CONTROL TECHNIQUES

NE200/300

High Performance

vector control drive

User manual

Part Number:3101A003
Version：V1.9

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Nidec
All for dreams

NE200/300 General Driver

Relative Documentations

User Guide in Chinese:

- ☑ 3101A002/NE200/NE300 User Guide
- ☑ 31019006/NE400/NE600 User Guide
- ☑ 3101A005 CC-Link Communication Board Card User Guide
- ☑ 3101A007 DP communication board User Guide
- ☑ 3101A009 PN Communication option User Guide
- ☑ 3101A015 TCP Communication option User Guide

User Guide in English:

- ☑ 3101A003/NE200/NE300 User Guide
- ☑ 3101A004/NE400/NE600 User Guide
- ☑ 3101A006 CC-Link Communication Board Card User Guide
- ☑ 3101A008 DP communication board User Guide
- ☑ 3101A010 PN Communication option User Guide

Control Techniques China

Service Tel：400-830-8250

Safety Information

⚠️ Warning

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

⚠️ Caution

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

⚠️ Use

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

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

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.

⚠️ Wiring

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

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.

⚠️Operation

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

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.

⚠️Maintenance & Inspection

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

Revision History

Date	Version	Description
2020/4/2	1.0	Issued for the first time
2020/5/19	1.1	Add "Modbus Address" column in parameter brief list
2020/6/12	1.2	Add contents of chapter 9 and re-structure the manual
2020/8/10	1.3	Update table8-8 outline size and weight data Add option information
2020/11/01	1.4	Add TCP option content and update the new Control technique logo
2021/1/7	1.5	1、Add parameter F2.35,F2.36,F7.37~F7.41,modify the default value of F3.38，F3.39,F3.42,Fd.00. 2、Add chapter 9.3 for Reactor and filter selection guidance 3、update figure 1-1 for the latest nameplate 4、Add the inspection certificate in the last page
2021/2/22	1.6	1、update fig 3-9
2021/4/16	1.7	Update CT logo to the newest version in all related drawings
2021/6/18	1.8	Update the last page "inspection certification"
2021/6/23	1.9	Update figure 8-7

Contents

1

Chapter 1   NE200/300 Product Introduction

1.1 Product Nameplate Description
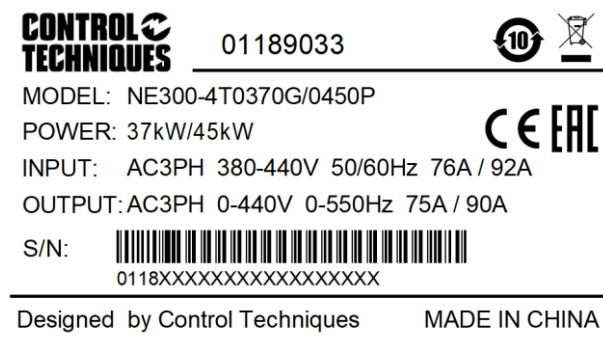
Fig.1-1 Nameplate

1.2 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.
NE300-4T0300G/0370P means this model can be used as 30kW heavy duty and 37kW normal duty.
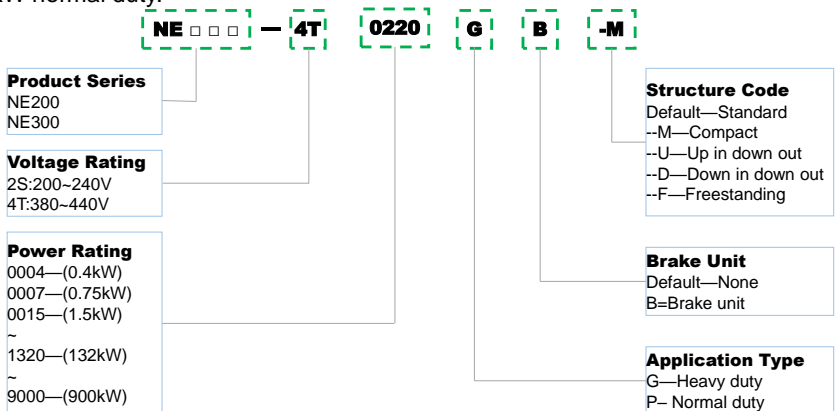
Fig.1-2 Product Model Description

2

Chapter 2   Wiring of System

2.1 Wiring diagram of system

R
S
T
N

Isolation Switch

Breaker or Fuse

AC input reactor

Contactor

EMI input filter

R S T P1
+
DC reactor

U V W −
Braking unit

EMI output filter

Braking resistor

AC output reactor

Motor

M
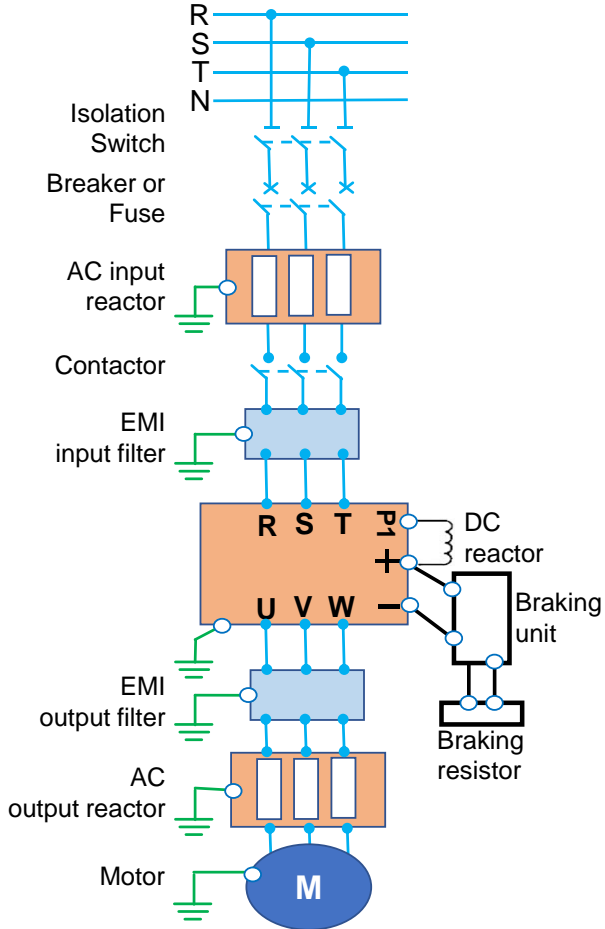
2.2 Description of Peripheral Devices for Main Circuit

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/DC reactor

The drive power supply capacity shall be more than 600kVA or 10 times of the drive capacity.
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.
When the voltage unbalance of the three-phase power supply exceeds 3%, the rectifier component will be damaged.
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

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.

2.3 Attention for Main Circuit Wiring

2.3.1   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.

2.4 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

2.4.1   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 driver and the motor must be grounded.

The grounding resistance shall be less than 10ohm. For the grounding wire diameter requirement, refer to *8.7 Model selection of system*

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

In the applications with more than 2 drivers, keep the grounding wire from forming a loop.
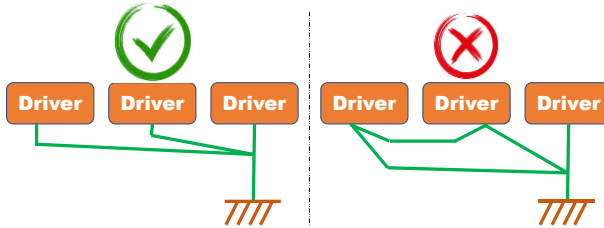
Fig.2-1 Grounding Wiring

2.4.2   Countermeasures against conduction and radiation interference
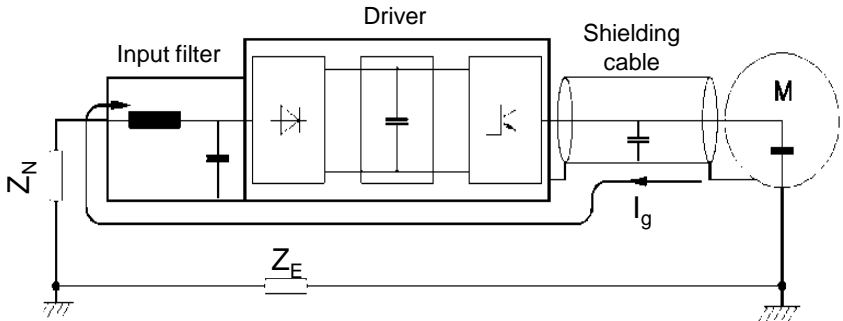
Fig.2-2 Countermeasures for Conduction and Radiation Interference

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 grounded 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 if 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

Chapter 3 Installation

3.1 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.

3.2 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. 3-1(1)

≥ 50 ≥ 50

(1)   (2)
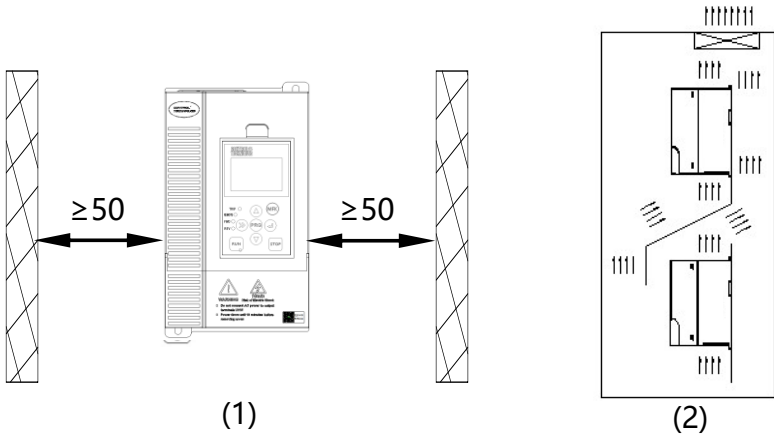
Fig.3−1 Mounting direction and Space∕Installation diagram

☐   When installing multiple drives vertically upside and downside, the air deflector is required as Fig.3-1(2)

3.3 Wiring preparation for driver

3.3.1   NE200 wiring preparation
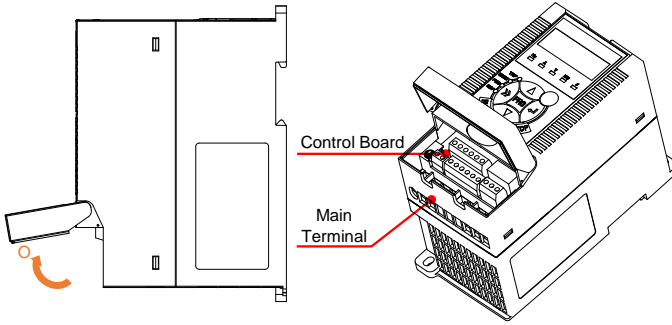
Fig.3-2 NE200 2P 200V 0.4~2.2kW(GB)/3P 400V 0.75(GB)~5.5kW(PB)

■ Wiring preparation: Open cover along the 'O' direction, close it along the opposite direction, see Fig. 3-2.

3.3.2   NE300 wiring preparation

1)   NE300 wiring preparation for the plastic enclosure driver
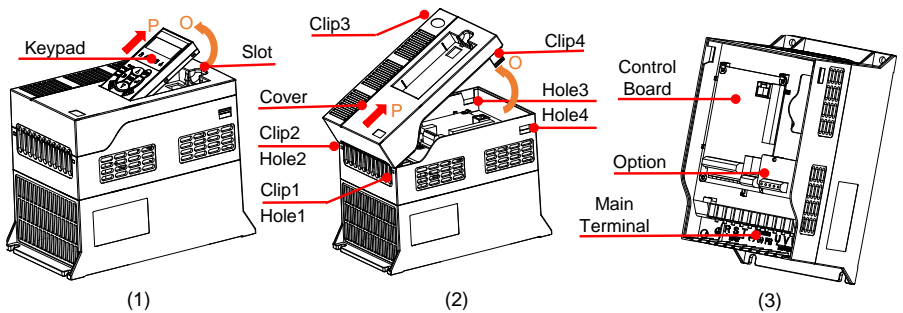
Fig.3-3a NE300 3P 400V 1.5~11kW(GB)/2.2~15kW(PB)
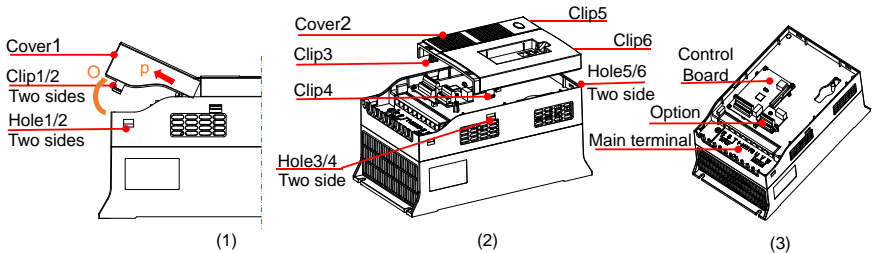
Fig.3-3b NE300 3P 400V 15~22kW(GB)/18.5~30kW(PB)

☐ There are 2 type plastic enclosure drivers, see Fig.3-3a/b
☐ Dismantled/mounted keypad: Push out keypad like Fig.3-3a(1),then take off it along the 'P' direction. Mount it along the opposite direction.

■ Wiring preparation (Fig.3-3a): Loosen the clip 3/4, then open along the 'O' direction, take off along the 'P' direction. Take off along the opposite

direction.

■ Wiring preparation (Fig.3-3b): Loosen the clip 1/2, then open along the 'O' direction, take off cover1 along the 'P' direction. Loosen the clip 3-6

2)   NE300 Metal-sheet enclosure type A
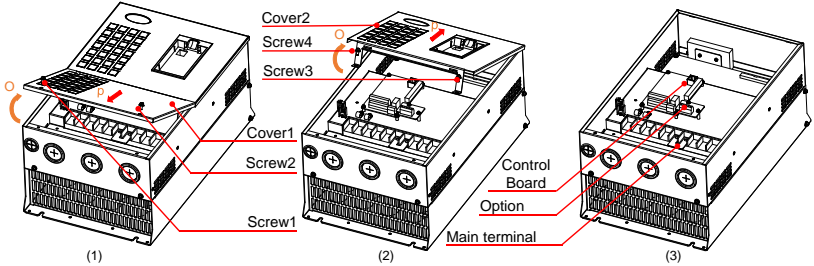
Fig.3-4 NE300 3P 400V 30~250kW(G)/37-280kW(P)

☐   The AC-in and AC-out of some drivers are at two sides of driver.

■ Dismantling cover1: dismantle the screw 1/2, open cover1 along 'O' direction, and take off it along 'P' direction.

■ Dismantling cover2: dismantle the screw 3/4, open cover2 along 'O' direction, take off it along 'P' direction.

3)   NE300 Metal-sheet enclosure type B
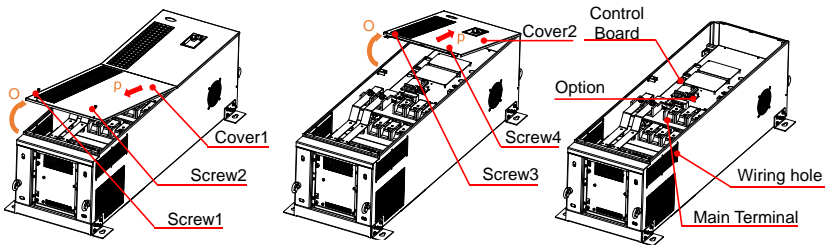
Fig.3-5 NE300 3P 400V 160~315kW(G)185~355(P)

■ Dismantling cover1: dismantle the screw 1/2, open cover1 along 'O' direction, and take off it along 'P' direction.

■ Dismantling cover2: dismantle the screw 3/4, open cover2 along 'O' direction, take off it along 'P' direction.

■ The wiring holes at two sides of driver, break it to create holes for wiring.

4)   NE300 Metal-sheet enclosure type C
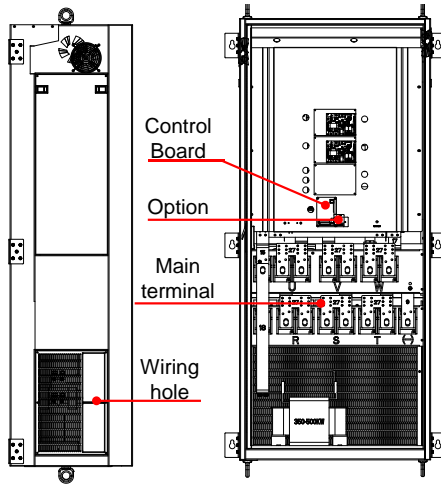
Fig.3-6 NE300 3P 400V 355~500kW(G)/400~560（P）

- Unlock and open door, then start to wiring.

- The wiring holes at two sides of driver, break it for wiring.

5) NE300 Metal-sheet enclosure type D
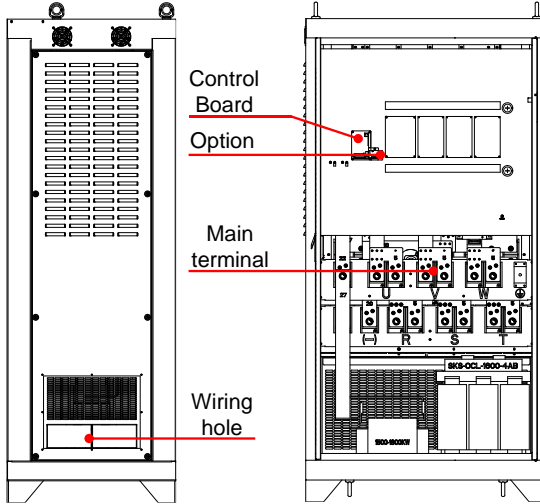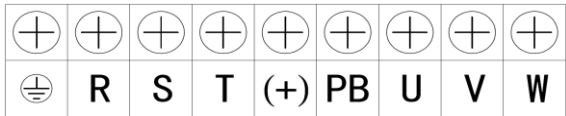
Fig.3-7 NE300 3P 400V 560~800kW(G)/630~900kW(P)

- Unlock and open door, then start to wiring.

- The wiring holes at two sides of driver, break it for wiring.
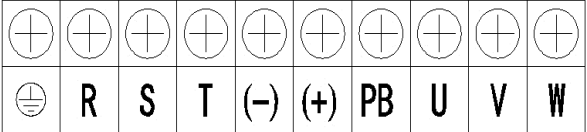
3.4 Terminal diagram of main circuit
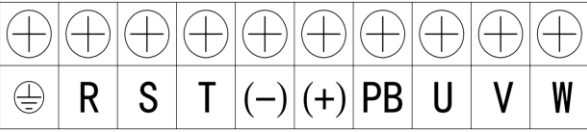
3.4.1   NE200-4T0007G/0015PB~4T0022GB-M/2S0004GB~2S000 15GB

Terminal diagram of main circuit	⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⏚ R S T (+) PB U V W
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   NE200-4T0015GB~4T0040GB/4T0055PB/2S0022GB

Terminal diagram of main circuit	⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⏚ R S T (−) (+) PB U V W
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~4T0220G/0300PB

Terminal diagram of main circuit	⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⊕ ⏚ R S T (−) (+) PB U V W
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~4T1100G/1320P

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

3.4.5   NE300-4T1320G/1600P（-U/-D）~4T2500G/2800P（-U/-D）

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

3.4.6   NE300-4T1600G/1850P-F~4T3150G/3550P-F

Terminal diagram of main circuit	⊕ ⊕ ⊕ ⊕ ⊕ P1 (+) U V W ⊕ ⊕ ⊕ ⊕ R S T (−) ⏚
Terminal Symbol	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

3.4.7   NE300-4T3550G/400P-F~4T5000G/5600P-F

Terminal diagram of main circuit	
Terminal Symbol	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

3.4.8   NE300-4T5600G/6300P-F~4T8000G/9000P-F

Terminal diagram of main circuit	
Terminal Symbol	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 Control Terminal Wiring

3.5.1   Control Terminal Wiring of NE200
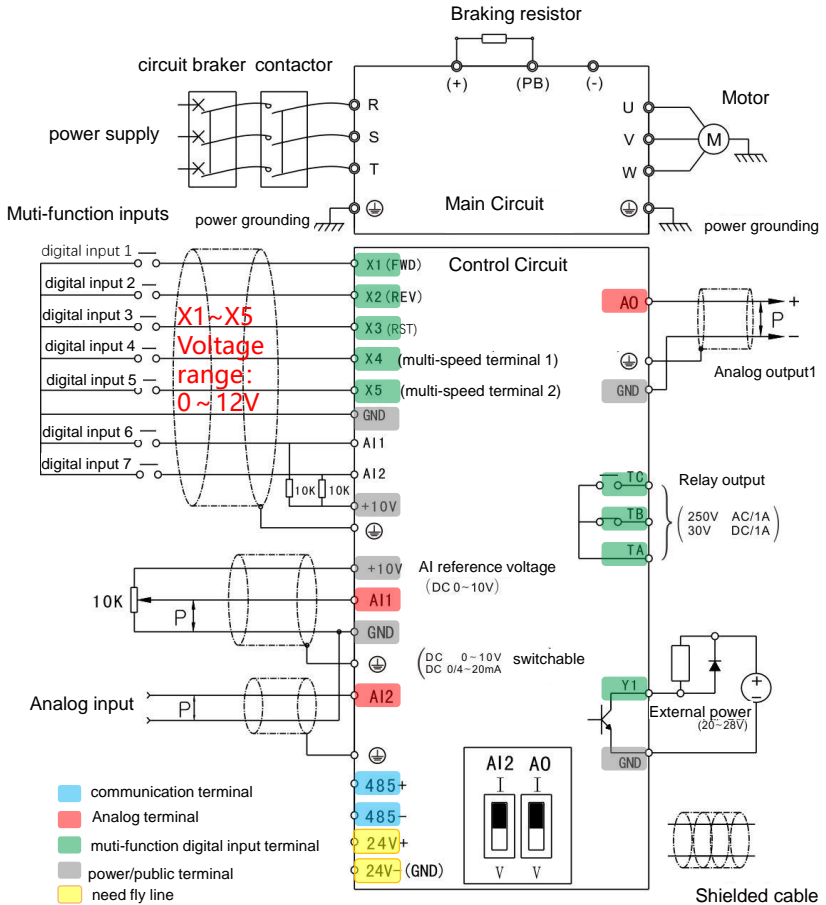
Fig.3-8 Control Terminal Wiring of NE200(Example: 0022GB~0040GB)

3.5.2   Control Terminal Wiring of NE300
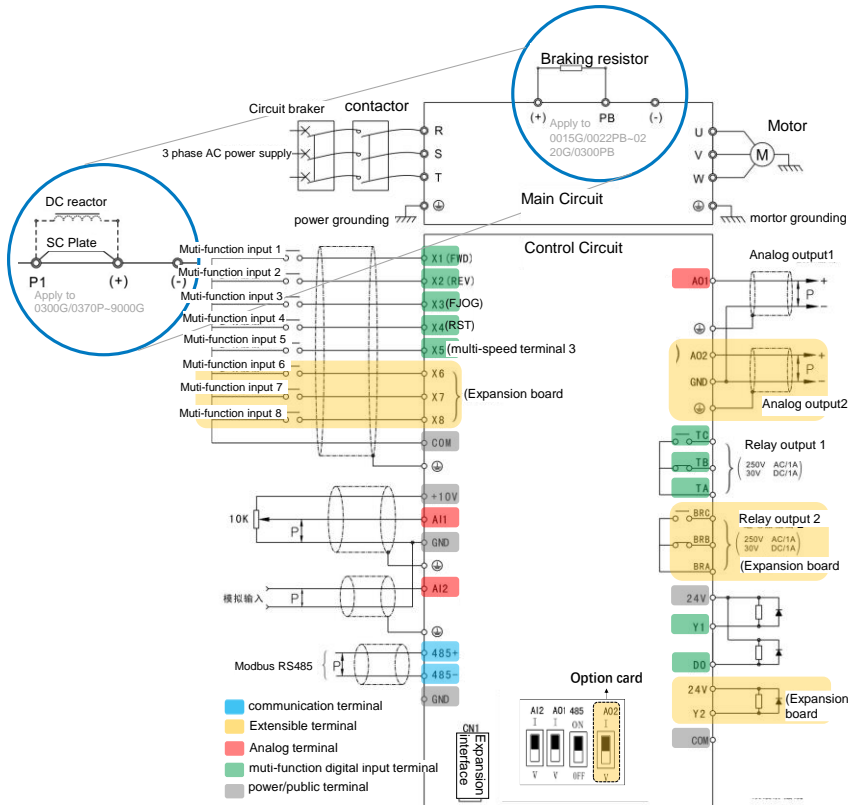
Fig 3-9 Control Terminal Wiring of NE300 (Example: NE300-4T0220G/0300PB and below)

3.6 Functions of Control Circuit Terminals

3.6.1   NE200 Standard configuration of control circuit terminals

Type	Termin	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
	GND	Analog grounding	

Type	Termin	Terminal function	Technical specification
Relay output	TA/TB/TC	Relay output 1	TA－TB：NC; TA－TC：NO Contact capacity：250VAC/1A，30VDC/1A
RS485	485+	485 differentials 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 negatives	
	GND	486 shielding grounding	Internal isolated with COM
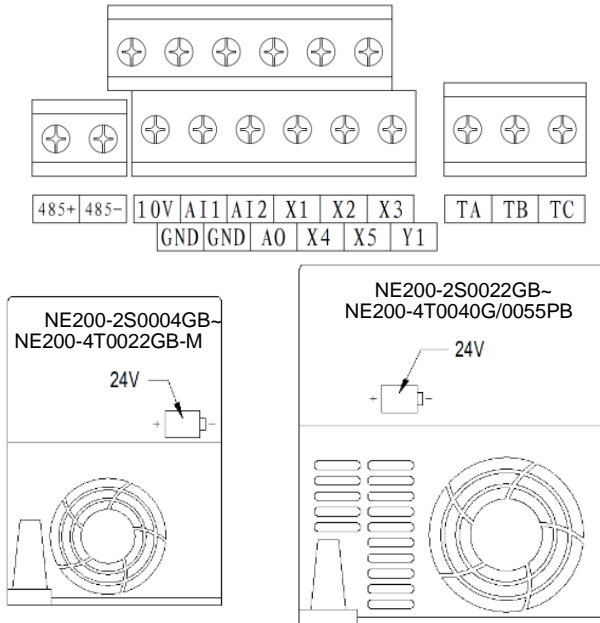
Fig.3-10 Arrangement of Control Circuit Terminals

3.6.2   NE200 Control Circuit Connection

■ External controller Dry contacts wiring diagram is as below. (for X1-X5 multifunction input)
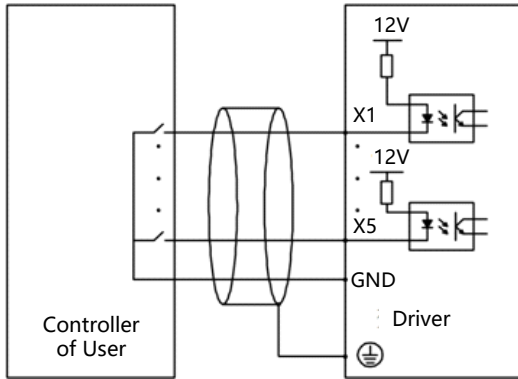
Fig.3-11 NE200 control circuit wiring diagram

■ External controller NPN with common emitter wiring diagram is as below. (for X1-X5 multifunction input)
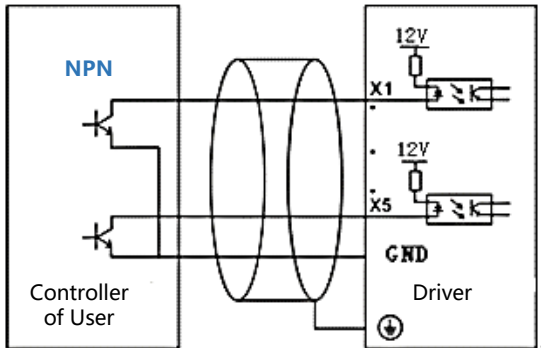
Fig.3-12 NE200 NPN common emitter wiring mode

■ Y1 multi-functional output terminal adopt external power supply wiring mode.
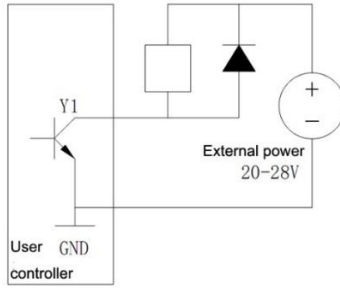
Fig.3-13 NE200 Y1 wiring diagram for external power supply
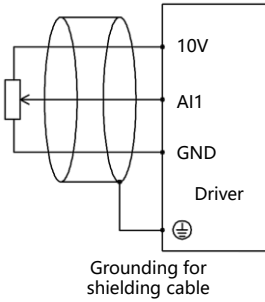
Fig.3-14 NE200 wiring diagram for analog input

3.6.3   NE200 keypad wiring
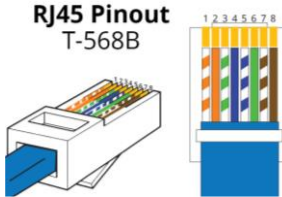
Fig.3-15 T-568B standard

Table 3-1 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		

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.

3.6.4   NE300 Standard configuration of control circuit terminals

Type	Termin	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
	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

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

Fig.3-16 Control circuit terminals diagram

3.6.5   NE300 Control Circuit Connection

■   External controller Dry contacts wiring mode is as below. (X1-X5 multifunction input)
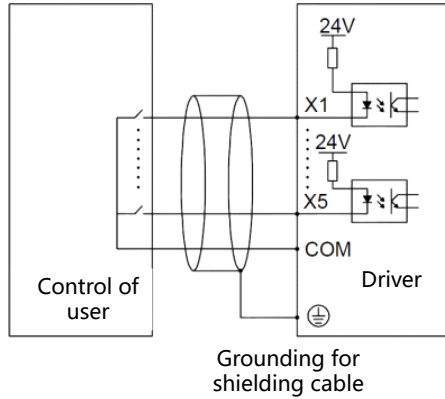
Fig.3-17 NE300 dry contacts wiring diagram for external controller

■ External controller NPN with common emitter wiring mode is as below. (X1-X5 multifunction input)
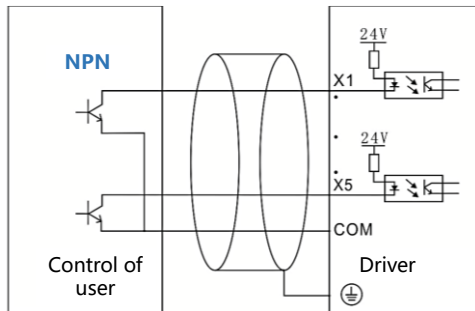
Fig.3-18 NE300 NPN common emitter wiring diagram

1) For NE30-i /O Lite option X6-X8 and NE300 closed-loop non-standard board X1-X5, the type of power supply input (PNP mode/NPN mode and internal/external power supply) can be selected by setting short wiring at terminal PLC-P24 or terminal PLC-COM. The wiring diagram is shown in Fig 9-2 to Fig 9-5 in chapter 9.
Note: Please do not short connect terminal P24 and terminal COM. Otherwise, the driver will be damaged

2）Internal power supply NPN mode: short connect terminal PLC-P24
Please do not short connect terminal PLC-COM. Otherwise, the driver will be damaged.
3）Internal power supply PNP mode: short connect terminal PLC-COM.
Please do not short connect terminal PLC-P24. Otherwise, the driver will be damaged.
4）External power supply: remove off the shorting wire at terminal PLC-COM and terminal PLC-P24

■ Y1/Y2, DO: The multi-functional output terminals adopt drive internal +24V power supply wiring mode.
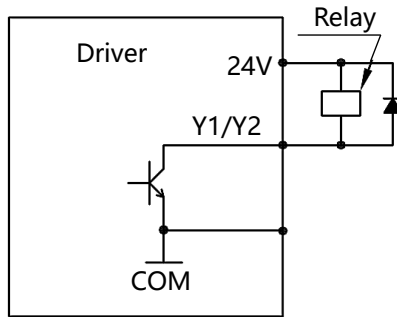
Fig.3-19 NE300 wiring mode of internal +24V power supply

■ Y1/Y2, DO: The multi-functional output terminals adopts external power supply wiring mode
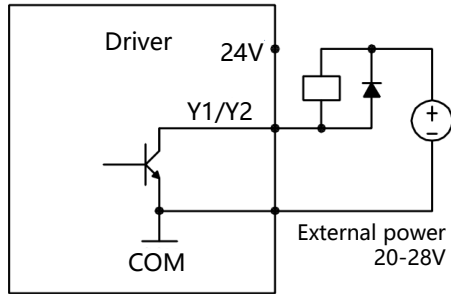
Fig.3-20 External power supply wiring mode

■ Analog input wiring mode
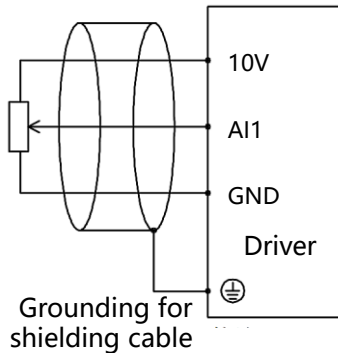
Fig.3-21 Wiring mode of analog input terminal

■ NE300 keypad wiring
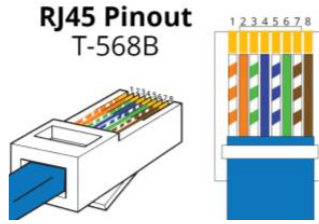
Fig.3-22 T568B standard

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

Table 3-2 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 Control board schematic drawing

3.7.1   NE200 Control board schematic drawing
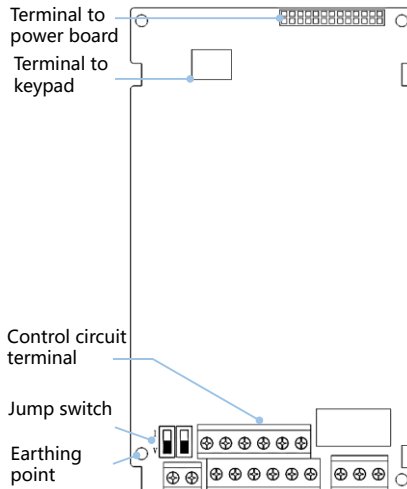
Fig.3-23 NE200 Control board schematic drawing

3.7.2   NE200 DIP switch setting instruction

Fig.3-24 NE200 DIP switch setting

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

3.7.3   NE300 Control board schematic drawing
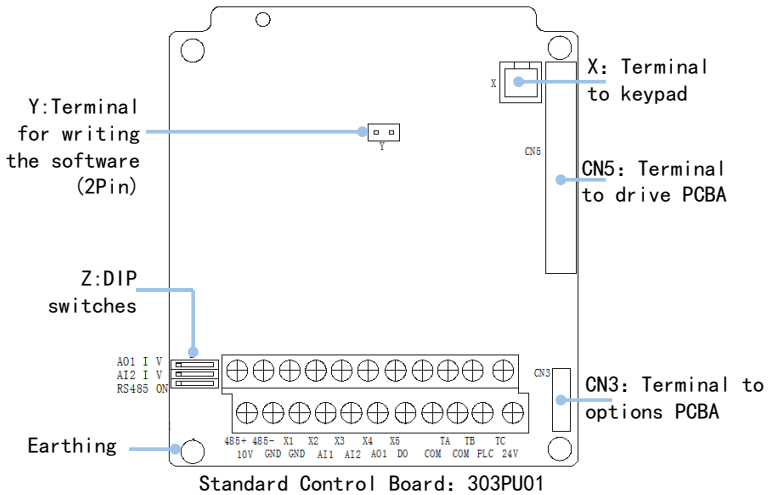
Fig.3-25 Control board schematic drawing

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
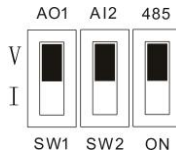
Fig.3-26 NE300 DIP switch setting

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

4

Chapter 4   Operation and application

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：NEF-LED01
LCD keypad model name (option)：NEF-LCD01
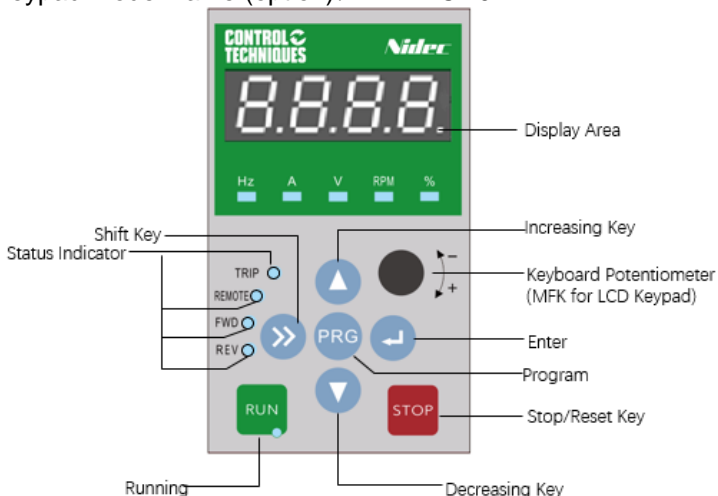
Fig.4-1 Keypad Diagram

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

Symbol of Indicator		Meanings
		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:
Groups of function code (level-1 menu)
Function code (level-2 menu)
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),
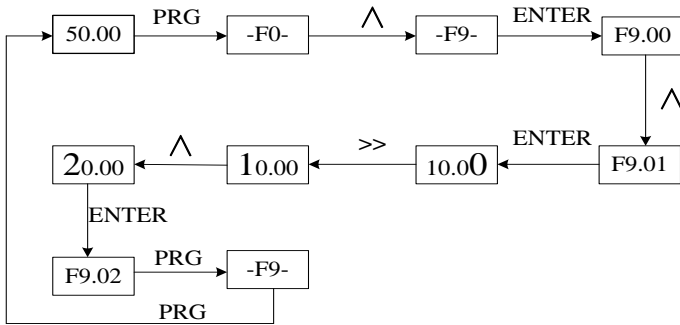
Fig.4-2 Example of 3 levels menu operating

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.

4.5 Typical application

4.5.1   Open loop synchronizer debugging

1）　To set the motor rated frequency (F0.10), motor type (F5.00=2), motor rated power (F5.02), Polarity number (F5.01, it can be unset, but the rotate speed will not be accurate), rated current(F5.03) according to the motor nameplate.

2）　To set the max/upper limit frequency (F0.11/F0.12) according to working conditions.

3）　To set the driver as open-loop vector control. (F0.01=1)

4）　Tuning motor: Set F5.10=2 as rotary tuning, when the driver displays "-At- "on screen, press "RUN" button to start tuning.

> The driver will automatically save synchronous motor parameters
> F5.11~F5.14.
> When the motor is on rotary tuning, it must be noted that the
> acceleration and deceleration time are F0.19 and F0.20, which cannot
> be set too small.
> If rotary tuning is not allowed on site, static tuning(F5.10=1) should be
> conducted, the synchronous motor counter EMF shall be set manually
> (F5.14).

Note：There are two commonly used method to represent the synchronous motor counter EMF.
- a) Volt per thousand rotation
- b) Rated frequency corresponds to the amount of voltage
  NE series invertors uses the second representation.

> Note: when the motor is on rotary tuning or running, the motor occurs
> unstable vibration, skip flow fault, current limiting fault, then need to turn
> down the current loop parameter properly.

4.5.2   Closed loop debugging

Incremental encoder parameters(F3.46=1)
1) To set some motor related parameters, like the motor type, rated power, rated current, motor polarity, rated rotation speed and so on according to motor nameplate.
2) To set encoder pulse number (F3.14), PG direction (F3.16), F3.54, F3.55, F3.56.
3) To set the control mode as closed-loop control mode (F0.01=2)
4) Waiting for the rotary tuning completed (if the encoder with Z signal, users do not have to set the encoder pulse, encoder direction related parameters, these parameters can be gotten from rotary tuning, but need to set the related function of parameter.

Resolver encoder(F3.46=3)
1) To set some motor related parameters, like motor type, rated current, motor polarity, rated rotation speed and so on according to motor nameplate.
2) To set the related parameters of resolver encoder. F3.47~F3.50.
3) To set the control mode (F0.01=2) as closed-loop control mode
4) Waiting for the rotary tuning completed.

Note:
a) The internal driver rated slip is calculated from the synchronous speed of the motor (120*f/P)-rated rotation speed, so the set rated rotation speed should be lower than motor synchronous rotation speed.
b) When there is no Z signal in the encoder of asynchronous motor, the encoder pulse can be set and run to 50Hz with an open loop to check the motor rotation speed and the running direction of encoder and motor.(F3.62=0 means same direction. F3.62=1 means that the

direction between encoder and motor is reverse, you can set F3.16 or exchange the A/B wires to make it reverse.)

c) As to the 24V differential PG option, when the encoder is non-differential, it can short connect the PG option terminals 24V,A+,B+, and the encoder terminals, A/ B/ Power/ Ground, should be accordingly connected to PG option's terminals, A-/ B-/ 24V/ COM (or short connect PG option's terminals, COM/ A-/ B- , and encoder terminals, A/ B/ Power/ Ground, short connect to PG card terminals A+, B+,24V, COM, which is mainly determined by the type of encoder.

4.5.3   DC common bus

A part of drivers of NE200/NE300 can share DC common bus, please to contact our technic support engineer if you want to share DC common bus. While sharing bus, the master driver is AC-in and AC-out, connect the DC bus of the slaver driver to the DC bus of the master. Warning!   Usually, the power of the slaver driver can 't be more than the 15% of the power of the master driver because the rectifier and capacitor's capacity limitation of the master driver.

5

Chapter 5   Parameter description

📖Note:

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

5.1 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.5-1
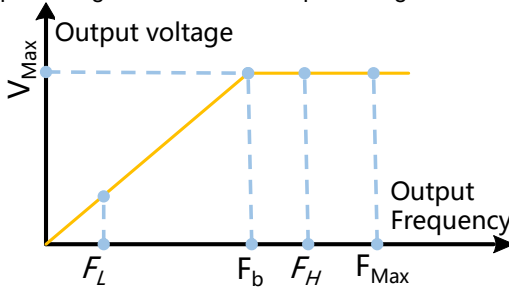
Fig.5-1 V/F characteristic diagram

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.5-1. The adjustment of carrier frequency will have influences on motor noise, motor temperature rising, and drive temperature rising as shown on Tab.5-2.

Tab.5-1 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 Type P: 18.5～30kW	1.0～10.0kHz	6.0kHz
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 5-2 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.
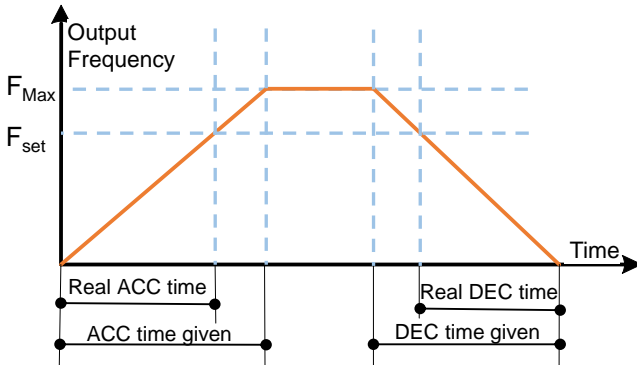
Fig.5-2 Schematic diagram for acceleration/deceleration time

📖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

5.2 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 driver 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 driver 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.

③ 2: Speed tracking and start

The driver 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.5-3; holding time of starting frequency is the time during which the drive operates at the start frequency, see t1 as shown in Fig.5-3:
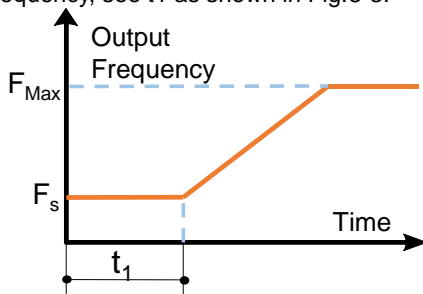
Fig.5-3 Start frequency and Start frequency holding time

📖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.5-4 as "①", where the changing rate of output frequency increases from 0;

Rising stage of S-curve is shown in Fig.5-4 as "②", where the changing rate of output frequency is constant;

Ending stage of S-curve is shown in Fig.5-4 as "③", where the changing rate of output frequency decreases to zero.
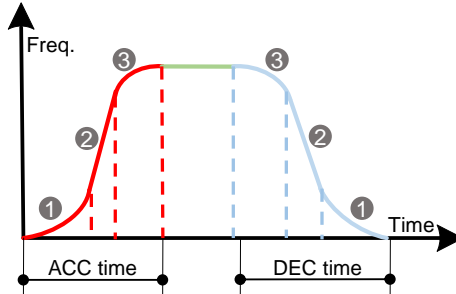
Fig.5-4 S-curve acceleration/deceleration

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 F1.19 Speed start interval	Range: 0.0-36.0s【3.0s】

This function parameter defines the interval between the start of speed tracking and the last shutdown. The time is mainly used to demagnetize motor so as to protect the frequency converter from abnormal jump when the speed tracking starts, and the parameter can be appropriately reduced for low-power frequency converter.

5.3 Auxiliary running function group (F2)

F2.00 Jog running freq.	Range: 0.0~50.00【5.00Hz】
F2.01 Jog Acc. time	Range: ②0.0~360.0s【6.0s】 ③0.0~3600.0s【20.0s】
F2.02 Jog Dec. time	Range: ②0.1~360.0s【6.0s】 ③0.1~3600.0s【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】 ③0.1~3600.0s【20.0s】
F2.04 Deceleration time2	Range:

	②0.1~360.0s【6.0s】 ③0.1~3600.0s【20.0s】
F2.05 Acceleration time3	Range: ②0.1~360.0s【6.0s】 ③0.1~3600.0s【20.0s】
F2.06 Deceleration time3	Range: ②0.1~360.0s【6.0s】 ③0.1~3600.0s【20.0s】
F2.07 Acceleration time4	Range: ②0.1~360.0s【6.0s】 ③0.1~3600.0s【20.0s】
F2.08 Deceleration time4	Range: ②0.1~360.0s【6.0s】 ③0.1~3600.0s【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.5-5.
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.
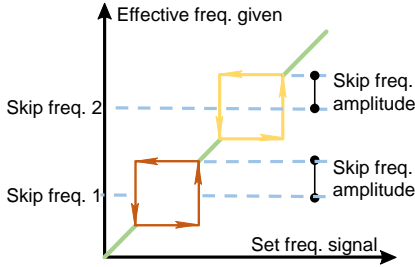
Fig.5-5 Skip Frequency

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.5-6.
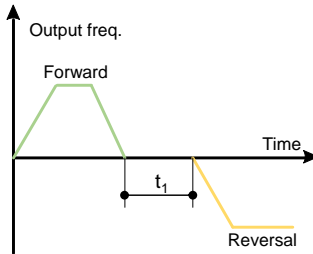
Fig.5-6 FWD/REV switching

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 frequency	Range：0～1【1】

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.

F2.32 PWM modulation mode	Range：0～1【0】

0: uplink 16Hz discrete modulation mode (5-stage mode), downlink 12Hz continuous modulation mode (7-stage mode)
1: fixed as z continuous modulation mode (7-stage mode)

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. 5-7 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.

f_a: Threshold value of Zero Freq. running

f_b: f_a+Range between start Freq. and threshold value of Zero Freq.

f_c: Freq. while CCI input current value is I_c
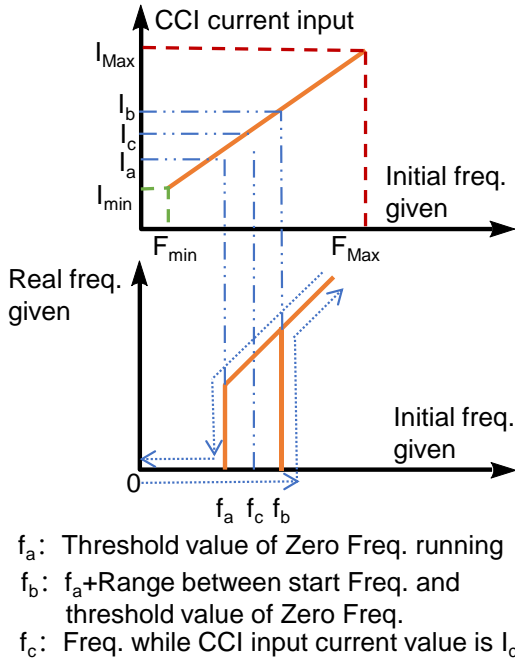
Fig. 5-7 Range between start Freq. and threshold value of Zero Freq.

F2.35 Synchronous motor IQ filter	Range:0~1【0】 0：with filter 1：without filter

0： with filter

1： without filter

F2.36 Voltage modulation coefficient of synchronous motor with weak magnetic field	Range: 0.0~120.0%【105.0%】

It is used when the synchronous motor is magnetically weak. The larger the parameter is, the higher the output voltage of the frequency converter will be. However, if the parameter is too large, the unstable operation of the motor will be easily caused by waveform distortion.

F2.37 Power calibration at low voltage	Range: 70.0-130.0%【100.0%】

F2.38 Power calibration at high voltage	Range: 70.0-130.0%【100.0%】
③ F2.39 V/F current limiting Kp	Range: 100-3,000【500】
③ F2.40 V/F current limiting Ki	Range: 100-3,000【500】

F2.37 and F2.38 are used to correct the output power calculated in the frequency converter when the grid voltage is too low and too high, respectively.

F2.39 and F2.40 are PID parameters of V/F control time-limit current. The larger the parameters are, the stronger the adjustment is. On the contrary, the weaker the adjustment is. Too large parameters may cause current oscillation. Generally, there is no need to adjust these two parameters.

5.4 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.5-8:
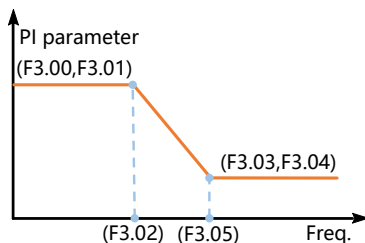
Fig.5-8 Schematic diagram of speed loop PI parameter

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 match 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: 0~31【28】

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 torque control mode	Range: 0.0～20.0%【15.0%】

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.

F3.29 Synchronous machine options	Range: 0000H-0010H【0000H】

Ten bits:
0: The parameters of current loop are not set during self-learning of synchronous machine.

1: The parameters of current loop are set during self-learning of synchronous machine.

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【500】
F3.39 Flux weaken regulation integration coefficient	Range：0～3000【800】

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%【0.0%】

Set the Min. excitation current of synchronous motor.

F3.43 ②V/F Start switching Frequency	Range：0～50.00Hz【0】

When the operating frequency is lower than F3.43, the converter runs constant current VF, and the current value is subject to F3.40. When the running frequency is higher than F3.43, the converter runs vector. This parameter is only available for NE200, but not for NE300

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.

5.5 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.5-9.
4: Multiple-points V/F. It can be defined by setting F4.01~F4.06 parameters. as shown Fig.5-10
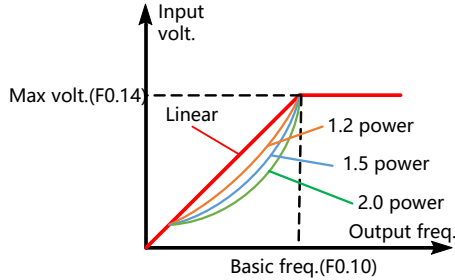
Fig.5-9 Torque-reducing curve
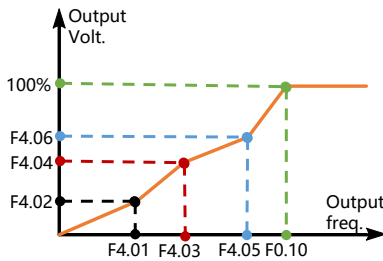
Fig.5-10Multi-points V/F curve

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.5-10. 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.5-11 for details.
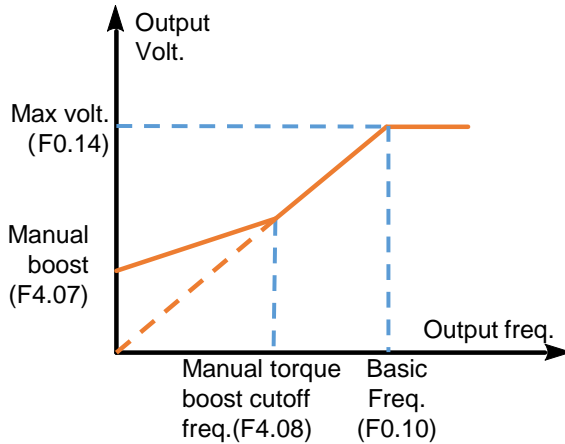
Fig.5-11 Schematic Diagram for torque boost

📖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.
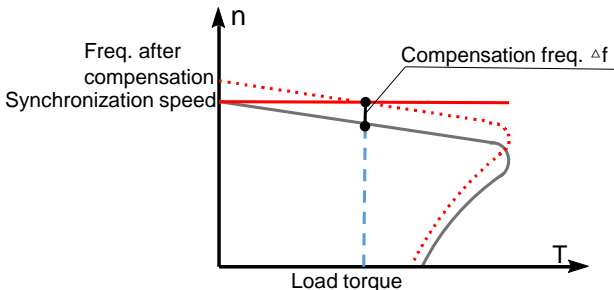
Fig.5-12   Auto slip compensation

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】
F4.15 Vibration suppressor	Range : 0～10【2】
③ F4.17 V/F oscillation suppression mode	Range: 0-1【0】

F4.17 V/F oscillation suppression mode:
Mode 0: In the previous version mode, oscillation suppression parameters are F4.14 and F4.15
When the oscillation suppression coefficient (F4.14) is set to 0, the oscillation suppression is ineffective. The larger the parameter is, the stronger the effect of

motor oscillation suppression is. Too large parameter may cause oscillation. Under normal circumstances, the oscillation suppression coefficient is set at about 300 for low-power machines, and 100-200 for high-power machines. The oscillation suppression factor (F4.15) is generally set to 2, and if the motor oscillation cannot be eliminated after F4.14 is set according to the recommended value, the value will be reduced.

Mode 1: The oscillation suppression parameter is F4.14

When the oscillation suppression coefficient (F4.14) is set to 0, the oscillation suppression is ineffective. The larger the parameter is, the stronger the effect of motor oscillation suppression is. Too large parameter may cause oscillation. Under normal circumstances, it can be set at about 20, and the setting range is generally 10-30.

5.6 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

	③ 0.1~999.9A
F5.06 Stator resistance R1	【Depends on model】Range: **②** 1～65535 mΩ **③** 1~65535 mΩ (Drive rated power ≤22kW) **③** 0.1～6553.5mΩ(Drive rated power>22kW)
F5.07 Leakage Inductive reactance X	【Depends on model】Range: **②** 0.01～655.35mH **③** 0.01～655.35mH(Drive rated power≤22kW) **③** 0.001～65.535mH(Drive rated power>22kW)
F5.08 Rotor resistance R2	【Depends on model】Range: **②** 1～65535mΩ **③** 1～65535mΩ(Drive rated power≤22kW) **③** 0.1～6553.5mΩ(Drive rated power>22kW)
F5.09 Mutual Inductive reactance Xm	【Depends on model】Range: **②** 0.1～6553.5mH **③** 0.1～6553.5mH(Drive rated power≤22kW) **③** 0.01～655.35mH(Drive rated power>22kW)

The above parameters are instructed in the fig.5-13 as below:
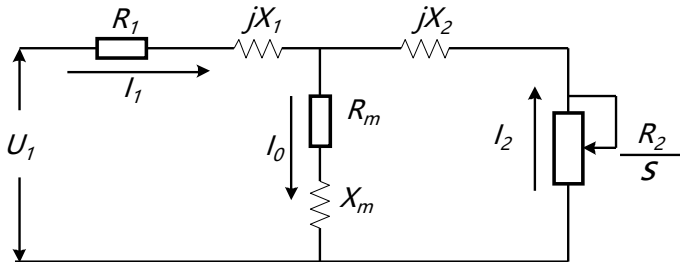
Fig. 5-13 Asynchronous motor equivalent circuit

In the Fig.5-13, R1, Xl, 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.

5.7 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.5-14.

K2	K1	Run command
0	0	Stop
0	1	Forward
1	0	Reverse
1	1	Stop
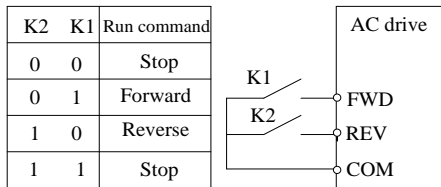
Fig.5-14 Two-wire mode 1

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.5-15.

K2	K1	Run command
0	0	Stop
0	1	Forward
1	0	Stop
1	1	Reverse
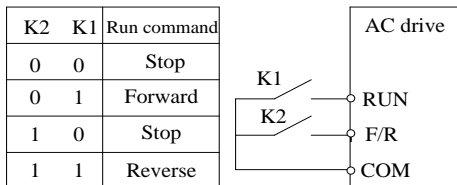
Fig.5-15 Two-wire mode 2

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.5-16
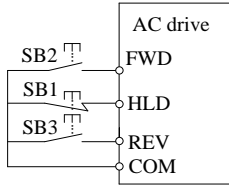
Fig.5-16 Three-wire mode 1

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.5-17. When F/R is not selected, the running direction is defined by function code (F0.17).

K	Run direction
0	Forward
1	Reverse
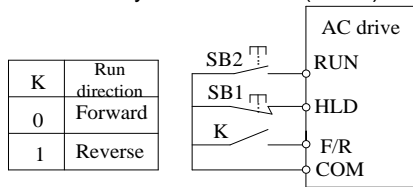
Fig.5-17 Three-wire mode 2

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】
②F6.06 AI1 terminal function selection	Range: 0～60【0】
③F6.06 X6 terminal Function selection	Range: 0～60【0】
②F6.07 AI2 terminal function selection	Range: 0～60【0】
③F6.07 X7 terminal Function selection	Range: 0～60【0】

②F6.08 Reserved	
③F6.08 X8 terminal function selection	Range: 0～60【0】
②F6.09 Reserved	
③F6.09 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 5-3 for details.

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

Table 5-3 Function list for digital input terminals

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)

Value	Function	Description
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 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 5-4 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 5-5 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 pauses 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 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
46	Torque increase clear	
47	Torque decrease	

Value	Function	Description
		F3.25 for torque increment and adjustment range.
48	One key recover user parameter (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.
49~55	Reserved	Reserved
56	Emergency stop	When the multifunctional terminal with the function is effective, the frequency converter stops at deceleration time of 4 (F2.08), and the signal pulse is effective, that is, the machine can stop immediately as long as the signal pulse is effective for an instant. When the functional terminal is closed all the time, the frequency converter cannot start normally.
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 5-4 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 5-5 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.5-18. 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.5-18. 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.5-18. 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.
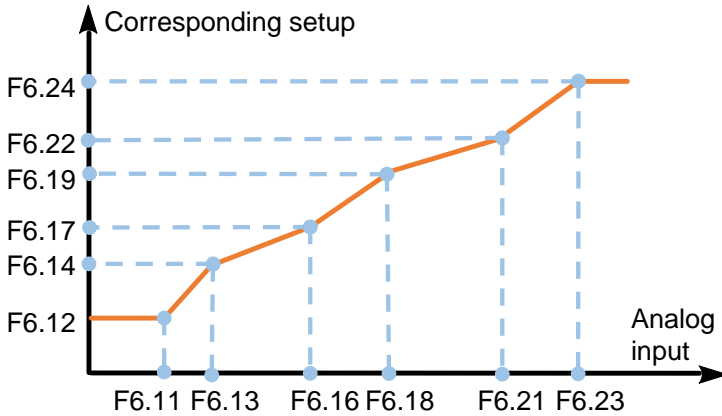
Fig.5-18 Analog input non-linear curve

F6.11 AI1 minimum input	Range: 0.0~F6.13【0.00V】
F6.12 AI1 minimum Input corresponding setup	Range: -200%~ 200.0%【0.0%】
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.5-19.
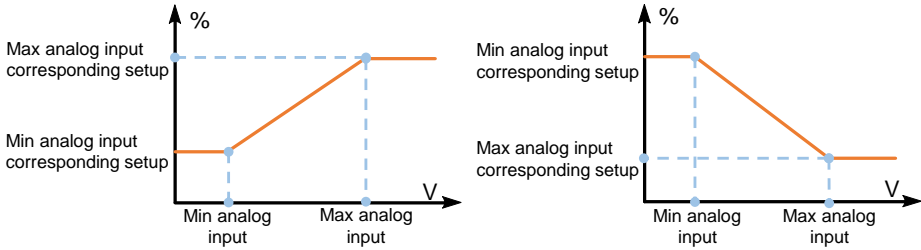
Fig.5-19 Analog input linear curve

F6.26 Terminal up/down initial increment	Range:0.00~10.00kHz【0.01Hz】
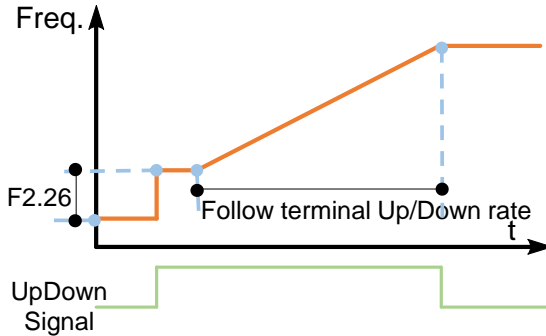
Fig.5-20 Terminal up/down initial increment

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 ② Pos. 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 ③ Pos. 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:

Terminal 24、25、26、27、42、43、44 and 49 are not impacted by F6.33.

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.

5.8 Output terminals group (F7)

② F7.00 Reserved	
③ F7.00 DO terminal output definition	Range:0~32【0】
F7.01 Y1 terminal output selection	Range: 0~32【1】
② F7.02 Reserved	
③ F7.02 Y2 terminal output selection	Range:0~32【0】
F7.03 Relay 1 (TA/TB/TC) output selection	Range: 0~32【16】
② F7.04 Reserved	Range:
③ F7.04 Relay 2 (BRA/BRB/BRC) output selection	Range:0~32【0】

Multifunctional output terminal function selection details are shown in Table 5-6.

Table5-6: 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.

Value	Function	Description
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.
10	②Reserved	Reserved
10	③Indicate the running step (Co-setting in DO\Y1\Y2)	It indicates the present running step. Refer to table 5-7 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	If the actual length exceeds the preset length, terminal outputs ON signal.

Value	Function	Description
	signals	
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 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	The frequency converter is in a running state and the running direction is forward, and the terminal output is effective.
30	Running in REV	The frequency converter is in a running state and the running direction is reversed, and the terminal output is effective.
31	Instantaneous power loss processing	When F2.21 is not zero and the frequency converter is in automatic frequency reduction or automatic shutdown due to power failure, the terminal output is effective.
32	Current arrival	Please refer to the detailed description of function codes F7.37-F7.40.
33	Brake signal	Please refer to the detailed description of function codes F7.42-F7.49.

Table 5-7 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.5-21.
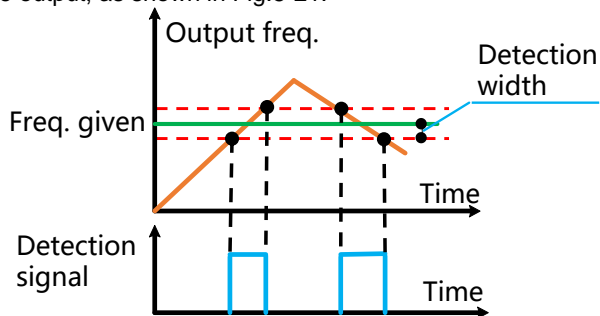
Fig.5-21 FAR detection diagram

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.5-22 below.
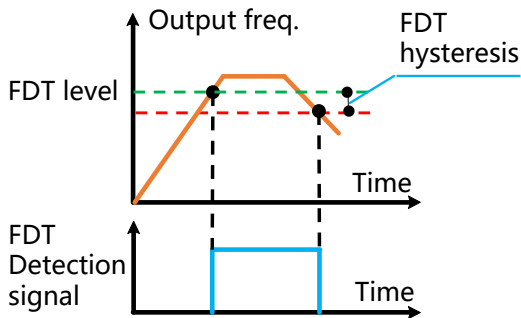
Fig.5-22 FDT level and lag diagram

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 error	Range: 0.00～30.00V【0.20V】

These parameters define the value of the analog comparison. Please refer to table 5-6 (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. 5-9.
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 5-8:

Table 5-8 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 ②Y1 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.5-23 for details.
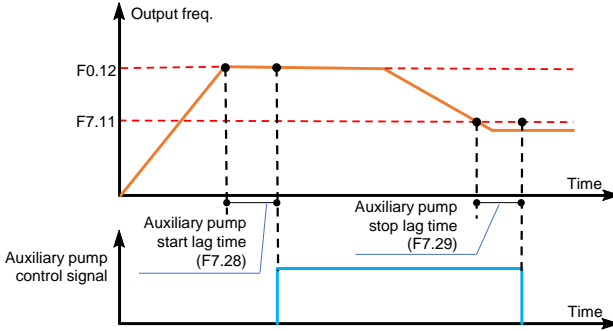
Fig.5-23 Constant pressure water supply auxiliary pump control signal

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	Range:0000~1111【0000】 Units: Logic of Y1 terminal Tens: Reserved Hundreds: Logic of Relay 1 Thousands: Reserved
F7.36 ③Digital output terminal Pos./Neg. logic	Range:0000~1111【0000】 Units: Logic of Y1 terminal Tens: Logic of Y2 terminal Hundreds: Logic of Relay 1 Thousands: Logic of Relay 2

F7.37 Current reaches the upper limit	Range：0.0～655.35A【0】
F7.38 Current upper limit check time	Range：0.00～50.00【0】
F7.39 Current reaches lower limit	Range：0.0～655.35A【0】
F7.40 Current lower limit check time	Range：0.00～50.00【0】

When the output terminal selects function No. 32 (current arrival), the terminal action is determined by F7.37~F7.40:
In the running state, when the output current of the converter reaches the upper limit F7.37 and the duration exceeds F7.38, the current arrival signal is effective; when the output current of the converter is lower than the lower limit F7.39 and the duration exceeds F7.40, the current arrival signal is invalid.
The current arrival signal is invalid when machine is shutdown or the current upper limit F7.37 is set to 0.
When the current limit F7.39 is set higher than the current upper limit F7.37, the lower limit F7.39 is set as F7.37.

F7.41 AO torque output range selection	Range: 0～1【0】

0：0~200% the motor rated torque
1：-200~200% motor rated torque output

F7.42 Brake release frequency	Range: 0.00~50.00Hz【2.00Hz】
F7.43 Detection value of brake release current	Range: 0.0~100.0%【20.0%】

F7.44 Detection time of brake release current	Range: 0.00~5.00s【0.00s】
F7.45 Action time of brake release	Range: 0.00~10.00s【1.00s】
F7.46 Current limit of brake release	Range: 0.00~200.0%【120.0%】
F7.47 Brake suction frequency	Range: 0.00~10.00Hz【2.00Hz】
F7.48 Waiting time of brake suction	Range: 0.00~10.00s【0.00s】
F7.49 Action time of brake suction	Range: 0.00~10.00s【1.00s】

When the frequency converter runs, it runs to the brake release frequency (F7.42), and starts to detect the output current of the frequency converter at the same time. If the output current of the frequency converter cannot reach F7.43 during the detection time of the brake release current (If F7.44 is 0, the current will not be detected), a fault (bAE) will be reported. The function prevents the contactor from not being actuated when the output terminal is connected with a contactor. Then the frequency converter outputs the brake release signal. After the brake release action time (F7.45), the frequency conversion starts the normal acceleration process. In these two processes, the output current of the frequency converter is limited to F7.46, and the subsequent current is limited by FC.05. When stopping, the frequency converter first decelerates to the brake suction frequency (F7.47). After F7.48, the brake starts to suck in, and after suction time (F7.49), the frequency converter stops directly.
See Figure 5-24 for detailed actions.
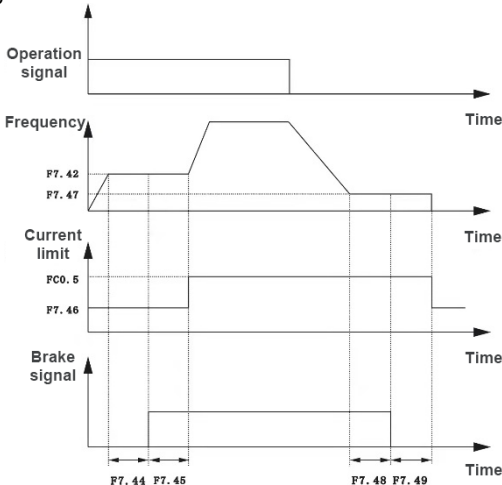
Figure 5-24 Brake Action Signal

5.9 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 5-24 as below.
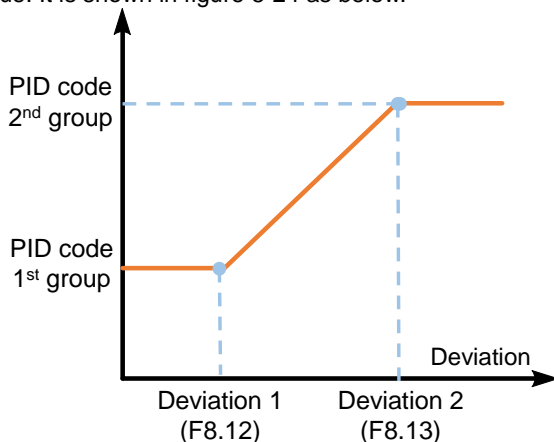
Figure 5-24 PID parameters switching

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 PID output positive limit	Range: 0.00～550.0Hz【50.00Hz】
F8.17 PID output negative limit	Range: -320Hz～320.0Hz【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, then F8.16 and F8.17 are set to 5.00Hz and -5.00Hz respectively

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.5-25.
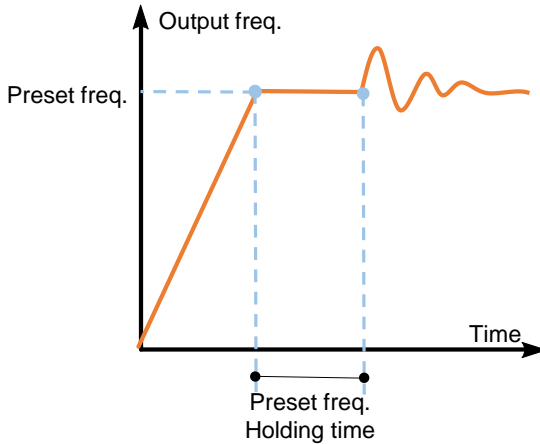
Fig. 5-25 PID preset frequency and holding time

📖 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	Range: 0.0~50.0s【2.0s】

detection time	
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).

5.10   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.5-26.

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	Range: 0～1【0】

power failure	

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 5-26.

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 5-9 for the details.

Table5-9 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
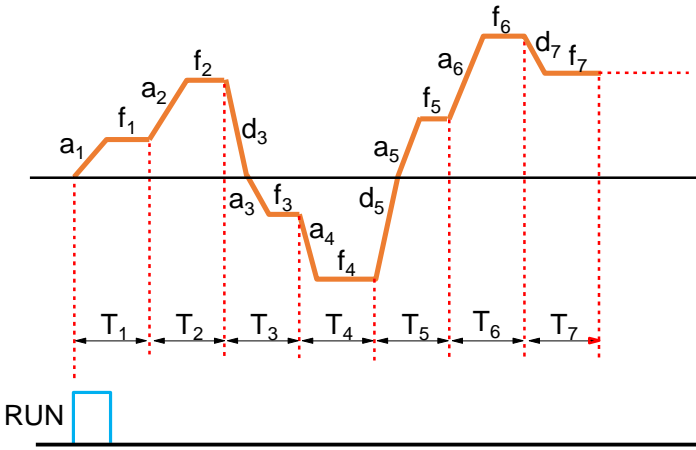
Fig.5-26 Simple PLC running

📖Note：

In Fig.5-26, 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 5-4)

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

5.11   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 5-27, 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.
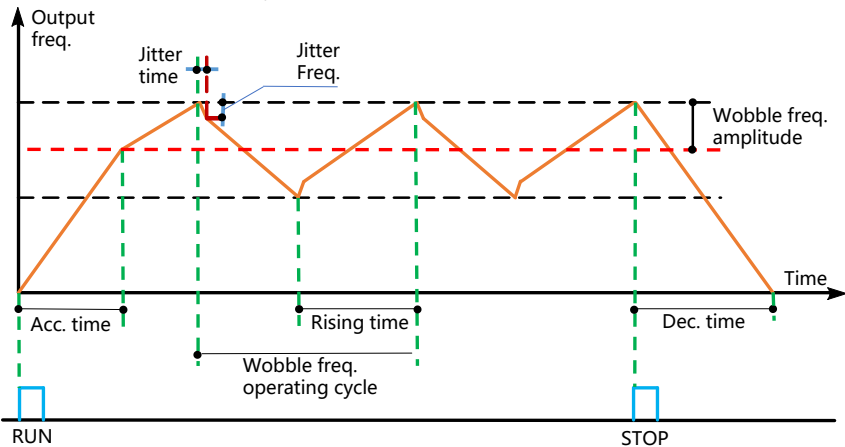
Fig.5-27 Wobble frequency running diagram

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.

5.12   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.

5.13   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.5-28.
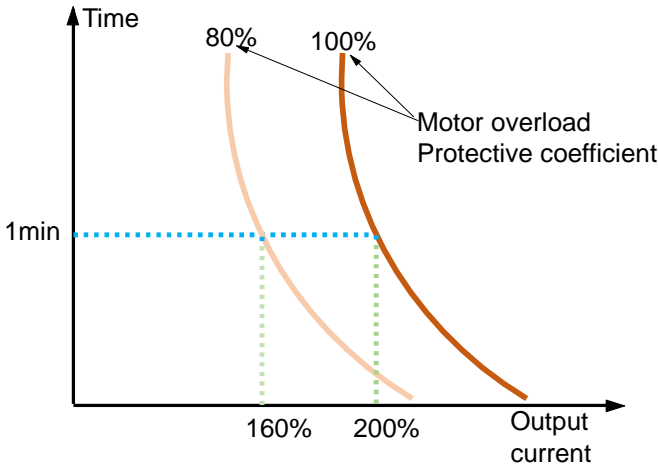
Fig 5-28 Motor overload protection curve

Motor overload protection coefficient calculates：

$C_m=(A_{max}/A_o)\times100\%$

C_m: Motor overload protection coefficient

A_{max}: the max allowed current of load
A_o: rated output current of drive

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: 0～3【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 accelerate to the previous constant speed status.

0: Invalid
1: Acc./Dec. valid; Constant speed invalid
2: Valid all the time
3: Constant speed is effective, acceleration and deceleration are ineffective

| 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.

5.14 Communication parameters group (Fd)

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

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:

Local address should be the unique one; it is the foundation to realize point-to-point communication between the host and drive.

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

5.15   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 5-29.
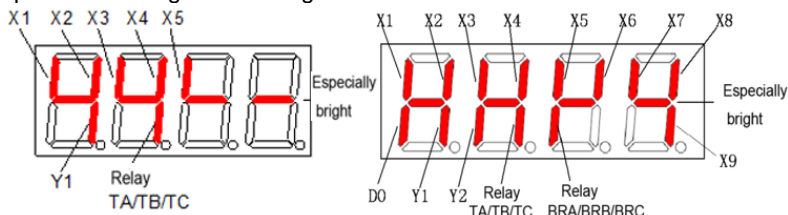
Fig 5-29 Terminal status diagram

5.16　Running history record group (FF)

FF.00 Type of latest fault	Setting range: 0～28【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

5.17   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.

6

Chapter 6 Fault information and trouble shooting

6.1 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 6-1.

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

Table 6-1 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
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.

Trip code	Trip Type	Possible causes	Solutions
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.
GF ③	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.
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	4. Use specialized electric motor. 5. Check whether the motor or the load is blocked to stall or not.

Trip code	Trip Type	Possible causes	Solutions
		6.Motor power too low	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.
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. 2. The downloading	1. Shorten the cable between Keypad and control board to reduce interference. 2. Before downloading,

Trip code	Trip Type	Possible causes	Solutions
		parameters do not match the existed parameters in the drive.	make sure the parameters match the drive.
IDE	IDE Hall current detection fault	1. The current sensoring or hall device get damaged.	1. Ask for service from supplier
ECE ③	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 pre-alarm error	1.fequency drive output current is higher than set pre-alarm threshold	1. Disable pre-alarm function(FC.19=0) 2. Increase pre-alarm threshold value (FC.02) 3. Increase pre-alarm detection time(FC.03)

6.2 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 6-2

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

Table 6-2 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
SF3 ③	Function codes setup is not appropriate	Output terminal DO, Y1, Y2 does not simultaneously select No.10 function

6.3 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

7

Chapter 7 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.

⚠️ **Caution**

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.

7.1 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 water drop	Visual check	There are no dust, oil, and water drop.
	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.

Item	Inspection contents	Inspection method	Inspection Criteria
	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.

7.2 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.

Item	Inspection content	Inspection method	Inspection criteria
	Internal foreign objects	Visual check	There are no foreign objects.
Motor	Insulation test	500VDC megohmmeter	Normal

7.3 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 is no electrolyte leakage, color change, crack and shell inflation. The safety valve is normal. Static capacity ≥the initial value*0.85.

⚠ Caution

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.

7.4 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.

8

Chapter 8   Technical Data and model selection

8.1 Technical features

		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, Drives/motor overload Over-current, Encoder off-line,	Analog input/output abnormal, Temperature sampling offline		
		Abnormal power failure in running		
		Under/over voltage,		Relay contact error
		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		

8.2 NE200 Technical data

■ 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			

8.3 NE300 Technical data

🟩 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															
Output Rated Current(A)	4	6	9	13	17	25	32	37	45	60	75	90	110	150	176	210
Output Overload	150% 1min; 180% 20sec															
Input Rated Volt/Freq	3Phase 380V/440V; 50Hz/60Hz															
Input Voltage Range	304V～456V voltage imbalance ≤3% Allowable frequency fluctuation ±5%															
Input 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															
Output Rated Current(A)	250	300	340	380	420	470	540	600	660	730	840	900	950	1160	1300	1460
Output Overload	150% 1min; 180% 20sec															
Input Rated Volt/Freq	3Phase 380V/440V; 50Hz/60Hz															
Input Voltage Range	3Phase 380V/440V; 50Hz/60Hz 150% 1min;180% 20sec															
Input 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.

8.4 Product Dimensions and weight

8.4.1　NE200 dimension and weight

☐　Length unit:（mm）；Weight unit:（Kg）
☐　Data in ( ) is the dimensions and weight with package.
☐　NE200 drivers can be mounted on 35mm din-rail.
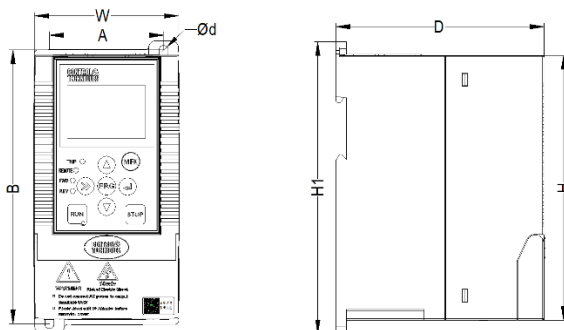
Fig 8-1 Dimensions diagram

Table 8-1 Dimensions and weight

Model (NE200-)	H	W	D	H1	A	B	d	Net weight
2S0004GB	150	83 (125)	120 (160)	166 (190)	65	153	5	1 (1.1)
2S0007GB								
2S0015GB								
4T0007G/0015PB								
4T0015G/0022PB								
4T0022GB-M								
2S0022GB	200	120 (166)	140 (189)	215 (244)	98	202	5	1.8 (2.1)
4T0022G/0040PB								
4T0040G/0055PB								

8.4.2　NE300 dimensions and weight

☐　* -F means stand-free cabinet with reactor built-in；
☐　* -U means input terminal is at up end, output terminal is at down end, the mounting method is surface-mounting.
☐　* -D means the input/output terminal are at same side, the mounting method is surface-mounting.

8.4.2.1　NE300-4T0015G/0022PB to 4T2500G/2800P-D

☐　Length unit:（mm）；Weight unit:（KG）
☐　Data in ( ) is the dimensions and weight with package.

☐   Fig. 8-2 is the diagram，the detail feature for all drive is different.
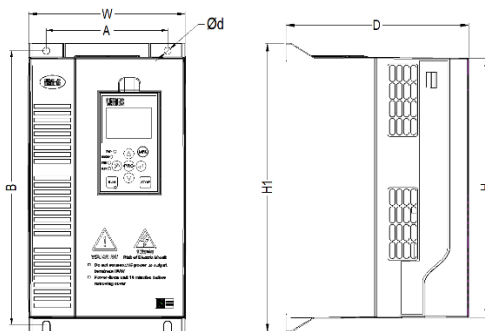
Fig. 8-2 Dimensions diagram

Table 8-2   Dimensions and weight

Model(NE300-)	H	W	D	H1	A	B	d	Weight
4T0015G/0022PB 4T0022G/0040PB 4T0040G/0055PB	210	133 *(180)*	180 *(205)*	238 *(255)*	108	225	7	2.3 *(2.8)*
4T0055G/0075PB 4T0075G/0110PB 4T0110G/0150PB	258	155 *(255)*	180 *(255)*	285 *(330)*	120	270	7	3.2 *(4.1)*
4T0150G/0185PB 4T0185G/0220PB 4T0220G/0300PB	308	192 *(275)*	186 *(275)*	340 *(435)*	150	323	7	4.8 *(6.0)*
4T0300G/0370P 4T0370G/0450P	425	270 *(345)*	200 *(280)*	450 *(530)*	200	430	7	13.5 *(15.5)*
4T0450G/0550P 4T0550G/0750P	535	320 *(460)*	248 *(440)*	560 *(655)*	240	540	9	26 *(37)*
4T0750G/0900P 4T0900G/1100P 4T1100G/1320P	640	380 *(470)*	248 *(500)*	665 *(760)*	240	640	9	42 *(56)*
4T1320G/1600P-U 4T1320G/1600P-D 4T1600G/1850P-U 4T1600G/1850P-D	710	465 *(576)*	355 *(576)*	750 *(842)*	380	719	11	64 *(82)*
4T1850G/2000P-U 4T1850G/2000P-D 4T2000G/2200P-U 4T2000G/2200P-D 4T2200G/2500P-U 4T2200G/2500P-D 4T2500G/2800P-U 4T2500G/2800P-D	859	550 *(662)*	385 *(492)*	900 *(974)*	440	868	11	89.5 *(110)*

8.4.2.2   NE300-4T1600G/1850P-F to 4T3150G/3550P-F

▢   Length unit:（mm）；Weight unit:（KG）
▢   Data in (   ) is the dimensions and weight with package.
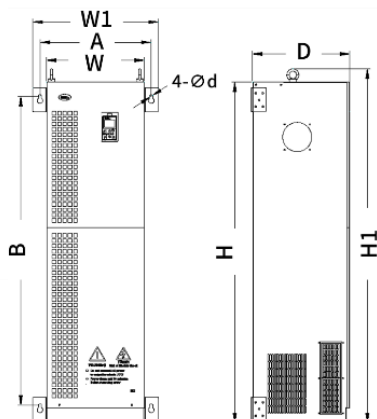
Fig. 8-3 Dimensions diagram
Table 8-3   Dimensions and weight

Model (NE300-)	H	W	W1	D	H1	A	B	d	Weight
4T1600G/1850P-F 4T1850G/2000P-F 4T2000G/2200P-F 4T2200G/2500P-F	1400	400 *(690)*	520	402 *(546)*	1455 *(1542)*	460	1270	13	118 *(148)*
4T2500G/2800P-F 4T2800G/3150P-F 4T3150G/3550P-F	1600	505 *(723)*	620	420 *(646)*	1655 *(1742)*	560	1460	13	175 *(210)*

8.4.2.3   NE300-4T3550G/4000P-F to 4T5000G/5600P-F

▢   Length unit:（mm）；Weight unit:（KG）
▢   Data in ( ) is the dimensions and weight with package.
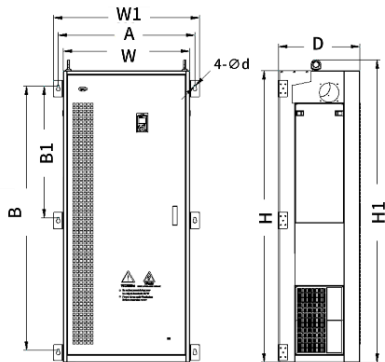
Fig. 8-4 Dimensions diagram

Table 8-4   Dimensions and weight

Model(NE300-)	H	W	W1	D	H1	A	B	B1	d	Weight
4T3550G/4000P-F	1800	780 (824)	900	500 (926)	1870 (1942)	840	1630	815	13	235 (283)
4T4000G/4500P-F										
4T4500G/5000P-F										
4T5000G/5600P-F										

8.4.2.4 NE300-4T5600G/6300P-F to 4T8000G/9000P-F

☐   Length unit:（mm）；Weight unit:（KG）
☐   Data in (   ) is the dimensions and weight with package.
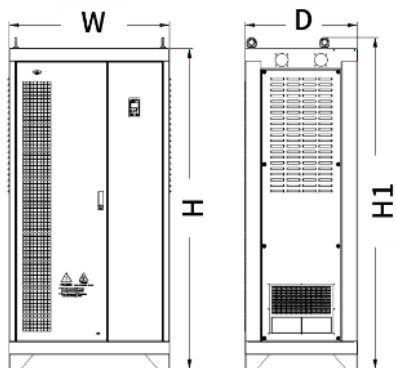
Fig. 8-5 Dimensions diagram

Table 8-5 Dimensions and weight

Model(NE300-)	H	W	D	H1	Weight
4T5600G/6300P-F	2000	1000 (1128)	700 (1008)	2070 (2124)	---
4T6300G/7100P-F					

Model(NE300-)	H	W	D	H1	Weight
4T7100G/8000P-F					(600)
4T8000G/9000P-F					
4T9000G-F	See NE300-4T9000G-F				

8.4.2.5 NE300-4T9000G-F

☐ Length unit:（mm）；Weight unit:（KG）

☐ Data in ( ) is the dimensions and weight with package.

☐ NE300-4T9000G-F consist of 2 NE300-4T5000G-F drivers.

☐ Assembly space S≥300，Assembly width W2≥1860.

☐ Dimensions with package:2124 X 1128 X 1008, weight with package 600Kg.
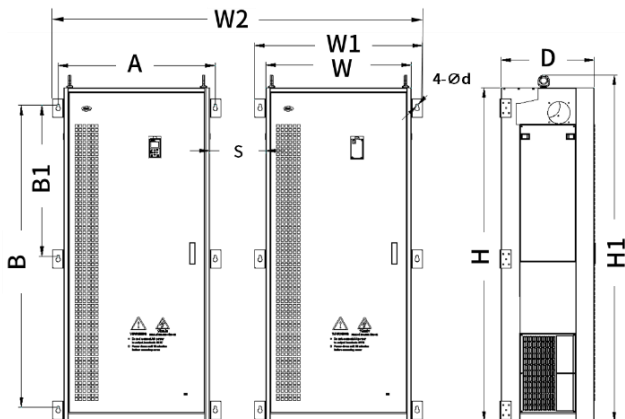
Fig. 8-6 Dimensions diagram

8.5 Keypad

8.5.1   Keypad dimension/mounting

☐ Length unit（mm）, weight unit（KG）.

☐ LCD and LED keypad's dimensions are same.
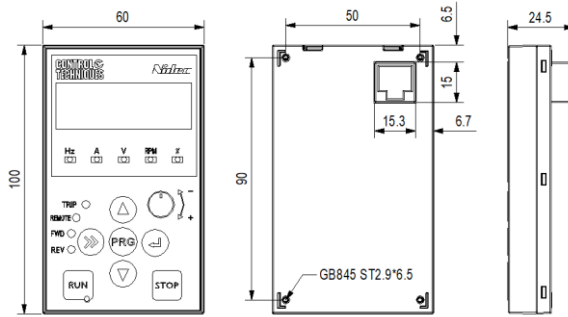
Fig.8-7 LED Operating Panel Outline and Mounting Dimension
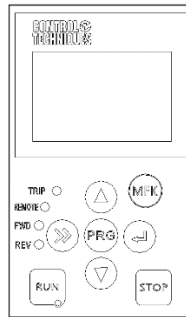
Fig.8-8 LCD keypad Outline

8.5.2   Keypad holder dimensions/mounting

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)：
Note: the metal sheet thickness of door is 1.0~1.5 mm.
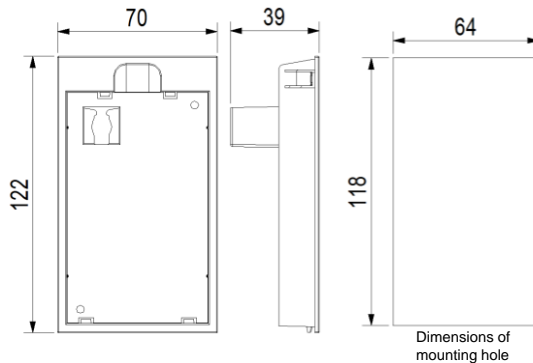
Fig.8-9 Operating Panel Outline and Mounting Dimension

8.6 Braking Resistor and Unit

8.6.1   Braking torque (T_B)

In general, when the motor is braked, there is heat-loss inside the motor, and the resultant brake torque is about 20% of the rated torque of the motor. Therefore, if the calculated brake electromagnetic torque is less than 20% of the rated torque of the motor, it indicates that there is no need to connect external brake device. Please use the following formula to calculate the electromagnetic torque required for braking:

$$T_B = \frac{(GD_M{}^2 + GD_L{}^2)(N_1 - N_2)}{375\, t_S} - T_L$$

T_B: Brake electromagnetic torque（Nm）

$GD_M{}^2$: Rotational inertia of the motor（Nm²）

$GD_L{}^2$: Rotational inertia converted from motor load side to motor side（Nm²）

T_L: Load resistance torque（Nm）

N_1: Motor speed before braking（rpm）

N_2: Motor speed before braking（rpm）

t_S: Deceleration time（s）

8.6.2   Braking Resistor Resistance (R_B)

During the operation of the braking unit, the voltage rise and fall of the DC bus depends on the constant RC, R is the resistance value of the braking resistance, and C is the capacity of the electrolytic capacitance of the converter. From the charge discharge curve, we know that the smaller the RC is, the faster the discharge speed of the bus voltage is. The smaller the R is, the faster the discharge speed of the bus voltage is when the C is kept constant (the model of the converter is determined). The resistance value of braking resistance can be calculated by the following formula.

$$R_B = \frac{U_C{}^2}{0.1047\,(T_B - 0.2 T_M)N_1} \; (W)$$

U_C: Action voltage value of braking unit，in general, it is 710V

T_M: Rated torque of motor（Nm）

R_B can meet all kind of deceleration work status while $N_2=0$

8.6.3   Nominal power of brake resistor (P_R)

Because the brake resistor is a short-time working system, i.e. the time of each power on is very short, during the power on period, the temperature rise of the resistor is far from stable, but the instantaneous power is very high; the interval time after each power on is long, and the temperature is falling continuously in this period of time, so the resistance finally reaches a stable temperature rise, generally 80-100 ℃. Therefore, according to the characteristics and technical indicators of the resistor, we know that the nominal power (rated power) of the

resistor will be less than the power consumption when it is powered on. Generally, the following formula can be used:

$$P_R = a \times P_S \times ED\% \ (W)$$

P_R：Nominal power of brake resistor（W）

P_S：Average power consumption during braking（W）

ED%：Braking utilization rate, recommend 10% at here

a：Derating coefficient of braking resistance，generally , it is 1.5~2，or find it from derating curve of resistance and can calculate Ps from formula.

8.6.4 Braking Unit Current (I_c)

When selecting the brake unit, the maximum instantaneous current flowing through the switch tube when the brake unit works is less than the rated current of the device, which is the only basis for selection. By calculating the maximum current value, the appropriate brake unit can be selected. The calculation formula is as follows:

$$I_c = \frac{U_c}{R_B} \ (A)$$

U_c：DC-BUS voltage of braking unit，generally , it is 800V
R_B：Braking resistor resistance（Ω）
I_c：Instantaneous current of braking (A）

Generally, the hardware over-voltage protection value of driver is 760V. Considering its action lag, it should be increased appropriately. But generally, it will not exceed 800V, so U_c is appropriately increased in the calculation of I_C.

8.6.5 Reference table of brake resistance selection

Brake Resistance Selection			
Model	Braking Unit	Min. Resistance (Ω)	Instantaneous Power (kW)
NE200-2S0004GB		200	0.7
NE200-2S0007GB		150	1.0
NE200-2S0015GB		100	1.4
NE200-2S0022GB		70	2.1
NE200-4T0007G/0015PB	Built-in	300	1.6
NE200-4T0015G/0022PB		300	1.6
NE200-4T0022GB-M		200	2.5
NE200-4T0022G/0040PB		200	2.5
NE200-4T0040G/0055PB		200	2.5
NE300-4T0015G/0022PB	Built-in	300	1.6
NE300-4T0022G/0040PB		200	2.5
NE300-4T0040G/0055PB		200	2.5
NE300-4T0055G/0075PB		100	4.9
NE300-4T0075G/0110PB		75	6.5
NE300-4T0110G/0150PB		50	9.8
NE300-4T0150G/0185PB		40	12.3

NE300-4T0185G/0220PB		30	16.3
NE300-4T0220G/0300PB		30	16.3
NE300-4T0300G/0370P		20	24.5
NE300-4T0370G/0450P		16	30.6
NE300-4T0450G/0550P		13.6	36.0
NE300-4T0550G/0750P		10	49.0
NE300-4T0750G/0900P		6.8	72.1
NE300-4T0900G/1100P		6.7	73.1
NE300-4T1100G/1320P		6.7	73.1
NE300-4T1320G/1600P-U		5.0	98.0
NE300-4T1320G/1600P-D		5.0	98.0
NE300-4T1600G/1850P-U		3.4	144.1
NE300-4T1600G/1850P-D		3.4	144.1
NE300-4T1600G/1850P-F		3.4	144.1
NE300-4T1850G/2000P-U		3.4	144.1
NE300-4T1850G/2000P-D		3.4	144.1
NE300-4T1850G/2000P-F		3.4	144.1
NE300-4T2000G/2200P-U		2.7	181.5
NE300-4T2000G/2200P-D		2.7	181.5
NE300-4T2000G/2200P-F	Built-out	2.7	181.5
NE300-4T2200G/2500P-U		2.7	181.5
NE300-4T2200G/2500P-D		2.7	181.5
NE300-4T2200G/2500P-F		2.7	181.5
NE300-4T2500G/2800P-U		2.7	181.5
NE300-4T2500G/2800P-D		2.7	181.5
NE300-4T2500G/2800P-F		2.7	181.5
NE300-4T2800G/3150P-F		2.3	213.0
NE300-4T3150G/3550P-F		2.3	213.0
NE300-4T3550G/4000P-F		1.5	326.7
NE300-4T4000G/4500P-F		1.5	326.7
NE300-4T4500G/5000P-F		1.0	490.0
NE300-4T5000G/5600P-F		1.0	490.0
NE300-4T5600G/6300P-F		1.0	490.0
NE300-4T6300G/7100P-F		0.67	731.3
NE300-4T7100G/8000P-F		0.67	731.3
NE300-4T8000G/9000P-F		0.67	731.3
NE300-4T9000G-F		0.67	731.3

☐ Note: Instantaneous power means the Max instantaneous power loss while the braking of IGBT work, the resistor will work about 3ms in this situation. The resistance is inversely proportional to the instantaneous rated power.

In most cases, the brake only starts occasionally. This makes the continuous rated power of the braking resistor much lower than the rated power of the frequency converter. Therefore, it is more suitable to use the braking resistor with continuous rated power in most occasions. However, it must be noted that the instantaneous rating of the braking resistor must be sufficient to cope with the possible extreme braking load.

The duty cycle of braking period should be considered carefully in the optimization of braking resistor

The resistance value of the selected braking resistor shall not be lower than the specified minimum resistance value. The larger resistance value can save cost and ensure safety in case of failure of the braking system.

However, if the selected resistance value is too high, the braking capacity will decrease accordingly, which may lead to over-voltage protection during the braking process of the frequency converter.

When using more than two braking units, pay attention to the equivalent resistance value after parallel braking unit, which shall not be lower than the equivalent minimum resistance value of each frequency converter. When using the brake unit, please read and follow the instructions in the brake unit manual for wiring.

8.6.6　Braking resistor and unit recommended

■　Model description of braking resistor

Code	Rated power
0015	1.5kW
0030	3.0kW
0050	5.0kW

Code	Motor power
0400	40KW
0200	20KW
0100	10KW

■　Model description of braking unit

Code	Voltage
2	220V
4	380V
6	660V

Code	Motor power
0300	30kW
0550	55kW
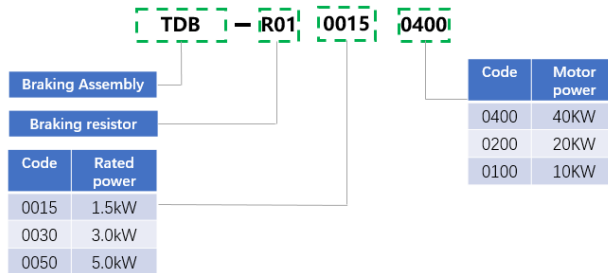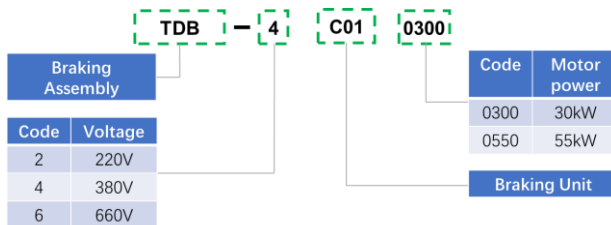
■　Outline and dimension of braking unit
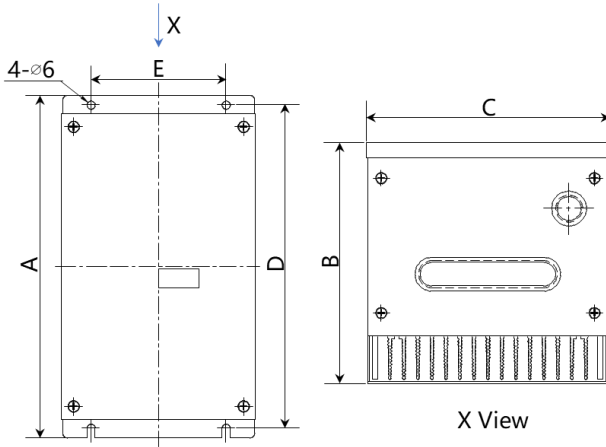
Table for dimension and weight of braking unit

■ Length unit：mm; Weight unit: Kg

Model	A	B	C	D	E	Weight
TDB-4C01-0300	254	143	144	240	100	3
TDB-4C01-0550	254	130	170	240	126	4

■ Outline and dimension of braking resistor
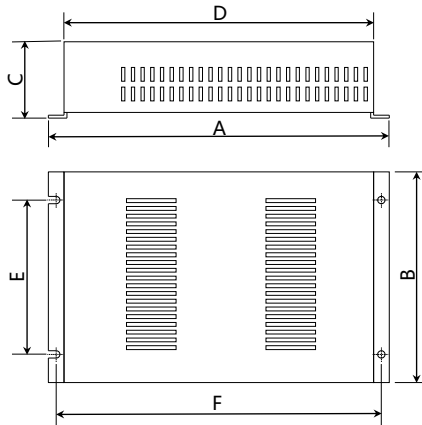
Table for dimension and weight of braking resistor

■ Length unit：mm; Weight unit: Kg

Model	A	B	C	D	E	F	Weight
TDB-4R01-0015-0400	475	228	127	447	177	460	3
TDB-4R01-0030-0200	500	350	128	480	298	490	6
TDB-4R01-0050-0100	540	520	170	520	470	530	8

8.7 Model selection of system

8.7.1   NE200 model selection of system

Table 8-6 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. (mm²)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm²)
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

8.7.2   NE300 model selection of system

Table 8-7 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. (mm²)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm²)
NE300-4T0022G/0040PB	16	10	M4	1.2~	2.5	M4	1.2~1.5	2.5
NE300-4T0040G/0055PB	25	16	M4	1.2~	4	M4	1.2~1.5	4
NE300-4T0055G/0075PB	32	25	M4	1.2~	6	M4	1.2~1.5	6

NE300-4T0075G/0110PB	40	32	M4	1.2~	6	M4	1.2~1.5	6
NE300-4T0110G/0150PB	63	40	M4	1.2~	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 8-8 NE300-4T0300G/0370P and above

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. (mm²)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm²)
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-	400	330	M12	40~45	150	M10	20~25	75
NE300-4T1320G/1600P-	400	330	M12	40~45	150	M10	20~25	75
NE300-4T1600G/1850P-	500	400	M12	40~45	185	M10	20~25	50×2
NE300-4T1600G/1850P-	500	400	M12	40~45	185	M10	20~25	50×2
NE300-4T1600G/1850P-	500	400	M12	40~45	185	M10	20~25	50×2
NE300-4T1850G/2000P-	400	330	M12	40~45	150	M10	20~25	50×2
NE300-4T1850G/2000P-	400	330	M12	40~45	150	M10	20~25	50×2
NE300-4T1850G/2000P-	500	400	M12	40~45	185	M10	20~25	50×2
NE300-4T2000G/2200P-	630	500	M12	40~45	240	M10	20~25	60×2
NE300-4T2000G/2200P-	630	500	M12	40~45	240	M10	20~25	60×2
NE300-4T2000G/2200P-	630	500	M12	40~45	240	M10	20~25	60×2
NE300-4T2200G/2500P-	800	630	M12	40~45	150×2	M10	20~25	75×2
NE300-4T2200G/2500P-	800	630	M12	40~45	150×2	M10	20~25	75×2
NE300-4T2200G/2500P-	800	630	M12	40~45	150×2	M10	20~25	75×2

NE300-4T2500G/2800P-	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. (mm²)	Terminal screw	Tightening torque (N·m)	Wire spec. (mm²)
NE300-4T2500G/2800P-	1000	630	M12	40～45	150×2	M10	20～25	100×2
NE300-4T2500G/2800P-	1000	630	M12	40～45	150×2	M10	20～25	100×2
NE300-4T2800G/3150P-	1000	800	M12	40～45	185×2	M10	20～25	125×2
NE300-4T3150G/3550P-	1200	800	M12	40～45	240×2	M10	20～25	150×2
NE300-4T3550G/4000P-	1280	960	M16	100～120	240×2	M12	40～45	185×2
NE300-4T4000G/4500P-	1380	1035	M16	100～120	185×3	M12	40～45	185×2
NE300-4T4500G/5000P-	1450	1150	M16	100～120	185×3	M12	40～45	240×2
NE300-4T5000G/5600P-	1720	1290	M16	100～120	185×3	M12	40～45	240×2
NE300-4T5600G/6300P-	1900	1450	M16	100～120	185×3	M12	40～45	240×2
NE300-4T6300G/7100P-	2200	1630	M16	100～120	240×3	M12	40～45	240×2
NE300-4T7100G/8000P-	2550	1830	M16	100～120	240×3	M12	40～45	240×2
NE300-4T8000G/9000P-	2950	2050	M16	100～120	240×3	M12	40～45	240×2

9

Chapter 9   Options

9.1 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. functions. (See fig. 9-1)
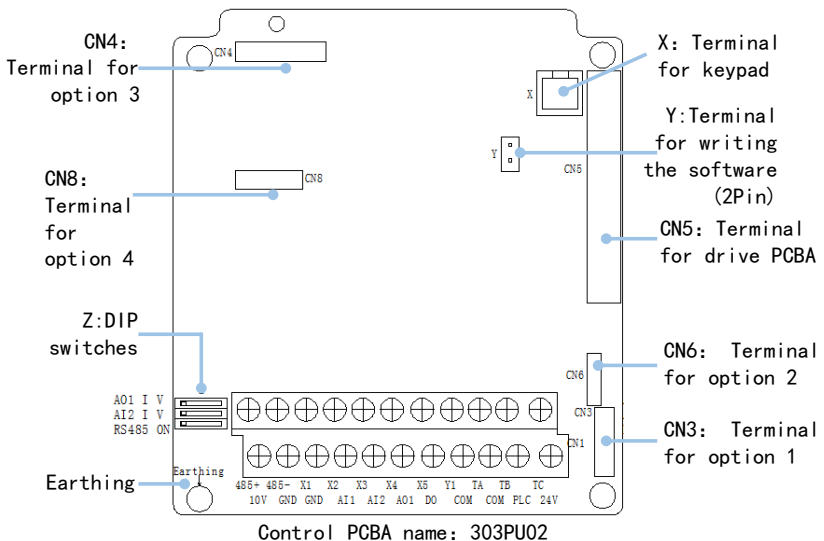
Fig. 9-1 NE300 close-loop control PCBA diagram

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

9.2 Wiring of control circuit

9.2.1   Terminal sequence of control circuit

485+	485-	X1	X2	X3	X4	X5	Y1	TA	TB	TC
	10V	GND	GND	AI1	AI2	AO1	DO	COM	COM	PLC	24V

☐ PLC and +24V terminals are shorted by a silver-colored metal part in factory.

1)   Wiring of multi-function terminal

▇   X1~X5 PNP/NPN wiring diagram
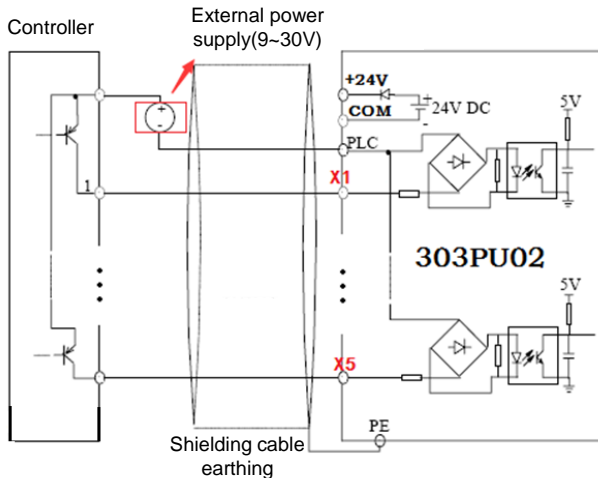
Fig. 9-2 PNP wiring diagram

(Using external power)

Controller
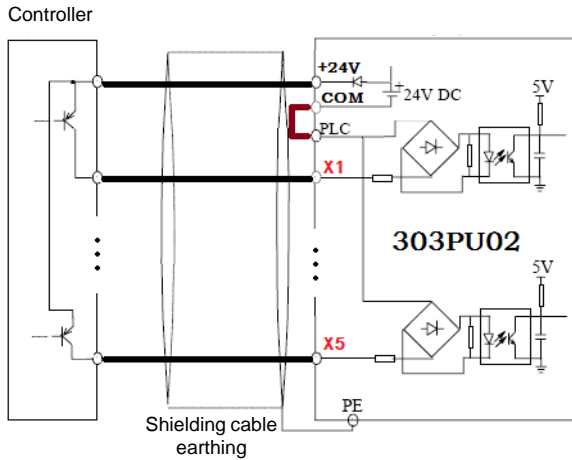
Fig. 9-3 PNP wiring diagram

(Using internal power)

Controller
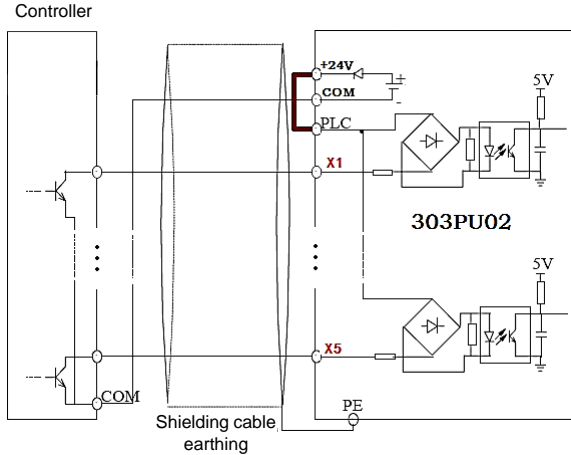
Fig. 9-4 NPN wiring diagram

(Using internal power)
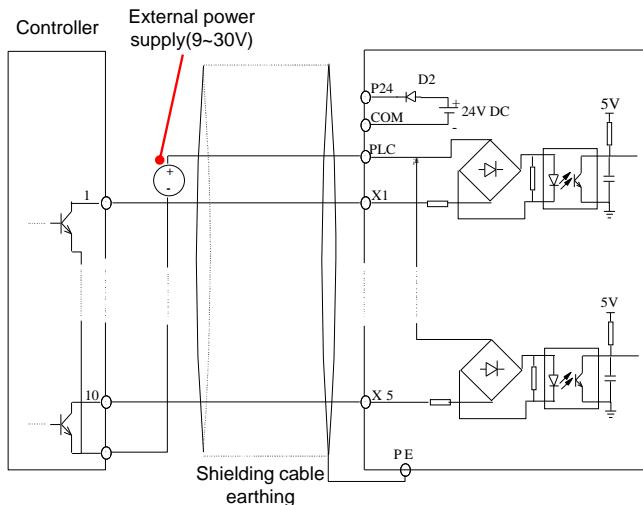
Fig. 9-5 NPN wiring diagram

(Using external power)

9.2.2   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
Byte2	Max. Freq. : 20000/Min. minus Freq. : -20000
	Note：　Byte1 high 8 byte，Byte2 low 8 byte
Byte3	Real feedback rotary speed：　Range：~20000~20000
Byte4	Max. Freq. : 20000/Min. minus Freq. : -20000
	Note：　Byte3 high 8 byte，Byte4 low 8 byte
Byte5	Given signal of current-loop (Iq): -8192~8192
Byte6	4096: Rated torque current related motor
	（From speed-loop output signal）
	Note：　Byte5 high 8 byte，Byte6 low 8 byte
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
Byte1	(Byte0 High 8 bytes，Byte1 low 8 bytes)
Byte2	Data 2
Byte3	(Byte2 High 8 bytes，Byte3 low 8 bytes)
Byte4	Data 3
Byte5	(Byte4 High 8 bytes，Byte5 low 8 bytes)
Byte6	Data 4
Byte7	(Byte6 High 8 bytes，Byte7 low 8 bytes)

9.3 Options

9.3.1   Function brief of options

☐   Only for NE300

Option card	Model No.	Terminals	Function	Models Range
I/O Option	NE30-I/O Lite	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	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	+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	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	U	Connect to drive U phase output	NE200-4T0015G/0022PB ~ NE300-4T0150G/0185PB
		W	Connect to drive W phase output	
CC-LINK option	NEF-CCLINK	DA	Signal DA	NE300
		DB	Signal DB	
		DG	Signal Ground	
		SLD	Shielding Ground	
		FG	Grounding	
Profibus-DP option	NEF-Profibus	RxD/TxD-P	Positive end of data transfer	NE300
		RxD/TxD-N	Negative end of data transfer	
		+5V	The power supply	
		0V	Ground	
		Shield	shielding	
PROFINET option	NEF-PROFINET	RJ45	2 gateways	NE300
Modbus TCP option	NEF- TCP	RJ45	2 gateways	NE300

		R1，R2	Base time signal	
Resolver PG encoder option	B602PG03A	S1，S3	SIN+ and SIN- input signal	NE300
		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	+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	+24V, COM	Power supply	NE300
		A+, A-	A/B signal input	
		B+, B-		
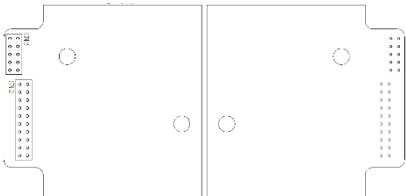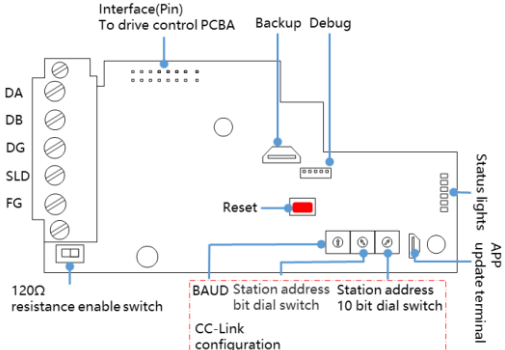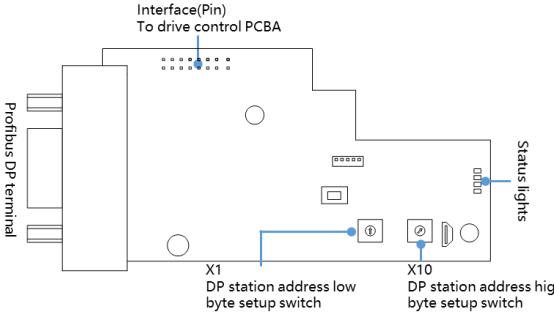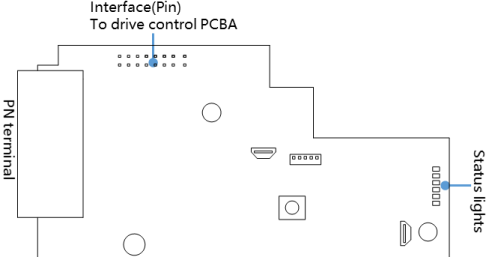
Note:
1) When using ±10V Option card, the AI1 on control board is invalid.
2) The work voltage of the Resolver PG encoder is 7V.
3) The work voltage of the 5V differential signal encoder is 5V. UVW also is used as the normal encoder.
4) The work voltage of the 24V differential signal encoder is 24V.

9.3.2   Mounting instruction of options (PCBA)

Option Name	Terminal on control PCBA	Option card diagram
IO	CN3	
IO	CN3	
Injection molding option	CN3	
±10V extension option	CN3	

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	

CAN communication	CN3+CN 6	
CC-LINK	CN3	
Profibus-DP	CN3	
Profinet	CN3	

MODBU S TCP	CN3	
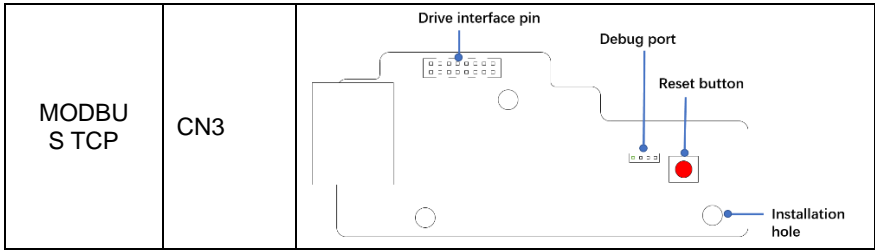
9.3.3 Function and using instruction of option

1) 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.

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-	The input encoder signal is outputted as A/B/Z differential signal, the location signal, though the IC operation.	100KHz		
BO+，BO-	Terminal to Terminal			
ZO+，ZO-				

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

while the output signal of terminal AO+、AO-、BO+、BO-、ZO+、ZO- is the differential signal which can drive the 5V differential encoder.

Wiring diagram between Resolver and 5V differential signal encoder	
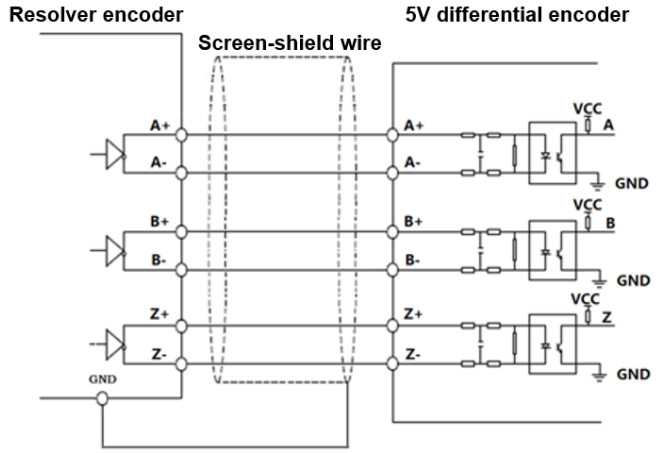
2)   5V differential signal PG encoder option

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.

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.

For the closed-loop encoder application of induction motor, the UVW terminal can be wired while using the normal differential encoder.

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:

Differential signal output encoder wiring diagram(5V)	
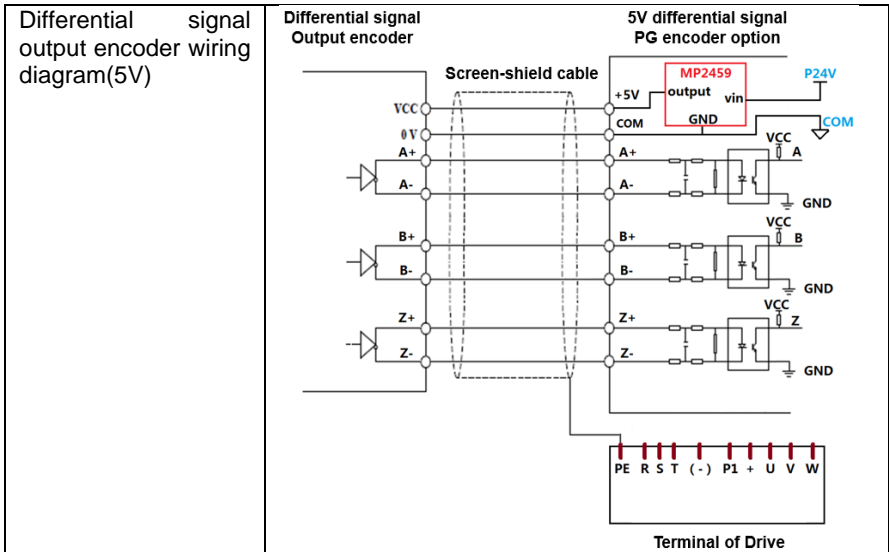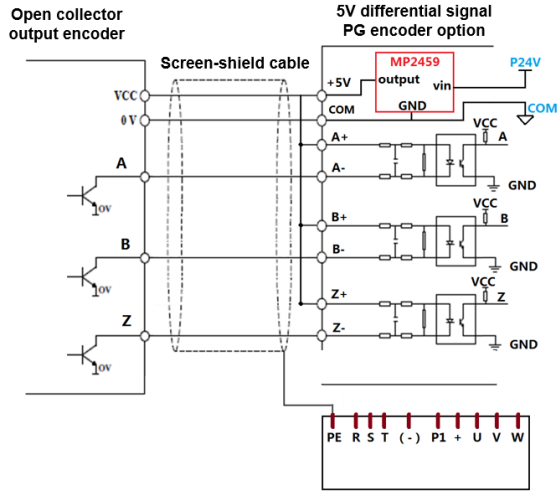
Open collector output encoder wiring diagram(5V)	
Push-pull encoder wiring diagram(5V)	
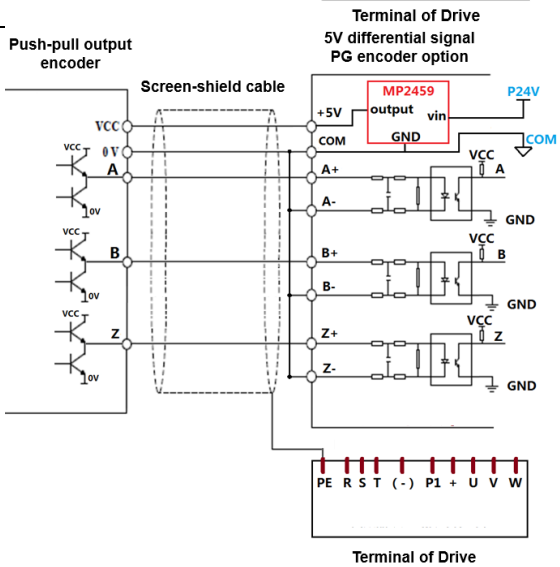
3)   24V differential signal PG encoder option

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.

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:

Differential signal output encoder wiring diagram(24V)	
Open collector output encoder wiring diagram（24V）	

Push-pull encoder wiring diagram（24V）	
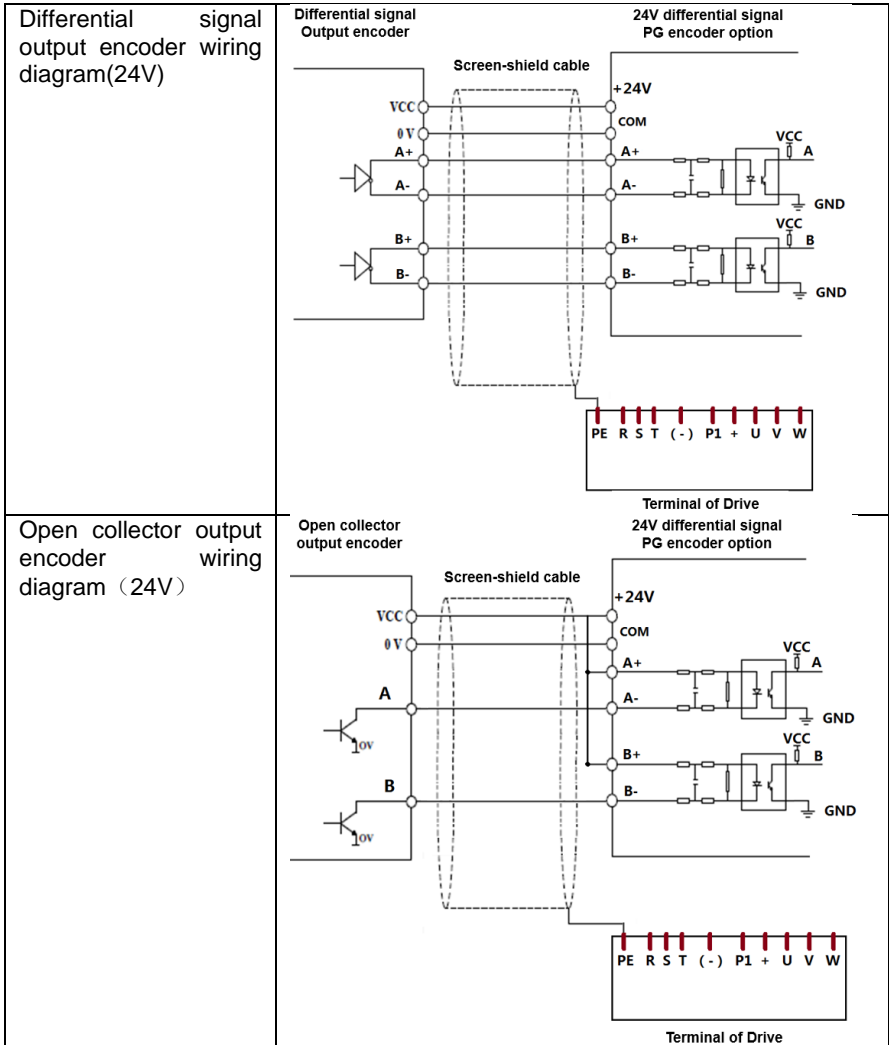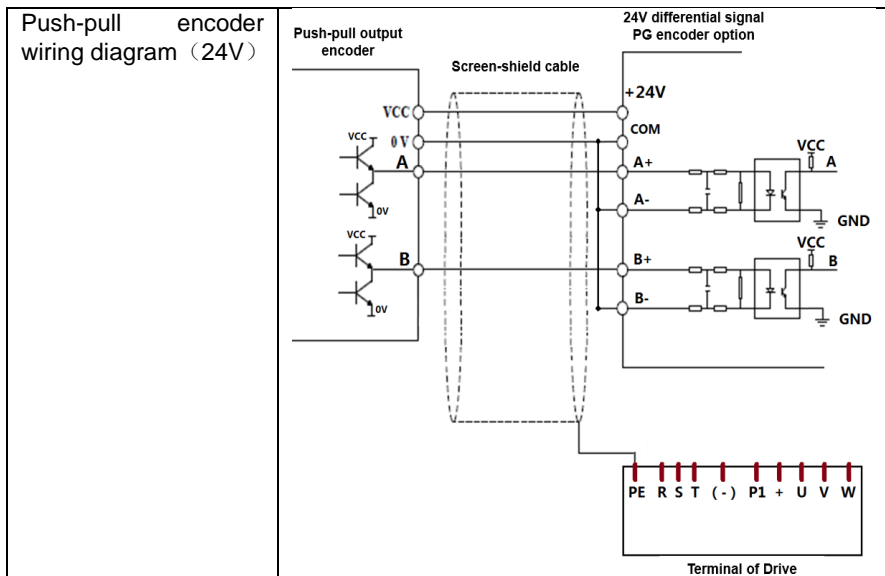
4) Modbus-RTU to CC-Link Communication Option

This communication board could realize the conversion between MODBUS-RTU and CC-Link of field bus, and it could be applied with VFD NE-300/600. The RS485 interface of the board works as the Modbus master while the CC-Link interface works as the slave. Please see User-Guide for details.

Technical features

1. Supports CC-Link Ver.2
2. CC-Link communication rate :(10M/5M/ 2.5M /625K/156Kbps)
3. Number of memory stations occupied by CC-Link communication: 3 stations (not modifiable)
4. CC-link communication extended loop station setting: 8 times (not modifiable)
5. Modbus function code supported by ModbusRTU communication board: 03/06
6. Modbus slave address read by ModbusRTU communication board: 1 (not modifiable)
7. Baud rate of ModbusRTU communication board: 19200bps (not modifiable)
8. ModbusRTU communication setting on the communication board: data bit is 8, even check, 1 stop bit (not modifiable)
9. Working voltage: 24VDC, 5VDC
10. Working environment temperature: -40 ~ 85℃, relative humidity: 5 ~ 95% (no condensation)
11. Storage temperature: -55 ~ 125℃
12. Installation: Fix it in the VFD with 3 pc of screws
13. Dimensions: 90.37*22*182(L * W * H, unit: mm)
14. Protection level: IP20

Function code	Name	Set Value
F0.02	Run command control mode settings	2
F0.03	Frequency setting 1	4
F0.04	Frequency setting 1	4
Fd.00	485 communication function	1
Fd.01	IP Address	1
Fd.02	Baud rate selection	4

5)   NEF-Profibus Communication Option

This communication board converts Modbus-RTU to Profibus-DP for NE300/600, the RS485 interface is Modbus Master, and Profibus-DP is slave. When using this module, engineers must also read NE300/600 user guides, specially the Modbus protocol part.

Technical features

1.   Supported Modbus function codes:03/06
2.   Support Profibus-DP V0
3.   Profibus-DP communication rates: adaptive(9.6Kbps-12Mbps)
4.   DP data area: 76 bytes input
                            14 bytes output

The output and input here are relative to PLC, the output 14 bytes(7 words)are outputs from PLC to drive registers, including 0001H~0004H(communication control word, communication reference, digital output setting, analog output setting) and EEPROM operation of address, data, enable bit, EEPROM operation can be used to write drive parameters like acceleration and deceleration time and maximum frequency with non-cycle mode.
Input 76 bytes are inputs from drive registers to PLC including 0001H~0004H,0020H~002FH,0030H~0039H, 8 bytes of DP communication error codes, and EEPROM operation (address, data, status, and error code).

5.   Modbus slave address:1(not modifiable)
6.   Modbus baud rate:19200bps (not modifiable)
7.   8 data bits, even parity check,1 stop bit (not modifiable)
8.   Working supply:24VDC,5VDC
9.   Ambient temperature: -40~85℃, humidity: 5~95% (no condensing)
10.   Storage temperature: -55~125℃
11.   Installation: fixed to CN3 of NE300/600 control board with 2 screws.
12.   Dimension: 90.37*22*182(Length*Width*Height, unit：mm)
13.   Protect level: IP20
14.   Certification: CE

Note: Drive parameters should be set before using this communication board, see below for details:

Parameters	Name	Value
F0.02	Run command control mode	2
F0.03	Frequency reference 1	4
Fd.00	485 communication enable	1
Fd.01	Communication address	1
Fd.02	Baud rate	4
Fd.03	Parity bit	0

6) Modbus-RTU to PROFINET Communication Option

This option is for NE-300/600 drive. The function is to convert communication protocol between Modbus-RTU and PROFINET. The option's RS485 is host of Modbus, PROFINET terminal is the slaver.

Technical features

1. Modbus function code：03/06
2. PROFINET is available
3. Modbus slaver address read：1 （Unchangeable）
4. Modbus baud rate：19200bps（Unchangeable）
5. Data bit is 8, even check, 1 stop bit（Unchangeable）
6. Voltage rated：24VDC、5VDC
7. Working environment temperature：-40～85℃，Humidity：5～95%（no condensation）
8. Storage temperature：-55～125℃
9. Installation：in drive with two screws
10. Dimensions：90.37*22*182(L*W*H, Unit：mm)
11. IP grade：IP20
12. Certification：CE

Note: Please setup the function codes before starting to work

Function code	Description	Value(Given)
F0.02	Run command control mode	2
F0.03	Frequency reference1	4
F0.04	Frequency reference2	4
Fd.00	485 Communication	1
Fd.01	Local address	1
Fd.02	Baud rate setup	4
Fd.03	Parity bit setup	0

7) Modbus-RTU to TCP Communication Option

This communication option realizes the interconversion between MODBUS-RTU protocol and MODbus-TCP, and is suitable for NE-300/600 drive. The RS485

interface of the board serves as MODBUS master station, and the RJ45 interface serves as Modbus-TCP server.

Technical features

1. MODBUS function code supported by network port: 03/04/06
2. Modbus-tcp default IP:192.168.1.100 (modifiable)
3. Network interface rate: 10M/100M adaptive
4. Modbus-tcp data area: input 84 bytes,
5. Output 14 bytes,
6. MODBUS function code supported by MODBUSRTU communication board: 03/06
7. Address of MODBUS slave station read by MODBUSRTU communication board: 1 (not modifiable)
8. MODBUSRTU communication Baud rate: 19200BPS (not modifiable)
9. MODBUSRTU communication setting on the communication board: data bit is 8, even check, 1 stop bit (not modifiable)
10. Working voltage: 24VDC, 5VDC
11. Working environment temperature: -40 ~ 85℃, relative humidity: 5 ~ 95% (no condensation)
12. Storage temperature: -55 ~ 125℃
13. Installation: Fix it in the inverter with 3 screws
14. Dimensions: 90.37*22*182(L * W * H, unit: MM)
15. Protection level: IP20

Function code	Description	Value (Given)
F0.02	Run command control mode setting	2
F0.03	Frequency setting 1	4
F0.04	Frequency setting 1	4
Fd.00	485 communication function	1
Fd.01	Address of the machine	1
Fd.02	Baud rate option	4
Fd.03	Parity selection	0

9.4 Guidance for reactor and filter selection

1、 Model description for reactor and filter

NE-OCL-0005-CL/4-1
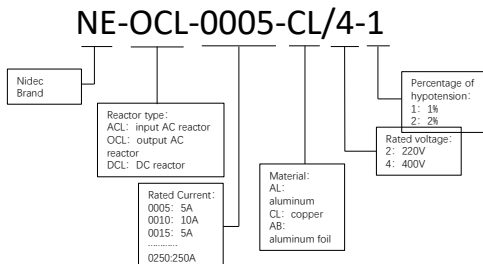
Fig. 9-6 Reactor model description

NE-EFI-0005/4-T
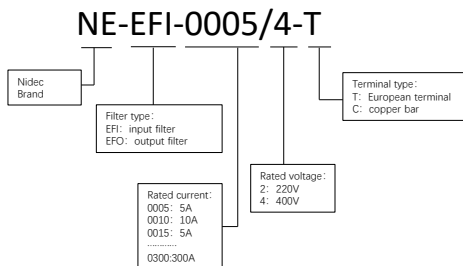
Fig. 9-7 Filter model description

9.4.1 Selection table for 380V AC output reactor (1% reactance rate)

Whether the output side of the inverter is equipped with AC output reactor is determined according to the specific situation. The transmission line between the inverter and the motor should not be too long, if the cable is too long , the distributed capacitance will be large, which is easy to produce high harmonic current.

Inverter model	Reactor model	Order number	Inductance (mH)	Rated Current (A)	Weight (Kg)	Dimension
NE200-4T0007G/0015B	NE-OCL-0005-CL/4-1	1006A021	1.4	5	1.7	See table 9-a
NE200-4T0022GB-M	NE-OCL-0007-CL/4-1	1006A022	1.0	7	1.8	
NE200-4T0040G/0055PB	NE-OCL-0010-CL/4-1	1006A023	0.7	10	1.85	
NE300-4T0055G/0075PB	NE-OCL-0015-AL/4-1	1006A024	0.455	15	2.5	
NE300-4T0075G/0110PB	NE-OCL-0020-AL/4-1	1006A025	0.35	20	2.5	
NE300-4T0110G/0150PB	NE-OCL-0030-AL/4-1	1006A026	0.235	30	3.5	
NE300-4T0150G/0185PB	NE-OCL-0040-AL/4-1	1006A027	0.175	40	5	
NE300-4T0185G/0220PB	NE-OCL-0050-AL/4-1	1006A028	0.14	50	5	
NE300-4T0220G/0300PB	NE-OCL-0060-AL/4-1	1006A029	0.12	60	6.5	
NE300-4T0300G/0370P	NE-OCL-0080-AL/4-1	1006A030	0.085	80	9	
NE300-4T0370G/0450P	NE-OCL-0090-AL/4-1	1006A031	0.08	90	9	
NE300-4T0450G/0550P	NE-OCL-0120-AL/4-1	1006A032	0.06	120	13	

NE300-4T0550G/0750P	NE-OCL-0150-AL/4-1	1006A033	0.048	150	15	See table
NE300-4T0750G/0900P	NE-OCL-0200-AL/4-1	1006A034	0.035	200	20	9-a
NE300-4T0900G/1100P	NE-OCL-0240-AB/4-1	1006A035	0.028	240	25	
NE300-4T1100G/1320P	NE-OCL-0250-AB/4-1	1006A036	0.028	250	25	

9.4.1.1   Dimension table for AC output reactor
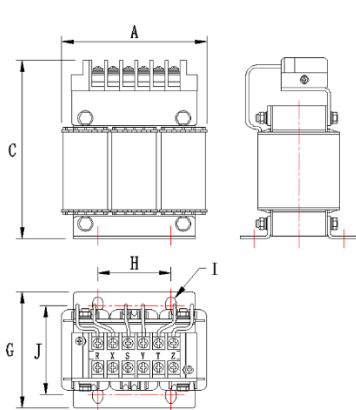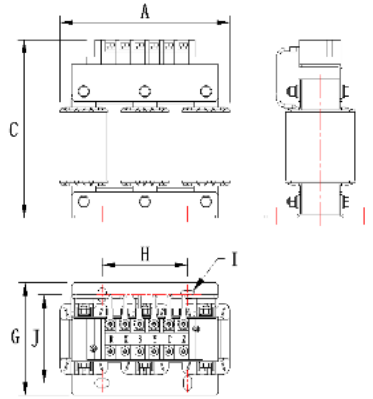
Fig.9-A   Fig. 9-B
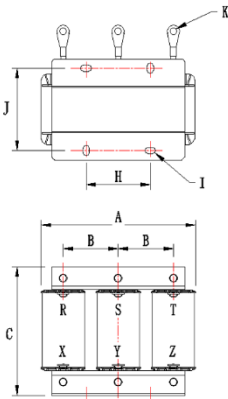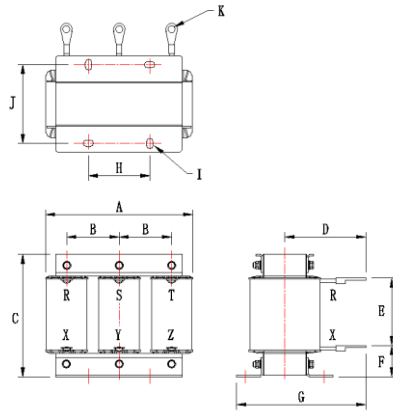
Fig.9-C   Fig.9-D
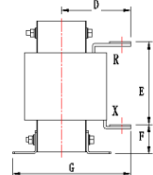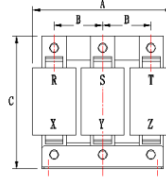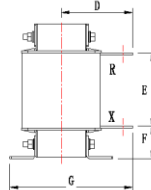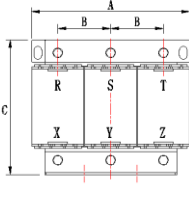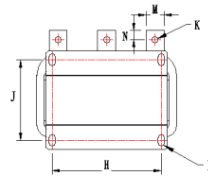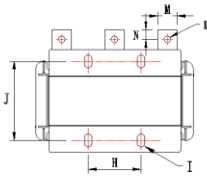
Fig.9-E   Fig.9-F

Table 9-a Dimension table of three phase output AC reactor

Reactor model	Rated Current (A)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Drawing NO.
NE-OCL-0005-CL/4-1	5	100Max	/	125Max	/	/	/	77±5	35±1	Φ7x12	59±2	/	/	/	/	
NE-OCL-0007-CL/4-1	7	100Max	/	125Max	/	/	/	77±5	35±1	Φ7x12	59±2	/	/	/	/	9-A
NE-OCL-0010-CL/4-1	10	100Max	/	125Max	/	/	/	77±5	35±1	Φ7x12	59±2	/	/	/	/	
NE-OCL-0015-AL/4-1	15	150Max	/	150Max	/	/	/	92±5	70±1	Φ7x12	72±2	/	/	/	/	
NE-OCL-0020-AL/4-1	20	150Max	/	150Max	/	/	/	92±5	70±1	Φ7x12	72±2	/	/	/	/	9-B
NE-OCL-0030-AL/4-1	30	180Max	/	170Max	/	/	/	88±5	70±1	Φ7x12	68±2	/	/	/	/	
NE-OCL-0040-AL/4-1	40	180Max	/	170Max	/	/	/	101±5	70±1	Φ7x12	81±2	/	/	/	/	
NE-OCL-0050-AL/4-1	50	180Max	60±5	140Max	85±10	66±5	39±5	135±10	70±1	Φ7x12	81±2	Φ8.3	/	/		9-C
NE-OCL-0060-AL/4-1	60	180Max	60±5	150Max	95±10	74±5	39±5	150±10	70±1	Φ7x12	90±2	Φ8.3	/	/		
NE-OCL-0080-AL/4-1	80	210Max	70±5	160Max	100±10	82±5	42±5	155±10	80±1	Φ7x12	91±2	Φ8.3	/	/		9-D
NE-OCL-0090-AL/4-1	90	210Max	70±5	160Max	100±10	82±5	42±5	155±10	80±1	Φ7x12	91±2	Φ8.3	/	/		
NE-OCL-0120-AL/4-1	120	245Max	80±5	210Max	93±10	110±5	50±5	160±10	80±1	Φ12x20	94±2	Φ11	/	30	15	
NE-OCL-0150-AL/4-1	150	245Max	80±5	210Max	93±10	110±5	50±5	160±10	80±1	Φ12x20	94±2	Φ11	/	30	15	9-E
NE-OCL-0200-AL/4-1	200	245Max	80±5	210Max	108±10	110±5	50±5	185±10	80±1	Φ12x20	120±2	Φ11	/	30	15	
NE-OCL-0240-AB/4-1	240	240Max	80±5	225Max	115±10	136±5	47±5	195±10	180±1	Φ11x20	132±2	Φ11	/	30	15	9-F
NE-OCL-0250-AB/4-1	250	240Max	80±5	225Max	115±10	136±5	47±5	195±10	180±1	Φ11x20	132±2	Φ11	/	30	15	

9.4.2   Selection table for 380V AC input reactor (2% reactance)

AC input reactor is mainly used to reduce the harmonic in the input current. As an option ,it can be externally installed. when the application environment has higher harmonic requirement, the reactor can be externally installed (for models above 200G,if the AC input reactor need to be configured, please ensure there is

enough installation space in the cabinet). The recommended type selection of input reactance is shown in the table below.

Inverter model	Reactor model	Order NO.	Inductance (mH)	Rated Current (A)	Weight (Kg)	Dimension
NE200-4T0007G/0015PB	NE-ACL-0005-CL/4-2	1006A004	2.8	5	1.7	
NE200-4T0022GB-M	NE-ACL-0007-CL/4-2	1006A005	2.0	7	1.8	
NE200-4T0040G/0055PB	NE-ACL-0010-CL/4-2	1006A007	1.4	10	1.85	
NE300-4T0055G/0075PB	NE-ACL-0015-AL/4-2	1006A008	0.93	15	2.5	
NE300-4T0075G/0110PB	NE-ACL-0020-AL/4-2	1006A009	0.7	20	2.5	
NE300-4T0110G/0150PB	NE-ACL-0030-AL/4-2	1006A010	0.47	30	3.5	
NE300-4T0150G/0185PB	NE-ACL-0040-AL/4-2	1006A011	0.35	40	5	See table 9-b
NE300-4T0185G/0220PB	NE-ACL-0050-AL/4-2	1006A012	0.28	50	5	
NE300-4T0220G/0300PB	NE-ACL-0060-AL/4-2	1006A013	0.24	60	6.5	
NE300-4T0300G/0370P	NE-ACL-0080-AL/4-2	1006A014	0.17	80	9	
NE300-4T0370G/0450P	NE-ACL-0090-AL/4-2	1006A015	0.16	90	9	
NE300-4T0450G/0550P	NE-ACL-0120-AL/4-2	1006A016	0.12	120	13	
NE300-4T0550G/0750P	NE-ACL-0150-AL/4-2	1006A017	0.095	150	15	
NE300-4T0750G/0900P	NE-ACL-0200-AL/4-2	1006A018	0.07	200	20	
NE300-4T0900G/1100P	NE-ACL-0240-AB/4-2	1006A019	0.056	240	25	
NE300-4T1100G/1320P	NE-ACL-0250-AB/4-2	1006A020	0.056	250	25	

9.4.2.1　Product dimension chart for AC input reactor
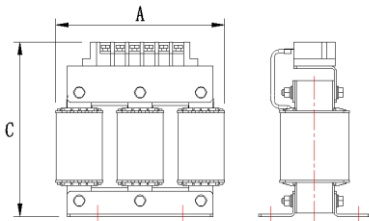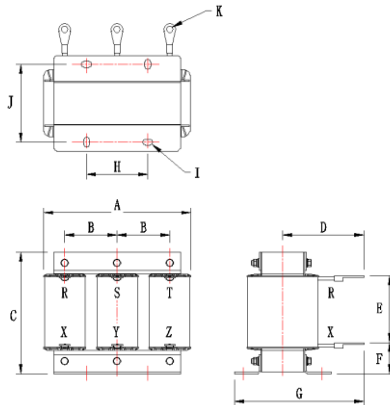
Fig.9-G　　　　　　　　　　Fig.9-H
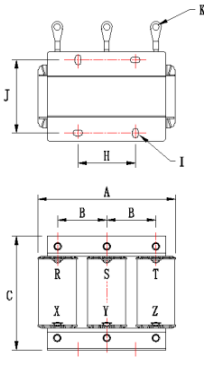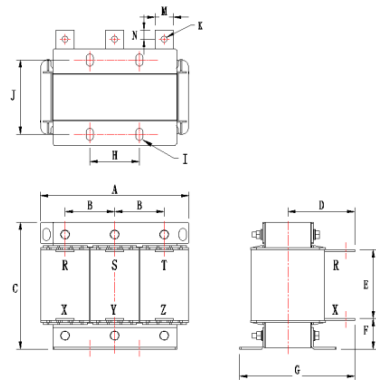
Fig.9-J   Fig.9-K
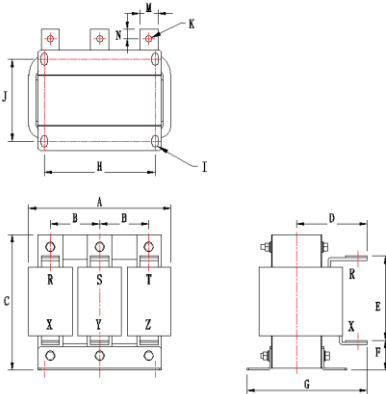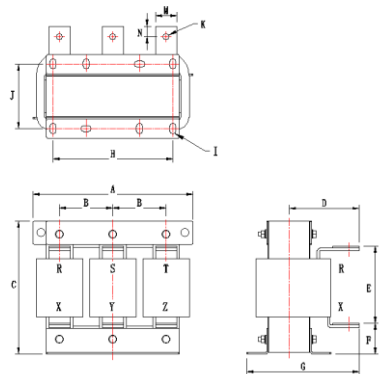
Fig.9-L   Fig.9-M

Table 9-b Dimension table for three phase input reactors

Reactor model	Rated Current (A)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Drawing NO.
NE-ACL-0005-CL/4-2	5	100Max	/	125Max	/	/	/	77±5	35±1	Φ7x12	59±2	/	/	/	/	
NE-ACL-0007-CL/4-2	7	100Max	/	125Max	/	/	/	77±5	35±1	Φ7x12	59±2	/	/	/	/	9-G
NE-ACL-0010-CL/4-2	10	100Max	/	125Max	/	/	/	77±5	35±1	Φ7x12	59±2	/	/	/	/	
NE-ACL-0015-AL/4-2	15	150Max	/	150Max	/	/	/	92±5	70±1	Φ7x12	72±2	/	/	/	/	
NE-ACL-0020-AL/4-2	20	150Max	/	150Max	/	/	/	92±5	70±1	Φ7x12	72±2	/	/	/	/	9-H
NE-ACL-0030-AL/4-2	30	180Max	/	170Max	/	/	/	88±5	70±1	Φ7x12	68±2	/	/	/	/	
NE-ACL-0040-AL/4-2	40	180Max	/	170Max	/	/	/	101±5	70±1	Φ7x12	81±2	/	/	/	/	
NE-ACL-0050-AL/4-2	50	180Max	60±5	140Max	85±10	66±5	39±5	135±10	70±1	Φ7x12	81±2	Φ8.3	/	/	/	9-J
NE-ACL-0060-AL/4-2	60	180Max	60±5	150Max	95±10	74±5	39±5	150±10	70±1	Φ7x12	90±2	Φ8.3	/	/	/	
NE-ACL-0080-AL/4-2	80	210Max	70±5	160Max	100±10	82±5	42±5	155±10	80±1	Φ7x12	91±2	Φ8.3	/	/	/	9-K
NE-ACL-0090-AL/4-2	90	210Max	70±5	160Max	100±10	82±5	42±5	155±10	80±1	Φ7x12	91±2	Φ8.3	/	/	/	
NE-ACL-0120-AL/4-2	120	245Max	80±5	210Max	93±10	110±5	50±5	160±10	80±1	Φ12x20	94±2	Φ11	/	30	15	
NE-ACL-0150-AL/4-2	150	245Max	80±5	210Max	93±10	110±5	50±5	160±10	80±1	Φ12x20	94±2	Φ11	/	30	15	9-L
NE-ACL-0200-AL/4-2	200	245Max	80±5	210Max	108±10	110±5	50±5	185±10	80±1	Φ12x20	120±2	Φ11	/	30	15	
NE-ACL-0240-AB/4-2	240	240Max	80±5	225Max	115±10	136±5	47±5	195±10	180±1	Φ11x20	132±2	Φ11	/	30	15	9-M

NE-ACL-0250-AB/4-2	250	240Max	80±5	225Max	115±10	136±5	47±5	195±10	180±1	Φ11x20	132±2	Φ11	/	30	15

9.4.3   Selection table of DC reactor for 400V inverter

Inverter model	Reactor model	Order NO.	Inductance (mH)	Rated Current (A)	Weight (Kg)	Dimension
NE300-4T0300G/0370P	NE-DCL-0065-AL/4	1006A048	0.8	65	6	See table 9-c
NE300-4T0370G/0450P	NE-DCL-0078-AL/4	1006A049	0.7	78	8	
NE300-4T0450G/0550P	NE-DCL-0095-AL/4	1006A050	0.54	95	9.5	
NE300-4T0550G/0750P	NE-DCL-0115-AL/4	1006A051	0.45	115	11	
NE300-4T0750G/0900P	NE-DCL-0160-AL/4	1006A052	0.36	160	16	
NE300-4T0900G/1100P	NE-DCL-0180-AL/4	1006A053	0.33	180	16	
NE300-4T1100G/1320P	NE-DCL-0250-AB/4	1006A054	0.26	250	25	

9.4.3.1   Product dimension chart for DC reactor
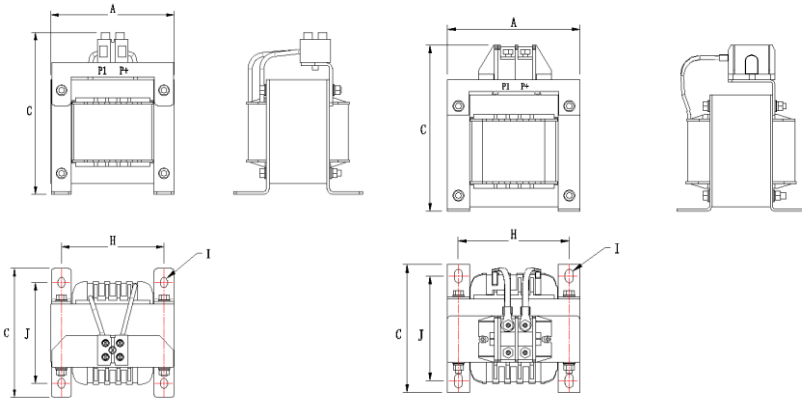
Fig.9-N   Fig.9-P
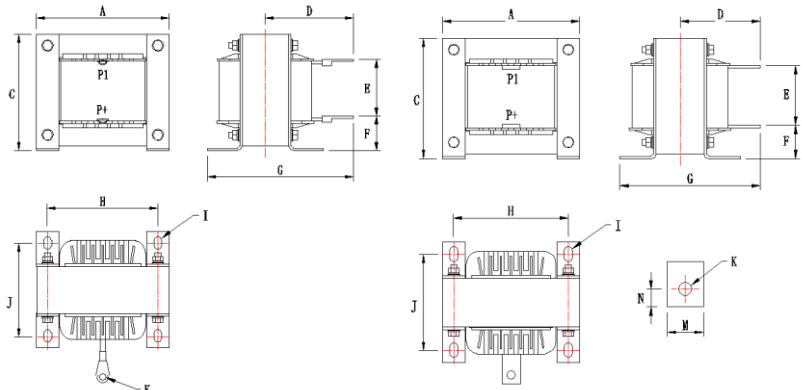
Fig.9-Q   Fig.9-R
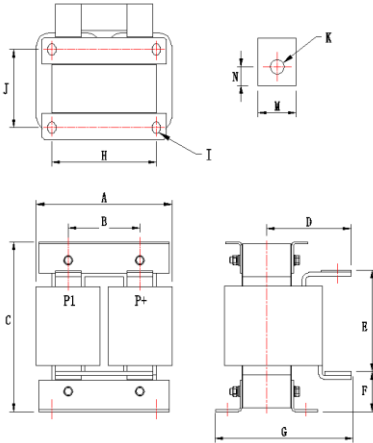
Fig. 9-S

Table 9-c　　Dimension table for DC reactor

Reactor model	Rated Current (A)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Dimension
NE-DCL-0003-AL/4	3	57±5	/	85±5	/	/	/	88±5	47.5±1	Φ4.5x7	68±2	/	/	/	/	
NE-DCL-0005-AL/4	5	76±5	/	105±5	/	/	/	76±5	64±1	Φ5x8	56±2	/	/	/	/	
NE-DCL-0006-AL/4	6	76±5	/	105±5	/	/	/	76±5	64±1	Φ5x8	56±2	/	/	/	/	9-N
NE-DCL-0010-AL/4	10	76±5	/	105±5	/	/	/	105±5	64±1	Φ5x8	85±2	/	/	/	/	
NE-DCL-0012-AL/4	12	76±5	/	105±5	/	/	/	105±5	64±1	Φ5x8	85±2	/	/	/	/	
NE-DCL-0020-AL/4	20	114±5	/	145±5	/	/	/	110±5	95±1	Φ7x12	90±2	/	/	/	/	
NE-DCL-0023-AL/4	23	114±5	/	145±5	/	/	/	110±5	95±1	Φ7x12	90±2	/	/	/	/	
NE-DCL-0025-AL/4	25	114±5	/	145±5	/	/	/	115±5	95±1	Φ7x12	95±2	/	/	/	/	
NE-DCL-0030-AL/4	30	114±5	/	145±5	/	/	/	115±5	95±1	Φ7x12	95±2	/	/	/	/	9-P
NE-DCL-0033-AL/4	33	114±5	/	145±5	/	/	/	115±5	95±1	Φ7x12	95±2	/	/	/	/	
NE-DCL-0035-AL/4	35	114±5	/	145±5	/	/	/	110±5	95±1	Φ7x12	90±2	/	/	/	/	
NE-DCL-0040-AL/4	40	114±5	/	145±5	/	/	/	110±5	95±1	Φ7x12	90±2	/	/	/	/	
NE-DCL-0050-AL/4	50	114±5	/	100±5	105±10	55±5	32±5	165±10	95±1	Φ7x12	105±2	Φ8.3	/	/	/	
NE-DCL-0065-AL/4	65	114±5	/	100±5	110±10	55±5	32±5	180±10	95±1	Φ7x12	120±2	Φ8.3	/	/	/	9-Q
NE-DCL-0078-AL/4	78	133±5	/	115±5	120±10	65±5	35±5	190±10	111±1	Φ7x12	120±2	Φ8.3	/	/	/	
NE-DCL-0095-AL/4	95	133±5	/	115±5	130±10	65±5	35±5	205±10	111±1	Φ7x12	135±2	Φ8.3	/	/	/	
NE-DCL-0115-AL/4	115	168±5	/	145±5	115±10	74±5	37±5	185±10	140±1	Φ8x14	120±2	φ11	/	30	15	
NE-DCL-0160-AL/4	160	168±5	/	145±5	125±10	74±5	37±5	205±10	140±1	Φ8x14	140±2	φ11	/	30	15	9-R
NE-DCL-0180-AL/4	180	168±5	/	145±5	125±10	74±5	37±5	205±10	140±1	Φ8x14	140±2	φ11		30	15	
NE-DCL-0250-AB/4	250	210Max	110±5	265Max	126±10	161±5	57±5	205±10	160±1	11x20	120±2	φ13	/	40	20	9-S

9.4.4　　Selection table for input filter

This series of filters can meet the CE certification EN 61800-3 C2 emission requirements. The filter must be reliably grounded, and length of the connecting cable between the filter and the inverter must be less than 30cm.

Inverter model	Filter model	Order NO.	Filter	Rated Current	Weight	Dimension

			Power (Kw)	(A)	(Kg)	
NE200-4T0007G/0015PB	NE-EFI-0005/4-T	1305A003	0.75-1.5	5	0.75	See table 9-d
NE200-4T0022G/0040PB	NE-EFI-0010/4-T	1305A005	2.2-3.7	10	0.75	
NE200-4T0040G/0055PB	NE-EFI-0015/4-T	1305A006	5.5	15	1.2	
NE300-4T0055G/0075PB	NE-EFI-0016/4-T	1305A007	7.5	16	1.2	
NE300-4T0075G/0110PB	NE-EFI-0020/4-T	1305A008	11	20	2.8	
NE300-4T0110G/0150PB	NE-EFI-0030/4-T	1305A009	15	30	3.0	
NE300-4T0150G/0185PB	NE-EFI-0045/4-T	1305A010	18.5	45	3.0	
NE300-4T0185G/0220PB	NE-EFI-0050/4-T	1305A011	22	50	3.0	
NE300-4T0220G/0300PB	NE-EFI-0060/4-T	1305A012	30	60	4.5	
NE300-4T0300G/0370P	NE-EFI-0080/4-T	1305A013	37	80	4.5	
NE300-4T0450G/0550P	NE-EFI-0100/4-T	1305A014	45	100	4.5	
NE300-4T0550G/0750P	NE-EFI-0120/4-T	1305A015	55	120	4.5	
NE300-4T0750G/0900P	NE-EFI-0150/4-T	1305A016	75	150	7.5	
NE300-4T0900G/1100P	NE-EFI-0200/4-T	1305A017	90	200	8.2	
NE300-4T1100G/1320P	NE-EFI-0300/4-C	1305A018	110-160	300	14.5	

9.4.4.1　Dimension chart for input filter
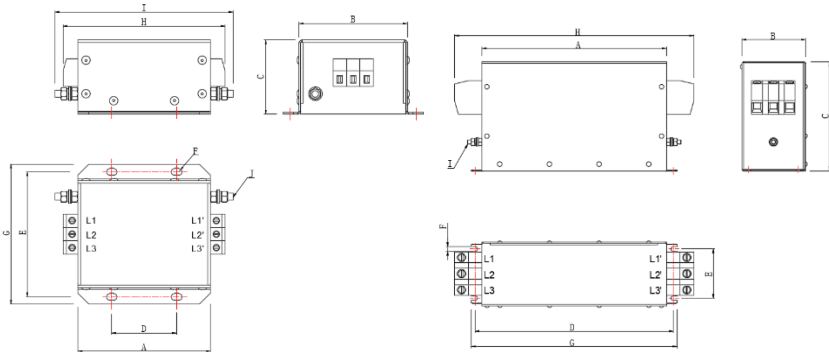
Fig.9-T　　　　　　　　　Fig.9-U
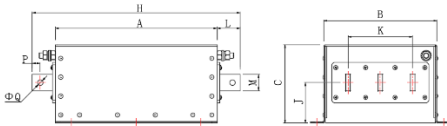
Fig.9-W

Table 9-d Dimension table for input filter

Filter model	Rated Current (A)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	Drawing NO.

Model																		Dim
NE-EFI-0005/4-T	5	98	80	55	48±0.5	93±0.5	Φ5×8	104	119.8±1	135Max	M5	/	/	/	/	/	/	9-T
NE-EFI-0010/4-T	10	98	80	55	48±0.5	93±0.5	Φ5×8	104	119.8±1	135Max	M5	/	/	/	/	/	/	
NE-EFI-0015/4-T	15	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFI-0016/4-T	16	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFI-0020/4-T	20	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFI-0025/4-T	25	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFI-0030/4-T	30	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	9-U
NE-EFI-0045/4-T	45	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	
NE-EFI-0050/4-T	50	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	
NE-EFI-0060/4-T	60	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	
NE-EFI-0080/4-T	80	260	90	155	280±1	70±1	6.5	290	337±2	M6	/	/	/	/	/	/	/	
NE-EFI-0100/4-T	100	260	90	155	280±1	70±1	6.5	290	337±2	M6	/	/	/	/	/	/	/	
NE-EFI-0120/4-T	120	260	90	155	280±1	70±1	6.5	290	337±2	M6	/	/	/	/	/	/	/	
NE-EFI-0150/4-T	150	350	120	170	365±1	90±1	6.5	380	449±2	M10	/	/	/	/	/	/	/	
NE-EFI-0200/4-T	200	350	120	170	365±1	90±1	6.5	380	449±2	M10	/	/	/	/	/	/	/	
NE-EFI-0250/4-C	250	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	25	6	15	Φ10.5	9-W
NE-EFI-0300/4-C	300	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	25	6	15	Φ10.5	
NE-EFI-0400/4-C	400	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	25	6	15	Φ10.5	
NE-EFI-0500/4-C	500	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	30	8	15	Φ10.5	
NE-EFI-0600/4-C	600	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	30	8	15	Φ10.5	
NE-EFI-0800/4-C	800	350	230	170	290±1	255±1	Φ12	M12	456±2	280	80	120	53	40	10	20	Φ14	
NE-EFI-1000/4-C	1000	350	230	170	290±1	255±1	Φ12	M12	456±2	280	80	120	53	40	10	20	Φ14	
NE-EFI-1200/4-C	1200	350	230	170	290±1	255±1	Φ12	M12	456±2	280	80	120	53	40	10	20	Φ14	

9.4.5   Selection table for output filter

Inverter model	Filter model	Order NO.	Filter Power (Kw)	Rated Current (A)	Weight (Kg)	Dimension
NE200-4T0007G/0015PB	NE-EFO-0005/4-T	1305A019	0.75-1.5	5	0.75	See table 9-e
NE200-4T0022G/0040PB	NE-EFO-0010/4-T	1305A020	2.2-3.7	10	0.75	
NE200-4T0040G/0055PB	NE-EFO-0016/4-T	1305A022	5.5	16	1.2	
NE300-4T0055G/0075PB	NE-EFO-0016/4-T	1305A022	5.5	16	1.2	
NE300-4T0075G/0110PB	NE-EFO-0020/4-T	1305A023	7.5	20	1.2	
NE300-4T0110G/0150PB	NE-EFO-0030/4-T	1305A024	11	30	2.8	
NE300-4T0150G/0185PB	NE-EFO-0045/4-T	1305A025	15	45	3.0	
NE300-4T0185G/0220PB	NE-EFO-0050/4-T	1305A026	18.5	50	3.0	
NE300-4T0220G/0300PB	NE-EFO-0060/4-T	1305A027	22	60	3.0	
NE300-4T0300G/0370P	NE-EFO-0080/4-T	1305A028	37	80	4.5	
NE300-4T0450G/0550P	NE-EFO-0100/4-T	1305A029	45	100	4.5	
NE300-4T0550G/0750P	NE-EFOI-0120/4-T	1305A030	55	120	4.5	
NE300-4T0750G/0900P	NE-EFO-0150/4-T	1305A031	75	150	7.5	
NE300-4T0900G/1100P	NE-EFO-0200/4-T	1305A032	90	200	8.2	
NE300-4T1100G/1320P	NE-EFO-0300/4-C	1305A033	110-160	300	14.5	

9.4.5.1 Dimension chart for output filter
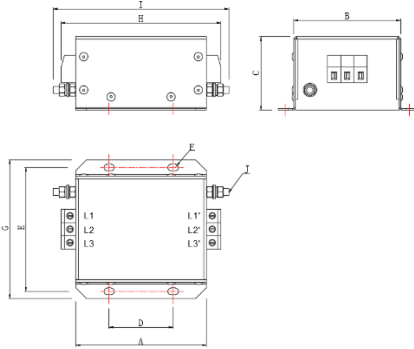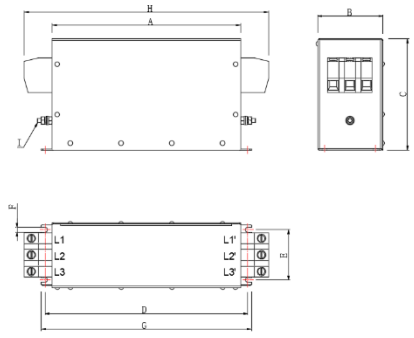
Fig. 9-X   Fig. 9-Y
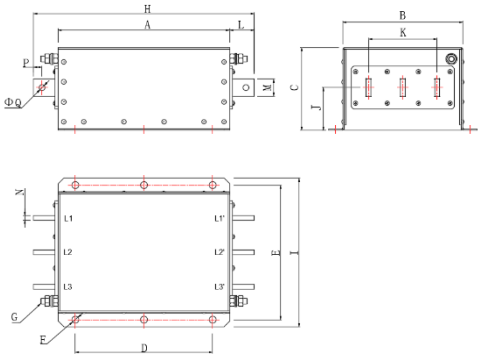
Fig. 9-Z

Table 9-e   Dimension table for output filter

Filter Model	Rated Current (A)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	Drawing NO.
NE-EFO-0005/4-T	5	98	80	55	48±0.5	93±0.5	Φ5×8	104	119.8±1	135Max	M5	/	/	/	/	/	/	9-X
NE-EFO-0010/4-T	10	98	80	55	48±0.5	93±0.5	Φ5×8	104	119.8±1	135Max	M5	/	/	/	/	/	/	
NE-EFO-0015/4-T	15	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFO-0016/4-T	16	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFO-0020/4-T	20	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFO-0025/4-T	25	130	82	60	51±0.5	95±0.5	Φ6×9	106	151.8±1	164Max	M5	/	/	/	/	/	/	
NE-EFO-0030/4-T	30	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	9-Y
NE-EFO-0045/4-T	45	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	
NE-EFO-0050/4-T	50	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	
NE-EFO-0060/4-T	60	220	80	135	235±1	58±1	5.5	250	251±2	M6	/	/	/	/	/	/	/	
NE-EFO-0080/4-T	80	260	90	155	280±1	70±1	6.5	290	337±2	M6	/	/	/	/	/	/	/	
NE-EFO-0100/4-T	100	260	90	155	280±1	70±1	6.5	290	337±2	M6	/	/	/	/	/	/	/	
NE-EFO-0120/4-T	120	260	90	155	280±1	70±1	6.5	290	337±2	M6	/	/	/	/	/	/	/	
NE-EFO-0150/4-T	150	350	120	170	365±1	90±1	6.5	380	449±2	M10	/	/	/	/	/	/	/	
NE-EFO-0200/4-T	200	350	120	170	365±1	90±1	6.5	380	449±2	M10	/	/	/	/	/	/	/	

NE-EFO-0250/4-C	250	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	25	6	15	Φ10.5	
NE-EFO-0300/4-C	300	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	25	6	15	Φ10.5	
NE-EFO-0400/4-C	400	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	25	6	15	Φ10.5	
NE-EFO-0500/4-C	500	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	30	8	15	Φ10.5	9-Z
NE-EFOI-0600/4-C	600	300	210	145	240±1	235±1	Φ12	M10	386±2	260	75	120	43	30	8	15	Φ10.5	
NE-EFO-0800/4-C	800	350	230	170	290±1	255±1	Φ12	M12	456±2	280	80	120	53	40	10	20	Φ14	
NE-EFO-1000/4-C	1000	350	230	170	290±1	255±1	Φ12	M12	456±2	280	80	120	53	40	10	20	Φ14	
NE-EFO-1200/4-C	1200	350	230	170	290±1	255±1	Φ12	M12	456±2	280	80	120	53	40	10	20	Φ14	

A

Appendix A: 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.

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) ……… Data(0)	2×N data, this is the main content of Modbus communication.
Error check	CRC check
End	The End space of frame is 3.5 characters or above

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:

1)   RTU 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

2)   RTU 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:

3)   RTU 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

4)   RTU 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:

5)   RTU 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

6) RTU 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

7) 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

8) Error code and Abnormal function code

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

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.

1) 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 0002H: Reverse rotation 0003H: Stop 0004H: Coast to stop 0005H: Fault reset	W
Communication Setting	0002H	Range(-10000~10000) 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	W/R

Function description	Register Address	Data definition and instruction	R/W
		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 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	R
Fault Content	0021H	0: NULL 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 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	R

Function description	Register Address	Data definition and instruction	R/W
		24: ③EF2 Terminal closing fault	
		25: ③PIDE PID feedback offline fault	
		26: ③OLP2 Overload pre-alarm	
Warning Content	0022H	0：No warning 1：uu Bus under voltage warning 2：OLP2Drive overload warning 3：OH2Drive overheat warning 4：SF3Output Terminal function selection 10 not reach to 3	R
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
	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:	R

Function description	Register Address	Data definition and instruction	R/W
		Valid	
	003CH	X8 terminal status 0: Invalid 1: Valid	R
	003DH	Reserved	R

2) NE200 Terminals status (0030H) definition.
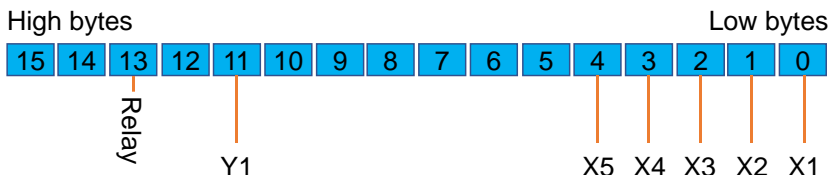
3) NE300 Terminals status (0030H) definition.
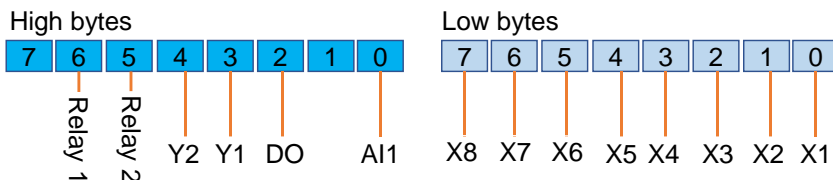
4) CRC16 calculation method

```
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
```

B

Appendix B: Adapted encoder instruction
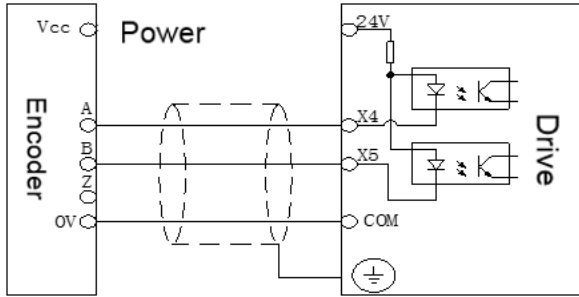
Fig B-1

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.
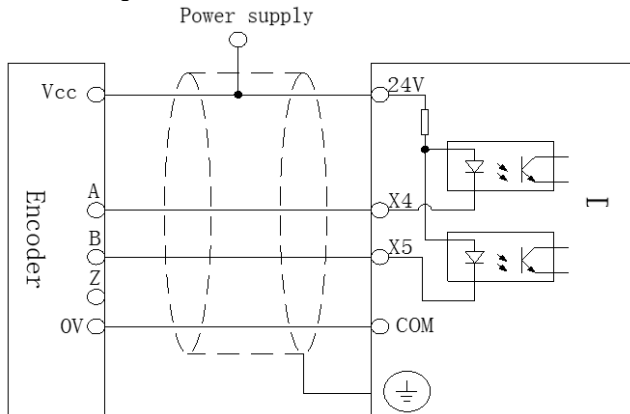
Fig. B-2

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.

C

Appendix C 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.

Code	Description	Setting range	Default	Mo dify	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
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					
F6.01	X1 terminal Function selection		1	×	0701H
F6.02	X2 terminal Function selection		2	×	0702H
F6.03	X3 terminal Function selection		8	×	0703H
F6.04	X4 terminal Function selection	55: Zero servo enable	17	×	0704H
F6.05	X5 terminal Function selection		18	×	0705H
F6.06	③X6 terminal Function selection ②AI1 terminal function selection		0	×	0706H

F6.07	③X7 terminal Function selection ②AI2 terminal function selection		0	×	0707H
F6.08	②Reserve ③X8 terminal function selection		Reserved	-	0708H
F6.09	②Reserve ③AI1 terminal function selection		Reserved	-	0709H
F7 Output terminal					
F7.19 ~F7.21	Ao1/Ao2/Pulse output	15: Speed loop output signal (given Iq), range: -150.0-150.0%		0	
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
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. 2：Output current 3：Output power 4：Bus voltage 5：Output voltage 6：Torque 7：Rotary speed	0	o	0E15H
Fd.22	ID2 data transmitting 2		2	o	0E16H
Fd.23	ID2 data transmitting 3		5	o	0E17H
Fd.24	ID2 data transmitting 4	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	12	o	0E18H
FF Running History Record					
FF.00	Fault type	CnE1: Fault is the CAN communication interrupting	-	-	1000H
FF.16	Fault code of resolver encoder	0x0~0xFFFF	0x0000	-	1010H

CAN instructions

CAN ID1 sends/receives data in fixed formats, as shown in the following table. As a multi-motor synchronization, it is necessary to reduce the transmission time interval of the master to increase the response speed (recommended being less than 1.5ms), and the transmission interval of the slave can be appropriately increased.

Byte0	Bit0: Run signal 1: Run 0: Stop Bit1: Direction signal 1: Inversion 0: Forward Bit2: Fault signal 1: Fault 0: No fault Bit3-Bit7: Reserved
Byte1	Frequency signal: range: -20000-20000, 20000 corresponds to the maximum frequency, and -20000 corresponds to the maximum negative frequency. Note: Byte1 is 8 bits higher and Byte2 is 8 bits lower
Byte2	
Byte3	Actual feedback speed: range: -20000-20000, 20000 corresponds to the maximum frequency, and -20000 corresponds to the maximum negative frequency. Note: Byte3 is 8 bits higher and Byte4 is 8 bits lower
Byte4	
Byte5	Current loop Iq given signal: -8192 - 8192, 4096 corresponds to

Byte6	the rated torque current of the motor (the sender outputs signals to the speed loop). Note: Byte5 is 8 bits higher and Byte6 is 8 bits lower
Byte7	Reserved

The data format sent by CAN ID2 is in the following table, which mainly includes some status information of this machine.

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Data 1 (Byte0 is 8 bits higher and Byte1 is 8 bits lower)		Data 2 (Byte2 is 8 bits higher and Byte3 is 8 bits lower)		Data 3 (Byte4 is 8 bits higher and Byte5 is 8 bits lower)		Data 4 (Byte6 is 8 bits higher and Byte7 is 8 bits lower)	

Fault code of resolver encoder

Resolver encoder Fault code	
Bit 0	Resolver fault
Bit 8	Fault of the encoder direction
Bit9	Fault of AB phase interrupting
Bit10	Fault of Z phase interrupting
Bit11	Fault of WVW interrupting
Bit12	Loss speed fault
---	---
---	---

D

Appendix D 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	Modbus Address
F0.00	②Reserved	Reserved	Reserved	-	0100H
F0.00	③Drive type display	0~1	0	×	0100H
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	×	0101H
	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	×	0101H
F0.02	Run command control mode	0: Keypad control 1: Terminal control 2: Communication control	0	○	0102H
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	0	○	0103H

Code	Description	Setting range	Default	Mod ify	Modbus Address
		6: PLC 7: PID 8: Keypad potentiometer			
F0.04	Frequency reference2 (Freq. ref.2)	1: AI1 2: AI2 3: PULSE setup 4: Communication 5:MS (Multi-step) Speed 6: 7: Reserved Reserved 8: Keypad potentiometer	1	○	0104H
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	○	0105H
F0.06	UP/DOWN Preset freq.	0~ Max frequency	50.00Hz	○	0106H
F0.07	Terminal UP/ DOWN rate	0.01~ 50.00Hz/s	1.00Hz/s	○	0107H
F0.08	UP/DOWN function source select	0: Keypad and terminal 1: Keypad 2: Terminal	1	○	0108H
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	○	0109H
F0.10	Basic frequency	0.10 ~ 550.0Hz	50.00Hz	×	010AH
F0.11	Max frequency	MAX[50.00Hz, Freq. upper limit, Reference frequency]~550.0Hz	50.00Hz	×	010BH
F0.12	Freq. upper limit	Freq. lower limit ~ Max frequency	50.00Hz	×	010CH
F0.13	Freq. lower limit	0.00~Frequency upper limit	0.00Hz	×	010DH
F0.14	Max output voltage	110~440V	Depend on model	×	010EH

Code	Description	Setting range	Default	Modify	Modbus Address
F0.15	Carrier freq.	1.0~16.0KHz	Depend on model	○	010FH
F0.16	Carrier freq. auto-adjust	0: disable 1: able	0	○	0110H
F0.17	Keypad direction	0: Forward 1: Reverse	0	○	0111H
F0.18	Motor wiring direction	0: Positive sequence 1: Reversed sequence	0	✕	0112H
F0.19	Acc. time1	0.1 ~ 3600s	Depend on model	○	0113H
F0.20	Dec. time1	0.1 ~ 3600s	Depend on model	○	0114H

Group F1: Start and stop control

Code	Description	Setting range	Default	Modify	Modbus Address
F1.00	②Start mode	0: Start directly 1: DC injection brake first and then start at start freq.	0	○	0200H
	③Start mode	0: Start directly 1: DC injection brake first and then start at start freq. 2: Speed tracking and start	0	○	0200H
F1.01	Start freq.	0.10~60.00Hz	0.50Hz	○	0201H
F1.02	Start freq. hold time	0.0~10.0s	0.0s	○	0202H
F1.03	②DC brake current at start	G: 0.0~100.0% rated current	0.00%	○	0203H
F1.03	③DC brake current at start	G: 0.0~100.0% rated current P: 0.0~80.0% rated current	0.00%	○	0203H
F1.04	DC brake time at start	0.0～30.0s	0.0s	○	0204H
F1.05	Acc./Dec. mode	0: Linear 1: S-curve	0	○	0205H
F1.06	Time of S-curve initial stage	10.0～50.0% (Acc./ Dec. time) F1.06+F1.07≤90%	30.00%	○	0206H
F1.07	Time of S-curve rising stage	10.0~80.0%（Acc./ Dec. time）F1.06+F1.07≤90%	40.00%	○	0207H
F1.08	Stop mode	0: Deceleration to stop 1: Coast to stop	0	✕	0208H

Code	Description	Setting range	Default	Modify	Modbus Address
		2: Deceleration +DC braking			
F1.09	DC brake trigger frequency at stop	0.00～550.0Hz	0.00Hz	○	0209H
F1.10	DC brake waiting time at stop	0.00～10.00s	0.00s	○	020AH
F1.11	②DC brake current at stop	0.0~100% rated current	0.00%	○	020BH
	③DC brake current at stop	Type G: 0.0~100.0% rated current Type P: 0.0~80.0% rated current	0.00%	○	020BH
F1.12	DC brake time at stop	0.0～30.0s	0.0s	○	020CH
F1.13	Energy consumption brake validity	0: Disabled 1: Enabled	0	○	020DH
F1.14	Energy consumption brake action voltage	380V: 650~750V 220V: 360~390V	700V 380V	○	020EH
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 only valid for terminal 2-wires mode. Fault restart is invalid for under-voltage fault.	0	○	020FH
F1.16	Waiting time for restart	0.0～3600s	2.0s	○	0210H
F1.18	Reserved	Reserved	0	○	0212H
③ F1.19	Speed start interval	0.0~36.0ms	3.0s	○	0213H

Group F2: Auxiliary running function

Code	Description	Setting range	Default	Modify	Modbus Address

Code	Description	Setting range	Default	Modify	Modbus Address
F2.00	Jog running freq.	0.0～50.00Hz	5.00Hz	○	0300H
F2.01	Jog Acc. time	②0.0～360.0s ③0.0~3600.0s	6.00s② 20.0s③	○	0301H
F2.02	Jog Dec. time	②0.1～360.0s ③0.1~3600.0s	6.00s② 20.0s③	○	0302H
F2.03	Acc. time2	②0.1～360.0s ③0.1~3600.0s	6.00s② 20.0s③	○	0303H
F2.04	Dec. time2	②0.1～360.0s ③0.1~3600.0s	6.00s② 20.0s③	○	0304H
F2.05	Acc. time3	②0.1～360.0s ③0.1~3600.0s	6.00s② 20.0s③	○	0305H
F2.06	Dec. time3	②0.1～360.0s ③0.1~3600.0s	6.00s② 20.0s③	○	0306H
F2.07	Acc. time4	②0.1～360.0s ③0.1~3600.0s	6.00s② 20.0s③	○	0307H
F2.08	Dec. time4	②0.1～360.0s ③0.1~3600.0s	6.00s② 20.0s③	○	0308H
F2.09	②Reserved	Reserved	Reserved	Reserved	0309H
	③Skip freq. 1	0.00~320.0Hz	0.00Hz	×	0309H
F2.10	③Skip freq. 2	0.00～320.0Hz	0.00Hz	×	030AH
F2.11	Skip freq. amplitude	0.00～15.00Hz	0.00Hz	×	030BH
F2.12	Anti-Reverse control	0: Reverse rotation allowed 1: Reverse rotation not allowed	0	○	030CH
F2.13	Fwd/ Rev switch dead-zone time	0.0～3600s	0.0s	○	030DH
F2.14	Freq. lower-limit treatment	0: Run with frequency lower limit 1: Zero frequency operation	0	×	030EH
F2.15	Reserved	Reserved	0	×	
F2.16	③Energy-saving control select	0: Disable 1: Enable	1	○	0310H
F2.17	AVR Function	0: Disabled 1: Enabled 2: Disabled only at	2	×	0311H

Code	Description	Setting range	Default	Modify	Modbus Address
		speed-down			
F2.18	Over modulation	0: Enabled 1: Disabled	1	×	0312H
F2.19	③Droop control	0.00~10.00Hz	0.00Hz	○	0313H
F2.20	Fan control mode	0: Auto mode 1: Always Running	0	×	0314H
F2.21	Instant-power-failure treatment	0: Disabled ②1: Drop frequency (Reserved) ③1: Drop frequency 2: Stop directly	0	○	0315H
F2.22	Instant-power-failure freq. drop point	210~600V	380V:420V 220V:230V	○	0316H
F2.23	Instant-power failure freq. drop rate	1-800	400	○	0317H
F2.24	Motor speed display ratio	0.00~500.0%	100.00%	○	0318H
F2.25	UP/DOWN drop to minus frequency	0: Enabled 1: Disable	1	○	0319H
F2.26	ENTER key function	0: No special action 1: FWD/REV switching 2: RUN for forward; Enter for reverse; STOP for stop 3: Jog running	0	○	031AH
F2.27	Freq. resolution	0: 0.01Hz 1: 0.1Hz	0	×	031BH
F2.28	Acc./Dec. time unit	0: 0.1s 1: 0.01s	1② 0③	×	031CH
F2.29	High freq. modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	×	031DH
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	○	031FH

Code	Description	Setting range	Default	Modify	Modbus Address
F2.32	PWM modulation mode	0: uplink 16Hz discrete modulation mode (5-stage mode), downlink 12Hz continuous modulation mode (7-stage mode) 1: fixed as z continuous modulation mode (7-stage mode)	0	○	0320H
F2.33	Threshold value of Zero Freq. running	0.00~550.0Hz	0.00Hz	○	0321H
F2.34	Range between start Freq. and threshold value of Zero Freq.	0.00~550.0Hz	0.00Hz	○	0322H
F2.35	Synchronous motor IQ filter	0： with filter 1： without filter	0	○	0323H
F2.36	Voltage modulation coefficient of synchronous motor with weak magnetic field	0.0~120.0%	105.0%	○	0324H
F2.37	Power calibration at low voltage	70.0~130.0%	100.0%	o	0325H
F2.38	Power calibration at high voltage	70.0~130.0%	100.0%	o	0326H
③F2.39	V/F current limiting Kp	100~3000	500	o	0327H
③F2.40	V/F current limiting Ki	100~3000	500	○	0328H

Group F3: Vector Control Parameters

Code	Description	Setting range	Default	Modify	Modbus Address

Code	Description	Setting range	Default	Modify	Modbus Address
F3.00	Speed loop proportional gain 1	1~3000	1000	○	0400H
F3.01	Speed loop integral time 1	1~3000	300	○	0401H
F3.02	Switching frequency 1	0.0～60.00Hz	5.00Hz	○	0402H
F3.03	Speed loop proportional gain 2	1~3000	800	○	0403H
F3.04	Speed loop integral time 2	1~3000	200	○	0404H
F3.05	Switching frequency 2	0.0～60.00Hz	10.00Hz	○	0405H
F3.06	Speed loop filter time constant	0～500ms	2ms ② 3ms ③	○	0406H
F3.07	Current loop proportional coefficient	0～6000	3000	○	0407H
F3.08	Current loop integral coefficient	0～6000	1500	○	0408H
F3.09	VC Slip compensation	0.0～200.0%	100.00%	○	0409H
F3.10	② Torque control	0: Torque control Disabled 1: Torque digital setting (F3.11) 2:AI1 3:AI2 4: Reserved 5: communication 6: keypad potentiometer	0	○	040AH
	③ Torque control	0: Torque control Disabled 1: Torque digital setting (F3.11) 2:AI1 3:AI2 4: Pulse 5: communication 6: keypad	0	○	040AH

Code	Description	Setting range	Default	Modify	Modbus Address
		potentiometer			
F3.11	Torque digital setting	0.0～200.0%	50.00%	○	040BH
F3.12	Torque control speed limit	0: digital setting (F3.13) 1: AI1　　2: AI2 3: PULSE　4: communication 5: keypad potentiometer	0	○	040CH
F3.13	Torque control speed limit digital setting	0.00～550.0Hz	50.00Hz	○	040DH
F3.14	③Encoder pulse number	1~9999	1000	○	040EH
F3.15	③Motor and PG reduction ratio	0.010~50.000	1.000	○	040FH
F3.16	③PG direction	0: Forward　　1: Reverse	0	○	0410H
F3.17	ACC/DEC limit controlled by PG	0: Limited　　1: No limited	0	○	0411H
F3.18	SVC speed calculation filter	0~31	28	○	0412H
F3.19	SVC mode	0: Mode1 1: Mode2	0	○	0413H
F3.20	SVC mode2 flux weaken coefficient	20~500%	100%	○	0414H
F3.21	Flux weaken control selection	0: Disable　　1: Enable	0	○	0415H
F3.22	Torque limit compensation coefficient while constant power output	60.0～300.0%	85%② 200%③	○	0416H
F3.23	Reserved	Reserved	Reserved	Reserved	
F3.24	Torque ref. terminal single	0.0~10%	0.00%	○	0418H

Code	Description	Setting range	Default	Modify	Modbus Address
	modulation				
F3.25	Torque ref. terminal total modulation	0.0~100%	50%	○	0419H
F3.26	Torque limit in vector control mode	0~300.0%	150.0%	○	041AH
F3.27	Torque boost cut-off frequency in torque control mode	0.00~15.00Hz	12.00Hz	○	041BH
F3.28	Torque boost amount in torque control mode	0.0~20.0%	15.0%	○	041CH
F3.29	Synchronous machine options	Ten bits: 0: The parameters of current loop are not set during self-learning of synchronous machine. 1: The parameters of current loop are set during self-learning of synchronous machine.	0000	×	041DH
F3.31	Synchronous motor initial position detection	0： Do not detect 1： Detect in power-on first run 2： Detect every time	2	○	041FH
F3.32	Synchronous motor initial position detection current	50~120%	90%	○	0420H
F3.33	Initial position detection pulse width	0~1200us	0	○	0421H
F3.34	Initial position detection pulse	0~1200us	0	*	0422H

Code	Description	Setting range	Default	Modify	Modbus Address
	width actual value				
F3.35	Synchronous motor braking torque limit	0.0~300.0%	150.0%	○	0423H
F3.36	Synchronous motor flux weaken mode	0：Flux weaken mode is invalid 1：Flux weaken mode is valid	0	○	0424H
F3.37	Max flux weaken current	0~100.0%	50%	○	0425H
F3.38	Flux weaken regulation proportional coefficient	0~3000	500	○	0426H
F3.39	Flux weaken regulation integration coefficient	0~3000	800	○	0427H
F3.40	Synchronous motor low speed Min. current	0~100%	30%	○	0428H
F3.41	Synchronous motor low speed carrier frequency	1.0~16.0KHz	2.0KHz	○	0429H
F3.42	Synchronous motor Min excitation current	-100.0~100.0%	0.0%	○	042AH
F3.43	(2)V/F Start switching frequency	0~50.00Hz	0.00Hz	○	042BH
F3.44	Synchronous motor position evaluating low speed filter	2~100	40	○	042CH
F3.45	Synchronous motor position evaluating high speed filter	2~100	15	○	042DH

Group F4: V/F Control Parameters

Code	Description	Setting range	Default	Modify	Modbus Address
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	×	0500H
F4.01	V/F freq. F1	0.0～F4.03	10.00Hz	×	0501H
F4.02	V/F voltage V1	0.0～100.0%	20.00%	×	0502H
F4.03	V/F freq. F2	F4.01～F4.05	25.00Hz	×	0503H
F4.04	V/F voltage V2	0.0～100.0%	50.00%	×	0504H
F4.05	V/F freq. F3	F4.03～F0.10	40.00Hz	×	0505H
F4.06	V/F voltage V3	0～100.0%	80.00%	×	0506H
F4.07	Torque boost	0.0%: Auto boost 0.1～30.0%: Manual boost	0.00%	○	0507H
F4.08	Manual torque boost cutoff point	0.00～60.00Hz	50.00Hz	○	0508H
F4.09	Slip compensation coefficient	0.0～200.0%	0.00%	○	0509H
F4.10	Slip compensation filtering time	0.01～2.55s	0.20s	○	050AH
F4.11	V/F separation control voltage source	0: disabled 1: Digital setting (F4.12) 2: AI1 3: AI2 4: Pulse 5: communication	0	×	050BH
F4.12	V/F separation voltage digital setting	0V～max output voltage	38 0V	○	050CH
F4.13	V/F separation	0.0s～1000.0s	0.0s	○	050DH

Code	Description	Setting range	Default	Modify	Modbus Address
	voltage rising time				
F4.14	V/F oscillation suppression	0~500	Depends on model	○	050EH
F4.15	Vibration suppressor	0~10	2	○	050FH
③F4.17	V/F oscillation suppression mode	0: Mode 1 1: Mode 2	0	○	0511H

Group F5: Motor Parameters

Code	Description	Setting range	Default	Modify	Modbus Address
F5.00	motor type	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: PM motor	0	×	0600H
F5.01	Motor polarity number	2~56	4	×	0601H
F5.02	rated power	②0.1～6553.5kW ③0.4~999.9kW	Depends on model	○	0602H
F5.03	rated current	②0.01～655.35A ③0.1~999.9A	Depends on model	○	0603H
F5.04	rated speed	②0～65535RPM ③0～24000 RPM	Depends on model	○	0604H
F5.05	No-load current I0	②0.01～655.35A ③0.1～999.9A	Depends on model	○	0605H
F5.06	②Stator resistance R1	1～65535mΩ	Depends on model	○	0606H
F5.06	③Stator resistance R1	1～65535mΩ(Drive rated power≤22kW) 0.1～6553.5mΩ(Drive rated power>22kW)	Depends on model	○	0606H

Code	Description	Setting range	Default	Modify	Modbus Address
F5.07	②Leakage inductive reactance X	0.01～655.35mH	Depends on model	○	0607H
	③Leakage inductive reactance X	0.01～655.35mH(Drive rated power≤22kW) 0.001～65.535mH(Drive rated power>22kW)	Depends on model	○	0607H
F5.08	②Rotor resistance R2	1～65535mΩ	Depends on model	○	0608H
	③Rotor resistance R2	1～65535mΩ(Drive rated power≤22kW) 0.1～6553.5mΩ(Drive rated power>22kW)	Depends on model	○	0608H
F5.09	②Mutual Inductive reactance Xm	0.1～6553.5mH	Depends on model	○	0609H
	③Mutual Inductive reactance Xm	0.1～6553.5mH(Drive rated power≤22kW) 0.01～655.35mH(Drive rated power>22kW)	Depends on model	○	0609H
F5.10	Auto tune	0: No operation 1: Static tuning 2: Rotary tuning	0	×	060AH
F5.11	②Synchronous motor stator resistor Rs	1～65535mΩ	Depends on model	○	060BH
	③Synchronous motor stator resistor Rs	1～65535mΩ(Drive rated power≤22kW) 0.1～6553.5mΩ(Drive rated power>22kW)	Depends on model	○	060BH
F5.12	②Synchronous motor D-axis inductance Ld	0.01～655.35mH	Depends on model	○	060CH
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	○	060CH

Code	Description	Setting range	Default	Modify	Modbus Address
F5.13	② Synchronous motor Q-axis inductance Lq	0.01~655.35mH	Depends on model	○	060DH
	③ Synchronous motor Q-axis inductance Lq	0.01~655.35mH(Drive rated power≤22kW) 0.001~65.535mH(Drive rated power>22kW)	Depends on model	○	060DH
F5.14	Synchronous motor counter EMF constant	0.0~6553.5v	300.0v	○	060EH

Group F6: Input terminals

Code	Description	Setting range	Default	Modify	Modbus Address
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	×	0700H
F6.01	X1 terminal Function selection	0: NULL 1: FWD 2: REV	1	×	0701H
F6.02	X2 terminal Function selection	3: RUN 4: F/R direction 5: HLD self-hold	2	×	0702H
F6.03	X3 terminal Function selection	6: FWD jog run (FJOG) 7: REV jog run	8	×	0703H
F6.04	X4 terminal Function selection	(RJOG) 8: RESET 9: Freq. source	17	×	0704H
F6.05	X5 terminal Function selection	switching 10: Terminal UP 11: Terminal	18	×	0705H
F6.06	③X6 terminal Function	DOWN 12: UP/DOWN setup clear	0	×	0706H

Code	Description	Setting range	Default	Modify	Modbus Address
	selection ②AI1 terminal function selection	13: Coast to stop 14: DC brake 15: Acc./Dec. prohibit 16: Drive running prohibit			
F6.07	③X7 terminal Function selection ②AI2 terminal function selection	17: Multi-step terminal 1 18: Multi-step terminal 2 19: Multi-step terminal 3 20: Multi-step terminal 4	0	×	0707H
F6.08	②Reserve ③X8 terminal function selection	21: torque control disable 22: Acc./Dec. time selector 1 23: Acc./Dec. time selector 2	Reserved	×	0708H
F6.09	②Reserve ③AI1 terminal function selection	24: Running pause normally open 25: Running pause normally closed 26: External fault normally open	Reserved	×	
		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			0709H

Code	Description	Setting range	Default	Modify	Modbus Address
		33: Wobble freq. pause 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) 49~55: Reserved 56: Emergency stop 57: Pulse input (Take X4 in case 2 inputs)			

Code	Description	Setting range	Default	Modify	Modbus Address
F6.10	Analog Nonlinear Selection	0: none 1: AI1 2: AI2 3: Pulse	0	×	070AH
F6.11	AI1 Min. input	0.00~F6.13	0.00V	○	070BH
F6.12	AI1 Min. input corresponding setup	-200.0~200.0%	0.00%	○	070CH
F6.13	AI1 Max. input	F6.11~10.00V	10.00V	○	070DH
F6.14	AI1 Max. input corresponding setup	-200.0~200.0%	100.00%	○	070EH
F6.15	AI1 input filter time	0.01~50.00s	0.05s	○	070FH
F6.16	AI2 Min. input	0.00~F6.18	0.00V	○	0710H
F6.17	AI2 Min. input corresponding setup	-200.0~200.0%	0.00%	○	0711H
F6.18	AI2 Max. input	F6.16~10.00V	10.00V	○	0712H
F6.19	AI2 Max. input corresponding setup	-200.0~200.0%	100.00%	○	0713H
F6.20	AI2 input filter time	0.01~50.00s	0.05s	○	0714H
F6.21	PULSE Min. input	0.00~F6.23	0.00kHz	○	0715H
F6.22	PULSE Min. input corresponding setup	-200.0%~200.0%	0.00%	○	0716H
F6.23	PULSE Max. input	F6.21~50.00kHz	50.00kHz	○	0717H
F6.24	PULSE Max. input corresponding setup	-200.0%~200.0%	100.00%	○	0718H
F6.25	Pulse filter time	0.01~50.00s	0.05s	○	0719H
F6.26	Terminal up/down initial	0.00~10.00Hz	0.01Hz	○	071AH

Code	Description	Setting range	Default	Modify	Modbus Address
	increment				
F6.27	Freq. ref.2 datum	0: Max. freq. 1: Freq. ref.1	0	○	071BH
F6.28	Delay duration of X1 terminal close	0.0~100.0s	0.0s	○	071CH
F6.29	Delay duration of X1 terminal open	0.0~100.0s	0.0s	○	071DH
F6.30	Delay duration of X2 terminal close	0.0~100.0s	0.0s	○	071EH
F6.31	Delay duration of X2 terminal open	0.0~100.0s	0.0s	○	071FH
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 Hundreds: Logic of X3 terminal Thousands: Logic of X4 terminal	0000	×	0720H
F6.33	②Pos. and Neg. logic terminal X 2	Units: Logic of X5 terminal Tens: Logic of AI1 terminal Hundreds: Logic of	0000	×	0721H

Code	Description	Setting range	Default	Modify	Modbus Address
		AI2 terminal Note: Terminal 24、25、26、27、42、43、44 and 49 are not impacted by this parameter.			
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.			0721H

Group F7: Output terminal

Code	Description	Setting range	Default	Modify	Modbus Address
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 9: PLC circulation	Reserve	Reserve	0800H
F7.00	③DO terminal output definition		0	○	0800H
F7.01	Y1 terminal output selection		1	○	0801H
F7.02	②Reserve		Reserve	Reserve	0802H
F7.02	③Y2 terminal output selection		0	○	0802H

Code	Description	Setting range	Default	Modify	Modbus Address
F7.03	Relay 1 (TA/TB/TC) output selection	completion 10: Reserved 11: Ready for running (RDY)	16	○	0803H
F7.04	②Reserve	12: Timing arrival 13: Counting arrival 14: Reserved 15: Preset torque	Reserve	Reserve	0804H
F7.04	③Relay 2 (BRA/BRB/BRC) output selection	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 32:Current arrival 33: Brake signal	0	○	0804H
F7.05	Freq. arrival (FAR) detection width	0.00 ~ 10.00Hz	2.50Hz	○	0805H

Code	Description	Setting range	Default	Modify	Modbus Address
F7.06	Frequency detection value 1 (FDT1 level)	0.00 ~ 600.0Hz	5.00Hz	○	0806H
F7.07	Freq. detection lag1 (FDT1-lag)	0.00 ~ 10.00Hz	1.00Hz	○	0807H
F7.08	②Frequency detection value 2 (FDT2 level)	0.00 ~ 320.0Hz	5Hz	○	0808H
	③Frequency detection value 2 (FDT2 level)	0.00 ~ 320.0Hz	25.00Hz	○	0808H
F7.09	Freq. detection lag2 (FDT2-lag)	0.00 ~ 10.00Hz	1.00Hz	○	0809H
F7.10	Up detection frequency	0.00 ~ 550.0Hz	50.00Hz	○	080AH
F7.11	Down detection frequency	0.00 ~ 550.0Hz	0.00Hz	○	080BH
F7.12	Torque detection reference	0.0 ~ 200.0%	100.00%	○	080CH
F7.13	Preset Counting arrival value	0 ~ 9999	0	○	080DH
F7.14	Preset Timing arrival value	0.0 ~ 6553.0s	0.0s	○	080EH
F7.16	AI1 compare threshold 1	0.00 ~ 10.00v	0.00v	○	0810H
F7.17	AI1 compare threshold 2	0.00 ~ 10.00v	0.00v	○	0811H
F7.18	Analog compare hysteresis error	0.00 ~ 30.00v	0.20v	○	0812H
F7.19	②AO function definition ③AO1 output selection	0: NULL 1: Running freq. (0~max frequency) 2: Setting freq. (0~max frequency) 3: Output	1	○	0813H

Code	Description	Setting range	Default	Modify	Modbus Address
F7.20	②Reserve	current(0 ~ 2 times of drive rated current) 4: Output voltage (0 ~ Max Voltage)	Reserve	Reserve	0814H
	③AO2 output selection		0	○	0814H
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	○	0815H
	③DO output selection		0	○	0815H
F7.22	②AO output range selection	0: 0 ~ 10V/0 ~ 20mA 1: 2 ~ 10V/4 ~ 20mA	0	○	0816H
	③AO1 output range selection				0816H
F7.23	②Reserve	Reserve	Reserve	Reserve	0817H
	③AO2 output	0: 0 ~ 10V/0 ~ 20mA	0	○	0817H

Code	Description	Setting range	Default	Modify	Modbus Address
	range selection	1: 2 ~ 10V/4 ~ 20mA			
F7.24	②Gain of AO	1 ~ 200%	100%	○	0818H
	③Gain of AO1				0818H
F7.25	②Reserve	Reserve	Reserve	Reserve	0819H
	Gain of AO2③	1~200%	100%	○	0819H
F7.26	②Y1 Max. output pulse freq.	Y1 Min. output pulse freq. ~ 50.00kHz	10.00kHz	○	081AH
	③DO Max. output pulse freq.	DO Min. output pulse freq. ~ 50.00kHz			081AH
F7.27	②Y1 Min. output pulse freq.	0.00 ~ Y1 Max. output pulse freq.	0.00kHz	○	081BH
	③DO Min. output pulse freq.	0.00 ~ DO Max. output pulse freq.	0.00kHz	○	081BH
F7.28	Auxiliary pump start lag time	0 ~ 9999s	0	○	081CH
F7.29	Auxiliary pump stop lag time	0 ~ 9999s	0	○	081DH
F7.30	②Y1 Max. output	0: 50.00KHz 1: 500.0Hz	0	×	081EH
	③DO Max. output				081EH
F7.31	FDT/RUN signal Jog selection	0: Include Jog signal 1: Do not include Jog signal	0	×	081FH

Code	Description	Setting range	Default	Modify	Modbus Address
F7.32	Running time arrival setup	0~65530Mins	0	○	0820H
F7.33	Running time arrival stop selection	0: Do not stop 1: Stop	0	○	0821H
F7.34	Ao1 4mA/2.00v adjustable datum	0.0~100.0%	20%	○	0822H
F7.35	②Reserve	Reserve	Reserve	Reserve	0823H
	③Ao2 4mA/2.00v adjustable datum	0.0~100.0%	20%	○	0823H
F7.36	②Digital output terminal Pos./Neg. logic	Units: Logic of Y1 terminal Tens: Reserve Hundreds: Logic of Relay 1 Thousands: Reserve	0000	○	0824H
	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	○	0824H
F7.37	Current reaches the upper limit	0.0 ~ 655.35A	0.0A	○	0825H
F7.38	Current upper limit check time	0.00 ~ 50.00s	0.00s	○	0826H
F7.39	Current reaches lower limit	0.0 ~ 655.35A	0.0A	○	0827H
F7.40	Current lower limit check time	0.00 ~ 50.00s	0.00s	○	0828H
F7.41	AO torque output range selection	0: 0~200% the rated torque of motor 1: -200~200%	0	○	0829H

Code	Description	Setting range	Default	Modify	Modbus Address
		Motor rated torque output			
F7.42	Brake release frequency	0.00~50.00Hz	2.00Hz	o	082AH
F7.43	Detection value of brake release current	0.0~100.0%	20.0%	o	082BH
F7.44	Detection time of brake release current	0.00~5.00s	0.0s	o	082CH
F7.45	Action time of brake release	0.00~10.00s	1.00s	o	082DH
F7.46	Current limit of brake release	0.00~200.0%	120.0%	o	082EH
F7.47	Brake suction frequency	0.00~10.00Hz	2.00Hz	o	082FH
F7.48	Waiting time of brake suction	0.00~10.00s	0.00s	o	0830H
F7.49	Action time of brake suction	0.00~10.00s	1.00s	o	0831H

Group F8: PID Parameters

Code	Description	Setting range	Default	Modify	Modbus Address
F8.00	PID setup channel selection	0: PID digital setting （F8.02） 1: AI1 2: AI2 3: Pulse input 4: serial communication	0	○	0900H
F8.01	PID feedback channel selection	0: AI1 1: AI2 2: Pulse input 3: serial communication 4: AI1-AI2 5: AI1+AI2 6: MAX(AI1, AI2) 7: MIN(AI1, AI2)	1	○	0901H
F8.02	Analog PID	0.0～999.9	50	○	0902H

Code	Description	Setting range	Default	Modify	Modbus Address
	digital setup				
F8.03	Analog closed loop measuring range	1.0～999.9	100	○	0903H
F8.04	PID action direction	0: Positive 1: Negative	0	○	0904H
F8.05	PID proportional gain 1 (KP1)	0.1～9.9	1	○	0905H
F8.06	PID integration time 1	0～100s	10s ② 3s ③	○	0906H
F8.07	PID differential time 1	0.00～1.00s	0.00s	○	0907H
F8.08	PID proportional gain 2 (KP2)	0.1～9.9	1	○	0908H
F8.09	PID integration time 2	0.0～100.0s	10.0s	○	0909H
F8.10	PID differential time 2	0.00～1.00s	0.00s	○	090AH
F8.11	PID parameters switching	0: No switching, use the first group parameters 1: switching by terminal 2: auto-switching by deviation	0	○	090BH
F8.12	PID parameter switching Deviation 1	0.0～999.9	20	○	090CH
F8.13	PID parameter switching Deviation 2	0.0～999.9	80	○	090DH
F8.14	PID delay time constant	0.0～100.0s	0.0s	○	090EH
F8.15	Deviation limit	0.0～999.9	0.2	○	090FH
F8.16	PID output positive limit	0.0～550.0Hz	50.00Hz	○	0910H

Code	Description	Setting range	Default	Modify	Modbus Address
F8.17	PID output negative limit	-320.0Hz～320.0Hz	0.00Hz	○	0911H
F8.18	PID preset freq.	0.00～550.0Hz	0.00Hz	✕	0912H
F8.19	Hold time of PID preset frequency	0.0～3600s	0.0s	✕	0913H
F8.20	Enable dormancy	0: Disabled 1: Enabled	0	✕	0914H
F8.21	Dormancy delay	0～999s	120s	○	0915H
F8.22	Dormancy threshold	0.0～320.0Hz	20.0Hz	○	0916H
F8.23	Awaken threshold	0.0~100.0% (relative to pre-set value)	80.00%	○	0917H
F8.24	PID feedback offline detection range	0.0~100.0% (relative to feedback measuring range, 0.0% no detection)	0.0%	○	0918H
F8.25	PID feedback offline detection time	0.0~50.0s	2.0s	○	0919H
F8.26	PID feedback offline detection Min. Freq.	0.00~50.00Hz	10.00Hz	○	091AH

Group F9: Multi-step speed and PLC

Code	Description	Setting range	Default	Modify	Modbus Address
F9.00	Multi-step freq.1	0.00 ~ Max frequency	5.00 Hz	○	0A00H
F9.01	Multi-step freq.2	0.00 ~ Max frequency	10.00 Hz	○	0A01H
F9.02	Multi-step freq.3	0.00 ~ Max frequency	15.00 Hz	○	0A02H
F9.03	Multi-step freq.4	0.00 ~ Max frequency	20.00 Hz	○	0A03H
F9.04	Multi-step freq.5	0.00 ~ Max frequency	30.00 Hz	○	0A04H

Code	Description	Setting range	Default	Modify	Modbus Address
F9.05	Multi-step freq.6	0.00 ~ Max frequency	40.00 Hz	○	0A05H
F9.06	Multi-step freq.7	0.00 ~ Max frequency	50.00 Hz	○	0A06H
F9.07	PLC running mode	0: Single cycle 1: Single cycle and hold final value 2: Continuous cycle	2	×	0A07H
F9.08	PLC restarting mode after interrupt	0: Restart from first step 1: Continue from the step where the drive interrupted	0	×	0A08H
F9.09	PLC status recorded or not at power failure	0: Not save 1: Save	0	×	0A09H
F9.10	Time unit select for each duration of PLC processing	0: Second 1: Minute	0	×	0A0AH
F9.11	PLC step1 duration (T1)	0.1 ~ 3600	20	○	0A0BH
F9.12	PLC step2 duration (T2)	0.0 ~ 3600	20	○	0A0CH
F9.13	PLC step3 duration (T3)	0.0 ~ 3600	20	○	0A0DH
F9.14	PLC step4 duration (T4)	0.0 ~ 3600	20	○	0A0EH
F9.15	PLC step5 duration (T5)	0.0 ~ 3600	20	○	0A0FH
F9.16	PLC step6 duration (T6)	0.0 ~ 3600	20	○	0A10H
F9.17	PLC step7 duration (T7)	0.1 ~ 3600	20	○	0A11H
F9.18	Step T1 program running setting	1 F/r ~ 4 F/r	1F	○	0A12H
F9.19	Step T2 program running setting	1 F/r ~ 4 F/r	1F	○	0A13H
F9.20	Step T3 program running setting	1 F/r ~ 4 F/r	1F	○	0A14H

Code	Description	Setting range	Default	Modify	Modbus Address
F9.21	Step T4 program running setting	1 F/r ~ 4 F/r	1F	○	0A15H
F9.22	Step T5 program running setting	1 F/r ~ 4 F/r	1F	○	0A16H
F9.23	Step T6 program running setting	1 F/r ~ 4 F/r	1F	○	0A17H
F9.24	Step T7 program running setting	1 F/r ~ 4 F/r	1F	○	0A18H
F9.25	②Current step running time	0.0 ~ 3600	0	*	0A19H
F9.25	③Current running step	1 ~ 7	0	*	0A19H
F9.26	②Current running step	1 ~ 7	0	*	0A1AH
F9.26	③Current step running time	0.0 ~ 3600	0	*	0A1AH
F9.27	Multi-step freq.8	0.00 ~ Max frequency	50.00 Hz	○	0A1BH
F9.28	Multi-step freq.9	0.00 ~ Max frequency	50.00 Hz	○	0A1CH
F9.29	Multi-step freq.10	0.00 ~ Max frequency	50.00 Hz	○	0A1DH
F9.30	Multi-step freq.11	0.00 ~ Max frequency	50.00 Hz	○	0A1EH
F9.31	Multi-step freq.12	0.00 ~ Max frequency	50.00 Hz	○	0A1FH
F9.32	Multi-step freq.13	0.00 ~ Max frequency	50.00 Hz	○	0A20H
F9.33	Multi-step freq.14	0.00 ~ Max frequency	50.00 Hz	○	0A21H
F9.34	Multi-step freq.15	0.00 ~ Max frequency	50.00 Hz	○	0A22H
F9.35	PLC Multi-step Freq.1 selection	0:Multi-step digital setting 1: AI1 2: AI2	0	○	0A23H

Code	Description	Setting range	Default	Modify	Modbus Address
F9.36	PLC Multi-step Freq.7 selection	3: keypad potentiometer 4: Pulse input	0	○	0A24H

Group FA: Wobble Frequency

Code	Description	Setting range	Default	Modify	Modbus Address
FA.00	Wobble amplitude	0.0~50.0%	0.0%	○	0B00H
FA.01	Jitter frequency	0.0~50.0%(to FA.00)	0.0%	○	0B01H
FA.02	Jitter Time	5~50ms	5ms	○	0B02H
FA.03	Wobble freq. up time	0.1~999.9s	5.0s	○	0B03H
FA.04	Wobble freq. down time	0.1~999.9s	5.0s	○	0B04H
FA.05	Amplitude mode	0: Relative to the central freq. 1: Relative to Max. frequency	0	○	0B05H

Group Fb: Fixed Length

Code	Description	Setting range	Default	Modify	Modbus Address
Fb.00	Preset length	0~65530	0	○	0C00H
Fb.01	Actual length	0~65530	0	*	0C01H
Fb.02	Pulses number per unit	0.1~6553.0	100	○	0C02H

Group FC: Protection and Fault Parameters

Code	Description	Setting range	Default	Modify	Modbus Address
FC.00	Motor overload protection mode	0: Disabled 1: Common motor (with low speed compensation)	1	×	0D00H

Code	Description	Setting range	Default	Modify	Modbus Address
		2: Variable frequency motor (without low speed compensation)			
FC.01	Electro thermal protection value	20～110%② 20～200%③	100%	○	0D01H
FC.02	Overload Pre-alarm detection level	30.0～200.0%	160%	○	0D02H
FC.03	Overload Pre-alarm detection time	0.0～80.0s	60.0s	○	0D03H
FC.04	Current amplitude limit	0: Invalid 1: Acc./Dec. valid; Constant speed invalid 2: Valid all the time 3: Constant speed is effective, acceleration and deceleration are ineffective	2	○	0D04H
FC.05	Current amplitude limit level	Type G：80.0～200.0% Type P：60.0～150.0%	G: 160.0% P: 120.0%	○	0D05H
FC.06	Over voltage stall function	0: Invalid (Recommended if braking resistor mounted) 1: Valid for Acc/Dec. 2: Valid all the time	1	×	0D06H
FC.07	Overvoltage point for Acc./Dec. suspend	110.0～150.0% (Bus voltage)	380V: 140% 220V: 120%	×	0D07H

Code	Description	Setting range	Default	Modify	Modbus Address
FC.08	Input phase loss detection	1~100% (100% correspond to 800V)	20%	×	0D08H
FC.09	Input phase loss detection delay time	2~255s	10s	×	0D09H
FC.10	Output phase loss detection	0: Invalid　1: Valid	1	○	0D0AH
FC.11	Terminal close fault detection	0: Invalid　1: Valid	1	○	0D0BH
FC.12	Fault auto reset times	0~10,"0" means auto reset is disabled. Only 3 faults have auto reset function	0	×	0D0CH
FC.13	Fault auto reset interval	0.1~20.0s/time	5.0s	×	0D0DH
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	○	0D0EH
FC.15	Fast current limit	50.0%~100.0% (100% means this function is disabled.)	Depends on model	○	0D0FH
FC.16	Fast current limit time	0.01~1.00s	0.10s ② 0.20s ③	○	0D10H
FC.17	Overvoltage suppression freq.	0.00~10.00Hz	0.00Hz	○	0D11H
FC.18	Select suppression overvoltage methods	0: method 1 1: method 2 2: method 3	0	○	0D12H

Code	Description	Setting range	Default	Modify	Modbus Address
FC.19	Treatment select while overvoltage forewarning	0: Warning and running still 1: Fault cause stopping	0	○	0D13H
FC.20	Reminding or not while undervoltage	0: Yes 1: No	0	○	0D14H

Group Fd: Communication Parameters

Code	Description	Setting range	Default	Modify	Modbus Address
Fd.00	485 Communication	0: Disabled RS485 1: Enabled RS485	1	○	0E00H
Fd.01	Local address	1～247	1	○	0E01H
Fd.02	Baud rate setup	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	3② 4③	○	0E02H
Fd.03	Parity bit setup	0: Even parity check 1: Odd parity check 2: No parity check	0	○	0E03H
Fd.04	Communication timeout detection duration	Range: 0.0～100.0s 0: No timeout detection Others: Timeout detection duration	0.0s	○	0E04H
Fd.05	Response delay duration	0～500ms	5ms	○	0E05H
Fd.06	Communication Freq. setting coefficient	0.0~200.0%	100.00%	○	0E06H

Code	Description	Setting range	Default	Mo dify	Modbus Address
Fd.07	Communicati on interrupt detection mode	0: Time interval between 2 packets receiving. 1: Time interval of 0005H Add. data writing	0	○	0E07H
Fd.08	Feedback or not (Y or N) While writing into COMMS setting	0：Y 1：N	0	○	0E08H
Fd.09	Save the COMMS setting or not (Y or N) While power down	0：N 1：Y	0	○	0E09H

Group FE: Operation interface & display

Code	Description	Setting range	Default	Modify	Modbus Address
FE.00	Display parameter-type setup	0: Normal 3-levels menu display 1: Only display modified parameters	0	○	0F00H
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	○	0F01H
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	2	○	0F02H

Code	Description	Setting range	Default	Modify	Modbus Address
		of terminal/ communication control mode 3: Valid in both stop & fault state of terminal/ communication control mode			
FE.03	Running freq.(Hz) (before compensation)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	2	○	0F03H
FE.04	Running freq. (Hz) (After compensation)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F04H
FE.05	Reference frequency (Hz blinking)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	1	○	0F05H
FE.06	Output current(A)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	2	○	0F06H
FE.07	Bus voltage (V)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	3	○	0F07H
FE.08	Output voltage (V)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F08H
FE.09	Output torque (%)	0: No display 1: Display at stop 2: Display at running 3: Display at stop &	0	○	0F09H

Code	Description	Setting range	Default	Modify	Modbus Address
		running			
FE.10	Reference torque (% blinking)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F0AH
FE.11	Rotate speed (r/min)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F0BH
FE.12	Reference speed (r/min blinking)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F0CH
FE.13	Output power (kW)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F0DH
FE.14	AI1 (V)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F0EH
FE.15	AI2 (V)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F0FH
FE.16	Analog PID feedback	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F10H
FE.17	Analog PID setup	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F11H
FE.18	Terminal	0: No display	0	○	0F12H

Code	Description	Setting range	Default	Modify	Modbus Address
	status (no unit)	1: Display at stop 2: Display at running 3: Display at stop & running			
FE.19	Actual length	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F13H
FE.20	Reference length	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F14H
FE.21	Linear speed (m/min)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F15H
FE.22	External count value (no unit)	0: No display 1: Display at stop 2: Display at running 3: Display at stop & running	0	○	0F16H

Group FF: Running History Record

Code	Description	Setting range	Default	Modify	Modbus Address
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.	NULL	*	1000H

Code	Description	Setting range	Default	Modify	Modbus Address
		overvoltage 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			

Code	Description	Setting range	Default	Modify	Modbus Address
		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 28: bAE brake current detection fault			
FF.01	Output freq. at latest fault	0～Frequency upper limit	0.00Hz	*	1001H
FF.02	Reference frequency at latest fault	0～Frequency upper limit	0.00Hz	*	1002H
FF.03	Output current at latest fault	0～2 drive rated current	0.0A	*	1003H
FF.04	Bus voltage frequency at latest fault	0～1000V	0V	*	1004H
FF.05	Running status at latest fault	0: **StP** Stop 1: **Acc** acceleration 2: **dEc** deceleration 3: **con** constant speed	0	*	1005H
FF.06	Fault history 1 (Last One)	The same as FF.00	NULL	*	1006H
FF.07	Fault history 2	The same as FF.00	NULL	*	1007H
FF.08	Total power on time	0～65530h	0h	*	1008H
FF.09	Total running time	0～65530h	0h	*	1009H
FF.10	Reserved	Reserved	Reserved	-	100AH
FF.11	Software version	1.00~10.00	1	-	100BH

Code	Description	Setting range	Default	Modify	Modbus Address
	number of control board				
FF.12	Non-standard version number of software	0~255	0	-	100CH
FF.13	②Heat sink temperature	-30.0～120.0°C	0.0°C	-	100DH
	③IGBT temperature	0.0～140.0°C	0.0°C	-	100DH
FF.14	②Flux current	-200.0~200.0%		*	100EH
FF.15	③Torque current	-200.0~200.0%		*	100FH
FF.17	Accumulated kilowatt-hours （Upper 16 bits）	0~65535kWH	0kWH	-	1011H
FF.18	Accumulated kilowatt-hours （Low 16 bits）	0~65535kWH	0kWH	-	1012H

Group FP Protection Parameters

Code	Description	Setting range	Default	Modify	Modbus Address
FP.00	User password	0~9999 0: No password Others: password protection	0	○	-
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 are not allowed read	0	○	--
FP.02	Parameter initialization	0: No operation 1: Clear fault history 2: Restore to defaults	0	×	--
FP.03	Parameter	0: No action	0	×	--

Code	Description	Setting range	Default	Modify	Modbus Address
	copy	1: Parameters download 2: Parameters upload (except motor's parameters) 3: Parameters upload (all parameters)			
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	×	--

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

This document certifies that this product
Inverter
Applied to standards
IEC61800 / EN61800 / GB12668

The width of blank position is 42mm

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was dispatched fully functional tested and inspected in accordance
with Control Techniques specifications and drawings.

ChenLi

Operations Director

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CONTROL TECHNIQUES