G/5600P-F		60000W	2Ω	2	130
NE300-4T5600G/6300P-F		60000W	2Ω	2	130
NE300-4T6300G/7100P-F		60000W	2Ω	3	130
NE300-4T7100G/8000P-F		60000W	2Ω	3	130
NE300-4T8000G/9000P-F		80000W	2Ω	3	130
NE300-4T9000G-F		80000W	2Ω	3	130
Note: The resistors should be paralleled while QTY. is 2 or above.					

Chapter 2 Installation

2.1 Environment

- Avoid installing the product in the sites with oil mist, metal powder and dust.
- Avoid installing the product in the sites with hazardous gas and liquid, and corrosive, combustible and explosive gas.
- Avoid installing the products in salty sites.
- Do not install the product in the sites with direct sunlight.
- Do not mount the product on the combustible materials, such as wood.
- Keep the drilling scraps from falling into the inside of drive during the installation.
- Mount the product vertically in the electric control cabinet, mount the cooling fan or air conditioner to prevent the ambient temperature from rising to above 40 ºC.
- For the sites with hash environment, it is recommended to mount the drive heat sink outside the cabinet.

2.2 Mounting Direction and Space

In order not to reduce the drive cooling effect, the drive must be mounted vertically, and certain space must be maintained, as shown in Fig. 2-1

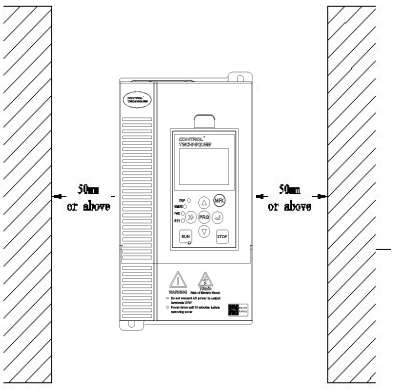


Fig.2−1 Mounting direction and Space

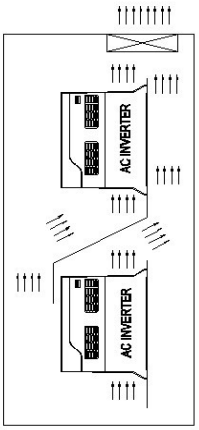


Fig.2−2 Installation diagram

Note:

When installing multiple drives vertically upside and downside, the air deflector is required.

2.3 Removal and mounting of keypad panel and enclosure

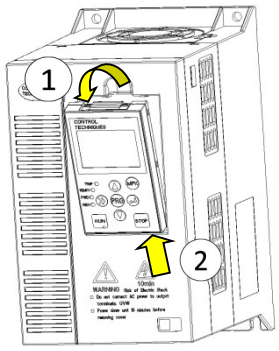
2.3.1 Removal and mounting of operating panel.

◆ Removal of keypad

As shown in Fig. 2-3, press the keypad buckle in direction 1 until the buckle come out, and then lift the keypad panel in direction 2.

◆ Mounting of keypad

As shown in Fig.2-4, push the keypad panel carefully in direction 1, until the “crack” sound is heard.



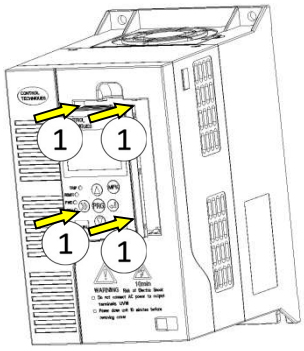


Fig.2-3 Removal of keypad Fig.2-4 Mounting of keypad

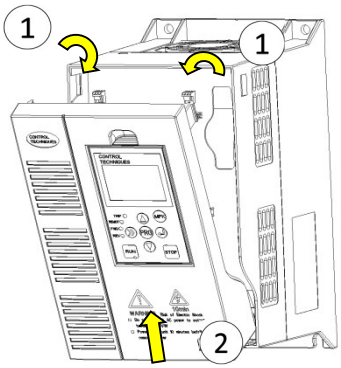
2.3.2 Removal and mounting of drive plastic enclosure

◆ Removal of cover

Forcefully press the 2 snap joints on the left and right sides as shown direction1 until the upper side of cover comes out. Lift the cover in direction 2, as in Fig. 2-5.

◆ Mounting of cover

After the wiring of main circuit terminals and control circuit terminals, insert the two snap hooks on the bottom part of the facial cover into the groove of the drive body, as shown in direction 1 in Fig.2-6, and then press the front cover in direction 2 as shown in Fig.2-6, until the “crack” sound is heard.



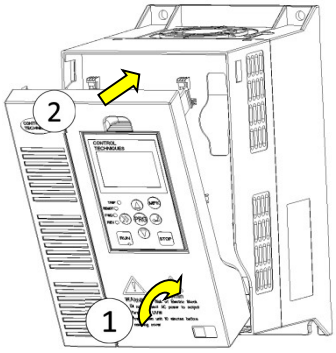


Fig.2-5 Removal of cover Fig.2-6 Mounting of cover

Chapter 3 Wiring

3.1 Connection of the Product and Peripheral Devices

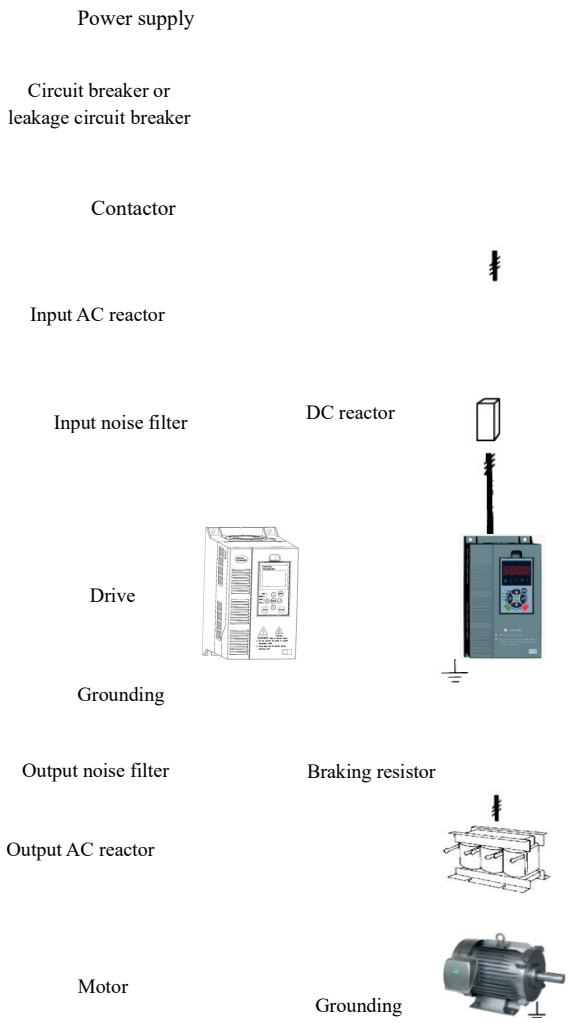


Fig 3-1 Connection of the Product and Peripheral Devices

3.2 Description of Peripheral Devices for Main Circuit

Circuit breaker	The capacity of the circuit breaker shall be 1.5 ~ 2 time of the rated current of the drive. The time features of the circuit breaker shall fully consider the time features of the drive overload protection.
Leakage circuit breaker	Because the drive output is the high-frequency pulse voltage, there will be high-frequency leakage current. Specialized leakage circuit breaker shall be installed at the input end of the drive. B type leakage circuit breaker is suggested, and the leakage current value shall be set as 300mA.
Contactor	Frequent open and close of contactor will cause drive failure, so the highest frequency for the open and close of contactor shall not exceed 10 times/min. When braking resistor is used, to protect the braking resistor from over-heat damage, thermal protection relay shall be installed to control the disconnect of the contactor at power supply side
Input AC reactor or DC reactor	1. The drive power supply capacity shall be more than 600kVA or 10 times of the drive capacity. 2. If there is switch type reactive-power compensation capacitor or load with silicon control at the same power line, there will be high peak current flowing into drive power input circuit, causing the damage of the rectifier components. 3. When the voltage unbalance of the three-phase power supply exceeds 3%, the rectifier component will be damaged. 4. The input power factor of the drive is required to be higher than 90%. In case of above situations, install the AC reactor at the input end of the drive or DC reactor to the DC reactor terminal.
Input noise filter	The input noise filter can reduce the noise that flows from the power supply to the drive or the drive to power supply.
Thermal protection relay	Although the drive has motor overload protection function, when one drive drives two or more motors or multi-pole motors, to prevent the motor over temperature failure, thermal protection relay shall be installed between the drive and each motor, and the motor overload protection parameter FC.00 shall be set as “0” (motor protection disabled).
Output noise filter	When the noise filter is applied to the output side of drive, the conduction and radiation interference can be reduced.

Output AC reactor	When the cable connecting the drive and the motor is longer than 100m, it is suggested to install AC output reactor to suppress the high-frequency oscillation to avoid the damage to motor insulation, large leakage current and frequent drive protective actions.

3.3 Main Circuit Peripheral Devices Guide

Table 3-1 NE200-4T0040G/0055PB and below

Drive Mode	Circuit Breaker（A）	Contactor（A）	R、S、T、P1、(+)、PB、(-)、U、V、W			Grounding terminal PE ⏚		
			Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)
NE200-2S0004GB	10	9	M3	0.87	0.75	M3	0.87	0.75
NE200-2S0007GB	16	12	M3	0.87	1.5	M3	0.87	1.5
NE200-2S0015GB	32	25	M3	0.87	2.5	M3	0.87	2.5
NE200-4T0007G/0015PB	10	9	M3	0.87	0.75	M3	0.87	0.75
NE200-4T0015G/0022PB	10	9	M3	0.87	1.5	M3	0.87	1.5
NE200-4T0022GB -M	10	9	M3	0.87	2.5	M3	0.87	2.5
NE200-2S0022GB	40	32	M4	1.5	4.0	M4	1.5	4.0
NE200-4T0022G/0040PB	10	9	M4	1.5	2.5	M4	1.5	2.5
NE200-4T0040G/0055PB	16	12	M4	1.5	4.0	M4	1.5	4.0

Table 3-2 NE300-4T0220G/0300PB and below

Drive Mode	Circuit Breaker（A	Contactor（A）	R、S、T、P1、(+)、PB、(-)、U、V、W			Grounding terminal PE ⏚		
			Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)
NE300-4T0022G/0040PB	16	10	M4	1.2～1.5	2.5	M4	1.2～1.5	2.5

NE300-4T0040G/0055PB	25	16	M4	1.2～1.5	4	M4	1.2～1.5	4
NE300-4T0055G/0075PB	32	25	M4	1.2～1.5	6	M4	1.2～1.5	6
NE300-4T0075G/0110PB	40	32	M4	1.2～1.5	6	M4	1.2～1.5	6
NE300-4T0110G/0150PB	63	40	M4	1.2～1.5	6	M4	1.2～1.5	6
NE300-4T0185G/0220PB	100	63	M5	4～6	10	M5	4～6	10
NE300-4T0220G/0300PB	100	100	M5	4～6	16	M5	4～6	16

Table 3-3 NE300-4T0300G/0370P and above

Drive Mode	Circuit Breaker（A	Contactor（A）（A）	R、S、T、P1、(+)、PB、(-)、U、V、W			Grounding terminal		
			Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)
NE300-4T0300G/0370P	125	100	M6	4～6	25	M6	4～6	16
NE300-4T0370G/0450P	160	100	M6	4～6	25	M6	4～6	16
NE300-4T0450G/0550P	200	125	M8	10～12	35	M8	10～12	16
NE300-4T0550G/0750P	200	170	M10	20～25	50	M8	10～12	25
NE300-4T0750G/0900P	250	230	M10	20～25	60	M8	10～12	35
NE300-4T0900G/1100P	315	250	M10	20～25	70	M8	10～12	35
NE300-4T1100G/1320P	350	330	M10	20～25	100	M8	10～12	50
NE300-4T1320G/1600P-U	400	330	M12	40～45	150	M10	20～25	75
NE300-4T1320G/1600P-D	400	330	M12	40～45	150	M10	20～25	75
NE300-4T1600G/1850P-U	500	400	M12	40～45	185	M10	20～25	50×2
NE300-4T1600G/1850P-D	500	400	M12	40～45	185	M10	20～25	50×2
NE300-4T1600G/1850P-F	500	400	M12	40～45	185	M10	20～25	50×2
NE300-4T1850G/2000P-U	400	330	M12	40～45	150	M10	20～25	50×2
NE300-4T1850G/2000P-D	400	330	M12	40～45	150	M10	20～25	50×2
NE300-4T1850G/2000P-F	500	400	M12	40～45	185	M10	20～25	50×2
NE300-4T2000G/2200P-U	630	500	M12	40～45	240	M10	20～25	60×2
NE300-4T2000G/2200P-D	630	500	M12	40～45	240	M10	20～25	60×2
NE300-4T2000G/2200P-F	630	500	M12	40～45	240	M10	20～25	60×2
NE300-4T2200G/2500P-U	800	630	M12	40～45	150×2	M10	20～25	75×2

NE300-4T2200G/2500P-D	800	630	M12	40～45	150×2	M10	20～25	75×2
NE300-4T2200G/2500P-F	800	630	M12	40～45	150×2	M10	20～25	75×2
NE300-4T2500G/2800P-U	1000	630	M12	40～45	150×2	M10	20～25	100×2

Drive Mode	Circuit Breaker（A	Contactor（A）(A)	R、S、T、P1、(+)、PB、(-)、U、V、W			Grounding terminal PE		
			Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm^2)
NE300-4T2500G/2800P-D	1000	630	M12	40～45	150×2	M10	20～25	100×2
NE300-4T2500G/2800P-F	1000	630	M12	40～45	150×2	M10	20～25	100×2
NE300-4T2800G/3150P-F	1000	800	M12	40～45	185×2	M10	20～25	125×2
NE300-4T3150G/3550P-F	1200	800	M12	40～45	240×2	M10	20～25	150×2
NE300-4T3550G/4000P-F	1280	960	M16	100～120	240×2	M12	40～45	185×2
NE300-4T4000G/4500P-F	1380	1035	M16	100～120	185×3	M12	40～45	185×2
NE300-4T4500G/5000P-F	1450	1150	M16	100～120	185×3	M12	40～45	240×2
NE300-4T5000G/5600P-F	1720	1290	M16	100～120	185×3	M12	40～45	240×2
NE300-4T5600G/6300P-F	1900	1450	M16	100～120	185×3	M12	40～45	240×2
NE300-4T6300G/7100P-F	2200	1630	M16	100～120	240×3	M12	40～45	240×2
NE300-4T7100G/8000P-F	2550	1830	M16	100～120	240×3	M12	40～45	240×2
NE300-4T8000G/9000P-F	2950	2050	M16	100～120	240×3	M12	40～45	240×2

3.4 Terminal configuration of main circuit

◆ 3.4.1 NE200-0004GB~0015GB

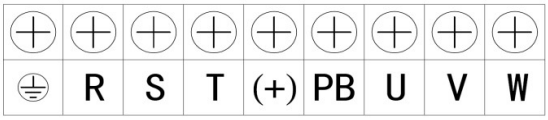


Fig.3-2 3 phase 400V main circuit wiring terminals
(0004GB ~ 0015GB)

Terminal symbol	Terminal description
⏚	Grounding terminal PE
R, S	Single-phase AC input terminals
R, S, T	Three-phase AC input terminals
(+)、PB	Terminals reserved for braking resistor
U、V、W	Three-phase AC output terminals

◆ 3.4.2 NE200-0022GB~0040GB

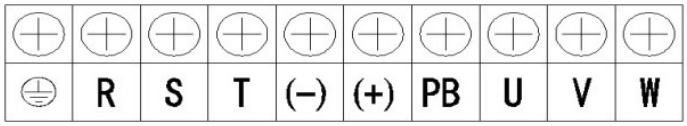


Fig.3-3 3 phase 400V main circuit wiring terminals (0022GB~0040GB)

Terminal symbol	Terminal description
⏚	Grounding terminal PE
R, S	Single-phase AC input terminals
R, S, T	Three-phase AC input terminals
(-), (+)	DC bus - + terminals for common bus DC input
(+), PB	Terminals reserved for braking resistor
U, V, W	Three-phase AC output terminals

◆ 3.4.3 NE300-4T0015G/0022PB~NE300-4T0220G/0300PB

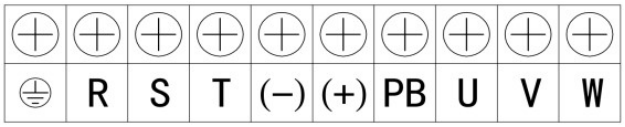


Fig.3-4 3 phase 400V main circuit wiring terminals

(0015G/0022PB~0220G/0300PB)

Terminal symbol	Terminal description
⏚	Grounding terminal PE
R、S、T	Three-phase AC input terminals
(-)、 (+)	DC bus - + terminals for common bus DC input
(+)、PB	Terminals reserved for braking resistor
U、V、W	Three-phase AC output terminals

- **3.4.4 NE300-4T0300G/0370P~NE300-4T1100G/1320P**

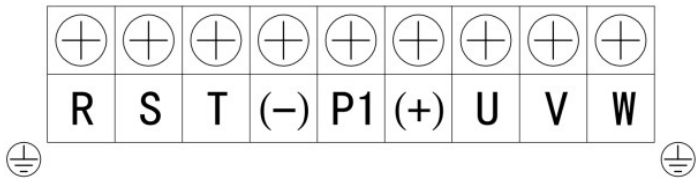


Fig.3-5 3 phase 400V main circuit wiring terminals

(0300G/0370P~1100G/1320P)

Terminal	Terminal description
⏚	Grounding terminal PE
R、S、T	Three-phase AC input terminals
(-)、 (+)	DC bus - + terminals for common bus DC input
P1、(+)	Reserved for DC reactor connecting terminal; Short circuited with copper plate as factor setting
U、V、W	Three-phase AC output terminals

- **3.4.5 NE300-4T1320G/1600P-U~NE300-4T2500G/2800P-U**

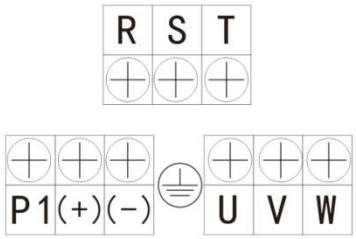


Fig.3-6 3 phase 400V main circuit wiring terminals
(1320G/1600P-U~2500G/2800P-U)

- **3.4.6 NE300-4T1320G/1600P-D~NE300-4T2500G/2800P-D**

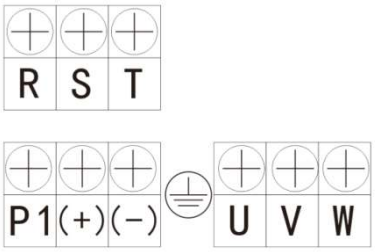


Fig.3-7 3 phase 400V main circuit wiring terminals
(1320G/1600P-D~2500G/2800P-D)

- **3.4.7 NE300-4T1600G/1850P-F~NE300-4T8000G/9000P-F**

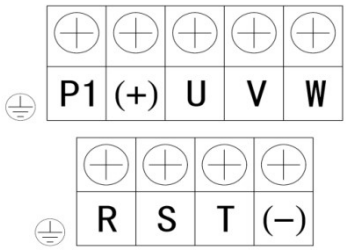


Fig.3-8 3 phase 400V main circuit wiring terminals
(1600G/1850P-F~8000G/9000P-F)

Terminal	Terminal description
⏚	Grounding terminal PE
R、S、T	Three-phase AC input terminals
(-)、 (+)	DC bus - + terminals for common bus DC input
P1、(+)	Reserved for DC reactor connecting terminal; Short circuited with copper plate as factor setting
U、V、W	Three-phase AC output terminals

3.5 Attention for Main Circuit Wiring

3.5.1 Power Supply Wiring

- It is forbidden to connect the power cable to the drive output terminals; otherwise, the internal components of the drive will be damaged.
- To facilitate the input side over current protection and power failure maintenance, the drive shall connect to the power supply through the circuit breaker or leakage circuit breaker and contactor.
- Please confirm that the power supply phases, rated voltage are consistent with that of the nameplate, otherwise, the drive may be damaged.

3.5.2 Motor Wiring

- It is forbidden to short circuit or ground the drive output terminals; otherwise the internal components of the drive will be damaged.
- Avoid short circuit the output cable and the drive enclosure, otherwise there is the risk of electric shock.
- It is forbidden to connect the output terminals of the drive to the capacitor or LC/RC noise filter with phase lead, otherwise, the internal components of the drive may be damaged.
- When contactor is installed between the drive and the motor, it is

forbidden to switch on/off the output contactor during the running of the drive; otherwise, there will be large current flowing into the drive, triggering the drive protection action.

◆ Length of cable between the drive and motor

If the cable between the drive and the motor is too long, the higher order harmonic leakage current will cause impact on the drive and the peripheral devices. It is suggested that output AC reactor be installed when the motor cable is longer than 100m, and that carrier frequency be set as follows:

Cable length between drive and motor	Less than 50 m	Less than 100 m	More than 100 m
Carrier frequency(F0.15)	Less than 10kHz	Less than 6kHz	Less than 4kHz

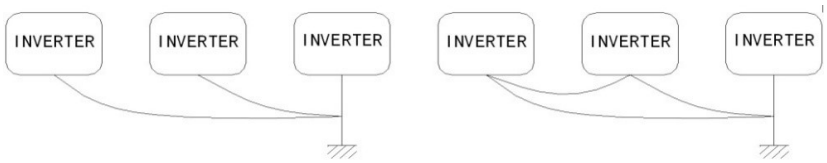
3.5.3 Grounding Wiring

◆ The drive will produce leakage current. The higher the carrier frequency is, the larger the leakage current will be. The leakage current of the drive system is more than 3.5mA, and the exact value of the leakage current is determined by the site conditions. To ensure the safety, the drive and the motor must be grounded.

◆ The grounding resistance shall be less than 10ohm. For the grounding wire diameter requirement, refer to *3.3 Main circuit peripheral devices guide*.

◆ Do not share grounding wire with the welding machine and other power equipment.

◆ In the applications with more than 2 drives, keep the grounding wire from forming a loop.



Correct Wrong

Fig.3-9 Grounding Wiring

3.5.4 Countermeasures against conduction and radiation interference

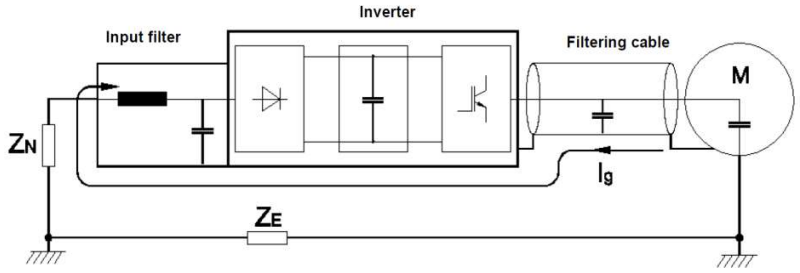


Fig.3-10 Countermeasures for Conduction and Radiation Interference

- When the input noise filter is installed, the wire connecting the filter to the drive power input terminal shall be as short as possible.
- The filter enclosure and mounting cabinet shall be large area reliably gounded to reduce the back flow impedance of the noise current Ig.
- The wire connecting the drive and the motor shall be as short as possible. The motor cable adopts 4-core cable, among which the grounding wire shall be one end grounded at the drive side, the other end connected to the motor enclosure. The motor cable shall be sleeved into the metal tube.
- The input power wire and output motor wire shall be kept away from each other as long as possible.

- The equipment and signal cables vulnerable to interference shall be kept far away from the drive.
- Key signal cables shall adopt shielding cable. It is suggested that the shielding layer shall be grounded with 360-degree grounding method and sleeved into the metal tube. The signal cable shall be kept far away from the drive power input wire and output motor wire. If the signal cable must cross the power input wire and output motor wire, they shall be laid orthogonal.
- When analog input of voltage or current is adopted for remote frequency setting, twisted shielding cable shall be used. The shielding layer shall be connected to the grounding terminal PE of the drive, and the signal cable shall be no longer than 50m.
- The wiring of TA/TB/TC shall be separated from wiring of other main circuit terminals.
- It is forbidden to short circuit the shielding layer and other signal cables or equipment.

3.6 Control Terminal Wiring

3.6.1 Control Terminal Wiring of NE200

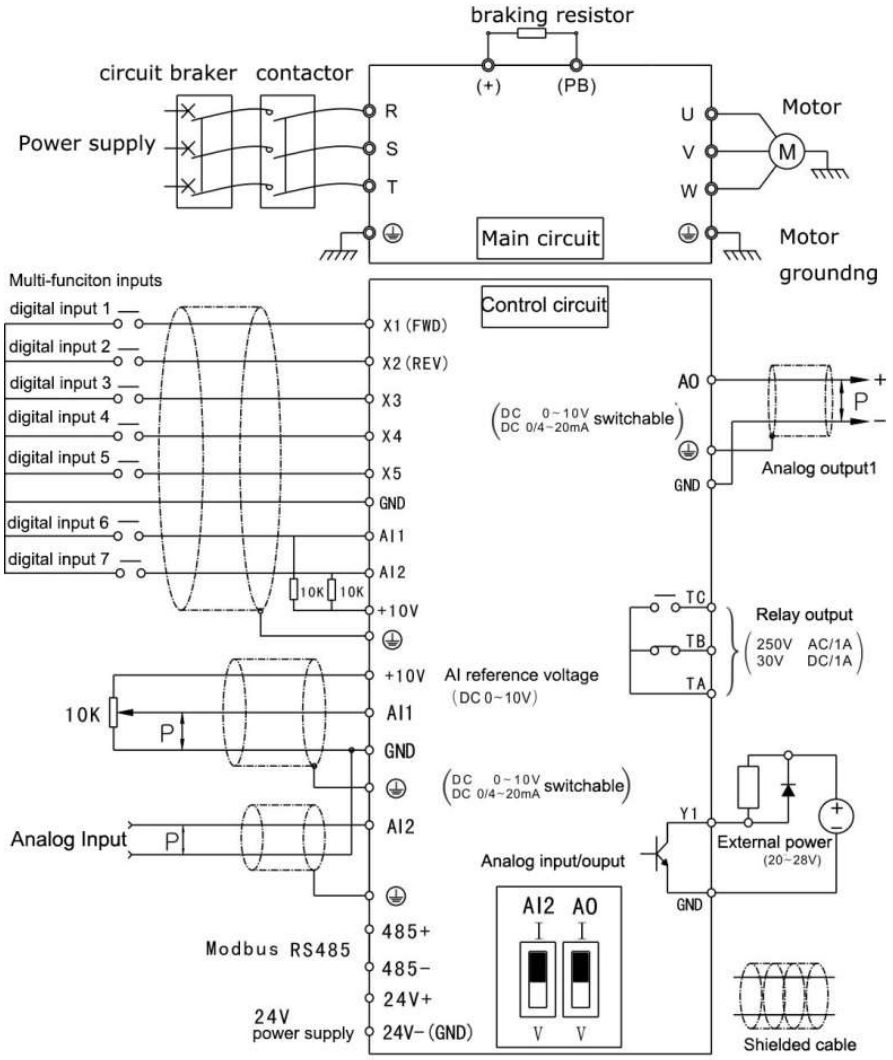


Fig.3-11 Control Terminal Wiring of NE200

3.6.2 Control Terminal Wiring of NE300

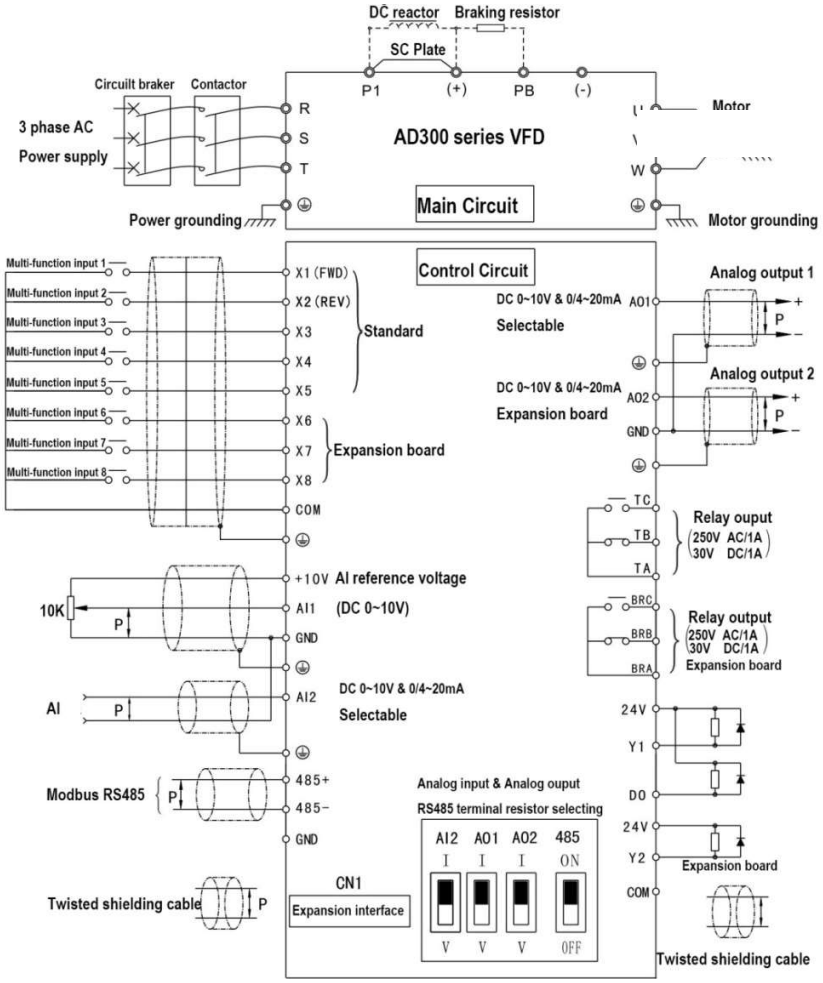


Fig 3-12 Control Terminal Wiring of NE300

3.7 Functions of Control Circuit Terminals

3.7.1 NE200 Standard configuration of control circuit terminals

Type	Termina	Terminal function	Technical specification
Digital input & output	X1～X5	Multi-functional input terminals 1～5	Optical-isolator input Frequency range:：0～200Hz Voltage range: 0～12V
	Y1	Open collector output	Optical-isolator output maximum output current: 50mA Output voltage range：0～24V
	GND	Terminal ref. grounding	
	24V	24V	24V±5%, Maximum load :200mA, with overload and short circuit protection
Analog input	10V	Analog input reference voltage	Open circuit voltage up to 11V; Maximum output 30mA
	AI1	Analog input channel 1	Input Voltage range：0～10V Input impedance：100kΩ
	AI2	Analog input channel 2	Input Voltage range：0～10V Input impedance：100kΩ Input current range：0～30mA Current Input impedance： 500Ω, 0~20mA or 0~10V analog input can be selected through DIP switch SW1
	GND	Terminal ref. grounding	
Analog output	AO	Analog output 1	0～20mA: Allowed load impedance 200~500Ω 0～10V: Allowed load impedance ≥1kΩ. With SC protection; 0~20mA or 0~10V analog output can be selected through DIP switch SW2

Type	Termina	Terminal function	Technical specification
	GND	Analog grounding	
Relay output	TA/TB/ TC	Relay output 1	TA－TB：NC; TA－TC：NO Contact capacity：250VAC/1A，30VDC/1A
RS485	485+	485 differential positive	Rate: 1200/2400/4800/9600/19200/38400bps; Max. parallel 127 No.s; SW3 select adapted resistor; Max. Length 500m. (twisted shielding cable)
	485-	485 differential negative	
	GND	486 shielding grounding	Internal isolated with COM

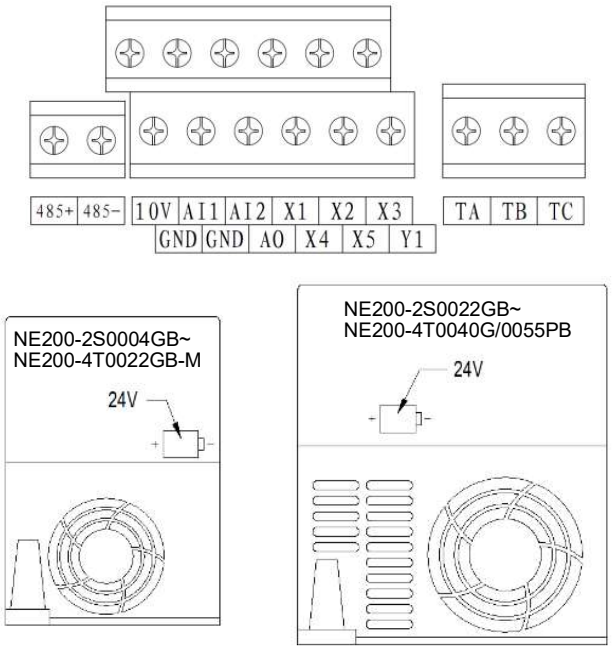


Fig.3-13 Arrangement of Control Circuit Terminals

3.7.1.1 NE200 Control Circuit Connection

- External controller Dry contacts wiring mode is as below. (for X1-X5 multifunction input)

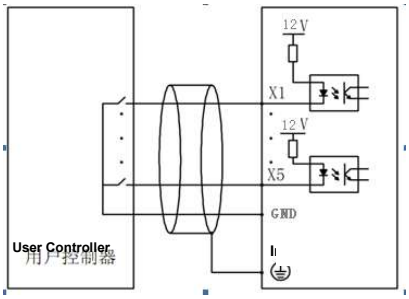


Fig.3-14 Control circuit wiring instruction

- External controller PNP/NPN with common emitter wiring mode is as below. (for X1-X5 multifunction input)

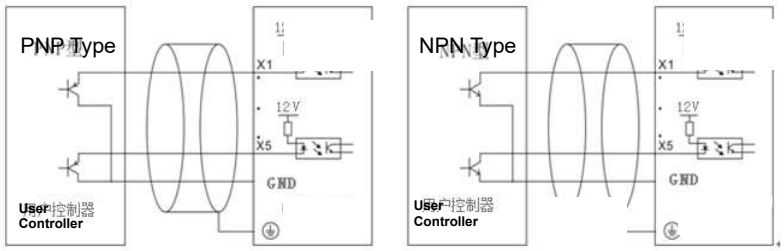


Fig.3-15 PNP/NPN common emitter wiring mode

- Y1 multi-functional output terminal adopt external power supply wiring mode.

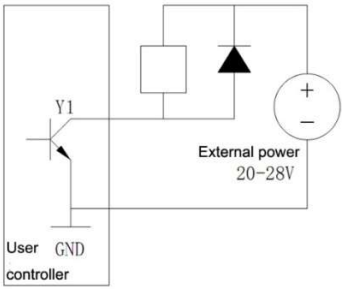


Fig.3-16 Y1 wiring mode of external power supply

- Analog input wiring mode

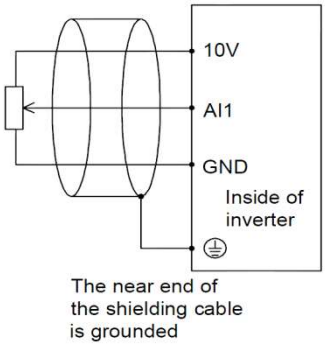


Fig.3-17 Wiring mode of analog input terminal

- Keypad Interface

Table 3-3 T568B Standard

Pin No.	Color	Pin No.	Color
1	Orange/White	8	Brown
2	Orange		
3	Green/White		
4	Blue		
5	Blue/ White		
6	Green		
7	Brown/White		

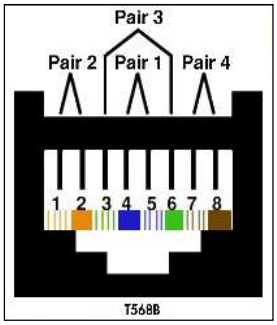


Fig.3-18 T568B standard

The cables connecting keypad and control board use standard RJ-45 Interface, namely both sides are connected according to EIA/TIA568B standard. Users can make the cable by themselves or purchase general internet cable from market as keypad cable.

3.7.2 NE300 Standard configuration of control circuit terminals

Type	Termina	Terminal function	Technical specification
Digital input	X1 ～ X3	Multi-functional input terminals 1～3	Optical-isolator input Frequency range:：0～200Hz Voltage range: 0～24V
	X4 X5	Multi-functional input or Single pulse input 4, 5	Multi-functional input：same as X1～X3 Single Pulse input:：0.1Hz～50kHz Voltage range：0～24V
	COM	multi-functional input terminals common end	Internal isolated with GND
Digital output	24V	24V	24V±5%, Maximum load :200mA, with overload and short circuit protection
	Y1	Open collector output 1	Optical-isolator output maximum output current: 50mA Output voltage range：0～24V

Type	Termina	Terminal function	Technical specification
	DO	Open collector or high speed pulse output	Output frequency: 0～50kHz Can be used as the normal open collector.
	COM	Open collector output common end	Internal isolated with GND
Analog input	10V	Analog input reference voltage	Open circuit voltage up to 11V; Internal isolated with com; Maximum load 30mA，with overload and short circuit protection
	AI1	Analog input channel 1	Input Voltage range：0～10V Input impedance：100kΩ
	AI2	Analog input channel 2	Input Voltage range：0～10V Input impedance：100kΩ Input current range：0～30mA Current Input impedance： 500Ω, 0~20mA or 0~10V analog input can be selected through DIP switch SW2
	GND	Analog grounding	Internal isolated with COM
Analog output	AO1	Analog output 1	0/4～20mA: Allow output impedance 200~500Ω 0～10V: Allowed output impedance ≥10kΩ. With SC protection; 0~20mA or 0~10V analog output can be selected through DIP switch SW1
	GND	Analog grounding	Internal isolated with COM
Relay output	TA/TB/ TC	Relay output 1	TA－TB：NC; TA－TC：NO Contact capacity：250VAC/1A，30VDC/1A
RS485	485+	485 differential positive	Rate:

Type	Termina	Terminal function	Technical specification
	485-	485 differential negative	1200/2400/4800/9600/19200/38400bps; Max. parallel 127 No.s; SW3 select adapted resistor; Max. Length 500m. (twisted shielding cable)
	GND	486 shielding grounding	Internal isolated with COM

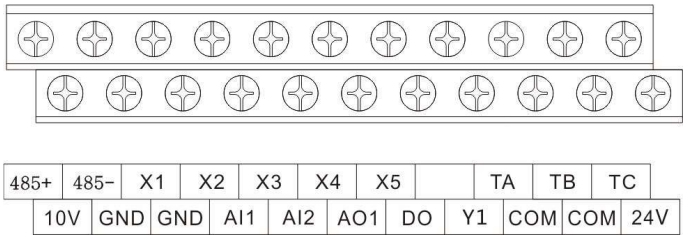


Fig.3-19 Arrangement of Control Circuit Terminals

3.7.2.1 NE300 Control Circuit Connection

- External controller Dry contacts wiring mode is as below. (for X1-X5 multifunction input)

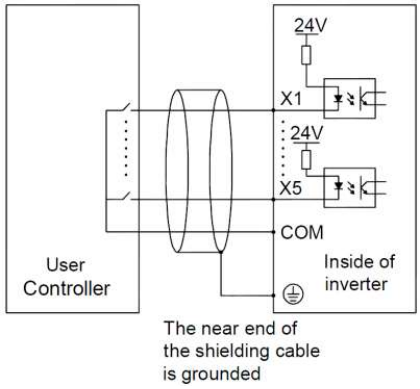


Fig.3-20 Control circuit wiring instruction

- External controller PNP/NPN with common emitter wiring mode is as below. (for X1-X5 multifunction input)

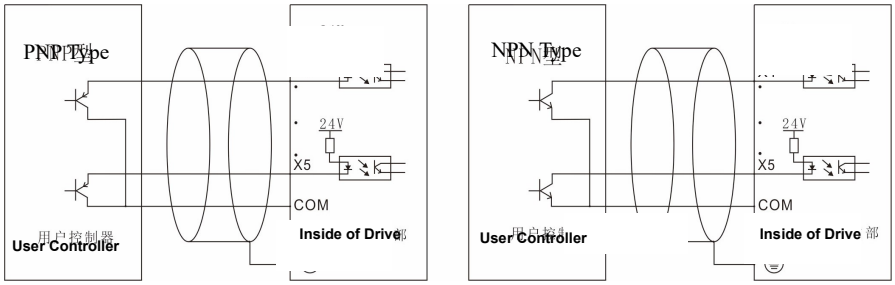


Fig.3-21 PNP/NPN common emitter wiring mode

- Y1/Y2, DO: The multi-functional output terminals adopt drive internal +24V power supply wiring mode.

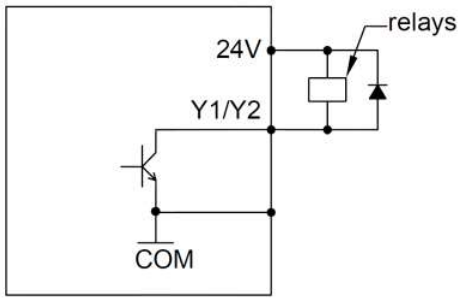


Fig.3-22 wiring mode of internal +24V power supply

- Y1/Y2, DO: The multi-functional output terminals adopts external power supply wiring mode

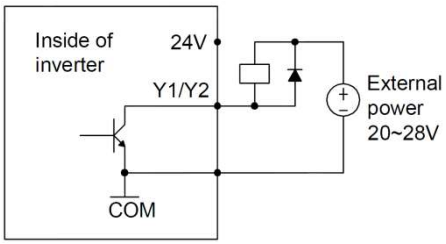


Fig.3-23 External power supply wiring mode

- Analog input wiring mode

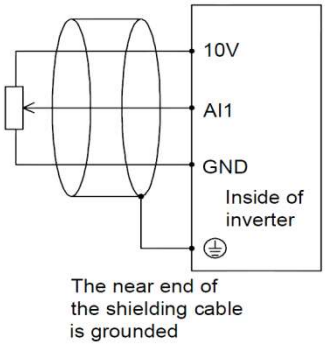


Fig.3-24 Wiring mode of analog input terminal

- Keypad Interface

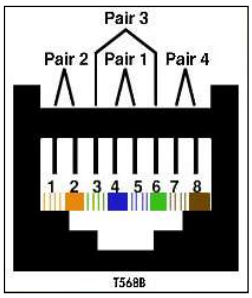


Fig.3-25 T568B standard

Pin No.	Color
1	White/Orange
2	Orange
3	Green/White
4	Blue
5	Blue/ White
6	Green
7	Brown/White
8	Brown

Table 3-5 T568B standard

The cables connecting keypad and control board use standard RJ-45 Interface, namely both sides are connected according to EIA/TIA568B standard. Users can make the cable by themselves or purchase general internet cable from market as keypad cable.

3.8 Control board schematic drawing

3.8.1 NE200 Control board schematic drawing

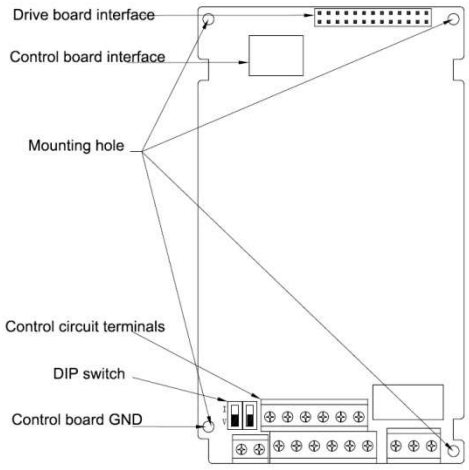


Fig.3-26 Control board schematic drawing

3.8.1.1 NE200 DIP switch setting instruction

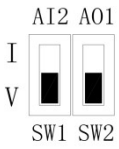


Fig.3-27 NE200 DIP switch setting

Terminal	Function	Default
AI2	I: 0~20mA input; V: 0～10V input	0～10V
AO1	I: 0~20mA output; V: 0～10V output	0～10V

3.8.2 NE300 Control board schematic drawing

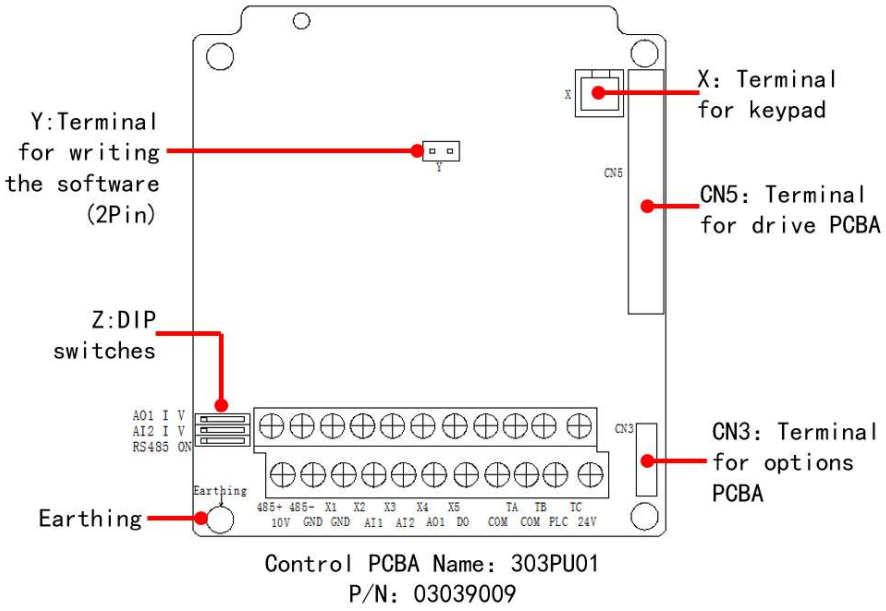


Fig.3-28 Control board schematic drawing

Note: X, Y and Z indicates the terminal, there are no the printing symbols. There are no printing symbols on 303PU01.

X: Terminal for keypad

Y: Terminal for writing the software. (2Pin terminal）

Z: DIP switches

CN3: Terminals 1 for options PCBA

CN5: Terminal for drive PCBA

Earthing: Earthing point of control PCBA

3.8.2.1 NE300 Control circuit periphery accessories selection

Terminal codes	Terminal screw	Tightening torque(N·m)	Wire Spec.mm^2	Type of Wire

10V, AI1, AI2, AO1, GND 485+, 485-	M3	0.5～0.6	0.75	Twisted pair Shielded cable
24V, X1, X2, X3, X4, X5, COM, Y1, DO, COM, TA, TB, TC	M3	0.5～0.6	0.75	Shielded cable

3.8.2.2 NE300 DIP switch setting instruction

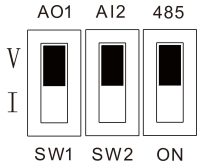


Fig.3-29 NE300 DIP switch setting

Terminal	Function	Default
AI2	I for current input(0/4~20mA); V for voltage input (0～10V)	0～10V
AO1	I for current output(0/4~20mA); V for voltage output (0～10V)	0～10V
RS485	User selected resistor	ON

Chapter 4 Operation and Display

4.1 Keypad

The keypad of NE200/300 series drives is the main unit of accepting command, displaying and modifying parameters. This series has 2 types of LED/LCD(Optional) keypads. LED keypad is with potentiometer and the LCD is MFK key without potentiometer. The LED keypad outline is as follows.

LED keypad model name：B302MA11，part No.: 02359005。
LCD keypad model name ：NEF-LCD01, part No.：02359006。

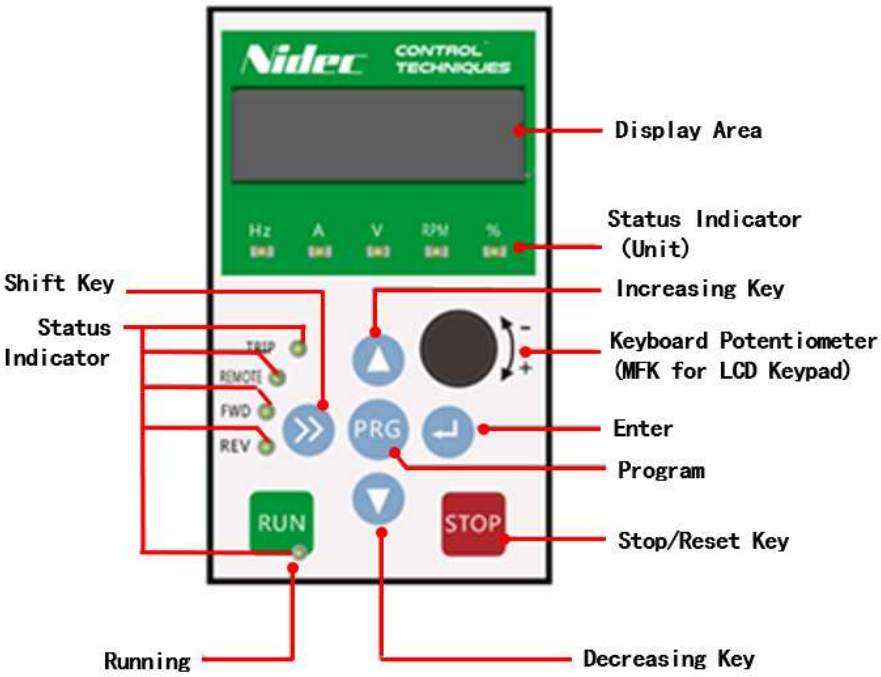


Fig.4-1 Keypad Diagram

4.1.1 Keypad button description

Table 4-1 Button description

Keys	Name	Function
PRG	Programming key	Entry and exit of primary menu
ENTER	Confirmation key	Enter the next level menu or confirm the data setting
∧	Increase key	Increase of the value or function code
∨	Decrease key	Decrease of the value or function code
>>	Shift key	Select the to be displayed parameters in turn under stop interface or running interface; Choose the to be modified digits when setting parameters.
RUN	Running key	Run the drive under keypad operation mode.
STOP	Stop/reset	Stop the drive at running status; Reset operation in the fault alarm status. Its function is limited to setting of code FE.02.
Knob	Potentiometer	Adjust setting value when potentiometer is set up as input. (For LED keypad)
MFK	Multi-Function key	MFK's function is set by FE.01(0~7). The function is different while FE.01 is equal to the different value. (For LCD keypad)

4.1.2 Keypad indicators

Table 4-2 Descriptions of Indicators

Symbol of Indicator		Meanings
Running Status	RUN	Light On: Running Light Off: Stopped Blinking: Running at zero frequency
	FWD	Light On: Running forward steadily Light Off: Running reverse or stop Light Blinking: Speed up or speed down forward
	REV	Light On: Running reverse steadily Light Off: Running forward or stop Blinking: Speed up or speed down reverse

	TRIP	Light On: Trip (Fault) Light off: Normal
	REMOT	Light On: Be controlled by the terminals Light Off: Be controlled by the keypad Blinking: Be controlled by communication.
Unit	Hz	Light On: Current frequency is running frequency Blinking: Current frequency is set frequency
	A	Current unit indicator
	V	Voltage unit indicator
	RPM	Light On: Current speed is running speed Blinking: Current speed is set speed
	%	Light on: Current value is running data Blinking: Current value is set data
	Hz+A	Light on: Current value is PID running value Blinking: Current value is the setup PID value

4.1.3 Digital display zone

It is four-digit LED display. Be able to display setup frequency, output frequency, various monitoring data and alarm code

.

4.2 Function code viewing and modification

The keypad of the NE200/300 drive adopts three levels menu structure to carry out operations such as parameter setting. The three levels are:

1. Groups of function code (level-1 menu)
2. Function code (level-2 menu)
3. Function code setup value(level-3 menu)

Note:

At level 3 menu, pressing PRG key or ENTER key can return to level-2 menu. The difference between them is that: Pressing ENTER will save the setup and return to the level 2 menu and then automatically shift to the next function code; while pressing PRG key will directly return to level 2 menu

without saving the parameter, and stay at current function code.

Below is the example of modifying the function code F9.01 from 10.00Hz to 20.00Hz. (The number of bigger font size refers to the blinking digit),

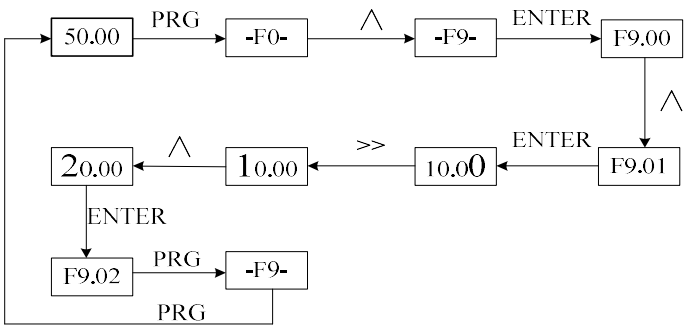


Fig.4-2 Example of 3 levels menu operating

At level-3 menu, if the parameter has no blinking digit, it indicates that this function code cannot be modified. The possible reasons include:

1) The function code is an unchangeable parameter, such as actual detection parameter, running record parameter, etc.

2) The function code cannot be modified in running status. It can be modified only after the drive running is stopped.

4.3 Display status of keypad

Displaying status include the stopped state parameter display, the running status parameter display, the function code edition display and the fault warning condition display etc.

1) The stop status parameter display

The drive is at stop state. The LED displays the stop state parameters. You can press “>>” to by turns display different parameters at stop state. (User can set which parameters are to be displayed at stop state in FE group function codes.)

2) The running state parameter display

The drive is running and the LED displays the running state parameters. You can press “>>” to display by turns the different running state parameters. (User can set which parameters are to be displayed at running state in FE group function codes.)

3) Fault and warning state

If the drive has detected a warning signal, it comes into warning state and blinks the warning code. If the warning signal disappeared, the warning code will automatically disappear.

If the drive has detected an error, it comes into fault state and show the fault code steadily. And the indicator TRIP will light on. By pressing the “>>”key, user can view the parameters value of stop state. If you want to see the details of fault information, press the “PRG” key to enter programming state and check parameter group FF.

User can reset the drive by STOP key, terminal or communication. If the fault signal still exists, the keypad keeps displaying the fault code.

4) Function code setting state

No matter it is under stop state, running state or warning/fault state, it is valid to press PRG key to enter parameter setting. The detailed setting method is instructed in this manual section-4.2.

4.4 Password Setting

The drive provides user password setting function. When FP.00 is set to non-zero value, which is the user password, the password protection turns valid after exiting the editing status. When the user goes to FP group again and presses ENTER, it shows “0000”. Correct password should be input to unlock the protection status to enter FP group again. To disable this password protection, user need to input the correct password first and then change FP.00=0.

Chapter 5 Parameters Brief

Attention:

"○"means the parameter can be changed during running.

"×"means the parameter cannot be changed during running;

"*" means the parameter is detected value or fixed value and not changeable.

"-" means manufacturer parameter and the users have no access to it.

"②" indicates this parameter is only for NE200

"③"indicates this parameter is only for NE300

F0: Basic function group

Code	Description	Setting range	Default	Modify
F0.00	②Reserved	Reserved	Reserved	-
F0.00	③Drive type display	0~1	0	×
F0.01	②Control mode	0: No vector Sensor vector control-1 1: No vector Sensor vector control-2 2: Reserved 3: V/F control	0	×
	③Control mode	0: No vector Sensor vector control-1 1: No vector Sensor vector control-2 2: Vector control with encoder 3: V/F control	0	×
F0.02	Run command control mode	0: Keypad control 1: Terminal control 2: Communication control	0	○

Code	Description	Setting range	Default	Modify
F0.03	Frequency reference1 (Freq. ref.1)	0: Digital reference (keypad, terminal up/down) 1: AI1 2: AI2 3: PULSE setup 4: Communication 5:MS (Multi-step) Speed 6: PLC 7: PID 8: Keypad potentiometer	0	○
F0.04	Frequency reference2 (Freq. ref.2)	1: AI1 2: AI2 3: PULSE setup 4: Communication 5:MS (Multi-step) Speed 6: Reserved 7: Reserved 8: Keypad potentiometer	1	○
F0.05	Frequency setting selection	0:Freq. ref.1 1:Freq. ref.2 2: Freq. ref.1+ Freq. ref.2 3: Switch between Freq. ref.1 & Freq. ref.2 by terminal 4: Switch between (Freq. ref.1+ Freq. ref.2) & Freq. ref.1 by terminal 5:MIIN (Freq. ref.1, Freq. ref.2) 6:MAX (Freq. ref.1, Freq. ref.2)	0	○
F0.06	UP/DOWN Preset freq.	0~ Max frequency	50.00Hz	○
F0.07	Terminal UP/ DOWN rate	0.01~ 50.00Hz/s	1.00Hz/s	○
F0.08	UP/DOWN function source select	0: Keypad and terminal 1: Keypad 2: Terminal	1	○
F0.09	UP/DOWN data saving selection	0: Be saved in power failure 1: Be saved in power failure 2: Be cleared to 0 after stop	0	○
F0.10	Basic frequency	0.10～550.0Hz	50.00Hz	×

Code	Description	Setting range	Default	Modify
F0.11	Max frequency	MAX[50.00Hz, Freq. upper limit, Reference frequency]~550.0Hz	50.00Hz	×
F0.12	Freq. upper limit	Freq. lower limit ~ Max frequency	50.00Hz	×
F0.13	Freq. lower limit	0.00~Frequency upper limit	0.00Hz	×
F0.14	Max output voltage	110~440V	Depend on model	×
F0.15	Carrier freq.	1.0~16.0KHz	Depend on model	○
F0.16	Carrier freq. auto-adjust	0: disable 1: able	0	○
F0.17	Keypad direction	0: Forward 1: Reverse	0	○
F0.18	Motor wiring direction	0: Positive sequence 1: Reversed sequence	0	×
F0.19	Acc. time1	0.1～3600s	Depend on model	○
F0.20	Dec. time1	0.1～3600s	Depend on model	○

Group F1: Start and stop control

Code	Description	Setting range	Default	Modify
F1.00	②Start mode	0: Start directly 1: DC injection brake first and then start at start freq.	0	○
	③Start mode	0: Start directly 1: DC injection brake first and then start at start freq. 2: Speed tracking and start	0	○
F1.01	Start freq.	0.10~60.00Hz	0.50Hz	○
F1.02	Start freq. hold time	0.0~10.0s	0.0s	○
F1.03	②DC brake current at start	G: 0.0~100.0% rated current	0.00%	○
F1.03	③DC brake	G: 0.0~100.0% rated current	0.00%	○

Code	Description	Setting range	Default	Modify
	current at start	P: 0.0~80.0% rated current		
F1.04	DC brake time at start	0.0～30.0s	0.0s	○
F1.05	Acc./Dec. mode	0: Linear 1: S-curve	0	○
F1.06	Time of S-curve initial stage	10.0～50.0% (Acc./ Dec. time) F1.06+F1.07≤90%	30.00%	○
F1.07	Time of S-curve rising stage	10.0~80.0%（Acc./ Dec. time） F1.06+F1.07≤90%	40.00%	○
F1.08	Stop mode	0: Deceleration to stop 1: Coast to stop 2: Deceleration +DC braking	0	×
F1.09	DC brake trigger frequency at stop	0.00～550.0Hz	0.00Hz	○
F1.10	DC brake waiting time at stop	0.00～10.00s	0.00s	○
F1.11	②DC brake current at stop	0.0~100% rated current	0.00%	○
	③DC brake current at stop	Type G: 0.0~100.0% rated current Type P: 0.0~80.0% rated current	0.00%	○
F1.12	DC brake time at stop	0.0～30.0s	0.0s	○
F1.13	Energy consumption brake validity	0: Disabled 1: Enabled	0	○
F1.14	Energy consumption brake action voltage	380V: 650~750V 220V: 360~390V	700V 380V	○
F1.15	Power failure and fault restart	0: Disable 1: Enabled for power failure 2: Enabled for fault 3: Enabled for both Note: Power recovery restart is	0	○

Code	Description	Setting range	Default	Modify
		only valid for terminal 2-wires mode. Fault restart is invalid for under-voltage fault.		
F1.16	Waiting time for restart	0.0～3600s	2.0s	○
F1.18	③Rotational speed tracking direction inspection	0: Disable 1: Enable	0	○
F1.19	③Rotational speed tracking direction inspection time	10~1000ms	50ms	○

Group F2: Auxiliary running function

Code	Description	Setting range	Default	Modify
F2.00	Jog running freq.	0.0～50.00Hz	5.00Hz	○
F2.01	Jog Acc. time	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.02	Jog Dec. time	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.03	Acc. time2	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.04	Dec. time2	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.05	Acc. time3	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.06	Dec. time3	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.07	Acc. time4	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.08	Dec. time4	②0.1～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○
F2.09	②Reserved	Reserved	Reserved	Reserved
	③Skip freq. 1	0.00~320.0Hz	0.00Hz	×
F2.10	③Skip freq. 2	0.00～320.0Hz	0.00Hz	×

Code	Description	Setting range	Default	Modify
F2.11	Skip freq. amplitude	0.00～15.00Hz	0.00Hz	×
F2.12	Anti-Reverse control	0: Reverse rotation allowed 1: Reverse rotation not allowed	0	○
F2.13	Fwd/ Rev switch dead-zone time	0.0～3600s	0.0s	○
F2.14	Freq. lower-limit treatment	0: Run with frequency lower limit 1: Zero frequency operation	0	×
F2.15	Reserved	Reserved	0	×
F2.16	③Energy-saving control select	0: Disable 1: Enable	1	○
F2.17	AVR Function	0: Disabled 1: Enabled 2: Disabled only at speed-down	2	×
F2.18	Over modulation	0: Enabled 1: Disabled	1	×
F2.19	③Droop control	0.00~10.00Hz	0.00Hz	○
F2.20	Fan control mode	0: Auto mode 1: Always Running	0	×
F2.21	Instant-power-failure treatment	0: Disabled ②1: Drop frequency (Reserved) ③1: Drop frequency 2: Stop directly	0	○
F2.22	Instant-power-failure freq. drop point	210～600V	380V:420V 220V:230V	○
F2.23	Instant-power failure freq. drop rate	1-800	400	○
F2.24	Motor speed display ratio	0.00～500.0%	100.00%	○
F2.25	UP/DOWN drop to minus frequency	0: Enabled 1: Disable	1	○
F2.26	ENTER key function	0: No special action 1: FWD/REV switching	0	○

Code	Description	Setting range	Default	Modify
		2: RUN for forward: ; Enter for reverse; STOP for stop 3: Jog running		
F2.27	Freq. resolution	0: 0.01Hz 1: 0.1Hz	0	×
F2.28	Acc./Dec. time unit	0: 0.1s 1: 0.01s	1 ② 0 ③	×
F2.29	High freq. modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	×
F2.31	IO output Freq. baseline select while vector control	0: According to the Freq. after ACC/DEC speed 1: According to the current value	0	○
F2.33	Threshold value of Zero Freq. running	0.00~550.0Hz	0.00Hz	○
F2.34	Range between start Freq. and threshold value of Zero Freq.	0.00~550.0Hz	0.00Hz	○

Group F3: Vector Control Parameters

Code	Description	Setting range	Default	Modify
F3.00	Speed loop proportional gain 1	1~3000	1000	○
F3.01	Speed loop integral time 1	1~3000	300	○
F3.02	Switching frequency 1	0.0～60.00Hz	5.00Hz	○
F3.03	Speed loop proportional gain 2	1~3000	800	○

Code	Description	Setting range	Default	Modify
F3.04	Speed loop integral time 2	1~3000	200	○
F3.05	Switching frequency 2	0.0～60.00Hz	10.00Hz	○
F3.06	Speed loop filter time constant	0～500ms	2ms② 3ms③	○
F3.07	Current loop proportional coefficient	0～6000	3000	○
F3.08	Current loop integral coefficient	0～6000	1500	○
F3.09	VC Slip compensation	0.0～200.0%	100.00%	○
F3.10	②Torque control	0:Torque control Disabled 1:Torque digital setting(F3.11) 2:AI1 3:AI2 4:Reserved 5:communication 6:keypad potentiometer	0	○
	③Torque control	0:Torque control Disabled 1:Torque digital setting(F3.11) 2:AI1 3:AI2 4:Pulse 5:communication 6:keypad potentiometer	0	○
F3.11	Torque digital setting	0.0～200.0%	50.00%	○
F3.12	Torque control speed limit	0: digital setting(F3.13) 1: AI1 2: AI2 3: PULSE 4: communication 5: keypad potentiometer	0	○
F3.13	Torque control speed limit digital	0.00～550.0Hz	50.00Hz	○

Code	Description	Setting range	Default	Modify
	setting			
F3.14	③Encoder pulse number	1~9999	1000	○
F3.15	③Motor and PG reduction ratio	0.010~50.000	1.000	○
F3.16	③PG direction	0: Forward 1: Reverse	0	○
F3.17	ACC/DEC limit controlled by PG	0: Limited 1: No limited	0	○
F3.18	SVC speed calculation filter	0~15	5	○
F3.19	SVC mode	0: Mode1 1: Mode2	0	○
F3.20	SVC mode2 flux weaken coefficient	20~500%	100%	○
F3.21	Flux weaken control selection	0: Disable 1: Enable	0	○
F3.22	Torque limit compensation coefficient while constant power output	60.0～300.0%	85%② 200%③	○
F3.23	Reserved	Reserved	Reserved	Reserved
F3.24	Torque ref. terminal single modulation	0.0~10%	0.00%	○
F3.25	Torque ref. terminal total modulation	0.0~100%	50%	○
F3.26	Torque limit in vector control mode	0~300.0%	150.0%	○
F3.27	Torque boost cut-off frequency in torque control	0.00~15.00Hz	12.00Hz	○

Code	Description	Setting range	Default	Modify
	mode			
F3.28	Torque boost amount in torque control mode	0.0~20.0%	15.0%	○
F3.31	Synchronous motor initial position detection	0：Do not detect 1：Detect in power-on first run 2：Detect every time	2	○
F3.32	Synchronous motor initial position detection current	50~120%	90%	○
F3.33	Initial position detection pulse width	0~1200us	0	○
F3.34	Initial position detection pulse width actual value	0~1200us	0	*
F3.35	Synchronous motor braking torque limit	0.0~300.0%	150.0%	○
F3.36	Synchronous motor flux weaken mode	0：Flux weaken mode is invalid 1：Flux weaken mode is valid	0	○
F3.37	Max flux weaken current	0~100.0%	50%	○
F3.38	Flux weaken regulation proportional coefficient	0~3000	1500	○
F3.39	Flux weaken regulation integration coefficient	0~3000	1500	○
F3.40	Synchronous	0~100%	30%	○

Code	Description	Setting range	Default	Modify
	motor low speed Min. current			
F3.41	Synchronous motor low speed carrier frequency	1.0~16.0KHz	2.0KHz	○
F3.42	Synchronous motor Min excitation current	-100.0~100.0%	8.0%	○
F3.44	Synchronous motor position evaluating low speed filter	2~100	40	○
F3.45	Synchronous motor position evaluating high speed filter	2~100	15	○

Group F4: V/F Control Parameters

Code	Description	Setting range	Default	Modify
F4.00	V/F curve setting	0: Constant torque load V/F 1: 2.0 power decreasing torque 2: 1.5 power decreasing torque 3: 1.2 power decreasing torque 4: Multiple dots V/F	0	×
F4.01	V/F freq. F1	0.0～F4.03	10.00Hz	×
F4.02	V/F voltage V1	0.0～100.0%	20.00%	×
F4.03	V/F freq. F2	F4.01～F4.05	25.00Hz	×
F4.04	V/F voltage V2	0.0～100.0%	50.00%	×
F4.05	V/F freq. F3	F4.03～F0.10	40.00Hz	×
F4.06	V/F voltage V3	0～100.0%	80.00%	×
F4.07	Torque boost	0.0%: Auto boost 0.1～30.0%: Manual boost	0.00%	○
F4.08	Manual torque boost cutoff point	0.00～60.00Hz	50.00Hz	○
F4.09	Slip compensation coefficient	0.0～200.0%	0.00%	○

Code	Description	Setting range	Default	Modify
F4.10	Slip compensation filtering time	0.01～2.55s	0.20s	○
F4.11	V/F separation control voltage source	0: Disabled 1: Digital setting (F4.12) 2: AI1 3: AI2 4: Pulse 5: communication	0	×
F4.12	V/F separation voltage digital setting	0V～max output voltage	38 0V	○
F4.13	V/F separation voltage rising time	0.0s～1000.0s	0.0s	○
F4.14	V/F oscillation suppression	0~500	Depends on model	○

Group F5: Motor Parameters

Code	Description	Setting range	Default	Modify
F5.00	motor type	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: PM motor	0	×
F5.01	Motor polarity number	2~56	4	×
F5.02	rated power	②0.1～6553.5kW ③0.4~999.9kW	Depends on model	○
F5.03	rated current	②0.01～655.35A ③0.1~999.9A	Depends on model	○
F5.04	rated speed	②0～65535RPM ③0～24000 RPM	Depends on model	○

Code	Description	Setting range	Default	Modify
F5.05	No-load current I0	②0.01～655.35A ③0.1～999.9A	Depends on model	○
F5.06	②Stator resistance R1	1～65535mΩ	Depends on model	○
	③Stator resistance R1	1～65535mΩ(Drive rated power≤22kW) 0.1～6553.5mΩ(Drive rated power>22kW)	Depends on model	○
F5.07	②Leakage inductive reactance X	0.01～655.35mH	Depends on model	○
	③Leakage inductive reactance X	0.01～655.35mH(Drive rated power≤22kW) 0.001～65.535mH(Drive rated power>22kW)	Depends on model	○
F5.08	②Rotor resistance R2	1～65535mΩ	Depends on model	○
	③Rotor resistance R2	1～65535mΩ(Drive rated power≤22kW) 0.1～6553.5mΩ(Drive rated power>22kW)	Depends on model	○
F5.09	②Mutual Inductive reactance Xm	0.1～6553.5mH	Depends on model	○
	③Mutual Inductive reactance Xm	0.1～6553.5mH(Drive rated power≤22kW) 0.01～655.35mH(Drive rated power>22kW)	Depends on model	○
F5.10	Auto tune	0: No operation 1: Static tuning 2: Rotary tuning	0	×

Code	Description	Setting range	Default	Modify
F5.11	②Synchronous motor stator resistor Rs	1～65535mΩ	Depends on model	○
	③Synchronous motor stator resistor Rs	1～65535mΩ(Drive rated power≤22kW) 0.1～6553.5mΩ(Drive rated power>22kW)	Depends on model	○
F5.12	②Synchronous motor D-axis inductance Ld	0.01～655.35mH	Depends on model	○
F5.12	③Synchronous motor D-axis inductance Ld	0.01～655.35mH(Drive rated power≤22kW) 0.001～65.535mH(Drive rated power>22kW)	Depends on model	○
F5.13	②Synchronous motor Q-axis inductance Lq	0.01～655.35mH	Depends on model	○
	③Synchronous motor Q-axis inductance Lq	0.01～655.35mH(Drive rated power≤22kW) 0.001～65.535mH(Drive rated power>22kW)	Depends on model	○
F5.14	Synchronous motor counter EMF constant	0.0~6553.5v	300.0v	○

Group F6: Input terminals

Code	Description	Setting range	Default	Modify
F6.00	Terminal Command mode	0: Two-wire mode 1 1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2	0	×
F6.01	X1 terminal Function selection	0: NULL 1: FWD 2: REV 3: RUN 4: F/R direction	1	×
F6.02	X2 terminal Function selection		2	×
F6.03	X3 terminal		8	×

Code	Description	Setting range	Default	Modify
	Function selection	5: HLD self-hold 6: FWD jog run (FJOG) 7: REV jog run (RJOG) 8: RESET 9: Freq. source switching 10: Terminal UP 11: Terminal DOWN 12: UP/DOWN setup clear 13: Coast to stop 14: DC brake 15: Acc./Dec. prohibit 16: Drive running prohibit 17: Multi-step terminal 1 18: Multi-step terminal 2 19: Multi-step terminal 3 20: Multi-step terminal 4 21: torque control disable 22: Acc./Dec. time selector 1 23: Acc./Dec. time selector 2 24: Running pause normally open 25: Running pause normally closed 26: External fault normally open 27: External fault normally closed 28: Run command switch to terminal 29: Run command switch to keypad 30: External stop terminal; same to STOP key in keypad control mode. 31: Reserved 32: PLC status reset 33: Wobble freq. pause		
F6.04	X4 terminal Function selection		17	×
F6.05	X5 terminal Function selection		18	×
F6.06	③X6 terminal Function selection ②AI1 terminal function selection		0	×
F6.07	③X7 terminal Function selection ②AI2 terminal function selection		0	×
F6.08	②Reserve ③X8 terminal function selection		Reserved	×
F6.09	②Reserve ③AI1 terminal function selection		Reserved	×

Code	Description	Setting range	Default	Modify
		34: Wobble freq. status reset 35: PID pause 36: PID parameters switching 37: PID direction reversion; Active this terminal to reverse PID direction set by F8.04. 38: Timing drive input 39: Counter signal input 40: Counter clear 41: Actual length clear 42: FWD running (FWD NC) 43: REV running (REV NC) 44: HLD (Normally open) 45: Increase torque 46: Torque increment clear 47: Decrease torque 48: One key recover user parameters(Valid in stop state) 49~56: Reserved 57: Pulse input (Take X4 in case 2 inputs)		
F6.10	Analog Nonlinear Selection	0: none 1: AI1 2: AI2 3: Pulse	0	×
F6.11	AI1 Min. input	0.00～F6.13	0.00V	○
F6.12	AI1 Min. input corresponding setup	-200.0～200.0%	0.00%	○
F6.13	AI1 Max. input	F6.11～10.00V	10.00V	○
F6.14	AI1 Max. input corresponding setup	-200.0～200.0%	100.00%	○
F6.15	AI1 input filter time	0.01～50.00s	0.05s	○
F6.16	AI2 Min. input	0.00～F6.18	0.00V	○
F6.17	AI2 Min. input corresponding setup	-200.0～200.0%	0.00%	○

Code	Description	Setting range	Default	Modify
F6.18	AI2 Max. input	F6.16～10.00V	10.00V	○
F6.19	AI2 Max. input corresponding setup	-200.0～200.0%	100.00%	○
F6.20	AI2 input filter time	0.01～50.00s	0.05s	○
F6.21	PULSE Min. input	0.00～F6.23	0.00kHz	○
F6.22	PULSE Min. input corresponding setup	-200.0%～200.0%	0.00%	○
F6.23	PULSE Max. input	F6.21～50.00kHz	50.00kHz	○
F6.24	PULSE Max. input corresponding setup	-200.0%～200.0%	100.00%	○
F6.25	Pulse filter time	0.01～50.00s	0.05s	○
F6.26	Terminal up/down initial increment	0.00~10.00Hz	0.01Hz	○
F6.27	Freq. ref.2 datum	0: Max. freq. 1: Freq. ref.1	0	○
F6.28	Delay duration of X1 terminal close	0.0~100.0s	0.0s	○
F6.29	Delay duration of X1 terminal open	0.0~100.0s	0.0s	○
F6.30	Delay duration of X2 terminal close	0.0~100.0s	0.0s	○
F6.31	Delay duration of X2 terminal open	0.0~100.0s	0.0s	○
F6.32	Pos. and Neg. logic terminal X 1	Pos. logic of Xi terminal: Be valid while connecting between Xi and COM. Neg. logic of Xi terminal: Be valid while disconnecting between Xi and COM. Units: Logic of X1 terminal Tens: Logic of X2 terminal	0000	×

Code	Description	Setting range	Default	Modify
		Hundreds: Logic of X3 terminal Thousands: Logic of X4 terminal		
F6.33	②Pos. and Neg. logic terminal X 2	Units: Logic of X5 terminal Tens: Logic of AI1 terminal Hundreds: Logic of AI2 terminal Note: Terminal 24、25、26、27、42、43、44 and 49 are not impacted by this parameter.	0000	×
F6.33	③Pos. and Neg. logic terminal X 2	Units: Logic of X5 terminal Tens: Logic of X6 terminal Hundreds: Logic of X7 terminal Thousands: Logic of X8 terminal Note: Terminal 24、25、26、27、42、43、44 and 49 are not impacted by this parameter.		

Group F7: Output terminal

Code	Description	Setting range	Default	Modify
F7.00	②Reserve	0: NULL 1: RUN 2: Freq. arrival(FAR) 3: Freq. level detection 1 (FDT1) 4: Freq. level detection 2 (FDT2) 5: Freq. detection when speed-up 6: Freq. detection when speed-down 7: Zero-speed running 8: Zero-speed	Reserve	Reserve
	③DO terminal output definition		0	○
F7.01	Y1 terminal output selection		1	○
F7.02	②Reserve		Reserve	Reserve
	③Y2 terminal output selection		0	○

Code	Description	Setting range	Default	Modify
F7.03	Relay 1 (TA/TB/TC) output selection	9: PLC circulation completion 10: Reserved 11: Ready for running (RDY) 12: Timing arrival 13: Counting arrival 14: Reserved 15: Preset torque value arrival 16: Drive fault output 17: Under voltage status output 18: Drive overload pre-warning 19: Fixed-length arrived, level signal 20: PID in dormancy 21: AI1>AI2 22: AI1<F7.16 23: AI1>F7.16 24: F7.16<AI1<F7.17 25: Frequency lower limit arrival 26: Multi-pumps system auxiliary pump control signal 27: Communication setting 28: Drive running time arrival 29: Running in FWD 30: Running in REV 31: Instantaneous power loss processing	16	○
F7.04	②Reserve		Reserve	Reserve
F7.04	③Relay 2 (BRA/BRB/BRC) output selection		0	○
F7.05	Freq. arrival (FAR) detection width	0.00～10.00Hz	2.50Hz	○
F7.06	Frequency detection value 1 (FDT1 level)	0.00～600.0Hz	5.00Hz	○
F7.07	Freq. detection lag1 (FDT1-lag)	0.00～10.00Hz	1.00Hz	○
F7.08	②Frequency detection value 2 (FDT2 level)	0.00～320.0Hz	5Hz	○

Code	Description	Setting range	Default	Modify
	③Frequency detection value 2 (FDT2 level)	0.00～320.0Hz	25.00Hz	○
F7.09	Freq. detection lag2 (FDT2-lag)	0.00～10.00Hz	1.00Hz	○
F7.10	Up detection frequency	0.00～550.0Hz	50.00Hz	○
F7.11	Down detection frequency	0.00～550.0Hz	0.00Hz	○
F7.12	Torque detection reference	0.0～200.0%	100.00%	○
F7.13	Preset Counting arrival value	0～9999	0	○
F7.14	Preset Timing arrival value	0.0～6553.0s	0.0s	○
F7.16	AI1 compare threshold 1	0.00～10.00v	0.00v	○
F7.17	AI1 compare threshold 2	0.00～10.00v	0.00v	○
F7.18	Analog compare hysteresis error	0.00～30.00v	0.20v	○
F7.19	②AO function definition ③AO1 output selection	0: NULL 1: Running freq. (0~max frequency) 2: Setting freq. (0~max frequency) 3: Output current(0～2 times of drive rated current) 4: Output voltage (0～Max Voltage)	1	○
F7.20	②Reserve		Reserve	Reserve
	③AO2 output selection		0	○

Code	Description	Setting range	Default	Modify
F7.21	②Y1 function definition	5: PID setup (0～10V) 6: PID feedback (0～10V) 7: Calibrating signal (5V) 8: Output torque (0～2 times of motor rated torque) 9: Output power (0～2 times of drive rated power) 10: Bus voltage (0~1000V) 11: 9: AI1 (0～10V) 12: AI2 (0～10V/4～20mA) 13: Pulse frequency 14: Communication setting 15: Reserve 16: Current output (0~2 time rated value)	0	○
	③DO output selection		0	○
F7.22	②AO output range selection	0: 0～10V/0～20mA 1: 2～10V/4～20mA	0	○
	③AO1 output range selection			
F7.23	②Reserve	Reserve	Reserve	Reserve
	③AO2 output range selection	0: 0～10V/0～20mA 1: 2～10V/4～20mA	0	○
F7.24	②Gain of AO	1～200%	100%	○
	③Gain of AO1			
F7.25	②Reserve	Reserve	Reserve	Reserve
	Gain of AO2③	1~200%	100%	○
F7.26	②Y1 Max. output pulse freq.	Y1 Min. output pulse freq.～50.00kHz	10.00kHz	○
	③DO Max. output pulse freq.	DO 最小输出脉冲频率～50.00kHz		
F7.27	②Y1 Min. output pulse freq.	0.00～Y1 Max. output pulse freq.	0.00kHz	○
	③DO Min. output pulse freq.	0.00～DO Max. output pulse freq.	0.00kHz	○
F7.28	Auxiliary pump	0～9999s	0	○

Code	Description	Setting range	Default	Modify
	start lag time			
F7.29	Auxiliary pump stop lag time	0～9999s	0	○
F7.30	②Y1 Max. output ③DO Max. output	0: 50.00KHz 1: 500.0Hz	0	×
F7.31	FDT/RUN signal Jog selection	0: Include Jog signal 1: Do not include Jog signal	0	×
F7.32	Running time arrival setup	0~65530Mins	0	○
F7.33	Running time arrival stop selection	0: Do not stop 1: Stop	0	○
F7.34	Ao1 4mA/2.00v adjustable datum	0.0~100.0%	20%	○
F7.35	②Reserve	Reserve	Reserve	Reserve
	③Ao2 4mA/2.00v adjustable datum	0.0~100.0%	20%	○
F7.36	②Digital output terminal Pos./Neg. logic	Units: Logic of Y1 terminal Tens: Reserve Hundreds: Logic of Relay 1 Thousands: Reserve	0000	○
	③Digital output terminal Pos./Neg. logic	Units: Logic of Y1 terminal Tens: Logic of Y2 terminal Hundreds: Logic of Relay 1 Thousands: Logic of Relay 2	0000	○

Group F8: PID Parameters

Code	Description	Setting range	Default	Modify
F8.00	PID setup channel selection	0: PID digital setting（F8.02） 1: AI1 2: AI2 3: Pulse input 4: serial communication	0	○
F8.01	PID feedback	0: AI1	1	○

Code	Description	Setting range	Default	Modify
	channel selection	1: AI2 2: Pulse input 3: serial communication 4: AI1-AI2 5: AI1+AI2 6: MAX(AI1, AI2) 7: MIN(AI1, AI2)		
F8.02	Analog PID digital setup	0.0～999.9	50	○
F8.03	Analog closed loop measuring range	1.0～999.9	100	○
F8.04	PID action direction	0: Positive 1: Negative	0	○
F8.05	PID proportional gain 1 (KP1)	0.1～9.9	1	○
F8.06	PID integration time 1	0～100s	10s② 3s③	○
F8.07	PID differential time 1	0.00～1.00s	0.00s	○
F8.08	PID proportional gain 2 (KP2)	0.1～9.9	1	○
F8.09	PID integration time 2	0.0～100.0s	10.0s	○
F8.10	PID differential time 2	0.00～1.00s	0.00s	○
F8.11	PID parameters switching	0: No switching, use the first group parameters 1: switching by terminal 2: auto-switching by deviation	0	○
F8.12	PID parameter switching Deviation 1	0.0～999.9	20	○
F8.13	PID parameter switching Deviation 2	0.0～999.9	80	○
F8.14	PID delay time constant	0.0～100.0s	0.0s	○
F8.15	Deviation limit	0.0～999.9	0.2	○
F8.16	PID output positive limit	②0.0~320.0Hz ③0.0～600.0Hz	50.00Hz	○

Code	Description	Setting range	Default	Modify
F8.17	PID output negative limit	0.00～550.0Hz	0.00Hz	○
F8.18	PID preset freq.	0.00～550.0Hz	0.00Hz	×
F8.19	Hold time of PID preset frequency	0.0～3600s	0.0s	×
F8.20	Enable dormancy	0: Disabled 1: Enabled	0	×
F8.21	Dormancy delay	0～999s	120s	○
F8.22	Dormancy threshold	0.0～320.0Hz	20.0Hz	○
F8.23	Awaken threshold	0.0~100.0% (relative to pre-set value)	80.00%	○
F8.24	PID feedback offline detection range	0.0~100.0% (relative to feedback measuring range, 0.0% no detection)	0.0%	○
F8.25	PID feedback offline detection time	0.0~50.0s	2.0s	○
F8.26	PID feedback offline detection Min. Freq.	0.00~50.00Hz	10.00Hz	○

Group F9: Multi-step speed and PLC

Code	Description	Setting range	Default	Modify
F9.00	Multi-step freq.1	0.00～Max frequency	5.00 Hz	○
F9.01	Multi-step freq.2	0.00～Max frequency	10.00 Hz	○
F9.02	Multi-step freq.3	0.00～Max frequency	15.00 Hz	○
F9.03	Multi-step freq.4	0.00～Max frequency	20.00 Hz	○
F9.04	Multi-step freq.5	0.00～Max frequency	30.00 Hz	○
F9.05	Multi-step freq.6	0.00～Max frequency	40.00 Hz	○
F9.06	Multi-step freq.7	0.00～Max frequency	50.00 Hz	○
F9.07	PLC running mode	0: Single cycle 1: Single cycle and hold final value 2: Continuous cycle	2	×
F9.08	PLC restarting mode	0: Restart from first step	0	×

Code	Description	Setting range	Default	Modify
	after interrupt	1: Continue from the step where the drive interrupted		
F9.09	PLC status recorded or not at power failure	0: Not save 1: Save	0	×
F9.10	Time unit select for each duration of PLC processing	0: Second 1: Minute	0	×
F9.11	PLC step1 duration (T1)	0.1～3600	20	○
F9.12	PLC step2 duration (T2)	0.0～3600	20	○
F9.13	PLC step3 duration (T3)	0.0～3600	20	○
F9.14	PLC step4 duration (T4)	0.0～3600	20	○
F9.15	PLC step5 duration (T5)	0.0～3600	20	○
F9.16	PLC step6 duration (T6)	0.0～3600	20	○
F9.17	PLC step7 duration (T7)	0.1～3600	20	○
F9.18	Step T1 program running setting	1 F/r ～ 4 F/r	1F	○
F9.19	Step T2 program running setting	1 F/r ～ 4 F/r	1F	○
F9.20	Step T3 program running setting	1 F/r ～ 4 F/r	1F	○
F9.21	Step T4 program running setting	1 F/r ～ 4 F/r	1F	○
F9.22	Step T5 program running setting	1 F/r ～ 4 F/r	1F	○
F9.23	Step T6 program running setting	1 F/r ～ 4 F/r	1F	○
F9.24	Step T7 program running setting	1 F/r ～ 4 F/r	1F	○

Code	Description	Setting range	Default	Modify
F9.25	②Current step running time	0.0～3600	0	*
F9.25	③Current running step	1～7	0	*
F9.26	②Current running step	1～7	0	*
F9.26	③Current step running time	0.0～3600	0	*
F9.27	Multi-step freq.8	0.00～Max frequency	50.00 Hz	○
F9.28	Multi-step freq.9	0.00～Max frequency	50.00 Hz	○
F9.29	Multi-step freq.10	0.00～Max frequency	50.00 Hz	○
F9.30	Multi-step freq.11	0.00～Max frequency	50.00 Hz	○
F9.31	Multi-step freq.12	0.00～Max frequency	50.00 Hz	○
F9.32	Multi-step freq.13	0.00～Max frequency	50.00 Hz	○
F9.33	Multi-step freq.14	0.00～Max frequency	50.00 Hz	○
F9.34	Multi-step freq.15	0.00～Max frequency	50.00 Hz	○
F9.35	PLC Multi-step Freq.1 selection	0:Multi-step digital setting 1: AI1 2: AI2 3: keypad potentiometer 4: Pulse input	0	○
F9.36	PLC Multi-step Freq.7 selection		0	○

Group FA: Wobble Frequency

Code	Description	Setting range	Default	Modify
FA.00	Wobble amplitude	0.0~50.0%	0.0%	○
FA.01	Jitter frequency	0.0~50.0%(to FA.00)	0.0%	○
FA.02	Jitter Time	5～50ms	5ms	○
FA.03	Wobble freq. up time	0.1～999.9s	5.0s	○
FA.04	Wobble freq. down time	0.1～999.9s	5.0s	○
FA.05	Amplitude mode	0: Relative to the central freq. 1: Relative to Max. frequency	0	○

Group Fb: Fixed Length

Code	Description	Setting range	Default	Modify
Fb.00	Preset length	0～65530	0	○
Fb.01	Actual length	0～65530	0	*
Fb.02	Pulses number per unit	0.1～6553.0	100	○

Group FC: Protection and Fault Parameters

Code	Description	Setting range	Default	Modify
FC.00	Motor overload protection mode	0: Disabled 1: Common motor (with low speed compensation) 2: Variable frequency motor (without low speed compensation)	1	×
FC.01	Electro thermal protection value	20～110%	100%	○
FC.02	Overload Pre-alarm detection level	30.0～200.0%	160%	○
FC.03	Overload Pre-alarm detection time	0.0～80.0s	60.0s	○
FC.04	Current amplitude limit	0:Invalid 1: Acc./Dec. valid; Constant speed invalid 2: Valid all the time	2	○
FC.05	Current amplitude limit level	Type G：80.0～200.0% Type P：60.0～150.0%	G: 160.0% P: 120.0%	○
FC.06	Over voltage stall function	0: Invalid (Recommended if braking resistor mounted) 1: Valid for Acc/Dec. 2: Valid all the time	1	×

Code	Description	Setting range	Default	Modify
FC.07	Overvoltage point for Acc./Dec. suspend	110.0～150.0% (Bus voltage)	380V: 140% 220V: 120%	×
FC.08	Input phase loss detection	1～100% (100% correspond to 800V)	20%	×
FC.09	Input phase loss detection delay time	2～255s	10s	×
FC.10	Output phase loss detection	0: Invalid 1: Valid	1	○
FC.11	Terminal close fault detection	0: Invalid 1: Valid	1	○
FC.12	Fault auto reset times	0～10,“0” means auto reset is disabled. Only 3 faults have auto reset function	0	×
FC.13	Fault auto reset interval	0.1～20.0s/time	5.0s	×
FC.14	Under-voltage fault treatment	0: No treatment 1: Auto reset at power recovery 2: Auto run at power recovery (Auto run time interval is F1.16)	0	○
FC.15	Fast current limit	50.0%~100.0% (100% means this function is disabled.)	Depends on model	○
FC.16	Fast current limit time	0.01~1.00s	0.10s	○
FC.17	Overvoltage suppression freq.	0.00~10.00Hz	0.00Hz	○
FC.18	Select suppression overvoltage methods	0: method 1 1: method 2 2: method 3	0	○

Code	Description	Setting range	Default	Modify
FC.19	Treatment select while overvoltage forewarning	0: Warning and running still 1: Fault cause stopping	0	○
FC.20	Reminding or not while undervoltage	0: Yes 1: No	0	○

Group Fd: Communication Parameters

Code	Description	Setting range	Default	Modify
Fd.00	485 Communication	0: Disabled RS485 1: Enabled RS485	0	○
Fd.01	Local address	1～247	1	○
Fd.02	Baud rate setup	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	3	○
Fd.03	Parity bit setup	0: Even parity check 1: Odd parity check 2: No parity check	0	○
Fd.04	Communication timeout detection duration	Range: 0.0～100.0s 0: No timeout detection Others: Timeout detection duration	0.0s	○
Fd.05	Response delay duration	0～500ms	5ms	○
Fd.06	Communication Freq. setting coefficient	0.0~200.0%	100.00%	○
Fd.07	Communication interrupt detection mode	0: Time interval between 2 packets receiving. 1: Time interval of 0005H Add. data writing	0	○

Group FE: Operation interface & display

Code	Description	Setting range	Default	Modify
FE.00	Display	0: Normal 3-levels menu display	0	○

Code	Description	Setting range	Default	Modify
	parameter-type setup	1: Only display modified parameters		
FE.01	MFK Key function selection	0: MFK inactive 1: JOG running 2: FWD/REV switching 3: UP/DOWN clear 4: Running command switch (terminal or communication) 7: RUN for FWD, MFK for REV, STOP for STOP	0	○
FE.02	STOP key function	0: Valid only in keypad control mode 1: Valid in stop state of terminal/ communication control mode 2: Valid in Fault state of terminal/ communication control mode 3: Valid in both stop & fault state of terminal/ communication control mode	2	○
FE.03	Running freq.(Hz) (before compensation)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	2	○
FE.04	Running freq. (Hz) (After compensation)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.05	Reference frequency (Hz blinking)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	1	○
FE.06	Output current(A)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	2	○
FE.07	Bus voltage (V)	0: No display 1: Display at stop	3	○

Code	Description	Setting range	Default	Modify
		2: Display at running 3: Display at stop & running		
FE.08	Output voltage (V)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.09	Output torque (%)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.10	Reference torque (% blinking)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.11	Rotate speed (r/min)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.12	Reference speed (r/min blinking)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.13	Output power (kW)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.14	AI1 (V)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.15	AI2 (V)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.16	Analog PID feedback	0: No display 1: Display at stop 2: Display at running	0	○

Code	Description	Setting range	Default	Modify
		3: Display at stop & running		
FE.17	Analog PID setup	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.18	Terminal status (no unit)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.19	Actual length	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.20	Reference length	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.21	Linear speed (m/min)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○
FE.22	External count value (no unit)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○

Group FF: Running History Record

Code	Description	Setting range	Default	Modify
FF.00	Type of latest fault	0: NULL 1: Uu1 bus undervoltage 2: OC1 Acc. overcurrent 3: OC2 Dec. overcurrent 4: OC3 Constant speed overcurrent 5: Ou1 Acc. overvoltage 6: Ou2 Dec. overvoltage	NULL	*

Code	Description	Setting range	Default	Modify
		7: Ou3 overvoltage in constant speed 8: ②Reserve 8: ③GF Ground Fault 9: SC Load Short-Circuit 10: OH1 Heatsink overheat 11: OL1 Motor overload 12: OL2 Drive overload 13: EF0 communication fault 14: EF1 external terminal fault 15: SP1 Input phase failure or input phases unbalance 16: SPO Output phase failure or Unbalance 17: EEP EEPROM Fault 18: CCF Communication between the drive and keypad cannot be established 19: bCE Brake unit fault 20: PCE Parameter copy Error 21: IDE Hall current detection fault 22: ECE PG fault 23: LC fast current limit fault 24: EF2 terminal close fault 25: PIDE: PID feedback offline 26: OLP2 Forewarning of overload fault 27: InPE Initial position fault detected of synchronous moto		
FF.01	Output freq. at latest fault	0～Frequency upper limit	0.00Hz	*
FF.02	Reference frequency at latest fault	0～Frequency upper limit	0.00Hz	*
FF.03	Output current at latest fault	0～2 drive rated current	0.0A	*

Code	Description	Setting range	Default	Modify
FF.04	Bus voltage frequency at latest fault	0～1000V	0V	*
FF.05	Running status at latest fault	0: **StP** Stop 1: **Acc** acceleration 2: **dEc** deceleration 3: **con** constant speed	0	*
FF.06	Fault history 1 (Last One)	The same as FF.00	NULL	*
FF.07	Fault history 2	The same as FF.00	NULL	*
FF.08	Total power on time	0～65530h	0h	*
FF.09	Total running time	0～65530h	0h	*
FF.10	Reserved	Reserved	Reserved	-
FF.11	Software version number of control board	1.00~10.00	1	-
FF.12	Non-standard version number of software	0~255	0	-
FF.13	②Heat sink temperature	-30.0～120.0°C	0.0°C	-
	③IGBT temperature	0.0～140.0°C	0.0°C	-
FF.14	②Flux current	-200.0~200.0%		*
FF.15	③Torque current	-200.0~200.0%		*
FF.17	Accumulated kilowatt-hours （Upper 16 bits）	0~65535kWH	0kWH	-
FF.18	Accumulated kilowatt-hours （Low 16 bits）	0~65535kWH	0kWH	-

Group FP Protection Parameters

Code	Description	Setting range	Default	Modify
FP.00	User password	0~9999 0: No password	0	○

Code	Description	Setting range	Default	Modify
		Others: password protection		
FP.01	Parameter write-in protection	0: All parameters are allowed modifying 1: Only FP.01 and FP.03 can be modified 2: All parameters aren't allowed read	0	○
FP.02	Parameter initialization	0: No operation 1: Clear fault history 2: Restore to defaults	0	×
FP.03	Parameter copy	0: No action 1: Parameters download 2: Parameters upload(except motor's parameters) 3: Parameters upload (all parameters)	0	×
FP.04	Parameter upload protection	0: Protection enabled 1: Protection disabled	0	×
FP.05	G/P model selection	0: Type G 1: Type P	0	×
FP.07	User parameters backup	0: Invalid 1: Valid	0	×
FP.08	User parameters recovery	0: Invalid 1: Valid	0	×

Chapter 6 Parameter description

📖Note:

The value in the "【】" indicates the factory default value of the parameter.

6.1 Group 0 Basic Function

②F0.00 Reserved	Range:
③Drive type display	0~1【0】

This parameter of NE200 is reserved, show the type of drive of NE300.

0: Type G (Heavy duty)

1: Type P (Normal duty)

F0.01 Control mode	Range: 0～2 【0】

0: No vector Sensor vector control-1

This mode offers excellent vector control performance while insensitive to motor parameters. It is applicable to most applications.

1: No vector Sensor vector control-2

Precise speed sensor-less vector control technology realizes AC motor decoupling, enabling the DC motorization of running control. It's applicable to high performance applications and features high precision of speed and torque and eliminates the need for pulse encoder.

2: ②Reserved

2: ③Vector control with encoder

3: V/F control

It is applicable to the common applications where load requirement is not high such as fan and pump loads. It can be also used in applications where one drive drives multiple motors.

F0.02 Run command control mode	Range: 0～2 【0】

0: Operation keypad control (“LOCAL/REMOT” indicator OFF)

Running commands are controlled by RUN and STOP keys on operation keypad.

1: Terminal control (“LOCAL/REMOT” indicator ON)

Running commands are controlled by the multifunctional input terminals such as FWD, REV, JOGF, JOGR, etc.

2: Serial communication control (“LOCAL/REMOT” indicator blinks)

Start & stop is controlled by the communication serial port. Modbus card is inbuilt.

F0.03 Frequency reference 1 (Freq. ref. 1)	Range: 0～8 【0】
F0.04 Frequency reference 2 (Freq. ref. 2)	Range: 1～8 【1】

0: Digital setup

The initial value is the value of F0.06 “UP/DOWN preset frequency”. The reference frequency value can be changed through the keys “▲” and “▼” on the keypad or multi-function terminals UP/DOWN (select through F0.08). The modification recording options in case of power failure is determined by the parameter F0.09. If setting is not saved in power failure, the reference frequency value will recover to default value F0.06 “UP/DOWN Preset Frequency” upon power recovery.

1: Terminal AI1

2: Terminal AI2

It means that the frequency is determined by the analog input terminal. AI1 refers to voltage input 0~10V. AI2 can be used as either voltage input of 0V~10V or current input of 0/4mA ~20mA, which can be

selected by the ②SW1/③SW2 DIP switch on the control board.

3: PULSE setup

②The reference frequency is given by the terminal pulse. Pulse signal reference specification: voltage 9V ~12V and frequency range 0Hz ~200Hz.

③The reference frequency is given by the terminal pulse. Pulse signal reference specification: voltage 9V ~30V and frequency range 0kHz ~50kHz.

4: Communication

It means that the frequency source is given by the host computer via the communication mode.

5: MS (Multi-step) Speed

When this mode is selected, group F6 “Input Terminals” and Group F9 “Multi-step speed and PLC” parameters shall be set to determine the relative relationship between the reference signal and the reference frequency.

6: Programmable Logic Controller (PLC)

When PLC mode is selected, Group F9 “Multi-step Speed and PLC” parameters shall be set to determine the reference frequency.

7: PID

When PID is selected to be reference, Group F8 “PID Parameters” shall be set. The running frequency of the drive is the value after PID regulation.

8: keypad potentiometer

📖Note：

- In Freq. ref. 1, the Multi-step option is prior to other frequency reference

options. If the terminal has selected multi-speed and active, the Freq. ref. 1 is determined by multi-speed no matter what value has F0.03 setup.

- In option of Freq. ref. 1+ the Freq. ref. 2, the UP/DOWN digital setting of Freq. ref. 1 will be Up/Down overlapped on Frequency ref.-2. And the F0.06 Up/Down preset value is invalid.
- Pulse reference can only be input from the multifunction input terminals X4 or X5.

F0.05 Frequency setting selection	Range: 0～6 【0】

This parameter is used to select the frequency reference channel. The frequency reference is realized through combination of frequency setting 1 and frequency setting 2.

0: Frequency reference 1

The frequency reference is determined by the selected channel of freq. ref-1.

1: Frequency reference 2

The frequency reference is determined by the selected channel of freq. ref-2

2: Frequency reference 1 + Frequency reference 2

5: MIN (Frequency reference 1, Frequency reference 2)

6: MAX (Frequency reference 1, Frequency reference 2)

The frequency reference is determined by frequency setting 1 and frequency setting 2 after the corresponding arithmetic.

3: Terminal switching between Freq. ref.1 & Freq. ref.2

The frequency reference can switch between the Frequency ref. 1 and Frequency ref.2 through the multifunction input terminal. When the terminal with “Freq. source switching” setting is active, the frequency reference is determined by freq. ref.-2. When the terminal with “Freq.

source switching" setting is invalid or the terminal has no setting of "Freq. source switching", the frequency reference is determined by frequency ref.-1.

4: Terminal switching between (Freq. ref.1+ Freq. ref.2) & Freq. ref.1
When the "Freq. source switching" terminal is invalid, the frequency reference is determined by Freq. ref.1+ Freq. ref.2. When the "Freq. source switching" terminal is active, the frequency reference is determined by Freq. ref.1

F0.06 UP/DOWN Preset Freq.	Range: 0.00 ～ Max frequency【50.00Hz】

When the frequency source has selected "Digital setup" or "Terminals UP/DN", this function code is the initial value of frequency digital setup of the drive.

F0.07 Terminal UP/DOWN rate	Range: 0.01～50.00Hz/s【1.00Hz/s】

Terminal UP/DOWN rate is the changing rate in terminal or keypad ∧ and ∨ setting.

F0.08 UP/DOWN function source select	Range: 0～2【1】

This parameter is used to select the UP/DOWN channel in Digital frequency reference setting.

0: Active in both keypad and terminal UP/DOWN

1: Active only in keypad UP/DOWN

2: Active only in terminal UP/DOWN

F0.09 UP/DOWN data saving selection	Range: 0～2【0】

0: Setting data saved in power failure

This option means the frequency upon power recovery is the frequency after Up/Down setting before power failure.

1: Setting not saved in power failure

This option means that the frequency upon power recovery is the preset Up/Down frequency value in F0.06. The Up/Down modification before power failure is cleared.

2: Setting cleared to 0 after stop

The Up/Down setting during running will be cleared after the drive stop. The frequency upon restart will be preset Up/Down frequency value in F0.06. And the modification part is cleared.

F0.10 Basic frequency	Range: 0.10～550.0Hz【50.00Hz】
F0.11 Max frequency	Range: MAX [50.00Hz, Freq. upper limit, Reference frequency] ～550.0Hz 【50.00Hz】
F0.12 Freq. upper limit	Range: Freq. lower limit～Max freq. 【50.00Hz】
F0.13 Freq. lower limit	Range: 0.00～Frequency upper limit 【0.00Hz】
F0.14 Max output voltage	Range: 110～440V【Depend on model】

The basic frequency (F_b) is the Min. output frequency when the drive output the Max. voltage. Usually, the motor rated frequency can be treated as basic frequency.

The max frequency (F_{max}) is the highest frequency that the drive can output.

The frequency upper limit (F_H) and frequency lower limit (F_L) are the maximum and minimum operating frequency of the motor set according to the production process technique requirements.

The maximum output voltage Vmax is the output voltage when the drive is in basic operating frequency. Normally it is the motor rated voltage.

The relationship of basic frequency, Max output frequency, frequency upper limit, the maximum output voltage and the Max. output voltage is shown in Fig.6-1

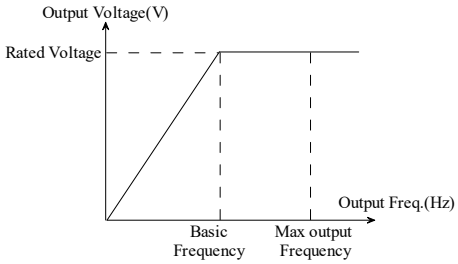


Fig.6-1 V/F characteristic diagram

F0.15 Carrier freq.	Range：1.0～16.0kHz【Depend on Model】

This parameter is used to adjust the carrier frequency of the drive. The drive power ratings and according carrier frequency value range is show as following Tab.6-1. The adjustment of carrier frequency will have influences on motor noise, motor temperature rising, and drive temperature rising as shown on Tab.6-2.

Tab.6-1 Drive power ratings and according carrier frequency

Model	Range	Factory default value
Type G: 2.2～11kW Type P: 4～15kW	1.0～16.0kHz	8.0kHz
Type G: 15～22kW	1.0～10.0kHz	6.0kHz

Type P: 18.5～30kW		
Type G: 30～45kW Type P: 37～55kW	1.0～10.0kHz	4.0kHz
Type G: 55～75kW Type P: 75～90kW	1.0～6.0kHz	3.0kHz
Type G: ≥90kW Type P: ≥110kW	1.0～3.0kHz	2.0kHz

Table 6-2 the temperature influences of carrier frequency

Carrier frequency	Low → high
Motor noise	High →low
Motor temperature rise	High → low
Output current waveform	Poor → Good
drive temperature rise	Low →high
Leakage current	low → high
External radiation interference	low to high

F0.16 Carrier freq. auto-adjust	Range: 0~1【0】

0: Disable (No- adjustment)

Carrier frequency will not be adjusted automatically according to the temperature of drive.

1: Able (Auto-adjustment)

Drive can automatically adjust carrier frequency through detection of temperature and the weight of load. The auto-adjusts is to keep drive running at light load with low noise and keep the temperature within control at heavy load, and thus maintain the reliable and continuous running.

F0.17 Keypad direction	Range: 0~1【0】

This parameter is used to select the motor rotation direction when the drive running command channel is keypad.

0: Forward rotation

1: Reverse rotation

F0.18 Motor wiring direction	Range: 0~1【0】

The drive output FWD direction might be different from FWD direction of motor. User can change the motor phases wiring sequence or change this parameter to make them agree with each other.

0: Positive sequence

1: Reversed sequence

F0.19 Acc. time1	Range: 0.1～3600s【Depend on model】
F0.20 Dec. time1	Range: 0.1～3600s【Depend on model】

Acceleration time: The time that the drive accelerates from 0Hz to maximum output frequency (F0.11).

Deceleration time: The time that the drive decelerates from maximum frequency (F0.11) to 0Hz.

This series drive has defined 4 types of Acc/Dec time. Here, Acc/Dec time 1 is defined, and Acc/Dec time 2~4 can be defined in F2.03～F2.08. User can select different Acc/Dec time by external multifunction input terminal. Acc.1/Dec.1 is taken as default.

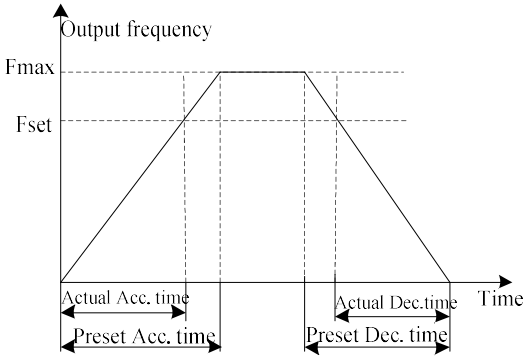


Fig.6-2 Schematic diagram for acceleration/deceleration time

📖Note：

The default value of acceleration and deceleration time:

7.5kW and below: 6.0 seconds

11kW~22kW: 20.0 seconds

30kW~110kW: 60.0 seconds

132kW and above: 90.0 seconds

6.2 Start and stop group (F1)

②F1.00 Start mode	Range: 0～1【0】
③F1.00 Start mode	Range: 0～2【0】

0: Start directly

The inverter starts according to the start frequency (F1.01) and the start frequency holding time (F1.02).

1: DC brake first and then start at start frequency

The inverter performs DC braking first and then starts in mode-0. It is applicable to the applications of small inertia loads where reverse rotation is

likely to occur.

③2: Speed tracking and start

The inverter detects the motor rotation speed firstly and then starts from the detected speed and Acc./Dec. to preset frequency. This realizes the smooth starting without impact.

🕮Note:

The 18.5kW and above ratings has inbuilt speed tracking card.

F1.01 Start freq.	Range: 0.10～60.00Hz【0.50Hz】
F1.02 Start freq. holding time	Range: 0.0～10.0s【0.0s】

Start frequency is the initial frequency at which the drive starts, see F_S as shown in Fig.6-3; holding time of starting frequency is the time during which the drive operates at the start frequency, see t1 as shown in Fig.6-3:

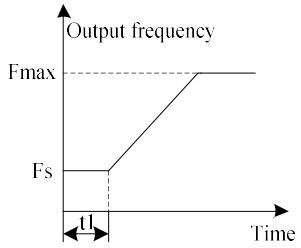


Fig.6-3 Start frequency and Start frequency holding time

🕮Note:

Starting frequency is not restricted by the frequency lower limit.

F1.03 DC brake current at start (Rated current)	Range: 【0.0%】 ②③G: 0.0~100.0%

	③P: 0.0~80.0%
F1.04 DC brake time at start	Range：0.0~30.0s【0.0s】

These parameters are only valid when the start mode selects “DC brake first and then start at start frequency” (F1.00=1). The higher the DC brake current is, the higher the brake force.

🕮Note:

If DC brake time or brake current is zero, the DC braking is invalid.

F1.05 Acc. /Dec. mode	Range: 0～1【0】

0: Linear

The output frequency increases or decreases linearly. The speed changes according to preset acceleration/ deceleration time. NE200/300 series has 4 types of Acc./Dec. time which can be selected via multifunctional input terminals.

1: S-curve

The output frequency increases or decreases along the S curve. S curve is generally used in the applications where smooth start and stop is required such as elevator and conveyor belt. Refer to F1.06 and F1.07 for S curve parameter setting.

F1.06 Time of S-curve initial stage	Range: 10.0～50.0%【30.0%】
F1.07 Time of S-curve rising stage	Range: 10.0～80.0%【40.0%】

The parameters of F1.06 and F1.07 are valid only when Acceleration /Deceleration mode is S-curve (F1.05=1) and F1.06+F1.07≤90%.

Starting stage of S-curve is shown in Fig.6-4 as “①”, where the changing rate of output frequency increases from 0;

Rising stage of S-curve is shown in Fig.6-4 as “②”, where the changing rate of output frequency is constant;

Ending stage of S-curve is shown in Fig.6-4 as “③”, where the changing rate of output frequency decreases to zero.

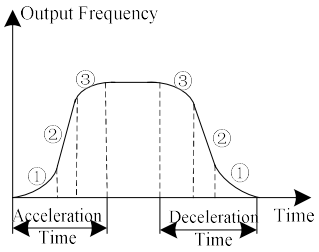


Fig.6-4 S-curve acceleration/deceleration

F1.08 Stop mode	Range: 0~2【0】

0: Deceleration to stop

After receiving the stop command, the drive reduces its output frequency according to the Dec time, and stops when the frequency decreases to zero.

1: Coast to stop

After receiving the stop command, the drive stops PWM output immediately and the load gradually stop under the effect of mechanical inertia.

2: Deceleration +DC braking

After receiving the stop command, the drive reduces its output frequency according to the Dec time and performs DC braking when its output frequency reaches the preset trigger frequency for DC braking. The relative parameters are defined in F1.09~F1.12.

F1.09 DC brake trigger frequency at stop	Range: 0.00~max frequency 【0.00Hz】
F1.10 DC brake waiting time at stop	Range: 0.00~10.00s【0.00s】
F1.11 DC brake current at stop	Range:0.0~100.0%Drive rated current【0.0%】
F1.11 DC brake current at stop (Rated current)	Range: 【0.0%】 G Type: 0.0~100.0% P Type: 0.0~80.0%
F1.12 DC brake time at stop	Range: 0.0~30.0s【0.0s】

DC brake trigger frequency at stop is the frequency at which DC brake action begins during Dec-to-stop process.

DC brake waiting time at stop: The holding time before doing the DC on brake. During this holding time the drive stops the output. It is used to prevent the over-current or over-voltage faults caused by DC brake when the speed is relatively high.

DC brake current at stop: It refers to the DC braking injection amount. The higher this value, the stronger the DC brake effect.

DC brake time at stop: It refers to the time span when DC braking is acting.

📖Note:

When DC brake current or DC brake time at stop is zero, it indicates there is no DC brake process.

F1.13 Energy consumption brake validity	Range: 0~1【0】

0: Disabled

1: Enabled

For large rotary inertia applications where rapid stop is required, the drive can be equipped with matched braking unit and braking resistors and proper braking parameters setting to realize fast braking and stop.

📖Note: For NE300, is only valid for 22kW and above.

F1.14 Energy consumption brake action voltage	Range: 380V: 650~750V【700V】 220V: 360~390V【380V】

This parameter is to set the action voltage of DC bus for energy consumption brake. The proper setting can get effective brake of the load.

F1.15 Power failure and fault restart	Range: 0~3【0】

0: Disable

Drive will not automatically restart after power recovery until run command is given.

1: Enabled for power failure

In case of power failure and power-on again, if STOP command is not given during restart-waiting time (F1.16), drive will restart automatically;

2: Enabled for fault

After drive get faults during running, if the stop command is not given during fault stage or restart-waiting time (F1.16), the drive will restart automatically after fault reset.

3: Enabled for both power failure and fault

The automatic restart function is enabled for both power failure recovery and faults reset situations as explained above.

📖Note:

The user shall be very caution in using this function. The inappropriate setting might cause damage of machinery or injury of human.

F1.16 Waiting time for restart	Range: 0.0~3600s【0.0s】

This parameter defines the waiting time before restart and over-voltage reset delay time.

③ F1.18 Rotational speed tracking direction inspection	0~1【0】
③ F1.19 Rotational speed tracking direction inspection time	10~1000ms【50ms】

F1.18 and F1.19 only for NE300.

F1.18 is for selecting whether the rotational speed tracking direction inspection is valid.

0: Disable 1: Enable

Notes for F1.19:

The motor start method is the DC brake mode while the motor frequency is below 2Hz, and the set value of DC brake current and brake time is not zero. The motor start method is normal from the zero frequency if the set value of the DC brake current and brake time is zero.

6.3 Auxiliary running function group (F2)

F2.00 Jog running freq.	Range: 0.0~50.00【5.00Hz】
F2.01 Jog Acc. time	Range: ② 0.1~360.0s【6.0s】 ③ 0.0~3600.0s【20.0s】
F2.02 Jog Dec. time	Range: ② 0.1~360.0s【6.0s】 ③ 0.0~3600.0s【20.0s】

These parameters define the frequency and Acc/Dec time of the JOG operation. In JOG operation, the drive starts according to starting mode 0 (F1.00=0 direct start) and stops according to stopping mode 0 (F1.08=0 Deceleration to stop). The Jog acceleration time refers to the time the drive

takes to accelerate form 0Hz to Max. output frequency F0.11; the jog deceleration time refers to the time the drive takes to decelerate from Max. output frequency F0.11 to 0Hz.

📖Note:

When the jog Acc./Dec. time is set to 0, the drive jog deceleration mode is “coast to stop”.

F2.03 Acceleration time2	Range: ②0.1~360.0s【6.0s】 ③0.0~3600.0s【20.0s】
F2.04 Deceleration time2	Range: ②0.1~360.0s【6.0s】 ③0.0~3600.0s【20.0s】
F2.05 Acceleration time3	Range: ②0.1~360.0s【6.0s】 ③0.0~3600.0s【20.0s】
F2.06 Deceleration time3	Range: ②0.1~360.0s【6.0s】 ③0.0~3600.0s【20.0s】
F2.07 Acceleration time4	Range: ②0.1~360.0s【6.0s】 ③0.0~3600.0s【20.0s】
F2.08 Deceleration time4	Range: ②0.1~360.0s【6.0s】 ③0.0~3600.0s【20.0s】

These parameters are to define Acc/Dec time 2, 3 and 4 respectively (Acc/Dec time 1 is defined in F0.19 and F0.20). Acc/Dec time 1, 2, 3 and 4 can be selected via external multifunction input terminals. If all terminals related with Acc/Dec time are invalid, the drive will take Acc/Dec time 1 as Acc/Dec time. However, when the drive chooses PLC or JOG operation, Acc/Dec time will not be controlled by external terminals, but be set by parameter of PLC or JOG.

②F2.09 Skip freq. 1	Range: 0.00~300.0Hz【0.00Hz】
③F2.09 Skip freq. 1	Range: 0.00~320.0Hz【0.00Hz】
③F2.10 Skip freq. 2	Range: 0.00~320.0Hz【0.00Hz】

F2.11 Skip frequency amplitude	Range: 0.00~15.00Hz【0.00Hz】

To avoid mechanical resonant, the drive can skip over some running points, which is called skip frequency. As shown in Fig.6-5.

NE300 drives can set two skip frequency points, and the skip frequency amplitude can overlap or nesting. If overlapped, the range broadens. When all, skip-freq. points value, are set to 0.00 Hz, the jump function will be disabled. Only one, skip frequency1, point for NE200.

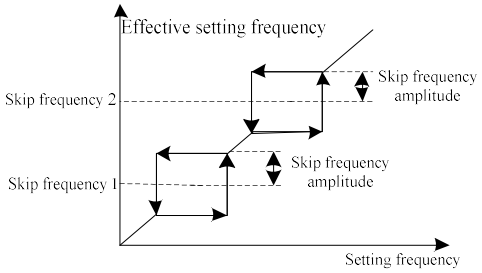


Fig.6-5 Skip Frequency

F2.12 Anti-reverse control	Range: 0~1【0】

For some equipment, reverse operation may cause equipment damage. This function can be used to prevent reverse operation.

0: Reverse rotation allowed

1: Reverse rotation not allowed

F2.13 Fwd/ Rev switch dead-zone time	Range: 0.0~3600s【0.0s】

It refers to the transition waiting time at zero frequency in process of rotation direction switching, i.e. from forward to reverse or from reverse to forward, as shown Fig.6-6.

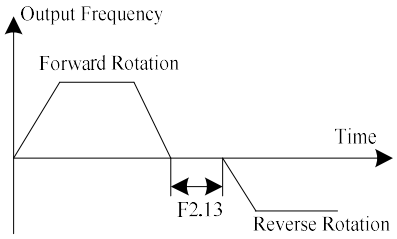


Fig.6-6 FWD/REV switching

F2.14 Freq. lower-limit treatment	Range: 0~1【0】

This parameter is used to select the running status of the drive when the setup frequency is lower than the frequency lower limit.

0: Run with frequency lower limit

1: Zero frequency operation

F2.15 Reserved	

③F2.16 Energy-saving control select	Range: 0~1【1】

0: Disable 1: Enable

'0' means the energy-saving control mode is disabled.

'1' means the energy-saving control mode is enabled.

To adjust the output current to degrease the energy-saving of motor by inspecting the current of load while the motor is working in no-load or light-load status.

📖Note:

This function is enabled while controlled by V/F mode.

F2.17 AVR function	Range: 0~2【2】

0: Disabled

1: Enabled

2: Disabled only at speed-down

AVR means automatic output voltage regulation. When the input voltage deviates from rated value, AVR function can maintain constant voltage output. Normally AVR function is recommended to be active. At process of “deceleration to stop”

F2.18 Over modulation	Range: 0~1【1】

0: Enabled

1: Disabled

When the over modulation function is enabled, the drive voltage output capacity can be improved. However, if the output voltage is too high, the output current harmonics will increase.

③F2.19 Droop control	Range: 0.00～10.00Hz【0.00Hz】

When multiple drives drive the same load, the unbalanced load distribution due to difference speed causes the drive with faster speed to carry heavier load. The droop control characteristics makes the speed droop change along with the addition of load, which can lead to balanced load distribution.

This parameter is used to adjust the frequency change value of the drive with droop speed.

F2.20 Fan control mode	Range: 0～1【0】

0: Auto mode

The fan always runs when the drive is running. After the drive stops three minutes, the internal temperature detection program will be activated to stop the fan or keep the fan running according to the IGBT’s temperature.

1: Always Running

The fan always runs when the drive is power on.

F2.21Instant-power-failure treatment	Range：0～2【0】

0: Disabled

②1: Drop frequency (Reserved)

③1: Drop frequency

2: Stop directly

When the bus voltage is lower than the instant power failure frequency drop point, the drive stops according to stop mode (F1.08).

F2.22 Instant-power-failure freq. drop point	Range: 380V: 410～600V【420V】 220V: 210～260V【230V】
F2.23 Instant-power-failure freq. drop rate	Range: 1~800

These parameters define the value of the power failure frequency drop point and power failure frequency drop rate.

The larger the value is, the greater the regulation intensity is, and the larger the parameter is, the more likely the current waveform will oscillate

F2.24 Motor speed display ratio	Range：0.0～500.0%【100.0%】

The motor speed display on the keypad is the actual motor speed×F2.24.

F2.25 UP/DOWN drop to minus	Range：0～1【1】

frequency	

0: Enabled

1: Disable

F2.26 ENTER key function	Range：0～3【0】

0: No special action

1: Fwd/Rev switching: When the keypad control the start and stop, press ENTER key under monitoring status will switch the rotation direction.

2: Under monitoring status, Run for forward; Enter for Reverse; STOP for stop.

3: Jog running

📖Note:

When MFK key defines RUN as forward, MFK as reverse, and STOP as stop (FE.01=7), the ENTER key shall not switch the rotation direction.

F2.27 Freq. resolution	Range：0～1【0】

0: 0.01Hz. The drive Max running frequency can be up to 320.0Hz.

1: 0.1Hz. The drive Max running frequency can be up to 3200.0Hz.

F2.28 Acc./Dec time unit	Range：0～1【0】

0: 0.1s. The drive longest Acc./Dec time is 3600 seconds

1: 0.01s. The drive longest Acc./Dec time is 360 seconds

F2.29 High freq. modulation mode	Range：0～1【0】

0: Asynchronous modulation

1: Synchronous modulation

When the frequency resolution is 0.01Hz, the regulation is fixed to be asynchronous modulation. When the frequency resolution is 0.1Hz, the regulation is asynchronous if this parameter F2.29=0; if this parameter

F2.29=1, the carrier frequency will be modulated according to present running frequency.

F2.31 IO output Freq. baseline select while vector control	Range：0～1【0】

0: Baseline is the frequency after Acc./Dec. speed.

1: Baseline is the real output frequency.

This function code is used to select the baseline frequency of AO and IO input. Example: The 0~10V signal is the comparative linear output between the frequency after Acc./Dec. speed and frequency of max. output while F2.31=0. The 0~10V signal is the comparative linear output between the real output frequency and the max. output frequency while F2.31=1.

F2.33 Threshold value of Zero Freq. running	Range：0.0～550.0【0Hz】
F2.34 Range between start Freq. and threshold value of Zero Freq.	Range：0.0～550.0【0Hz】

This function code is used for the ‘Range between start Freq. and threshold value of Zero Freq’ control.

Example: See fig. 6-7 The given channel of CCI current.

Process of start: The drive will be started while CCI is up to or over Ib, and the given is up to fb, in the meantime, give the related frequency while the CCI value is ok after Acc. Speed during the Acc./Dcc. Duration given.

Process of stop: The drive will be stopped till the CCI current is Ia, will not be stopped instantly while the CCI current is Ib.

Note: fa is defined as ‘Threshold value of Zero Freq. running’ (F2.33),

fb-fa is defined as ‘Range between start Freq. and threshold value of Zero Freq’ (F2.34).

These function codes are used to avoid the start-stop of drive continually,

used to realize the stand-by and sleep-mode.

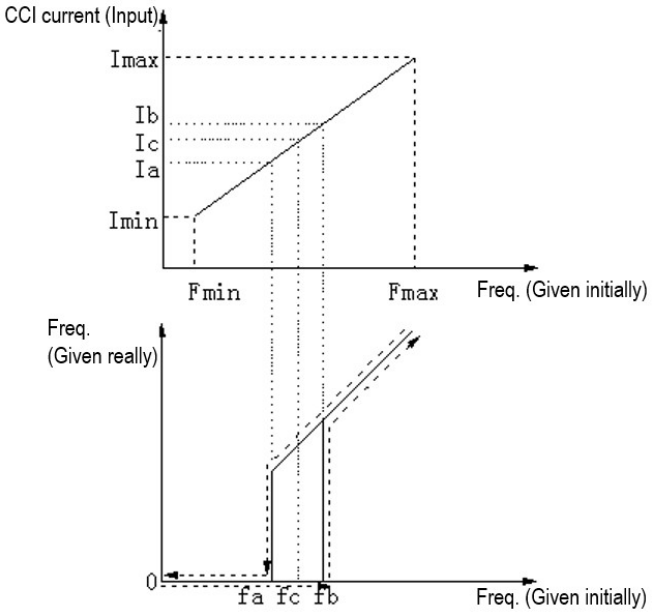


Fig. 6-7

6.4 Vector Control Parameters (F3)

F3.00 Speed loop proportional gain 1	Range: 1~3000【1000】
F3.01 Speed loop integral time 1	Range: 1~3000【300】
F3.02 Switching frequency 1	Range: 0.0～60.00Hz【5.00Hz】
F3.03 Speed loop proportional gain 2	Range: 1~3000【800】
F3.04 Speed loop integral time 2	Range: 1~3000【200】
F3.05 Switching frequency 2	Range: 0.0～60.00Hz【10.00Hz】

F3.00 and F3.01 are PI adjustment parameters when the running frequency is lower than switching frequency 1 (F3.02). F3.03 and F3.04 are PI adjustment parameters when the running frequency is higher than

switching frequency 2. PI parameter of frequency range between the switching frequency 1 and switching frequency 2 is the linear conversion from two groups of PI parameters, as shown in the fig.6-7:

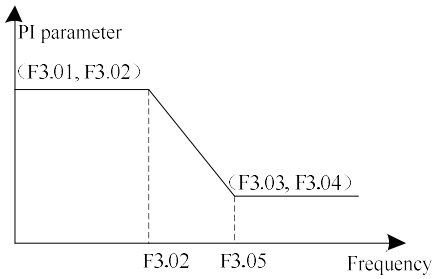


Fig.6-7 Schematic diagram of speed loop PI parameter

The speed dynamic response characteristics of the vector control can be adjusted by setting the proportional coefficient and integration time of the speed regulator. Increasing the proportional gain or reducing the integration time can accelerate the dynamic response of the speed loop. However, if the proportional gain is too large or the integration time is too short, it will cause the oscillation of the system.

F3.06 Speed loop filtering time constant	Range: 0～500ms 【②2ms/③3ms】

This parameter determines the value of speed loop filtering time and don’t need to be adjusted generally.

F3.07 Current loop proportional coefficient	Range: 0～6000【3000】
F3.08 Current loop integral coefficient	Range: 0～6000【1500】

These function codes define the current loop PID parameters; they influence directly the control precision and speed dynamic response and

needs no adjustment generally.

F3.09 VC Slip compensation	Range: 0.0～200.0%【100.0%】

When the load increase, the motor slip increases, and motor speed drops down. Using this slip compensation parameter, the motor speed can be maintained constant. The adjustment is instructed as follows:

When the motor speed is lower than the target value, increase the vector control slip compensation value.

When the motor speed is higher than the target value, decrease the vector control slip compensation value.

F3.10 Torque control	Range: 0～6【0】

0: Torque control disabled

When the torque control is disabled, the drive performs speed control. The drive outputs frequency according to the setup frequency command; and the output torque automatically matches the load torque.

1: AI1 as torque reference.

2: AI2 as torque reference.

3: Pulse input as torque reference.

②4: Reserved

③4: Pulse

5: Keypad digital setting as torque reference.

1~5: Torque control is active

When the drive is in torque control, the drive output the torque according to the torque command which is defined in this parameter. And the output frequency will automatically matche to the load speed. But the output

frequency is limited F3.12.

🕮Note:

- ◆ Analog and pulse input physical quantity is corresponding to torque setup
- ◆ Torque control is valid only when the Control Mode is sensor-less vector control-2 or vector control with encoder speed feedback.

F3.11 Torque digital setting	Range: 0.0～200.0%【50.0%】

This parameter is used to define the value of torque digital setting.

F3.12 Torque control speed limit	Range: 0～5【0】

This parameter is used to define the value of speed limit when the drive is running in torque control mode.

0: digital setting (F3.13)

1: AI1

2: AI2

3: PULSE input

4: Serial communication

5: Keypad potentiometer

F3.13 Torque control speed limit setting	Range: 0.00～550.0Hz【50.00Hz】

Setting the value of torque control upper limit digital setting (F3.12 =0).

③F3.14 Encoder pulse number	Range: 1~9999【1000】

Setting the pulse quantity per circle of Encoder.

🕮Note:

The operation status of motor will be abnormal if the pulse quantity of encoder set is not correct while controlled by the vector sensor. Please

exchange the wiring of the A,B phases or adjust the value of F3.16 if the operation status of motor is abnormal still while the pulse quantity set is right.

③F3.15 Motor and PG reduction ratio	Range: 0.010~50.000【1.000】

Set this function code as 1 if the PG is on the axle of motor. Set this function code as the real reduction gear ratio because there is a reduction gear ratio between motor axle and PG while the PG is not installed on the axel of motor.

③F3.16 PG direction	Range: 0~1 【0】

0: Forward 1: Reverse

Don't need to re-wiring while found the wiring sequence is not right, you can set this function code as 1.

F3.17 ACC/DEC limit controlled by PG	Range: 0~1 【0】

0: Limited

This means the real output frequency will limit the frequency after ACC/DEC speed while controlled by PG option.

1: No limited

F3.18 SVC speed calculation filter	Range: 0~15 【5】
F3.19 SVC mode	Range: 0~1 【0】
F3.20 SVC mode2 flux weaken coefficient	Range: 20~500% 【100%】

F3.21 Field-weakening function	Range: 0～1【0】

0: Disabled

1: Enabled

F3.22 Torque limit compensation coefficient while constant power output	Range: 60.0～300.0%【200%】

This parameter is used to compensate the torque limit in constant power zone. Appropriate setting can improve the drive Acc/Dec time and output torque.

F3.23 Reserved	Reserved

F3.24 Torque ref. terminal single modulation	Range: 0.00~10.00%【0.00%】
F3.25 Torque ref. terminal total modulation	Range: 0.0~100% 【50.0%】

When the torque reference is digital mount, this parameter sets the single time modulation amount and total modulation amount.

F3.26 Torque limit in vector control mode	Range: 0.0～300.0%【150.0%】

When it is asynchronous motor vector control, this value is the torque limit value of motoring and generating. When it is synchronous motor control, this value is the motor's electric torque limit.

F3.27 Torque boost cut-off frequency in torque control mode	Range: 0.00～15.00Hz【12.00Hz】
F3.28 Torque boost amount in	Range: 0.0～20.0%【15.0%】

torque control mode	

This parameter is valid when vector torque control mode (F3.10 ≠0). It is used to boost the given torque volume at low speed, i.e. the final given torque value is calculated on given torque value, F3.27, and F3.28.

F3.31 Synchronous motor initial position detection	Range: 0～2【2】

0：Drive runs without detecting the motor rotor initial position

1：In first-run after power on, the motor rotor initial position will be detected. If it is not first-run, the motor rotor initial position will not be checked.

2：Detect the motor rotor initial position at every run.

F3.32 Synchronous motor initial position detection current	Range：50～120%【90%】

This is to set the detection current value for motor's initial position. The smaller the current value, the lower the detection noise; but too small current value might cause incorrect detection.

F3.33 Initial position detection pulse width	Range：0～1200us【0us】

When the setting value of this parameter is 0, the detection pulse width of detection position is searched gradually from small pulse to larger pulse according to preset detection current value. When this parameter is not 0, the detection position pulse width will be calculated from this parameter and thus decrease the initial position detection time. This parameter will be automatically filled with actual pulse width after parameter tuning operation.

F3.34 Initial position detection pulse width actual value	Range：0～1200us【0us】

This value is the actual pulse width in every time position detection.

F3.35 Synchronous motor braking torque limit	Range：0.0～300.0%【150.0%】

This parameter is to set the synchronous motor braking torque limitation. If the motor gets over-voltage fault during running, try to reduce

this parameter setting value.

F3.36 Synchronous motor flux weakening mode	Range：0～1【0】

0：Flux weakening mode is invalid

1：Flux weakening mode is valid

F3.37 Max flux weaken current	Range：0～100%【50%】

The actual running flux-weakening current is equal to the theoretical flux-weakening current by flux-weakening gain. The larger this parameter, the better of the motor's dynamic performance. But too high value will cause vibration. Normally set it to 50.

F3.38 Flux weaken regulation proportional coefficient	Range：0～3000【1500】
F3.39 Flux weaken regulation integration coefficient	Range：0～3000【1500】

Adjust the flux weaken output current automatically according to the rotation speed, bus voltage and counter emf and so on. The larger proportional integral coefficient, the quicker speed responding, it causes the oscillation of motor while the motor works in flux weaken status.

F3.40 Synchronous motor low speed Min. current	Range：0～100%【30%】

Set the synchronous motor's minimum current when the motor is at low speed. (The percentage of motor's rated current). This function is used to improve the load carrying performance at low frequency.

F3.41 Synchronous motor low speed carrier frequency	Range：1.0～16.0KHz【2.0KHz】

This is to set the synchronous motor's carrier frequency at low speed. When the motor is running at low speed, the lower carrier frequency will help to reduce the motor rotation pulsation, but it will come with some noise from changing carrier frequency. When this parameter setting is higher than preset carrier frequency (F0.15), this parameter will become invalid.

F3.42 Synchronous motor Min excitation current	Range：-100～100.0%【8.0%】

Set the Min. excitation current of synchronous motor.

F3.44 Synchronous motor position evaluating low speed filter	Range：2～100【40】
F3.45 Synchronous motor position evaluating high speed filter	Range：2～100【15】

The above 2 parameters are to set the motor's position evaluating filtering coefficient. Normally take the default value.

6.5 V/F Control Parameters (F4)

F4.00 V/F curve setting	Range: 0～4【0】

0: Linear V/F. It is suitable for common constant torque load.

1~3: Multi-power decreasing torque. It is suitable for the centrifugal loads such as fan and pump, as shown Fig.6-8.

4: Multiple-points V/F. It can be defined by setting F4.01~F4.06 parameters. as shown Fig.6-9

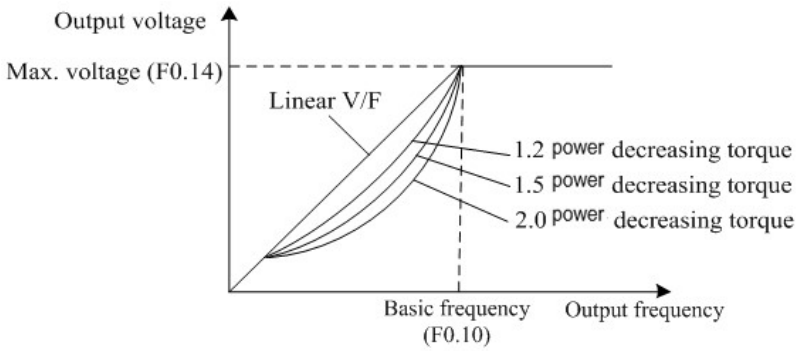


Fig.6-8 Torque-reducing curve

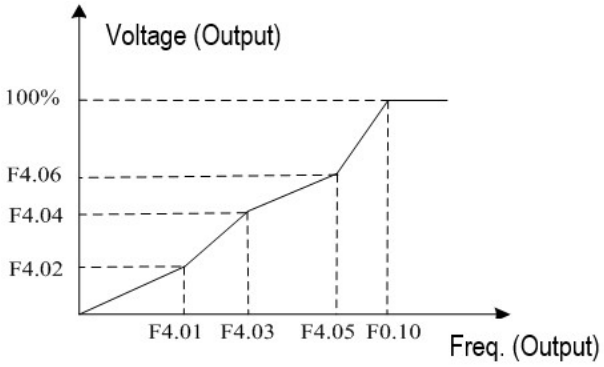


Fig.6-9 Multi-points V/F curve

F4.01 V/F freq. F1	Range: 0.0~F4.03【10.00Hz】
F4.02 V/F voltage V1	Range: 0~100.0%【20.0%】
F4.03 V/F freq. F2	Range: F4.01~F4.05【25.00Hz】
F4.04 V/F voltage V2	Range: 0~100.0%【50.0%】
F4.05 V/F freq. F3	Range: F4.03~F0.10【40.00Hz】
F4.06 V/F voltage V3	Range: 0~100.0%【80.0%】

Six parameters of F4.01 to F4.06 define multi segments V/F curve, shown as Fig.6-9. The V/F curve is generally set in accordance with the load characteristics of the motor.

F4.07 Torque boost	Range: 0.0~30.0%【0.0%】
F4.08 Manual torque boost cutoff point	Range: 0.00~60.00Hz【50.00Hz】

To compensate the low frequency torque characteristics of V/F control, it can boost the output voltage when the drive is running at low frequency.

When the torque boost is set to 0.0, the drive will adopt auto torque boost.

Torque boost cutoff point frequency: Under this frequency, the torque

boost is valid. If it exceeds this frequency point, the torque boost is inactive. Refer to Fig.6-10 for details.

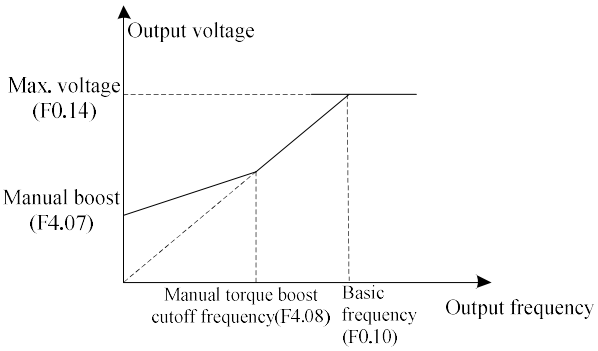


Fig.6-10 Schematic Diagram for torque boost

📖Note:

- If the torque boost is set to be too large, the motor may be over heat, and the drive might get over-current fault.
- When the drive drives synchronous motor, manual torque boost function is recommended to be used and V/F curve should be adjusted according to the motor parameters

F4.09 Slip compensation coefficient	Range: 0.0~200.0%【0.0%】
F4.10 Slip compensation filtering time	Range: 0.01～2.55s【0.20s】

Setting the parameters can compensate the motor rotation slip due to change of load torque in the V/F control. With this compensation, the drive regulates the output frequency according to the change of load torque and thus increases the motor mechanical performance.

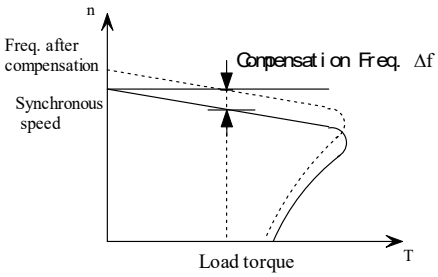


Fig.6-11 Auto slip compensation

In rated torque state, the value of slip compensation is: Slip compensation gain (F4.09) × Rated slip (Synchronous speed- Rated speed)

Motoring state: Increase the gain of slip compensation (F4.09) gradually when the actual speed is lower than the reference speed.

Generating state: Increase the gain of slip compensation (F4.09)) gradually when the actual speed is higher than the reference speed.

🕮Note:

- The value of automatic slip compensation is related to the motor's rated slip; therefore, the motor rated speed (F5.04) must be set correctly.
- Slip compensation is disabled when Slip compensation coefficient is set to "0".

F4.11 V/F separation control voltage source	Range: 0~5【0】

0: Disabled

V/F separation control is disabled. The drive adopts common V/F control.

1~4: The output voltage and frequency are controlled separately.

The drive outputs frequency according to the frequency setup and runs according to Acc./Dec time. But the voltage is regulated independently by

the voltage reference source defined in this parameter and Acc./Dec according to F4.13(V/F separation voltage rising time).

🕮Note:

- Analog and pulse input maximum physical quantity is corresponding to maximum output voltage (F0.14).

F4.12 V/F separation voltage digital setting	Range: 0 ～ maximum output voltage【380V】

This parameter is used to set the value of the output voltage when voltage source is digital setting in V/F separation control.

F4.13 V/F separation voltage rising time	Range: 0.0s～1000.0s【0.0s】

This parameter is used to set the value of the output Voltage acceleration time when the voltage is controlled independently. The acceleration time is the time that the voltage accelerates from 0 to maximum voltage.

F4.14 V/F oscillation suppression	Range: 0.0s～500.0s【Depend on model】

When this parameter is set to be 0, the V/F oscillation suppression is invalid. The larger this value, the stronger the suppression effect. Normally setting value of 100~300 will take suppression effect.

6.6 Motor parameters group (F5)

F5.00 Motor type	Range: 0～2【0】
F5.01 Motor polarity number	Range: 2～56【4】
F5.02 Rated power	【Depends on model】Range: ②0.1～6553.5kW ③0.4~999.9kW
F5.03 Rated current	【Depends on model】Range: ②0.01～655.35A ③0.1~999.9A
F5.04 Rated rotation speed	【Depends on model】Range: ②0～65535RPM ③0~24000

F5.00～F5.04 are used to set the controlled motor parameters. In order to ensure the control performance, please set F5.00～F5.04 correctly by referring to values on motor nameplate.

📖Note:

On V/F control, the motor power shall be matched to the drive power. Normally the motor power is only allowed to be 2 steps lower than that of the drive or 1 step higher. While in SVC or VC control, the motor power must exactly match that of the drive, otherwise, the control performance could not be ensured.

F5.05 No-load current I0	【Depends on model】Range: ②0.01～655.35A ③0.1~999.9A
F5.06 Stator resistance R1	【Depends on model】Range: ②1～65535 mΩ ③1~65535 mΩ (Drive rated power ≤22kW) ③0.1～6553.5mΩ(Drive rated power>22kW)
F5.07 Leakage Inductive	【Depends on model】Range:

reactance X	②0.01～655.35mH ③0.01～655.35mH(Drive rated power≤22kW) ③0.001～65.535mH(Drive rated power>22kW)
F5.08 Rotor resistance R2	【Depends on model】Range: ②1～65535mΩ ③1～65535mΩ(Drive rated power≤22kW) ③0.1～6553.5mΩ(Drive rated power>22kW)
F5.09 Mutual Inductive reactance Xm	【Depends on model】Range: ②0.1～6553.5mH ③0.1～6553.5mH(Drive rated power≤22kW) ③0.01～655.35mH(Drive rated power>22kW)

The above parameters are instructed in the fig.6-12 as below:

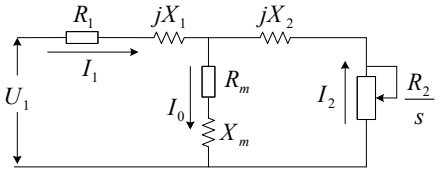


Fig. 6-12 Asynchronous motor equivalent circuit

In the Fig.6-12, R1, XI, R2, X2, Xm, and I0 represent resistance of stator, leakage inductance of stator, resistance of rotor, leakage inductance of rotor, mutual inductance and no-load current respectively. The setting of F5.07 is the sum of leakage inductance of stator and leakage inductance of rotor.

After motor rated power (F5.02) is changed, the drive will automatically change F5.03～F5.09 to adapt to the rated motor power.

F5.10 Auto tune	Range: 0~2【0】

0: No operation

1: Static tuning, it is suitable to the situation as the motor is not easy to

disconnect from the load.

Action description: Set the function code to 1 and press RUN key for confirmation, and then the drive will conduct static tuning.

2: Rotary tuning

To ensure the dynamic control performance of the drive, please select rotary

tuning. During the rotary tuning, the motor must be disconnected with the loads (i.e. no-load).

Action description:

Set the function code to 2 and press RUN key for confirmation, the drive will conduct static rotary first, and then accelerate to 80% of motor rated frequency according to the acceleration time set in F0.19, holding this frequency for a while, and finally decelerate to zero speed according to deceleration time set in F0.20.

F5.11 Synchronous motor stator resistor Rs	【Depends on model】Range： ②1～65535mΩ ③1～65535mΩ (for drive≤22kW) ③0.1～6553.5mΩ (for drive>22kW)
F5.12 Synchronous motor D-axis inductance Ld	【Depends on model】Range： ②0.01~655.35mH ③0.01~655.35mH (for drive≤30kW) ③0.001~65.535mH(for drive>22kW)
F5.13 Synchronous motor Q-axis inductance Lq	【Depends on model】Range： ②0.01~655.35mH ③0.01~655.35mH (for drive≤30kW) ③0.001~65.535mH(for drive>22kW)
F5.14 Synchronous motor counter EMF constant	Range：0.1~6553.5V【300.0V】

Synchronous motor stator resistance is defined as half of the resistance of any two lines among U V W.

Synchronous motor counter EMF constant is defined as voltage of any two lines among UVW when the motor is driven to rated frequency (F0.10).

F5.11~F5.14 are the main parameters that affect the drive control

performance. The values are automatically filled and saved accordingly after tuning operation until next time modification or next time parameter tuning.

Note: Static tuning can only acquire F5.11~F5.13 values, while dynamic tuning can acquire all 4 values for F5.11~F5.14.

6.7 Input terminals group (F6)

F6.00 Terminal Command mode	Range: 0～3【0】

This parameter defines four different control modes that control the drive operation through external terminals.

0: Two-wire mode 1

This mode is the most commonly used two-line mode. The forward/reverse rotation of the motor is decided by the commands of FWD and REV terminals, as shown in Fig.6-13.

K2	K1	Run command
0	0	Stop
0	1	Forward
1	0	Reverse
1	1	Stop

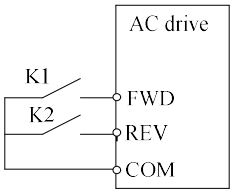


Fig.6-13 Two-wire mode 1

1: Two-wire mode 2

In this mode, both function RUN (Run command) and F/R (Running direction) are used: If RUN is enabled, the drive will startup. If F/R is selected but disabled, the drive will run forward. If F/R is selected and enabled, the drive will run reverse. When F/R is not selected, the running direction is defined by function code (F0.17) Terminals wiring is show in Fig.6-14.

K2	K1	Run command
0	0	Stop
0	1	Forward
1	0	Stop
1	1	Reverse

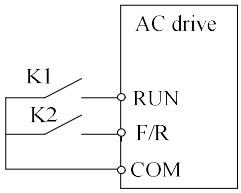


Fig.6-14 Two-wire mode 2

2: Three-wire mode 1

In this mode, FWD and REV terminal control the forward and reverse direction of the motor; but the pulse signal is effective. HLD is holding terminal, i.e. when HLD is ON, the pulse signal of FWD and REV is hold; when HLD is OFF, the holding of FWD and REV is removed. The drive is stopped by disconnecting the HLD terminal. As shown in Fig.6-15

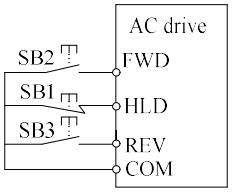


Fig.6-15 Three-wire mode 1

3: Three-wire mode 2

In this mode, RUN terminal control run command; while F/R decides the motor rotation direction. When HLD is ON, the RUN pulse signal is hold; when the HLD is off, the holding of RUN is removed. Stop command is conducted by disconnecting the HLD terminal. As shown in Fig.6-16. When F/R is not selected, the running direction is defined by function code (F0.17).

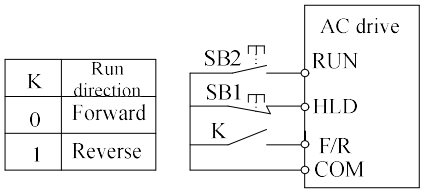


Fig.6-16 Three-wire mode 2

F6.01 X1 terminal function selection	Range: 0～60【1】
F6.02 X2 terminal function selection	Range: 0～60【2】
F6.03 X3 terminal function selection	Range: 0～60【8】
F6.04 X4 terminal function selection	Range: 0～60【17】
F6.05 X5 terminal function selection	Range: 0～60【18】
② F6.06 AI1 terminal function selection	Range: 0～60【0】
③ F6.06 X6 terminal Function selection	Range: 0～60【0】
② F6.07 AI2 terminal function selection	Range: 0～60【0】
③ F6.07 X7 terminal Function selection	Range: 0～60【0】
②F6.08 Reserved	
③ F6.08 X8 terminal function selection	Range: 0～60【0】
②F6.09 Reserved	
③ F6.09 AI1 terminal function selection	Range: 0～60【0】

These parameters are used to set the functions of the multifunctional digital input terminals. Refer to table 6-3 for details.

Note: For NE300, X6~X8 terminals are on the IO option PCB.

Table 6-3 Function list for digital input terminals

Value	Function	Description

Value	Function	Description
0	NULL	This is to define invalidity of the terminal. The drive shall have no action even there is pulse input. The undefined terminals can be set into NULL to avoid mistaken action.
1	Forward (FWD)	Control the forward rotation and reverse rotation of the drive via the external terminals
2	Reverse (REV)	
3	RUN	Control the drive running via the external terminal.
4	F/R running direction	Control the direction of the drive. inactive state: Forward; Active state: Reverse rotation.
5	HLD self-hold selection	Running signal self-hold terminal, refer to F6.00 terminal command modes setup.
6	Forward rotation Jog (FJOG)	Terminals JOG running. FJOG is prior. For details regarding frequency and Jog acceleration/deceleration time during the Jog running, refer to F2.00, F2.01 and F2.02 function codes.
7	Reverse rotation Jog (RJOG)	
8	RESET (RST)	The terminal defined as RST can be used to do fault reset under fault status; In running status, activating this terminal will stop the drive according to preset stop mode.
9	Frequency source switching	When the frequency reference selection (F0.05) is set to 3, this terminal is used to switch Freq. reference1 and Freq. reference2. When the frequency source selection (F0.05) is set to 4, it performs switching between frequency ref. 1 and (freq. ref.1 + freq. ref.2)
10	Terminal UP	When the frequency is given by the external terminals, it is used to modify increment and decrement commands of frequency. When the frequency source is set to digital setup, it can be used to adjust up & down the setup frequency.
11	Terminal DOWN	
12	UP/DOWN setup clear	When the frequency reference is digital

Value	Function	Description
		frequency reference, this terminal can be used to clear the frequency value modified by UP/DOWN and thus restore the reference frequency to the setup value of F0.06.
13	Coast to stop	The drive locks the output, and the motor stop process is beyond the drive control. It is the general method adopted when the load has high inertia and no requirement for the stop time.
14	DC injection braking	Once his terminal is enabled, the drive directly switches to the DC brake status. Intensity of DC brake follows DC braking current preset in F1.11.
15	Acceleration/deceleration prohibit	Protect the drive from affecting by the external signals (except stop command), and maintain the current frequency.
16	Drive running prohibit	Once this terminal is enabled, if the drive is on running status, the drive will coast to stop immediately, if the drive is on stop status, the drive cannot start. This is mainly used in applications where needs safety linkage.
17	Multi-step terminal 1	It can realize 16 steps of speed through the combination of digital status of these four terminals. Refer to attached table 6-4 for multi-speed setting details. K1~K4 correspond to terminals 17~20.
18	Multi-step terminal 2	
19	Multi-step terminal 3	
20	Multi-step terminal 4	
21	Torque control disabled	The torque control of drive is inactive.
22	Acc/Dec time selector 1	It can select four types of speed-up/speed-down time through the combination of digital status of these two terminals. Refer to table 6-5 for details.
23	Acc/Dec time selector 2	
24	External pause normally open input	The drive decelerates to stop, but al l the running parameters are saved in memory, such as PLC parameter, wobble frequency parameter and PID parameters. After this pause signal disappears, the drive restores to the status before stop.
25	External pause normally closed input	

Value	Function	Description
26	External fault normally open	After the external fault signal is sent to the drive, the drive reports fault and stops.
27	External fault normally closed	
28	Run command switching to terminal	When Run command (F0.02) is 0 or 2, this terminal forces the run command switching to terminal control.
29	Run command switching to Keypad	When Run command (F0.02) is 1 or 2, this terminal forces the run command switching to keypad control.
30	External stop terminal; same to STOP key in keypad control mode.	This is to define an external stop terminal. In keypad control mode, this terminal can stop the drive. It is same as STOP key on keypad.
31	Reserved	Reserved
32	PLC status reset	Drive reset to the first step of PLC running.
33	Wobble freq. pause	The drive pause at the present frequency. Once this terminal is disabled, the drive resumes the wobble frequency running.
34	Wobble freq. status reset	The drive returns to wobble center frequency.
35	PID pause	PID is inactive temporarily, and the drive maintains the current frequency output.
36	PID parameters switching	If the terminal is valid, PID control switches to second group PID parameters.
37	PID direction reversion	If this terminal is enabled, PID action direction is opposite to the direction set in F8.04.
38	Timing drive input	If the terminal is valid, drive starts the timing, otherwise zero-clear.
39	Counter signal input	The input terminal of counting pulse.
40	Counter clear	Clear the counter status.
41	③Actual length clear	When the function terminal is enabled, actual length in fixed length control will be cleared to zero.
42	FWD running (FWD NC)	Control the drive forward or reversed by external terminals.
43	REV running (REV NC)	
44	HLD (Normally Open)	Running signal self-hold terminal, refer to

Value	Function	Description
		F6.00 terminal command modes setup.
45	Torque increase	When the torque reference is given by discrete signal, this function realizes the torque increasing, decreasing, and increment clearing. Refer to F3.24 and F3.25 for torque increment and adjustment range.
46	Torque increase clear	
47	Torque decrease	
48	One key recover user parameters (Valid in stop state)	If the user has done the parameter backup operation before, drive can be reset to those parameters setting by this terminal under stop state.
49~56	Reserved	Reserved
57	Pulse input	High speed pulse input. This function is only valid for X4 & X5. And X4 has priority when there are 2 routes input.
58	③Single phase measuring speed input	Single phase measuring speed input. Only valid for X4 and X5. Take X4 as priority when there are 2 routes input.
59	③Speed measuring input A	Measuring speed input A. It is only valid for X4
60	③Speed measuring input B	Measuring speed input B. It is only valid for X5

Table 6-4 Multi-steps running selection guide

K4	K3	K2	K1	Freq. Setup	Parameter
OFF	OFF	OFF	OFF	F0.06	F0.06
OFF	OFF	OFF	ON	Multi-step freq.1	F9.00
OFF	OFF	ON	OFF	Multi-step freq.2	F9.01
OFF	OFF	ON	ON	Multi-step freq.3	F9.02
OFF	ON	OFF	OFF	Multi-step freq.4	F9.03
OFF	ON	OFF	ON	Multi-step freq.5	F9.04
OFF	ON	ON	OFF	Multi-step freq.6	F9.05
OFF	ON	ON	ON	Multi-step freq.7	F9.06

ON	OFF	OFF	OFF	Multi-step freq.8	F9.27
ON	OFF	OFF	ON	Multi-step freq.9	F9.28
ON	OFF	ON	OFF	Multi-step freq.10	F9.29
ON	OFF	ON	ON	Multi-step freq.11	F9.30
ON	ON	OFF	OFF	Multi-step freq.12	F9.31
ON	ON	OFF	ON	Multi-step freq.13	F9.32
ON	ON	ON	OFF	Multi-step freq.14	F9.33
ON	ON	ON	ON	Multi-step freq.15	F9.34

Table 6-5 Acc/Dec time selection table

Terminal 2	Terminal 1	Acc/Dec time selection
OFF	OFF	Acc time 1/ Dec time 1
OFF	ON	Acc time 2/ Dec time 2
ON	OFF	Acc time 3/ Dec time3
ON	ON	Acc time 4/ Dec time4

F6.10 Analog Nonlinear Selection	Range: 0~3【0】

0: None

F6.11～F6.15 are used to define AI1 inputs, F6.16～F6.20 are used to define AI2 inputs, and F6.21～F6.25are used to defined pulse inputs. They are independent and do not interfere to each other.

1: AI1

All the parameters from F6.11 to F6.25 are nonlinear setting points for the AI1 channel, as shown in Fig.6-17. The AI1 filter time F6.15 is taken. And AI2 setting points F6.16~6.20 are taken as 0.00~10.00V input and its corresponding 0.00~100.00%.setup value. And pulse input setting points are taken as 0.00~50.00 kHz and its corresponding 0.00~100.00% setup value.

2: AI2

All the parameters from F6.11 to F6.25 are nonlinear setting points for the AI2 channel, as shown in Fig.6-17. The AI2 filter time F6.20 is taken. And AI1 setting points F6.16~6.20 are taken as 0.00~10.00V input and its corresponding 0.00~100.00%.setup value. And pulse input setting points are taken as 0.00~50.00 kHz and its corresponding 0.00~100.00% setup value.

3: Pulse input

All the parameters from F6.11 to F6.25 are nonlinear setting points for the PULSE input channel, as shown in Fig.6-17. The pulse filter time F6.25 is taken. And AI1 setting points F6.16~6.20 are taken as 0.00~10.00V input and its corresponding 0.00~100.00%.setup value. AI2 setting points F6.16~6.20 are taken as 0.00~10.00V input and its corresponding 0.00~100.00%.setup value.

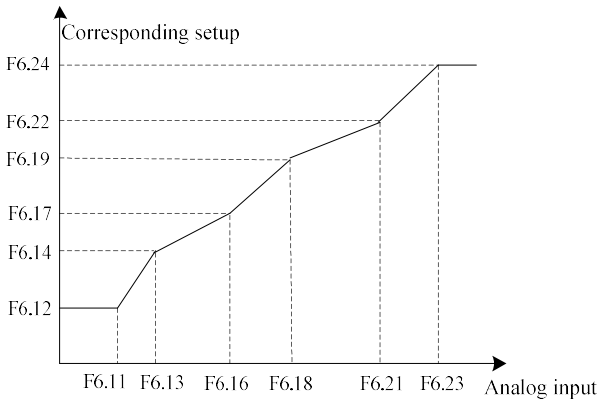


Fig.6-17 Analog input non-linear curve

F6.11 AI1 minimum input	Range: 0.0~F6.13【0.00V】
F6.12 AI1 minimum Input	Range: -200%~ 200.0%【0.0%】

corresponding setup	
F6.13 AI1 Max. input	Range:F6.11～10.00V【10.00V】
F6.14 AI1 Max. Input corresponding setup	Range: -200%~ 200.0%【100.0%】
F6.15 AI1 input filter time	Range: 0.01～50.00s【0.05s】
F6.16 AI2 Min. input	Range: 0.00～F6.18【0.00V】
F6.17 AI2 Min. Input corresponding setup	Range: -200%~ 200.0%【0.0%】
F6.18 AI2 Max. input	Range: F6.16～10.00V【10.00V】
F6.19 AI2 Max. Input corresponding setup	Range: -200%~ 200.0%【100.0%】
F6.20 AI2 input filter time	Range: 0.01～50.00s【0.05s】
F6.21 Pulse Min. input frequency	Range: 0.00～F6.23 【0.00kHz】
F6.22 Pulse Min. input frequency Corresponding setup	Range: -200%~ 200.0%【0.0%】
F6.23 PULSE Max. input frequency	Range:F6.21~50.00kHz【50.00kHz】
F6.24 PULSE input Maximum Frequency Corresponding setup	Range: -200%~ 200.0%【100.0%】
F6.25 Pulse filter time	Range: 0.01～50.00s【0.05s】

The above function codes define the relationship between the analog input (AI1, AI2, Pulse input) voltage and their corresponding value. When the analog input voltage exceeds the setup maximum input or minimum input range, the excess part will be calculated as maximum input or minimum input, as shown in Fig.6-18.

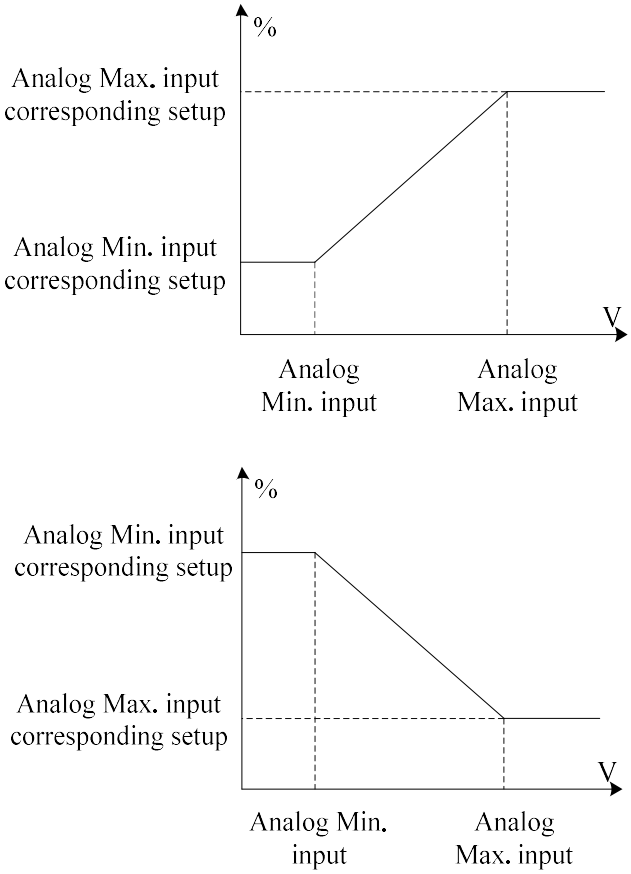


Fig.6-18 Analog input linear curve

F6.26 Terminal up/down initial increment	Range:0.00~10.00kHz 【0.01Hz】

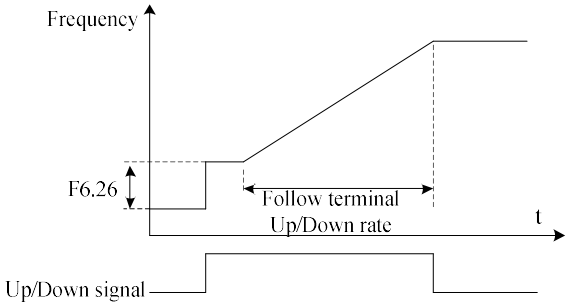


Fig.6-19 Terminal up/down initial increment

F6.27 Freq. ref. 2 datum	Range: 0~1【0】

When the frequency reference 2 is analog or pulse setting, its base frequency is defined by this parameter.

0: Maximum frequency

1: Frequency reference 1

Note: For NE200, select the frequency at 10V point as datum while this function code is the analog.

For NE300, select the frequency datum while this function code is the analog and pulse.

F6.28 Delay duration of X1 terminal close	Range: 0.0~100.0s【0】
F6.29 Delay duration of X1 terminal open	Range: 0.0~100.0s【0】
F6.30 Delay duration of X2 terminal close	Range: 0.0~100.0s【0】
F6.31 Delay duration of X2 terminal open	Range: 0.0~100.0s【0】

F6.32 Pos. and Neg. logic terminal X 1	Range: 【0000】 Units: Logic of X1 terminal Tens: Logic of X2 terminal Hundreds: Logic of X3 terminal Thousands: Logic of X4 terminal
F6.33 ②Pos. and Neg. logic terminal X 2	Range: 【0000】 Units: Logic of X5 terminal Tens: Logic of AI1 terminal Hundreds: Logic of AI2 terminal
F6.33 ③Pos. and Neg. logic terminal X 2	Range: 【0000】 Units: Logic of X5 terminal Tens: Logic of X6 terminal Hundreds: Logic of X7 terminal Thousands: Logic of X8 terminal

Notes:

1) Terminal 24、25、26、27、42、43、44 and 49 are not impacted by F6.33.
2) Pos. logic of Xi terminal: Be valid while connecting between Xi and COM.
3) Neg. logic of Xi terminal: Be valid while disconnecting between Xi and COM.

6.8 Output terminals group (F7)

②F7.00 Reserved	
③F7.00 DO terminal output definition	Range:0~31【0】
F7.01 Y1 terminal output selection	Range: 0～31【1】
②F7.02 Reserved	

③F7.02 Y2 terminal output selection	Range:0~31【0】
F7.03 Relay 1 (TA/TB/TC) output selection	Range: 0～31【16】
②F7.04 Reserved	Range:
③F7.04 Relay 2 (BRA/BRB/BRC) output selection	Range:0~31【0】

Multifunctional output terminal function selection details are shown in Table 6-6.

Table6-6: Multifunction output terminals selection

Value	Function	Description
0	NULL	The output terminal does not have any function.
1	Run	It indicates the drive is running, and there is output frequency (can be zero), terminal outputs ON signal
2	Freq. arrival (FAR)	Please refer to F7.05 for details.
3	Freq. level detection 1 (FDT1)	Please refer to F7.06 and F7.07 for details.
4	Freq. level detection 2 (FDT2)	Please refer to F7.08 and F7.09 for details.
5	Freq. detection when speed-up	When the output frequency increases to the Up detection frequency (F7.10), terminal outputs ON signal.
6	Freq. detection when speed-down	When the output frequency decreases to Down detection frequency (F7.11), terminal outputs ON signal.
7	Zero-speed running	When the drive output frequency is zero and is still in running, the terminal outputs ON signal.
8	Zero-speed	When output frequency is zero, terminal outputs ON signal.
9	PLC circulation completion	When the simple PLC running completes one cycle, the terminal outputs ON signal.

Value	Function	Description
10	②Reserved	Reserved
10	③Indicate the running step (Co-setting in DO\Y1\Y2)	It indicates the present running step. Refer to table 6-7 for details.
11	Ready for running (RDY)	When the main circuit and control circuit is power up and there is no fault protection action, the drive is ready for running and then terminal output ON signal.
12	Timing arrival	When multi-function input terminal defined as No.38 is active, the drive starts timing. And when the running time exceeds the F7.14 preset time, it output ON signal. The timing is cleared to zero if the input terminal is invalid.
13	Counting arrival	When the counting value reach the value defined in F7.13, it output ON signal.
14	Reserved	Reserved
15	Preset torque value arrival	When motor's torque exceeds reference value (set by P7.12), terminal outputs ON signal.
16	Drive fault output	When the drive is faulty, it outputs ON signal.
17	Under voltage status output	When the drive is in under voltage status, terminal outputs ON signal.
18	Drive overload pre-warning	If the output current is higher than the value defined by FC.02 (Overload Pre-alarm detection level), terminal outputs ON signal.
19	Fixed-length arrived, output a high level signals	If the actual length exceeds the preset length, terminal outputs ON signal.
20	PID in dormancy	When PID is in dormancy, terminal outputs ON signal.
21	AI1>AI2	When AI1>AI2 value, terminal outputs ON signal.
22	AI1<F7.16	When AI1<F7.16, terminal outputs ON signal.
23	AI1>F7.16	When AI1>F7.16, terminal outputs ON signal.
24	F7.16<AI1<F7.17	When F7.16<AI1<F7.17, terminal outputs ON

Value	Function	Description
		signal.
25	Frequency lower limit arrival	When the running frequency reaches frequency lower limit, terminal outputs ON signal.
26	Multi-pumps system auxiliary pump control signal	Auxiliary pump control signal for constant pressure water supply, refer to the parameter F7.28&F7.29 instruction for details.
27	Communication setting	This can define the terminal status, see the communication appendix for details.
28	Drive running time arrival	Output signal while the drive running time ≥F7.32.
29	Running in FWD	---
30	Running in REV	---
31	Instantaneous power loss processing	---

Table 6-7 PLC Running Steps

Y2	Y1	D0	Running Step
OFF	OFF	ON	T1
OFF	ON	OFF	T2
OFF	ON	ON	T3
ON	OFF	OFF	T4
ON	OFF	ON	T5
ON	ON	OFF	T6
ON	ON	ON	T7

F7.05 Freq. arrival (FAR) detection width	Range: 0.00～10.00Hz【2.50Hz】

If the drive's output frequency is within the detection width of frequency, a pulse signal will be output, as shown in Fig.6-20.

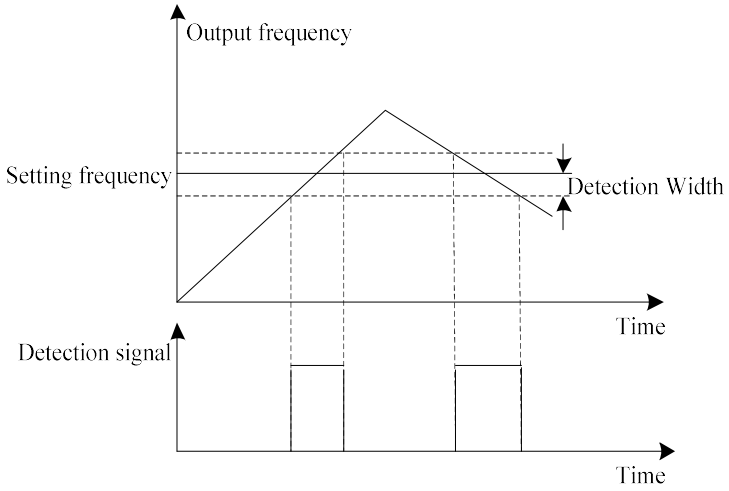


Fig.6-20 FAR detection diagram

F7.06 Frequency detection value 1 (FDT1 level)	Range: 0.00～600.0Hz【5.00Hz】
F7.07 Frequency detection lag 1(FDT1-lag)	Range: 0.00～10.0Hz【1.00Hz】
F7.08 Frequency detection value 2 (FDT2 level)	Range:0.00~300.0Hz 【②5Hz/③25.00Hz】
F7.09 Frequency detection lag 2(FDT2-lag)	Range: 0.00～10.0Hz【1.00Hz】

The setting of 2 frequency arrival detection values and the action relief lag value are shown as Fig.6-21 below.

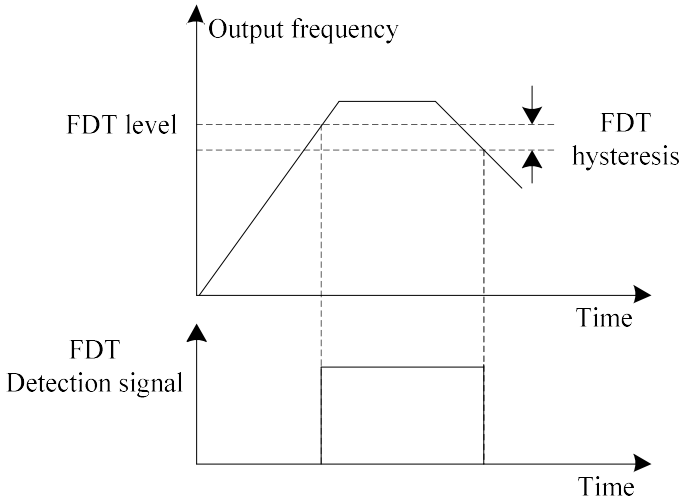


Fig.6-21 FDT level and lag diagram

F7.10 Up detection frequency	Range: 0.00～550.0Hz【50.00Hz】
F7.11 Down detection frequency	Range: 0.00～550.0Hz【0.00Hz】

These two parameters define the detection trigger frequency value for increasing stage and decreasing stage respectively.

F7.12 Torque detection reference	Range: 0.0~200.0%【100.0%】
F7.13 Preset Count value	Range: 0~9999【0】
F7.14 Preset Timing value	Range: 0.0~6553.0s【0.0s】

The above parameters define the detection trigger value for torque arrival detection, counting arrival detection, and timing arrival detection.

F7.16 AI1 compare threshold 1	Range: 0.00～10.00V【0.00V】
F7.17 AI1 compare threshold 2	Range: 0.00～10.00V【0.00V】
F7.18 Analog compare hysteresis	Range: 0.00～30.00V【0.20V】

error	

These parameters define the value of the analog comparison. Please refer to table 6-6 (value 22-24) for details.

F7.19 ②AO function definition	Range: 0～16【1】
F7.19 ③AO1 function definition	Range: 0～16【1】
F7.20 ②Reserved	
F7.20 ③AO2 output selection	Range: 0～16【0】
F7.21 ②Y1 function definition	Range: 0～16【0】
F7.21 ③DO output selection	Range: 0～16【0】

For NE200, AO analog output is 0-10V or 0-20mA, customer can exchange between them by switch on board. See fig. 6-8.

For NE300, AO1 can output either 0~10V or 0/4~20mA, which can be selected by the jumper on the control board.These output selection details are shown as table 6-8:

Table 6-8 Analog output terminals selection

Value	Function	Description
0	NULL	NULL
1	Running frequency	0~maximun frequency
2	setting frequency	0~maximun frequency
3	output current	0～2* drive rated current
4	Output voltage	0～Maximum Voltage
5	PID setup	0～10V
6	PID feedback	0～10V
7	Calibration signals	5V
8	Output torque	0～2*motor rated torque
9	Output power	0～2*Drive rated power
10	DC Bus voltage	0～1000V
11	AI1	0～10V
12	AI2	0～10V

13	Pulse input	0.1～50.0KHz
14	Communication setup	See Communication appendix
15	Reserved	---
16	Output current	0~2 time rated current

F7.22 ②AO output range selection	Range: 0～1【0】
F7.22 ③AO1 output range selection	Range: 0～1【0】
F7.23 ②Reserved	---
F7.23 ③AO2 output range selection	Range: 0～1【0】

0: 0～10V / 0～20mA

1: 2～10V / 4～20mA

F7.24 ②Gain of AO	Range: 1～200%【100%】
F7.24 ③Gain of AO1	Range: 1～200%【100%】
F7.25 ②Reserved	---
F7.25 ③Gain of AO2	Range: 1~200%【100%】

The drive output and user's instrument systems are likely to produce error; you can adjust the output gain (AO1) for the meter calibration and the change of measuring range.

F7.26 ② Y1 Maximum output pulse freq.	Range: Y1 Minimum output pulse freq.~50.00kHz【10.00kHz】
F7.26 ③DO Max. output pulse freq.	Range: DO Minimum output pulse freq.~50Hz【10.00kHz】
F7.27 ②Y1 Minimum output pulse freq.	Range: 0.00～Y1 Maximum output pulse frequency【0.00kH】
F7.27 ③DO Min. output pulse freq.	Range: 0.00～DO Max. output pulse freq.【0.00kH】

The above parameters define output pulse frequency range.

F7.28 Auxiliary pump start lag time	Range: 0～9999【0s】
F7.29 Auxiliary pump stop lag time	Range: 0～9999【0s】

The above parameters define the delay time for auxiliary pump start and stop. Refer to Fig.6-22 for details.

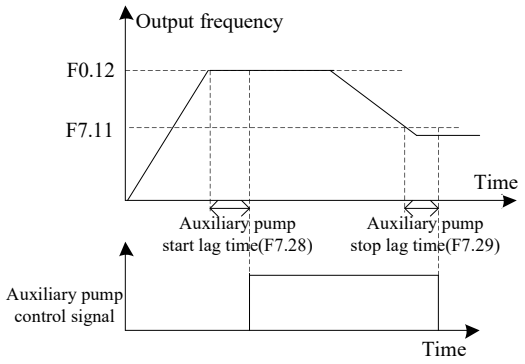


Fig.6-22 Constant pressure water supply auxiliary pump control signal

F7.30 ②Y1 Max. output	Range: 0~1【0】
F7.30 ③DO Max. output	Range: 0~1【0】

0: 50.00 kHz, Maximum output is 50kHz.

1: 500.0Hz, Maximum output is 500Hz

F7.31 FDT/RUN signal Jog selection	Range: 0~1【0】

0: Include jog signal

1: Do not include jog signal

F7.32 Running time arrival setup	Range: 0~65530 min【0】

When the drive starts running, the counting starts. Once the counting reach to the value preset in this parameter F7.32, the drive stopping and internal counter remains. But the run command rising edge conducts the

clearance to the counting.

F7.33 Running time arrival stop selection	Range: 0~1【0】

0: Do not stop 1: Stop

When the internal counter value ≥F7.32, the drive can be set to stop or not by this parameter.

📖Note: When F7.32=0, this function is invalid.

F7.34 Ao1 4mA/2.00v adjustable datum	Range: 0.0~100%【20%】

F7.35 ②Reserved	
F7.35 ③Ao2 4mA/2.00v adjustable datum	Range: 0.0~100%【20%】

F7.36 ②Digital output terminal Pos./Neg. logic	【0000】 Units: Logic of Y1 terminal Tens: Reserved Hundreds: Logic of Relay 1 Thousands: Reserved
F7.36 ③Digital output terminal Pos./Neg. logic	【0000】 Units: Logic of Y1 terminal Tens: Logic of Y2 terminal Hundreds: Logic of Relay 1 Thousands: Logic of Relay 2

6.9 PID Parameters (F8)

F8.00 PID setup channel selection	Range: 0～4【0】

This parameter defined the given channel of PID target quantity。

0: PID digital setting, Determined by F8.02.

1: AI1 terminal

Taken as 0~10V analog voltage input.

2: AI2 terminal

Taken as 0 ~ 10V analog voltage or 0 ~ 20mA current input, which can be selected by DIP switch setting.

3: Pulse input

4: Serial communication

The input value should in 0~100.00% (0~10000). 100.00% corresponds to the full scale of PID.

📖 Note:

The relationship between AI1, AI2 & pulse frequency and the actual physical quantities can be seen in F6.10 ~ F6.26. Its full range (100.0%) of actual physical quantities correspond to the PID full range

F8.01 PID feedback channel selection	Range: 0～7【1】

This parameter defined the PID feedback channel。

0: AI1 terminal

Taken as 0~10V analog voltage input.

1: AI2 terminal

Taken as 0 ~ 10V analog voltage or 0 ~ 20mA current input, which can be selected by DIP switch setting.

2: Pulse input

3: serial communication

The input value should in 0~100.00% (0~10000). 100.00% corresponds to the full scale of PID.

4: AI1-AI2

AI1-AI2 as PID feedback, if the result is negative the feedback value is negative

5: AI1+AI2

AI1+ AI2 as PID feedback, if the result is bigger than the actual

physical quantities (100%) the PID feedback quantity is the 100% full range.

6: MAX (AI1, AI2)

Take the larger one between AI1 and AI2 as the PID feedback.

7: MIN (AI1, AI2)

Take the smaller one between AI1 and AI2 as the PID feedback.

F8.02 Analog PID digital setup	Range: 0.0～999.9【50.0】

When analog PID setting channel select the digital setting (F8.00 = 0), this parameter decide the setting value of the PID.

F8.03 Analog closed loop measuring range	Range: 1.0～999.9【100.0】

It is the setting range for analog PID setting and PID feedback value, it must match the actual measuring range. The 100% physical quantity of AI1, AI2 and pulse input correspond to analog PID range.

F8.04 PID action direction	Range: 0～1【0】

0: Positive

When the PID reference increases, the output frequency will increase and the controlled physical value will increase, such as water supply system.

1: Negative

When the PID reference increases, the motor speed decreases with setting value such as refrigeration system.

F8.05 PID proportional gain 1 (KP1)	Range：0.1～9.9【1.0】
F8.06 PID integration time 1	Range：0.00～100.0s

	【②10.00s/③3.00s】
F8.07 PID differential time 1	Range：0.00～1.00【0.00s】
F8.08 PID proportional gain 2 (KP2)	Range：0.1～9.9【1.0】
F8.09 PID integration time 2	Range：0.00～100.0【10.00s】
F8.10 PID differential time 2	Range：0.00～1.00【0.00s】

The proportional gain (KP) is the parameter that decides the sensitivity of P action in response to the deviation. The bigger the proportional gain KP is, the more sensitive the system acts and the faster the drive responses. However, oscillation may easily come into being and regulation time extends. When KP is too big, the system tends to instability. When KP is too small, the system will slow, and responses lag.

Use integration time to decide the effect of integral action. The longer the integration time, the slower the response, and the worse the ability of control external disturbance variation. The smaller the integration time is, the stronger the integral take effect. The smaller integration time can eliminate the steady state error and improve control precision, fast response. However, oscillation may easily occur, and the system stability decrease, if the integration time is too small.

Differential time define the effect of differential action. The bigger differential time can attenuate the oscillation caused by P action more quickly when deviations occurs and short the regulation time. However, if differential time is too big, oscillation may occur. If the differential time is small, the attenuation effect will be small when deviations come into being and the regulation time is longer. Only the right differential time can reduce regulation time.

🕮 Note:

NE200/300 drive has two sets of PID parameters, determined by F8.11. The first group PID parameters are taken as default.

F8.11 PID parameters switching	Range: 0～2【0】

0: No switching, use the first group parameters

1: Switching by terminal，to defined the multi-function terminals to switch two groups of PID parameters.

2: Auto-switching by deviation，Refer to the F8.12, F8.13 instructions.

F8.12 PID para. switching Deviation 1	Range: 0.0～999.9【20.0】
F8.13 PID para. switching Deviation 2	Range: 0.0～999.9【80.0】

Two groups of PID parameters can be switched by feedback deviation from the preset PID value. It is shown in figure 6-23 as below.

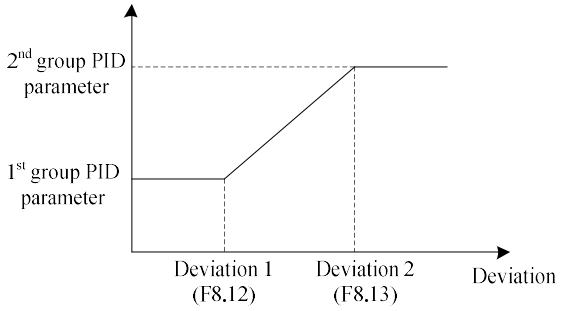


Figure 6-23 PID parameters switching

F8.14 PID delay time constant	Range: 0.00～100.0s【0.0s】

The PID control frequency output delay time setting.

F8.15 Deviation limit	Range: 0.0～999.9s【0.2】

When the deviation of feedback value from preset value lies within the deviation limit range, PID regulator stops adjustment. The proper settings of

this function can reach a balance between system output accuracy and stability.

F8.16 ②PID output positive limit	Range: 0.00～320.0Hz【50.00Hz】
F8.16 ③PID output positive limit	Range: 0.00～600.0Hz【50.00Hz】
F8.17 PID output negative limit	Range: 0.00～600.0Hz【0.00Hz】

The two parameters are used to limit the output range of the PID regulator. When PID regulating is set to be the frequency reference, user can adjust the negative limit of the PID for reverse control, e.g. setting F8.17=30.00Hz to limit the reversed rotation within 30Hz. When PID and other channels are combined as frequency reference, the PID positive and negative limit can be adjusted according to actual application needs. For example, when PID and AI1 is overlapped to be frequency reference, and if system requires PID to conduct fine adjust of ±5V based on AI1, both F8.16 and F8.17 are to be set as 5.00Hz.

F8.18 PID preset freq.	Range: 0.00～550.0Hz【0.00Hz】
F8.19 Hold time of PID preset frequency	Range: 0.0～3600s【0.0s】

When the PID operation is start, the frequency will ramp up to the PID preset frequency (F8.18) according to the Acc time. The drive will keeps running at this preset frequency for a period of time set by F8.19, and then starts to conduct PID characteristic regulating as shown in Fig.6-24.

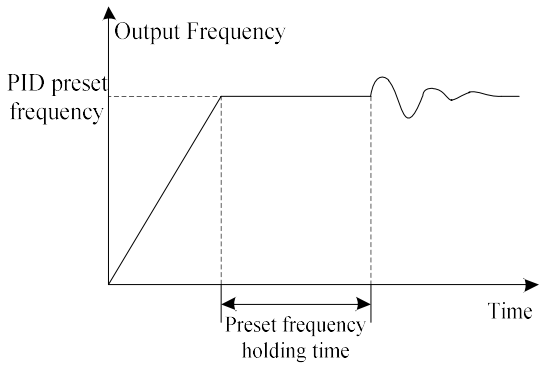


Fig. 6-24 PID preset frequency and holding time

📖 Note:

If you do not need the preset frequency function, set the preset frequency =0.

F8.20 Enable dormancy	Range: 0～1【0】

0: Disabled

1: Enabled

F8.21 Dormancy delay	Range: 0～999s【120s】
F8.22 Dormancy threshold	Range: 0.00～320.0Hz【20.00Hz】
F8.23 Awaken threshold	Range: 0.0～100.0%【80%】

When the output frequency is lower than the dormancy threshold value and keeps under this threshold for a lag time defined in F8.21, PID will enter the dormant state, which means the output frequency goes to 0Hz. The drive will quit the dormant state if PID feedback value is lower than awaken threshold (F8.23).

F8.24 PID feedback offline detection range	Range: 0~100.0%【0.0%】

F8.25 PID feedback offline detection time	Range: 0.0~50.0s【2.0s】
F8.26 PID feedback offline detection Min. Frequency	Range: 0.00~50.00Hz【10.00Hz】

When the running frequency is higher than F2.26 and feedback signal is lower than F8.24 for a period of time defined by F8.25, the drive will give alarm (PID offline).

6.10 PLC and Multi-steps group (F9)

F9.00 Multi-step freq. 1	Range: 0.00～Max frequency【5.00Hz】
F9.01 Multi-step freq. 2	Range: 0.00～Max frequency【10.00Hz】
F9.02 Multi-step freq. 3	Range: 0.00～Max frequency【15.00Hz】
F9.03 Multi-step freq. 4	Range: 0.00～Max frequency【20.00Hz】
F9.04 Multi-step freq. 5	Range: 0.00～Max frequency【30.00Hz】
F9.05 Multi-step freq. 6	Range: 0.00～Max frequency【40.00Hz】
F9.06 Multi-step freq. 7	Range: 0.00～Max frequency【50.00Hz】

Define Multi-steps frequency respectively, which can be used in Multi-step speed running and simple PLC running.

For Multi-steps speed running, Multi-step speed frequency can be selected by multi-step terminals. While in simple PLC running, Multi-step speed frequency is decided by present running step. It is shown in Fig.6-25.

F9.07 PLC running mode	Range: 0～2【2】

0: Single cycle 1

The drive stops automatically after one cycle of operation and will start when receiving RUN command again.

1: Single cycle and hold the final value

The drive will hold the operating frequency and direction of last step after completing one cycle of operation.

2: Continuous operation

The drive will start next cycle of operation automatically after completing one cycle of PLC operation until receiving STOP command.

F9.08 PLC restarting mode after interrupt	Range: 0～1【0】

0: Restart from first step

If the drive stops during PLC operation because of receiving STOP command or fault, or power loss, it will restart from the first step after restarting.

1: Continue from the step where the drive was interrupted

When the drive stops during PLC operation because of receiving STOP command or fault, it will record the already running time of the present step. After restart, the drive automatically enters the specific step where it was interrupted and run the left time of this step with the step frequency.

F9.09 PLC status recorded or not at power failure	Range: 0～1【0】

If F9.09 is set to 1, the PLC operating parameters such as the PLC operating step and PLC operating time will be saved when power loss.

0: Not save 1: save

F9.10 Time unit select for each duration of PLC processing	Range: 0～1【0】

Define the unit of PLC running time.

0: Second 1: Minute

F9.11 PLC step1 duration (T1)	Range: 0.1～3600【20.0】

F9.12 PLC step2 duration (T2)	Range: 0.0～3600【20.0】
F9.13 PLC step3 duration (T3)	Range: 0.0～3600【20.0】
F9.14 PLC step4 duration (T4)	Range: 0.0～3600【20.0】
F9.15 PLC step5 duration (T5)	Range: 0.0～3600【20.0】
F9.16 PLC step6 duration (T6)	Range: 0.0～3600【20.0】
F9.17 PLC step7 duration (T7)	Range: 0.1～3600【20.0】

Configure the running time of each PLC running step. If the running time of the step is set to 0, the drive will skip the step and run the next step, as shown in Fig 6-25.

F9.18 Step T1 program running setting	Range: 1F/r～4F/r【1F】
F9.19 Step T2 program running setting	Range: 1F/r～4F/r【1F】
F9.20 Step T3 program running setting	Range: 1F/r～4F/r【1F】
F9.21 Step T4 program running setting	Range: 1F/r～4F/r【1F】
F9.22 Step T5 program running setting	Range: 1F/r～4F/r【1F】
F9.23 Step T6 program running setting	Range: 1F/r～4F/r【1F】
F9.24 Step T7 program running setting	Range: 1F/r～4F/r【1F】

F9.18~F9.24 are used to configure the direction and Acc/Dec time of each PLC running step. There are total 8 kinds of combinations could be selected, please refer to Table 6-9 for the details.

Table6-9 PLC program running setting

Combination	Acc/Dec time	Direction
1F	Acc/Dec time 1	F：Forward
1r		r：Reverse
2F	Acc/Dec time 2	F：Forward
2r		r：Reverse
3F	Acc/Dec time 3	F：Forward
3r		r：Reverse
4F	Acc/Dec time 4	F：Forward

Combination	Acc/Dec time	Direction
4r		r：Reverse

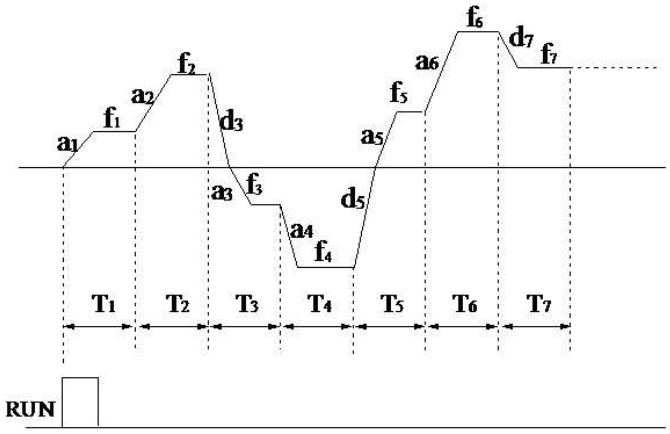


Fig.6-25 Simple PLC running

📖Note:

In Fig.6-25, f1～f7, a1～a7, d1～d7 and T1～T7 respectively correspond to step frequency, Acc Time, Dec Time and running time.

F9.25 ②Current step running time	Range: 0.0～3600【0】
F9.25 ③Current running step	Range: 1～7【0】
F9.26 ②Current running step	Range: 1～7【0】
F9.26 ③Current step running time	Range: 0.0～3600【0】

Records the step that the PLC currently operating at.

Records the operating time of the step that the PLC currently running at.

F9.27 Multi-step freq. 8	Range: 0.00 ～ Max frequency

	【50.00Hz】
F9.28 Multi-step freq. 9	Range: 0.00 ～ Max frequency 【50.00Hz】
F9.29 Multi-step freq. 10	Range: 0.00 ～ Max frequency 【50.00Hz】
F9.30 Multi-step freq. 11	Range: 0.00 ～ Max frequency 【50.00Hz】
F9.31 Multi-step freq. 12	Range: 0.00 ～ Max frequency 【50.00Hz】
F9.32 Multi-step freq. 13	Range: 0.00 ～ Max frequency 【50.00Hz】
F9.33 Multi-step freq. 14	Range: 0.00 ～ Max frequency 【50.00Hz】
F9.34 Multi-step freq. 15	Range: 0.00 ～ Max frequency 【50.00Hz】

Define Multi-steps frequency respectively, which can be used in Multi-step speed running. The terminals defined as multi-steps decide which step to be run. (See table 6-4)

F9.35 PLC Multi-step frequency 1 selection	Range: 0～4【0】
F9.36 PLC Multi-step frequency 7 selection	Range: 0～4【0】

Define Multi-step 1 & 7 frequency source. When the setting is 0, the first step and the 7th step speed is F9.00 and F9.06

0: Multi-steps running

1: AI1 terminal

2: AI2 terminal

3: keypad potentiometer

4: Pulse input

6.11 Wobble frequency running group (FA)

The wobble frequency running function is to make the drive output frequency wobbling up and down with the setup frequency as the center. The trace of running frequency at the time axis is shown in Figure 6-26, of which the swing amplitude is set by FA-00.When FA-00 is set to 0, indicating the swing amplitude is 0, the wobble frequency function is disabled.

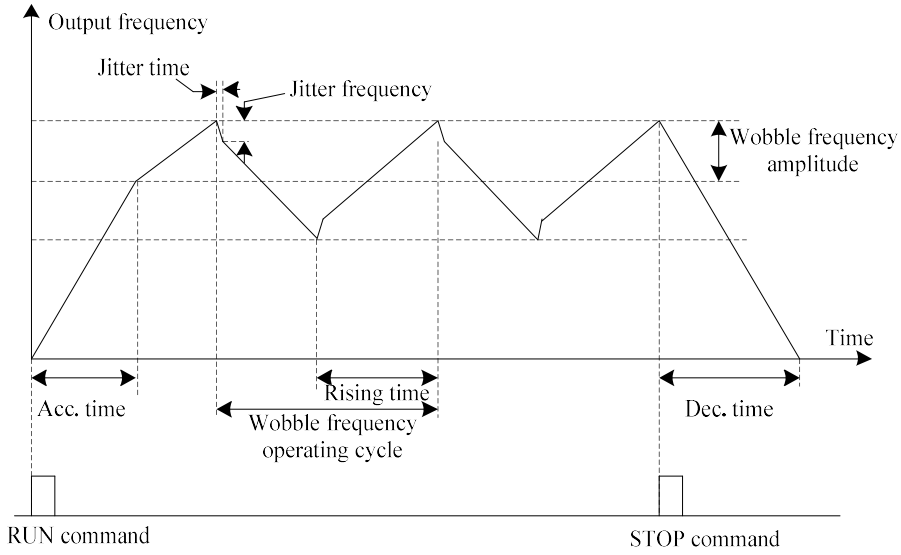


Fig.6-26 Wobble frequency running diagram

FA.00 Wobble frequency amplitude	Range: 0.0~50%【0.0%】
FA.01 Jitter frequency	Range: 0.0~50% (Relative to FA.00) 【0.0%】

FA.02 Jitter Time	Range: 5～50ms【5ms】
FA.03 Wobble freq. rising time	Range: 0.1～999.9s【5.0s】
FA.04 Wobble freq. dropping time	Range: 0.1～999.9s【5.0s】

Wobble frequency amplitude: The running amplitude around setup frequency.

Wobble frequency rising time: The time takes from the peak base (lowest frequency in the swing) to the peak height (highest frequency in the swing).

Wobble frequency dropping time: The time takes from the peak height (highest frequency in the swing) to peak base (lowest frequency in the swing).

FA.05 Amplitude setting mode	Range: 0～1【0】

This parameter is used to select the benchmark quantity of the swing amplitude.

0: Relative to the central frequency

It is variable swing amplitude system. The swing amplitude varies with the change of central frequency (setup frequency).

1: Relative to the maximum frequency

It is fixed swing amplitude system. The swing amplitude is fixed.

6.12 Fixed-length control group (Fb)

FB.00 Preset length	Range: 0~65530 【0】
FB.01 Actual length	Range: 0~65530 【0】
FB.02 Pulse number per unit	Range: 0.1~6553.0【100.0】

The preset length (PB.00), actual length (PB.01) and number of pulse per-unit (FB.02) are mainly used for fixed-length control. The length is calculated via the pulse signal input by the discrete input terminal, which

needs to set the corresponding input terminal to length count input terminal. And input terminal X4 or X5 is usually used when the pulse frequency is relatively high.

Actual length = counted terminal input pulse number ÷ number of pulse per unit.

When the actual length FB.01exceeds the preset length FB.00, the multifunction digital output terminal defined as “length arrival terminal” will output ON signal.

6.13 Protection and fault parameters group (FC)

FC.00 Motor overload protection mode	Range: 0～2【0】

0: Disabled

The overload protection is disabled. Be cautious to use this function because the drive will not protect the motor in case of overload.

1: Common motor (with low speed compensation)

Since the cooling effects of common motor deteriorates at low speed (below 30 Hz), the motor’s overheat protecting threshold should be lowered, which is called low speed compensation。

2: Variable frequency motor (without low speed compensation)

The cooling effects of variable frequency motor are not affected by the motor’s speed, so low speed compensation is not necessary.

FC.01 Electro thermal protective value	Range: 20～110%【100%】

In order to apply effective overload protection to different kinds of motors, the Max output current of the drive should be adjusted, as shown in Fig.6-27.

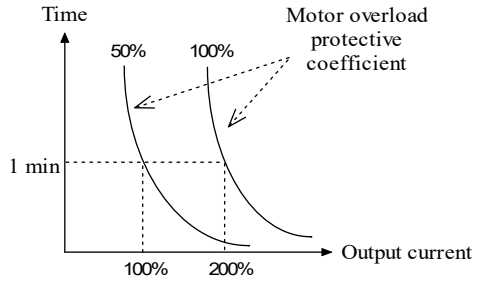


Fig 6-27 Motor overload protection curve

Motor overload protection coefficient calculates：

Motor overload protection coefficient = (the max allowed current of load ÷ rated output current of drive) × 100%

Generally, the Max load current is the motor rated current.

FC.02 Pre-overload detection Level	Range: 30.0～200.0%【160.0%】
FC.03 Pre-Overload detection time	Range: 0.0～80.0s【60.0s】

FC.02 defines the current threshold for overload pre-alarm protection. The setting range is a percentage value of rated current.

FC.03 defines the time during which the drive current exceeds FC.02. If the drive continuous output current lager than FC.02 for some time defined in FC.03, the drive will output pre-alarm signal (OLP2).

FC.04 Current amplitude limit	Range: 0～2【2】

During the Acc/Dec running, if the drive actual current exceeds the “Current amplitude limiting level” (PC.04), the drive stops the Acc/Dec process till the current is lower than the limit point.

In the drive’s constant speed operating process, if PC.04 is set to 2, when the drive actual current exceeds “Current amplitude limiting level” (PC.05), the drive will reduce output frequency till the current gets lower than the limit point. Then the drive will accelerates to the previous constant

speed status.

0: Invalid

1: Acc./Dec. valid; Constant speed invalid

2: Valid all the time

FC.05 Current amplitude limit level	Range: Type G: 80.0~200.0%【160.0%】 Type P: 60.0~150.0%【120.0%】

This parameter is used to define the current limiting level.

FC.06 Over voltage stall function	Range: 0～2【1】

Over voltage stall function selection.

In Drive's Acc/Dec process, if the bus voltage exceeds the over-voltage stall point defined by FC.07, the drive will stop Acc/Dec.

In the drive's constant speed operating process, if the bus voltage exceeds the stall overvoltage point, the drive will raise its output frequency. The Acc/Dec time is defined by Acc/Dec time 4.

0: Invalid

1: Acc./Dec. valid; Constant speed invalid

2: Valid

FC.07 Over-voltage point for stall	Range: 110.0~150.0% Bus voltage【140.0%】

Define the stall over voltage point.

FC.08 Input phase loss detection level	Range: 1～100%【20%】
FC.09 Input phase loss detection delay	Range: 2～255s【10s】

Input phase loss detection function can detect loss of input phase or a

serious imbalance in the three-phase input, in order to protect drive. If the input phase loss detection is too sensitive, you can appropriately increase the detection level (FC.08) and detection delay time (FC.09) and vice versa. When FC.08 is set to 100%, there is no input phase's loss protection.

FC.10 Output phase loss detection	Range: 0~1【1】

Output phase loss detect function can detect loss of output phase or a serious imbalance in the three-phase output, in order to protect drive and motor

0: Invalid

1: Valid

FC.11 Terminal close fault detection	Range: 0～10【0】

0: Invalid

1: Valid

When the drive does not allow the restart after power failure recovery (F1.15=0 or 2), and at the same time the drive run command is controlled by terminal, the drive will give "terminal close fault" (EF2) if the FWD or REV terminal close after power recovery.

FC.12 Fault auto reset times	Range: 0~10【0】
FC.13 Fault auto reset interval	Range: 2.0~20.0s/time【5.0s】

Auto reset function can reset OC and OU according to preset reset times(FC.12) and reset interval (FC.13). During the reset interval, the drive stops output and runs at zero-speed. After the reset has been done, the drive will start according to preset starting mode. When the "reset times" is set to 0, the reset function is disabled, and the drive directly enters protection status.

📖Note: Only OC, OU has auto reset function.

FC.14 Under-voltage fault treatment	Range:0~2【0】

0: No treatment

1: Auto reset after power recovery (reset the UU fault only, do not run after fault reset.)

2: Auto run after power recovery (Auto run time interval is F1.16)

FC.15 Fast current limit	Range:50.0~100.0%【80%】
FC.16 Fast current limit time	Range:0.01~1.00s【0.10s】

This function is to protect the drive from tripping by fast current limit in case of large impact. If the drive is in fast current limit for a long time, the drive will give fast current limit fault (LC).

The smaller the fast-current-limit value, the smaller loss to the IGBT is. But too small current limit value will also cause the abnormal working of the drive. When the fast-current-limit value is set to 100%, there is no fast current limit function.

FC.17 Overvoltage suppression mode	Range:0.01~1.00s【0.20s】

When the motor is in generating status, the drive will raise the output frequency automatically to avoid tripping with over-voltage fault. When this parameter is set to 0.00Hz, the suppression function is disabled.

6.14 Communication parameters group (Fd)

Fd.00 RS485 communication	Range: 0～1【0】

Disable 485 communication function can effectively reduce the interference, when MODBUS communication is not used.

0: RS485 Disabled

1: RS485 Enabled

Fd.01 Local address	Range：1～247【1】

Define the drive's communicating address. The address set to 0 is for the broadcast address to realize the PC broadcasting; when the drive address is 247, it will serve as the host on the network to broadcast to other slave machines to achieve synchronization function.

📖Note:

1) Local address should be the unique one; it is the foundation to realize point-to-point communication between the host and drive.
2) When the drive is set to be host, the broadcasting interval is the response delay time defined in Fd.05. If the response delay time is set to be too short, the communication networking might get abnormal.

Fd.02 Baud rate	Range: 0～5【3】

Select the baud rate of serial communication. The master and the slave must keep the same baud rate setting. Otherwise, they cannot communicate normally. Higher baud rate could have a faster communication.

0: 1200bpS

1: 2400bpS

2: 4800bpS

3: 9600bpS

4: 19200bpS

5: 38400bpS

Fd.03 Parity bit setup	Range: 0～2【0】

Choose the way of parity check. The master and the slave must keep the same parity check setting. Otherwise, they cannot communicate normally.

0: Even parity check

1: Odd parity check

2: No parity check

Fd.04 Communication Timeout time	Range: 0.0～100.0s【0.0s】

Set communication timeout detecting time. Once establishing communications, if there is no data communicating within timeout detection time (Fd.04), the drive will report communication error. If Pb.03 is set to 0, this function is disabled.

Fd.05 Response delay	Range：0～500ms【5ms】

When the drive works as the slave, this parameter refers to the time from drive receiving the host PC command to returning response frame to it. When the drive works as the host, it refers to the interval of each broadcast

Fd.06 Communication Freq. setting coefficient	Range：0.0~200.0%【100%】

When the frequency reference is set to be serial communication (F0.03=4), the frequency of the drive as a slave will be the host frequency by the coefficient defined in this parameter.

Fd.07 Communication interrupt detection mode	Range：0~1【0】

0: Time interval between 2 packets receiving.

1: Time interval of 0005H Add. data writing

6.15 Operation interface & display group (FE)

FE.00 Parameter display	Range: 0～1【0】

0: Normal 3-levels menu display

1: Only display modified parameters

Note:

In normal status, menu show as 3 levels. The parameters without modification will be not shown while only showing the parameters modified, the customer can be easy to look at them.

FE.01 MFK Key function selection	Range: 0～7【0】

0: MFK inactive

1: JOG running

Used to start Jog running, the direction is set by function code F0.17。

2: FWD/REV switching

MFK key is used to switch the running direction between forward and reverse. It is equivalent to modify F0.17, but it will not be saved when power lost.

3: UP/DOWN clear

Used to Clear the frequency set by external terminals (UN/DOWN) , this is equal to the function of terminal “UP/DOWN clear command”。

4: Running command switch

MFK key is used to switch the run command mode between keypad control and remote command control (terminal command channel or serial communication command channel). And the current run command mode must be terminal or communications, otherwise this option is invalid

7: RUN for FWD, MFK for REV, STOP for STOP

FE.02 STOP key function selection	Range: 0～3【2】

This parameter is used to define the STOP key functions, including stop and fault reset.

0: Active only in the keypad control mode

1: STOP key stop function active in the terminal/communication control mode

2: STOP key fault reset function active in the terminal/ communication control mode

3: STOP key stop and fault reset function active in the terminal/ communication control mode

FE.03 Running freq. (Hz) (before compensation)	Range: 0～3【2】
FE.04 Running freq. (Hz) (after compensation)	Range: 0～3【0】
FE.05 Reference frequency (Hz, blinking)	Range: 0～3【1】
FE.06 Output current(A)	Range: 0～3【2】
FE.07 Bus voltage (V)	Range: 0～3【3】
FE.08 Output voltage (V)	Range: 0～3【0】
FE.09 Output torque (%)	Range: 0～3【0】
FE.10 Reference torque (%, blinking)	Range: 0～3【0】
FE.11 Rotate speed (r/min)	Range: 0～3【0】
FE.12 Reference speed (r/min blinking)	Range: 0～3【0】
FE.13 Output power (kW)	Range: 0～3【0】
FE.14 AI1 (V)	Range: 0～3【0】
FE.15 AI2(V)	Range: 0～3【0】
FE.16 Analog PID feedback	Range: 0～3【0】
FE.17 Analog PID setup	Range: 0～3【0】
FE.18 Terminal status (no unit)	Range: 0～3【0】
FE.19 Actual length	Range: 0～3【0】
FE.20 Reference length	Range: 0～3【0】
FE.21 Linear speed (m/s)	Range: 0～3【0】

FE.22 External counting value (no unit)	Range: 0～3【0】

These parameters define the display in stop and running monitoring condition.

0: No display

1: Display only in stop process

2: Display only during running

3: Display in stop and running

📖 Explanation:

- In stop process monitoring, if no parameter is set to show in monitor state, reference frequency will be displayed. In running monitoring state, if no parameter is set to be displayed, the output frequency (before compensation) will be displayed.
- The indication for analog PID reference and analog PID feedback is “Hz” +” A”,
  For PID reference, the Hz+A is blinking; while for PID feedback, the Hz+A is constant ON.
- The terminal status is shown by four digits of LED without unit indicator, the specific meaning shown in figure 6-28.

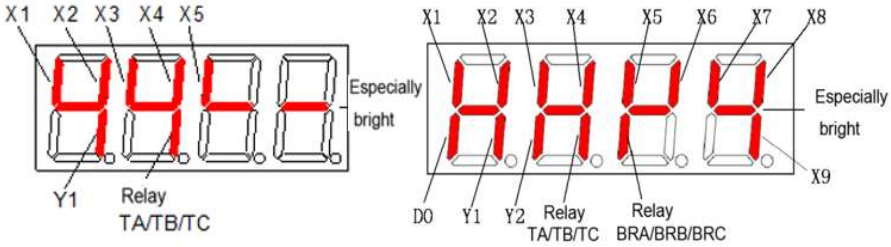


Fig 6-28 Terminal status diagram

6.16 Running history record group (FF)

FF.00 Type of latest fault	Setting range: 0～27【NULL】
FF.01 Output freq. at latest fault	Setting range: 0～Frequency

	upper limit【0.00Hz】
FF.02 Reference frequency at latest fault	Setting range: 0～Frequency upper limit【0.00Hz】
FF.03 Output current at latest fault	Setting range: 0～2* drive rated current【0.0A】
FF.04 Bus voltage frequency at latest fault	Setting range: 0～1000V【0V】
FF.05 Running status at latest fault	Setting range: 0～3【0】
FF.06 Fault history 1 (Last One)	Setting range: Same with FF.00
FF.07 Fault history 2	Setting range: Same with FF.00

Memorize the types of the latest 3 faults (See “chapter 7: fault/ alarm information table” for the details of faults). And record the output frequency, reference frequency, output current, DC bus voltage and running status of the latest fault for troubleshooting.

FF.08 Total power on time	Range: 0～65530h【0】
FF.09 Total running time	Range: 0～65530h【0】

The total boot time and runtime accumulated automatically by Drive.

FF.10 Reserved	Reserved
FF.11 Software version number of control board	Range: 1.00～10.00【1.00】
FF.12 Non-standard version number of software	Range: 0～255【0】

These two parameters indicate the software version of the product and also the non-standard version, which helps to identify the product.

FF.13 ②Heat sink temperature	Range: -30.0～120.0°C
FF.13 ③IGBT temperature	Range: 0.0～140.0°C

Record the real time temperature of the heat sink/IGBT.

FF.14 ②Flux current	Range: -200.0～200.0°C
FF.15 ③Torque current	Range: -200.0～200.0°C
FF.17 Accumulated kilowatt-hours (Upper 16 bits)	Range: -200.0～200.0°C
FF.18 Accumulated kilowatt-hours (Low 16 bits)	Range: -200.0～200.0°C

6.17 Protection Parameters (FP)

FP.00 User password	Range: 0~9999【0】

Any non-zero number can be set as password to activate the protection function. After this operation, password is required to access to Group PF. Otherwise all parameters of Group PF cannot be accessed.

0000: Clear the previous setup user password and disable the password protection function.

FP.01 Parameter write-in protection	Range: 0~2【0】

0: All parameters are allowed to be modified

1: Only FP.01 and FP.03 can be modified

In addition to this function code and FP.03, all parameters can be read but cannot be modified.

2: All parameters aren't allowed read

In addition to this function code and FP.03, all parameters value is shown as "0000" and cannot be modified, this can prevent irrelevant person to check.

FP.02 Parameter initialization	Range: 0~2【0】

0: No operation

1: Clear fault history

When FP.02 is set to 1, the fault records of FF.00~FF.07 will be cleared.

2: Restore to default setting

When FP.02 is set to 2, the parameters (except running history and user password) are restored to defaults.

FP.03 Parameter copy	Range: 0~2【0】

0: No action

1: Parameters download

According to the type parameter of the keypad preservation (whether has motor parameters, etc), automatically download to the control board。

2: Parameters upload (except motor's parameters)

All parameters will upload to EEPROM of keypad except "Running history record" (Group FF) and "motor parameters" (Group F5).

3: Parameters upload (all parameters)

All parameters will upload to the EEPROM of keypad except "Running history record" (Group FF).

FP.04 Parameter upload protection	Range: 0～1【0】

0: Protection enabled

When the keypad has stored effective parameters, uploading parameters to keypad is invalid and report "copy fault"

1: Protection disabled

No matter the panel has stored effective parameters or not, the uploading operation will upload the present parameters from the control board to the keypad panel.

FP.05 G/P model selection	Range: 0～1【0】

0: Type G 1: Type P

FP.07 User parameters backup	Range: 0～1【0】

0: Invalid 1: Valid

With this function, the operator can make backup for the parameters after setup.

FP.08 User parameters recovery	Range: 0～1【0】

0: Invalid 1: Valid

With this function, the operator can restore the parameters setup to the backup parameters.

Chapter 7 Fault information and trouble shooting

7.1 Fault information and solutions.

Once a fault is detected, the NE200/300 series of frequency converter would immediately block PWM output and enter the fault protection state; meanwhile TRIP on the keypad would spark and the digital control area display the fault code. At this point one must identify the cause of failure and its corresponding solutions according to the method suggested in this section, if it does not work, please contact us immediately. The series of frequency converter has 22 kinds of faults, which is shown together with their respective solutions in Table 7-1.

Note: A trip code with a sign ③ indicates this trip code is only for NE300

Table 7-1 fault diagnosis and its solutions

Trip code	Trip Type	Possible causes	Solutions
Uu1	Bus Under voltage during running	1.Power grid low voltage	1. Check the input power source.
OC1	Over current in Acceleration	1. Acceleration time too short 2. Power grid low voltage 3. Drive power rating too small	1. Increase the acceleration time. 2. Check the input power source. 3. Choose drive with higher capacity.
OC2	Over current in Deceleration	1. Deceleration time too short 2. Large load inertia 3. Drive power rating too small	1. Increase the deceleration time. 2. Add suitable brake devices. 3. Choose higher capacity drive

Trip code	Trip Type	Possible causes	Solutions
OC3	Over current at constant-speed	1. Abnormal load mutation 2. Power grid low voltage 3. Drive power rating too small 4.Encoder sudden offline in closed-loop vector control	1. Check the load 2. Check the input power source. 3. Choose higher capacity drive 4. Check the encoder and its wiring.
Ou1	Over Voltage in Acceleration	1.Acceleration time too short 2.Power supply abnormal	1. Increase the acceleration time 2. Check the input power source.
Ou2	Over voltage in deceleration	1.Deceleration time too short 2.Large load inertia	1. Increase the deceleration time 2. Add suitable brake devices.
Ou3	Over voltage in constant speed	1. Power supply abnormal 2.Large load inertia	1. Check the input power source. 2. Add suitable braking devices.
GF③	Ground Fault	1. One output phase got short circuit problem.	1. Check whether the electric motor insulation is weakening. 2. Check whether the wiring between the frequency converter and the electric motor is damaged.
SC	Load short-circuit	1. Wiring of drive and motor get phase-to-phase short circuit 2.Damage of the inverting module IGBT	1. Check whether the electric motor coil is short circuit. 2. Ask for the services from manufactures.

Trip code	Trip Type	Possible causes	Solutions
OH1	Heat-sink over heat	1. Ambient temperature too high 2. Fan is damaged 3. Fan air duct is blocked	1. Lower the ambient temperature. 2. Change the fan 3. Clear the air duct.
OL1	Motor overload	1. Power supply abnormal 2. Motor rated current set wrongly 3.The Curve of V/F is not fit	1. Check the input power source. 2. Check whether the motor's rated current is correctly set up. 3. Adjust the V/F curve and torque boosting performance.
		4. Motor always works with heavy load at low speed. 5. Motor blocked to stall or sudden large load change 6.Motor power too low	4. Use specialized electric motor. 5. Check whether the motor or the load is blocked to stall or not. 6. Use motor and drive of suitable power ratings
OL2	Drive overload	1. Low voltage in power grid 2. Load too heavy 3. Acceleration too fast 4.Restart the motor still in turning	1. Check the input power source. 2. Select bigger capacity drive. 3. Increase the acceleration time 4. Avoid restarting when the motor is in rotation.
EF0	Communication fault	1. Baud rate and parity checksum is set incorrect 2. Communication interrupted for long time	1. Check communication parameters correct or not. 2. Check the interface wiring.

Trip code	Trip Type	Possible causes	Solutions
EF1	External terminal fault	1. Faults comes from external control circuit	1. Check the external input
SP1	Input phase loss	1. Input RST have phase loss or imbalance	1. Check input voltage
SPO	Output phase loss	1.There is lack of UVW when output 2.There is a serious unbalance in output	1. Check U-V-W motor wiring 2. Check the load
EEP	EEPROM error	1.Function code parameter writing error 2. EEPROM damaged	1. Recover factory defaults 2. Ask for service from supplier
CCF	Keypad & control board communication interrupted	1.Connection cable between keypad and control panel is broken	1. Check the connection cable between keypad and control panel
bCE	Brake unit fault	1.The braking line or braking pipe is broken 2.brake resistor is too lower	1. Check the brake unit, change the brake pipe. 2. Choose the suitable braking resistor.
PCE	Parameter copy Error	1. Too long connection cable between keypad and control board leads to interference in parameters transmission.	1. Shorten the cable between Keypad and control board to reduce interference.
		2. The downloading parameters do not match the existed	2. Before downloading, make sure the parameters match the drive.

Trip code	Trip Type	Possible causes	Solutions
		parameters in the drive.	
IDE	IDE Hall current detection fault	1. The current sensoring or hall device get damaged.	1. Ask for service from supplier
ECE③	Encoder fault	1. Encoder signal wires are connected reversely. 2. Encoder signal wires get damaged. 3. Encoder damaged. 4. Dual-way encoder detected motor direction is not match with drive direction.	1. Check whether the encoder signal is correctly connected. 2. Check whether the encoder wiring is broke. 3. Change the encoder. 4. Change the encoder direction (F3.16) or alter motor wiring sequence.
LC	Fast current limit fault	1. Load too large or motor blocked to stall 2. Drive power rating too small 3. Drive output circuit loop grounded or SC.	1. Decrease the load and check motor and mechanical part status 2. Choose higher power drive 3. Remove the external fault
EF2	Terminal close fault	1. The FWD or REV terminals close and get power on. But drive is set to not allow the restart after power failure recovery.	1. Disconnect the FWD or REV terminal first and then power on the drive. 2. Close the fault detection function for closed terminal fault (FC.11=0)
PIDE	PID feedback error	1. PID feedback offline	1. Check PID feedback line. 2. Disable PID feedback detection (F8.24=0.0%) 3. Increase PID feedback offline detection time (F8.25)
OLP2	Overload	1.fequency drive	1. Disable pre-alarm

Trip code	Trip Type	Possible causes	Solutions
	pre-alarm error	output current is higher than set pre-alarm threshold	function(FC.19=0) 2. Increase pre-alarm threshold value (FC.02) 3. Increase pre-alarm detection time(FC.03)

7.2 Warning information

Once warning information is detected, the NE200/300 series of frequency converter would immediately enter the warning indicating state and giving out warning codes on LED display. During warning the drive keeps running and returns to previous normal status once the warning is gone. Specific warning information is shown in Table 7-2

Note: A Warning code with a sign③indicates this warning code is only for NE300

Table 7-2 warning information

Warning Code	Type	Description
Uu	Warning of under-voltage	The bus voltage is below the voltage point
OLP2	The pre-warning about overload of drive	Operating current exceeded the converter overload pre-detection level and maintained more than pre-overload detection time
OH2	Heat-sink temperature is high	Temperature in the radiator higher than the OH2 standard
SF3③	Function codes setup is not appropriate	Output terminal DO, Y1, Y2 does not simultaneously select No.10 function

7.3 The general fault diagnosis and solutions

Following abnormal situations might happen in using of the drive. Try to

make simple analysis according to the instructions as below.

S.N	Abnormity	Possible causes	Countermeasure
1	Keypad LED no display after power on	1. Drive power supply absent 2. The keypad or the connecting cable between keypad and control board is damaged. 3. The drive is damaged in the internal.	1. Check the input power supply 2. Change connecting cable between keypad and control board or change keypad. 3. Ask for service from supplier
2	Motor does not run after drive give run command	1.The motor is damaged or block up 2. The anti-reverse function is set and rotation direction conflicts with this setting. 3. The frequency reference signal is zero. 4.The wiring of motor has phase loss	1. Replace the electric motor or rule out the mechanical failure. 2. Remove “Anti-reverse” setting or change the motor running direction. 3. Check frequency reference signal. 4. Check the electric motor wiring.
3	Motor running reversely	1. The motor wiring sequence is not correct.	1. Alter the sequence of the motor wiring 2. Adjust the function code F0.18.
4	Motor gets serious vibration	1.mechanical resonance 2.The legs of the machine not stable 3.Output phases imbalance	1. Adjust the machine 2. Adjust the machine legs 3. Check the load.
5	The noise of motor is too loud	1.Lubrication is not good or bearing wear 2.Carrier frequency is too low	1. Repair or replace the electric motor. 2. Increase the carrier frequency of the drive

Chapter 8 Routine Repair and Maintenance

The application environment (such as temperature, humidity, dust and powder, wool, smoke and oscillation), burning and wearing of internal devices and other factors may increase the possibilities of drive failure. To reduce the failures and prolong the service life of the drive, it needs to conduct routine repair and periodic maintenance.

⚠Note:

1. Only the personnel with professional training can dismantle and replace the drive components.

2. Before inspection and maintenance, please make sure that the power supply to the drive has been shut down for at least ten minutes or the CHARGER indictor is OFF, otherwise there may be risks of electric shock.

3. Do not leave metal components and parts in the drive, or it may damage the equipment.

8.1 Routine Maintenance

The drive shall be used under the allowable conditions as recommended in this manual and its routine maintenance shall be conducted as per the table below.

Item	Inspection contents	Inspection method	Inspection Criteria
Operating Environment	Temperature	Thermometer	-10 ~ +40ºC De-rating at 40 to 50ºC, and the rated output current shall be decreased by 1% for every temperature rise of 1ºC.
	Humidity	Hygroscope	5 ~ 95%, no condensing
	Dust, oil, and	Visual check	There are no dust, oil, and

Item	Inspection contents	Inspection method	Inspection Criteria
	water drop		water drops.
	Vibration	Special test instrument	3.5mm，2～9Hz； 10m/s2，9～200Hz; 15m/s2，200～500Hz
	Gas	Special test instrument, smell and visual check	3.5mm, 2~ 9Hz; 10m/s2,9~ 200Hz; 15m/s2,200~ 500Hz
Drive	Overheat	Special test instrument	Exhaust normal
	Sound	Listen	There is no abnormal sound.
	Gas	Special test instrument	There are no abnormal smell and smoke.
	Physical appearance	Visual check	The physical appearance is kept intact.
	Heat-sink fan ventilation	Visual check	There are no fouling and wool that block the air duct.
	Input current	Ampere meter	In the allowable operating range. Refer to the nameplate.
	Input voltage	Voltmeter	In the allowable operating range. Refer to the nameplate.
	Output current	Ampere meter	In the rated value range. It can be overloaded for a short while.
	Output voltage	Voltmeter	In the rated value range.
Motor	Overheat	Special test instrument and smell.	There are no overheat fault and burning smell.
	Sound	Listen	There is no abnormal sound.
	Vibration	Special test instrument	There is no abnormal oscillation.

8.2 Periodic Maintenance

It needs to perform periodic inspection on the drive once every three to six months according to the application environment and work conditions.

Item	Inspection content	Inspection method	Inspection criteria
Drive	Main circuit terminal	Screwdriver/sleeve	The screws are tightened and the cables are kept well.
	PE terminal	Screwdriver/sleeve	The screws are tightened and the cables are kept well.
	Control circuit terminal	Screwdriver	The screws are tightened and the cables are kept well.
	Internal wiring and connectors	Screwdriver and hands	Connection is firm and reliable.
	Expansion card connector	Screwdriver and hands	Connection is firm and reliable.
	Mounting screws	Screwdriver/sleeve	The screws are tightened.
	Cleaning the dusts and powders	Cleaner	There are no dusts and wools.
	Internal foreign objects	Visual check	There are no foreign objects.
Motor	Insulation test	500VDC megohmmeter	Normal

8.3 Component Replacement

Different types of components have different service span. The service spans of the components are subject to the environment and application conditions. Better working environment may prolong the service lives of the components. The cooling fan and electrolytic capacitor are vulnerable components and shall be conducted routine inspection as per the table below. If any fault occurs, please conduct immediate replacement.

Vulnerable parts	Damage Causes	Solutions	Items for Routine Inspection
Fan	Bearing wear, blade aging	Change	The fan blade has no cracks and rotates normally. The screws are tightened.
Electrolytic capacitor	Ambient temperature is relatively high and electrolyte volatilizes.	Change	There are no electrolyte leakage, color change, crack and shell inflation. The safety valve is normal. Static capacity ≥the initial value*0.85.

⚠Note:

When the drive is stored for a long period of time, power on test shall be conducted once within two years and last at least five hours. Use voltage regulator to gradually increase the voltage to the rated value when power connection is performed.

8.4 Warranty

The drive's warranty period is 18 months (from date of shipping), during which the company would offer free repair or replacement if the fault or damage occurred under normal use.

During the warranty period, the maintenance will be charged a reasonable cost due to fault caused by the following reasons.

1) The fault is caused by not following the operation manual or exceeding the operating standards.

2) The fault is caused by repairing or modifying the drive without permission.

3) The fault is caused by using the drive in a wrong way, such as wiring mistakes.

4) The fault is caused by fire, salt corrosion, gas corrosion, earthquake, storms, floods, lightning, abnormal voltage, or other force majeure causes.

Appendix A NE300 Closed-loop Control

Attention:

"○"means the parameter can be changed during running.

"×"means the parameter cannot be changed during running;

"*" means the parameter is detected value or fixed value and not changeable.

"-" means manufacturer parameter and the users have no access to it.

Parameter Brief

Code	Description	Setting range	Default	Modify	Modbus
F0 Basic Function					
F0.02	Run command control mode	3：CAN	0	o	0102H
F0.03	Frequency reference1 (Freq. ref.1)	9：CAN	0	o	0103H
F0.04	Frequency reference1 (Freq. ref.1)		1	o	0104H
F1 Start and Stop					
F1.18	Rotational speed tracking direction inspection	0：Disable 1：Enable	0	o	0212H
F1.19	Rotational speed tracking direction inspection time	10~1000ms	50ms	o	0213H
F2 Auxiliary Running Function					
F2.23	Instant-power-failure freq. drop rate	1~800	300	o	0317H
F2.33	Threshold value of Zero Freq. running	0.00~550.0Hz (Logic is same with EV1000/EV2000)	0.00Hz	o	0321H
F2.34	Range between start Freq. and threshold value of Zero Freq.		0.00Hz	o	0322H

F3 Vector Control					
F3.46	Encoder Type	0：none 1：ABZ incremental encoder 2：UVW incremental encoder（Reserved） 3：Resolver Encoder	0	x	042EH
F3.47	Resolver polarity number	2~80	2	x	042FH
F3.48	Resolver decoding resolution	0：10bit 1：12 bit 2：14 bit 3：16 bit	1	x	0430H
F3.49	Resolver ABZ output select	0：10 bit 1：12 bit 2：14 bit 3：16 bit	1	x	0431H
F3.50	Resolver Initiation signal Freq.	2.0~20.0KHz	10.0KHz	x	0432H
F3.51	Mounting-angle of encoder	0.0~360.0°	0.0°	x	0433H
F3.52	Reserved	Reserved	Reserved	x	0434H
F3.53	Reserved	Reserved	Reserved	x	0435H
F3.54	ABZ encoder location detecting While powering on initially	0：Don't detecting 1：Detecting	1	x	0436H
F3.55	Detecting encoder learning automatically	Units：Pulse quantity of AB Phase 0：Detecting 1：Don't detect Tens：Direction of encoder 0：Don’t detecting 1：Decting	11	x	0437H
F3.56	Adjusting Z signal location	0：Disable 1：Enable	1	x	0438H
F3.57	Detecting disconnection	Units：Z signal 0：Don’t detecting 1：Detecting Tens：AB phase 0：Don’t detecting 1：Detecting Hundreds：Encoder reversed fault 0：Don't detecting 1：Detecting	111	x	0439H
F3.58	Stall detection	0.00~100.00Hz	10.00Hz	o	043AH
F3.59	Time of stall detection	0.0~100.0s Note ： 0.0 means ‘don’t detection’	0.0s	o	043BH

F3.60	Current Electrical angle of motor	0.0~359.9°	0.0°	-	043CH
F3.61	Status of UVW encoder（Reserved）	0~7	1	-	043DH
F3.62	Running direction of encoder and motor	0：Same direction 1：Not be same direction	0	-	043EH
F3.63	Count of Z signal	0~0xFFFF	0	-	043FH
F3.64	Count of ABZ encoder adjusting	0~0xFFFF	0	-	0440H
F3.65	Set electric current loop (Iq) value	0：Calculating value of speed-loop PI 1：CAN 2：AI1 3：AI2 Note： Need to set Min. and Max. analog value as -150% and 150% if set by AI1 and AI2.	0	x	0441H
F6 Input terminals					
F6.00	Terminal Command mode	4：3-wire mode 3 **Note：** No.3 function: RUN, pulse signal operation. No.4 function: F/R, exchange pulse signal direction. No.5 function: HLD, hold the operation signal. HLD function don't impact the signal of direction. 5：3-wire mode 4 **Note:** No.3 function: RUN, pulse signal operation. No.4 function: F/R, the reverse signal of pulse, come back to forward only while disconnecting HLD signal. No.5 function: HLD, hold the operation signal. 56：Enable 'Motor return initial location automatically'	0	x	0700H
F6.28	Delay duration of X1 terminal close	0.0~100.0s	0.0s	o	071CH
F6.29	Delay duration of X1 terminal open	0.0~100.0s	0.0s	o	071DH
F6.30	Delay duration of X2 terminal close	0.0~100.0s	0.0s	o	071EH

F6.31	Delay duration of X2 terminal open	0.0~100.0s	0.0s	o	071FH
F6.32	Pos. and Neg. logic terminal X 1	Pos. and Neg. logic of Xi terminal: Pos. logic： Be valid while connecting Xi and COM. Neg. logic：Be valid while disconnecting Xi and COM. Units：Logic of X1 Tens：Logic of X2 Hundreds：Logic of X3 Thousands：Logic of X4	0000	x	0720H
F6.33	Pos. and Neg. logic terminal X 2	Units: Logic of X5 terminal Tens: Logic of X6 terminal Hundreds: Logic of X7 terminal Thousands: Logic of X8 terminal **Note:** Terminal 24、25、26、27、42、43、44 and 49 are not impacted by this parameter.	0000	x	0721H
F7 Output terminal					
F7.00~F7.04	DO~ Relay digital output	29：Running in FWD 30：Running in REV 31 ： Instantaneous power loss processing		o	
F7.19~F7.21	Ao1/Ao2/Pulse output	15：Output signal of speed loop given by Iq Range: -150.0~150.0%		0	
F7.34	Ao1 4mA/2.00v adjustable datum	0.0~100.0%	20.0%	o	0822H
F7.35	Ao2 4mA/2.00v adjustable datum	0.0~100.0%	20.0%	o	0823H
F7.36	Digital output terminal Pos./Neg. logic	Units: Logic of Y1 terminal Tens: Logic of Y2 terminal Hundreds: Logic of Relay 1 Thousands: Logic of Relay 2	0000	o	0824H
Fb Fixed Length					
Fb.05	Motor return initial location automatically	0：Valid 1：Valid this function while the set Freq. is lower than the Freq. of motor return the initial location 2 ： Valid this function by terminal		x	0C05H
Fb.06	Initial Freq. of 'Motor return initial location automatically'	0.00~10.00Hz	1.00Hz	o	0C06H

Fb.07	Gain of location loop	0.001~10.00	1.000	o	0C07H
FC Protection and Fault					
FC.20	Reminding or not while undervoltage	0：Yes 1：No **Note：** Include digital output, reading the communication fault code. 0 means that it is same with before.		o	0D14H
Fd Communication					
Fd.10	CAN communication	0：Disable 1：Enable	0	o	0E0AH
Fd.11	CAN communication baud rate	0：20KBPS 1：50KBPS 2：125KBPS 3：250KBPS 4：500KBPS 5：1MBPS	3	o	0E0BH
Fd.12	Receiving ID of CAN (High byte)	18F8H	0~1FFFH	o	0E0CH
Fd.13	Receiving ID of CAN (Low byte)	2238H	0~FFFFH	o	0E0DH
Fd.14	Receiving interval time	0.0~100.0s Note： 0.0s means there is no ‘receiving interval time’. The drive will give the communication fault feedback if the interval time is over the set value after communication is connected.	0.0s	o	0E0EH
Fd.15	Transmitting ID of CAN （High byte） 1	18F8H	0~1FFFH	o	0E0FH
Fd.16	Transmitting ID of CAN （Low byte） 1	2247H	0~FFFFH	o	0E10H
Fd.17	ID1 data transmitting time interval	0.1~500.0ms	100.0ms	o	0E11H
Fd.18	Transmitting ID of CAN （High byte） 2	18F8H	0~1FFFH	o	0E12H
Fd.19	Transmitting ID of CAN （Low byte） 2	2248H	0~FFFFH	o	0E13H
Fd.20	ID2 data transmitting time interval	0~5000ms Don’t transmit data while Value is 0.	500ms	o	0E14H
Fd.21	ID2 data transmitting 1	0：Output Freq. 1：Given Freq.	0	o	0E15H

Fd.22	ID2 data transmitting 2	2：Output current 3：Output power 4：Bus voltage 5：Output voltage 6：Torque 7：Rotary speed 8：AI1 9：AI2 10：Input pulse 11：Input the Xi terminal status 12：Fault code （0 means there is no fault） 13：Temperature of IGBT and heatsink	2	o	0E16H
Fd.23	ID2 data transmitting 3		5	o	0E17H
Fd.24	ID2 data transmitting 4		12	o	0E18H
FF Running History Record					
FF.00	Fault type	CnE1: Fault is the CAN communication interrupting	-	-	1000H
FF.16	Fault code of encoder	0x0~0xFFFF	0x0	-	1010H
FF.17	Accumulated kilowatt-hours（Upper 16 bits）	0~65535 kWH	0kWH	-	1011H
FF.18	Accumulated kilowatt-hours（Low 16 bits）	0~65535 kWH	0kWH	-	1012H

Fault code of encoder

Resolver encoder Fault code (Low 8 byte)		Resolver encoder Fault code (High 8 byte)	
D7	SIN/COS input clipped	Bit 8	Fault of the encoder direction
D6	SIN/COS input is lower than LOS threshold value	Bit9	Fault of AB phase interrupting
D5	SIN/COS input is over DOS outrange threshold value	Bit10	Fault of Z phase interrupting
D4	SIN/COS input is over DOS adapting threshold value	Bit11	Fault of WVW interrupting
D3	Tracking tolerance is over LOT threshold value.	Bit12	Loss speed fault
D2	Speed is over the Max. of tracking speed rate	---	---
D1	Phase tolerance is over the phase-locked range.	---	---
D0	Odd-even check fault	---	---

Appendix B: Modbus Communication Protocol

The drive support Modbus protocol, RTU format, Broadcast address 0, slave address “1-247”. Interface mode: RS485: Asynchronous, half duplex.

Note: ③ means only for NE300.

1. Protocol Format

Start	The initial space of frame is 3.5 characters or above
Slave address	1～247
Function Code	03: Read parameters from slave 06: Write parameters to slave 08: Loopback Test
Data(N)	2×N data, this is the main content of Modbus communication.
……	
Data(0)	
Error check	CRC check
End	The End space of frame is 3.5 characters or above

2. Function Code and Data

Function Code 03H: Reads parameters and status words of one parameters of the drive.

Example：Read parameter (register address: 0100H) from the slave 1, the format is as follows:

The Master Request

Slave address	01H
Function code	03H
Register address Hi	01H

Register address Lo	00H
Number of registers Hi	00H
Number of registers Lo	01H
CRC Hi	85H
CRC Lo	F6H

The Slave Response

Slave address	01H
Function code	03H
Byte Count	02H
Data Hi	00H
Data Lo	01H
CRC Hi	79H
CRC Lo	84H

Function Code 06H: Write parameters and status words of one parameters of the drive.

Example：Write parameter (F0.19 register address: 0113H) to the slave 1, the format is as follows:

The Master Request

Slave address	01H
Function code	06H
Register address Hi	01H
Register address Lo	13H
Data Hi	00H
Data Lo	64H
CRC Hi	78H
CRC Lo	18H

The Slave Response

Slave address	01H
Function code	06H
Register address Hi	01H
Register address Lo	13H
Data Hi	00H

Data Lo	64H
CRC Hi	78H
CRC Lo	18H

Function Code 10H: Write parameters and status words of one parameters of the drive.

Example: Write parameter (F0.19 register address: 0113H) to the slave 1, the format is as follows:

The Master Request

Slave address	01H
Function code	10H
Register address Hi	01H
Register address Lo	13H
Number of registers Hi	00H
Number of registers Lo	01H
Byte Count	02H
Data Hi	00H
Data Lo	64H
CRC Hi	B5H
CRC Lo	D8H

The Slave Response

Slave address	01H
Function code	06H
Register addres Hi	01H
Register address Lo	13H
Number of registers Hi	00H
Number of registers Lo	01H
CRC Hi	F1H
CRC Lo	F0H

Function Code 08H: The transmitted message is returned unchanged as a response message. This test is used for checking the signal

communication between master and slave. The format is as follows:

The Master Request

Slave address	01H
Function code	08H
Register address Hi	00H
Register address Lo	00H
Data Hi	12H
Data Lo	34H
CRC Hi	EDH
CRC Lo	7CH

The Slave Response

Slave address	01H
Function code	08H
Register address Hi	00H
Register address Lo	00H
Data Hi	12H
Data Lo	34H
CRC Hi	EDH
CRC Lo	7CH

If the operation request is rejected, the response will be error code and abnormal function code. Error function code equals to function code +0x80, abnormal code shows the error cause in detail. The format is as follows:

The slave response for the rejected request

Slave address	01H
Function code	83H
Error Code	02H
CRC Hi	C0H
CRC Lo	F1H

Examples for abnormal codes:

Error Code	Definition
01H	Illegal function code: is not 03H,06H,10H,08H
02H	Register address error
03H	Register number error
21H	Data error: beyond data limit
22H	Error when data is written: The register is not written when the drive is running, or writing data to the only read-out register address. ·Data is written during EPPROM fault. ·Data is written when data is edited by keypad.
23H	Data is written when the drive is under voltage.
24H	CRC check error

3. Drive Register Address Distribution

1) The corresponding relationship between the function codes of the drive and the Modbus protocol register address. The bytes at higher orders refer to function code group number + 1, the bytes at lower orders refer to function code number, express with HEX a decimal. For example, the modbus register address of function code F0.02 is 0102H. The parameters are saved upon power failure when the highest bit of the register address is set. For example, when the register address 8012H is written, the parameter F0.02 is saved to EEPROM.

Note: The life of EEPROM is about 100000 times, if change setting frequency frequently, several days or several weeks may damage EEPROM, adopt write RAM, it can avoid to damage EEPROM.

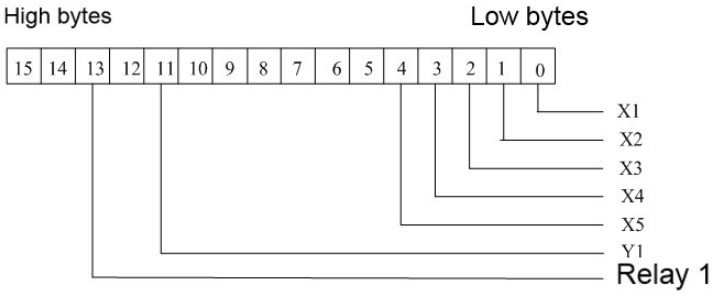
2)The other parameter registers address

Function description	Register Address	Data definition and instruction	R/W
Reserved	0000H	Reserved	Reserved
Communication Run Command	0001H	0001H: Forward rotation	W
		0002H: Reverse rotation	
		0003H: Stop	
		0004H: Coast to stop	
		0005H: Fault reset	
Communication Setting	0002H	Range(-10000～10000)	W/R
		Note: Communication Setting is percentage. (-100.00～100.00%) When it is used to frequency setting, it's relative to the maximum frequency. When it's used to torque setting, it's relative to the 2*rated torque. When it's used to PID setting or feedback, it's relative to the analog input corresponding setup	
Reserved	0003H～001FH	Reserved	Reserved
Drive Status	0020H	Bit0---1:Run 0: Stop	R
		Bit1---1:Reverse rotation 0:Forward rotation	
		Bit2---1:Fault 0:No Fault	
		Bit3---1:Warning 0:No warning	
		Bit4---1:On fault reset 0:no on fault reset	
Fault Content	0021H	0: NULL	R
		1: Uu1 bus Under voltage fault	
		2: OC1 over current in acceleration	
		3: OC2 over current in deceleration	
		4: OC3 over current in constant speed	
		5: Ou1 over voltage in acceleration	
		6: Ou2 over voltage in deceleration	
		7: Ou3 over voltage in constant speed	
		8: GF Ground Fault	
		9: SC Load Short-Circuit	

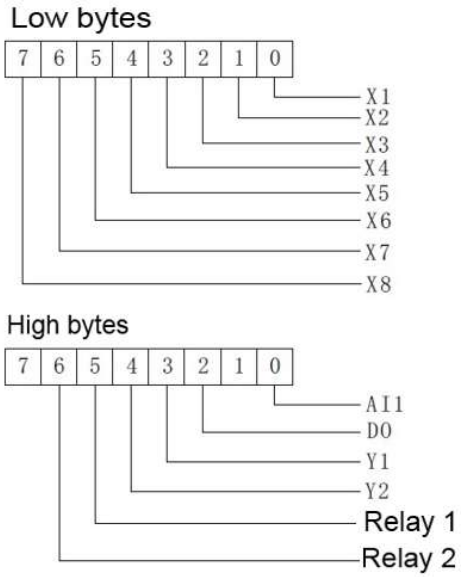
Function description	Register Address	Data definition and instruction	R/W
		10: OH1 Radiator over heat	
		11: OL1 Motor overload	
		12: OL2 Drive overload	
		13: EF0 communication fault	
		14: EF1 external terminal fault	
		15: SP1 Input phase failure or Unbalance	
		16: SPO Output phase failure or Unbalance	
		17: EEP EEPROM Fault	
		18: CCF Transmission between the drive and keypad cannot be established	
		19: bCE Brake unit fault	
		20: PCE Parameter copy Error	
		21: IDE Hall current detection fault	
		22: ECE PG fault	
		23: ③LC Fast current limit fault	
		24: ③EF2 Terminal closing fault	
		25: ③PIDE PID feedback offline fault	
		26: ③OLP2 Overload pre-alarm	
Warning Content	0022H	0：No warning	R
		1：uu Bus under voltage warning	
		2：OLP2Drive overload warning	
		3：OH2Drive overheat warning	
		4 ： SF3Output Terminal function selection 10 not reach to 3	
Running/Stop Monitor parameters	0023H	Output frequency	R
	0024H	Frequency reference	R
	0025H	Bus voltage	R
	0026H	Output voltage	R
	0027H	Output current	R
	0028H	Rotate speed of motor	R
	0029H	Output power	R
	002AH	Output torque	R
	002BH	PID reference	R
	002CH	PID feedback	R
	002DH	AI1	R

Function description	Register Address	Data definition and instruction	R/W
	002EH	AI2	R
	002FH	High pulse input	R
	0030H	Terminal status	R
	0031H	PLC current steps	R
	0032H	length reference	R
	0033H	Actual length	R
	0034H	External count	R
Running/ Stop Monitor parameters	0035H	X1 terminal status 0: Invalid 1: Valid	R
	0036H	X2 terminal status 0: Invalid 1: Valid	R
	0037H	X3 terminal status 0: Invalid 1: Valid	R
	0038H	X4 terminal status 0: Invalid 1: Valid	R
	0039H	X5 terminal status 0: Invalid 1: Valid	R
	003AH	X6 terminal status 0: Invalid 1: Valid	R
	003BH	X7 terminal status 0: Invalid 1: Valid	R
	003CH	X8 terminal status 0: Invalid 1: Valid	R
	003DH	Reserved	R

3) NE200 Terminals status (0030H) definition.



4) NE300 Terminals status (0030H) definition.



4. CRC16 calculation method

```
unsigned int   CRC16（unsigned char *data，unsigned char length）
{
    int i，crc_result=0xffff；

    while（length--）
    {
        crc_result^=*data++；
        for（i=0；i<8；i++）
        {
            if（crc_result&0x01）
                crc_result=（crc_result>>1）^0xa001；
            else
                crc_result=crc_result>>1；
```

```
    }
  }
return （crc_result=（（crc_result&0xff）<<8）|（crc_result>>8
```

Appendix C: Adapted encoder instruction

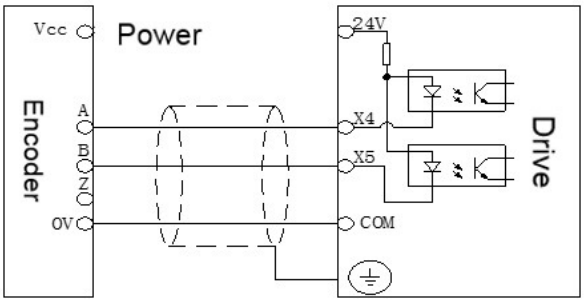


Fig B-1

Fig B-1 is the wiring method of the collector of encoder. The encoder power supply may be the 24V of drive while the encoder Vcc is 24V, may use the 5~24V power supply while using the external encoder.

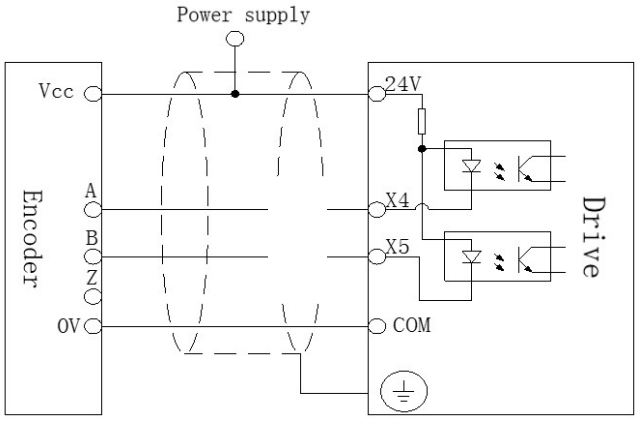


Fig. B-2

Fig. B-2 is the encoder wiring method in Push-pull output or voltage output modes. The encoder power supply Vcc is 24V and drive's 24V is recommended.

Note:

The above instruction is for standard inbuilt PG card, the highest pulse frequency NE300 series can take is 50kHz.

If higher requirement closed-loop control is needed, please order extra professional PG card and its matched control board for NE300 series.

Appendix D NE300 advanced control PCBA（Option）

NE300 advanced control PCBA diagram

303PU01 is the standard control PCBA (See fig. 3-28). Need to use 303PU02 if you want to get the close-loop, CAN etc. advanced functions. (See fig. D-1)

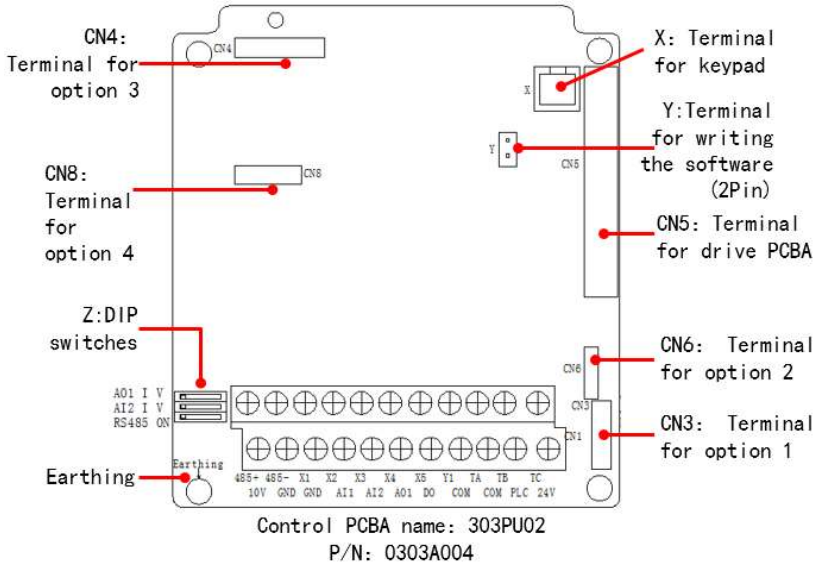


Fig. D-1 NE300 advanced control PCBA diagram

Notes:

The X, Y, Z symbols are for reading, they are not printed on the PCBA (See fig. D-1)

X: Terminal for keypad

Y: Terminal for writing the software (2 pins)

Z: DIP switches

CN3: Terminal for option 1

CN4: Terminal for option 3

CN5: Terminal for drive PCBA

CN6： Terminal for option 2

CN8： Terminal for option 4

Earthing: Earthing point

Wiring of control circuit

Terminal sequence of control circuit

Note： PLC and +24V terminals are shorted by a silver-colored metal part in factory.

Wiring of multi-function terminal

- **Drain connecting wiring (External power supply +24V)**

Note: Must dismantle the silver-colored metal part using to short PLC and +24V terminal

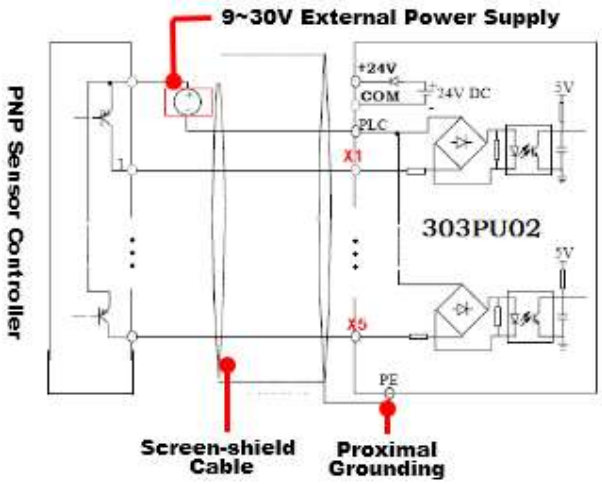


Fig. D-2 Drain connection wiring diagram (Using external +24V)

- **Drain connection wiring (Using internal +24V)**

⚠ **Note:** Short-connect PLC and +24V

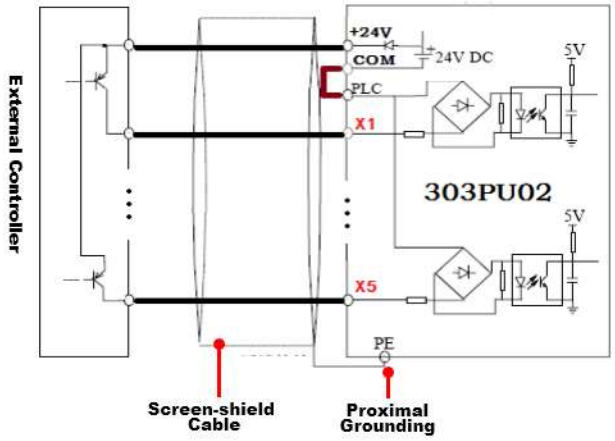


Fig. D-3 Drain connection wiring diagram
(Using internal +24V)

- **NPN common-emitter connection wiring**
  (Using internal +24V)

⚠ **Note:** Short-connect PLC and +24V

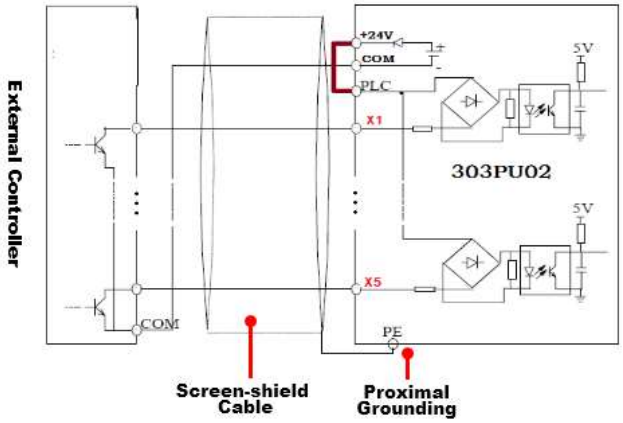


Fig. D-4 NPN common-emitter connection wiring
(Using internal +24V)

CAN non-standard protocol instruction

CAN ID1 transmitting and receiving data format is constant as Table D-1. Adjust to decrease interval time, suggest within 1.5ms, of host transmitting, to increase interval time of slaver device.

Table D-1 CAN ID1 Transmitting and Receiving Format

Byte0	Bit0：Running signal 1：Running 0：Stopped Bit1：Direction signal 1：REV 0：FWD Bit2：Fault signal 1：Fault 0：Normal Bit3~Bit7：Reserved
Byte1	Freq. Signal：Range：~20000~20000 Max. Freq. : 20000/Min. minus Freq. : -20000 Note： Byte1 high 8 byte，Byte2 low 8 byte
Byte2	
Byte3	Real feedback rotary speed： Range：~20000~20000 Max. Freq. : 20000/Min. minus Freq. : -20000 Note： Byte3 high 8 byte，Byte4 low 8 byte
Byte4	
Byte5	Given signal of current-loop (Iq): -8192~8192 4096: Rated torque current related motor （From speed-loop output signal） Note： Byte5 high 8 byte，Byte6 low 8 byte
Byte6	
Byte7	Reserved

CAN ID2 transmitting data format as following Table D-2，this function is to transmit the status info. of self.

Table D-2 CAN ID2 Transmitting data format

Byte0	Data 1 (Byte0 High 8 bytes，Byte1 low 8 bytes)
Byte1	
Byte2	Data 2 (Byte2 High 8 bytes，Byte3 low 8 bytes)
Byte3	
Byte4	Data 3 (Byte4 High 8 bytes，Byte5 low 8 bytes)
Byte5	
Byte6	Data 4 (Byte6 High 8 bytes，Byte7 low 8 bytes)
Byte7	

Appendix C: NE300 Option cards instruction

Function brief of option cards

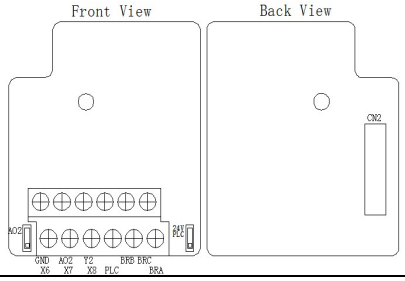
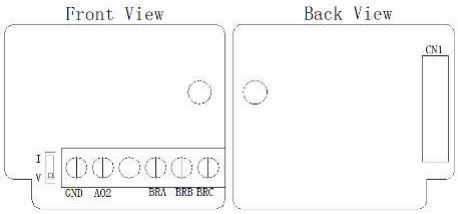
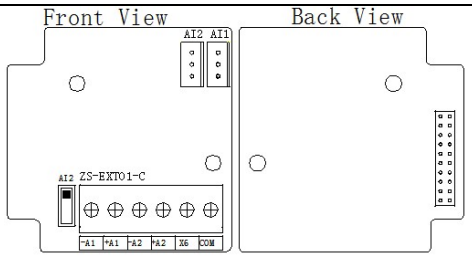
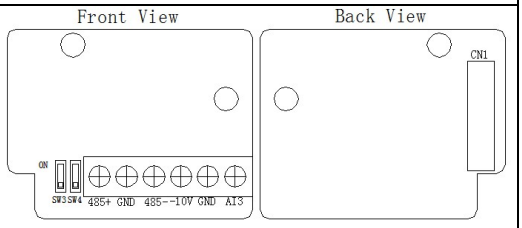
Option card	Model No.	Terminals	Function	Models Range
I/O Option	NE30-I/O Lite ---------- 02359000	X6	Multi-function input terminal 6 (to PLC)	NE300-4T0015G/0022PB ~ NE300-4T8000G/9000P-F
		X7	Multi-functions input terminal 7 (to PLC)	
		X8	Multi-functions input terminal 8 (to PLC)	
		Y2	Multi-functions input terminal Y2 (to COM)	
	NE30-I/O Relay --------- 02359001	BRA/BRB/ BRC	Relay output 2	
		PLC	PLC common end (to PLC)	
		AO2	Analog output 2 (0~10V, 0/4~20mA)	
		GND	Analog output common end	
Injection molding option	NE30-ZS01 02359002	+A1	0-1A current input	NE300-4T0110G/0150PB ~ NE300-4T8000G/9000P-F
		-A1	0-1A current output	
		+A2	0-1A/2A current input	
		-A2	0-1A/2A current output	
		X6	Multi-function input terminal 6 (to PLC)	
		COM	Multi-function input common end	
±10V extension option	NE30-AN01 ---------- --- 02359003	485+	485 differential signal +	NE200-4T0022G/0040PB ~ NE300-4T8000G/9000P-F
		485-	485 differential signal -	
		-10V	Provide -10V to external (to GND)	
		AI3	±10V analog input (to GND)	
		GND	Analog input common end	
Speed tracking option	NE30-SP01 --------- 02359004	U	Connect to drive U phase output	NE200-4T0015G/0022PB ~ NE300-4T0150G/0185PB
		W	Connect to drive W phase output	

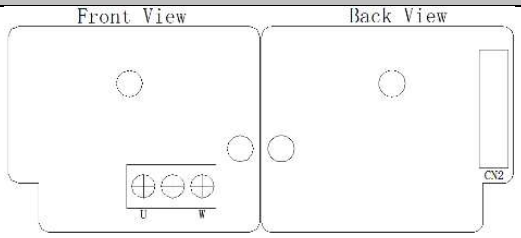
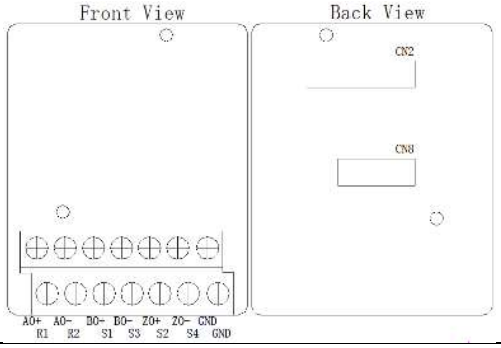
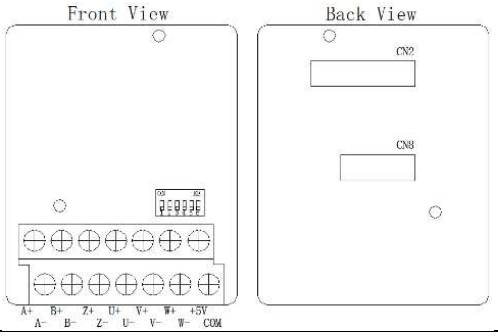
Option card	Model No.	Terminals	Function	Models Range
Resolver PG encoder option	B602PG03A ---------- 0303A001	R1，R2	Base time signal	NE300
		S1，S3	SIN+ and SIN- input signal	
		S2，S4	COS+ and COS- input signal	
		GND	Ref. GND of the differential signal, can wiring the shield line	
		AO+，AO-	The input encoder signal is outputted as A/B/Z differential signal, the location signal, though the IC operation. Terminal to Terminal	
		BO+，BO-		
		ZO+，ZO-		
5V differential signal PG encoder option	B602PG04A 303A000	+5V, COM	Power supply	NE300
		A+，A-	A/B/Z input of the 5V differential signal	
		B+，B-		
		Z+，Z-		
		U+，U-	The UVW location signal of encoder	
		V+，V-		
		W+，W-		
		B+, B-		
24V differential signal PG encoder option	B602PG02A ---------- 0303A005	+24V, COM	Power supply	NE300
		A+, A-	A/B signal input	
		B+, B-		

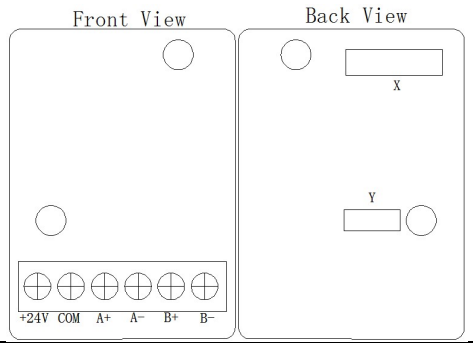
Note:

1) When using ±10V Option card, the AI1 on control board is invalid.
2) The work voltage of the Resolver PG encoder is 7V.
3) The work voltage of the 5V differential signal encoder is 5V. UVW also is used as the normal encoder.
4) The work voltage of the 24V differential signal encoder is 24V.

Mounting instruction of option card (PCBA)

Option Name	Terminal on control PCBA	Option card diagram
IO	CN3	
	CN3	
Injection molding option	CN3	
±10V extension option	CN3	

Option Name	Terminal on control PCBA	Option card diagram
Speed tracking option	CN3	
Resolver PG encoder option	CN4+CN8	
5V differential signal PG encoder option	CN4+CN8	

24V differential signal PG encoder option	CN4+CN8	

Resolver PG encoder option instruction

Resolver PG encoder option is an adapter between drive and Resolver PG encoder, can be for the closed-loop control application of synchronous and induction motor.

Caution: Encoder's work voltage is 7V

Specification

Terminal instruction:

Terminal name	Function	Response speed	Max. Current	Remark
R1，R2	Base time signal			
S1，S3	SIN+ and SIN- input signal	100KHz	---	
S2，S4	COS+ and COS- input signal	100KHz	---	
GND	Ref. GND of the differential signal, can wiring the shield line	---	---	
AO+，AO- BO+，BO- ZO+，ZO-	The input encoder signal is outputted as A/B/Z differential signal, the location signal, though the IC operation. Terminal to Terminal	100KHz		

Terminal correspondence Table:

Resolver option terminal	Resolver PG encoder terminal	Resolver option terminal	Resolver PG encoder terminal
R1	EXC+	S3	SIN-
R2	EXC-	S2	COS+
S1	SIN+	S4	COS-

Note: Toggle-switch on the option is at “ON’ location

See Fig. C-1 while the output signal of terminal AO+、AO-、BO+、BO-、ZO+、ZO- is the differential signal which can drive the 5V differential encoder.

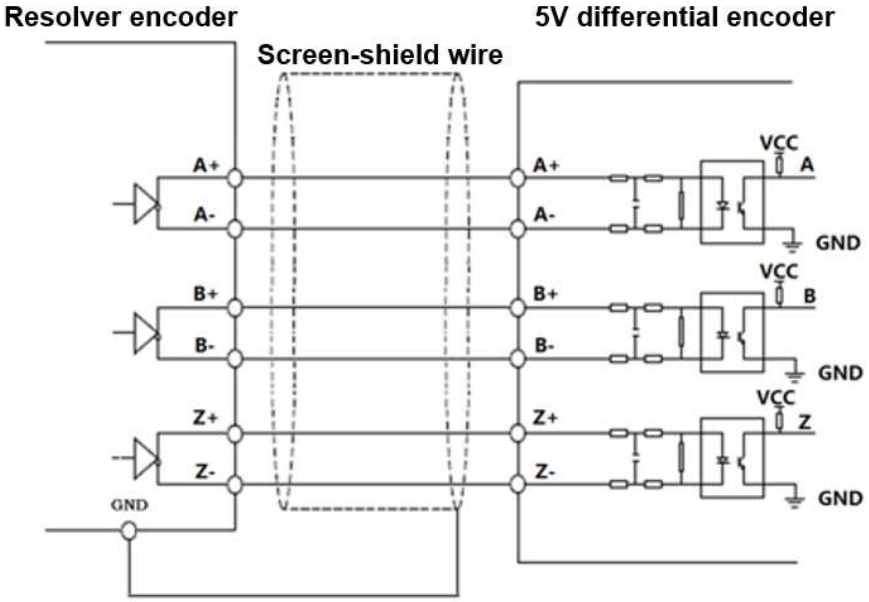


Fig. C-1 Wiring diagram between Resolver and 5V differential signal encoder

5V differential signal PG encoder option

5V differential signal encoder is the adapter between drive and the differential encoder, can be for the closed-loop control application of synchronous and induction motor.

1) For the closed-loop control application of synchronous motor, in the meantime, the UVW encoder with the magnetic polarity detection can be used while the magnetic polarity quantity is same with the synchronous motor's magnetic polarity quantity.
2) For the closed-loop encoder application of induction motor, the UVW terminal can be wired while using the normal differential encoder.


Caution: Encoder's work voltage is 5V.

Specification:

Terminal instruction:

Terminal name	Function	Response speed	Max. Current	Remark
+5V, COM	Power supply		0.5A	
A+，A- B+，B- Z+，Z-	A/B/Z input of the 5V differential signal	250KHz	---	
U+，U- V+，V- W+，W-	The UVW location signal of encoder	250KHz	---	

Encoder wiring:

Fig.C-2 Differential signal output encoder wiring diagram(5V)

Fig. C-3 Open collector output encoder wiring diagram(5V)

Fig. C-4 Push-pull encoder wiring diagram(5V)

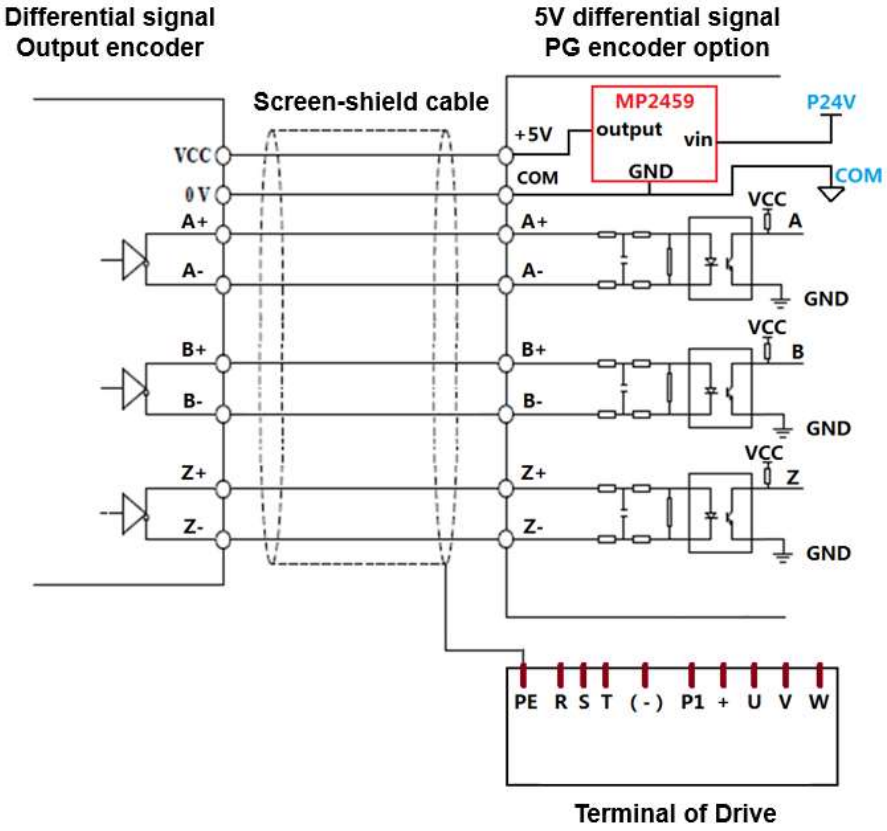


Fig.C-2 Differential signal output encoder wiring diagram(5V)

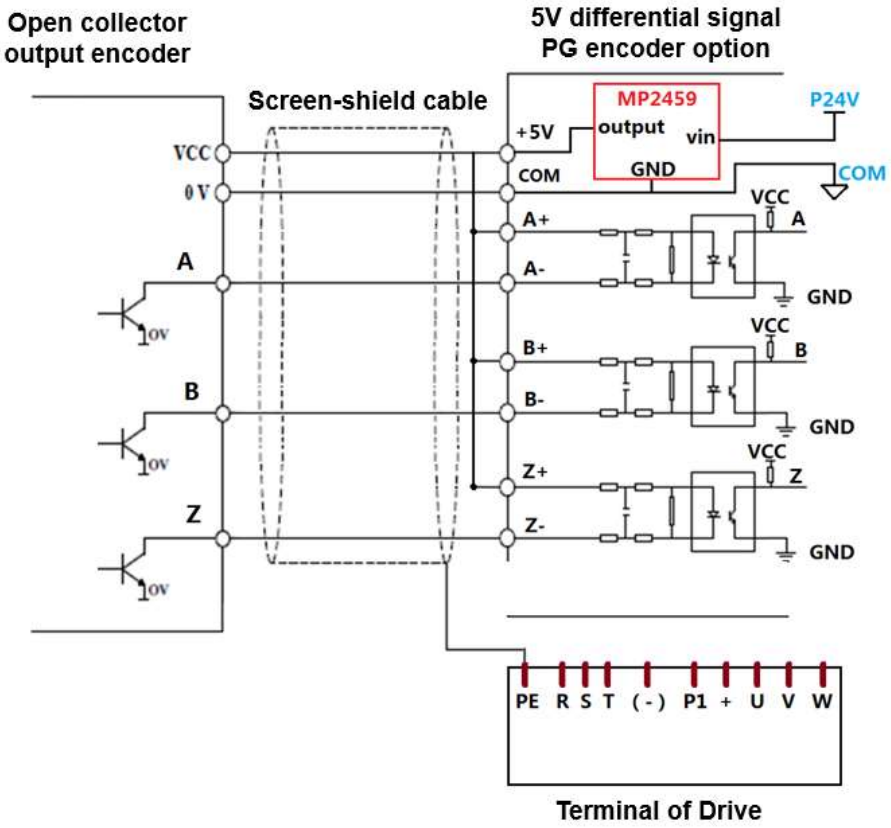


Fig. C-3 Open collector output encoder wiring diagram(5V)

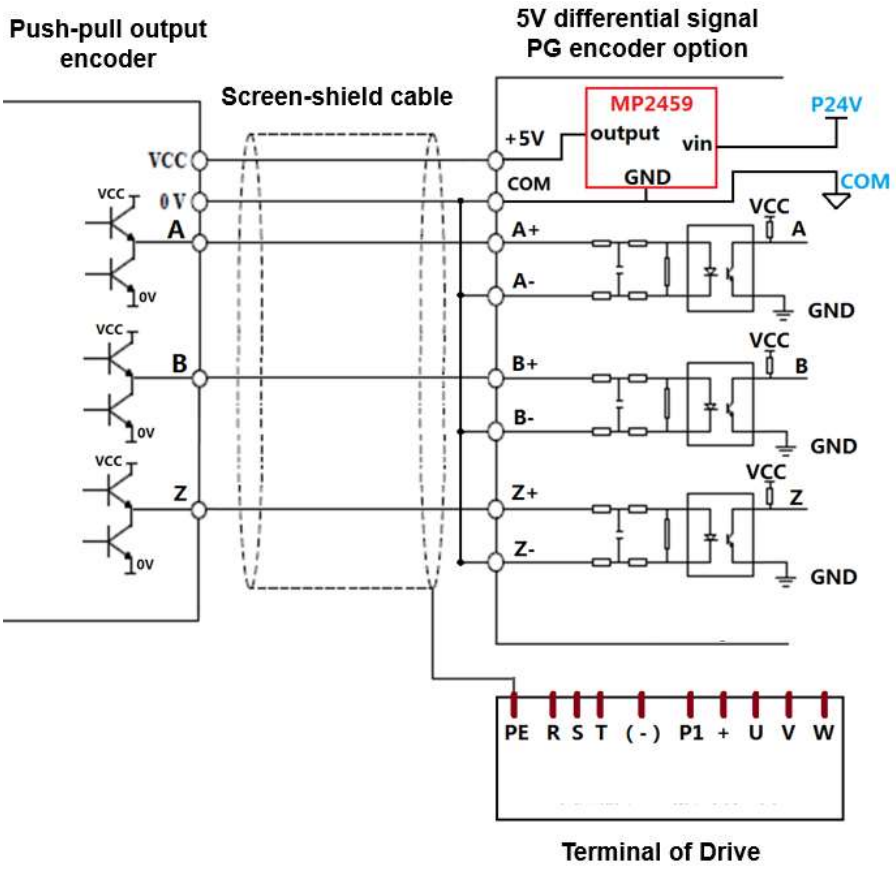


Fig. C-4 Push-pull encoder wiring diagram(5V)

24V differential signal PG encoder option

24V differential signal PG encoder option is the adapter between drive and the differential encoder, can be for the closed-loop control application of synchronous and induction motor.

Caution: Encoder's work voltage is 24V

Specification:

Terminal instruction:

Terminal name	Function	Response speed	Max. Current	Remark
+24V, COM	Power supply		100mA	
A+，A- B+，B-	A/B signal input	250KHz	---	

Encoder wiring:

Fig.C-5 Differential signal output encoder wiring diagram(24V)

Fig. C-6 Open collector output encoder wiring diagram(24V)

Fig. C-7 Push-pull encoder wiring diagram(24V)

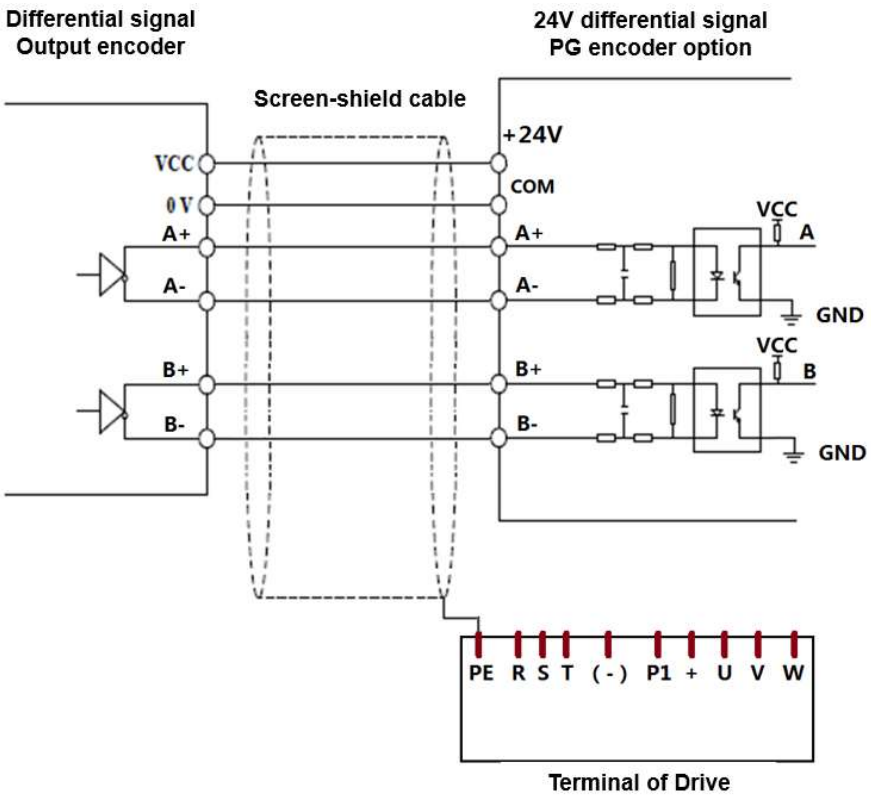


Fig. C-5 Differential signal output encoder wiring diagram（24V）

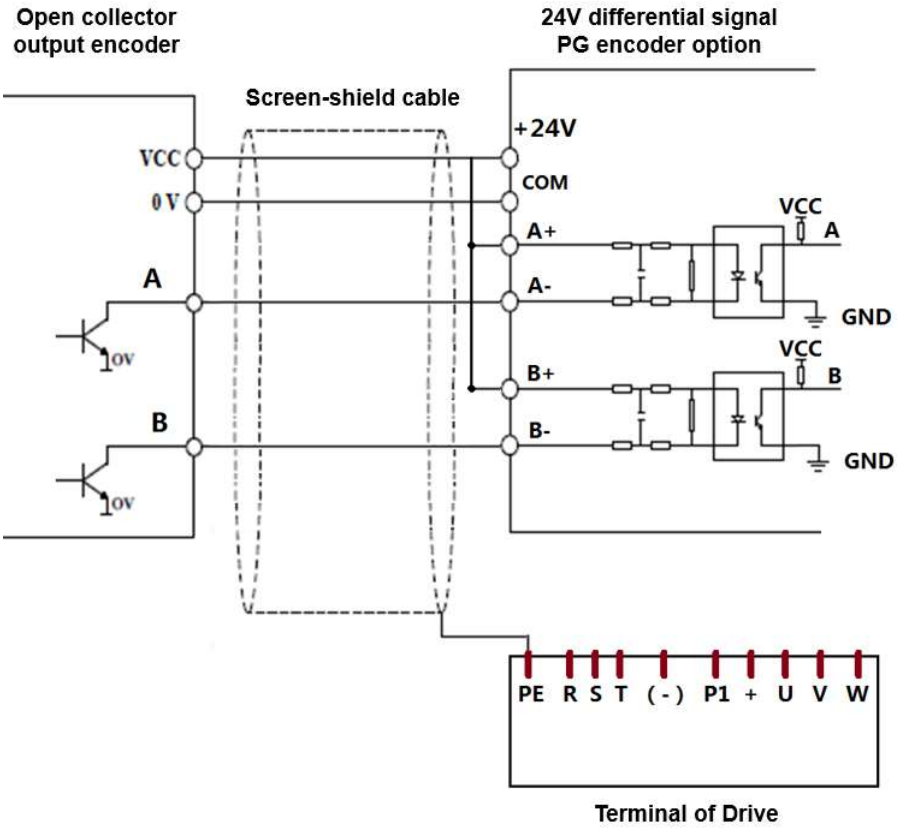


Fig. C-6 Open collector output encoder wiring diagram（24V）

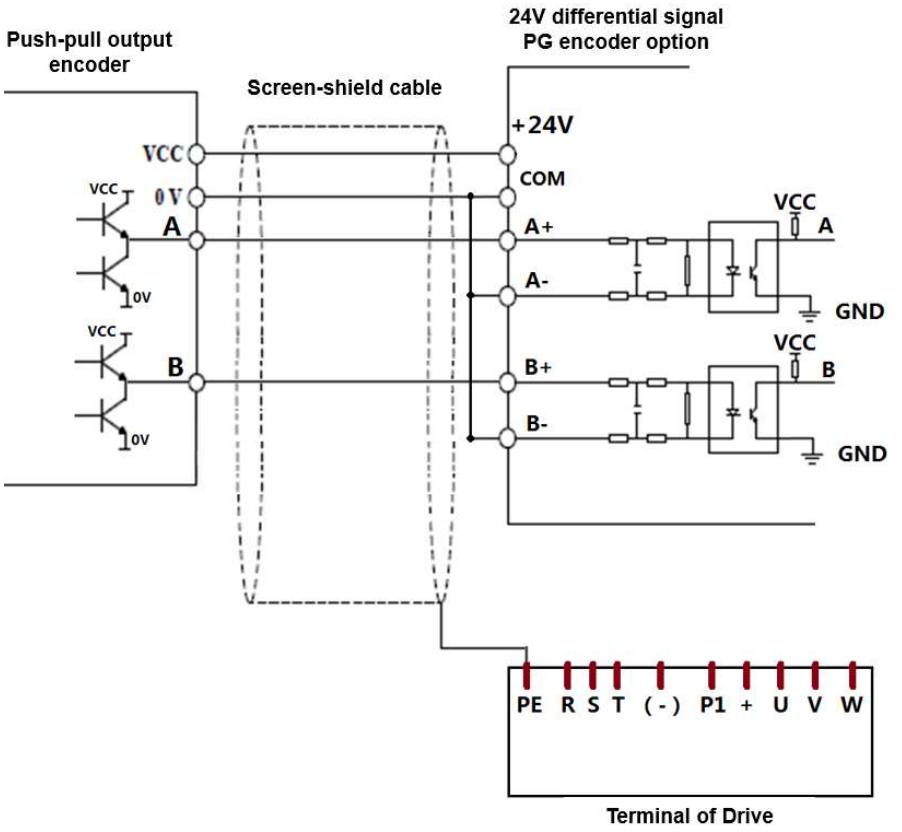


Fig. C-7 Push-pull encoder wiring diagram（24V）

Hazardous substance limit table for electrical and electronic products

Part Name	Hazardous substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr +6)	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Electronics assembly	X	0	0	0	0	0
Housing assembly	0	0	0	0	0	0
Keypad Battery	0	0	0	0	0	0

This table is in accordance with the provision of SJ/T11364

O: Indicates that said hazardous substance in all of the homogeneous materials for
this part is below the limit requirement of GB/T 26572

X: Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

Inspection Certificate

产品合格证

This document certifies that this product
本文档证明

Inverter
变频器类产品
Applied to standards
执行标准（IEC61800 / EN61800 / GB12668）

was dispatched fully functional tested and inspected in accordance with Control Techniques specifications and drawings.
已通过全功能测试检查，符合 Control Techniques 规范和图纸。

Operations Director

1st Floor Machinery Building, EVOC Science & Technology Park, No. 11 West Gaoxin Road, Guangming District, Shenzhen, Guangdong
广东省深圳市光明新区高新区高新西路 11 号研祥科技工业园机械厂房 1 楼
Tel: 0755-86010763

CONTROL TECHNIQUES™