U S E R M A N U A L

Preface

Thank you for purchasing the SET750 series AC drive developed

The SET750 series AC drive is a general-purpose high-performance current vector control AC drive. It is an upgrade product based on HL320 and can implement the control of asynchronous motor and permanent magnet synchronous motor (PMSM). It increases the user programmable function, background monitoring software and communication bus function, and supports multi-kind PG cards. It is used to drive various automation production equipment involving textile, paper-making, wiredrawing, machine tool, packing, food, fan and pump.

This manual describes the correct use of the SET750 series AC drive, including selection, parameter setting, commissioning, maintenance & inspection. Read and understand the manual before use and forward the manual to the end user.

Notes

- The drawings in the manual are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- The drawings in the manual are shown for description only and may not match the product you purchased.
- The instructions are subject to change, without notice, due to product upgrade, specification modification as well as efforts to increase the accuracy and convenience of the manual.
- Contact our agents or customer service center if you have problems during the use.

Introduction

Compared with HL320, the SET750 series AC drive incorporates the following improvements:

1) Multiple voltage classes
   It provides coverage of single-phase 220 V, three-phase 220 V, three-phase 380 V, three-phase 480 V, three-phase 690 V and three-phase 1,140 V.
2) Control of asynchronous motor and PMSM
   It supports vector control of three-phase AC asynchronous motor and three-phase AC PMSM.
3) Diversified control modes
   It supports three control modes, namely, sensorless flux vector control (SFVC), closed-loop vector control (CLVC) and V/F control.
4) Multiple communication protocols
   It supports communication via Modbus-RTU, PROFIBUS-DP, CANlink and CANopen.
5) Multiple encoder types
   It supports various encoders such as differential encoder, open-collector encoder, resolver and UVW encoder.
6) All-new SFVC algorithm
   It introduces an all-new sensorless flux vector control (SFVC) algorithm that gives better low-speed stability, enhanced low-frequency loading capacity, and supports torque control.
7) User programmable function
   The HL38PC1 programmable card enables you to write programs in ladder diagram. Its programming environment is compatible with that of the H1U series PLC.
8) Advanced background software
   The background monitoring software helps to achieve functions of parameter upload & download and a real-time oscilloscope.
9) Other new functions
   The newly added functions of the SET750 series AC drive are described as below:

Function	Description
Virtual I/O	It can implement various simple logic functions.
Motor overheat protection	The optional HL38IO1 extension card enables AI3 to receive the signal from the motor temperature sensor input (PT100, PT1000) thereby providing motor overheat protection.
Rapid current limit	It helps to avoid frequent occurrence of overcurrent faults of the AC drive.

Function	Description
Multi-motor switchover	Four motors can be switched over via four groups of motor parameters.
Restoring user parameters	It allows you to save or restore the parameters set by yourself.
Higher-accuracy AI/AO	The AI/AO accuracy can reach almost 20 mv via factory correction or on-site correction.
Customized parameter display	You can customize the parameters that need to be displayed.
Modified parameter display	You can view the modified parameters.
Operation selection at fault occurrence	You can select the reaction of the AC drive to a fault occurring, based on the actual need. The reactions are as below: • Coast to stop • Decelerate to stop • Continue to run You can also select the frequency at which the AC drive continues to run.
PID parameters switchover	Two groups of PID parameters can be switched over via terminals or can be automatically switched over according to deviation.
PID feedback loss detection	The PID feedback loss value can be set to realize PID protection.
DI/DO positive or negative logic	You can set the DI/DO positive or negative logic.
DI/DO response delay	You can set DI/DO response delay time.
Power dip ride through	It ensures that the AC drive continues to run for a short time when an instantaneous power failure or sudden voltage reduction occurs.
Timing operation	The AC drive supports timing operation for 6500 minutes at maximum.
User programmable function	The externally connected programmable card helps you to realize secondary development.
Load allocation	Load allocation can be implemented between two SET750 series AC drives through point-to-point communication.

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Safety Information and Precautions

Chapter 1 Safety Information and Precautions

In this manual, the notices are graded based on the degree of danger:

- ⚠ **DANGER** indicates that failure to comply with the notice will result in severe personal injury or even death.
- ⚠ **WARNING** indicates that failure to comply with the notice will result in personal injury or property damage.

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. SET will assume no liability or responsibility for any injury or loss caused by improper operation.

1.1 Safety Information

Use Stage	Safety Grade	Precautions
Before installation	⚠ **DANGER**	• Do not install the equipment if you find water seepage, component missing or damage upon unpacking. • Do not install the equipment if the packing list does not conform to the product you received.
	⚠ **WARNING**	• Handle the equipment with care during transportation to prevent damage to the equipment. • Do not use the equipment if any component is damaged or missing. Failure to comply will result in personal injury. • Do not touch the components with your hands. Failure to comply will result in static electricity damage.
During installation	⚠ **DANGER**	• Install the equipment on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire. • Do not loosen the fixed screws of the components, especially the screws with red mark.
	⚠ **WARNING**	• Do not drop wire end or screw into the AC drive. Failure to comply will result in damage to the AC drive. • Install the AC drive in places free of vibration and direct sunlight. • When two AC drives are laid in the same cabinet, arrange the installation positions properly to ensure the cooling effect.

Use Stage	Safety Grade	Precautions
At wiring	⚠ DANGER	• Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents. • A circuit breaker must be used to isolate the power supply and the AC drive. Failure to comply may result in a fire. • Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. • Tie the AC drive to ground properly by standard. Failure to comply may result in electric shock.
	⚠ WARNING	• Never connect the power cables to the output terminals (U, V, W) of the AC drive. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the AC drive. • Never connect the braking resistor between the DC bus terminals (+) and (-). Failure to comply may result in a fire. • Use wire sizes recommended in the manual. Failure to comply may result in accidents. • Use a shielded cable for the encoder, and ensure that the shielding layer is reliably grounded.
Before power-on	⚠ DANGER	• Check that the following requirements are met: – The voltage class of the power supply is consistent with the rated voltage class of the AC drive. – The input terminals (R, S, T) and output terminals (U, V, W) are properly connected. – No short-circuit exists in the peripheral circuit. – The wiring is secured. Failure to comply will result in damage to the AC drive • Do not perform the voltage resistance test on any part of the AC drive because such test has been done in the factory. Failure to comply will result in accidents.
	⚠ WARNING	• Cover the AC drive properly before power-on to prevent electric shock. • All peripheral devices must be connected properly under the instructions described in this manual. Failure to comply will result in accidents
After power-on	⚠ DANGER	• Do not open the AC drive's cover after power-on. Failure to comply may result in electric shock. • Do not touch any I/O terminal of the AC drive. Failure to comply may result in electric shock.
	⚠ WARNING	• Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply will result in accidents. • Do not change the default settings of the AC drive. Failure to comply will result in damage to the AC drive.

Use Stage	Safety Grade	Precautions
During operation	⚠ DANGER	• Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt. • Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the AC drive.
	⚠ WARNING	• Avoid objects falling into the AC drive when it is running. Failure to comply will result in damage to the AC drive. • Do not start/stop the AC drive by turning the contactor ON/OFF. Failure to comply will result in damage to the AC drive.
During maintenance	⚠ DANGER	• Repair or maintenance of the AC drive may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the AC drive. • Do not repair or maintain the AC drive at power-on. Failure to comply will result in electric shock. • Repair or maintain the AC drive only ten minutes after the AC drive is powered off. This allows for the residual voltage in the capacitor to discharge to a safe value. Failure to comply will result in personal injury. • Ensure that the AC drive is disconnected from all power supplies before starting repair or maintenance on the AC drive. • Set and check the parameters again after the AC drive is replaced. • All the pluggable components must be plugged or removed only after power-off. • The rotating motor generally feeds back power to the AC drive. As a result, the AC drive is still charged even if the motor stops, and the power supply is cut off. Thus ensure that the AC drive is disconnected from the motor before starting repair or maintenance on the AC drive.

1.2 General Precautions

1) Requirement on residual current device (RCD)

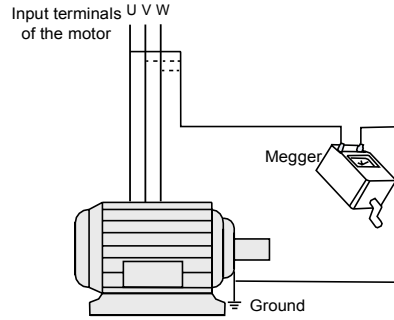
The AC drive generates high leakage current during running, which flows through the protective earthing (PE) conductor. Thus install a type-B RCD at primary side of the power supply. When selecting the RCD, you should consider the transient and steady-state leakage current to ground that may be generated at startup and during running of the AC drive. You can select a specialized RCD with the function of suppressing high harmonics or a general-purpose RCD with relatively large residual current.

2) High leakage current warning

The AC drive generates high leakage current during running, which flows through the PE conductor. Earth connection must be done before connection of power supply. Earthing shall comply with local regulations and related IEC standards.

3) Motor insulation test

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the AC drive. The motor must be disconnected from the AC drive during the insulation test. A 500-V mega-Ohm meter is recommended for the test. The insulation resistance must not be less than 5 MΩ.



4) Thermal protection of motor

If the rated capacity of the motor selected does not match that of the AC drive, especially when the AC drive's rated power is greater than the motor's, adjust the motor protection parameters on the operation panel of the AC drive or install a thermal relay in the motor circuit for protection.

5) Running at over 50 Hz

The AC drive provides frequency output of 0 to 3200 Hz (Up to 300 Hz is supported if the AC drive runs in CLVC and SFVC mode). If the AC drive is required to run at over 50 Hz, consider the capacity of the machine.

6) Vibration of mechanical device

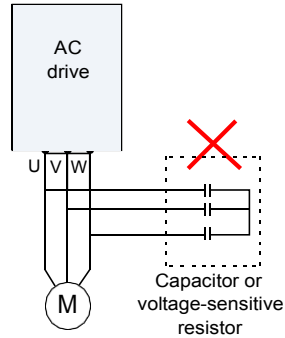
The AC drive may encounter the mechanical resonance point at some output frequencies, which can be avoided by setting the skip frequency.

7) Motor heat and noise

The output of the AC drive is pulse width modulation (PWM) wave with certain harmonic frequencies, and therefore, the motor temperature, noise, and vibration are slightly greater than those when the AC drive runs at power frequency (50 Hz).

8) Voltage-sensitive device or capacitor on output side of the AC drive

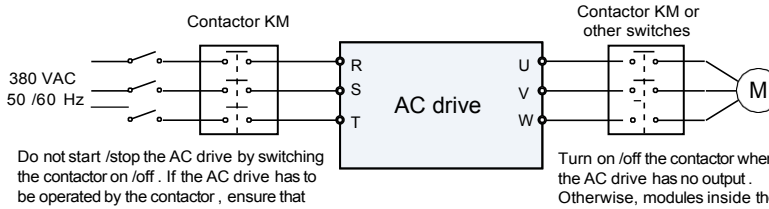
Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the AC drive because the output of the AC drive is PWM wave. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.



9) Contactor at the I/O terminal of the AC drive

When a contactor is installed between the input side of the AC drive and the power supply, the AC drive must not be started or stopped by switching the contactor on or off. If the AC drive has to be operated by the contactor, ensure that the time interval between switching is at least one hour since frequent charge and discharge will shorten the service life of the capacitor inside the AC drive.

When a contactor is installed between the output side of the AC drive and the motor, do not turn off the contactor when the AC drive is active. Otherwise, modules inside the AC drive may be damaged.



10) When external voltage is out of rated voltage range

The AC drive must not be used outside the allowable voltage range specified in this manual. Otherwise, the AC drive's components may be damaged. If required, use a corresponding voltage step-up or step-down device.

11) Prohibition of three-phase input changed into two-phase input

Do not change the three-phase input of the AC drive into two-phase input. Otherwise, a fault will result or the AC drive will be damaged.

12) Surge suppressor

The AC drive has a built-in voltage dependent resistor (VDR) for suppressing the surge voltage generated when the inductive loads (electromagnetic contactor, electromagnetic relay, solenoid valve, electromagnetic coil and electromagnetic brake) around the AC drive are switched on or off. If the inductive loads generate a very high surge voltage, use a surge suppressor for the inductive load or also use a diode.

Note

Do not connect the surge suppressor on the output side of the AC.

13) Altitude and de-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the AC drive. Contact SET for technical support.

14) Some special usages

If wiring that is not described in this manual such as common DC bus is applied, contact the agent or SET for technical support.

15) Disposal

The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

16) Adaptable Motor

- The standard adaptable motor is adaptable four-pole squirrel-cage asynchronous induction motor or PMSM. For other types of motor, select a proper AC drive according to the rated motor current.
- The cooling fan and rotor shaft of non-variable-frequency motor are coaxial, which results in reduced cooling effect when the rotational speed declines. If variable speed is required, add a more powerful fan or replace it with variable-frequency motor in applications where the motor overheats easily.
- The standard parameters of the adaptable motor have been configured inside the AC drive. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running result and protection performance will be affected.
- The AC drive may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the AC drive is disconnected from the tested parts.

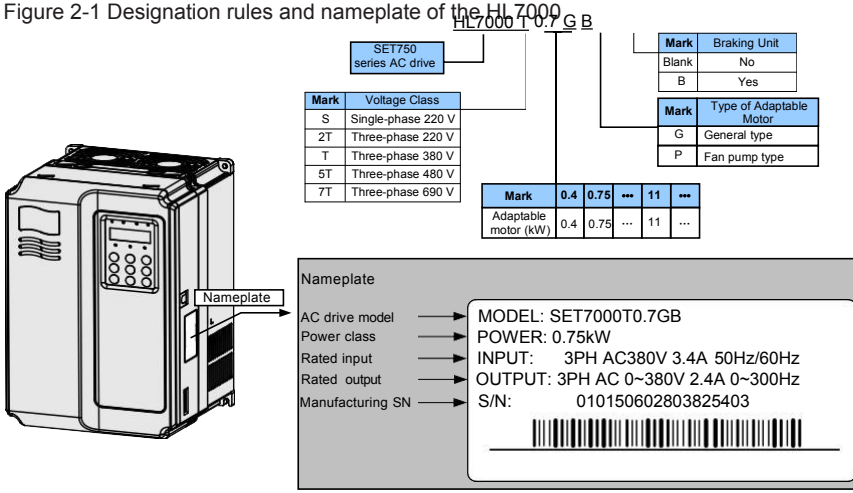
2

Product Information

Chapter 2 Product Information

2.1 Designation Rules and Nameplate of the SET750

Figure 2-1 Designation rules and nameplate of the HL7000



2.2 Components of the SET750

The SET750 series AC drives have two housing types, plastic housing and sheet metal housing, according to different voltage and power classes.

Figure 2-2 Components of the SET750 series AC drive (plastic housing)

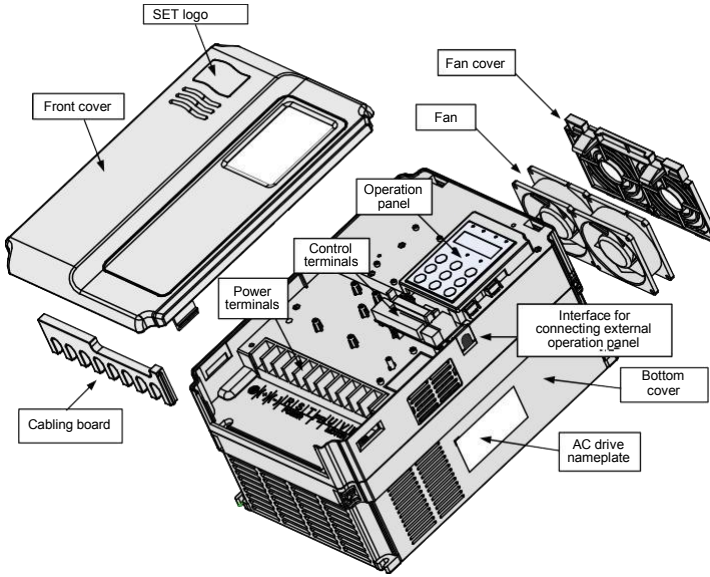
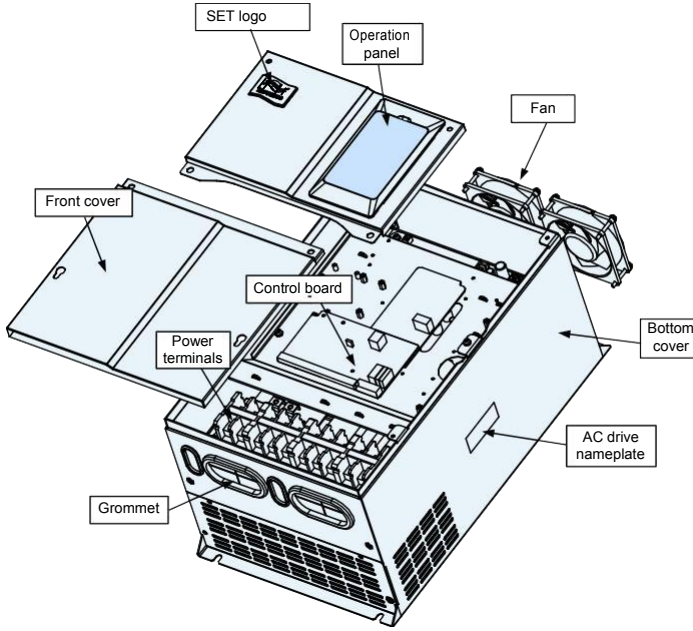


Figure 2-3 Components of the SET750 series AC drive (sheet metal housing)



The housing types of the SET750 models with different voltage and power classes are listed in the following table.

Table 2-1 Housing types for different voltage and power classes

Voltage & Power Class	Housing Type
Single-phase 220 V	
0.4–2.2 kW	Plastic housing
Three-phase 220 V	
0.4–7.5 kW	Plastic housing
11–75 kW	Sheet metal housing
Three-phase 380 V	
0.75–15 kW	Plastic housing
18.5–400 kW	Sheet metal housing
Three-phase 480 V	
0.75–15 kW	Plastic housing
18.5–400 kW	Sheet metal housing
Three-phase 690 V	
55–500 kW	Sheet metal housing

2.3 Technical Specifications

Table 2-2 Technical specifications of the SET750

Item		Specifications	
Standard functions	Maximum frequency	• Vector control: 0–300 Hz • V/F control: 0–320 Hz	
	Carrier frequency	0.5–16 kHz The carrier frequency is automatically adjusted based on the load features.	
	Input frequency resolution	Digital setting: 0.01 Hz Analog setting: maximum frequency x 0.025%	
	Control mode	• Sensorless flux vector control (SFVC) • Closed-loop vector control (CLVC) • Voltage/Frequency (V/F) control	
	Startup torque	• G type: 0.5 Hz/150% (SFVC); 0 Hz/180% (CLVC) • P type: 0.5 Hz/100%	
	Speed range	1:100 (SFVC)	1:1000 (CLVC)
	Speed stability accuracy	• ± 0.5% (SFVC) • ± 0.02% (CLVC)	
	Torque control accuracy	± 5% (CLVC)	

Item		Specifications
Standard functions	Overload capacity	• G type: 60s for 150% of the rated current, 3s for 180% of the rated current • P type: 60s for 120% of the rated current, 3s for 150% of the rated current
	Torque boost	• Fixed boost • Customized boost 0.1%–30.0%
	V/F curve	• Straight-line V/F curve • Multi-point V/F curve • N-power V/F curve (1.2-power, 1.4-power, 1.6-power, 1.8-power, square)
	V/F separation	Two types: complete separation; half separation
	Ramp mode	• Straight-line ramp • S-curve ramp Four groups of acceleration/deceleration time with the range of 0.0–6500.0s
	DC braking	DC braking frequency: 0.00 Hz to maximum frequency Braking time: 0.0–36.0s Braking action current value: 0.0%–100.0%
	JOG control	JOG frequency range: 0.00–50.00 Hz JOG acceleration/deceleration time: 0.0–6500.0s
	Onboard multiple preset speeds	It implements up to 16 speeds via the simple PLC function or combination of DI terminal states.
	Onboard PID	It realizes process-controlled closed loop control system easily.
	Auto voltage regulation (AVR)	It can keep constant output voltage automatically when the mains voltage changes.
	Overvoltage/ Overcurrent stall control	The current and voltage are limited automatically during the running process so as to avoid frequent tripping due to overvoltage/overcurrent.
	Torque limit and control	It can limit the torque automatically and prevent frequent over current tripping during the running process. Torque control can be implemented in the CLVC mode.
Individualized functions	High performance	Control of asynchronous motor and synchronous motor are implemented through the high-performance current vector control technology.
	Power dip ride through	The load feedback energy compensates the voltage reduction so that the AC drive can continue to run for a short time.
	Rapid current limit	It helps to avoid frequent overcurrent faults of the AC drive.
	Virtual I/Os	Five groups of virtual DI/Dos can realize simple logic control.
	Timing control	Time range: 0.0–6500.0 minutes

Item		Specifications
Individualized functions	Multi-motor switchover	Four motors can be switched over via four groups of motor parameters.
	Multiple communication protocols	It supports communication via Modbus-RTU, PROFIBUS-DP, CANlink and CANopen.
	Motor overheat protection	The optional I/O extension card enables AI3 to receive the motor temperature sensor input (PT100, PT1000) so as to realize motor overheat protection.
	Multiple encoder types	It supports various encoders such as differential encoder, open-collector encoder, resolver, UVW encoder, and SIN/COS encoder.
	User programmable function	The optional programming card helps you to realize secondary development. Its programming environment is compatible with that of the PLC of SET.
	Advanced background software	It supports the operation of AC drive parameters and virtual oscillograph function, via which the state inside the AC drive is monitored.
RUN	Running command source	• Operation panel • Control terminals • Serial communication port You can perform switchover between these sources in various ways.
	Frequency source	There are a total of 10 frequency sources, such as digital setting, analog voltage setting, analog current setting, pulse setting and serial communication port setting. You can perform switchover between these sources in various ways.
	Auxiliary frequency source	There are ten auxiliary frequency sources. It can implement fine tuning of auxiliary frequency and frequency synthesis.
	Input terminal	Standard: 5 digital input (DI) terminals, one of which supports up to 100 kHz high-speed pulse input 2 analog input (AI) terminals, one of which only supports 0–10 V voltage input and the other supports 0–10 V voltage input or 4–20 mA current input Expanding capacity: 5 DI terminals 1 AI terminal that supports -10–10 V voltage input and also supports PT100\PT1000

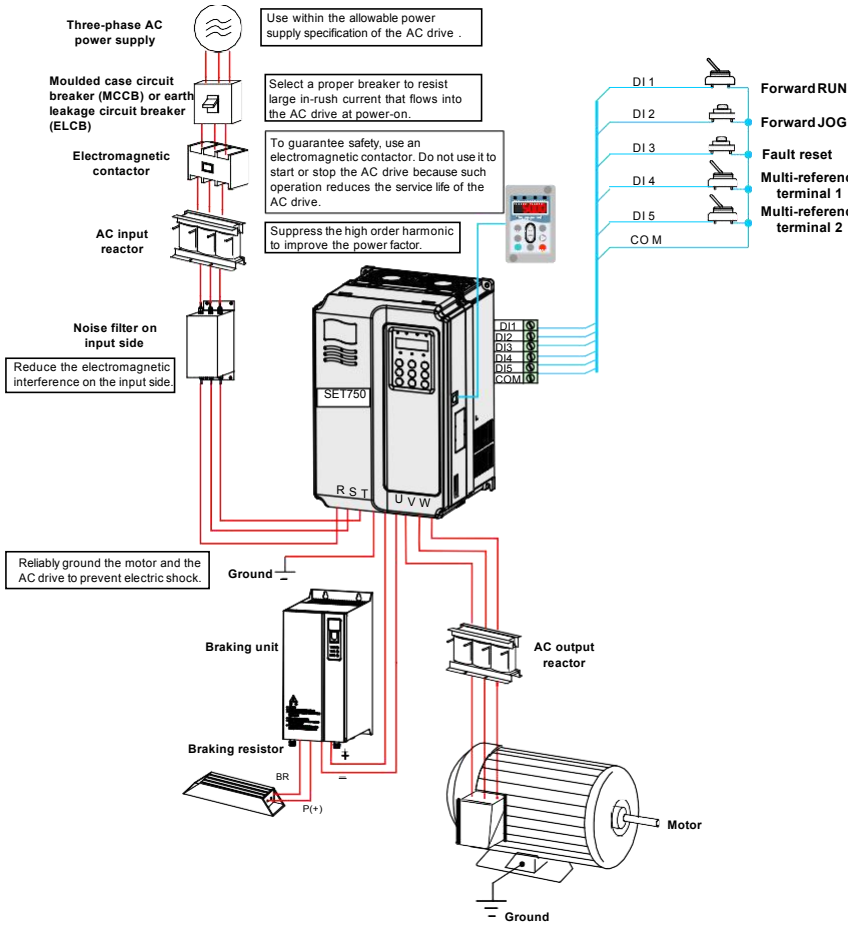
Item		Specifications
RUN	Output terminal	Standard 1 high-speed pulse output terminal (open-collector) that supports 0–100 kHz square wave signal output 1 digital output (DO) terminal 1 relay output terminal 1 analog output (AO) terminal that supports 0–20 mA current output or 0–10 V voltage output Expanding capacity: 1 DO terminal 1 relay output terminal 1 AO terminal that supports 0–20 mA current output or 0–10 V voltage output
Display and operation on the operation panel	LED display	It displays the parameters.
	Key locking and function selection	It can lock the keys partially or completely and define the function range of some keys so as to prevent mis-function.
	Protection mode	Motor short-circuit detection at power-on, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection and overload protection
	Optional parts	LCD operation panel, braking unit, I/O extension card 1, I/O extension card 2, user programmable card, RS485 communication card, PROFIBUS-DP communication card, CANlink communication card, CANopen communication card, differential input PG card, UVW differential input PG card, resolver PG card and OC input PG card
Environment	Installation location	Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil smoke, vapour, drip or salt.
	Altitude	Lower than 1000 m
	Ambient temperature	-10°C to +40°C (de-rated if the ambient temperature is between 40°C and 50°C)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9 m/s2 (0.6 g)
	Storage temperature	-20°C to +60°C
	IP level	IP20
	Pollution degree	PD2
	Power distribution system	TN , TT

2.4 Peripheral Electrical Devices and System Configuration

When the SET750 is used to control the synchronous or asynchronous motor, forming a control system, it is necessary to install various electrical devices on the input and output sides of the AC drive to ensure the system safety and stability.

In addition, several optional extension cards are available for the SET750 to implement various functions. The system configuration of three-phase 220 V/380 V/480 V voltage class, 3.7 kW and above is shown in the following figure.

Figure 2-4 System configuration of three-phase 220 V/380 V/480 V voltage class, 3.7 kW and above



2.4.1 Description of Peripheral Electrical Devices

Table 2-3 Description of peripheral electrical devices

Part	Mounting Location	Function Description
MCCB	Power receiving side	Interrupt the power supply when overcurrent occurs on downstream devices
Contactor	Between MCCB and AC drive input side	Start and stop the AC drive. Do not start and stop the AC drive frequently by switching the contactor on and off (less than twice per minute) nor use it to directly start the AC drive.
AC input reactor	AC drive input side	• Improve the power factor of the input side. • Eliminate the higher harmonics of the input side effectively and prevent other devices from being damaged due to distortion of the voltage waveform. • Eliminate the input current unbalance due to unbalance between the power phases.
EMC Input filter	AC drive input side	• Reduce the external conduction and radiation interference of the AC drive. • Decrease the conduction interference flowing from the power end to the AC drive and improve the anti-interference capacity of the AC drive.
DC reactor	SET series AC drive of 7.5G and above configured with DC reactor as standard	• Improve the power factor of the input side. • Improve the efficiency and thermal stability of the AC drive. • Eliminate the impact of higher harmonics of the AC drive input side and reduce the external conduction and radiation interference.
AC output reactor	Between AC drive output side and the motor, close to the AC drive	The output side of the AC drive generally has much higher harmonics. When the motor is far from the AC drive, there is much distributed capacitance in the circuit and certain harmonics may cause resonance in the circuit, bringing about the following two impacts: • Degrade the motor insulation performance and damage the motor in the long run. • Generate large leakage current and cause frequent AC drive protection trips. If the distance between the AC drive and the motor is greater than 100 m, install an AC output reactor.

1) Do not install the capacitor or surge suppressor on the output side of the AC drive. Otherwise, it may cause faults to the AC drive or damage to the capacitor and surge suppressor.

2) Inputs/Outputs (main circuit) of the AC drive contain harmonics, which may interfere with the communication device connected to the AC drive. Therefore, install an anti-interference filter to minimize the interference.

3) For more details on peripheral devices, refer to related selection manual.

2.4.2 Description of Optional Parts

The optional parts include braking unit, extension cards of different functions and external operation panel, etc. If any optional part is required, specify it in your order.

Table 2-4 Optional parts of the SET750

Name	Model	Function	Remark
Internal braking unit	AC drive model followed by letter B	The models of single-phase (0.4–2.2 kW) and three-phase (0.75–15 kW) are installed with the internal braking unit as standard configuration.	Internal braking unit is optional for the models of 18.5–30 kW.
External braking unit	HLBUN	The SET750 AC drives of 37 kW and above need to be configured with an external braking unit.	Multiple braking units are connected in parallel for the models of 75 kW and above.
Regenerative unit	HLPb	As an energy-saving part, it feeds back the electricity of the AC drive to the AC mains.	
Rectifying unit	HLRU	It is used in common bus and has energy saving function.	
I/O extension card 1	HL38IO1	It can extend 5 DIs, 1 AI (AI3 is used for separation analog input and can be connected to PT100, PT1000), 1 relay output, 1 DO and 1 AO, RS485 and CANlink communication terminal	It applies to the models of 3.7 kW and above.
I/O extension card 2-Size B	HL38IO2	It can extend 3 DIs.	It applies to all models.
Modbus communication card	HL38TX1	It is the RS485 communication card card with isolation.	It applies to all models.
CANlink communication card	HL38CAN1	It is the CANlink communication card.	It applies to all models.
CANopen communication card	HL38CAN2	It is the CANopen communication card.	It applies to all models.
Profibus-DP communication card	HL38DP	It is the Profibus-DP communication card.	It applies to the models of 3.7 kW and above.
User programmable card	HL38PC1	It is compatible to Hailing's H1U series PLC.	It applies to the models of 3.7 kW and above.

Name	Model	Function	Remark
Differential encoder interface card	HL38PG1	It is the differential resolver interface card. It is adaptable to 5 V power supply	It applies to all models.
UVW encoder interface card	HL38PG3	It is suitable for the UVW differential encoder and applied to synchronous motor. It is adaptable to 5 V power supply	It applies to all models.
Resolver interface card	HL38PG4	It is applied to the resolver. 10 kHz excitation frequency, DB9 interface	It applies to all models.
Open-collector encoder interface card	HL38PG5	It is the open-collector encoder interface card with 1:1 frequency division output. It is adaptable to 15 V power supply.	It applies to all models.
External LED operation panel	HLKE	It supports LED display and operations.	It applies to the SET series AC drives with the RJ45 interface.
Extension cable	HLCAB	It is a standard 8-core cable and can be connected to HLKE, HL32KC and HLCP.	The standard length is 3 meters.

3

Mechanical and Electrical Installation

Chapter 3 Mechanical and Electrical Installation

3.1 Removal of the Front Cover of the SET750

For the SET750 series AC drives, you need to remove the front cover and before wiring the main circuit and control circuit.

Figure 3-12 Removal of the front cover of the SET750 (plastic housing)

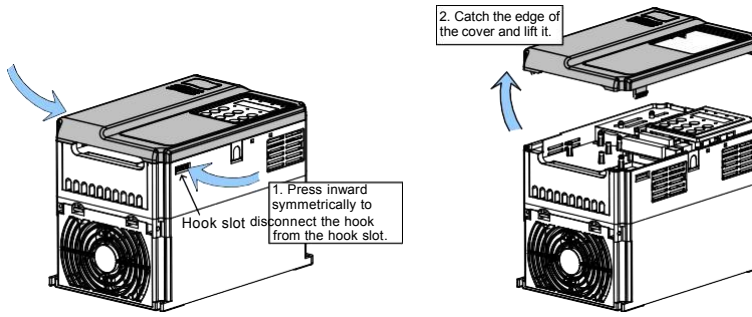
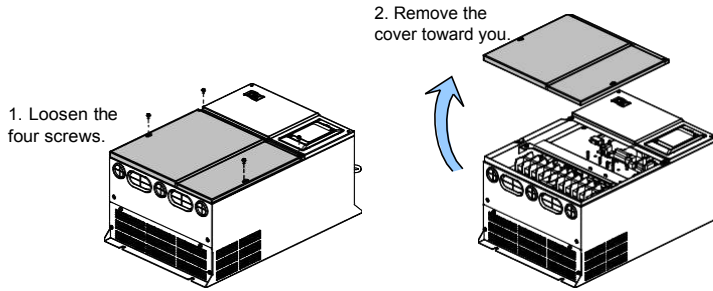


Figure 3-13 Removal of the front cover of the SET750 (sheet metal housing)



DANGER

Prevent the cover from falling off during the removal to avoid potential damage to the equipment or personal injury.

3.2 Electrical Installation

3.2.1 Description of Main Circuit Terminals

■ Description of Main Circuit Terminals of Single-phase AC drive

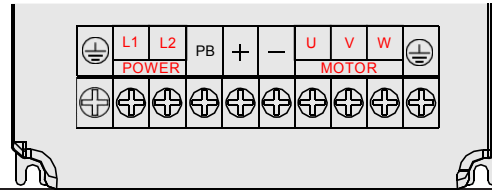


Table 3-1 Description of main circuit terminals of single-phase AC drive

Terminal	Name	Description
L1, L2	Single-phase power supply input terminals	Connect to the single-phase 220 VAC power supply.
(+), (-)	Positive and negative terminals of DC bus	Common DC bus input point.
(+), PB	Connecting terminals of braking resistor	Connect to a braking resistor.
U, V, W	AC drive output terminals	Connect to a three-phase motor.
⏚	Grounding terminal	Must be grounded.

■ Description of Main Circuit Terminals of Three-phase AC drive

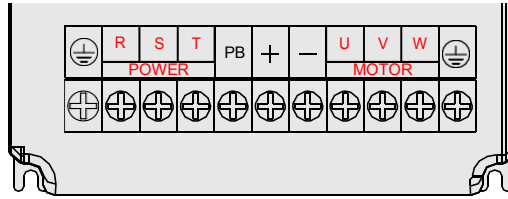
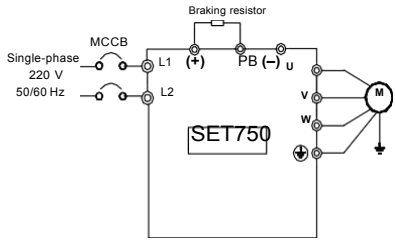
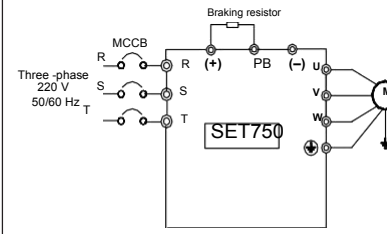
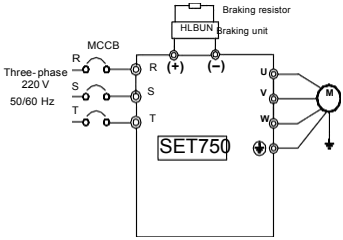
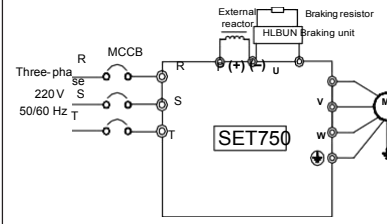
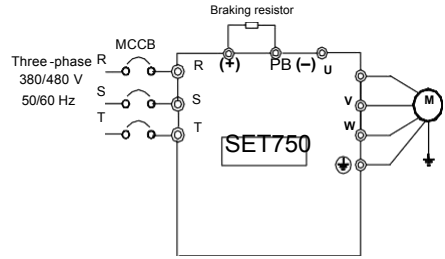
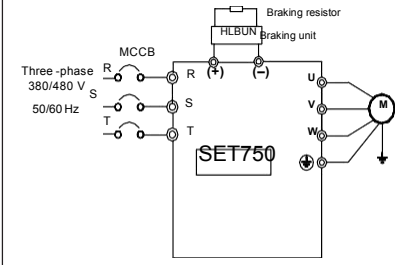
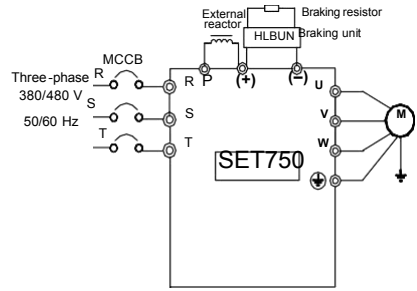
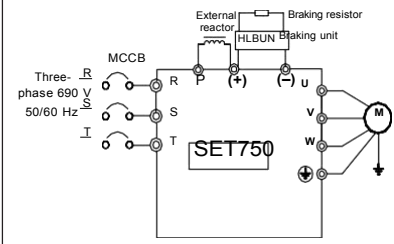


Table 3-2 Description of main circuit terminals of three-phase AC drive

Terminal	Name	Description
R, S, T	Three-phase power supply input terminals	Connect to the three-phase AC power supply
(+), (-)	Positive and negative terminals of DC bus	Common DC bus input point Connect the external braking unit to the AC drive of 18.5 kW and above (220 V) and 37 kW and above (other voltage classes).
(+), PB	Connecting terminals of braking resistor	Connect to the braking resistor for the AC drive of 15 kW and below (220 V) and 30 kW and below (other voltage classes).
P, (+)	Connecting terminals of external reactor	Connect to an external reactor.
U, V, W	AC drive output terminals	Connect to a three-phase motor.
⏚	Grounding terminal	Must be grounded.

3.2.2 Wiring of AC Drive Main Circuit

Table 3-3 Wiring of the AC drive main circuit

Single-phase 220 V	Three-phase 220 V (15 kW and Below)
	
Three-phase 220 V (18.5–30 kW)	**Three-phase 220 V (37 kW and Above)**
	
Three-phase 380/480 V (30 kW and Below)	**Three-phase 380/480 V (37–55 kW)**
	
Three-phase 380/480 V (75 kW and Above)	**Three-phase 690 V**
	

■ Precautions on the Wiring

1) Power input terminals L1, L2 or R, S, T

   – The cable connection on the input side of the AC drive has no phase sequence requirement.
   – The specification and installation method of external power cables must comply with the local safety regulations and related IEC standards.
   – Use copper conductors of a proper size as power cables according to the recommended values in section 8.3.

2) DC bus terminals (+), (-)

   – Terminals (+) and (-) of DC bus have residual voltage after the AC drive is switched off. After indicator CHARGE goes off, wait at least 10 minutes before touching the equipment Otherwise, you may get electric shock.
   – connecting external braking components for the AC drive of 18.5 kW and above (220 V) and 37 kW and above (other voltage classes), do not reverse poles (+) and (-). Otherwise, it may damage the AC drive and even cause a fire.
   – The cable length of the braking unit shall be no longer than 10 m. Use twisted pair wire or pair wires for parallel connection.
   – Do not connect the braking resistor directly to the DC bus. Otherwise, it may damage the AC drive and even cause fire.

3) Braking resistor connecting terminals (+), PB

   – The connecting terminals of the braking resistor are effective only for the AC configured with the built-in braking unit.
   – The cable length of the braking resistor shall be less than 5 m. Otherwise, it may damage the AC drive.

4) External reactor connecting terminals P, (+)

   For the AC drive of 37 kW and above (220 V) and 75 kW and above (other voltage classes), remove the jumper bar across terminals P and (+) and install the reactor between the two terminals.

5) AC drive output terminals U, V, W

   – The specification and installation method of external power cables must comply with the local safety regulations and related IEC standards.
   – Use copper conductors of a proper size as power cables according to the recommended values in section 8.3.
   – The capacitor or surge absorber cannot be connected to the output side of the AC drive. Otherwise, it may cause frequent AC drive fault or even damage the AC drive.
   – If the motor cable is too long, electrical resonance will be generated due to the impact of distributed capacitance. This will damage the motor insulation or generate higher leakage current, causing the AC drive to trip in overcurrent protection. If the motor cable is greater than 100 m long, an AC output reactor must be installed close to the AC drive.

6) Terminal ⏚ PE

   – This terminal must be reliably connected to the main earthing conductor. Otherwise, it may cause electric shock, mal-function or even damage to the AC drive.

– Do not connect the earthing terminal to the neutral conductor of the power supply.
– The impedance of the PE conductor must be able to withstand the large short-circuit current that may arise when a fault occurs.
– Select the size of the PE conductor according to the following table:

Cross-sectional Area of a Phase Conductor (S)	Min. Cross-sectional Area of Protective Conductor (Sp)
$S \leq 16\ mm^2$	S
$16\ mm^2 < S \leq 35\ mm^2$	$16\ mm^2$
$35\ mm^2 < S$	S/2

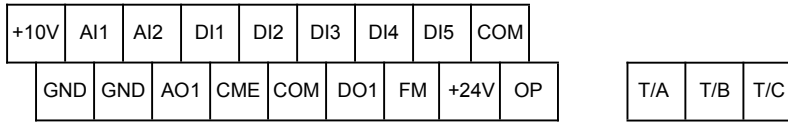
– You must use a yellow/green cable as the PE conductor.

7) Requirements on upstream protection device

– Install upstream protection device on the input power circuit. The protection device must provide the protections on overcurrent, short-circuit and electrical solation.
– When selecting the protective device, you should consider the current capacity of the power cable, system overload capacity and short-circuit capacity of the upstream power distribution of the equipment. Generally, make selection according to the recommended values in section 8.4.

3.2.3 Description of Control Circuit Terminals

■ Terminal Arrangement of Control Circuit



■ Description of Control Circuit Terminals

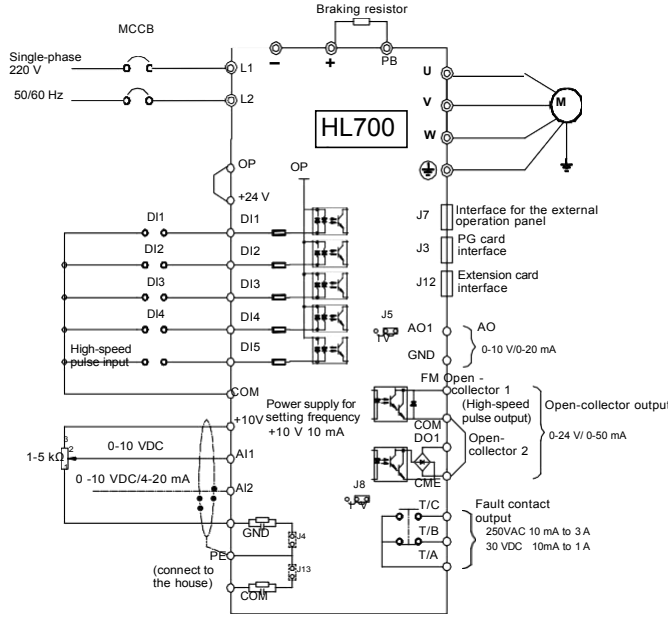
Table 3-3 Description of control circuit terminals

Type	Terminal	Name	Function Description
Power supply	+10V-GND	External +10 V power supply	Provide +10 V power supply to external unit. Generally, it provides power supply to external potentiometer with resistance range of 1–5 kΩ. Maximum output current: 10 mA
	+24V-COM	External +24 V power supplyApplying to Overvoltage Category II circuit	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors. Maximum output current: 200 mA
	OP	Input terminal of external power supply	Connect to +24 V by default. When DI1-DI5 need to be driven by external signal, OP needs to be connected to external power supply and be disconnected from +24 V.

Type	Terminal	Name	Function Description
Analog input	AI1-GND	Analog input 1	Input voltage range: 0–10 VDC Impedance: 22 kΩ
	AI2-GND	Analog input 2	Input range: 0–10 VDC/4–20 mA, decided by jumper J8 on the control board Impedance: 22 kΩ (voltage input), 500 Ω (current input)
Digital input	DI1- OP	Digital input 1	Optical coupling isolation, compatible with dual polarity input Impedance: 2.4 kΩ Voltage range for level input: 9–30 V
	DI2- OP	Digital input 2	
	DI3- OP	Digital input 3	
	DI4- OP	Digital input 4	
	DI5- OP	High-speed pulse input	Besides features of DI1–DI4, it can be used for high-speed pulse input. Maximum input frequency: 100 kHz
Analog output	AO1-GND	Analog output 1	Voltage or current output is decided by jumper J5. Output voltage range: 0–10 V Output current range: 0–20 mA
Digital output	DO1-CME	Digital output 1	Optical coupling isolation, dual polarity open collector output Output voltage range: 0–24 V Output current range: 0–50 mA Note that CME and COM are internally insulated, but they are shorted by jumper externally. In this case DO1 is driven by +24 V by default. If you want to drive DO1 by external power supply, remove the jumper.
	FM- COM	High-speed pulse output	It is limited by P5-00 (FM terminal output mode selection). As high-speed pulse output, the maximum frequency hits 100 kHz. As open-collector output, its specification is the same as that of DO1
Relay output	T/A-T/B	NC terminal	Contact driving capacity: 250 VAC, 3 A, COSø = 0.4 30 VDC, 1 A Applying to Overvoltage Category II circuit
	T/A-T/C	NO terminal	
Auxiliary interface	J12	Extension card interface	I28-pin terminal Connect to an optional card (I/O extension card, PLC card and various bus cards)
	J3	PG card interface	Support various types of PG cards: OC, differential, UVW and resolver.
	J7	External operation panel interface	Connect to external operation panel.

3.2.4 Wiring of AC Drive Control Circuit

Figure 3-14 Wiring mode of the AC drive control circuit



Note

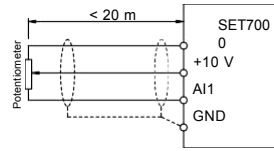
- All SET750 series AC drives have the same wiring mode. The figure here shows the wiring of single-phase 220 VAC drive. ◎ indicates main circuit terminal, while ○ indicates control circuit terminal.
- When the external operation panel is connected, the display of the operation panel on the SET750 goes off.

■ Description of Wiring of Signal Terminals

1) Wiring of AI terminals

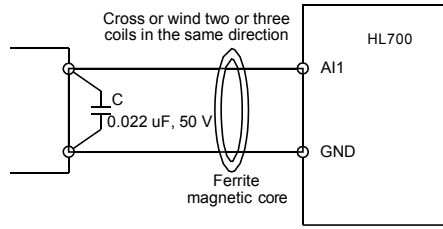
Weak analog voltage signals are easy to suffer external interference, and therefore the shielded cable must be used and the cable length must be less than 20 m, as shown in following figure.

Figure 3-15 Wiring mode of AI terminals



In applications where the analog signal suffers severe interference, install filter capacitor or ferrite magnetic core at the analog signal source.

Figure 3-16 Install filter capacitor or ferrite magnetic core

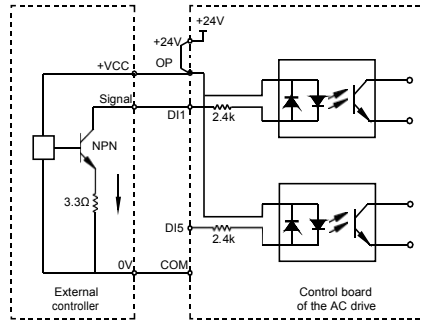


2) Wiring of DI terminals

Generally, select shielded cable no longer than 20 m. When active driving is adopted, necessary filtering measures shall be taken to prevent the interference to the power supply. It is recommended to use the contact control mode.

a. SINK wiring

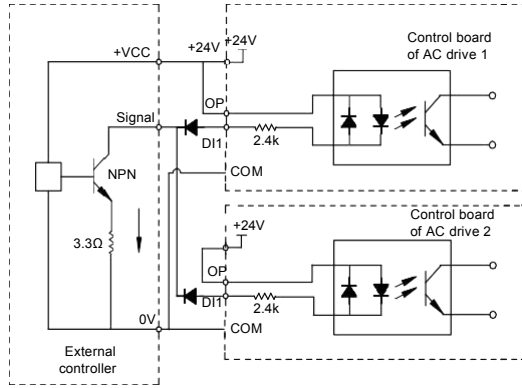
Figure 3-17 Wiring in SINK mode



This is the most commonly used wiring mode. To apply external power supply, remove jumpers between +24 V and OP and between COM and CME, and connect the positive pole of external power supply to OP and negative pole to CME.

In such wiring mode, the DI terminals of different AC drives cannot be connected in parallel. Otherwise, DI mal-function may result. If parallel connection (different AC drives) is required, connect a diode in series at the DI and the diode needs to satisfy the requirement: IF > 10 mA, UF < 1 V.

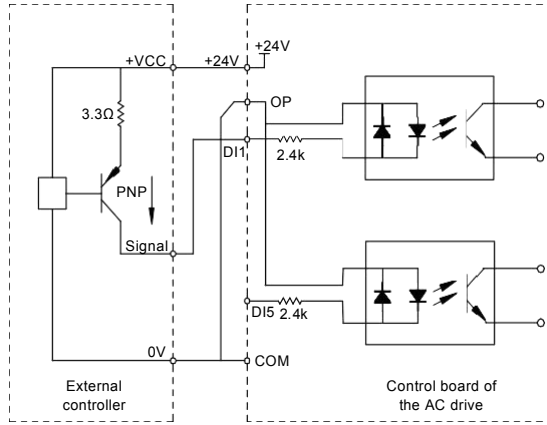
Figure 3-18 DI terminals connected in parallel in SINK mode



b. SOURCE wiring

In such wiring mode, remove the jumper between +24 V and OP. Connect +24 V to the common port of external controller and meanwhile connect OP to COM. If external power supply is applied, remove the jumper between CME and COM.

Figure 3-19 Wiring in SOURCE mode



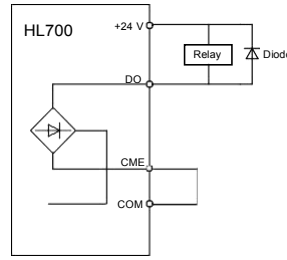
3) Wiring of DO terminal

When the digital output terminal needs to drive the relay, an absorption diode shall be installed between two sides of the relay coil. Otherwise, it may cause damage to the 24 VDC power supply. The driving capacity is not more than 50 mA.

Note

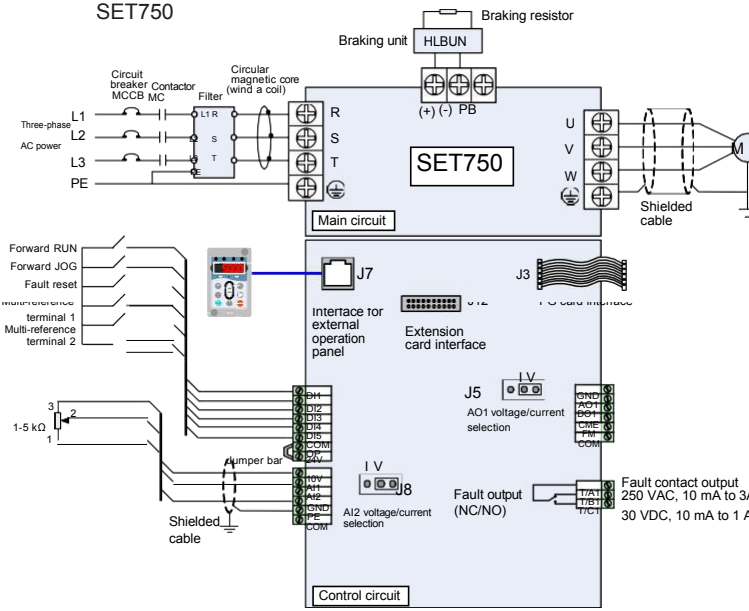
Do not reverse the polarity of the absorption diode during installation, as shown in Figure 3-11. Otherwise, the 24 VDC power supply will be damaged immediately once there is digital output.

Figure 3-20 DO terminal wiring diagram



3.2.5 Electric Wiring of the SET750

Figure 3-21 Electric wiring of the SET750



4

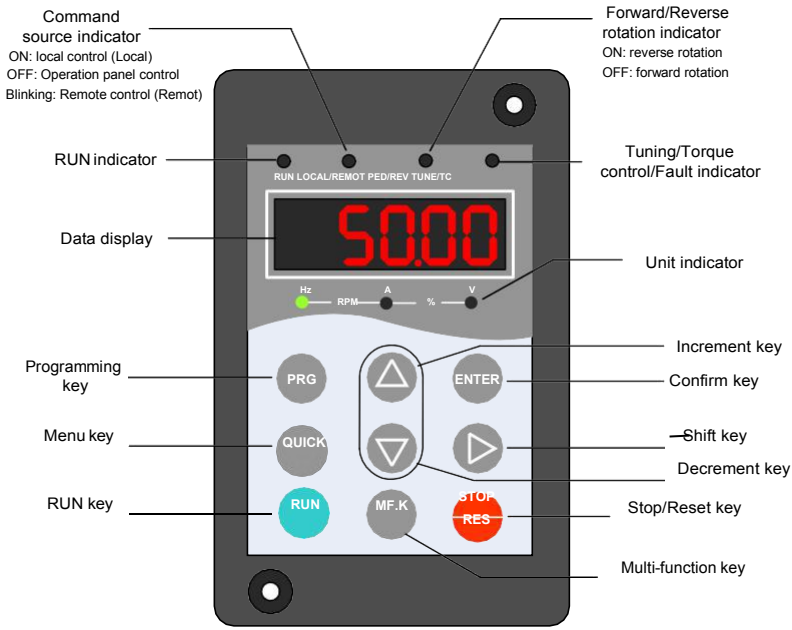
Operation, Display and Application Examples

Chapter 4 Operation, Display and Application Examples

4.1 Operation Panel

You can modify the parameters, monitor the working status and start or stop the SET750 by operating the operation panel, as shown in the following figure.

Figure 4-1 Diagram of the operation panel



4.1.1 Description of Indicators

- RUN

  ON indicates that the AC drive is in the running state, and OFF indicates that the AC drive is in the stop state.

- LOCAL/REMOT

  It indicates whether the AC drive is operated by means of operation panel, terminals or communication.

○LOCAL/REMOT: OFF	Operation panel control
●LOCAL/REMOT: ON	Terminal control
◑LOCAL/REMOT: blinking	Communication control

- FWD/REV

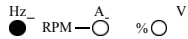
  ON indicates reverse rotation, and OFF indicates forward rotation.

- TUNE/TC

  When the indicator is ON, it indicates torque control mode. When the indicator is blinking slowly, it indicates the auto-tuning state. When the indicator is blinking quickly, it indicates the fault state.

- Unit Indicators

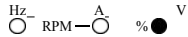
  ● means that the indicator is ON, and ○ means that the indicator is OFF.

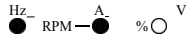
  Hz: unit of frequency

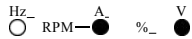
  A: unit of current

  V: unit of voltage

  RPM: unit of rotational speed

  %: percentage

- Digital Display

  The 5-digit LED display is able to display the set frequency, output frequency, monitoring data and fault codes.

4.1.2 Description of Keys on the Operation Panel

Table 4-1 Description of keys on the operation panel

Key	Name	Function
PRG	Programming	Enter or exit Level I menu.
ENTER	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting.
△	Increment	Increase data or function code.
▽	Decrement	Decrease data or function code.
▷	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
RUN	RUN	Start the AC drive in the operation panel control mode.

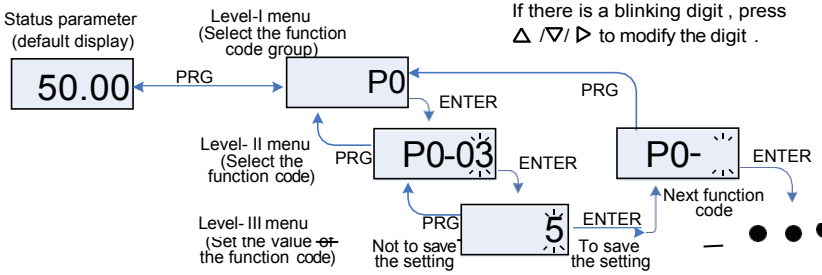
Key	Name	Function
STOP RES	Stop/Reset	Stop the AC drive when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted in P7-02.
MF.K	Multifunction	Perform function switchover (such as quick switchover of command source or direction) according to the setting of P7-01.
QUICK	Menu mode selection	Perform switchover between menu modes according to the setting of PP-03.

4.2 Viewing and Modifying Function Codes

The operation panel of the SET750 adopts three-level menu.

The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the following figure.

Figure 4-2 Operation procedure on the operation panel

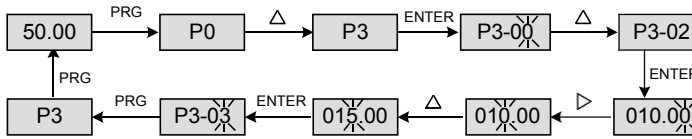


You can return to Level II menu from Level III menu by pressing PRG or ENTER.

- After you press ENTER, the system saves the parameter setting first, and then goes back to Level II menu and shifts to the next function code.
- After you press PRG, the system does not save the parameter setting, but directly returns to Level II menu and remains at the current function code.

Here is an example of changing the value of P3-02 to 15.00 Hz.

Figure 4-3 Example of changing the parameter value



In Level III menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:

- Such a function code is only readable, such as, AC drive model, actually detected parameter and running record parameter.
- Such a function code cannot be modified in the running state and can only be changed at stop.

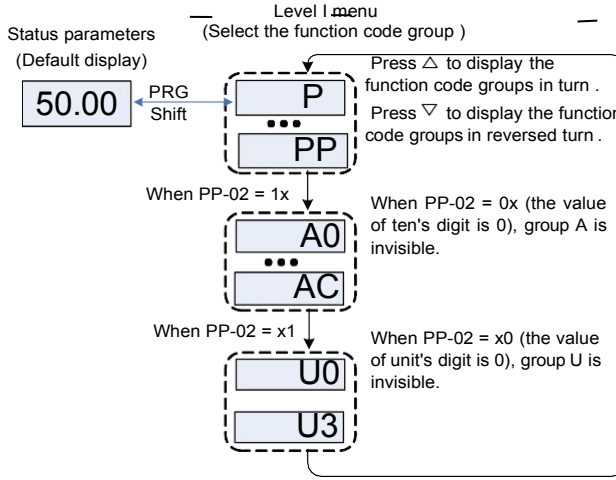
4.3 Structure of Function Codes

The SET750, an advanced product based on HL320, groups A and U, and new function codes to group F.

Function Code Group	Function	Description
P0 to P9, PA to PE, PP	Standard AC drive function code group	Compatible with HL320 series function codes and adding some function codes.
A0 to A8, AC	Advanced function code group	Multi-motor parameters, AI/AO correction, optimization control, PLC card extension function setting.
U0 to U3	Running state function code group	Display of AC drive basic parameters

In the function code display state, select the required function code by pressing the key  or  , as shown in the following figure.

Figure 4-4 Selecting the required function code



PP-02 is used to determine whether group A and group U are displayed.

Function Code	Parameter Name	Setting Range	Default
PP-02	AC drive parameter display property	Unit's digit (group U display selection) 0: Not display 1: Display Ten's digit (group A display selection) 0: Not display 1: Display	11

4.4 Quick View of Function Codes

The SET750 provides two quick modes of viewing the required function codes.

1) You can define a maximum of 30 function codes into group PE.

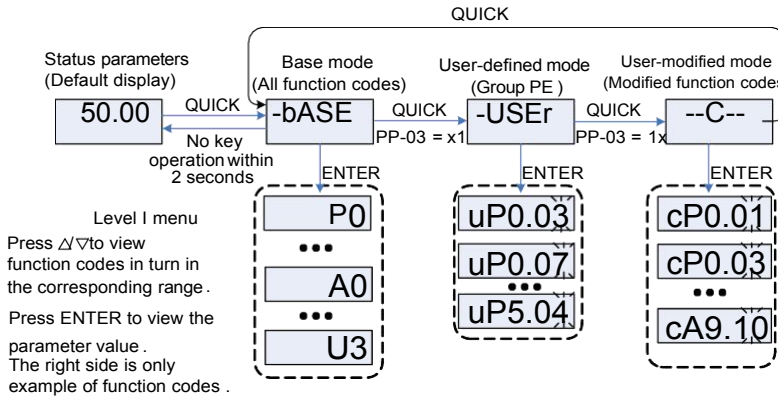
2) The SET750 automatically list the modified function codes.

In this case, the operation panel provides three viewing modes: base mode, user-defined mode and user-modified mode, as listed in the following table.

Function Code Display Mode	Display
Base mode	-bASE
User-defined mode	-USEr
User-modified mode	--C--

You can perform switchover between the three function code display modes by pressing QUICK. The method of viewing and modifying function codes in each mode is the same as the method of operating the operation panel described above.

Figure 4-5 Switchover between three function code display modes



PP-03 is used to determine whether the user-defined group and user-modified group are displayed.

Function Code	Parameter Name	Setting Range	Default
PP-03	Individualized parameter display property	Unit's digit: -USEr group display selection	11
		0: Not display 1: Display	
		Ten's digit: --C-- group display selection	
		0: Not display 1: Display	

-bASE

It indicates all function codes of the SET750. After the mode is switched over to -bASE, level I menu is displayed.

-USEr

The user-defined menu is set to facilitate viewing and modifying of commonly used function codes. In this mode, the display parameter uP3.02 indicates function code P3-02. You can also modify parameters in this mode as in common editing state. After the mode is switched over to -USEr, level II menu is displayed.

The user-defined parameters are included in group PE. If PE is set to P0.00, it indicates that no function codes are available. A maximum of 30 parameters can be included in group PE. If "NULL" is displayed, it indicates that the user-defined menu is null.

A total of 16 parameters are pre-stored in the user-defined menu, as listed in the following table.

P0-01	Motor 1 control mode	P3-01	Torque boost
P0-02	Command source selection	P4-00	DI1 function selection
P0-03	Main frequency source X selection	P4-01	DI2 function selection
P0-07	Frequency source selection	P4-02	DI3 function selection
P0-08	Preset frequency	P5-04	DO1 function
P0-17	Acceleration time 1	P5-07	AO1 function selection
P0-18	Deceleration time 1	P6-00	Start mode
P3-00	V/F curve setting	P6-10	Stop mode

You can edit the user-defined menu based on actual requirements.

--C--

In you modified menu, only the parameters that are modified to a non-default value are displayed. The menu is generated by the AC drive automatically. After the mode is switched over to --C--, level II menu is displayed.

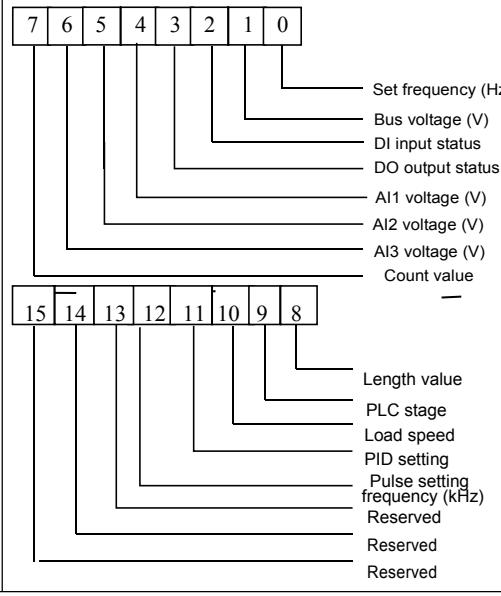
4.5 Definition and Operation of the Multifunction Key (MF.K)

You can define the function (command source switchover or rotation direction switchover) of the multifunction key in P7-01. For details, see the description of P7-01.

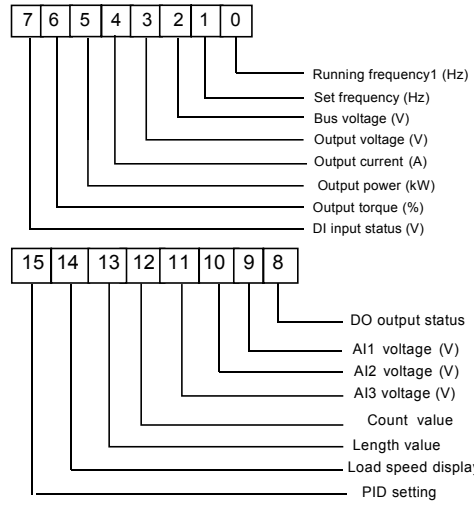
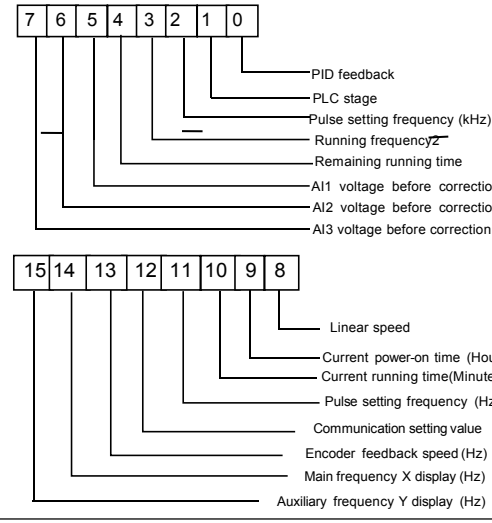
4.6 Viewing Status Parameters

In the stop or running state, you can press on the operation panel to display status parameters. Whether parameters are displayed is determined by the binary bits of values converted from the values of P7-03, P7-04, and P7-05 in the hexadecimal format.

In stop state, a total of 13 status parameters can be displayed, as listed in the following table.

Function Code	Parameter Name	Setting Range	Default
P7-05	LED display stop parameters	0000–FFFF 	33

In running state, five running status parameters are displayed by default, and you can set whether other parameters are displayed by setting P7-03 and P7-04, as listed in the following table.

Function Code	Parameter Name	Setting Range	Default
P7-03	LED display running parameters 1		1F
P7-04	LED display running parameters 2		0

When the AC drive is powered on again after power failure, the parameters that are selected before power failure are displayed.

Select the required parameters by pressing  . Set the values of the parameters by referring to the following example.

1. Determine the parameters to be displayed.

   Running frequency, Bus voltage, Output voltage, Output current, Output frequency, Output torque, PID feedback, Encoder feedback speed

2. Set the binary data.

   P7-03: 0000 0000 0111 1101B, P7-04: 0010 0000 0000 0001B

3. Convert the binary data to hexadecimal data:

   P7-03: 007DH, P7-04: 2001H

   The values displayed on the operation panel are respectively H.1043 and H.2001 respectively for P7-03 and P7-04.

4.7 Starting or Stopping the AC Drive

4.7.1 Selecting the Start/Stop Command Source

There are three start/stop command sources, namely, operation panel control, terminal control, and communication control. You can select the command source in P0-02.

Function Code	Parameter Name	Setting Range	Description	Default
P0-02	Command source selection	0: Operation panel control (indicator OFF) 1: Terminal control (indicator ON) 2: Communication control (indicator blinking)	Press RUN or STOP/RES to start or stop the AC drive. A DI terminal needs to be defined as the run/stop terminal. The Modbus-RTU communication protocol is used.	0

- 0: Operation panel control

  After you press RUN, the AC drive starts running (the RUN indicator is ON). After you press STOP/RES when the AC drive is in running state, the AC drive stops running (the RUN indicator is OFF).

- 1: Terminal control

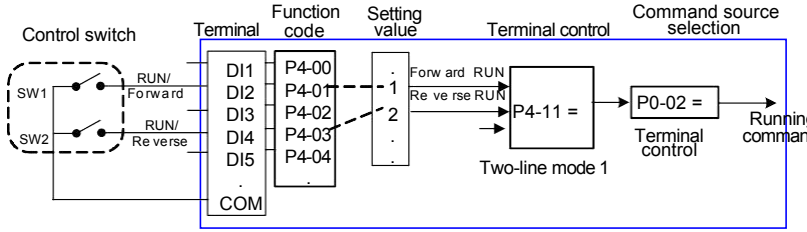
  This control mode is applicable to scenarios where the DIP switch or electromagnetic button is used to start or stop the application system or scenarios where the dry contact signal is used to start or stop the AC drive.

The switch signal mode is set in P4-11. The input terminal of the start/stop signal is set in P4-00 to P4-09. For details, see the description of P4-11 and P4-00 to P4-09.

Example 1:

To use the DIP switch as the start/stop source, and allocate the forward rotation switch signal to DI2 and the reverse rotation switch signal to DI3, perform the setting as shown in the following figure.

Figure 4-6 Setting of using the DIP switch for start/stop

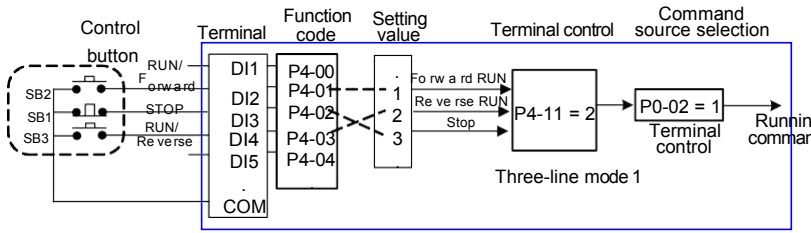


In the preceding figure, when SW1 is ON, the AC drive instructs forward rotation; when SW1 is OFF, the AC drive stops. When SW2 is ON, the AC drive instructs reverse running; when SW2 is OFF, the AC drive stops. If SW1 and SW2 are ON or OFF simultaneously, the AC drive stops.

Example 2:

To use the electromagnetic button as the start/stop source, and allocate the startup signal to DI2, stop signal to DI3 and reverse rotation signal to DI4, perform the setting as shown in the following figure.

Figure 4-7 Setting of using the electromagnetic button for start/stop



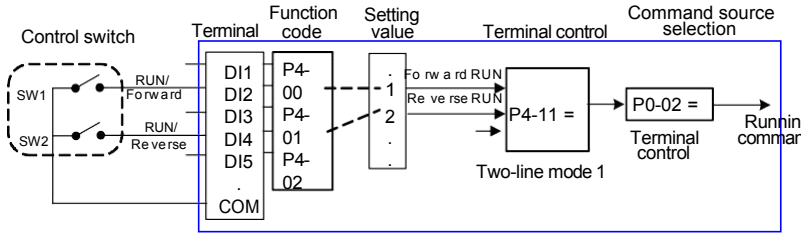
In the preceding figure, SB1 must stay ON during normal start and running. The AC drive stops immediately after SB1 becomes OFF. The signals from SB2 and SB3 become valid once they become ON. The running state of the AC drive is determined by the final actions on the three buttons.

- 2: Communication control

  The most common configuration is when the host computer is used to control running of the AC drive by means of communication, such as the RS485, PROFIBUS-DP, CANlink, and CANopen. The SET750 interacts with the user programmable card also by means of communication.

  Install a matching communication card in the multifunction extension port, and set P0-02 to 2. Then, you can start or stop the AC drive in communication mode. The following figure shows the setting method.

  Figure 4-8 Setting for start/stop using the communication control mode



When Pd-04 is set to a non-zero number, the function of automatic AC drive stop upon communication timeout is enabled. This prevents uncontrollable AC drive running due to faults of the communication cable or the host computer.

The communication port of the AC drive supports the Modbus-RTU protocol, and the communication is implemented only when the host computer supports the Modbus-RTU master station protocol.

4.7.2 Start Mode

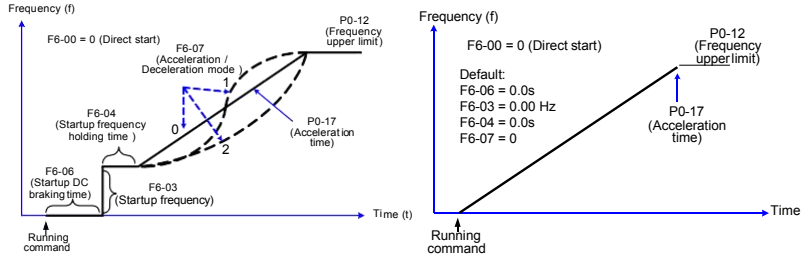
The SET750 supports three start modes, namely, direct start, rotational speed tracking restart, and pre-excited start (asynchronous motor), set in P6-00.

- P6-00 = 0 (direct start)

  It is applicable to small-inertia load. The frequency curve in this mode is shown in the following figure.

  DC braking before the start is applicable to drive of load such as elevator and crane. Startup frequency is applicable to drive with burst start under start torque, such as cement mixer.

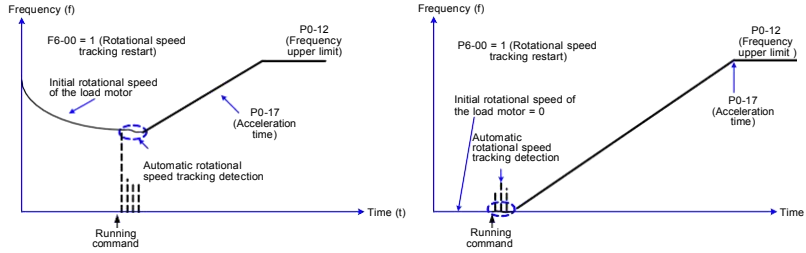
Figure 4-9 Frequency curve of direct start



- P6-00 = 1 (Rotational speed tracking restart)

It is applicable to large-inertia load. The frequency curve in this mode is shown in the following figure. If the load motor is still rotating due to the inertia when the AC drive starts, this mode is used to prevent start overcurrent.

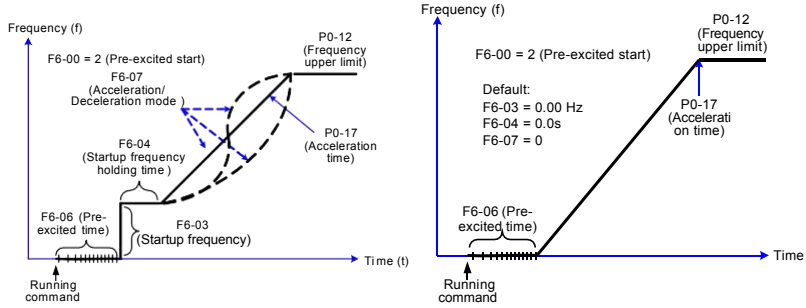
Figure 4-10 Frequency curve of rotational speed tracking restart



- P6-00 = 2 (Pre-excited start)

It is applicable only to inductive asynchronous motor. The AC drive performs pre-excitation before start, improving quick response of the motor and meeting the requirements of short acceleration time. The frequency curve in this mode is shown in the following figure.

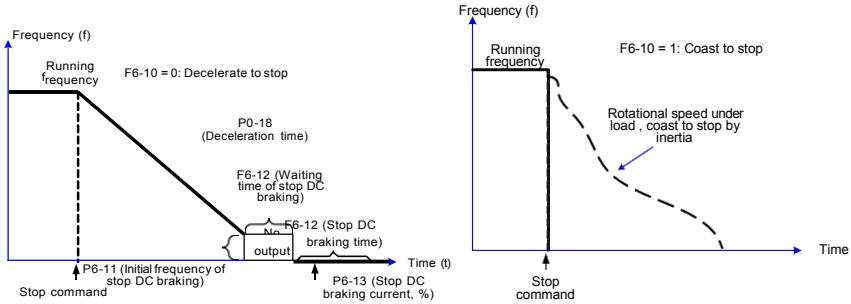
Figure 4-11 Frequency curve of pre-excited start



4.7.3 Stop Mode

The AC drive supports two stop modes, decelerate to stop and coast to stop, set in P6-10.

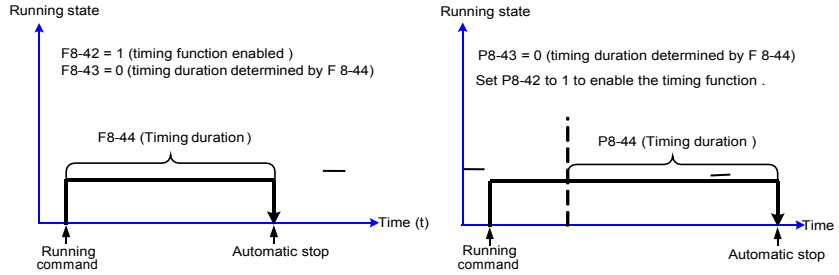
Figure 4-12 Diagram of two stop modes (decelerate to stop and coast to stop)



4.7.4 Timing Stop

The SET750 supports timing stop. This function is enabled by P8-42 and the timing duration is determined by P8-43 and P8-44.

Figure 4-13 Setting of the timing stop function

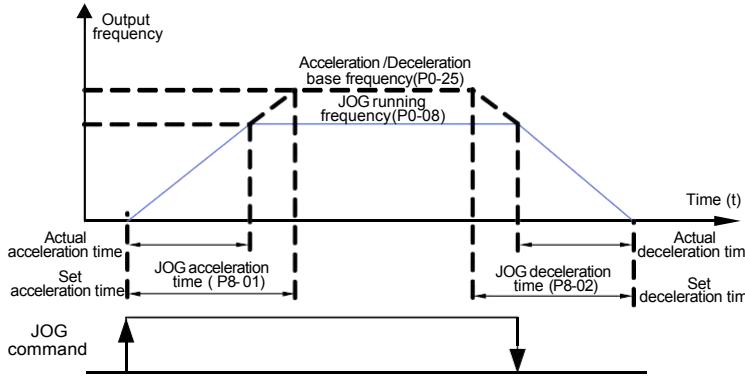


You can set the timing duration by means of analog input (such as potentiometer signal). For details, see the description of P8-43.

4.7.5 JOG Running

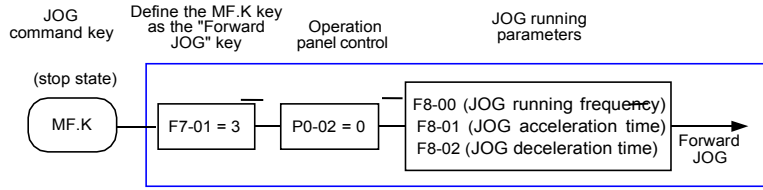
In certain applications, the AC drive needs to run in low speed temporarily to facilitate equipment test or other commissioning operations. In this case, you can set the AC drive to perform JOG running.

Figure 4-14 JOG running



■ Parameter Setting and Operation of JOG Running in Operation Panel Control

Figure 4-15 JOG running in operation panel control



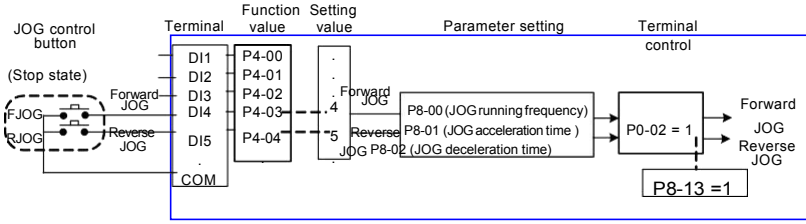
Set the parameters according to the preceding figure. In stop state of the AC drive, hold down MF.K, and the AC drive starts JOG running. After you release MF.K, the AC drive decelerates to stop.

To perform reverse JOG, set P7-01 to 4 and P8-13 to 1. Hold down MF.K and the AC drive starts reverse JOG running.

■ Parameter Setting and Operation of JOG Running in DI Terminal Control

For equipment that requires frequent JOG operations, such as textile machine, it is more convenient to control JOG running by using keys or buttons. To achieve convenient control, perform the setting according to the following figure.

Figure 4-16 JOG running in DI terminal control



After performing the setting according to the preceding figure, press the FJOG button in stop state of the AC drive. Then, the AC drive starts forward JOG. After you press the FJOG button again, the AC drive decelerates to stop.

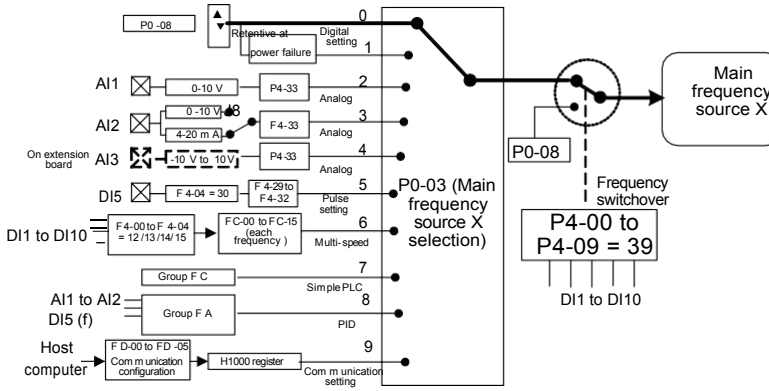
4.8 Setting the Running Frequency

The AC drive provides two frequency sources, namely, main frequency source X and auxiliary frequency source Y. You can select one frequency source and switch over between the two sources. You can also perform superposition on the two sources by setting the calculation formula to meet different control requirements of different scenarios.

4.8.1 Frequency Setting by the Main Frequency Source

There are nine setting modes of main frequency sources, digital setting (UP/DOWN modification, non-retentive at power failure), digital setting (UP/DOWN modification, retentive at power failure), AI1, AI2, AI3, pulse setting, multi-reference, simple PLC, and communication setting. You can select one in P0-03.

Figure 4-17 Frequency set by the main frequency source



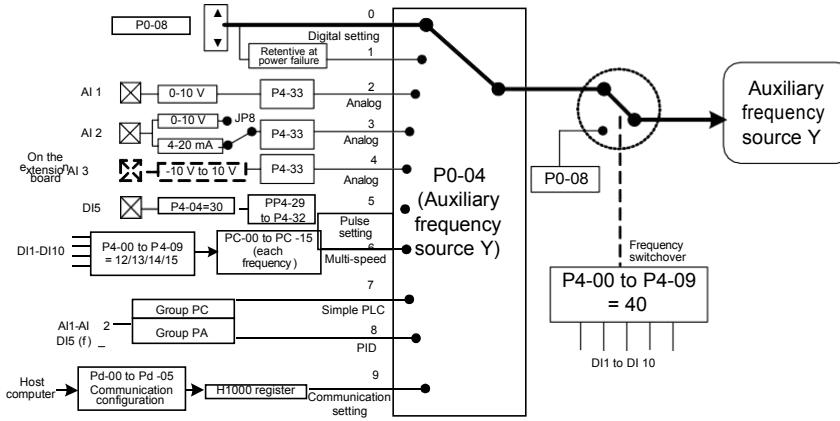
According to the preceding figure, the running frequency of the AC drive can be set by means of function codes, manual adjustment, analog input, multi-speed terminal, external feedback signal, internal PID regulator, or the host computer.

Set the corresponding function codes of each frequency setting mode, as shown in the preceding figure.

4.8.2 Frequency Setting by the Auxiliary Frequency Source

The frequency setting by the auxiliary frequency source is the same as the frequency setting by the main frequency source. You can set the auxiliary frequency source in P0-04.

Figure 4-18 Frequency set by the auxiliary frequency source

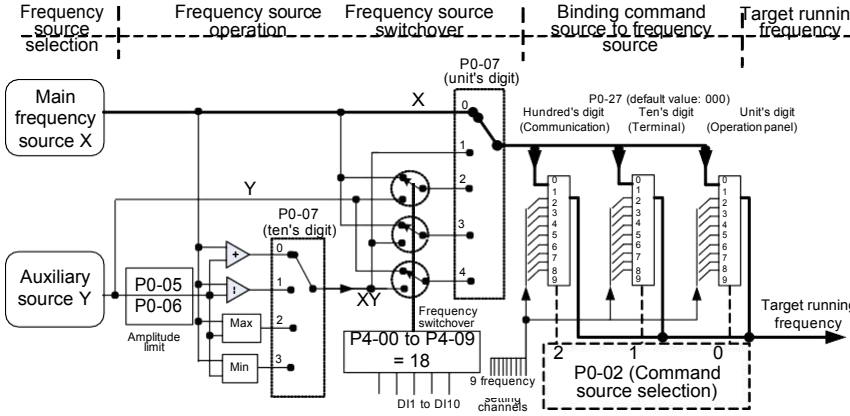


The relationship between the target running frequency and the main frequency source and auxiliary frequency source is set in P0-07, as follows:

1) Main frequency source X: The main frequency source is directly used to set the target running frequency.
2) Auxiliary frequency source Y: The auxiliary frequency source is directly used to set the target running frequency.
3) X and Y operation: There are four operation methods, namely, X+Y, X-Y, maximum of X and Y, and minimum of X and Y.
4) Frequency switchover: A DI terminal is used to switch over between the preceding three frequency setting channels.

The following figure shows how to set the relationship in P0-07, in which the bold line indicates the default setting.

Figure 4-19 Relationship between the target running frequency and main and auxiliary frequency sources



The operation between the main frequency source and the auxiliary frequency source can be used for closed-loop speed control. For example, using the main frequency source for setting the required frequency and the auxiliary frequency source for automatic adjustment, in conjunction with switchover performed by the external DI terminal signal, the required closed-loop control can be implemented.

4.8.3 Binding Command Source to Frequency Source

The three command sources can be separately bound to frequency sources, as shown in Figure 4-19. When the specified command source (P0-02) is bound to a frequency source (corresponding digit in the value of P0-27), the frequency is determined by the frequency setting channel set in P0-27. In this case, both main and auxiliary frequency sources are ineffective.

4.8.4 AI as the Frequency Source

The AI terminal can be used as the frequency source. The SET750 provides two AI terminals (AI1 and AI2) on the control board, and the optional I/O extension card provides another AI terminal (AI3).

The following figures show how to use the AI as the frequency source.

Figure 4-20 Voltage input of AI1 connected to the potentiometer as the frequency source (2–10 V corresponding to 10–40 Hz)

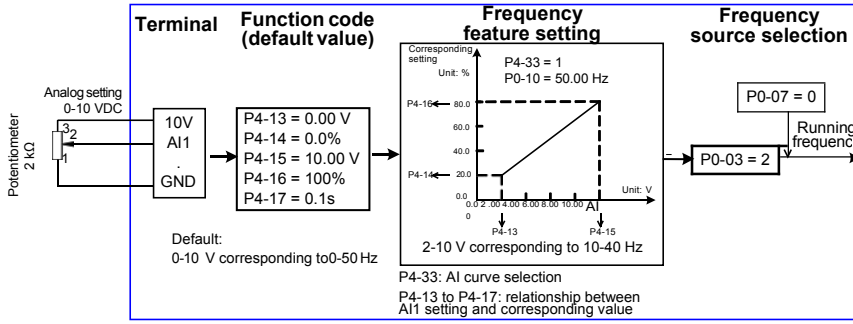
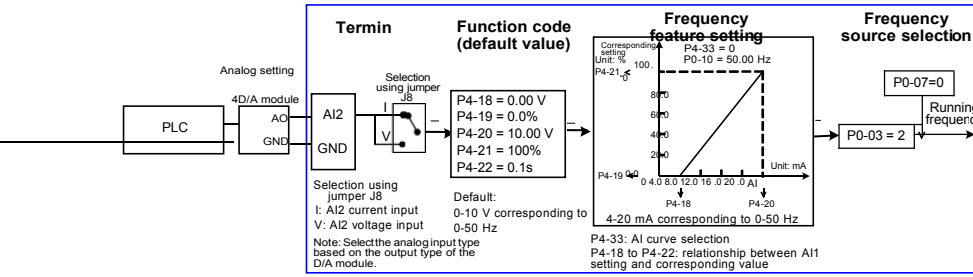


Figure 4-21 Current input of AI2 connected to 4DA module of the PLC as the frequency source (4–20 mA corresponding to 0–50 Hz)



Note

1. SET750 provides two AI terminals (AI1 and AI2) on the control board, and the optional I/O extension card provides another AI terminal (AI3).

2. AI1 provides 0–10 V voltage input. AI2 provides 0–10 V voltage input or 4–20 mA current input, determined by jumper J8 on the control board. AI3 provides -10 V to +10 V bipolar voltage input.

3. When AI is used as the frequency source, 100% of the voltage or current input corresponding setting corresponds to the maximum frequency in P0-10.

4. When the temperature transmitter is used for analog setting, it must be connected to AI3 on the I/O extension card.

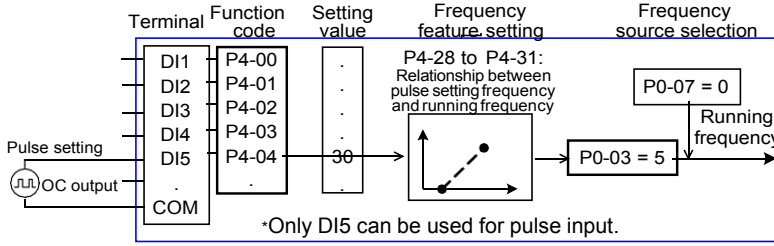
5. SET750 provides five corresponding relationship curves, which can be selected in P4-33. The input values and corresponding settings of each curve are set in P4-13 to P4-27 and group A6.

4.8.5 Pulse Setting as the Frequency Source

In many scenarios, pulse input is used as the frequency source. The specifications of pulse signals are: voltage 9–30 V, frequency 0–100 kHz.

Only DI5 can be used for pulse input. The relationship between pulse input from DI5 and the corresponding setting is set in P4-28 to P4-31. The relationship is a two-point line, and 100% of pulse input corresponding setting corresponds to the maximum frequency of P0-10, as shown in Figure 4-22.

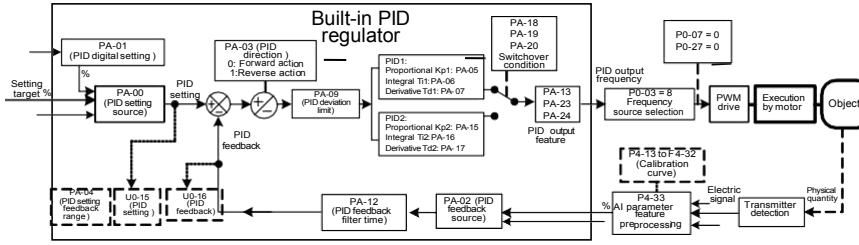
Figure 4-22 Pulse setting as the frequency source



4.8.6 Frequency Closed-Loop Control

The SET750 has a built-in PID regulator. Together with the frequency sources, the PID regulator can implement automatic adjustment of progress control, such as constant temperature, constant pressure, and tension control.

Figure 4-23 Automatic adjustment by PID regulator



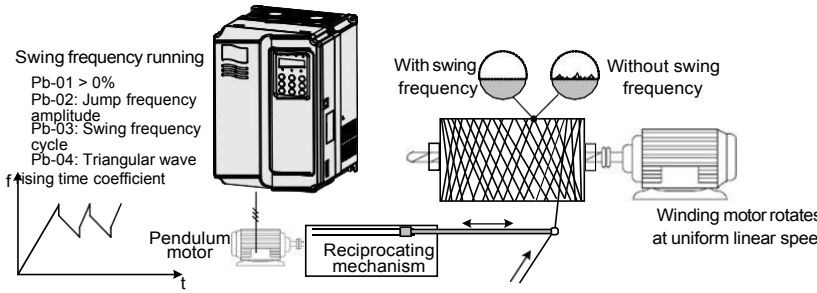
When PID frequency closed-loop control is implemented, P0-03 (Main frequency source X selection) must be set to 8 (PID). The PID-related parameters are set in group PA, as shown in Figure 4-23.

The SET750 has two built-in equivalent PID calculating units. You can set the features, such as adjustment speed and accuracy, for the two units separately based on the actual conditions. Switchover between the two units can be implemented automatically or by means of an external DI terminal.

4.8.7 Swing Mode

For the textile and chemical fiber processing equipment, the swing function improves the uniform density of traversing and winding, as shown in Figure 4-24. The function is set in Pb-00 to Pb-04. For details, see the description of these function codes.

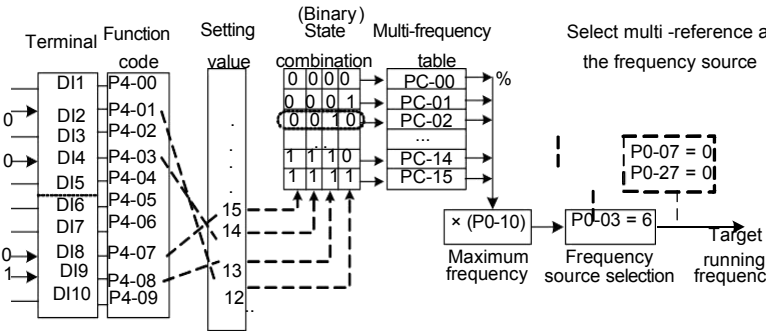
Figure 4-24 Swing function



4.8.8 Multi-Speed Mode

In scenarios where the running frequency of the AC drive need not be adjusted continuously and only several frequencies are required, the multi-speed control can be used. The SET750 supports a maximum of 16 running frequencies, which are implemented by state combinations of four DI terminals. Set the function codes corresponding to DI terminals to a value among 12 to 15, and then the DI terminals are specified as the multi-frequency input terminals. The multiple frequencies are set based on the multi-frequency table in group PC. In addition, you need to set P0-03 (Main frequency source X selection) to 6 (Multi-reference). The following figure shows how to set the multi-speed function.

Figure 4-25 Setting the multi-speed function



In the preceding figure, DI7, DI4, DI8, and DI2 are used as the multi-frequency input terminals, each of which has a bit value. The state combinations of these terminals correspond to multiple frequencies, When (DI7, DI4, DI8, DI2) = (0, 0, 1, 0), the state combination value is 2, corresponding to the value set in PC-02. The target running frequency is automatically calculated by PC-02 x P0-10.

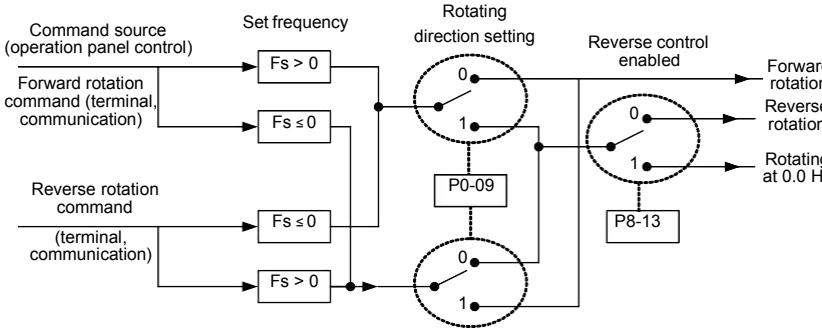
The SET750 supports a maximum of four DI terminals to be used as the multi-frequency input terminals. You can also use less than four DI terminals, and the empty bit is considered to be 0.

4.8.9 Setting the Motor Rotating Direction

After the AC drive restores the default settings, press RUN to drive the motor to rotate. In this case, the rotating direction is regarded as the forward rotation. If the rotating direction is reverse to the direction required by the equipment, power off the AC drive and exchange any two of the output UVW cables (wait until the main capacitor of the AC drive is completely discharged).

In some applications where both forward rotation and reverse rotation are required, enable the reverse control (P8-13 = 0, default value) and meanwhile reverse the rotating direction by setting P0-09 to 1. Then press RUN to make the motor rotate in the reverse direction, as shown in the following figure.

Figure 4-26 Reversing the motor rotating direction



If the command source is terminal control and reverse rotation is required, use the default value 0 of P8-13 to enable reverse control.

According to the preceding figure, when the running frequency of the AC drive is set by means of communication (P0-03 = 9) and reverse control is enabled (P8-13 = 0), the AC drive instructs the reverse direction if the set frequency Fs is a negative value.

If the give running command is reverse rotation or the set frequency is a negative value, but reverse control is disabled (P8-13 = 1), the AC drive will run at 0 Hz and has no output.

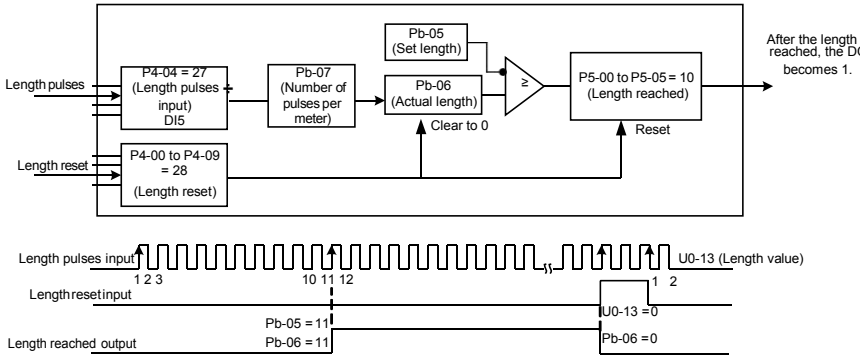
In some applications where reverse rotation is prohibited, do not change the rotating direction by modifying the function codes because the function codes will be restored once the AC drive restores the default settings.

4.8.10 Setting the Fixed Length Control Mode

The SET750 has the fixed length control function. The length pulses are sampled by the DI allocated with function 27 (Length count input). The "Actual length" (Pb-06) is obtained by dividing the number of pulses sampled by the value of Pb-07 (Number of pulses per meter). If the actual length is larger than the "Set length" (Pb-05), the multifunctional DO terminal becomes ON.

In the process of fixed length control, the length can be reset by means of the DI terminal allocated with function 28 (Length reset). The related setting is shown in the following figure.

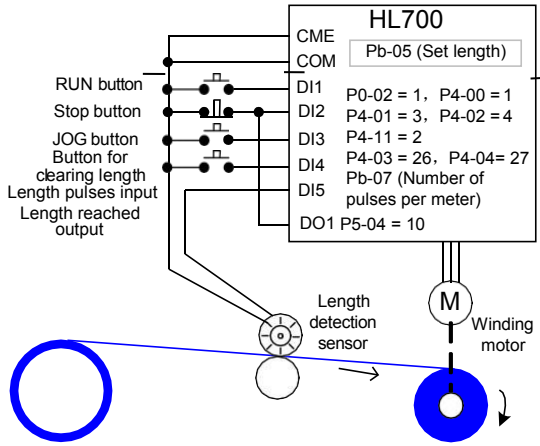
Figure 4-27 Function code setting for fixed length control



Note

- In the fixed length control mode, the direction cannot be identified and only the length shall be calculated based on the number of pulses.
- Only DI5 can be allocated with the function "Length count input".
- An automatic stop system can be implemented if the length reached signal output by the DO is fed back to the AC drive input terminal with the stop function.

Figure 4-28 Common application example of the fixed length control function

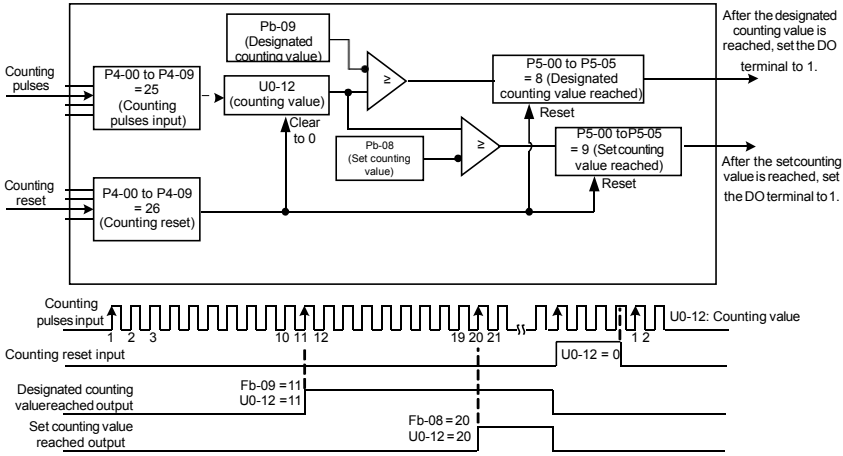


4.8.11 Use of the Counting Function

The count value needs to be collected by the DI terminal that is allocated with function 25. When the count value reaches Pb-08 (Set count value), the DO terminal allocated with function 8 (Set count value reached) becomes ON. Then the counter stops counting.

When the count value reaches Pb-09 (Designated count value), the DO terminal allocated with function 9 (Designated count value reached) becomes ON. The counter continues to count until "Set count value" is reached.

Figure 4-29 Parameter setting in the counting mode



Note

- Pb-09 (Designated count value) must not be greater than Pb-08 (Set count value).
- DI5 must be used when the pulse frequency is high.
- The DO terminal that is allocated with function 9 (Designated count value reached) and the DO terminal that is allocated with function 8 (Set count value reached) must not be the same.
- In the RUN/STOP state of the AC drive, the counter will not stop until "Set count value" is reached.
- The count value is retentive at power failure.
- An automatic stop system can be implemented if the signal output by the DO terminal with the function (Count value reached) is fed back to the DI terminal of the AC drive with stop function.

4.9 Setting and Auto-tuning of Motor Parameters

4.9.1 Motor Parameters to Be Set

When the AC drive runs in the vector control mode (P0-01 = 0 or 1), accurate motor parameters are required to ensure desired driver performance and running efficiency. This is extremely different from the V/F control (P0-01 = 2).

Motor parameters (motor 1 by default) that need to be set are listed in the following table.

Table 4-2 Motor parameters to be set

Parameter	Description	Remark
P1-00	Motor type	Asynchronous motor, variable-frequency asynchronous motor, synchronous motor
P1-01 to P1-05	Rated motor power, Rated motor voltage, Rated motor current, Rated motor frequency, Rated motor rotational speed	Model parameters, manual input
P1-06 to P1-20	Motor internal equivalent stator resistance, inductive reactance and rotor inductance	Auto-tuning parameters
P1-27/28/34	Encoder parameters (these parameters need to be set in the vector control mode with sensor)	Encoder parameters

For complicated application system with multiple motors, the parameters of motors 2, 3, and 4 are listed in the following table.

Table 4-3 Motors 2, 3, and 4 parameters to be set

Motor 2 Parameters	Motor 3 Parameters	Motor 4 Parameters	Description
A2-00	A3-00	A4-00	Asynchronous motor, variable-frequency asynchronous motor, synchronous motor
A2-01 to A2-05	A3-01 to A3-05	A4-01 to A4-05	Model parameters, manual input
A2-06 to A2-20	A3-06 to A3-20	A4-06 to A4-20	Auto-tuning parameters
A2-27, A2-28, A2-34	A3-27, A3-28, A3-34	A4-27, A4-28, A4-34	Encoder parameters

4.9.2 Motor Auto-tuning

To obtain the motor parameters, the AC drive can perform dynamic auto-tuning or static auto-tuning. For the asynchronous motor that cannot be disconnected from the load, you can input the motor parameters of the same model that was successfully auto-tuned before.

Auto-tuning	Application	Result
No-load dynamic auto-tuning	It is applied to applications where the motor (synchronous motor or asynchronous motor) can be disconnected from the load.	Best
With-load dynamic auto-tuning	It is applied to applications where the motor (synchronous motor or asynchronous motor) cannot be disconnected from the load.	OK
Static auto-tuning	It is applied to applications where the motor (asynchronous motor only) cannot be disconnected from the load and dynamic auto-tuning is not allowed.	Poor
Manual input	It is applied to applications where the motor (asynchronous motor only) cannot be disconnected from the load. Input the motor parameters of the same model that was successfully auto-tuned before into function codes P1-00 to P1-10.	OK

The following motor auto-tuning description takes motor 1 as an example. The auto-tuning of motor 2, 3, and 4 is the same and only the function codes are changed correspondingly.

The process of motor auto-tuning is as follows:

1) If the motor can be disconnected from the load, disconnect the motor from the load mechanically after power-off so that the motor can run without load.

2) After power-on, set P0-02 (Command source selection) to 0 (Operation panel control).

3) Input the motor nameplate parameters (such as P1-00 to P1-05) correctly and input the following parameters based on the actually selected motor.

Motor	Parameter
Motor 1	P1-00: Motor type selection P1-01: Rated motor power P1-02: Rated motor voltage P1-03: Rated motor current P1-04: Rated motor frequency P1-05: Rated motor rotational speed
Motor 2	A2-00 to A2-05, defined the same as P1-00 to P1-05
Motor3	A3-00 to A3-05, defined the same as P1-00 to P1-05
Motor 4	A4-00 to A4-05, defined the same as P1-00 to P1-05

For asynchronous motor, set P1-37 (Auto-tuning selection) to 2 (Asynchronous motor complete auto-tuning). For motors 2, 3, or 4, the corresponding function code is A2-37/ A3-37/ A4-37. Press ENTER on the operation panel. The operation panel displays:

Then press RUN on the operation panel. The AC drive will drive the motor to accelerate/decelerate and run in the forward/reverse direction, and the RUN indicator is ON. The auto-tuning lasts approximately 2 minutes. When the preceding display information disappears and the operation panel returns to the normal parameter display status, it indicates that the auto-tuning is complete.

The AC drive will automatically calculate the following motor parameters:

Motor	Parameter
Motor 1	P1-06: Stator resistance (asynchronous motor) P1-07: Rotor resistance (asynchronous motor) P1-08: Leakage inductive reactance (asynchronous motor) P1-09: Mutual inductive reactance (asynchronous motor) P1-10: No-load current (asynchronous motor)
Motor 2	A2-06 to A2-10, defined the same as P1-06 to P1-10
Motor3	A3-06 to A3-10, defined the same as P1-06 to P1-10
Motor 4	A4-06 to A4-10, defined the same as P1-06 to P1-10

If the motor cannot be disconnected from the load, set P1-37 (Auto-tuning selection) to 1 (Asynchronous motor static tuning) and then press RUN on the operation panel. The motor auto-tuning starts.

Note

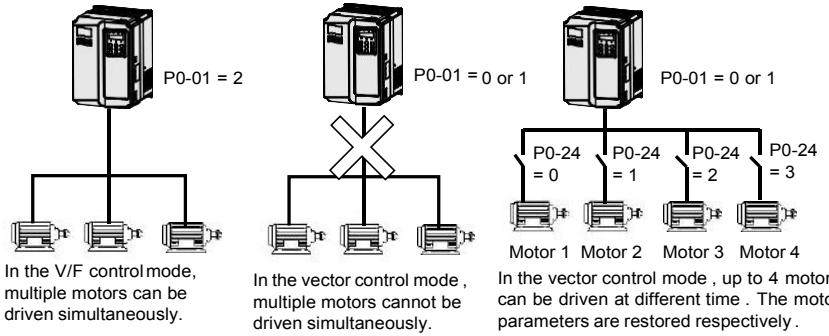
In the synchronous motor system driven by SET750, and encoder for signal feedback is required. Therefore, you need to set the encoder parameters correctly before the auto-tuning. During the synchronous motor auto-tuning, the synchronous motor must rotate, and the best auto-tuning mode is no-load dynamic auto-tuning. If it is not allowed, you can perform with-load dynamic auto-tuning.

4.9.3 Setting and Switchover of Multiple Groups of Motor Parameters

The AC drive supports switchover between four groups of motor parameters, namely, groups P1, P2 (motor 1 parameters and encoder parameters) and group A2 (motor 2 parameters), group A3 (motor 3 parameters) and group A4 (motor 4 parameters).

You can select the current effective motor parameter group by means of function code P0-24 or DI terminals with functions 41 and 42. When the DI terminals with functions 41 and 42 become ON, they are privileged and the setting of P0-24 becomes invalid.

Figure 4-30 Driving multiple motors



4.10 Use of DI Terminals

The control board provides five DI terminals DI1 to DI5. You can obtain another DI terminals DI6 to DI10 by installing an I/O extension card.

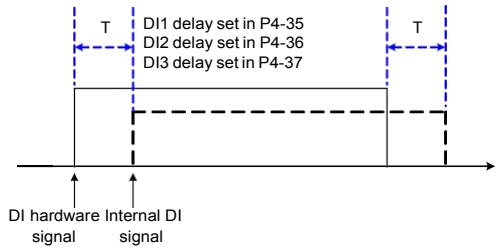
The internal hardware of DI terminals are configured with 24 VDC power supply for detection. You can input a signal to a DI terminal of the AC drive only by shorting the DI terminal and COM.

By default, P4-38 = 0000 and P4-39 = 0000. When a DI terminal is shorted to COM, it is active (logic 1). When a DI terminal is not shorted to COM, it is inactive (logic 0).

You can change the DI terminal active mode. That is, a DI terminal is inactive (logic 0) when being shorted with COM, and active (logic 1) when being not shorted to COM. In this case, it is necessary to change the corresponding bit in P4-38 and P4-39 (these two parameters respectively specifying the active mode setting of DI1 to DI5 and DI16 to DI10) to 1.

The AC drive also provides P4-10 (DI filter time) for the DI signal to improve the anti-interference level. For DI1 to DI3, the AC drive provides the DI signal delay function, convenient for some applications requiring delay.

Figure 4-31 DI delay setting



The preceding 10 DI terminals can be defined in function codes P4-00 to P4-09. Each DI can be allocated with their respective function from the 50 functions. For details, see descriptions of P4-00 to P4-09.

The hardware design allows only DI5 to receive high-speed pulse signal. If high-speed pulse count is required, use DI5.

4.11 Use of DO Terminals

The control board provides three DO terminals, namely FM, DO1 and TA/TB/TC. FM and DO1 are transistor outputs and can drive 24 VDC low-voltage circuit; TA/TB/TC is relay output, and can drive 250 VAC control circuit.

You can obtain another two terminals DO2 and PA/PB/PC by installing an I/O extension card. DO2 is transistor output and PA/PB/PC is relay output.

You can define the function of the DO terminals by setting P5-01 and P5-05 to indicate the running state and alarm information of the AC drive. There are a total of 40 functions. For details, see the descriptions of group P5.

Terminal	Corresponding Function Code	Output Feature Description
FM-CME	P5-06 when P5-00 = 0	Transistor, able to output high-speed pulses 10 Hz to 100 kHz; drive capacity: 24 VDC, 50 mA
	P5-01 when P5-00 = 1	Transistor; drive capacity: 24 VDC, 50 mA
TA-TB-TC	P5-02	Relay; drive capacity: 250 VAC, 3 A
PA-PB-PC	P5-03	Extension card, relay; drive capacity: 250 VAC, 3 A
DO1-CME	P5-04	Transistor; drive capacity: 24 VDC, 50 mA
DO2-CME	P5-05	Extension card, transistor; drive capacity: 24 VDC, 50 mA

When P5-00 = 0, the FM terminal is high-speed pulse output. The frequency of output pulses indicates the value of the internal running parameters. The greater the value is, the higher the output pulse frequency is. The 100% value corresponds to 100 kHz. The property of the indicated internal parameter is defined by P5-06.

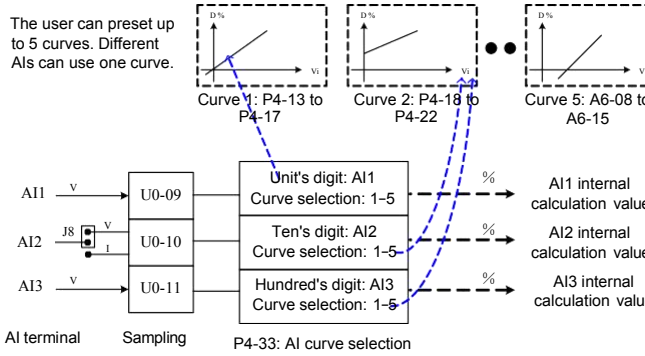
4.12 Use of AI Terminals

The AC drive supports a total of three AI terminals, among which AI1 and AI2 are provided on the control board and AI3 is provided on the extension card.

Terminal	Input Signal Characteristic
AI1-GND	It receives the signal of 0–10 VDC.
AI2-GND	If J8 is connected to the position with "V" mark, it receives the signal of 0–10 VDC. If J8 is connected to the position with "I" mark, it receives the signal of 4–20 mA.
AI3-GND	It is provided on the extension card and receives the signal of -10 to +10 VDC.

As external voltage/current signal, AI is used for frequency source setting, torque setting, voltage setting at V/F separation, and PID setting or feedback. The corresponding relationship of the voltage or current and actual setting or feedback is defined by P4-13 to P4-27.

Figure 4-32 Defining corresponding relationship of the voltage or current and actual setting or feedback



The sampling of AI terminals can be queried in U0-09 to U0-11. The calculation value is for internal subsequent calculation and cannot be directly read by the user.

4.13 Use of AO Terminals

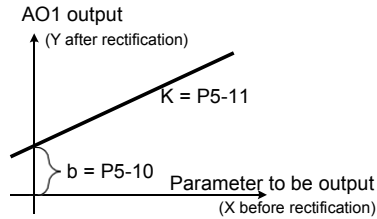
The AC drive supports a total of two AO terminals, among which AO1 is provided by the control board and AO2 is provided on the extension card.

Terminal	Output Signal Characteristic
AO1-GND	If J5 is connected to the position with "V" mark, it outputs the signal of 0–10 VDC. If J5 is connected to the position with "I" mark, it outputs the signal of 0–20 mA.
AO2-GND	It is provided on the extension card and outputs the signal of 0–10 VDC.

AO1 and AO2 can be used to indicate the internal running parameters in the analog mode. The property of indicated parameters can be defined by P5-07 and P5-08.

The designated running parameters can be rectified before output. The rectification feature is Y = kX + b, among which "X" indicates the running parameters to be output, and "k" and "b" of AO1 can be set by P5-10 and P5-11.

Figure 4-33 Setting of "k" and "b" of AO1



4.14 Use of the PG Terminal

The closed-loop vector control with sensor (P0-01 = 1) helps to improve the speed stability accuracy of the AC drive. In this case, it is necessary to install an encoder for the motor. Signals from the encoder are fed back to the AC drive through the PG card. The SET750 provides PG cards of four different types of signal features.

The AC drive supports four types of encoders, differential encoder, UVW encoder (wire-saving UVW encoder), resolver, open-collector encoder.

The setting of encoder parameters varies with the actually used encoder type. Here takes motor 1 parameters as an example for description.

- For the differential encoder, set P1-27 (Encoder pulses per revolution) and set P1-28 to 0 (ABZ incremental encoder).
- For the UVW encoder, set P1-27 (Encoder pulses per revolution) and set P1-28 to 1 (UVW incremental encoder).
- For the resolver, set P1-28 to 2 (Resolver).
- For the open-collector encoder, set P1-27 (Encoder pulses per revolution) and set P1-28 to 0 (ABZ incremental encoder).
- For the wire-saving UVW encoder, set P1-27 (Encoder pulses per revolution) and set P1-28 to 4 (Wire-saving UVW encoder).

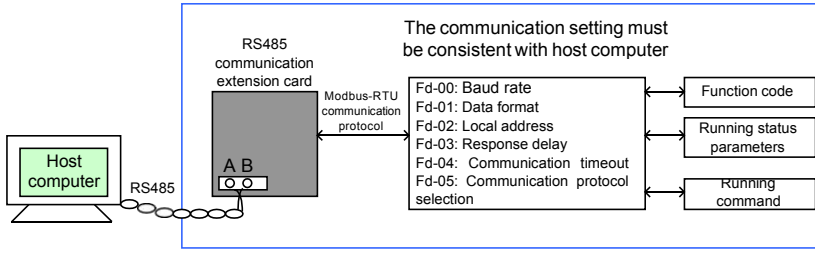
4.15 Use of Serial Communication

When communication mode RS485, Profibus-DP or CANopen are adopted, you need to install a corresponding extension card on the SET750 series AC drive, and set P0-28 correctly according to the used communication protocol type. CAN-link is enabled by default and you need not select it.

For the configuration of hardware communication parameters for the communication port, see group Pd. Set the communication rate and data format to consistent with those of the host computer, which is the precondition of normal communication.

The SET750 serial port itself supports the Modbus RTU slave communication protocol. You can query or modify the AC drive's function codes, query various running state parameters, and send running command and running frequency to the AC drive from the host computer through the serial port.

Figure 4-34 Communication control mode of the AC drive



The SET750 arranges the function codes, running state parameters and running commands in the "register parameter address" mode. The host computer can define the protocol of communication data interaction.

4.16 Use of Multifunctional Extension Interfaces

The extension card and functions are described in the following table.

Table 4-4 Extension cards and functions

Name	Model	Function	Remark
I/O extension card 1	HL38IO1	It extends five DIs, an analog voltage input AI3 (isolation analog) connected to PT100, PT1000, a relay output, a DO, and an AO. It supports RS485 and CAN protocols.	Applied to the models of 3.7 kW and above.
I/O extension card 2-Size B	HL38IO2	It extends three DI terminals.	Applied to all models.
Modbus communication card	HL38TX1	RS485 communication card with isolation	Applied to all models.
CANlink communication extension card	HL38CAN1	CANlink communication card	Applied to all models.
CANopen communication extension card	HL38CAN2	CANopen communication card	Applied to all models.
Profibus-DP communication card	HL38DP	Profibus-DP communication card	Applied to the models of 3.7 kW and above.
User programmable card	HL38PC1	User programmable extension card, completely compatible with Hailing's H1U series PLC	Applied to the models of 3.7 kW and above.
Differential encoder interface card	HL38PG1	Differential encoder interface card, requiring 5 V power supply	Applied to all models.
UVW encoder interface card	HL38PG3	Applied to UVW differential encoder and used on PMSM, requiring 5 V power supply	Applied to all models.
Resolver interface card	HL38PG4	Applied to resolver, excitation frequency 10 kHz, DB9 interface	Applied to all models.
Open-collector encoder card	HL38PG5	Open-collector encoder card, requiring 15 V power supply	Applied to all models.

4.17 Password Setting

The AC drive provides the user password protection function. When PP-00 is set to a non-zero value, the value is the user password. The password takes effect after you after exit the function code editing state. When you press PRG again, "------" will be displayed, and you must enter the correct user password to enter the menu.

To cancel the password protection function, enter with password and set PP-00 to 0.

4.18 Parameter Saving and Default Setting Restoring

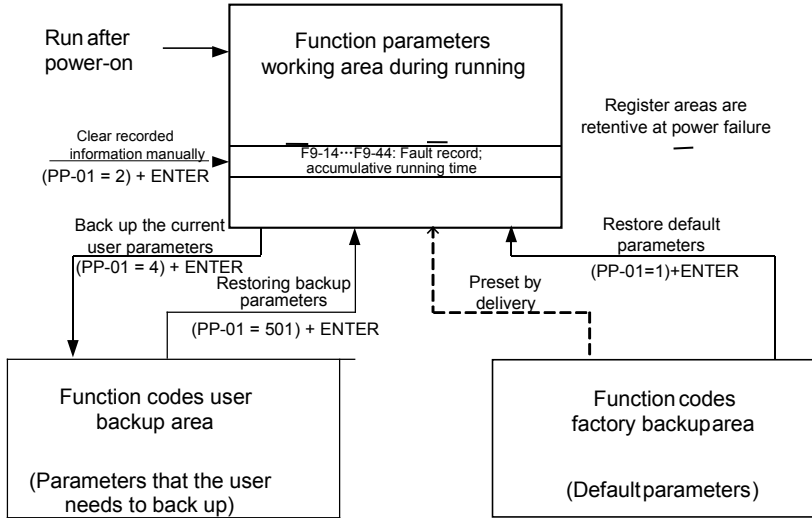
After a function code is modified on the operation panel, the modification will be saved in the register of the AC drive and remain effective at next power-on.

The AC drive supports backup and restoration of parameter setting, which is convenient for commissioning.

The AC drive also provides the retentive function on alarm information and accumulative running time.

You can restore the backup values or default settings of the function codes of the AC drive or clear the running data through PP-01. For details, see the description of PP-01.

Figure 4-35 Parameter saving and default parameter restoring



5

Function Code Table

Chapter 5 Function Code Table

If PP-00 is set to a non-zero number, parameter protection is enabled. You must enter the correct user password to enter the menu.

To cancel the password protection function, enter with password and set PP-00 to 0.

Group F and Group A are standard function parameters. Group U includes the monitoring function parameters.

The symbols in the function code table are described as follows:

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

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

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

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

5.1 Standard Function Parameters

Function Code	Parameter Name	Setting Range	Default	Property
Group P0: Standard Function Parameters				
P0-00	G/P type display	1: G type (constant torque load) 2: P type (variable torque load e.g. fan and pump)	Model dependent	●
P0-01	Motor 1 control mode	0: Sensorless flux vector control (SFVC) 1: Closed-loop vector control (CLVC) 2: Voltage/Frequency (V/F) control	0	★
P0-02	Command source selection	0: Operation panel control (LED off) 1: Terminal control (LED on) 2: Communication control (LED blinking)	0	☆
P0-03	Main frequency source X selection	0: Digital setting (non-retentive at power failure) 1: Digital setting (retentive at power failure) 2: AI1 3: AI2 4: AI3	0	★

Function Code	Parameter Name	Setting Range	Default	Property
P0-03	Main frequency source X selection	5: Pulse setting (DI5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication setting	0	★
P0-04	Auxiliary frequency source Y selection	The same as P0-03 (Main frequency source X selection)	0	★
P0-05	Range of auxiliary frequency Y for X and Y operation	0: Relative to maximum frequency 1: Relative to main frequency X	0	☆
P0-06	Range of auxiliary frequency Y for X and Y operation	0%–150%	100%	☆
P0-07	Frequency source selection	Unit's digit (Frequency source selection) 0: Main frequency source X 1: X and Y operation (operation relationship determined by ten's digit) 2: Switchover between X and Y 3: Switchover between X and "X and Y operation" 4: Switchover between Y and "X and Y operation" Ten's digit (X and Y operation relationship) 0: X+Y 1: X-Y 2: Maximum 3: Minimum	00	☆
P0-08	Preset frequency	0.00 to maximum frequency (valid when frequency source is digital setting)	50.00 Hz	☆
P0-09	Rotation direction	0: Same direction 1: Reverse direction	0	☆
P0-10	Maximum frequency	50.00–320.00 Hz	50.00 Hz	★
P0-11	Source of frequency upper limit	0: Set by P0-12 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting	0	★

Function Code	Parameter Name	Setting Range	Default	Property
P0-12	Frequency upper limit	Frequency lower limit (P0-14) to maximum frequency (P0-10)	50.00 Hz	☆
P0-13	Frequency upper limit offset	0.00 Hz to maximum frequency (P0-10)	0.00 Hz	☆
P0-14	Frequency lower limit	0.00 Hz to frequency upper limit (P0-12)	0.00 Hz	☆
P0-15	Carrier frequency	0.5–16.0 kHz	Model dependent	☆
P0-16	Carrier frequency adjustment with temperature	0: No 1: Yes	1	☆
P0-17	Acceleration time 1	0.00–650.00s (P0-19 = 2) 0.0–6500.0s (P0-19 = 1) 0–65000s (P0-19 = 0)	Model dependent	☆
P0-18	Deceleration time 1	0.00–650.00s (P0-19 = 2) 0.0–6500.0s (P0-19 = 1) 0–65000s (P0-19 = 0)	Model dependent	☆
P0-19	Acceleration/Deceleration time unit	0:1s 1: 0.1s 2: 0.01s	1	★
P0-21	Frequency offset of auxiliary frequency source for X and Y operation	0.00 Hz to maximum frequency (P0-10)	0.00 Hz	☆
P0-22	Frequency reference resolution	1: 0.1 Hz 2: 0.01 Hz	2	★
P0-23	Retentive of digital setting frequency upon power failure	0: Not retentive 1: Retentive	2	☆
P0-24	Motor parameter group selection	0: Motor parameter group 1 1: Motor parameter group 2 2: Motor parameter group 3 3: Motor parameter group 4	0	★
P0-25	Acceleration/Deceleration time base frequency	0: Maximum frequency (P0-10) 1: Set frequency 2: 100 Hz	0	★
P0-26	Base frequency for UP/DOWN modification during running	0: Running frequency 1: Set frequency	0	★

Function Code	Parameter Name	Setting Range	Default	Property
P0-27	Binding command source to frequency source	Unit's digit (Binding operation panel command to frequency source) 0: No binding 1: Frequency source by digital setting 2: AI1 3: AI2 4: AI3 5: Pulse setting (DI5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication setting Ten's digit (Binding terminal command to frequency source) 0–9, same as unit's digit Hundred's digit (Binding communication command to frequency source) 0–9, same as unit's digit	000	☆
P0-28	Serial communication protocol	0: Modbus protocol 1: Profibus-DP bridge 2: CANopen bridge	0	☆
Group P1: Motor 1 Parameters				
P1-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnetic synchronous motor	1	★
P1-01	Rated motor power	0.1–1000.0 kW	Model dependent	★
P1-02	Rated motor voltage	1–2000 V	Model dependent	★
P1-03	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW) 0.1–6553.5 A (AC drive power > 55 kW)	Model dependent	★
P1-04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★
P1-05	Rated motor rotational speed	1–65535 RPM	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
P1-06	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
P1-07	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
P1-08	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
P1-09	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW) 0.01–-655.35 mH (AC drive power > 55 kW)	Model dependent	★
P1-10	No-load current (asynchronous motor)	0.01 to P1-03 (AC drive power ≤ 55 kW) 0.1 to P1-03 (AC drive power > 55 kW)	Model dependent	★
P1-16	Stator resistance (synchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
P1-17	Shaft D inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
P1-18	Shaft Q inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
P1-20	Back EMF (synchronous motor)	0.1–6553.5 V	Model dependent	★
P1-27	Encoder pulses per revolution	1–65535	1024	★
P1-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: SIN/COS encoder 4: Wire-saving UVW encoder	0	★
P1-30	A/B phase sequence of ABZ incremental encoder	0: Forward 1: Reserve	0	★

Function Code	Parameter Name	Setting Range	Default	Property
P1-31	Encoder installation angle	0.0°–359.9°	0.0°	★
P1-32	U, V, W phase sequence of UVW encoder	0: Forward 1: Reverse	0	★
P1-33	UVW encoder angle offset	0.0°–359.9°	0.0°	★
P1-34	Number of pole pairs of resolver	1–65535	1	★
P1-36	Encoder wire-break fault detection time	0.0s: No action 0.1–10.0s	0.0s	★
P1-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning 11: Synchronous motor with-load auto-tuning 12: Synchronous motor no-load auto-tuning	0	★
Group P2: Vector Control Parameters				
P2-00	Speed loop proportional gain 1	0–100	30	☆
P2-01	Speed loop integral time 1	0.01–10.00s	0.50s	☆
P2-02	Switchover frequency 1	0.00 to P2-05	5.00 Hz	☆
P2-03	Speed loop proportional gain 2	0–100	20	☆
P2-04	Speed loop integral time 2	0.01–10.00s	1.00s	☆
P2-05	Switchover frequency 2	P2-02 to maximum output frequency	10.00 Hz	☆
P2-06	Vector control slip gain	50%–200%	100%	☆
P2-07	Time constant of speed loop filter	0.000–0.100s	0.000s	☆
P2-08	Vector control over-excitation gain	0–200	64	☆
P2-09	Torque upper limit source in speed control mode	0: P2-10 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting	0	☆
P2-10	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
P2-13	Excitation adjustment proportional gain	0–20000	2000	☆
P2-14	Excitation adjustment integral gain	0–20000	1300	☆
P2-15	Torque adjustment proportional gain	0–20000	2000	☆
P2-16	Torque adjustment integral gain	0–20000	1300	☆
P2-17	Speed loop integral property	Unit's digit: integral separation 0: Disabled 1: Enabled	0	☆
P2-18	Field weakening mode of synchronous motor	0: No field weakening 1: Direct calculation 2: Automatic adjustment	1	☆
P2-19	Field weakening depth of synchronous motor	50%–500%	100%	☆
P2-20	Maximum field weakening current	1%–300%	50%	☆
P2-21	Field weakening automatic adjustment gain	10%–500%	100%	☆
P2-22	Field weakening integral multiple	2–10	2	☆
Group P3: V/F Control Parameters				
P3-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 6: 1.6-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation	0	★
P3-01	Torque boost	0.0% (fixed torque boost) 0.1%–30.0%	Model dependent	☆
P3-02	Cut-off frequency of torque boost	0.00 Hz to maximum output frequency	50.00 Hz	★
P3-03	Multi-point V/F frequency 1 (P1)	0.00 Hz to P3-05	0.00 Hz	★
P3-04	Multi-point V/F voltage 1 (V1)	0.0%–100.0%	0.0%	★

Function Code	Parameter Name	Setting Range	Default	Property
P3-05	Multi-point V/F frequency 2 (P2)	P3-03 to P3-07	0.00 Hz	★
P3-06	Multi-point V/F voltage 2 (V2)	0.0%–100.0%	0.0%	★
P3-07	Multi-point V/F frequency 3 (P3)	P3-05 to rated motor frequency (P1-04) Note: The rated frequencies of motors 2, 3, and 4 are respectively set in A2-04, A3-04, and A4-04.	0.00 Hz	★
P3-08	Multi-point V/F voltage 3 (V3)	0.0%–100.0%	0.0%	★
P3-09	V/F slip compensation gain	0%–200.0%	0.0%	☆
P3-10	V/F over-excitation gain	0–200	64	☆
P3-11	V/F oscillation suppression gain	0–100	Model dependent	☆
P3-13	Voltage source for V/F separation	0: Digital setting (P3-14) 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Multi-reference 6: Simple PLC 7: PID 8: Communication setting 100.0% corresponds to the rated motor voltage (P1-02, A4-02, A5-02, A6-02).	0	☆
P3-14	Voltage digital setting for V/F separation	0 V to rated motor voltage	0 V	☆
P3-15	Voltage rise time of V/F separation	0.0–1000.0s It indicates the time for the voltage rising from 0 V to rated motor voltage.	0.0s	☆
P3-16	Voltage decline time of V/F separation	0.0–1000.0s It indicates the time for the voltage to decline from rated motor voltage to 0 V.	0.0s	☆
P3-17	Stop mode selection upon V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declines to 0	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group P4: Input Terminals				
P4-00	DI1 function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 3: Three-line control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Terminal UP	1	★
P4-01	DI2 function selection	7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: Normally open (NO) input of external fault 12: Multi-reference terminal 1 13: Multi-reference terminal 2	4	★
P4-02	DI3 function selection	14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection	9	★
P4-03	DI4 function selection	18: Frequency source switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover terminal 1 21: Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing pause 25: Counter input 26: Counter reset	12	★
P4-04	DI5 function selection	27: Length count input 28: Length reset 29: Torque control prohibited	13	★

Function Code	Parameter Name	Setting Range	Default	Property
P4-05	DI6 function selection	30: Pulse input (enabled only for DI5) 31:Reserved 32: Immediate DC braking 33: Normally closed (NC) input of external fault 34: Frequency modification forbidden 35: Reverse PID action direction	0	★
P4-06	DI7 function selection	36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral pause 39: Switchover between main frequency source X and preset frequency	0	★
P4-07	DI8 function selection	40: Switchover between auxiliary frequency source Y and preset frequency 41: Motor selection terminal 1 42: Motor selection terminal 2 43: PID parameter switchover	0	★
P4-08	DI9 function selection	44: User-defined fault 1 45: User-defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop	0	★
P4-09	DI10 function selection	48: External STOP terminal 2 49: Deceleration DC braking 50: Clear the current running time 51: Switchover between two-line mode and three-line mode 52–59: Reserved	0	★
P4-10	DI filter time	0.000–1.000s	0.010s	☆
P4-11	Terminal command mode	0: Two-line mode 1 1: Two-line mode 2 2: Three-line mode 1 3: Three-line mode 2	0	★
P4-12	Terminal UP/DOWN rate	0.01–65.535 Hz/s	1.00 Hz/s	☆
P4-13	AI curve 1 minimum input	0.00 V to P4-15	0.00 V	☆

Function Code	Parameter Name	Setting Range	Default	Property
P4-14	Corresponding setting of AI curve 1 minimum input	-100.00%–100.0%	0.0%	☆
P4-15	AI curve 1 maximum input	P4-13 to 10.00 V	10.00 V	☆
P4-16	Corresponding setting of AI curve 1 maximum input	-100.00%–100.0%	100.0%	☆
P4-17	AI1 filter time	0.00–10.00s	0.10s	☆
P4-18	AI curve 2 minimum input	0.00 V to P4-20	0.00 V	☆
P4-19	Corresponding setting of AI curve 2 minimum input	-100.00%–100.0%	0.0%	☆
P4-20	AI curve 2 maximum input	P4-18 to 10.00 V	10.00 V	☆
P4-21	Corresponding setting of AI curve 2 maximum input	-100.00%–100.0%	100.0%	☆
P4-22	AI2 filter time	0.00–10.00s	0.10s	☆
P4-23	AI curve 3 minimum input	0.00 V to P4-25	0.00 V	☆
P4-24	Corresponding setting of AI curve 3 minimum input	-100.00%–100.0%	0.0%	☆
P4-25	AI curve 3 maximum input	P4-23 to 10.00 V	10.00 V	☆
P4-26	Corresponding setting of AI curve 3 maximum input	-100.00%–100.0%	100.0%	☆
P4-27	AI3 filter time	0.00–10.00s	0.10s	☆
P4-28	Pulse minimum input	0.00 kHz to P4-30	0.00 kHz	☆
P4-29	Corresponding setting of pulse minimum input	-100.00%–100.0%	0.0%	☆
P4-30	Pulse maximum input	P4-28 to 50.00 kHz	50.00 kHz	☆
P4-31	Corresponding setting of pulse maximum input	-100.00%–100.0%	100.0%	☆
P4-32	Pulse filter time	0.00–10.00s	0.10s	☆

Function Code	Parameter Name	Setting Range	Default	Property
P4-33	AI curve selection	Unit's digit (AI1 curve selection) Curve 1 (2 points, see P4-13 to P4-16) Curve 2 (2 points, see P4-18 to P4-21) Curve 3 (2 points, see P4-23 to P4-26) Curve 4 (4 points, see A6-00 to A6-07) Curve 5 (4 points, see A6-08 to A6-15) Ten's digit (AI2 curve selection) Curve 1 to curve 5 (same as AI1) Hundred's digit (AI3 curve selection) Curve 1 to curve 5 (same as AI1)	321	☆
P4-34	Setting for AI less than minimum input	Unit's digit (Setting for AI1 less than minimum input) 0: Minimum value 1: 0.0% Ten's digit (Setting for AI2 less than minimum input) 0, 1 (same as AI1) Hundred's digit (Setting for AI3 less than minimum input) 0, 1 (same as AI1)	000	☆
P4-35	DI1 delay time	0.0–3600.0s	0.0s	★
P4-36	DI2 delay time	0.0–3600.0s	0.0s	★
P4-37	DI3 delay time	0.0–3600.0s	0.0s	★
P4-38	DI valid mode selection 1	Unit's digit (DI1 valid mode) 0: High level valid 1: Low level valid Ten's digit (DI2 valid mode) 0, 1 (same as DI1) Hundred's digit (DI3 valid mode) 0, 1 (same as DI1)	00000	★

Function Code	Parameter Name	Setting Range	Default	Property
P4-38	DI valid mode selection 1	Thousand's digit (DI4 valid mode) 0, 1 (same as DI1) Ten thousand's digit (DI5 valid mode) 0, 1 (same as DI1)	00000	★
P4-39	DI valid mode selection 2	Unit's digit (DI6 valid mode) 0, 1 (same as DI1) Ten's digit (DI7 valid mode) 0, 1 (same as DI1) Hundred's digit (DI8 state) 0, 1 (same as DI1) Thousand's digit (DI9 valid mode) 0, 1 (same as DI1) Ten thousand's digit (DI10 valid mode) 0, 1 (same as DI1)	00000	★
P4-40	AI2 input signal selection	0: Voltage signal 1: Current signal	0	★
Group P5: Output Terminals				
P5-00	FM terminal output mode	0: Pulse output (FMP) 1: Switch signal output (FMR)	0	☆
P5-01	FMR function (open-collector output terminal)	0: No output 1: AC drive running 2: Fault output (stop) 3: Frequency-level detection PdT1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pre-warning 7: AC drive overload pre-warning 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle complete 12: Accumulative running time reached 13: Frequency limited	2	☆
P5-02	Relay function (T/A-T/B-T/C)		2	☆

Function Code	Parameter Name	Setting Range	Default	Property
P5-03	Extension card relay function (P/A-P/B-P/C)	14: Torque limited 15: Ready for RUN 16: AI1 larger than AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Undervoltage state output 20: Communication setting 21: Reserved 22: Reserved 23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detection PdT2 output 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Timing reached 31: AI1 input limit exceeded 32: Load becoming 0 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Software current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Motor overheat warning 40: Current running time reached 41: Fault output (There is no output if it is the coast to stop fault and undervoltage occurs.)	0	☆
P5-04	O1 function selection (open-collector output terminal)			
P5-04	DO1 function selection (open-collector output terminal)		1	☆
P5-05	Extension card DO2 function		4	☆

Function Code	Parameter Name	Setting Range	Default	Property
P5-06	FMP function selection	0: Running frequency 1: Set frequency 2: Output current 3: Output torque (absolute value) 4: Output power 5: Output voltage 6: Pulse input 7: AI1 8: AI2 9: AI3 10: Length 11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current 15: Output voltage 16: Output torque (actual value)	0	☆
P5-07	AO1 function selection		0	☆
P5-08	AO2 function selection		1	☆
P5-09	Maximum FMP output frequency	0.01–100.00 kHz	50.00 kHz	☆
P5-10	AO1 offset coefficient	-100.0%–100.0%	0.0%	☆
P5-11	AO1 gain	-10.00–10.00	1.00	☆
P5-12	AO2 offset coefficient	-100.0%–100.0%	0.00%	☆
P5-13	AO2 gain	-10.00–10.00	1.00	☆
P5-17	FMR output delay time	0.0–3600.0s	0.0s	☆
P5-18	Relay 1 output delay time	0.0–3600.0s	0.0s	☆
P5-19	Relay 2 output delay time	0.0–3600.0s	0.0s	☆
P5-20	DO1 output delay time	0.0–3600.0s	0.0s	☆
P5-21	DO2 output delay time	0.0–3600.0s	0.0s	☆

Function Code	Parameter Name	Setting Range	Default	Property
P5-22	DO valid mode selection	Unit's digit (FMR valid mode) 0: Positive logic 1: Negative logic Ten's digit (Relay 1 valid mode) 0, 1 (same as FMR) Hundred's digit (Relay 2 valid mode) 0, 1 (same as FMR) Thousand's digit (DO1 valid mode) 0, 1 (same as FMR) Ten thousand's digit (DO2 valid mode) 0, 1 (same as FMR)	00000	☆
P5-23	AO1 output signal selection	0: Voltage signal 1: Current signal	0	★
Group P6: Start/Stop Control				
P6-00	Start mode	0: Direct start 1: Rotational speed tracking restart 2: Pre-excited start (asynchronous motor)	0	☆
P6-01	Rotational speed tracking mode	0: From frequency at stop 1: From zero speed 2: From maximum frequency	0	★
P6-02	Rotational speed tracking speed	1–100	20	☆
P6-03	Startup frequency	0.00–10.00 Hz	0.00 Hz	☆
P6-04	Startup frequency holding time	0.0–100.0s	0.0s	★
P6-05	Startup DC braking current/ Pre-excited current	0%–100%	0%	★
P6-06	Startup DC braking time/ Pre-excited time	0.0–100.0s	0.0s	★
P6-07	Acceleration/Deceleration mode	0: Linear acceleration/ deceleration 1: S-curve acceleration/ deceleration A 2: S-curve acceleration/ deceleration B	0	★

Function Code	Parameter Name	Setting Range	Default	Property
P6-08	Time proportion of S-curve start segment	0.0% to (100.0% – P6-09)	30.0%	★
P6-09	Time proportion of S-curve end segment	0.0% to (100.0% – P6-08)	30.0%	★
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
P6-11	Initial frequency of stop DC braking	0.00 Hz to maximum frequency	0.00 Hz	☆
P6-12	Waiting time of stop DC braking	0.0–36.0s	0.0s	☆
P6-13	Stop DC braking current	0%–100%	0%	☆
P6-14	Stop DC braking time	0.0–36.0s	0.0s	☆
P6-15	Brake use ratio	0%–100%	100%	☆
Group P7: Operation Panel and Display				
P7-01	MF.K Key function selection	0: MF.K key disabled 1: Switchover between operation panel control and remote command control (terminal or communication) 2: Switchover between forward rotation and reverse rotation 3: Forward JOG 4: Reverse JOG	0	★
P7-02	STOP/RESET key function	0: STOP/RESET key enabled only in operation panel control 1: STOP/RESET key enabled in any operation mode	1	☆
P7-03	LED display running parameters 1	0000–FFFF Bit00: Running frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit07: DI input status	1F	☆

Function Code	Parameter Name	Setting Range	Default	Property
P7-03	LED display running parameters 1	Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: AI3 voltage (V) Bit12: Count value Bit13: Length value Bit14: Load speed display Bit15: PID setting	1F	☆
P7-04	LED display running parameters 2	0000–FFFF Bit00: PID feedback Bit01: PLC stage Bit02: Pulse setting frequency (kHz) Bit03: Running frequency 2 (Hz) Bit04: Remaining running time Bit05: AI1 voltage before correction (V) Bit06: AI2 voltage before correction (V) Bit07: AI3 voltage before correction (V) Bit08: Linear speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: Pulse setting frequency (Hz) Bit12: Communication setting value Bit13: Encoder feedback speed (Hz) Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
P7-05	LED display stop parameters	0000–FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: AI3 voltage (V) Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: Pulse setting frequency (kHz)	33	☆
P7-06	Load speed display coefficient	0.0001–6.5000	1.0000	☆
P7-07	Heatsink temperature of inverter module	0.0–100.0°C	-	●
P7-08	Temporary software version	-	-	●
P7-09	Accumulative running time	0–65535 h	-	●
P7-10	Product number	-	-	●
P7-11	Software version	-	-	●
P7-12	Number of decimal places for load speed display	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1	☆
P7-13	Accumulative power-on time	0–65535 h	0 h	●
P7-14	Accumulative power consumption	0–65535 kWh	-	●
Group P8: Auxiliary Functions				
P8-00	JOG running frequency	0.00 Hz to maximum frequency	2.00 Hz	☆
P8-01	JOG acceleration time	0.0–6500.0s	20.0s	☆
P8-02	JOG deceleration time	0.0–6500.0s	20.0s	☆
P8-03	Acceleration time 2	0.0–6500.0s	Model dependent	☆
P8-04	Deceleration time 2	0.0–6500.0s	Model dependent	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8-05	Acceleration time 3	0.0–6500.0s	Model dependent	☆
P8-06	Deceleration time 3	0.0–6500.0s	Model dependent	☆
P8-07	Acceleration time 4	0.0–500.0s	Model dependent	☆
P8-08	Deceleration time 4	0.0–6500.0s	Model dependent	☆
P8-09	Jump frequency 1	0.00 Hz to maximum frequency	0.00 Hz	☆
P8-10	Jump frequency 2	0.00 Hz to maximum frequency	0.00 Hz	☆
P8-11	Frequency jump amplitude	0.00 Hz to maximum frequency	0.00 Hz	☆
P8-12	Forward/Reverse rotation dead-zone time	0.0–3000.0s	0.0s	☆
P8-13	Reverse control	0: Enabled 1: Disabled	0	☆
P8-14	Running mode when set frequency lower than frequency lower limit	0: Run at frequency lower limit 1: Stop 2: Run at zero speed	0	☆
P8-15	Droop control	0.00–10.00 Hz	0.00 Hz	☆
P8-16	Accumulative power-on time threshold	0–65000 h	0 h	☆
P8-17	Accumulative running time threshold	0–65000 h	0 h	☆
P8-18	Startup protection	0: No 1: Yes	0	☆
P8-19	Frequency detection value (PdT1)	0.00 Hz to maximum frequency	50.00 Hz	☆
P8-20	Frequency detection hysteresis (PdT hysteresis 1)	0.0%–100.0% (PdT1 level)	5.0%	☆
P8-21	Detection range of frequency reached	0.00–100% (maximum frequency)	0.0%	☆
P8-22	Jump frequency during acceleration/deceleration	0: Disabled1: Enabled	0	☆
P8-25	Frequency switchover point between acceleration time 1 and acceleration time 2	0.00 Hz to maximum frequency	0.00 Hz	☆
P8-26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 to maximum frequency	0.00 Hz	☆
P8-27	Terminal JOG preferred	0: Disabled1: Enabled	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8-28	Frequency detection value (PdT2)	0.00 to maximum frequency	50.00 Hz	☆
P8-29	Frequency detection hysteresis (PdT hysteresis 2)	0.0%–100.0% (PdT2 level)	5.0%	☆
P8-30	Any frequency reaching detection value 1	0.00 Hz to maximum frequency	50.00 Hz	☆
P8-31	Any frequency reaching detection amplitude 1	0.0%–100.0% (maximum frequency)	0.0%	☆
P8-32	Any frequency reaching detection value 2	0.00 Hz to maximum frequency	50.00 Hz	☆
P8-33	Any frequency reaching detection amplitude 2	0.0%–100.0% (maximum frequency)	0.0%	☆
P8-34	Zero current detection level	0.0%–300.0% (rated motor current)	5.0%	☆
P8-35	Zero current detection delay time	0.00–600.00s	0.10s	☆
P8-36	Output overcurrent threshold	0.0 % (no detection) 0.1 %–300.0% (rated motor current)	200.0%	☆
P8-37	Output overcurrent detection delay time	0.00–600.00s	0.00s	☆
P8-38	Any current reaching 1	0.0%–300.0% (rated motor current)	100.0%	☆
P8-39	Any current reaching 1 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆
P8-40	Any current reaching 2	0.0%–300.0% (rated motor current)	100.0%	☆
P8-41	Any current reaching 2 amplitude	0.0%–300.0% (rated motor current)	0.0%	☆
P8-42	Timing function	0: Disabled 1: Enabled	0	☆
P8-43	Timing duration source	0: P8-44 1: AI1 2: AI2 3: AI3 (100% of analog input corresponds to the value of P8-44)	0	☆
P8-44	Timing duration	0.0–6500.0 min	0.0 min	☆
P8-45	AI1 input voltage lower limit	0.00 V to P8-46	3.10 V	☆
P8-46	AI1 input voltage upper limit	P8-45 to 10.00 V	6.80 V	☆

Function Code	Parameter Name	Setting Range	Default	Property
P8-47	Module temperature threshold	0–100°C	75°C	☆
P8-48	Cooling fan control	0: Fan working during running 1: Fan working continuously	0	☆
P8-49	Wakeup frequency	Dormant frequency (P8-51) to maximum frequency (P0-10)	0.00 Hz	☆
P8-50	Wakeup delay time	0.0–6500.0s	0.0s	☆
P8-51	Dormant frequency	0.00 Hz to wakeup frequency (P8-49)	0.00 Hz	☆
P8-52	Dormant delay time	0.0–6500.0s	0.0s	☆
P8-53	Current running time reached	0.0–6500.0 min	0.0 min	☆
P8-54	Output power correction coefficient	0.00%–200 .0%	100.0%	☆
Group P9: Fault and Protection				
P9-00	Motor overload protection selection	0: Disabled 1: Enabled	1	☆
P9-01	Motor overload protection gain	0.20–10.00	1.00	☆
P9-02	Motor overload warning coefficient	50%–100%	80%	☆
P9-03	Overvoltage stall gain	0 (no stall overvoltage)–100	0	☆
P9-04	Overvoltage stall protective voltage	120%–150%	130%	☆
P9-05	Overcurrent stall gain	0–100	20	☆
P9-06	Overcurrent stall protective current	100%–200%	150%	☆
P9-07	Short-circuit to ground upon power-on	0: Disabled 1: Enabled	1	☆
P9-09	Fault auto reset times	0–20	0	☆
P9-10	DO action during fault auto reset	0: Not act 1: Act	0	☆
P9-11	Time interval of fault auto reset	0.1s–100.0s	1.0s	☆
P9-12	Input phase loss protection/ contactor energizing protection selection	Unit's digit: Input phase loss protection Ten's digit: Contactor energizing protection 0: Disabled 1: Enabled	11	☆

Function Code	Parameter Name	Setting Range	Default	Property
P9-13	Output phase loss protection selection	0: Disabled 1: Enabled	1	☆
P9-14	1st fault type	0: No fault	-	●
P9-15	2nd fault type	1: Reserved 2: Overcurrent during acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Buffer resistance overload 9: Undervoltage 10: AC drive overload 11: Motor overload 12:Power input phase loss 13: Power output phase loss 14: Module overheat 15: External equipment fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Encoder/PG card fault 21: EEPROM read-write fault 22: AC drive hardware fault 23: Short circuit to ground 24: Reserved 25: Reserved 26: Accumulative running time reached 27: User-defined fault 1 28: User-defined fault 2 29: Accumulative power-on time reached 30: Load becoming 0 31: PID feedback lost during running	-	●

Function Code	Parameter Name	Setting Range	Default	Property
P9-16	3rd (latest) fault type	40: With-wave current limit fault 41: Motor switchover fault during running 42: Too large speed deviation 43: Motor over-speed 45: Motor overheat 51: Initial position fault	-	●
P9-17	Frequency upon 3rd fault	-	-	●
P9-18	Current upon 3rd fault	-	-	●
P9-19	Bus voltage upon 3rd fault	-	-	●
P9-20	DI status upon 3rd fault	-	-	●
P9-21	Output terminal status upon 3rd fault	-	-	●
P9-22	AC drive status upon 3rd fault	-	-	●
P9-23	Power-on time upon 3rd fault	-	-	●
P9-24	Running time upon 3rd fault	-	-	●
P9-27	Frequency upon 2nd fault	-	-	●
P9-28	Current upon 2nd fault	-	-	●
P9-29	Bus voltage upon 2nd fault	-	-	●
P9-30	DI status upon 2nd fault	-	-	●
P9-31	Output terminal status upon 2nd fault	-	-	●
P9-32	Frequency upon 2nd fault	-	-	●
P9-33	Current upon 2nd fault	-	-	●
P9-34	Bus voltage upon 2nd fault	-	-	●
P9-37	DI status upon 1st fault	-	-	●
P9-38	Output terminal status upon 1st fault	-	-	●
P9-39	Frequency upon 1st fault	-	-	●
P9-40	Current upon 1st fault	-	-	●
P9-41	Bus voltage upon 3rd fault	-	-	●
P9-42	DI status upon 1st fault	-	-	●
P9-43	Output terminal status upon 1st fault	-	-	●
P9-44	Frequency upon 1st fault	-	-	●

Function Code	Parameter Name	Setting Range	Default	Property
P9-47	Fault protection action selection 1	Unit's digit (Motor overload, Err11) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Ten's digit (Power input phase loss, Err12) Same as unit's digit Hundred's digit (Power output phase loss, Err13) Same as unit's digit Thousand's digit (External equipment fault, Err15) Same as unit's digit Ten thousand's digit (Communication fault, Err16) Same as unit's digit	00000	☆
P9-48	Fault protection action selection 2	Unit's digit (Encoder fault, Err20) 0: Coast to stop 1: Switch over to V/F control, stop according to the stop mode 2: Switch over to V/F control, continue to run Ten's digit (EEPROM read-write fault, Err21) 0: Coast to stop 1: Stop according to the stop mode	00000	☆
P9-48	Fault protection action selection 2	Hundred's digit: reserved Thousand's digit (Motor overheat, Err25) Same as unit's digit in P9-47 Ten thousand's digit (Accumulative running time reached) Same as unit's digit in P9-47	00000	☆

Function Code	Parameter Name	Setting Range	Default	Property
P9-49	Fault protection action selection 3	Unit's digit (User-defined fault 1, Err27) Same as unit's digit in P9-47 Ten's digit (User-defined fault 2, Err28) Same as unit's digit in P9-47 Hundred's digit (Accumulative power-on time reached, Err29) Same as unit's digit in P9-47 Thousand's digit (Load becoming 0, Err30) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run at 7% of rated motor frequency and resume to the set frequency if the load recovers Ten thousand's digit (PID feedback lost during running, Err31) Same as unit's digit in P9-47	00000	☆
P9-50	Fault protection action selection 4	Unit's digit (Too large speed deviation, Err42) Same as unit's digit in P9-47 Ten's digit (Motor over-speed, Err43) Same as unit's digit in P9-47 Hundred's digit (Initial position fault, Err51) Same as unit's digit in P9-47 Thousand's digit (Speed feedback fault, Err52) Same as unit's digit in P9-47 Ten thousand's digit: Reserved	00000	☆
P9-54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
P9-55	Backup frequency upon abnormality	0.0%–100.0% (maximum frequency)	100.0%	☆
P9-56	Type of motor temperature sensor	0: No temperature sensor 1: PT100 2: PT1000	1	☆
P9-57	Motor overheat protection threshold	0–200°C	110°C	☆
P9-58	Motor overheat warning threshold	0–200°C	90°C	☆
P9-59	Action selection at instantaneous power failure	0: Invalid 1: Decelerate 2: Decelerate to stop	0	☆
P9-60	Action pause judging voltage at instantaneous power failure	80.0%–100.0%	90.0%	☆
P9-61	Voltage rally judging time at instantaneous power failure	0.00–100.00s	0.50s	☆
P9-62	Action judging voltage at instantaneous power failure	60.0%–100.0% (standard bus voltage)	80.0%	☆
P9-63	Protection upon load becoming 0	0: Disabled 1: Enabled	0	☆
P9-64	Detection level of load becoming 0	0.0%–100.0% (rated motor current)	10.0%	☆
P9-65	Detection time of load becoming 0	0.0–60.0s	1.0s	☆
P9-67	Over-speed detection value	0.0%–50.0% (maximum frequency)	20.0%	☆
P9-68	Over-speed detection time	0.0–60.0s	1.0s	☆
P9-69	Detection value of too large speed deviation	0.0%–50.0% (maximum frequency)	20.0%	☆
P9-70	Detection time of too large speed deviation	0.0–60.0s	5.0s	☆
Group PA: Process Control PID Function				
PA-00	PID setting source	0: PA-01 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting 6: Multi-reference	0	☆
PA-01	PID digital setting	0.0%–100.0%	50.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
PA-02	PID feedback source	0: AI1 1: AI2 2: AI3 3: AI1 – AI2 4: Pulse setting (DI5) 5: Communication setting 6: AI1 + AI2 7: MAX (|AI1|, |AI2|) 8: MIN (|AI1|, |AI2|)	0	☆
PA-03	PID action direction	0: Forward action 1: Reverse action	0	☆
PA-04	PID setting feedback range	0–65535	1000	☆
PA-05	Proportional gain Kp1	0.0–100.0	20.0	☆
PA-06	Integral time Ti1	0.01–10.00s	2.00s	☆
PA-07	Differential time Td1	0.00–10.000	0.000s	☆
PA-08	Cut-off frequency of PID reverse rotation	0.00 to maximum frequency	2.00 Hz	☆
PA-09	PID deviation limit	0.0%–100.0%	0.0%	☆
PA-10	PID differential limit	0.00%–100.00%	0.10%	☆
PA-11	PID setting change time	0.00–650.00s	0.00s	☆
PA-12	PID feedback filter time	0.00–60.00s	0.00s	☆
PA-13	PID output filter time	0.00–60.00s	0.00s	☆
PA-14	Reserved	-	-	☆
PA-15	Proportional gain Kp2	0.0–100.0	20.0	☆
PA-16	Integral time Ti2	0.01–10.00s	2.00s	☆
PA-17	Differential time Td2	0.000–10.000s	0.000s	☆
PA-18	PID parameter switchover condition	0: No switchover 1: Switchover via DI 2: Automatic switchover based on deviation	0	☆
PA-19	PID parameter switchover deviation 1	0.0% to PA-20	20.0%	☆
PA-20	PID parameter switchover deviation 2	PA-19 to 100.0%	80.0%	☆
PA-21	PID initial value	0.0%–100.0%	0.0%	☆
PA-22	PID initial value holding time	0.00–650.00s	0.00s	☆
PA-23	Maximum deviation between two PID outputs in forward direction	0.00%–100.00%	1.00%	☆

Function Code	Parameter Name	Setting Range	Default	Property
PA-24	Maximum deviation between two PID outputs in reverse direction	0.00%–100.00%	1.00%	☆
PA-25	PID integral property	Unit's digit (Integral separated) 0: Invalid 1: Valid Ten's digit (Whether to stop integral operation when the output reaches the limit) 0: Continue integral operation 1: Stop integral operation	00	☆
PA-26	Detection value of PID feedback loss	0.0%: Not judging feedback loss 0.1%–100.0%	0.0%	☆
PA-27	Detection time of PID feedback loss	0.0–20.0s	0.0s	☆
PA-28	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	0	☆
Group Pb: Swing Frequency, Fixed Length and Count				
Pb-00	Swing frequency setting mode	0: Relative to the central frequency 1: Relative to the maximum frequency	0	☆
Pb-01	Swing frequency amplitude	0.0%–100.0%	0.0%	☆
Pb-02	Jump frequency amplitude	0.0%–50.0%	0.0%	☆
Pb-03	Swing frequency cycle	0.0–3000.0s	10.0s	☆
Pb-04	Triangular wave rising time coefficient	0.0%–100.0%	50.0%	☆
Pb-05	Set length	0–65535 m	1000 m	☆
Pb-06	Actual length	0–65535 m	0 m	☆
Pb-07	Number of pulses per meter	0.1–6553.5	100.0	☆
Pb-08	Set count value	1–65535	1000	☆
Pb-09	Designated count value	1–65535	1000	☆
Group PC: Multi-Reference and Simple PLC Function				
PC-00	Reference 0	-100.0%–100.0%	0.0%	☆
PC-01	Reference 1	-100.0%–100.0%	0.0%	☆
PC-02	Reference 2	-100.0%–100.0%	0.0%	☆
PC-03	Reference 3	-100.0%–100.0%	0.0%	☆
PC-04	Reference 4	-100.0%–100.0%	0.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
PC-05	Reference 5	-100.0%–100.0%	0.0%	☆
PC-06	Reference 6	-100.0%–100.0%	0.0%	☆
PC-07	Reference 7	-100.0%–100.0%	0.0%	☆
PC-08	Reference 8	-100.0%–100.0%	0.0%	☆
PC-09	Reference 9	-100.0%–100.0%	0.0%	☆
PC-10	Reference 10	-100.0%–100.0%	0.0%	☆
PC-11	Reference 11	-100.0%–100.0%	0.0%	☆
PC-12	Reference 12	-100.0%–100.0%	0.0%	☆
PC-13	Reference 13	-100.0%–100.0%	0.0%	☆
PC-14	Reference 14	-100.0%–100.0%	0.0%	☆
PC-15	Reference 15	-100.0%–100.0%	0.0%	☆
PC-16	Simple PLC running mode	0: Stop after the AC drive runs one cycle 1: Keep final values after the AC drive runs one cycle 2: Repeat after the AC drive runs one cycle	0	☆
PC-17	Simple PLC retentive selection	Unit's digit (Retentive upon power failure) 0: No 1: Yes Ten's digit (Retentive upon stop) 0: No 1: Yes	00	☆
PC-18	Running time of simple PLC reference 0	0.0–6553.5s (h)	0.0s (h)	☆
PC-19	Acceleration/deceleration time of simple PLC reference 0	0–3	0	☆
PC-20	Running time of simple PLC reference 1	0.0–6553.5s (h)	0.0s (h)	☆
PC-21	Acceleration/deceleration time of simple PLC reference 1	0–3	0	☆
PC-22	Running time of simple PLC reference 2	0.0–6553.5s (h)	0.0s (h)	☆
PC-23	Acceleration/deceleration time of simple PLC reference 2	0–3	0	☆
PC-24	Running time of simple PLC reference 3	0.0–6553.5s (h)	0.0s (h)	☆
PC-25	Acceleration/deceleration time of simple PLC reference 3	0–3	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
PC-26	Running time of simple PLC reference 4	0.0–6553.5s (h)	0.0s (h)	☆
PC-27	Acceleration/deceleration time of simple PLC reference 4	0–3	0	☆
PC-28	Running time of simple PLC reference 5	0.0–6553.5s (h)	0.0s (h)	☆
PC-29	Acceleration/deceleration time of simple PLC reference 5	0–3	0	☆
PC-30	Running time of simple PLC reference 6	0.0–6553.5s (h)	0.0s (h)	☆
PC-31	Acceleration/deceleration time of simple PLC reference 6	0–3	0	☆
PC-32	Running time of simple PLC reference 7	0.0–6553.5s (h)	0.0s (h)	☆
PC-33	Acceleration/deceleration time of simple PLC reference 7	0–3	0	☆
PC-34	Running time of simple PLC reference 8	0.0–6553.5s (h)	0.0s (h)	☆
PC-35	Acceleration/deceleration time of simple PLC reference 8	0–3	0	☆
PC-36	Running time of simple PLC reference 9	0.0–6553.5s (h)	0.0s (h)	☆
PC-37	Acceleration/deceleration time of simple PLC reference 9	0–3	0	☆
PC-38	Running time of simple PLC reference 10	0.0–6553.5s (h)	0.0s (h)	☆
PC-39	Acceleration/deceleration time of simple PLC reference 10	0–3	0	☆
PC-40	Running time of simple PLC reference 11	0.0–6553.5s (h)	0.0s (h)	☆
PC-41	Acceleration/deceleration time of simple PLC reference 11	0–3	0	☆
PC-42	Running time of simple PLC reference 12	0.0–6553.5s (h)	0.0s (h)	☆
PC-43	Acceleration/deceleration time of simple PLC reference 12	0–3	0	☆
PC-44	Running time of simple PLC reference 13	0.0–6553.5s (h)	0.0s (h)	☆
PC-45	Acceleration/deceleration time of simple PLC reference 13	0–3	0	☆
PC-46	Running time of simple PLC reference 14	0.0–6553.5s (h)	0.0s (h)	☆

Function Code	Parameter Name	Setting Range	Default	Property
PC-47	Acceleration/deceleration time of simple PLC reference 14	0–3	0	☆
PC-48	Running time of simple PLC reference 15	0.0–6553.5s (h)	0.0s (h)	☆
PC-49	Acceleration/deceleration time of simple PLC reference 15	0–3	0	☆
PC-50	Time unit of simple PLC running	0: s (second)1:h (hour)	0	☆
PC-51	Reference 0 source	0: Set by PC-00 1: AI1 2: AI2 3: AI3 4: Pulse setting 5: PID 6: Set by preset frequency (P0-08), modified via terminal UP/DOWN	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group Pd: Communication Parameters				
Pd-00	Baud rate	Unit's digit (Modbus baud rate) 0: 300 BPs 1: 600 BPs 2: 1200 BPs 3: 2400 BPs 4: 4800 BPs 5: 9600 BPs 6: 19200 BPs 7: 38400 BPs 8: 57600 BPs 9: 115200 BPs Ten's digit (PROFIBUS-DP baud rate) 0: 115200 BPs 1: 208300 BPs 2: 256000 BPs 3: 512000 Bps Hundred's digit (reserved) Thousand's digit (CANlink baud rate) 0: 20 1: 50 2: 100 3: 125 4: 250 5: 500 6: 1 M	6005	☆
Pd-01	Data format	0: No check, data format <8,N,2> 1: Even parity check, data format <8,E,1> 2: Odd Parity check, data format <8,O,1> 3: No check, data format <8,N,1> Valid for Modbus	0	☆
Pd-02	Local address	0: Broadcast address 1–247 Valid for Modbus, PROFIBUS-DP and CANlink	1	☆

Function Code	Parameter Name	Setting Range	Default	Property
Pd-03	Response delay	0–20 ms Valid for Modbus	2 ms	☆
Pd-04	Communication timeout	0.0s (invalid) 0.1–60.0s Valid for Modbus, PROFIBUS-DP and CANopen	0.0s	☆
Pd-05	Modbus protocol selection and PROFIBUS-DP data format	Unit's digit: Modbus protocol 0: Non-standard Modbus protocol 1: Standard Modbus protocol Ten's digit: PROFIBUS-DP data format 0: PPO1 format 1: PPO2 format 2: PPO3 format 3: PPO5 format	30	☆
Pd-06	Communication reading current resolution	0: 0.01A 1: 0.1A	0	☆
Pd-08	CANlink communication timeout time	0.0s: Invalid 0.1–60.0s	0	☆
Group PE: User-defined Parameters				
PE-00	User-defined function code 0	P0-00 to PP-xx A0-00 to Ax-xx U0-xx to U0-xx	P0-10	☆
PE-01	User-defined function code 1		P0-02	☆
PE-02	User-defined function code 2		P0-03	☆
PE-03	User-defined function code 3		P0-07	☆
PE-04	User-defined function code 4		P0-08	☆
PE-05	User-defined function code 5		P0-17	☆
PE-06	User-defined function code 6		P0-18	☆
PE-07	User-defined function code 7		P3-00	☆
PE-08	User-defined function code 8		P3-01	☆
PE-09	User-defined function code 9		P4-00	☆
PE-10	User-defined function code 10		P4-01	☆
PE-11	User-defined function code 11		P4-02	☆
PE-12	User-defined function code 12		P5-04	☆
PE-13	User-defined function code 13		P5-07	☆
PE-14	User-defined function code 14		P6-00	☆

Function Code	Parameter Name	Setting Range	Default	Property
PE-15	User-defined function code 15	P0-00 to PP-xx A0-00 to Ax-xx U0-xx to U0-xx	P6-10	☆
PE-16	User-defined function code 16		P0-00	☆
PE-17	User-defined function code 17		P0-00	☆
PE-18	User-defined function code 18		P0-00	☆
PE-19	User-defined function code 19		P0-00	☆
PE-20	User-defined function code 20		P0-00	☆
PE-21	User-defined function code 21		P0-00	☆
PE-22	User-defined function code 22		P0-00	☆
PE-23	User-defined function code 23		P0-00	☆
PE-24	User-defined function code 24		P0-00	☆
PE-25	User-defined function code 25		P0-00	☆
PE-26	User-defined function code 26		P0-00	☆
PE-27	User-defined function code 27		P0-00	☆
PE-28	User-defined function code 28		P0-00	☆
PE-29	User-defined function code 29		P0-00	☆
Group PP: Function Code Management				
PP-00	User password	0–65535	0	☆
PP-01	Restore default settings	0: No operation 01: Restore factory settings except motor parameters 02: Clear records 04: Restore user backup parameters 501: Back up current user parameters	0	★
PP-02	AC drive parameter display property	Unit's digit (Group U display selection) 0: Not display 1: Display Ten's digit (Group A display selection) 0: Not display 1: Display	11	★

Function Code	Parameter Name	Setting Range	Default	Property
PP-03	Individualized parameter display property	Unit's digit (User-defined parameter display selection) 0: Not display 1: Display Ten's digit (User-modified parameter display selection) 0: Not display 1: Display	00	☆
PP-04	Parameter modification property	0: Modifiable 1: Not modifiable	0	☆
Group A0: Torque Control and Restricting Parameters				
A0-00	Speed/Torque control selection	0: Speed control 1: Torque control	0	★
A0-01	Torque setting source in torque control	0: Digital setting (A0-03) 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Communication setting 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) Full range of values 1–7 corresponds to the digital setting of A0-03.	0	★
A0-03	Torque digital setting in torque control	-200.0%–200.0%	150.0%	☆
A0-05	Forward maximum frequency in torque control	0.00 Hz to maximum frequency (P0-10)	50.00 Hz	☆
A0-06	Reverse maximum frequency in torque control	0.00 Hz to maximum frequency (P0-10)	50.00 Hz	☆
A0-07	Acceleration time in torque control	0.00–65000s	0.00s	☆
A0-08	Deceleration time in torque control	0.00–65000s	0.00s	☆
Group A1: Virtual DI (VDI)/Virtual DO (VDO)				
A1-00	VDI1 function selection	0–59	0	★
A1-01	VDI2 function selection	0–59	0	★
A1-02	VDI3 function selection	0–59	0	★
A1-03	VDI4 function selection	0–59	0	★

Function Code	Parameter Name	Setting Range	Default	Property
A1-04	VDI5 function selection	0–59	0	★
A1-05	VDI state setting mode	Unit's digit (VDI1) 0: Decided by state of VDOx 1: Decided by A1-06 Ten's digit (VDI2) 0, 1 (same as VDI1) Hundred's digit (VDI3) 0, 1 (same as VDI1) Thousand's digit (VDI4) 0, 1 (same as VDI1) Ten thousand's digit (VDI5) 0, 1 (same as VDI1)	00000	★
A1-06	VDI state selection	Unit's digit (VDI1) 0: Invalid 1: Valid Ten's digit (VDI2) 0, 1 (same as VDI1) Hundred's digit (VDI3) 0, 1 (same as VDI1) Thousand's digit (VDI4) 0, 1 (same as VDI1) Ten thousand's digit (VDI5) 0, 1 (same as VDI1)	00000	★
A1-07	Function selection for AI1 used as DI	0–59	0	★
A1-08	Function selection for AI2 used as DI	0–59	0	★
A1-09	Function selection for AI3 used as DI	0–59	0	★
A1-10	State selection for AI used as DI	Unit's digit (AI1) 0: High level valid 1: Low level valid Ten's digit (AI2) 0, 1 (same as unit's digit) Hundred's digit (AI3) 0, 1 (same as unit's digit)	000	★

Function Code	Parameter Name	Setting Range	Default	Property
A1-11	VDO1 function selection	0: Short with physical DIx internally 1–40: Refer to function selection of physical DO in group P5.	0	☆
A1-12	VDO2 function selection	0: Short with physical DIx internally 1–40: Refer to function selection of physical DO in group P5.	0	☆
A1-13	VDO3 function selection	0: Short with physical Dix internally 1–40: Refer to function selection of physical DO in group P5.	0	☆
A1-14	VDO4 function selection	0: Short with physical Dix internally 1–40: Refer to function selection of physical DO in group P5.	0	☆
A1-15	VDO5 function selection	0: Short with physical Dix internally 1–40: Refer to function selection of physical DO in group P5.	0	☆
A1-16	VDO1 output delay	0.0–3600.0s	0.0s	☆
A1-17	VDO2 output delay	0.0–3600.0s	0.0s	☆
A1-18	VDO3 output delay	0.0–3600.0s	0.0s	☆
A1-19	VDO4 output delay	0.0–3600.0s	0.0s	☆
A1-20	VDO5 output delay	0.0–3600.0s	0.0s	☆
A1-21	VDO state selection	Unit's digit (VDO1) 0: Positive logic 1: Reverse logic Ten's digit (VDO2) 0, 1 (same as unit's digit) Hundred's digit (VDO3) 0, 1 (same as unit's digit) Thousand's digit (VDO4) 0, 1 (same as unit's digit) Ten thousand's digit (VDO5) 0, 1 (same as unit's digit)	00000	☆

Function Code	Parameter Name	Setting Range	Default	Property
Group A2: Motor 2 Parameters				
A2-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnetic synchronous motor	0	★
A2-01	Rated motor power	0.1–1000.0 kW	Model dependent	★
A2-02	Rated motor voltage	1–2000 V	Model dependent	★
A2-03	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW) 0.1–6553.5 A (AC drive power > 55 kW)	Model dependent	★
A2-04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★
A2-05	Rated motor rotational speed	1–65535 RPM	Model dependent	★
A2-06	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A2-07	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A2-08	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A2-09	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW) 0.01–655.35 mH (AC drive power > 55 kW)	Model dependent	★
A2-10	No-load current (asynchronous motor)	0.01 A to A2-03 (AC drive power ≤ 55 kW) 0.1 A to A2-03 (AC drive power > 55 kW)	Model dependent	★
A2-16	Stator resistance (synchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
A2-17	Shaft D inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A2-18	Shaft Q inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A2-20	Back EMF (synchronous motor)	0.1–6553.5 V	Model dependent	★
A2-27	Encoder pulses per revolution	1–65535	1024	★
A2-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: SIN/COS encoder 4: Wire-saving UVW encoder	0	★
A2-30	A, B phase sequence of ABZ incremental encoder	0: Forward 1: Reserve	0	★
A2-31	Encoder installation angle	0.0°–359.9°	0.0°	★
A2-32	U, V, W phase sequence of UVW encoder	0: Forward 1: Reverse	0	★
A2-33	UVW encoder angle offset	0.0°–359.9°	0.0°	★
A2-34	Number of pole pairs of resolver	1–65535	1	★
A2-36	Encoder wire-break fault detection time	0.0s: No action 0.1–10.0s	0.0s	★
A2-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning 11: Synchronous motor with-load auto-tuning 12: Synchronous motor no-load auto-tuning	0	★
A2-38	Speed loop proportional gain 1	0–100	30	☆
A2-39	Speed loop integral time 1	0.01–10.00s	0.50s	☆
A2-40	Switchover frequency 1	0.00 to A2-43	5.00 Hz	☆
A2-41	Speed loop proportional gain 2	0–100	15	☆

Function Code	Parameter Name	Setting Range	Default	Property
A2-42	Speed loop integral time 2	0.01–10.00s	1.00s	☆
A2-43	Switchover frequency 2	A2-40 to maximum output frequency	10.00 Hz	☆
A2-44	Vector control slip gain	50%–200%	100%	☆
A2-45	Time constant of speed loop filter	0.000–0.100s	0.000s	☆
A2-46	Vector control over-excitation gain	0–200	64	☆
A2-47	Torque upper limit source in speed control mode	0: A2-48 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Via communication 6: MIN(AI1,AI2) 7: MIN(AI1,AI2)	0	☆
A2-48	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆
A2-51	Excitation adjustment proportional gain	0–20000	2000	☆
A2-52	Excitation adjustment integral gain	0–20000	1300	☆
A2-53	Torque adjustment proportional gain	0–20000	2000	☆
A2-54	Torque adjustment integral gain	0–20000	1300	☆
A2-55	Speed loop integral property	Unit's digit: Integral separated 0: Disabled 1: Enabled	0	☆
A2-56	Field weakening mode of synchronous motor	0: No field weakening 1: Direct calculation 2: Adjustment	0	☆
A2-57	Field weakening degree of synchronous motor	50%–500%	100%	☆
A2-58	Maximum field weakening current	1%–300%	50%	☆
A2-59	Field weakening automatic adjustment gain	10%–500%	100%	☆
A2-60	Field weakening integral multiple	2–10	2	☆

Function Code	Parameter Name	Setting Range	Default	Property
A2-61	Motor 2 control mode	0: Sensorless flux vector control (SFVC) 1: Closed-loop vector control (CLVC) 2: Voltage/Frequency (V/F) control	0	☆
A2-62	Motor 2 acceleration/ deceleration time	0: Same as motor 1 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	☆
A2-63	Motor 2 torque boost	0.0%: Automatic torque boost 0.1%–30.0%	Model dependent	☆
A2-65	Motor 2 oscillation suppression gain	0–100	Model dependent	☆
Group A3: Motor 3 Parameters				
A3-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnetic synchronous motor	0	★
A3-01	Rated motor power	0.1–1000.0 kW	Model dependent	★
A3-02	Rated motor voltage	1–2000 V	Model dependent	★
A3-03	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW) 0.1–6553.5 A (AC drive power > 55 kW)	Model dependent	★
A3-04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★
A3-05	Rated motor rotational speed	1–65535 RPM	Model dependent	★
A3-06	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A3-07	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
A3-08	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A3-09	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW) 0.01–655.35 mH (AC drive power > 55 kW)	Model dependent	★
A3-10	No-load current (asynchronous motor)	0.01 A to A2-03 (AC drive power ≤ 55 kW) 0.1 A to A2-03 (AC drive power > 55 kW)	Model dependent	★
A3-16	Stator resistance (synchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A3-17	Shaft D inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A3-18	Shaft Q inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A3-20	Back EMF (synchronous motor)	0.1–6553.5 V	Model dependent	★
A3-27	Encoder pulses per revolution	1–65535	1024	★
A3-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: SIN/COS encoder 4: Wire-saving UVW encoder	0	★
A3-30	A, B phase sequence of ABZ incremental encoder	0: Forward 1: Reserve	0	★
A3-31	Encoder installation angle	0.0°–359.9°	0.0°	★
A3-32	U, V, W phase sequence of UVW encoder	0: Forward 1: Reverse	0	★
A3-33	UVW encoder angle offset	0.0°–359.9°	0.0°	★

Function Code	Parameter Name	Setting Range	Default	Property
A3-34	Number of pole pairs of resolver	1–65535	1	★
A3-36	Encoder wire-break fault detection time	0.0s: No action 0.1–10.0s	0.0s	★
A3-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning 11: Synchronous motor with-load auto-tuning 12: Synchronous motor no-load auto-tuning	0	★
A3-38	Speed loop proportional gain 1	0–100	30	☆
A3-39	Speed loop integral time 1	0.01–10.00s	0.50s	☆
A3-40	Switchover frequency 1	0.00 to A2-43	5.00 Hz	☆
A3-41	Speed loop proportional gain 2	0–100	15	☆
A3-42	Speed loop integral time 2	0.01–10.00s	1.00s	☆
A3-43	Switchover frequency 2	A2-40 to maximum output frequency	10.00 Hz	☆
A3-44	Vector control slip gain	50%–200%	100%	☆
A3-45	Time constant of speed loop filter	0.000–0.100s	0.000s	☆
A3-46	Vector control over-excitation gain	0–200	64	☆
A3-47	Torque upper limit source in speed control mode	0: A2-48 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Via communication 6: MIN (AI1,AI2) 7: MAX (AI1,AI2)	0	☆
A3-48	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆
A3-51	Excitation adjustment proportional gain	0–20000	2000	☆
A3-52	Excitation adjustment integral gain	0–20000	1300	☆

Function Code	Parameter Name	Setting Range	Default	Property
A3-53	Torque adjustment proportional gain	0–20000	2000	☆
A3-54	Torque adjustment integral gain	0–20000	1300	☆
A3-55	Speed loop integral property	Unit's digit: Integral separated 0: Disabled 1: Enabled	0	☆
A3-56	Field weakening mode of synchronous motor	0: No field weakening 1: Direct calculation 2: Adjustment	0	☆
A3-57	Field weakening degree of synchronous motor	50%–500%	100%	☆
A3-58	Maximum field weakening current	1%–300%	50%	☆
A3-59	Field weakening automatic adjustment gain	10%–500%	100%	☆
A3-60	Field weakening integral multiple	2–10	2	☆
A3-61	Motor 2 control mode	0: Sensorless flux vector control (SFVC) 1: Closed-loop vector control (CLVC) 2: Voltage/Frequency (V/F) control	0	☆
A3-62	Motor 2 acceleration/ deceleration time	0: Same as motor 1 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	☆
A3-63	Motor 2 torque boost	0.0%: Automatic torque boost 0.1%–30.0%	Model dependent	☆
A3-65	Motor 2 oscillation suppression gain	0–100	Model dependent	☆
Group A4: Motor 4 Parameters				
A4-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Permanent magnetic synchronous motor	0	★
A4-01	Rated motor power	0.1–1000.0 kW	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
A4-02	Rated motor voltage	1–2000 V	Model dependent	★
A4-03	Rated motor current	0.01–655.35 A (AC drive power ≤ 55 kW) 0.1–6553.5 A (AC drive power > 55 kW)	Model dependent	★
A4-04	Rated motor frequency	0.01 Hz to maximum frequency	Model dependent	★
A4-05	Rated motor rotational speed	1–65535 RPM	Model dependent	★
A4-06	Stator resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A4-07	Rotor resistance (asynchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A4-08	Leakage inductive reactance (asynchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A4-09	Mutual inductive reactance (asynchronous motor)	0.1–6553.5 mH (AC drive power ≤ 55 kW) 0.01–655.35 mH (AC drive power > 55 kW)	Model dependent	★
A4-10	No-load current (asynchronous motor)	0.01 A to A2-03 (AC drive power ≤ 55 kW) 0.1 A to A2-03 (AC drive power > 55 kW)	Model dependent	★
A4-16	Stator resistance (synchronous motor)	0.001–65.535 Ω (AC drive power ≤ 55 kW) 0.0001–6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A4-17	Shaft D inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★
A4-18	Shaft Q inductance (synchronous motor)	0.01–655.35 mH (AC drive power ≤ 55 kW) 0.001–65.535 mH (AC drive power > 55 kW)	Model dependent	★

Function Code	Parameter Name	Setting Range	Default	Property
A4-20	Back EMF (synchronous motor)	0.1–6553.5 V	Model dependent	★
A4-27	Encoder pulses per revolution	1–65535	1024	★
A4-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Resolver 3: SIN/COS encoder 4: Wire-saving UVW encoder	0	★
A4-30	A, B phase sequence of ABZ incremental encoder	0: Forward 1: Reserve	0	★
A4-31	Encoder installation angle	0.0°–359.9°	0.0°	★
A4-32	U, V, W phase sequence of UVW encoder	0: Forward 1: Reverse	0	★
A4-33	UVW encoder angle offset	0.0°–359.9°	0.0°	★
A4-34	Number of pole pairs of resolver	1–65535	1	★
A4-36	Encoder wire-break fault detection time	0.0s: No action 0.1–10.0s	0.0s	★
A4-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning 11: Synchronous motor with-load auto-tuning 12: Synchronous motor no-load auto-tuning	0	★
A4-38	Speed loop proportional gain 1	0–100	30	☆
A4-39	Speed loop integral time 1	0.01–10.00s	0.50s	☆
A4-40	Switchover frequency 1	0.00 to A2-43	5.00 Hz	☆
A4-41	Speed loop proportional gain 2	0–100	15	☆
A4-42	Speed loop integral time 2	0.01–10.00s	1.00s	☆
A4-43	Switchover frequency 2	A2-40 to maximum output frequency	10.00 Hz	☆
A4-44	Vector control slip gain	50%–200%	100%	☆
A4-45	Time constant of speed loop filter	0.000–0.100s	0.000s	☆

Function Code	Parameter Name	Setting Range	Default	Property
A4-46	Vector control over-excitation gain	0–200	64	☆
A4-47	Torque upper limit source in speed control mode	0: A2-48 1: AI1 2: AI2 3: AI3 4: Pulse setting (DI5) 5: Via communication 6: MIN(AI1,AI2) 7: MIN(AI1,AI2)	0	☆
A4-48	Digital setting of torque upper limit in speed control mode	0.0%–200.0%	150.0%	☆
A4-51	Excitation adjustment proportional gain	0–20000	2000	☆
A4-52	Excitation adjustment integral gain	0–20000	1300	☆
A4-53	Torque adjustment proportional gain	0–20000	2000	☆
A4-54	Torque adjustment integral gain	0–20000	1300	☆
A4-55	Speed loop integral property	Unit's digit: Integral separated 0: Disabled 1: Enabled	0	☆
A4-56	Field weakening mode of synchronous motor	0: No field weakening 1: Direct calculation 2: Adjustment	0	☆
A4-57	Field weakening degree of synchronous motor	50%–500%	100%	☆
A4-58	Maximum field weakening current	1%–300%	50%	☆
A4-59	Field weakening automatic adjustment gain	10%–500%	100%	☆
A4-60	Field weakening integral multiple	2–10	2	☆
A4-61	Motor 2 control mode	0: Sensorless flux vector control (SFVC) 1: Closed-loop vector control (CLVC) 2: Voltage/Frequency (V/F) control	0	☆

Function Code	Parameter Name	Setting Range	Default	Property
A4-62	Motor 2 acceleration/ deceleration time	0: Same as motor 1 1: Acceleration/Deceleration time 1 2: Acceleration/Deceleration time 2 3: Acceleration/Deceleration time 3 4: Acceleration/Deceleration time 4	0	☆
A4-63	Motor 2 torque boost	0.0%: Automatic torque boost 0.1%–30.0%	Model dependent	☆
A4-65	Motor 2 oscillation suppression gain	0–100	Model dependent	☆
Group A5: Control Optimization Parameters				
A5-00	DPWM switchover frequency upper limit	0.00–15.00 Hz	12.00 Hz	☆
A5-01	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation	0	☆
A5-02	Dead zone compensation mode selection	0: No compensation 1: Compensation mode 1 2: Compensation mode 2	1	☆
A5-03	Random PWM depth	0: Random PWM invalid 1–10	0	☆
A5-04	Rapid current limit	0: Disabled1: Enabled	1	☆
A5-05	Current detection compensation	0–100	5	☆
A5-06	Undervoltage threshold	60.0%–140.0%	100.0%	☆
A5-07	SFVC optimization mode selection	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	☆
A5-08	Dead-zone time adjustment	100%–200%	150%	☆
A5-09	Overvoltage threshold	200.0–2500.0 V	2000.0 V	☆
Group A6: AI Curve Setting				
A6-00	AI curve 4 minimum input	-10.00 V to A6-02	0.00 V	☆
A6-01	Corresponding setting of AI curve 4 minimum input	-100.0%–100.0%	0.0%	☆
A6-02	AI curve 4 inflexion 1 input	A6-00 to A6-04	3.00 V	☆
A6-03	Corresponding setting of AI curve 4 inflexion 1 input	-100.0%–100.0%	30.0%	☆
A6-04	AI curve 4 inflexion 1 input	A6-02 to A6-06	6.00 V	☆
A6-05	Corresponding setting of AI curve 4 inflexion 1 input	-100.0%–100.0%	60.0%	☆
A6-06	AI curve 4 maximum input	A6-06 to 10.00 V	10.00 V	☆

Function Code	Parameter Name	Setting Range	Default	Property
A6-07	Corresponding setting of AI curve 4 maximum input	-100.0%–100.0%	100.0%	☆
A6-08	AI curve 5 minimum input	-10.00 V to A6-10	0.00 V	☆
A6-09	Corresponding setting of AI curve 5 minimum input	-100.0%–100.0%	0.0%	☆
A6-10	AI curve 5 inflexion 1 input	A6-08 to A6-12	3.00 V	☆
A6-11	Corresponding setting of AI curve 5 inflexion 1 input	-100.0%–100.0%	30.0%	☆
A6-12	AI curve 5 inflexion 1 input	A6-10 to A6-14	6.00 V	☆
A6-13	Corresponding setting of AI curve 5 inflexion 1 input	-100.0%–100.0%	60.0%	☆
A6-14	AI curve 5 maximum input	A6-14 to 10.00 V	10.00 V	☆
A6-15	Corresponding setting of AI curve 5 maximum input	-100.0%–100.0%	100.0%	☆
A6-16	Jump point of AI1 input corresponding setting	-100.0%–100.0%	0.0%	☆
A6-17	Jump amplitude of AI1 input corresponding setting	0.0%–100.0%	0.5%	☆
A6-18	Jump point of AI2 input corresponding setting	-100.0%–100.0%	0.0%	☆
A6-19	Jump amplitude of AI2 input corresponding setting	0.0%–100.0%	0.5%	☆
A6-20	Jump point of AI3 input corresponding setting	-100.0%–100.0%	0.0%	☆
A6-21	Jump amplitude of AI3 input corresponding setting	0.0%–100.0%	0.5%	☆
Group A7: User Programmable Function				
A7-00	User programmable function selection	0: Disabled 1: Enabled	0	★

Function Code	Parameter Name	Setting Range	Default	Property
A7-01	Selection of control mode of the output terminals on the control board	Unit's digit: FMR (FM used as digital output) 0: Controlled by the AC drive 1: Controlled by the user programmable card Ten's digit: relay (T/A-T/B-T/C) Same as unit's digit Hundred's digit: DO1 Same as unit's digit Thousand's digit FMR (FM used as pulse output) Same as unit's digit Ten thousand's digit: AO1 Same as unit's digit	0	★
A7-02	AI/AO function selection of the user programmable card	0: AI3 (voltage input), AO2 (voltage output) 1: AI3 (voltage input), AO2 (current output) 2: AI3 (current input), AO2 (voltage output) 3: AI3 (current input), AO2 (current output) 4: AI3 (PTC input), AO2 (voltage output) 5: AI3 (PTC input), AO2 (current output) 6: AI3 (PTC100 input), AO2 (voltage output) 7: AI3 (PTC100 input), AO2 (current output)	0	★
A7-03	FMP output	0.0%–100.0%	0.0%	☆
A7-04	AO1 output	0.0%–100.0%	0.0%	☆
A7-05	Digital output	Binary setting Unit's digit: FMR Ten's digit: Relay1 Hundred's digit: DO	1	☆
A7-06	Frequency setting through the user programmable card	-100.00% to 100.00%	0.0%	☆
A7-07	Torque setting through the user programmable card	-200.00% to 200.00%	0.0%	☆

Function Code	Parameter Name	Setting Range	Default	Property
A7-08	Command given by the user programmable card	1: Forward RUN 2: Reverse RUN 3: Forward JOG 4: Reverse JOG 5: Coast to stop 6: Decelerate to stop 7: Fault reset	0	☆
A7-09	Faults given by the user programmable card	0: No fault 80–89: Fault codes	0	☆
Group A8: Point-point Communication				
A8-00	Point-point communication selection	0: Disabled 1: Enabled	0	☆
A8-01	Master and slave selection	0: Master 1: Slave	0	☆
A8-02	Slave following master command selection	0: Slave not following running commands of the master 1: Slave following running commands of the master	0	☆
A8-03	Usage of data received by slave	0: Torque setting1: Frequency setting	0	☆
A8-04	Zero offset of received data (torque)	-100.00%–100.00%	0.00%	★
A8-05	Gain of received data (torque)	-10.00–10.00	1.00	★
A8-06	Point-point communication interruption detection time	0.0–10.0s	1.0s	☆
A8-07	Master data sending cycle	0.001–10.000s	0.001s	☆
A8-08	Zero offset of received data zero offset (frequency)	-100.00%–100.00%	0.00%	★
A8-09	Gain of received data gain (frequency)	-10.00–10.00	1.00	★
A8-10	Runaway prevention coefficient	0.00%–100.00%	10.00%	★
Group AC: AI/AO Correction				
AC-00	AI1 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC-01	AI1 displayed voltage 1	0.500–4.000 V	Factory corrected	☆
AC-02	AI1 measured voltage 2	6.000–9.999 V	Factory corrected	☆

Function Code	Parameter Name	Setting Range	Default	Property
AC-03	AI1 displayed voltage 2	6.000–9.999 V	Factory corrected	☆
AC-04	AI2 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC-05	AI2 displayed voltage 1	0.500–4.000 V	Factory corrected	☆
AC-06	AI2 measured voltage 2	6.000–9.999 V	Factory corrected	☆
AC-07	AI2 displayed voltage 2	9.999–10.000 V	Factory corrected	☆
AC-08	AI3 measured voltage 1	9.999–10.000 V	Factory corrected	☆
AC-09	AI3 displayed voltage 1	9.999–10.000 V	Factory corrected	☆
AC-10	AI3 measured voltage 2	9.999–10.000 V	Factory corrected	☆
AC-11	AI3 displayed voltage 2	9.999–10.000 V	Factory corrected	☆
AC-12	AO1 target voltage 1	0.500–4.000 V	Factory corrected	☆
AC-13	AO1 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC-14	AO1 target voltage 2	6.000–9.999 V	Factory corrected	☆
AC-15	AO1 measured voltage 2	6.000–9.999 V	Factory corrected	☆
AC-16	AO2 target voltage 1	0.500–4.000 V	Factory corrected	☆
AC-17	AO2 measured voltage 1	0.500–4.000 V	Factory corrected	☆
AC-18	AO2 target voltage 2	6.000–9.999 V	Factory corrected	☆
AC-19	AO2 measured voltage 2	6.000–9.999 V	Factory corrected	☆
AC-20	AI2 measured current 1	0.000–20.000 mA	Factory corrected	☆
AC-21	AI2 sampling current 1	0.000–20.000 mA	Factory corrected	☆
AC-22	AI2 measured current 2	0.000–20.000 mA	Factory corrected	☆
AC-23	AI2 sampling current 2	0.000–20.000 mA	Factory corrected	☆

Function Code	Parameter Name	Setting Range	Default	Property
AC-24	AO1 ideal current 1	0.000–20.000 mA	Factory corrected	☆
AC-25	AO1 sampling current 1	0.000–20.000 mA	Factory corrected	☆
AC-26	AO1 ideal current 2	0.000–20.000 mA	Factory corrected	☆
AC-27	AO1 sampling current 2	0.000–20.000 mA	Factory corrected	☆

5.2 Monitoring Parameters

Function Code	Parameter Name	Min. Unit	Communication Address
Group U0: Standard Monitoring Parameters			
U0-00	Running frequency (Hz)	0.01 Hz	7000H
U0-01	Set frequency (Hz)	0.01 Hz	7001H
U0-02	Bus voltage	0.1 V	7002H
U0-03	Output voltage	1 V	7003H
U0-04	Output current	0.01 A	7004H
U0-05	Output power	0.1 kW	7005H
U0-06	Output torque	0.1%	7006H
U0-07	DI state	1	7007H
U0-08	DO state	1	7008H
U0-09	AI1 voltage (V)	0.01 V	7009H
U0-10	AI2 voltage (V)/current (mA)	0.01 V/0.01 mA	700AH
U0-11	AI3 voltage (V)	0.01 V	7007BH
U0-12	Count value	1	700CH
U0-13	Length value	1	700DH
U0-14	Load speed	1	700EH
U0-15	PID setting	1	700FH
U0-16	PID feedback	1	7010H
U0-17	PLC stage	1	7011H
U0-18	Input pulse frequency (Hz)	0.01 kHz	7012H
U0-19	Feedback speed	0.01 Hz	7013H
U0-20	Remaining running time	0.1 Min	7014H
U0-21	AI1 voltage before correction	0.001 V	7015H
U0-22	AI2 voltage (V)/current (mA) before correction	0.01 V/0.01 mA	7016H

Function Code	Parameter Name	Min. Unit	Communication Address
Group U0: Standard Monitoring Parameters			
U0-23	AI3 voltage before correction	0.001 V	7017H
U0-24	Linear speed	1 m/Min	7018H
U0-25	Accumulative power-on time	1 Min	7019
U0-26	Accumulative running time	0.1 Min	701AH
U0-27	Pulse input frequency	1 Hz	701BH
U0-28	Communication setting value	0.01%	701CH
U0-29	Encoder feedback speed	0.01 Hz	701DH
U0-30	Main frequency X	0.01 Hz	701EH
U0-31	Auxiliary frequency Y	0.01 Hz	701FH
U0-32	Viewing any register address value	1	7020H
U0-33	Synchronous motor rotor position	0.1°	7021H
U0-34	Motor temperature	1°C	7022H
U0-35	Target torque	0.1%	7023H
U0-36	Resolver position	1	7024H
U0-37	Power factor angle	0.1°	7025H
U0-38	ABZ position	1	7026H
U0-39	Target voltage upon V/F separation	1 V	7027H
U0-40	Output voltage upon V/F separation	1V	7028H
U0-41	DI state visual display	1	7029H
U0-42	DO state visual display	1	702AH
U0-43	DI function state visual display 1	1	702BH
U0-44	DI function state visual display 2	1	702CH
U0-45	Fault information	1	702DH
U0-58	Phase Z counting	1	703AH
U0-59	Current set frequency	0.01%	703BH
U0-60	Current running frequency	0.01%	703CH
U0-61	AC drive running state	1	703DH
U0-62	Current fault code	1	703EH
U0-63	Sent value of point-point communication	0.01%	703FH
U0-64	Received value of point-point communication	0.01%	7040H
U0-65	Torque upper limit	0.1%	7041H

6

EMC

Chapter 6 EMC

6.1 Definition of Terms

1) EMC

Electromagnetic compatibility (EMC) describes the ability of electronic and electrical devices or systems to work properly in the electromagnetic environment and not to generate electromagnetic interference that influences other local devices or systems.

In other words, EMC includes two aspects: The electromagnetic interference generated by a device or system must be restricted within a certain limit; the device or system must have sufficient immunity to the electromagnetic interference in the environment.

2) First environment

Environment that includes domestic premises, it also includes establishments directly connected without intermediate transformers to a low-voltage power supply network which supplies buildings used for domestic purposes

3) Second environment

Environment that includes all establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes

4) Category C1 AC drive

Power Drive System (PDS) of rated voltage less than 1 000 V, intended for use in the first environment

5) Category C2 AC drive

PDS of rated voltage less than 1 000 V, which is neither a plug in device nor a movable device and, when used in the first environment, is intended to be installed and commissioned only by a professional

6) Category C3 AC drive

PDS of rated voltage less than 1 000 V, intended for use in the second environment and not intended for use in the first environment

7) Category C4 AC drive

PDS of rated voltage equal to or above 1 000 V, or rated current equal to or above 400 A, or intended for use in complex systems in the second environment

6.2 Introduction to EMC Standard

6.2.1 EMC Standard

The SET750 series AC drive satisfies the requirements of standard EN 61800-3: 2004 Category C2. The AC drives are applied to both the first environment and the second environment.

6.2.2 Installation Environment

The system manufacturer using the AC drive is responsible for compliance of the system with the European EMC directive. Based on the application of the system, the integrator must ensure that the system complies with standard EN 61800-3: 2004 Category C2, C3 or C4.

The system (machinery or appliance) installed with the AC drive must also have the CE mark. The system integrator is responsible for compliance of the system with the EMC directive and standard EN 61800-3: 2004 Category C2.

Warning
If applied in the first environment, the AC drive may generate radio interference. Besides the CE compliance described in this chapter, users must take measures to avoid such interference, if necessary.

6.3 Selection of Peripheral EMC Devices

6.3.1 Installation of EMC Input Filter on Power Input Side

An EMC filter installed between the AC drive and the power supply can not only restrict the interference of electromagnetic noise in the surrounding environment on the AC drive, but also prevents the interference from the AC drive on the surrounding equipment.

The SET750 series AC drive satisfies the requirements of category C2 only with an EMC filter installed on the power input side. The installation precautions are as follows:

- Strictly comply with the ratings when using the EMC filter. The EMC filter is category I electric apparatus, and therefore, the metal housing ground of the filter should be in good contact with the metal ground of the installation cabinet on a large area, and requires good conductive continuity. Otherwise, it will result in electric shock or poor EMC effect.
- The ground of the EMC filter and the PE conductor of the AC drive must be tied to the same common ground. Otherwise, the EMC effect will be affected seriously.
- The EMC filter should be installed as closely as possible to the power input side of the AC drive.

The following table lists the recommended manufacturers and models of EMC filters for the SET750 series AC drive. Select a proper one based on actual requirements.

Table 6 -1 Recommended manufacturers and models of EMC filters

AC Drive Model	Power Capacity (kVA)	Rated Input Current (A)	AC Input Filter Model (Changzhou Jianli)	AC Input Filter Model (Schaffner)
Three-phase 380 V, 50/60 Hz				
SET7000T0.7GB	1.5	3.4	DL-5EBK5	FN 3258-7-44
SET7000T1.5GB	3	5	DL-5EBK5	FN 3258-7-44
SET7000T2.2GB	4	5.8	DL-10EBK5	FN 3258-7-44
SET7000T3.7GB	5.9	10.5	DL-16EBK5	FN 3258-16-33
SET7000T5.5GB	8.9	14.6	DL-16EBK5	FN 3258-16-33

AC Drive Model	Power Capacity (kVA)	Rated Input Current (A)	AC Input Filter Model (Changzhou Jianli)	AC Input Filter Model (Schaffner)
SET7000T7.5GB	11	20.5	DL-25EBK5	FN 3258-30-33
SET7000T11GB	17	26	DL-35EBK5	FN 3258-30-33
SET7000T15GB	21	35	DL-35EBK5	FN 3258-42-33
SET7000T18.5G	24	38.5	DL-50EBK5	FN 3258-42-33
SET7000T22G	30	46.5	DL-50EBK5	FN 3258-55-34
SET7000T30G	40	62	DL-65EBK5	FN 3258-75-34
SET7000T37G	57	76	DL-80EBK5	FN 3258-100-35
SET7000T45G	69	92	DL-100EBK5	FN 3258-100-35
SET7000T55G	85	113	DL-130EBK5	FN 3258-130-35
SET7000T75G	114	157	DL-160EBK5	FN 3258-180-40
SET7000T90G	134	180	DL-200EBK5	FN 3258-180-40
SET7000T110G	160	214	DL-250EBK5	FN 3270H-250-99
SET7000T132G	192	256	DL-300EBK3	FN 3270H-320-99
SET7000T160G	231	307	DL-400EBK3	FN 3270H-320-99
SET7000T200G	250	385	DL-400EBK3	FN 3270H-400-99
SET7000T220G	280	430	DL-600EBK3	FN 3270H-600-99
SET7000T250G	355	468	DL-600EBK3	FN 3270H-600-99
SET7000T280G	396	525	DL-600EBK3	FN 3270H-600-99
SET7000T315G	445	590	DL-600EBK3	FN 3270H-600-99
SET7000T355G	500	665	DL-700EBK3	FN 3270H-800-99
SET7000T400G	565	785	DL-800EBK3	FN 3270H-800-99
Three-phase 480 V, 50/60 Hz				
SET750-5T0.7GB	1.5	3.4	DL-5EBK5	FN 3258-7-44
SET750-5T1.5GB	3	5	DL-5EBK5	FN 3258-7-44
SET750-5T2.2GB	4	5.8	DL-10EBK5	FN 3258-7-44
SET750-5T3.7GB	5.9	10.5	DL-16EBK5	FN 3258-16-33
SET750-5T5.5GB	8.9	14.6	DL-16EBK5	FN 3258-16-33
SET750-5T7.5GB	11	20.5	DL-25EBK5	FN 3258-30-33
SET750-5T11GB	17	26	DL-35EBK5	FN 3258-30-33
SET750-5T15GB	21	35	DL-35EBK5	FN 3258-42-33
SET750-5T18.5G	24	38.5	DL-50EBK5	FN 3258-42-33
SET750-5T22G	30	46.5	DL-50EBK5	FN 3258-55-34
SET750-5T30G	40	62	DL-65EBK5	FN 3258-75-34
SET750-5T37G	57	76	DL-80EBK5	FN 3258-100-35
SET750-5T45G	69	92	DL-100EBK5	FN 3258-100-35
SET750-5T55G	85	113	DL-130EBK5	FN 3258-130-35
SET750-5T75G	114	157	DL-160EBK5	FN 3258-180-40
SET750-5T90G	134	180	DL-200EBK5	FN 3258-180-40

AC Drive Model	Power Capacity (kVA)	Rated Input Current (A)	AC Input Filter Model (Changzhou Jianli)	AC Input Filter Model (Schaffner)
SET750-5T110G	160	214	DL-250EBK5	FN 3270H-250-99
SET750-5T132G	192	256	DL-300EBK3	FN 3270H-320-99
SET750-5T160G	231	307	DL-400EBK3	FN 3270H-320-99
SET750-5T200G	250	385	DL-400EBK3	FN 3270H-400-99
SET750-5T220G	280	430	DL-600EBK3	FN 3270H-600-99
SET750-5T250G	355	468	DL-600EBK3	FN 3270H-600-99
SET750-5T280G	396	525	DL-600EBK3	FN 3270H-600-99
SET750-5T315G	445	590	DL-600EBK3	FN 3270H-600-99
SET750-5T355G	500	665	DL-700EBK3	FN 3270H-800-99
SET750-5T400G	565	785	DL-800EBK3	FN 3270H-800-99
Three-phase 690 V, 50/60 Hz				
SET750-7T55G	84	70	DL-100EBK5-CHV	-
SET750-7T75G	107	90	DL-100EBK5-CHV	-
SET750-7T90G	125	105	DL-130EBK51-CHV	-
SET750-7T110G	155	130	DL-160EBK5-CHV	-
SET750-7T132G	192	170	DL-200EBK5-CHV	-
SET750-7T160G	231	200	DL-250EBK31/60	-
SET750-7T200G	250	235	DL-250EBK31/60	-
SET750-7T220G	280	247	DL-250EBK31/60	-
SET750-7T250G	355	265	No recommendation	-
SET750-7T280G	396	305	No recommendation	-
SET750-7T315G	445	350	No recommendation	-
SET750-7T355G	500	382	No recommendation	-
SET750-7T400G	565	435	DL-600EBK35/60	-
SET750-7T450G	630	490	DL-600EBK35/60	-
SET750-7T500G	700	595	DL-600EBK35/60	-

6.3.2 Installation of AC Input Reactor on Power Input Side

An AC input reactor is installed to eliminate the harmonics of the input current. As an optional device, the reactor can be installed externally to meet strict requirements of an application environment for harmonics. The following table lists the recommended manufacturers and models of input reactors.

Table 6 -2 Recommended manufacturers and models of AC input reactors

AC Drive Model	Rated Input Current (A)	AC Input Reactor Model (SET)
Three-phase power: 380 V, 50/60 Hz		
SET7000T0.7GB	3.4	SET-ACL-7-4T-222-2%
SET7000T1.5GB	5	SET-ACL-7-4T-222-2%

AC Drive Model	Rated Input Current (A)	AC Input Reactor Model (SET)
SET7000T2.2GB	5.8	SET-ACL-7-4T-222-2%
SET7000T3.7GB	10.5	SET-ACL-10-4T-372-2%
SET7000T5.5GB	14.6	SET-ACL-15-4T-552-2%
SET7000T7.5GB	20.5	SET-ACL-30-4T-113-2%
SET7000T11GB	26	SET-ACL-30-4T-113-2%
SET7000T15GB	35	SET-ACL-40-4T-153-2%
SET7000T18.5G	38.5	SET-ACL-40-4T-153-2%
SET7000T22G	46.5	SET-ACL-50-4T-183-2%
SET7000T30G	62	SET-ACL-80-4T-303-2%
SET7000T37G	76	SET-ACL-80-4T-303-2%
SET7000T45G	92	SET-ACL-120-4T-453-2%
SET7000T55G	113	SET-ACL-120-4T-453-2%
SET7000T75G	157	SET-ACL-200-4T-753-2%
SET7000T90G	180	SET-ACL-200-4T-753-2%
SET7000T110G	214	SET-ACL-250-4T-114-2%
SET7000T132G	256	SET-ACL-330-4T-164-2%
SET7000T160G	307	SET-ACL-330-4T-164-2%
SET7000T200G	385	SET-ACL-490-4T-224-2%
SET7000T220G	430	SET-ACL-490-4T-224-2%
SET7000T250G	468	SET-ACL-490-4T-224-2%
SET7000T280G	525	SET-ACL-660-4T-304-2%
SET7000T315G	590	SET-ACL-660-4T-304-2%
SET7000T355G	665	SET-ACL-800-4T-384-2%
SET7000T400G	785	SET-ACL-800-4T-384-2%
Three-phase power: 480 V, 50/60 Hz		
SET750-5T0.7GB	3.4	SET-ACL-7-4T-222-2%
SET750-5T1.5GB	5	SET-ACL-7-4T-222-2%
SET750-5T2.2GB	5.8	SET-ACL-7-4T-222-2%
SET750-5T3.7GB	10.5	SET-ACL-10-4T-372-2%
SET750-5T5.5GB	14.6	SET-ACL-15-4T-552-2%
SET750-5T7.5GB	20.5	SET-ACL-30-4T-113-2%
SET750-5T11GB	26	SET-ACL-30-4T-113-2%
SET750-5T15GB	35	SET-ACL-40-4T-153-2%
SET750-5T18.5G	38.5	SET-ACL-40-4T-153-2%
SET750-5T22G	46.5	SET-ACL-50-4T-183-2%
SET750-5T30G	62	SET-ACL-80-4T-303-2%
SET750-5T37G	76	SET-ACL-80-4T-303-2%
SET750-5T45G	92	SET-ACL-120-4T-453-2%
SET750-5T55G	113	SET-ACL-120-4T-453-2%
SET750-5T75G	157	SET-ACL-200-4T-753-2%

AC Drive Model	Rated Input Current (A)	AC Input Reactor Model (SET)
SET750-5T90G	180	SET-ACL-200-4T-753-2%
SET750-5T110G	214	SET-ACL-250-4T-114-2%
SET750-5T132G	256	SET-ACL-330-4T-164-2%
SET750-5T160G	307	SET-ACL-330-4T-164-2%
SET750-5T200G	385	SET-ACL-490-4T-224-2%
SET750-5T220G	430	SET-ACL-490-4T-224-2%
SET750-5T250G	468	SET-ACL-490-4T-224-2%
SET750-5T280G	525	SET-ACL-660-4T-304-2%
SET750-5T315G	590	SET-ACL-660-4T-304-2%
SET750-5T355G	665	SET-ACL-800-4T-384-2%
SET750-5T400G	785	SET-ACL-800-4T-384-2%
Three-phase power: 690 V, 50/60 Hz		
SET750-7T55G	70	ACL-0080-EISC-EM19B
SET750-7T75G	90	ACL-0090-EISC-EM19B
SET750-7T90G	105	ACL-0120-EISH-EM13B
SET750-7T110G	130	ACL-0120-EISH-EM13B
SET750-7T132G	170	ACL-0150-EISH-EM11B
SET750-7T160G	200	ACL-0200-EISH-E80UB
SET750-7T200G	235	ACL-0250-EISH-E65UB
SET750-7T220G	247	ACL-0250-EISH-E65UB
SET750-7T250G	265	ACL-0290-EISH-E50UB
SET750-7T280G	305	ACL-0330-EISH-E50UB
SET750-7T315G	350	ACL-0330-EISH-E50UB
SET750-7T355G	382	ACL-0390-EISH-E44UB
SET750-7T400G	435	ACL-0490-EISH-E35UB
SET750-7T450G	490	ACL-0490-EISH-E35UB
SET750-7T500G	595	ACL-0600-EISH-E25UB

6.3.3 Installation of AC Output Reactor on Power Output Side

Whether to install an AC output reactor on the power output side is dependent on the actual situation. The cable connecting the AC drive and the motor should not be too long; capacitance enlarges when an over-long cable is used and thus high-harmonics current may be easily generated.

If the length of the output cable is equal to or greater than the value in the following table, install an AC output reactor on the power output side of the AC drive.

Table 6 -3 Cable length threshold when an AC output reactor is installed

AC Drive Power (kW)	Rated Voltage (V)	Cable Length Threshold (m)
4	200–500	50
5.5	200–500	70
7.5	200–500	100
11	200–500	110
15	200–500	125
18.5	200–500	135
22	200–500	150
≥ 30	280–690	150

The following table lists the recommended manufacturer and models of AC output reactors.

Table 6 -4 Recommended manufacturer and models of AC output reactors

AC Drive Model	Rated Output Current (A)	AC Output Reactor Model (Shanghai Eagtop)
Three-phase 380 V, 50/60 Hz		
SET7000T0.7GB	2.1	OCL-0005-EISC-E1M4
SET7000T1.5GB	3.8	OCL-0005-EISC-E1M4
SET7000T2.2GB	5.1	OCL-0007-EISC-E1M0
SET7000T3.7GB	9	OCL-0010-EISC-EM70
SET7000T5.5GB	13	OCL-0015-EISC-EM47
SET7000T7.5G	17	OCL-0020-EISC-EM35
B HL7000T11GB	25	OCL-0030-EISC-EM23
HL7000T15GB	32	OCL-0040-EISC-EM18
HL7000T18.5G	37	OCL-0050-EISC-EM14
HL7000T22G	45	OCL-0060-EISC-EM12
HL7000T30G	60	OCL-0080-EISC-E87U
HL7000T37G	75	OCL-0090-EISC-E78U
HL7000T45G	91	OCL-0120-EISC-E58U
HL7000T55G	112	OCL-0150-EISH-E47U
HL7000T75G	150	OCL-0200-EISH-E35U
HL7000T90G	176	OCL-0200-EISH-E35U
HL7000T110G	210	OCL-0250-EISH-E28U
HL7000T132G	253	OCL-0290-EISH-E24U
HL7000T160G	304	OCL-0330-EISH-E21U
HL7000T200G	377	OCL-0490-EISH-E14U
HL7000T220G	426	OCL-0490-EISH-E14U
HL7000T250G	465	OCL-0530-EISH-E13U
HL7000T280G	520	OCL-0600-EISH-E12U
HL7000T315G	585	OCL-0660-EISH-E4U0
HL7000T355G	650	OCL-0800-EISH-E5U0

AC Drive Model	Rated Output Current (A)	AC Output Reactor Model (Shanghai Eagtop)
HL7000T400G	725	OCL-0800-EISH-E5U0
Three-phase 480 V, 50/60 Hz		
SET750-5T0.7GB	2.1	OCL-0005-EISC-E1M4
SET750-5T1.5GB	3.8	OCL-0005-EISC-E1M4
SET750-5T2.2GB	5.1	OCL-0007-EISC-E1M0
SET750-5T3.7GB	9	OCL-0010-EISC-EM70
SET750-5T5.5GB	13	OCL-0015-EISC-EM47
	17	OCL-0020-EISC-EM35
SET750-5T7.5GB SET750-5T11GB	25	OCL-0030-EISC-EM23
SET750-5T15GB	32	OCL-0040-EISC-EM18
SET750-5T18.5G	37	OCL-0050-EISC-EM14
SET750-5T22G	45	OCL-0060-EISC-EM12
SET750-5T30G	60	OCL-0080-EISC-E87U
SET750-5T37G	75	OCL-0090-EISC-E78U
SET750-5T45G	91	OCL-0120-EISC-E58U
SET750-5T55G	112	OCL-0150-EISH-E47U
SET750-5T75G	150	OCL-0200-EISH-E35U
SET750-5T90G	176	OCL-0200-EISH-E35U
SET750-5T110G	210	OCL-0250-EISH-E28U
SET750-5T132G	253	OCL-0290-EISH-E24U
SET750-5T160G	304	OCL-0330-EISH-E21U
SET750-5T200G	377	OCL-0490-EISH-E14U
SET750-5T220G	426	OCL-0490-EISH-E14U
SET750-5T250G	465	OCL-0530-EISH-E13U
SET750-5T280G	520	OCL-0600-EISH-E12U
SET750-5T315G	585	OCL-0660-EISH-E4U0
SET750-5T355G	650	OCL-0800-EISH-E5U0
SET750-5T400G	725	OCL-0800-EISH-E5U0
Three-phase 690 V, 50/60 Hz		
SET750-7T55G	65	ACL-0080-EISC-EM19B
SET750-7T75G	86	OCL-0080-EISC-E87U
SET750-7T90G	100	OCL-0120-EISC-E58U
SET750-7T110G	120	OCL-0150-EISH-E47U
SET750-7T132G	150	OCL-0200-EISH-E35U
SET750-7T160G	175	OCL-0200-EISH-E35U
SET750-7T200G	215	OCL-0250-EISH-E28U
SET750-7T220G	245	OCL-0290-EISH-E24U
SET750-7T250G	260	OCL-0290-EISH-E24U
SET750-7T280G	299	OCL-0330-EISH-E21U
SET750-7T315G	330	OCL-0390-EISH-E18U

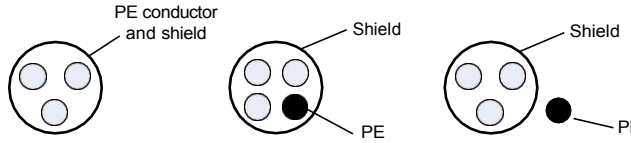
AC Drive Model	Rated Output Current (A)	AC Output Reactor Model (Shanghai Eagtop)
SET750-7T355G	374	OCL-0490-EISH-E14U
SET750-7T400G	410	OCL-0490-EISH-E14U
SET750-7T450G	465	OCL-0530-EISH-E13U
SET750-7T500G	550	OCL-0600-EISH-E12U

6.4 Shielded Cable

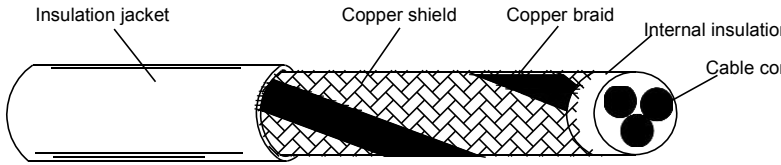
6.4.1 Requirements for Shielded Cable

The shielded cable must be used to satisfy the EMC requirements of CE marking. Shielded cables are classified into three-conductor cable and four-conductor cable. If conductivity of the cable shield is not sufficient, add an independent PE cable, or use a four-conductor cable, of which one phase conductor is PE cable.

The three-conductor cable and four-conductor cable are shown in the following figure.

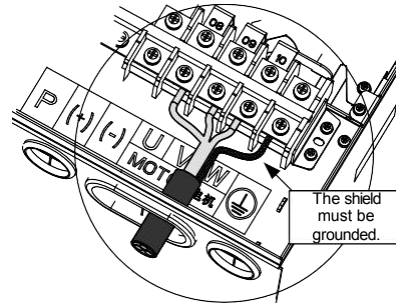


To suppress emission and conduction of the radio frequency interference effectively, the shield of the shielded cable is cooper braid. The braided density of the cooper braid should be greater than 90% to enhance the shielding efficiency and conductivity, as shown in the following figure.



The following figure shows the grounding method of the shielded cable.

Figure 6 -1 Grounding of the shielded cable



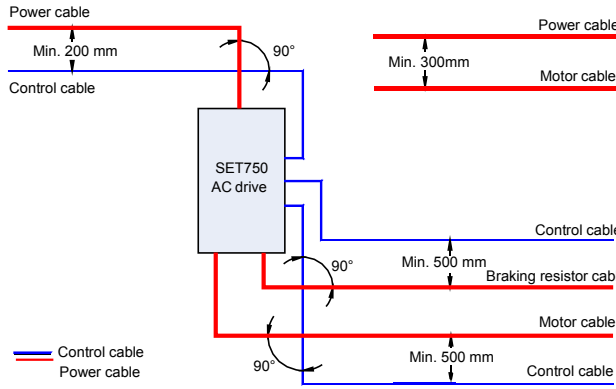
The installation precautions are as follows:

- Symmetrical shielded cable is recommended. The four-conductor shielded cable can also be used as an input cable.
- The motor cable and PE shielded conducting wire (twisted shielded) should be as short as possible to reduce electromagnetic radiation and external stray current and capacitive current of the cable. If the motor cable is over 100 meters long, an output filter or reactor is required.
- It is recommended that all control cables be shielded.
- It is recommended that a shielded cable be used as the output power cable of the AC drive; the cable shield must be well grounded. For devices suffering from interference, shielded twisted pair (STP) cable is recommended as the lead wire and the cable shield must be well grounded.

6.4.2 Cabling Requirements

1) The motor cables must be laid far away from other cables. The motor cables of several AC drives can be laid side by side.
2) It is recommended that the motor cables, power input cables and control cables be laid in different ducts. To avoid electromagnetic interference caused by rapid change of the output voltage of the AC drive, the motor cables and other cables must not be laid side by side for a long distance.
3) If the control cable must run across the power cable, make sure they are arranged at an angle of close to 90° . Other cables must not run across the AC drive.
4) The power input and output cables of the AC drive and weak-current signal cables (such as control cable) should be laid vertically (if possible) rather than in parallel.
5) The cable ducts must be in good connection and well grounded. Aluminium ducts can be used to improve electric potential.
6) The filter, AC drive and motor should be connected to the system (machinery or appliance) properly, with spraying protection at the installation part and conductive metal in full contact.

Figure 6 -2 Cabling diagram



6.5 Solutions to Common EMC Interference Problems

The AC drive generates very strong interference. Although EMC measures are taken, the interference may still exist due to improper cabling or grounding during use. When the AC drive interferes with other devices, adopt the following solutions.

Interference Type	Solution
Leakage protection switch tripping	• Connect the motor housing to the PE of the AC drive. • Connect the PE of the AC drive to the PE of the mains power supply. • Add a safety capacitor to the power input cable. • Add magnetic rings to the input drive cable.
AC drive interference during running	• Connect the motor housing to the PE of the AC drive. • Connect the PE of the AC drive to the PE of the mains voltage. • Add a safety capacitor to the power input cable and wind the cable with magnetic rings. • Add a safety capacitor to the interfered signal port or wind the signal cable with magnetic rings. • Connect the equipment to the common ground.
Communication interference	• Connect the motor housing to the PE of the AC drive. • Connect the PE of the AC drive to the PE of the mains voltage. • Add a safety capacitor to the power input cable and wind the cable with magnetic rings. • Add a matching resistor between the communication cable source and the load side. • Add a common grounding cable besides the communication cable. • Use a shielded cable as the communication cable and connect the cable shield to the common grounding point.
I/O interference	• Enlarge the capacitance at the low-speed DI. A maximum of 0.11 uF capacitance is suggested. • Enlarge the capacitance at the AI. A maximum of 0.22 uF is suggested.

7

Selection and Dimensions

Chapter 7 Selection and Dimensions

7.1 Electrical Specifications of the SET750

Table 7-1 Models and technical data of the SET750

Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Adaptable Motor (kW, HP)		Thermal Power Consumption (kW)
Single-phase 220 V, 50/60 Hz						
HL7000S0.4GB	1	5.4	2.3	0.4	0.5	0.016
HL7000S0.7GB	1.5	8.2	4	0.75	1	0.030
HL7000S1.5GB	3	14	7	1.5	2	0.055
HL7000S2.2GB	4	23	9.6	2.2	3	0.072
Three-phase 220 V, 50/60 Hz						
SET750-2T0.4GB	1.5	3.4	2.1	0.4	0.5	0.016
SET750-2T0.75GB	3	5	3.8	0.75	1	0.030
SET750-2T1.5GB	4	5.8	5.1	1.5	2	0.055
SET750-2T2.2GB	5.9	10.5	9	2.2	3	0.072
SET750-2T3.7GB	8.9	14.6	13	3.7	5	0.132
SET750-2T5.5GB	17	26	25	5.5	7.5	0.214
SET750-2T7.5GB	21	35	32	7.5	10	0.288
SET750-2T11G	30	46.5	45	11	15	0.489
SET750-2T15G	40	62	60	15	20	0.608
SET750-2T18.5G	57	76	75	18.5	25	0.716
SET750-2T22G	69	92	91	22	30	0.887
SET750-2T30G	85	113	112	30	40	1.11
SET750-2T37G	114	157	150	37	50	1.32
SET750-2T45G	134	180	176	45	60	1.66
SET750-2T55G	160	214	210	55	75	1.98
SET750-2T75G	231	307	304	75	100	2.02
Three-phase 380 V, 50/60 Hz						
SET7000T0.7GB	1.5	3.4	2.1	0.75	1	0.027
SET7000T1.5GB	3	5	3.8	1.5	2	0.050
SET7000T2.2GB	4	5.8	5.1	2.2	3	0.066
SET7000T3.7GB	5.9	10.5	9	3.7	5	0.120
SET7000T5.5GB	8.9	14.6	13	5.5	7.5	0.195
SET7000T7.5GB	11	20.5	17	7.5	10	0.262

Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Adaptable Motor (kW, HP)		Thermal Power Consumption (kW)
HL7000T11GB	17	26	25	11	15	0.445
HL7000T15GB	21	35	32	15	20	0.553
HL7000T18.5G	24	38.5	37	18.5	25	0.651
HL7000T22G	30	46.5	45	22	30	0.807
HL7000T30G	40	62	60	30	40	1.01
HL7000T37G	57	76	75	37	50	1.20
HL7000T45G	69	92	91	45	60	1.51
HL7000T55G	85	113	112	55	75	1.80
HL7000T75G	114	157	150	75	100	1.84
HL7000T90G	134	180	176	90	125	2.08
HL7000T110G	160	214	210	110	150	2.55
HL7000T132G	192	256	253	132	200	3.06
HL7000T160G	231	307	304	160	250	3.61
HL7000T200G	250	385	377	200	300	4.42
HL7000T220G	280	430	426	220	300	4.87
HL7000T250G	355	468	465	250	400	5.51
HL7000T280G	396	525	520	280	370	6.21
HL7000T315G	445	590	585	315	500	7.03
HL7000T355G	500	665	650	355	420	7.81
HL7000T400G	565	785	725	400	530	8.51
Three-phase 480 V, 50/60 Hz						
SET750-5T0.7GB	1.5	3.4	2.1	0.75	1	0.027
SET750-5T1.5GB	3	5	3.8	1.5	2	0.050
SET750-5T2.2GB	4	5.8	5.1	2.2	3	0.066
SET750-5T3.7GB	5.9	10.5	9	3.7	5	0.120
SET750-5T5.5GB	8.9	14.6	13	5.5	7.5	0.195
SET750-5T7.5GB	11	20.5	17	7.5	10	0.262
SET750-5T11GB	17	26	25	11	15	0.445
SET750-5T15GB	21	35	32	15	20	0.553
SET750-5T18.5G	24	38.5	37	18.5	25	0.651
SET750-5T22G	30	46.5	45	22	30	0.807
SET750-5T30G	40	62	60	30	40	1.01
SET750-5T37G	57	76	75	37	50	1.20
SET750-5T45G	69	92	91	45	60	1.51
SET750-5T55G	85	113	112	55	70	1.80

Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Adaptable Motor (kW, HP)		Thermal Power Consumption (kW)
SET750-5T75G	114	157	150	75	100	1.84
SET750-5T90G	134	180	176	90	125	2.08
SET750-5T110G	160	214	210	110	150	2.55
SET750-5T132G	192	256	253	132	175	3.06
SET750-5T160G	231	307	304	160	210	3.61
SET750-5T200G	250	385	377	200	260	4.42
SET750-5T220G	280	430	426	220	300	4.87
SET750-5T250G	355	468	465	250	350	5.51
SET750-5T280G	396	525	520	280	370	6.21
SET750-5T315G	445	590	585	315	420	7.03
SET750-5T355G	500	665	650	355	470	7.81
SET750-5T400G	565	785	725	400	530	8.51
Three-phase 690 V, 50/60 Hz						
SET750-7T55G	84	70	65	55	70	1.22
SET750-7T75G	107	90	86	75	100	1.63
SET750-7T90G	125	105	100	90	125	1.96
SET750-7T110G	155	130	120	110	150	2.39
SET750-7T132G	192	170	150	132	175	3.00
SET750-7T160G	231	200	175	160	210	3.32
SET750-7T200G	250	235	215	200	260	4.20
SET750-7T220G	280	247	245	220	300	4.91
SET750-7T250G	355	265	260	250	350	5.08
SET750-7T280G	396	305	299	280	370	5.86
SET750-7T315G	445	350	330	315	420	6.42
SET750-7T355G	500	382	374	355	470	7.38
SET750-7T400G	565	435	410	400	530	7.83
SET750-7T450G	630	490	465	450	600	8.93
SET750-7T500G	700	595	550	500	660	10.76

7.2 Selection of Peripheral Electrical Devices

Table 7 -2 Selection of peripheral electrical devices of the SET750

AC Drive Model	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm^2)	Cable of Output Side Main Circuit (mm^2)	Cable of Control Circuit (mm^2)
Single-phase 220 V					
SET7000S0.4GB	6	9	0.75	0.75	0.5
SET7000S0.7GB	10	12	0.75	0.75	0.5
SET7000S1.5GB	16	18	1.5	1.5	0.5
SET7000S2.2GB	25	25	2.5	2.5	0.5
Three-phase 220 V					
SET750-2T0.4GB	4	9	0.75	0.75	0.5
SET750-2T0.75GB	6	9	0.75	0.75	0.5
SET750-2T1.5GB	10	12	0.75	0.75	0.5
SET750-2T2.2GB	16	18	1.5	1.5	0.5
SET750-2T3.7GB	20	25	2.5	2.5	0.75
SET750-2T5.5GB	32	32	4.0	4.0	0.75
SET750-2T7.5GB	40	40	6.0	6.0	0.75
SET750-2T11G	50	50	10	10	0.75
SET750-2T15G	63	63	16	16	0.75
SET750-2T18.5G	80	80	25	25	1.0
SET750-2T22G	100	115	35	35	1.0
SET750-2T30G	125	125	50	50	1.0
SET750-2T37G	160	185	70	70	1.0
SET750-2T45G	200	225	95	95	1.0
SET750-2T55G	225	225	120	120	10
SET750-2T75G	350	400	150	150	1.0
Three-phase 380 V					
SET7000T0.7GB	4	9	0.75	0.75	0.5
SET7000T1.5GB	6	9	0.75	0.75	0.5
SET7000T2.2GB	10	12	0.75	0.75	0.5
SET7000T3.7GB	16	18	1.5	1.5	0.5
SET7000T5.5 GB	20	25	2.5	2.5	0.75
SET7000T7.5 GB	25	25	4.0	4.0	0.75
SET7000T11 GB	32	32	6.0	6.0	0.75
SET7000T15GB	40	40	6.0	6.0	0.75
SET7000T18.5G	50	50	10	10	1.0
SET7000T22G	50	50	10	10	1.0
SET7000T30G	63	63	16	16	1.0

AC Drive Model	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm^2)	Cable of Output Side Main Circuit (mm^2)	Cable of Control Circuit (mm^2)
SET7000T37G	80	80	25	25	1.0
SET7000T45G	100	115	35	35	1.0
SET7000T55G	125	125	50	50	1.0
SET7000T75G	160	185	70	70	1.0
SET7000T90G	200	225	95	95	1.0
SET7000T110G	225	225	120	120	1.0
SET7000T132G	315	330	120	120	1.0
SET7000T160G	350	400	150	150	1.0
SET7000T200G	400	400	185	185	1.0
SET7000T220G	500	500	240	240	1.0
SET7000T250G	500	500	120 x 2	120 x 2	1.0
SET7000T280G	630	630	120 x 2	120 x 2	1.0
SET7000T315G	630	630	150 x 2	150 x 2	1.0
SET7000T355G	700	800	185 x 2	185 x 2	1.0
SET7000T400G	800	800	240 x 2	240 x 2	1.0
Three-phase 480 V					
SET750-5T0.7GB	4	9	0.75	0.75	0.5
SET750-5T1.5GB	6	9	0.75	0.75	0.5
SET750-5T2.2GB	10	12	0.75	0.75	0.5
SET750-5T3.7GB	16	18	1.5	1.5	0.5
SET750-5T5.5GB	20	25	2.5	2.5	0.75
SET750-5T7.5GB	25	25	4.0	4.0	0.75
SET750-5T11GB	32	32	4.0	4.0	0.75
SET750-5T15GB	40	40	6.0	6.0	0.75
SET750-5T18.5G	50	50	10	10	1.0
SET750-5T22G	50	50	10	10	1.0
SET750-5T30G	63	63	16	16	1.0
SET750-5T37G	80	80	25	25	1.0
SET750-5T45G	100	115	35	35	1.0
SET750-5T55G	125	125	50	50	1.0
SET750-5T75G	160	185	70	70	1.0
SET750-5T90G	200	225	95	95	1.0
SET750-5T110G	225	225	120	120	1.0
SET750-5T132G	315	330	120	120	1.0
SET750-5T160G	350	400	150	150	1.0
SET750-5T200G	400	400	185	185	1.0
SET750-5T220G	500	500	240	240	1.0

AC Drive Model	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit (mm^2)	Cable of Output Side Main Circuit (mm^2)	Cable of Control Circuit (mm^2)
SET750-5T250G	500	500	120 x 2	120 x 2	1.0
SET750-5T280G	630	630	120 x 2	120 x 2	1.0
SET750-5T315G	630	630	150 x 2	150 x 2	1.0
SET750-5T355G	700	800	185 x 2	185 x 2	1.0
SET750-5T400G	800	800	240 x 2	240 x 2	1.0
Three-phase 690 V					
SET750-7T55G	80	80	16	16	1.0
SET750-7T75G	100	115	25	25	1.0
SET750-7T90G	125	125	35	35	1.0
SET750-7T110G	160	185	50	50	1.0
SET750-7T132G	180	200	70	70	1.0
SET750-7T160G	225	225	95	95	1.0
SET750-7T200G	250	250	120	120	1.0
SET750-7T220G	315	315	120	120	1.0
SET750-7T250G	315	315	150	150	1.0
SET750-7T280G	350	400	150	150	1.0
SET750-7T315G	400	400	185	185	1.0
SET750-7T355G	400	400	185	185	1.0
SET750-7T400G	500	500	240	240	1.0
SET750-7T450G	630	630	120 x 2	120 x 2	1.0
SET750-7T500G	630	630	150 x 2	150 x 2	1.0

7.3 Selection and Installation of External DC Reactor

7.3.1 Installation Mode of External DC Reactor

The SET750 series AC drives of over 75 kW power (2T is 37 kW) are configured with an external DC reactor as standard. The DC reactor is packed in separate wooden box for delivery.

When installing the DC reactor, remove the shorting copper busbar between the main circuit connection terminals P and +. Then connect the DC reactor between terminals P and + (no polarity requirement). The copper busbar is not used any longer after the installation is complete.

Note

Customized models can be provided for special requirements.

7.3.2 Selection of Power of Braking Resistor

In theory, the power of the braking resistor is consistent with the braking power. But in consideration that the de-rating is 70%, you can calculate the power of the braking resistor according to the formula 0.7 x Pr = Pb x D.

- Pr refers to the power of resistor.
- D refers to the braking frequency (percentage of the regenerative process to the whole working process)

Application	Elevator	Winding and unwinding	Centrifuge	Occasional braking load	General application
Braking Frequency	20%–30%	20%–30%	50%–60%	5%	10%

Table 7 - 3 below provides data for reference. You can select different resistance and power based on actual needs. However, the resistance must not be lower than the recommended value. The power may be higher than the recommended value.

The braking resistor model is dependent on the generation power of the motor in the actual system and is also related to the system inertia, deceleration time and potential energy load. For systems with high inertia, and/or rapid deceleration times, or frequent braking sequences, the braking resistor with higher power and lower resistance value should be selected.

Table 7 -4Recommended values of braking resistor

Model	Recommended Power	Recommended Resistance	Braking Unit	Remark
Single-phase 220 V				
HL7000S0.4GB	80 W	≥ 200 Ω	Built-in (standard)	No special description
HL7000S0.7GB	80 W	≥ 150 Ω		
HL7000S1.5GB	100 W	≥ 100 Ω		
HL7000S2.2GB	100 W	≥ 70 Ω		
Three-phase 220 V				
SET750-2T0.4GB	150 W	≥ 150 Ω	Built-in (standard)	No special description
SET750-2T0.75GB	150 W	≥ 110 Ω		
SET750-2T1.1GB	250 W	≥ 100 Ω		
SET750-2T2.2GB	300 W	≥ 65 Ω		
SET750-2T3.7GB	400 W	≥ 45 Ω		
SET750-2T5.5GB	800 W	≥ 22 Ω		
SET750-2T7.5GB	1000 W	≥ 16 Ω		
SET750-2T11G	1500 W	≥ 11 Ω	Built-in (optional)	Add "B" to the model if a braking unit is needed.
SET750-2T15G	2500 W	≥ 8 Ω		
SET750-2T18.5G	3.7 kW	≥ 8.0 Ω	External	HLBUN-45-S
SET750-2T22G	4.5 kW	≥ 8 Ω	External	HLBUN-45-S
SET750-2T30G	5.5 kW	≥ 4 Ω	External	HLBUN-60-S
SET750-2T37G	7.5 kW	≥ 4 Ω	External	HLBUN-90-S
SET750-2T45G	4.5 kW x 2	≥ 4 Ω x 2	External	HLBUN-60-S x 2

Model	Recommended Power	Recommended Resistance	Braking Unit	Remark
SET750-2T55G	5.5 kW x 2	≥ 4 Ω x 2	External	HLBUN-60-S x 2
SET750-2T75G	16 kW	≥ 1.2 Ω	External	HLBUN-90-S x 2
Three-phase 380 V				
SET7000T0.7GB	150 W	≥ 300 Ω	Built-in (standard)	No special description
SET7000T1.5GB	150 W	≥ 220 Ω		
SET7000T2.2GB	250 W	≥ 200 Ω		
SET7000T3.7GB	300 W	≥ 130 Ω		
SET7000T5.5GB	400 W	≥ 90 Ω		
SET7000T7.5GB	500 W	≥ 65 Ω		
SET7000T11GB	800 W	≥ 43 Ω		
SET7000T15GB	1000 W	≥ 32 Ω		
SET7000T18.5G	1300 W	≥ 25 Ω	Built-in (optional)	Add "B" to the model if a braking unit is needed.
SET7000T22G	1500 W	≥ 22 Ω		
SET7000T30G	2500 W	≥ 16 Ω		
SET7000T37G	3.7 kW	≥ 16.0 Ω	External	HLBUN-45-T
SET7000T45G	4.5 kW	≥ 16 Ω	External	HLBUN-60-T
SET7000T55G	5.5 kW	≥ 8 Ω	External	HLBUN-60-T
SET7000T75G	7.5 kW	≥ 8 Ω	External	HLBUN-90-T
SET7000T90G	4.5 kW x 2	≥ 8 Ω x 2	External	HLBUN-60-T x 2
SET7000T110G	5.5 kW x 2	≥ 8 Ω x 2	External	HLBUN-60-T x 2
SET7000T132G	6.5 kW x 2	≥ 8 Ω x 2	External	HLBUN-90-T x 2
SET7000T160G	16 kW	≥ 2.5 Ω	External	HLBUN-90-T x 2
HL7000T200G	20 kW	≥ 2.5 Ω	External	HLBU-200-B
HL7000T220G	22 kW	≥ 2.5 Ω	External	HLBU-200-B
HL7000T250G	12.5 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-B x 2
HL7000T280G	14 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-B x 2
HL7000T315G	16 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-B x 2
HL7000T355G	17 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-B x 2
HL7000T400G	14 kW x 3	≥ 2.5 Ω x 3	External	HLBU-200-B x 3
Three-phase 480 V				
SET750-5T0.7GB	150 W	≥ 300 Ω	Built-in (standard)	No special description
SET750-5T1.5GB	150 W	≥ 220 Ω		
SET750-5T2.2GB	250 W	≥ 200 Ω		
SET750-5T3.7GB	300 W	≥ 130 Ω		
SET750-5T5.5GB	400 W	≥ 90 Ω		
SET750-5T7.5GB	500 W	≥ 65 Ω		
SET750-5T11GB	800 W	≥ 43 Ω		
SET750-5T15GB	1000 W	≥ 32 Ω		
SET750-5T18.5G	1300 W	≥ 25 Ω	Built-in (optional)	Add "B" to the model if a braking unit is needed.
SET750-5T22G	1500 W	≥ 22 Ω		
SET750-5T30G	2500 W	≥ 16 Ω		

Model	Recommended Power	Recommended Resistance	Braking Unit	Remark
SET750-5T37G	3.7 kW	≥ 16.0 Ω	External	HLBUN-45-5T
SET750-5T45G	4.5 kW	≥ 16 Ω	External	HLBUN-45-5T
SET750-5T55G	5.5 kW	≥ 8 Ω	External	HLBUN-60-5T
SET750-5T75G	7.5 kW	≥ 8 Ω	External	HLBUN-90-5T
SET750-5T90G	4.5 kW x 2	≥ 8 Ω x 2	External	HLBUN-90-5T
SET750-5T110G	5.5 kW x 2	≥ 8 Ω x 2	External	HLBUN-60-5T x 2
SET750-5T132G	6.5 kW x 2	≥ 8 Ω x 2	External	HLBUN-90-5T x 2
SET750-5T160G	16 kW	≥ 2.5 Ω	External	HLBUN-90-5T x 2
SET750-5T200G	20 kW	≥ 2.5 Ω	External	HLBU-200-D
SET750-5T220G	22 kW	≥ 2.5 Ω	External	HLBU-200-D
SET750-5T250G	12.5 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-D x 2
SET750-5T280G	14 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-D x 2
SET750-5T315G	16 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-D x 2
SET750-5T355G	17 kW x 2	≥ 2.5 Ω x 2	External	HLBU-200-D x 2
SET750-5T400G	14 kW x 3	≥ 2.5 Ω x 3	External	HLBU-200-D x 3

Note

- " x 2" indicates that two braking units with their respective braking resistor are connected in parallel.
- " x 3" means the same.

8

Maintenance and Troubleshooting

Chapter 8 Maintenance and Troubleshooting

Before contacting SET for technical support, you can first determine the fault type, analyze the causes, and perform troubleshooting according to the following tables. If the fault cannot be rectified, contact the agent or SET.

Err22 is the AC drive hardware overcurrent or overvoltage signal. In most situations, hardware overvoltage fault causes Err22.

Figure 8 -1 Solutions to the faults of the SET750

Fault Name	Display	Possible Causes	Solutions
Inverter unit protection	Err01	1: The output circuit is grounded or short circuited. 2: The connecting cable of the motor is too long. 3: The module overheats. 4: The internal connections become loose. 5:The main control board is faulty. 6: The drive board is faulty. 7: The inverter module is faulty.	1: Eliminate external faults. 2: Install a reactor or an output filter. 3: Check the air filter and the cooling fan. 4: Connect all cables properly. 5: Contact the agent or SET.
Overcurrent during acceleration	Err02	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The acceleration time is too short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select an AC drive of higher power class.
Overcurrent during deceleration	Err03	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor.

Fault Name	Display	Possible Causes	Solutions
Overcurrent at constant speed	Err04	1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The voltage is too low. 4: A sudden load is added during operation. 5: The AC drive model is of too small power class.	1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Adjust the voltage to normal range. 4: Remove the added load. 5: Select an AC drive of higher power class.
Overvoltage during acceleration	Err05	1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration time. 4: Install the braking unit and braking resistor.
Overvoltage during deceleration	Err06	1: The input voltage is too high. 2: An external force drives the motor during deceleration. 3: The deceleration time is too short. 4: The braking unit and braking resistor are not installed.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor. 3: Increase the deceleration time. 4: Install the braking unit and braking resistor.
Overvoltage at constant speed	Err07	1: The input voltage is too high. 2: An external force drives the motor during deceleration.	1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.
Control power supply fault	Err08	The input voltage is not within the allowable range.	Adjust the input voltage to the allowable range.
Undervoltage	Err09	1: Instantaneous power failure occurs on the input power supply. 2: The AC drive's input voltage is not within the allowable range. 3: The bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are faulty. 5: The drive board is faulty. 6: The main control board is faulty.	1: Reset the fault. 2: Adjust the voltage to normal range. 3: Contact the agent or SET.
AC drive overload	Err10	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.

Fault Name	Display	Possible Causes	Solutions
Motor overload	Err11	1: P9-01 is set improperly. 2: The load is too heavy or locked-rotor occurs on the motor. 3: The AC drive model is of too small power class.	1: Set P9-01 correctly. 2: Reduce the load and check the motor and the mechanical condition. 3: Select an AC drive of higher power class.
Power input phase loss	Err12	1: The three-phase power input is abnormal. 2: The drive board is faulty. 3: The lightening board is faulty. 4: The main control board is faulty.	1: Eliminate external faults. 2: Contact the agent or SET.
Power output phase loss	Err13	1: The cable connecting the AC drive and the motor is faulty. 2: The AC drive's three-phase outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4: The module is faulty.	1: Eliminate external faults. 2: Check whether the motor three-phase winding is normal. 3: Contact the agent or SET.
Module overheat	Err14	1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the module is damaged. 5: The inverter module is damaged.	1: Lower the ambient temperature. 2: Clean the air filter. 3: Replace the damaged fan. 4: Replace the damaged thermally sensitive resistor. 5: Replace the inverter module.
External equipment fault	Err15	1: External fault signal is input via DI. 2: External fault signal is input via virtual I/O.	Reset the operation.
Communication fault	Err16	1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: P0-28 is set improperly. 4: The communication parameters in group Pd are set improperly.	1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set P0-28 correctly. 4: Set the communication parameters properly.
Contactor fault	Err17	1: The drive board and power supply are faulty. 2: The contactor is faulty.	1: Replace the faulty drive board or power supply board. 2: Replace the faulty contactor.

Fault Name	Display	Possible Causes	Solutions
Current detection fault	Err18	1: The HALL device is faulty. 2: The drive board is faulty.	1: Replace the faulty HALL device. 2: Replace the faulty drive board.
Motor auto-tuning fault	Err19	1: The motor parameters are not set according to the nameplate. 2: The motor auto-tuning times out.	1: Set the motor parameters according to the nameplate properly. 2: Check the cable connecting the AC drive and the motor.
Encoder fault	Err20	1: The encoder type is incorrect. 2: The cable connection of the encoder is incorrect. 3: The encoder is damaged. 4: The PG card is faulty.	1: Set the encoder type correctly based on the actual situation. 2: Eliminate external faults. 3: Replace the damaged encoder. 4: Replace the faulty PG card.
EEPROM read-write fault	Err21	The EEPROM chip is damaged.	Replace the main control board.
AC drive hardware fault	Err22	1: Overvoltage exists. 2: Overcurrent exists.	1: Handle based on overvoltage. 2: Handle based on overcurrent.
Short circuit to ground	Err23	The motor is short circuited to the ground.	Replace the cable or motor.
Accumulative running time reached	Err26	The accumulative running time reaches the setting value.	Clear the record through the parameter initialization function.
User-defined fault 1	Err27	1: The user-defined fault 1 signal is input via DI. 2: User-defined fault 1 signal is input via virtual I/O.	Reset the operation.
User-defined fault 2	Err28	1: The user-defined fault 2 signal is input via DI. 2: The user-defined fault 2 signal is input via virtual I/O.	Reset the operation.
Accumulative power-on time reached	Err29	The accumulative power-on time reaches the setting value.	Clear the record through the parameter initialization function.
Load becoming 0	Err30	The AC drive running current is lower than P9-64.	Check that the load is disconnected or the setting of P9-64 and P9-65 is correct.
PID feedback lost during running	Err31	The PID feedback is lower than the setting of PA-26.	Check the PID feedback signal or set PA-26 to a proper value.

Fault Name	Display	Possible Causes	Solutions
Pulse-by-pulse current limit fault	Err40	1: The load is too heavy or locked-rotor occurs on the motor. 2: The AC drive model is of too small power class.	1: Reduce the load and check the motor and mechanical condition. 2: Select an AC drive of higher power class.
Motor switchover fault during running	Err41	Change the selection of the motor via terminal during running of the AC drive.	Perform motor switchover after the AC drive stops.
Too large speed deviation	Err42	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed. 3: P9-69 and P9-70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning. 3: Set P9-69 and P9-70 correctly based on the actual situation.
Motor over-speed	Err43	1: The encoder parameters are set incorrectly. 2: The motor auto-tuning is not performed.3: P9-69 and P9-70 are set incorrectly.	1: Set the encoder parameters properly. 2: Perform the motor auto-tuning. 3: Set P9-69 and P9-70 correctly based on the actual situation.
Motor overheat	Err45	1: The cabling of the temperature sensor becomes loose. 2: The motor temperature is too high.	1: Check the temperature sensor cabling and eliminate the cabling fault. 2: Lower the carrier frequency or adopt other heat radiation measures.
Initial position fault	Err51	The motor parameters are not set based on the actual situation.	Check that the motor parameters are set correctly and whether the setting of rated current is too small.

Common Faults and Solutions

You may come across the following faults during the use of the AC drive. Refer to the following table for simple fault analysis.

Table 9-2 Troubleshooting to common faults of the AC drive

SN	Fault	Possible Causes	Solutions
1	There is no display at power-on.	1: There is no power supply to the AC drive or the power input to the AC drive is too low. 2: The power supply of the switch on the drive board of the AC drive is faulty. 3: The rectifier bridge is damaged. 4: The control board or the operation panel is faulty. 5: The cable connecting the control board and the drive board and the operation panel breaks.	1: Check the power supply. 2: Check the bus voltage. 3: Re-connect the 8-core and 28-core cables. 4: Contact the agent or SET for technical support.
2	“HC” is displayed at power-on.	1: The cable between the drive board and the control board is in poor contact. 2: Related components on the control board are damaged. 3: The motor or the motor cable is short circuited to the ground. 4: The HALL device is faulty. 5: The power input to the AC drive is too low.	1: Re-connect the 8-core and 28-core cables. 2: Contact the agent or SET for technical support.
3	“Err23” is displayed at power-on.	1: The motor or the motor output cable is short-circuited to the ground. 2: The AC drive is damaged.	1: Measure the insulation of the motor and the output cable with a megger. 2: Contact the agent or SET for technical support.
4	The AC drive display is normal upon power-on. But “HC” is displayed after running and stops immediately.	1:The cooling fan is damaged or locked-rotor occurs. 2: The external control terminal cable is short circuited.	1: Replace the damaged fan. 2: Eliminate external fault.
5	Err14 (module overheat) fault is reported frequently.	1: The setting of carrier frequency is too high. 2: The cooling fan is damaged, or the air filter is blocked. 3: Components inside the AC drive are damaged (thermal coupler or others).	1: Reduce the carrier frequency (P0-15). 2: Replace the fan and clean the air filter. 3: Contact the agent or SET for technical support.

SN	Fault	Possible Causes	Solutions
6	The motor does not rotate after the AC drive runs.	1: Check the motor and the motor cables. 2: The AC drive parameters are set improperly (motor parameters). 3: The cable between the drive board and the control board is in poor contact. 4: The drive board is faulty.	1: Ensure the cable between the AC drive and the motor is normal. 2: Replace the motor or clear mechanical faults. 3: Check and re-set motor parameters.
7	The DI terminals are disabled.	1: The parameters are set incorrectly. 2: The external signal is incorrect. 3: The jumper bar across OP and +24 V becomes loose. 4: The control board is faulty.	1: Check and reset the parameters in group P4. 2: Re-connect the external signal cables. 3: Re-confirm the jumper bar across OP and +24 V. 4: Contact the agent or SET for technical support.
8	The motor speed is always low in CLVC mode.	1: The encoder is faulty. 2: The encoder cable is connected incorrectly or in poor contact. 3: The PG card is faulty. 4: The drive board is faulty.	1: Replace the encoder and ensure the cabling is proper. 2: Replace the PG card. 3: Contact the agent or SET for technical support.
9	The AC drive reports overcurrent and overvoltage frequently.	1: The motor parameters are set improperly. 2: The acceleration/deceleration time is improper. 3: The load fluctuates.	1: Re-set motor parameters or re-perform the motor auto-tuning. 2: Set proper acceleration/ deceleration time. 3: Contact the agent or SET for technical support.
10	Err17 is reported upon power-on or running.	The soft startup contactor is not picked up.	1: Check whether the contactor cable is loose. 2: Check whether the contactor is faulty. 3: Check whether 24 V power supply of the contactor is faulty. 4: Contact the agent or SET for technical support.
11	is displayed upon power-on.	Related component on the control board is damaged.	Replace the control board.