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DATA NO.: ZL-18-1118-IBCN

CTB TECHNOLOGY

GH DRIVER

Operating manual

AC servo driver

Model: BKSC - □ □ □ □ GHX

Class 400V, 1.5 ~ 315KW (2.5 ~ 460KVA)

Please send the manual to final user, and keep it properly.

CTB Co., Ltd.

DATA NO.: ZL-18-1118-IBCN

Preface

Thank you for purchasing GH series servo driver produced by Beijing CTB Servo Co., Ltd. The GH series AC servo driver is a high-quality, multi-functional and low-noise AC servo driver that was researched, developed and manufactured by Beijing CTB Servo Co., Ltd. The driver is servo driver for AC induction motor (IM) and AC permanent magnet synchronous motor (PM). It can control the position, speed, acceleration and output torque of various AC servo motor appropriately.

In command to achieve control functions of various machine tools, GH series AC servo driver is equipped with dual 32-bit CPU and abundant control function module. It can be conveniently connected with various domestic and foreign CNC systems through standard control interfaces to allow full play for function of CNC system. The characteristics of torque, acceleration and deceleration, precision and efficiency of machine tool which is equipped with GH series AC servo driver are remarkable, and accurate stop, C-axis, rigid tapping, electronic shift, multi-axis synchronization and other functions can be realized easily.

As the first choice of driving product of various machine tool power shaft, GH series AC servo driver can be widely used for drive of product such as CNC milling machine, vertical machining center, horizontal machining center, CNC boring machine, CNC lathe, vertical lathe, heavy horizontal lathe and gantry machine tool.

For proper application, please read the manual carefully before using the GH series AC servo driver. Abnormal operation, fault or reduction of service life, and even personal injury accident may be caused by inappropriate use. Therefore, the manual shall be read repeatedly before use, and operate in strict accordance with the instructions. The manual is attachment with the equipment. Please keep it properly after using for future repair and maintenance of the driver.

Safety -related symbol description

The following symbols are used for safety-related content in the manual. Sentences marked by the safety symbols describe important content, and must be abided. If the requirements in the safety-related content are not abided, application of the product may lead to abnormal product operation, damage to the product, even danger and personal injury.

Danger	Use the symbol where danger, even personal injury or death when wrong about the described content.
Caution	Use the symbol where danger, even mild or moderate personal injury and equipment damage when wrong about the described content.
Forbid	Prohibited matters (matters that cannot do).
! ! Important	Certain matters do not belong to “danger”, and “caution”, but they are required to be abided by user. They are marked in the relevant sections.

Safety precautions

◆ Unpacking inspection

⚠ Caution	● For risk of injury, please do not install damaged or part missing driver.

◆ Installation

⚠ Caution	● For risk of fire, please install the equipment on nonflammable metal plate without combustible materials around. ● Please be sure to tighten the mounting screws of the driver. Falling and damage of the driver or personal injury may be caused by mounting screws loosing. ● Please do not install the equipment in environment with flammable gas where an explosion is caused easily.

◆ Wiring

⚠ Danger	● For risk of electric shock and fire, please make sure that the input power supply is in the OFF state before wiring. ● For risk of electric shock, the operation on main circuit terminal of the controller shall be conducted after the power is cut off for five minutes, and the power charge indicator CHARGE in the controller completely extinguished. ● For risk of electric shock and fire, the wiring shall be carried by professional electrical engineering personnel. ● For risk of electric shock and fire, the ground terminal must be grounded reliably. (earth resistance shall be lower than 4Ω) ● It's prohibited to directly connect terminals of P / PB and N, or connect the zero line or the earth wire to the N terminal. Otherwise, the rectifier bridge will be shorted and the main loop will be burned. ● It's prohibited to connect the high-voltage line to control terminal of the driver. Otherwise, the control board will be burned. ● For risk of injury, please set emergency stop and locking circuit at the outside of the controller (user is responsible for the wiring) . ● There is a risk of electric shock and short circuit.

◆ Wiring

⚠ Caution	● For risk of injury and fire, please ensure that the voltage of the main circuit AC input power and the rated voltage of the driver are consistent. ● Please do not conduct withstand voltage and insulation test to the controller arbitrarily. Otherwise, the semiconductor and other components in the controller may be damaged. ● For risk of fire, please connect braking resistor and braking unit according to the wiring diagram. ● Please do not connect the AC input power cord to the output U, V, W terminals. Otherwise, damage to inside of the controller may be caused. ● For risk of fire and malfunction of the controller, please tighten the terminals of main loop and control circuit with appropriate torque. ● Please do not connect the phase shifting electrolytic capacitor and LC / RC noise filter to the output circuit. Otherwise, damage to inside of the controller may be caused. ● Please do not connect the electromagnetic switch and electromagnetic contactor to the output circuit to connect or disconnect the load. During loaded operation of the controller, the surge current will cause protection circuit action of the controller.

◆ Trial run

⚠ Danger	● For risk of electric shock and short circuit, please do not touch the terminals of the main circuit directly after power-on. ● Please confirm the input and output signals to guarantee safe operation. Malfunction of the system will cause casualties and damage to the work piece and nearby equipment. ● For risk of injury, alarm reset only can be done after ensuring that the operating signal is cut off. Alarm reset with operating signal will lead to suddenly re-start. ● For risk of driver burning, the inside of long term stored driver shall be checked for water and condensation. ● For risk of electric shock and burning the equipment, it's prohibited to touch the terminals of the driver with hand during operating.
⚠ Caution	● For risk of scalding, the running servo driver and motor may have a high temperature rise, please do not touch. ● For risk of scalding and electric shock as the braking resistor has a high temperature rise for discharging, please do not touch. ● For risk of damage to the equipment and accident, please do not change the settings of the drive arbitrarily.

◆ Maintenance and inspection

Danger	● For risk of electric shock, please do not directly touch terminals of the controller. Some of them have high voltage and very dangerous. ● For risk of electric shock, please do install the housing before power-on; and must disconnect the power firstly before removing the housing. ● For risk of electric shock and fire, please confirm that the power source is in the OFF state or not before wiring. ● Inspection and maintenance only can be carried out after cut off the main circuit input power and confirm that the power charge indicator CHARGE completely extinguished. There is a risk of electric shock as residual power in electrolytic capacitor. ● Please make designated professional electrical engineering personnel to conduct inspection and maintenance. Before work, please take off metal object (watch, rings etc.), and use tools with insulation protection during operation. Otherwise, it may cause electric shock. ● For risk of explosion and fire, used battery, circuit printing plate must not be throw into fire. Otherwise, it may cause explosion.
Caution	● CMOS IC integrated circuit is installed on main control panel. Full attention shall be paid during operating. The electrostatic induction due to direct touching of finger on the main control panel may cause damage to the main control panel. ● For risk of electric shock, please do not conduct wiring and removing terminal when the equipment is energized. ● For risk of damage to the equipment, the appropriate parameter settings must be carried out before running after control panel replacing.

Table of contents

GH DRIVER

1 Installation

The chapter describes matters to be confirmed and installation requirements for the user after getting the GH DRIVER.

Introduction to GH DRIVER

GH DRIVER is a type of driver that specifically designed for machine tool. Precise control of position, speed, acceleration and output torque of AC induction servo motor and AC inverter motor is allowed through the driver. It can be used for control of motor of machining center, CNC milling machine, CNC drilling machine, CNC lathe, CNC grinder, and feed motor of large gantry equipment and vertical lathe. To achieve the best operation effect, please complete wiring with CNC system by the "CTB servo application manual ", and carry out installation and commissioning in accordance to the manual.

Model description (taking 7.5kW as example)

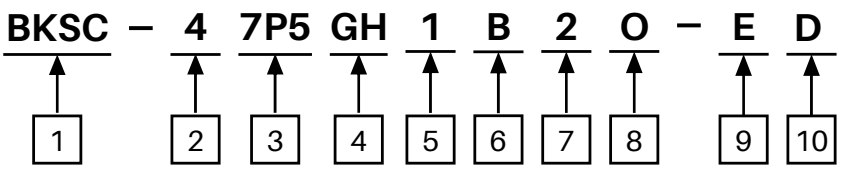


Table 1-1 Detailed description of motor model designation

Code	Item	Description	Illustrated model meaning
1	Manufacturer code	BKSC: code for driver product of the manufacturer	Manufactured by CTB CO., LTD.
2	Voltage level	2: level 200V 4: level 400V 6: level 600V	level 400V
3	Power code	See power code list for detail	7.5kW
4	Product series	GS: GS series driver GH: GH series driver	GH series driver
5	Encoder model	0: no encoder interface 1: Incremental encoder 2: Rotary encoder 3: Sine-cosine encoder 4: Absolute value encoder 5: Smart card	Incremental encoder
6	Product model	None: standard B: general type	General type
7	Encoder agreement	None: standard design 1: SSI protocol 2: Renishaw encoder (BISS) 3: SYNTEC encoder 4. Tamogawa 8401 (23rd absolute value) 5: Tamogawa 8501 (17-bit absolute value) 7: Tamogawa N7 encoder 8: Tamogawa N8/N9 encoder 9: Nikon encoder	Renishaw encoder (BISS) Note: item 7 holds when item 5 equals 4
8	Egress Identifier	None: domestic products O: Export products (English letter O)	Non-standard requirements to main board of driver

Code	Item	Description	Illustrated model meaning
9	Special label	None: standard products E: Ethercat bus M: Mecholink bus J: electro-hydraulic servo C: CANopen bus PN: Profinet bus PB: Profobus PL: powerlink bus M2: Mecholink Ⅱ bus M3: Mecholink Ⅲ bus	Ethercat bus
10	Battery options	None: standard products D: Equipped with batteries	Equipped with batteries

- GH DRIVER SERIES APPLIES FOR 21 TYPES WITH A MOTOR CAPACITY OF 1.5KW TO 315KW. PLEASE SEE TABLE 1-2 FOR DETAIL

Table 1-2 GH DRIVER model (rated voltage: 400v)

Driver model	Rated capacity (KVA)	Rated input current (A)	Rated output current (A)	Adapt motor power (KW)	Built-in brake unit
BKSC-41P5GHX	2.5	4	3	1.5	有
BKSC-42P2GHX	3	6	5	2.2	有
BKSC-43P7GHX	5.5	9	8	3.7	有
BKSC-45P5GHX	8.5	14.2	13	5.5	有
BKSC-47P5GHX	11	18	17	7.5	有
BKSC-4011GHX	17	26	25	11	有
BKSC-4015GHX	21	35	32	15	有
BKSC-4018GHX	24	38.5	37	18.5	有
BKSC-4022GHX	30	46.5	45	22	有
BKSC-4030GHX	40	62	60	30	有
BKSC-4037GHX	50	76	75	37	有
BKSC-4045GHX	60	92	90	45	有
BKSC-4055GHX	72	113	110	55	有
BKSC-4075GHX	100	157	152	75	有
BKSC-4090GHX	116	190	185	90	有
BKSC-4110GHX	138	236	230	110	有
BKSC-4132GHX	167	288	280	132	有
BKSC-4160GHX	200	345	336	160	有
BKSC-4200GHX	250	420	370	200	选配
BKSC-4250GHX	300	530	460	250	选配
BKSC-4315GHX	360	680	570	315	选配

Unpacking inspection

Please confirm the following items when you get the product. Please contact directly with the dealer or manufacturer that purchased from for any adverse situation. Please see Table 1-3 for detail.

Table 1-3 Confirm items

Confirm item	Confirm method
Confirm that the materials listed on the packing list are complete.	Check the materials in the packing against the packing list stuck to the external packing.
Are they in line with the ordered merchandise?	Please confirm the label at the side of the driver.
Is there any damage?	Check the overall appearance for damage during transportation.

Standard specifications and performance parameters

Please see Table 1-4 for standard specifications and performance parameters of 3-phase Class 400V driver

Table 1-4 Standard specifications and performance parameters of GH DRIVER

Model BKSC-XXXXGHX		41P5	42P2	43P4	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160	4200	4250	4315
Adapt motor power KW		1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	250	315
Output	Capacity KVA	2.5	3	5.5	8.5	11	17	21	24	30	40	50	60	72	100	116	138	167	200	250	300	360
	Current A	3	5	8	13	17	25	32	37	45	60	75	90	110	152	185	230	280	336	370	460	570
	Maximum output voltage V	3-phase 380/400/415/440V corresponding input voltage																				
	Maximum output speed rpm	4-pole motor 24000rpm: 50/60Hz																				
Power	Rated voltage and frequency	3-phase 380/400/415/440V: 50/60Hz±5%																				
	Allowed voltage pulsation	+10%, −15%																				
	Allowed frequency pulsation	±5%																				
Control characteristics	Control mode	Sine wave PWM modulation, entirely closed-loop vector control																				
	Torque feather	200% rated torque output below the fundamental frequency. Accuracy: ±5%																				
	Range of speed regulation	1：24000																				
	Speed control accuracy	±0.1%																				
	Frequency set resolution	Digital quantity: : 0.01Hz; Analog: Unipolar, maximum output frequency is /4092; bipolar, maximum output frequency is / 2046																				
	Position control accuracy	±1 PULSE																				
	Acceleration and deceleration time	0～3000s																				
	Brake mode	dynamic braking. 125% rated torque: built-in braking unit (external braking resistor)																				
	Overload capacity	200% rated current 30s																				
Input and output interface	Digital quantity input	12-channel isolation photo-coupler input; input mode: PNP, NPN optional																				
	Digital quantity output	6-channel isolation photo-coupler output; 24V, 10mA																				
	Analog input	2-channel; −10V～+10V 1 channel, 0～10V 1-channel																				
	Analog output	2-channel; −10V～+10V																				
	Relay output	1 channel: a group of N.O/N.C contact: AC250V/DC30V, 1A																				
	Fault output relay	1 channel: a group of N.O/N.C contact: AC250V/DC30V, 1A																				
	Encoder input interface	Two: Motor encoders: receive incremental encoder, rotary transformer, sine and cosine encoder, absolute encoder External encoders: receive incremental encoder																				
	PULSE input interface	One: direction PULSE , orthotropic PULSE optional																				
	Encoder output interface	One: maximum output frequency is 300KHz: cable driven output mode: RS422 standard																				
	Bus interface	RS485, CAN, MechtroLink, PowerLink, Ethercat																				
Control function	Speed control	Range: 0～24000rpm; turning: positive and negative; speed order: analog, PULSE frequency, multi - stage speed control, communication																				
	Position control	Automatic return to zero, reciprocating positioning, multi-point positioning																				
	Torque control	Coiling control, swing control, torque limiting																				
	Other functions	External encoder positioning, synchronous drive, hydraulic servo, PID control																				
Protection function	river/motor over-current	With independent driver, motor overcurrent detection function																				
	Driver/motor overload	With independent driver, motor overload detection function																				
	Motor overheating	Built-in motor thermal protection interface																				
	Low voltage/ Overvoltage	The busbar voltage of main circuit: higher than 800V, overvoltage alarm output; lower than 400V,undervoltage alarm output																				
Service environment	Service site	Free of dust, corrosive gas and inflammable gas																				
	Temperature	−10～45℃																				
	Humidity	Lower than 95%RH (no condensation)																				
	Vibration	vibration frequency≤20Hz: 9.8m/s2； 20Hz≤vibration frequency≤50Hz: 2m/s2；																				

Driver nameplate description

Nameplate which indicates model and rated values of the driver is affixed to the lower right of housing of the driver. The content of the nameplate is shown in Figure 1-1.

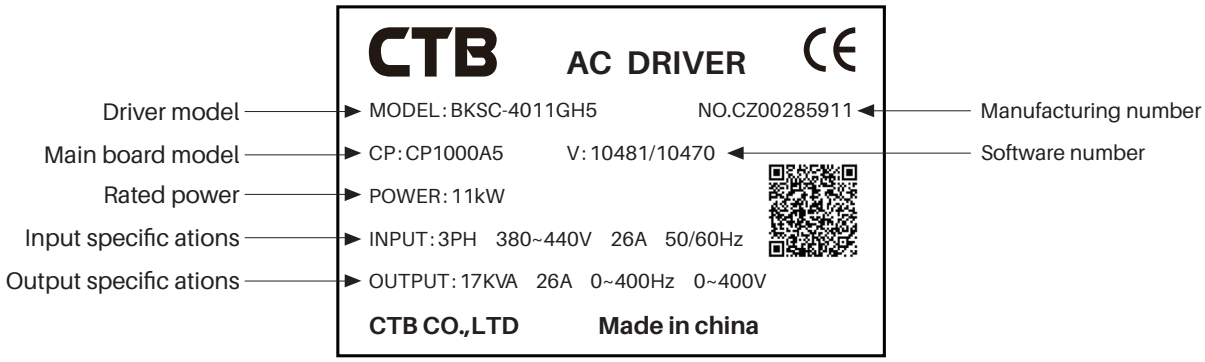


Figure 1-1 AC Servo driver nameplate

Note: the two-dimension code includes manufacturing number of the driver; customer name of the driver (take BEIJING CTB SERVO CO., LTD. as an example); contract number; driver model; main board model; software number; non-standard (take standard as an example) and other description.

External dimensions and installation dimensions

1. 1.5-3.7kw driver

Please see diagram 1-2 for external dimensions and installation dimensions

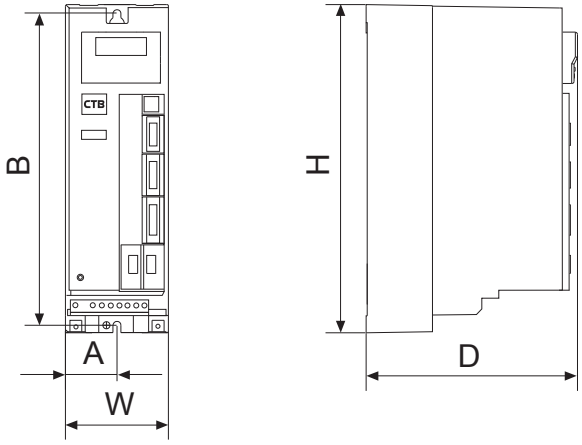


Figure 1-2

Table 1-5 Dimensions (mm) and weight (kg) of GH DRIVER (1.5-3.7kw) driver

Dimension / Model	A	B	W	H	D	Connecting terminal screw	Installation screw	Weight (kg)
BKSC-41P5GHX	45.5	276	91	290	200	Wire nail width 3mm	M6	3
BKSC-42P2GHX								
BKSC-43P7GHX								

2、5.5～11kw driver

Please see diagram 1-3 for external dimensions and installation dimensions

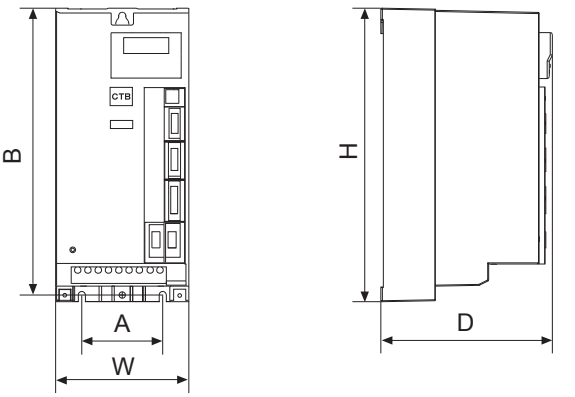


Figure 1-3

Table 1-6 Dimensions (mm) and weight (kg) of GH DRIVER (5.5-11kw) driver

Dimension / Model	A	B	W	H	D	Connecting terminal screw	Installation screw	Weight (kg)
BKSC-45P5GHX	80	276	132	290	200	Wire nail width 5mm	M6	5
BKSC-47P5GHX								
BKSC-4011GHX								

3、15～45kw driver

Please see diagram 1-4 for external dimensions and installation dimensions.

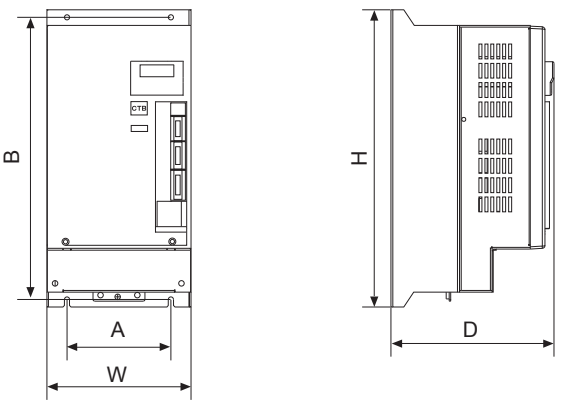


Figure 1-4

Table 1-7 Dimensions (mm) and weight (kg) of GH DRIVER (15-45kw) driver

Dimension / Model	A	B	W	H	D	Connecting terminal screw	Installation screw	Weight (kg)
BKSC-4015GHX	140	380	194	400	230	M6	M6	14
BKSC-4018GHX								
BKSC-4022GHX	236	376	282	390	270	M6	M8	20
BKSC-4030GHX								
BKSC-4037GHX	300	376	380	390	270	M8	M8	26
BKSC-4045GHX								

4、55～160kw driver

Please see diagram 1-5 for external dimensions and installation dimensions

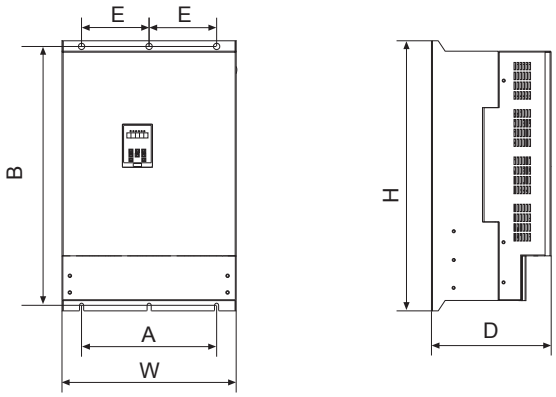


Figure 1-5

Table 1-8 Dimensions (mm) and weight (kg) of GH DRIVER (55-160kw) driver

Dimension / Model	A	B	W	H	D	E	Connecting terminal screw	Installation screw	Weight (kg)
BKSC-4055GHX	392	376	472	390	270	196	M10	M8	33
BKSC-4075GHX									
BKSC-4090GHX	360	690	464	720	320	180	M10	M10	90
BKSC-4110GHX									
BKSC-4132GHX									
BKSC-4160GHX									

4、200～315kw driver

Please see diagram 1-6 for external dimensions and installation dimensions

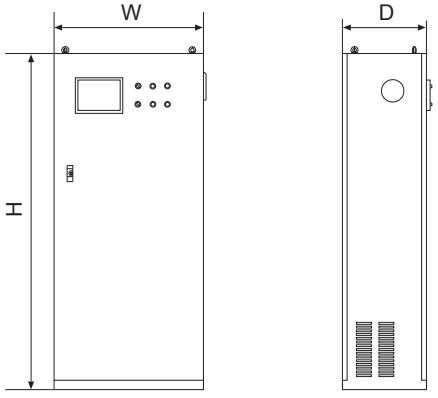


Figure 1-6

Table 1-9 Dimensions (mm) and weight (kg) of GH DRIVER (200-315kw) driver

Dimension / Model	A	B	W	H	D	Connecting terminal screw	Installation screw	Weight (kg)
BKSC-4200GHX	-	-	800	1800	600	-	-	230
BKSC-4250GHX								
BKSC-4315GHX								

Confirmation and requirements of the installation space

Installation environment

The following items shall be noted when selecting the installation environment:

1. Ambient temperature: operate in -10℃ ~ 45℃; if the ambient temperature is higher than 45℃, the equipment shall be used with 30% derating for each 5℃ temperature rise.

★ Note: If the ambient temperature is higher than 45℃, the ventilation shall be strengthened, and use by the specified derating.

2. The humidity of the installation site shall lower than 95%, and free of condensing;
3. Do not install the equipment in place with dust or metal powder;
4. The equipment shall be installed at place without corrosive, explosive gas;
5. The equipment shall be installed at place that meets the requirements of vibration. The vibration frequency ≤ 20Hz: 9.8m/s2; 20Hz ≤ vibration frequency ≤ 50Hz: 2m/s2;
6. The equipment shall be installed at place away from direct sunlight.

Installation direction and space

● Installation spacing and distance requirements of single driver are shown in Figure 1-7.

● Generally, abreast installation mode is adopted when multiple drivers are installed in the control cabinet, and air inlet, outlet and dedicated cooling fan shall be equipped; if up and down installation mode is adopted, stream guidance clapboard shall be added between drivers to guarantee good cooling effect as shown in Figure 1-8.

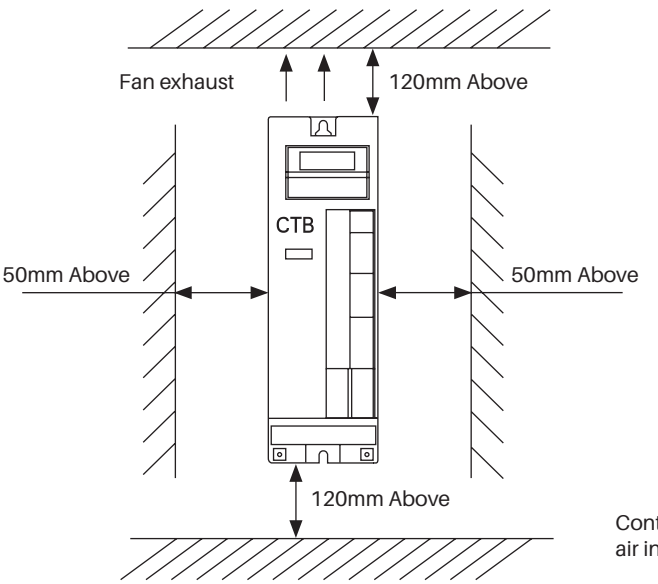


Figure 1-7 Single controller installation

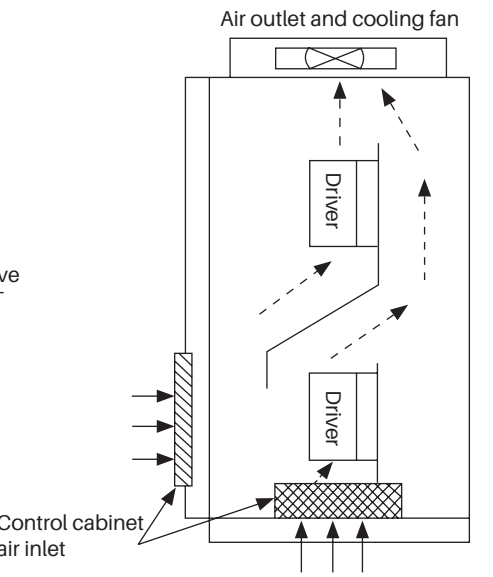


Figure 1-8 Multiple controllers installation

Notes on motor and load

Compared with frequency conversion operation

GH DRIVER is full closed-loop vector servo driver. It adjusts output voltage and current automatically according to the load change. It's more energy-efficient than inverter with higher speed control accuracy and wider speed regulation range. As the controlled motor and driver are closed loop, the control of position, speed and torque can be achieved conveniently.

Constant torque operation

When motor works in constant torque area, the output torque of the motor is required by the mechanical operation instead of the rated torque of the motor. However, the maximum continuous output torque of the motor must not exceed the rated torque.

High-speed operation in constant power area

For high-speed operation in constant power area, the increased vibration and noise shall be considered, and the service speed range of motor bearing and mechanical devices must be confirmed, and consulted in advance. It's strictly prohibited to make the machine operate above the rated speed.

Lubrication of the mechanical device

For reduction box and gear head motor and other mechanical device that requires lubrication, damage may be caused due to deterioration of lubricating effect in long-term low-speed operation. It must be consulted in advance.

Negative torque load

Negative torque load occurs frequently for load such as lifting. The driver will generate over-current and overvoltage alarm and trip. Equipping of brake components or mechanical safety devices shall be considered.

Reciprocating load

Please pay attention to unstable phenomenon in output current when the driver is driving piston reciprocating load. The phenomenon is more prominent in long-term low-frequency operation. The capacity of driver shall be increased.

Mechanical resonance point of the load device

The driver may encounter the mechanical resonance point of the load device in certain output frequency range. It can be avoided by setting jump frequency.

Notes on the driver

Applications not in rated voltage

The servo driver shall not be used in voltage that not in the working voltage range. Please conduct voltage transformation with appropriate step-up or step-down unit as required.

Note on the drive 3 phase input into 2-phase input

The device shall not be changed into 2-phase input, otherwise, default phase protection will occur.

Capacitor or pressure-sensitive device to improve power factor

As shown in Figure 1-9, the output of the driver is PULSE wave, drive failure tripping or damage to the device will be caused due to capacitor or pressure-sensitive device for lightning to improve power factor installed at the output side. They must be removed.

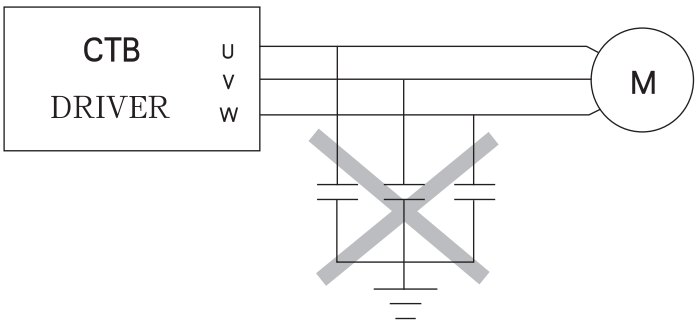


Figure 1-9 Capacitor is prohibited at the output end of controller

Lightning attack protection

lightning over-current device is equipped in the driver for self-protection to induction stroke

Altitude and derating operation

For areas with altitude over 1000 m, derating operation is necessary due to deterioration of cooling effect of the drive caused by thin air. The relationship curve of rated current of driver and altitude is shown in Figure 1-10.

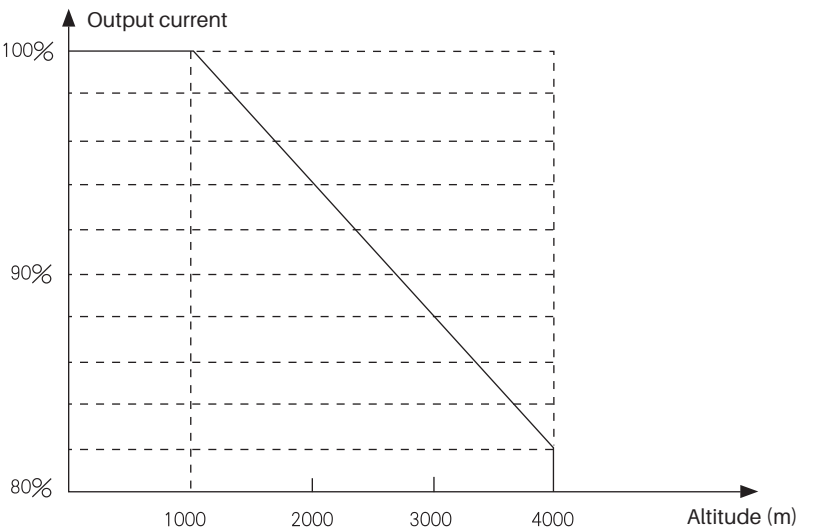


Figure 1-10 Derating curve of rated current of driver and altitude

Notes on scrapping:

Explosion of electrolytic capacitor: the electrolytic capacitors on main circuit and printed panel may explode when incinerated.

Plastic incineration waste gas: toxic gases will be generated in incineration of front panel and other plastic parts.

Processing method: please process the waste as industrial waste.

★ Description: The contents of the manual are subject to change due to product upgrade or optimize. The new version shall prevail.

GH DRIVER

2 Wiring

The chapter describes the wiring specifications of power supply terminals and control circuit terminals, and install wiring specifications of control board jumpers and expansion interface board.

Selection and connection of peripheral devices

Driver and peripheral devices connection diagram taking 7.5kw drives as an example in Figure 2-1.

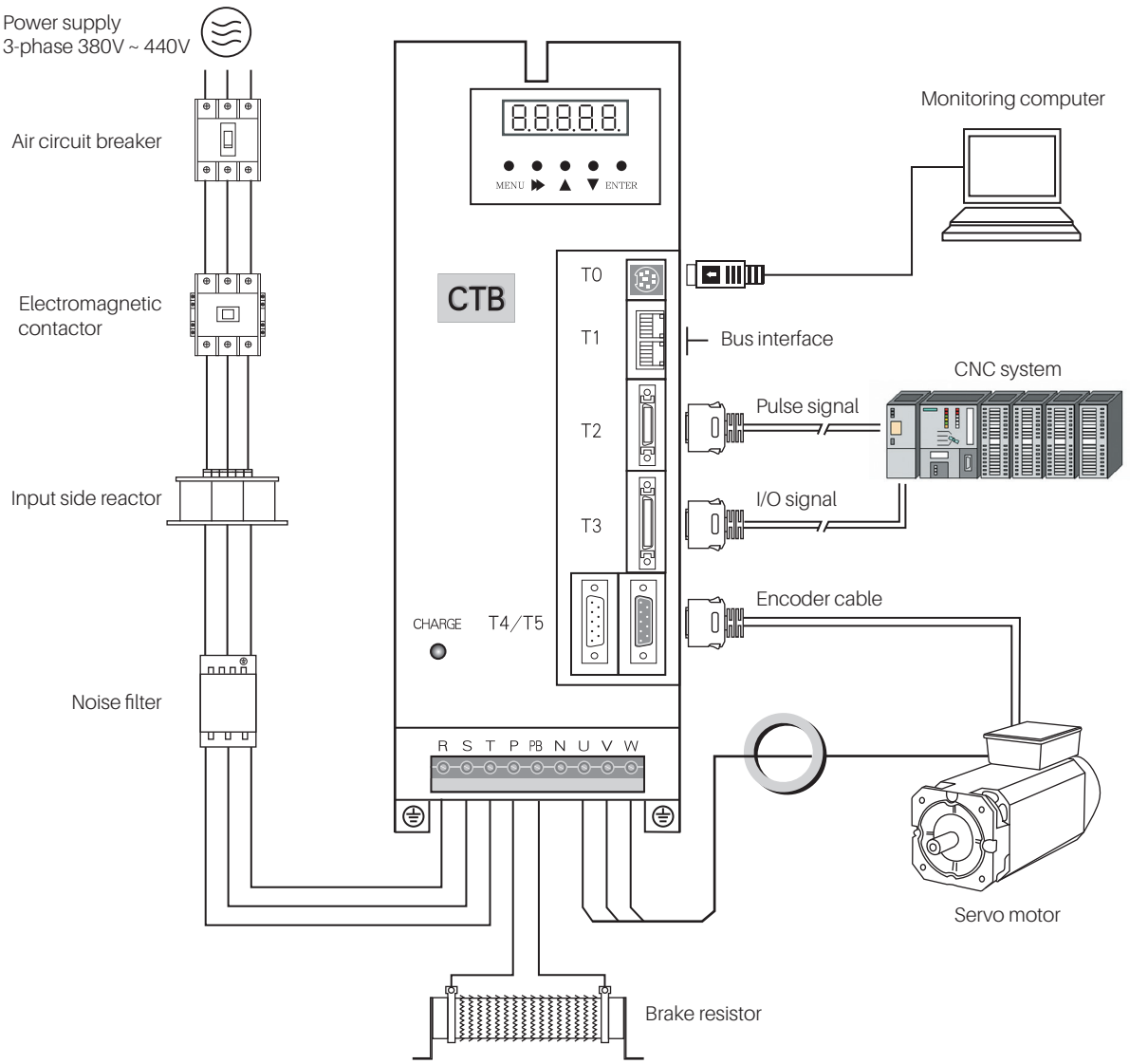


Figure 2-1 driver and peripheral devices connection diagram

Parts selection description

Item	Usage	Selection note	Remarks
Air circuit breaker	Turn on or off driver power	Select by 150% of rated current of the driver	Refer to Table 2 - 3
Electromagnetic contactor	For automatic power on of driver	Select by 150% of rated current of the driver	Refer to Table 2 - 3
Input side reactor	Improve power factor of power grid	Select by 100% of rated current of the driver	
Input noise filter	Suppress interference of driver to power supply	Select by 150% of rated current of the driver	
Braking resistor	Consume regenerated energy of the driver	Select by standard provided by the factory	Refer to Table 2 - 2
Filtering magnet ring	Suppress wireless interference of the driver to outside	Select by standard provided by the factory	Refer to GH model selection sample

Wiring of the main circuit terminals

The structure of the main circuit

See Figure 2-2A, 2-2B, 2-2C and 2-2D for internal structure diagram of the main circuit.

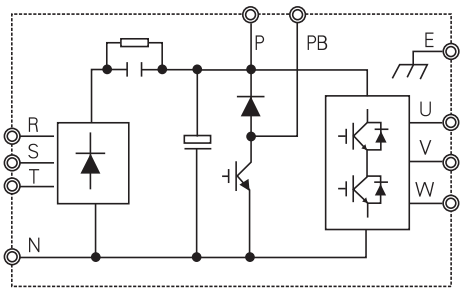


Figure 2-2A 1.5~11kw main circuit composition

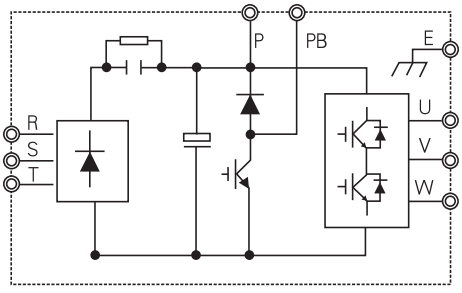


Figure 2-2B 15~30kw main circuit composition

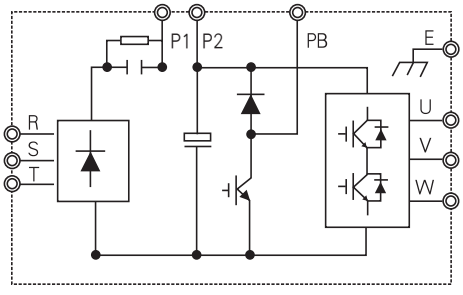


Figure 2-2C 37~75kw main circuit composition

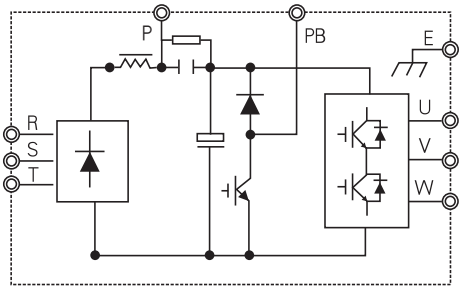
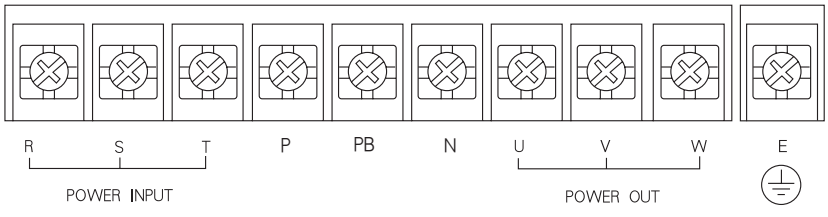


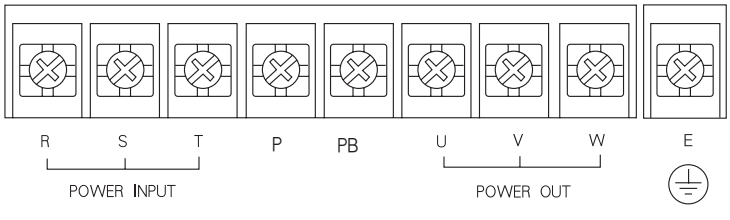
Figure 2-2D 90~160kw main circuit composition

Main circuit terminals composition

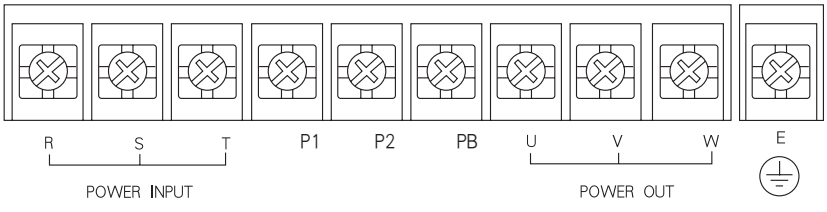
1.5~11kw main circuit terminals composition



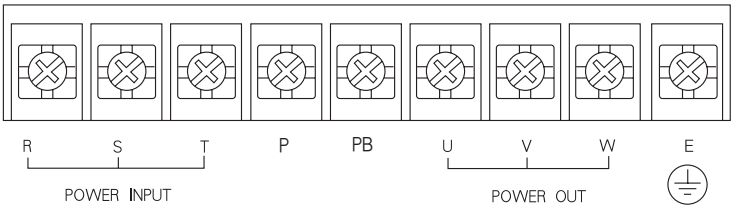
1.5~30kw main circuit terminals composition



37~75kw main circuit terminals composition



90~160kw main circuit terminals composition



Main circuit terminals and functional description

Item	Function	Notes
R S T	3-phase AC supply input terminal. 380~440V, 50/60Hz	Need to install breaker for protection
P P1	DC bus positive pole	P and N are for input of external braking unit or DC power input
P2	DC reactor wiring terminal	P1 and P2 are for external DC reactor
PB	Braking resistor wiring terminal	P, P2 and PB are for external braking resistor
N	DC bus negative pole	N and P are for external braking unit or DC power input
U V W	Driver output terminal	Consistent with the phase sequence of the motor during wiring
E	Earth terminal	C type grounding, the grounding resistance≤ 4Ω

Wiring of input side of the main circuit

Please pay attention to the following items for wiring of input side of the main circuit. See2-3

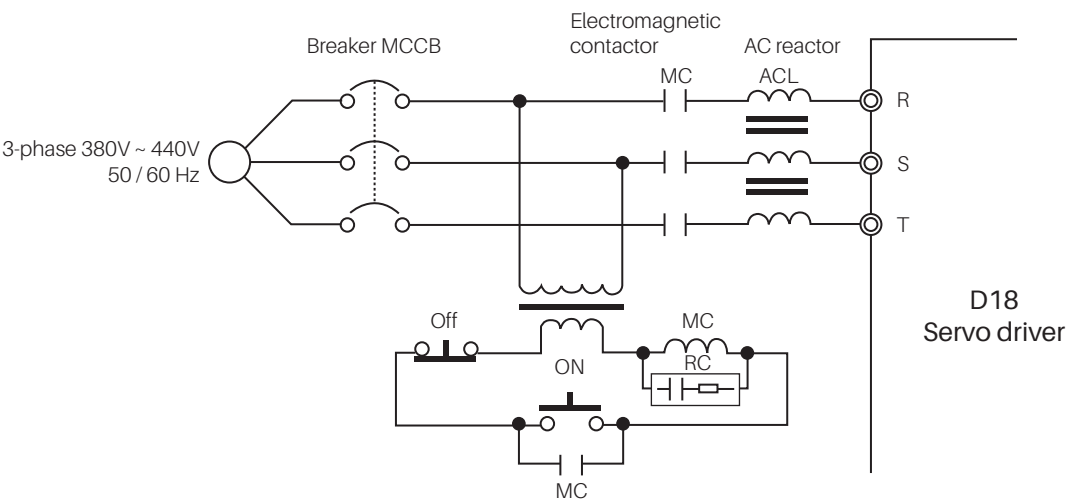


Figure 2-3 Standard wiring diagram for incoming line

Incoming line circuit breaker (MCCB)

The main circuit power input terminals (R, S, T) must be connected to 3-phase AC power through line protection circuit breaker (MCCB).

- The selection of MCCB must be in accordance with requirements in Table 2-3.
- The time characteristics of MCCB must take overload characteristics (rated output current 200%/min) and time characteristics of the servo driver into account.
- Each AC servo driver shall be equipped with independent breaker; when multiple drivers share a circuit breaker, to cut off the power supply and prevent the failure expansion during driver failure, it's recommended to control the incoming line electromagnetic contactor with the fault output relay of the driver to ensure safety.

Caution **Installation of the residual current circuit breaker**

The output of the servo driver is a high frequency PULSE wave so that there is high-frequency leakage current generated. Residual current circuit breaker can be used at the incoming line side of the driver to remove high-frequency leakage current, and only inspect channel current that dangerous to human body. Please select special residual current circuit breaker for servo (inverter) for wiring.

- When select special residual current circuit breaker, please select model for control of one driver with an induction current over 30ma.
- When select normal residual current circuit breaker, please select model for control of one driver with an induction current over 200ma, and a time over 0.1s.
- Installing isolation transformer between normal residual current circuit breaker and AC servo driver can effectively avoid malfunction of the breaker.

Incoming line electromagnetic contactor

Incoming line electromagnetic contactor may be used to cut off the power in sequential control. It cannot be used as start of AC servo driver. When cut off power of AC servo driver compulsorily with incoming line electromagnetic contactor, AC servo driver is in power-off alarm state, motor only can slide freely and stop.

- Frequent turning on/off incoming line magnetic contactor may cause heating, even burning of charging resistor of the driver (driver interior).
- The time interval of turning on/off incoming line magnetic contactor shall be longer than 10 minutes.

AC reactor

Installing AC reactor at the incoming line side of the servo driver can effectively suppress the surge of power, avoid burning of rectification part of the driver, and also can improve the power factor of the power supply side. Please see Figure 2-3 for connection of AC reactor, see Table 2-1 for selection of AC reactor.

DC reactor

External DC reactor can be connected to GH AC servo driver of 37 to 75KW. It can effectively suppress the surge of power, avoid burning of rectification part of the driver, and also can improve the power factor of the power supply side. Please see Figure 2-4 for connection of DC reactor.

If external DC reactor is not connected, P1, P2 or D C + terminals shall be shorted as shown in Figure 2-5.

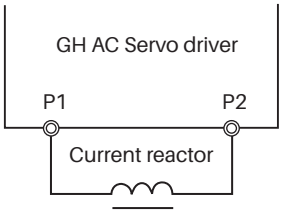


Figure 2-4 DC reactor connection diagram

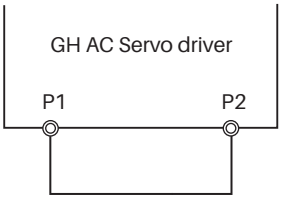


Figure 2-5 Connection diagram without DC reactor

Precautions for wiring of DC reactor

1. Please do not connect DC reactor to any main circuit terminal except P1, P2, otherwise, it may cause internal short circuit of the driver, and burn the driver.
2. Please see Table 2-3 for specifications of DC driver connecting cable, the standard of the main circuit cable.
3. Please see Table 2-1 for selection standard of DC reactor.
4. With external DC reactor, the P2 terminal shall be multiplex terminal, and one end of braking resistor also shall be connected to the terminal.

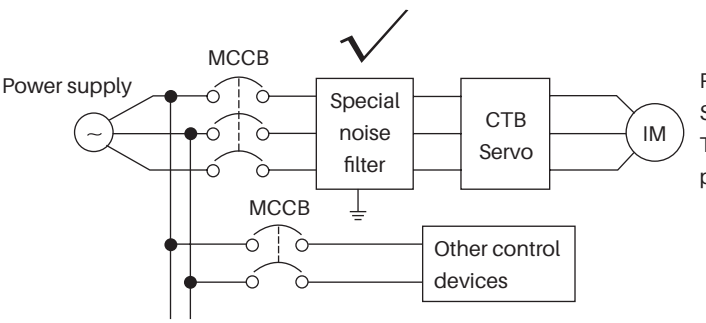
Table 2-1 Selection of AC reactor, DC reactor and input filter

Driver model		41P5	42P2	43P7	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160
AC reactor	CURRENT (A)	5	7	10	15	20	30	40	50	60	80	90	120	150	200	230	250	290	330
	MODEL ACL	0005	0007	0010	0015	0020	0030	0040	0050	0060	0080	0090	0120	0150	0200	0230	0250	0290	0350
DC reactor	CURRENT (A)	Without connection to DC reactor										90	110	150	180	Built-in driver			
	MODEL DCL											090	0110	0150	0180				
Input filter	CURRENT (A)	6	6	6	10	16	25	30	50	50	65	80	100	120	150	200	250	250	320
	MODEL EMI	06	06	06	010	016	025	030	050	050	065	080	0100	0120	0150	0200	0250	0250	0320

Power side noise filter

In command to reduce high-frequency interference noise from power line coupling to the driver, and suppress the noise feedback to power from the driver, noise filter with appropriate model and specifications at the power input side of the driver.

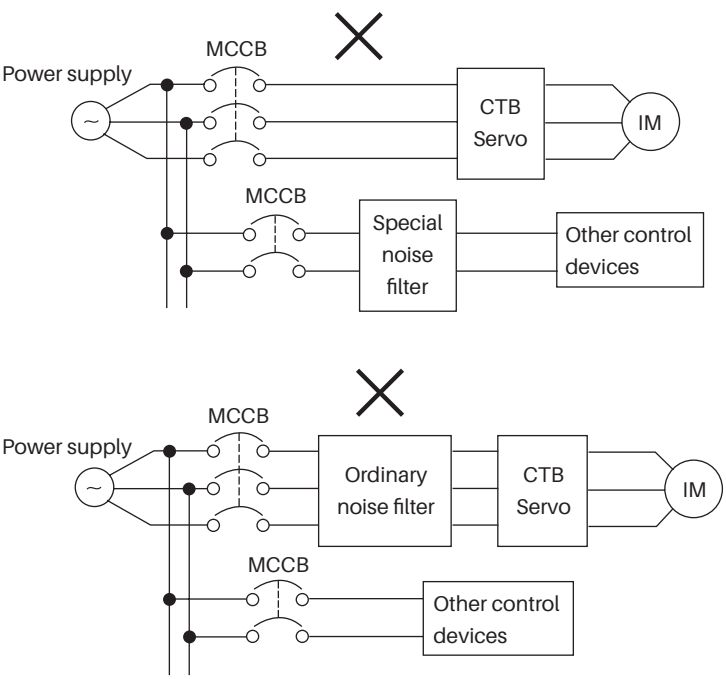
Set and connect the incoming line filter correctly as shown in Figure 2-6.



Please use AC servo or inverter
Special noise filter
The noise filter shall be grounded properly

Figure 2-6 Correct installation of noise filter at the input side of the power supply

Please see Figure 2-7 for examples of incorrect settings and connection.



Effect of suppressing noise of driver with ordinary noise filter is very poor, and it's not recommended.

Figure 2-7 Incorrect settings and connection of noise filter at the input side of the power supply

The wiring of output side of main circuit

The output terminals U, V and W of the driver should be connected to the terminals U, V and W of three-phase AC motor in the correct phase sequence. If the phase sequence is wrong, the driver will send out an error alarm E.SE or E.OL2. At this time, it is necessary to change the phase sequence of any two phases. The standard wiring on the output side is shown in Figure 2-8

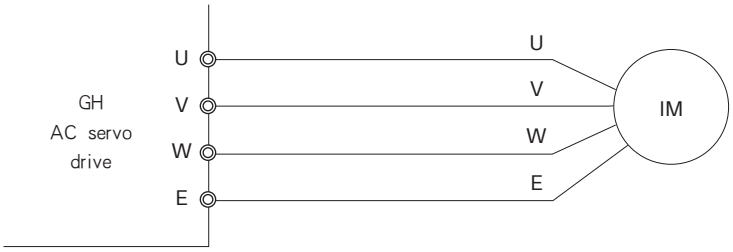


Figure 2-8 Output side wiring

Caution The AC servo driver and motor must be well grounded, otherwise it may make the driver not functioning properly, even burn the driver.

Forbid

- It's strictly prohibited to connect the input power cord to the output terminal. Never connect the input power cord to the output terminal, otherwise, it will lead to damage to internal components of the controller.
- It's strictly prohibited to connect make the output terminal shorted and grounded. Never touch the output terminal directly, or make the output line touch the controller housing for risk of electric shock. In addition, never short the output line.
- It's strictly prohibited to use phase shift electrolytic capacitor, LC / RC noise filter. Never connect phase shift electrolytic capacitor, LC / RC noise filter in output circuit. Damage to internal components of the controller may be caused when use these components.
- It's strictly prohibited to connect or disconnect load with electromagnetic switch. Never connect electromagnetic switch, electromagnetic contactor to connect or disconnect the load in output circuit. During load operation, the protection circuit action of the controller will be acurated by the surge current.surge current will arose
- It's strictly prohibited to connect fan of motor to U / V / W output terminals of the driver. It may burn the fan, and short-circuit the driver.

Wiring distance between the driver and motor

Generally, the wiring distance between the AC servo driver and motor shall be shorter than 50 m. For longer distance, please contact the manufacturer to select wire with smaller resistivity.

Inductive interference countermeasures

Three methods of suppressing radio interference and inductive interference are provided in the information: filter magnetic ring, shielded cable and output filter.

Filter magnetic ring

Installing filter magnetic ring at the output side near to the driver can suppress common code interference at the output side effectively, as shown in Figure 2-9.

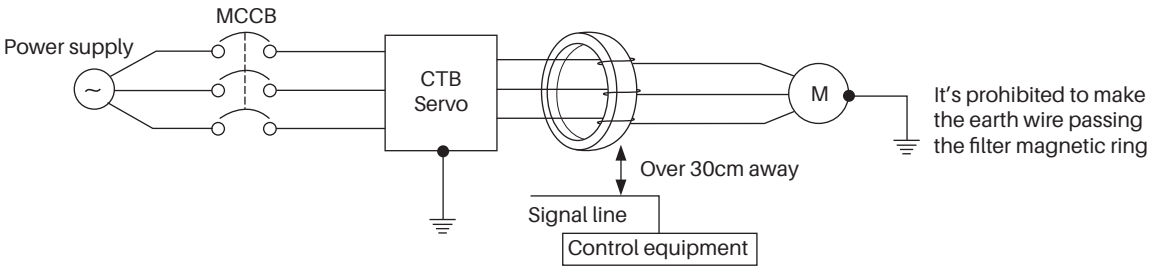


Figure 2-9 Filtering magnetic ring installation diagram

Output shielded cable

Use shielded cable for output line of the AC servo driver can effectively suppress radio interference and inductive interference. The ends of shielding layer of the shielded cable shall be grounded separately as shown in Figure 2-10.

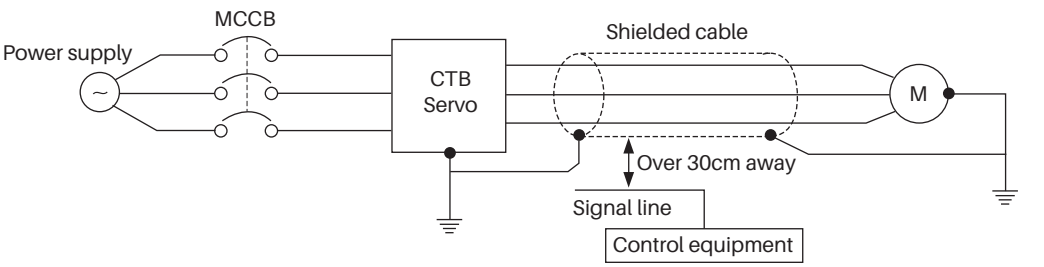


Figure 2-10 Connecting method of shielded cable

For applications of input and output filters in occasions with relatively large radio interference, output filter can be used to suppress interference. The input side and the drive generate radio interference so that the effect is best by using the input, output filter at the same time, as shown in Figure 2-11.

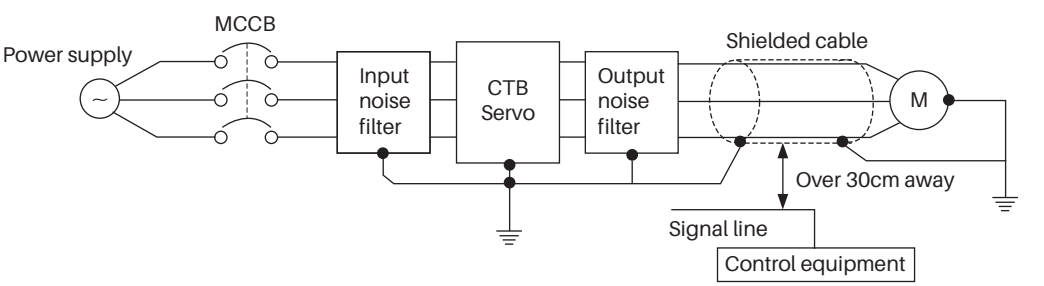


Figure 2-11 Suppress radio interference with output filter

Connection of the grounding wire

- The ground terminal is identified as E or ⏚, please do ground.
- Earth resistance: below 4Ω.
- Do not share grounding wire with welder and other power equipment.
- Please select wire diameter specification for grounding wire as specification in technical standards of electrical equipment as short as possible.
- Please make grounding wire forming a loop where more than two drivers are used.
- Example: as shown in Figure 2-12

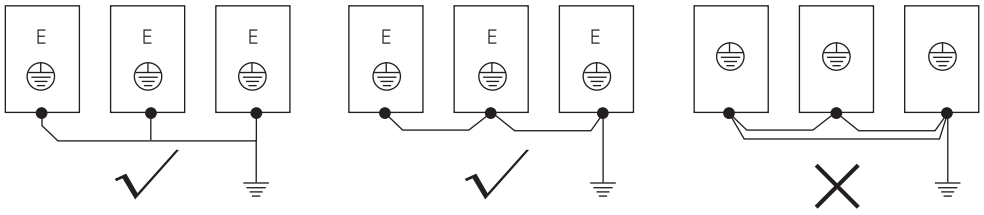


Figure 2-12 Connection of grounding wire

Connection of braking resistor

The P, PB terminals on main circuit block of AC servo driver are for connection with braking resistor. Please do not connect braking resistor to other terminals, otherwise, the braking resistor will heat up and burn out, or cause damage to the driver. Please see Table 2-2 for braking resistor selection.

Table 2-2 Specification of braking resistor

BKSC-XXXXGHX			41P5	42P2	43P7	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160	4200	4250	4315
Braking resistor	ripple	Power W	200	300	800	1500	1500	1500	1500	2000	2000	2000	2000	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
		Resistance Ω	150	100	40	40	30	40	40	40	40	32	32	55	55	55	55	55	55	55	55	55	55
		Qty	1	1	1	1	1	2	2	2	2	2	2	4	4	4	6	6	8	8	10	10	12
	Aluminum housing	Power W	200	300	800	1500	1500	1500	1500	2000	2000	2000	2000	Same parameters for ripple resistor									
		Resistance Ω	150	100	40	40	30	40	40	40	40	32	32										
		Qty	1	1	1	1	1	2	2	2	2	2	2										
RESISTANCE BOX			None Resistance box											884 × 400 × 155			884 × 400 × 294				884 × 400 × 441		
Filtering magnet ring	inside diameter ϕ (mm)		15	15	15	18	18	23	23	23	27	27	38	38	38	38	38	44	44	44	—	—	—
	Thickness H(mm)		13	13	13	13	13	15	15	15	15	15	24	24	24	24	24	15	15	15	—	—	—

Note: above accessories data is standard data recommended by the manufacturer. For special applications, please contact your supplier.

- The connection of braking resistor shall be in strict accordance with Figure 2-13.
- The length of connecting wire between driver and braking resistor shall be less than 50 m.
- Please pay particular attention to: external braking unit may be connected to p (+) / DC +, N (-) / DC side of the driver, but direct connecting with braking resistor is not allowed, otherwise, damage to driver or fire may be caused.

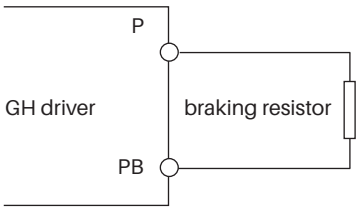


Figure 2-13 Connection of braking resistor

Selection of breaker, contactor and cable

Please see Table 2-3 for selection of breaker, contactor and input and output cable

Table 2-3 Specification of breaker, contactor and cable

Model BKSC	Power (kW)	Breaker (air switch) (A)	断路器 (空气开关) (A)	Main circuit cable (copper conductor cable) (mm2)	Contactor Voltage：380V. Current：(A)
41P5GHX	1.5	4	10	2.5	9
42P2GHX	2.2	6	10	2.5	9
43P7GHX	3.7	9	16	4	16
45P5GHX	5.5	14.2	32	4	18
47P5GHX	7.5	18	40	6	25
4011GHX	11	26	63	6	32
4015GHX	15	35	63	10	50
4018GHX	18.5	38.5	100	16	63
4022GHX	22	46.5	100	16	80
4030GHX	30	62	125	25	95
4037GHX	37	76	160	35	115
4045GHX	45	92	200	35	115
4055GHX	55	113	200	50	150
4075GHX	75	157	225	70	185
4090GHX	90	190	250	70	250
4110GHX	110	236	400	95	250
4132GHX	132	288	400	120	315
4160GHX	160	345	400	150	400
4200GHX	200	420	630	185	500
4250GHX	250	530	630	240	630
4315GHX	315	680	800	300	800

Main circuit wiring precautions

- Please do connect breaker or fuse between power supply and power input terminals (R, S, T) of the driver.
- Please do connect to earth wire at E terminal of the driver. Copper core cable over 4mm2 shall be used for earth wire with a grounding resistance lower than 4Ω.
- Please ensure the high reliability of wiring.
- Please check the following items after circuit wiring.

  (1) Are all connections correct?

  (2) Is there connection missing?

  (3) Is there short circuit between terminals and connecting line or shorted to ground?

Control circuit wiring

Input and output signals of GH Series AC servo driver include: switching value input signal, switching value output signal, Analog input signal, PULSE input signal, encoder input / output signal.

Specifications of input and output signal cable

As the control signals are different, the requirements to cable for connector are strict. Specifications of cable for different signal connectors are listed in Table 2-4. User shall follow the standard for wiring.

Table 2-4 Specifications of input and output signal cable

Signal	Signal name	Cable	Cable(mm2) specification
switching value input /output	I1~I12 Q1~Q6 PV SC	common cable or shielded cable	0.2~2
Relay output	M0A/M0B/M0C M1A/M1B/M1C	common cable or shielded cable	0.2~2
Analog signal	FV FI FS FC TS FT	shielded cable	0.2~1
Encoder signal	PV1 G1 A+ A- B+ B- Z+ Z- PV2 G2 OA+ OA- OB+ OB- OZ+ OZ-	Shielded twisted twin cable	0.2~1
PULSE signal	SA+ SA- PB+ PB- DZ+ DZ-	Shielded twisted twin cable	0.2~1
enable reset signal	ST PV SC	common cable or shielded cable	0.2~1

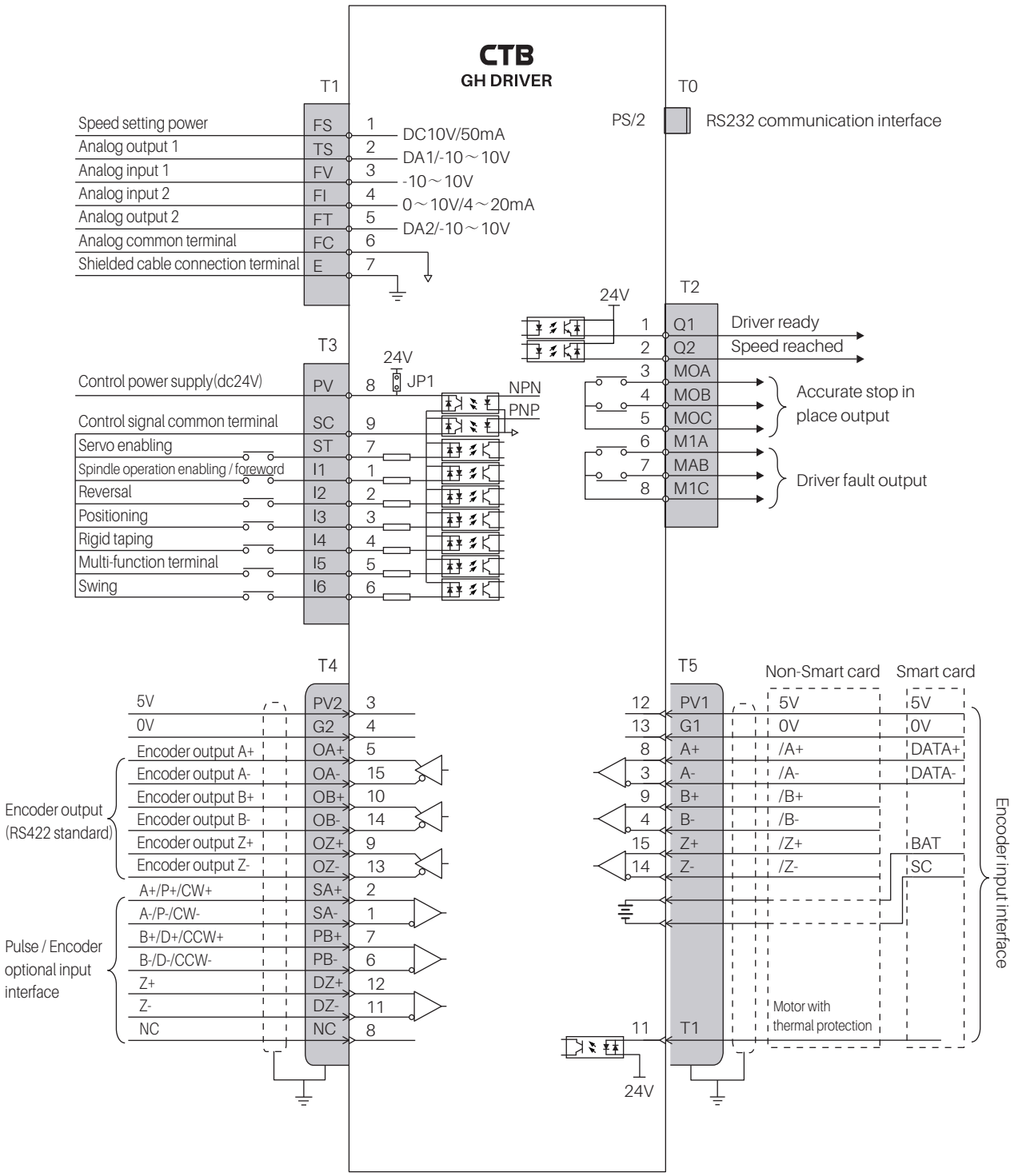
GH DRIVER control panel specifications

GH Series driver provides six kinds of control board according to different power and function of GH Series driver. Please see Table 2-5 for interface characteristics and applicable model.

Table 2-5 GH DRIVER main board specifications

Control panel model	switching value input	switching value output	Analog input	Analog output	PULSE input	Communication interface	Encoder input	Encoder output
Standard type	7	4	2	2	1	-	1	1
General type	14	8	2	2	3	RS485 CAN TCP/IP	1	1

Standard version control wiring diagram (taking 7.5kW GH X driver as an example)

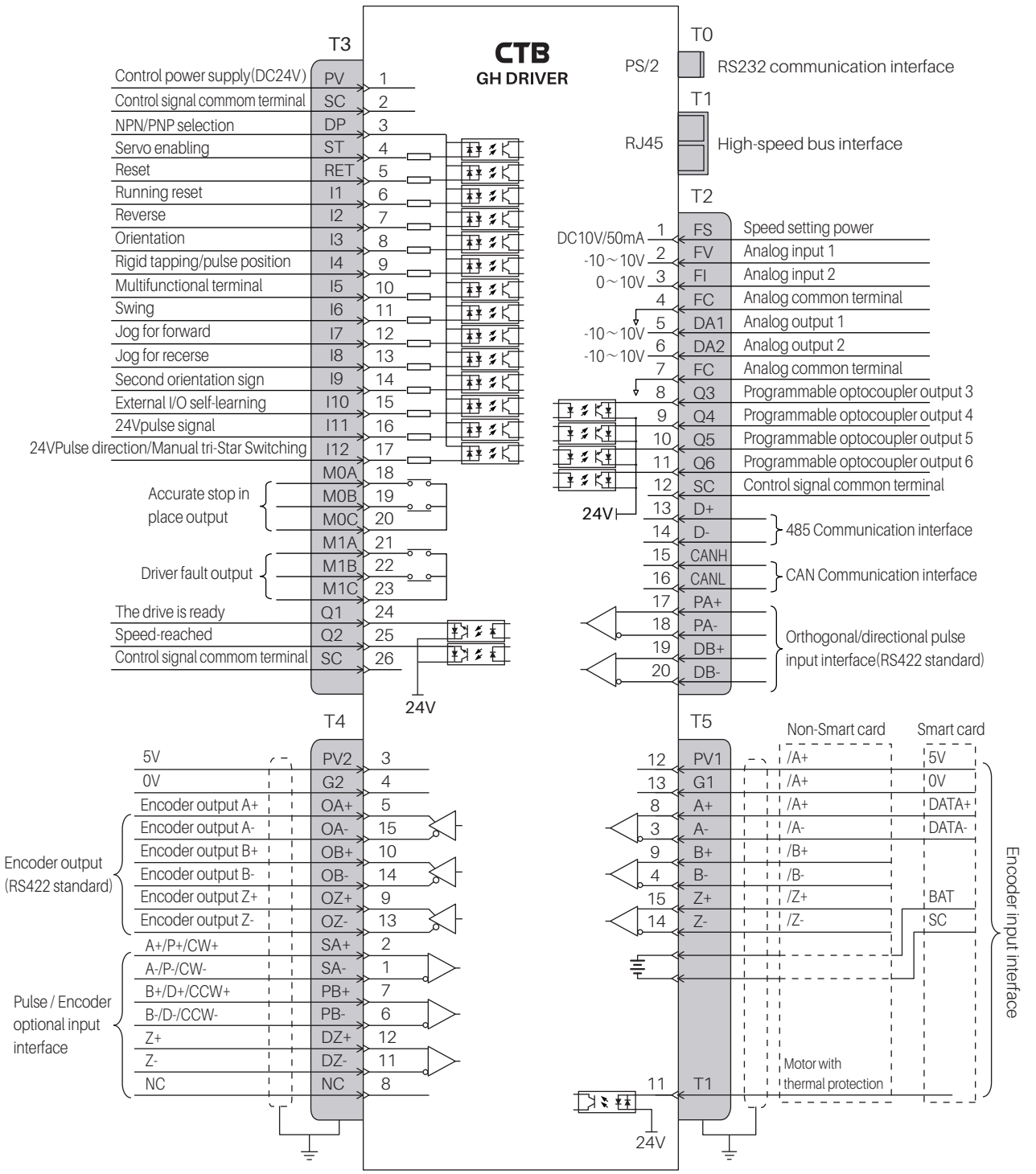


Input and output signals description (GHX Series)

Table 2-6 Input and output signal function description

Port	Type	Pin	Name	Function	Signal standard
T0	Communication			communicate with computer	RS232
T1	Analog input	1	FS	10V power for speed setting is provided inside common port	DC10V 50mA
		6	FC	analog input /output common terminal	0V
		3	FV	-10V~+10V analog input, input impedance: 20KΩ	Analog signal
			FI	Analog input impedance may be selected for 0~10V, 4~20mA impedance: 20K/500Ω	
	Analog output	2	TS	-10~10V output	
		5	FT	-10~10V output	
T2	Programmable optocoupler output	1	Q1	speed reached	24V optocoupler output 10mA
		2	Q2	driver ready	
	Relay output	3/4/5	M0A/M0B/ M0C	output accurate stop end (in place) output	AC250V 1A DC30 1A
		6/7/8	M1A/M1B/ M1C	driver fault output	
T3	Control signal input	7	ST	control enabling and reset	PNP: 0V input effective NPN:24V input effective Input mode of PNP or NPN Shall be selected by software parameter setting
		1	I1	Foreword/ operation enabling	
		2	I2	reverse	
		3	I3	accurate stop, close: start accurate stop and maintain; open: cancel accurate stop	
		4	I4	rigid tapping signal, close : enter rigid tapping state	
		5	I5	multifunctional terminal	
		6	I6	Swing	
	Control power	8	PV	DC24V power terminal, it's 24V output when JP1 is turned on, and 24V input when JP1 is shut down.	DC24V 100mA
		9	SC	D 24V power 0V terminal /control signal common port	
T4	Encoder output	3/4	PV2/G2	Preset power, provided by digital system, system without electrify inspection may go without.	DC5V 200mA
		5/15	OA+/OA-	encoder A phase output	line driver output RS 422 standard
		10/14	OB+/OB-	encoder B phase output	
			OZ+/OZ-	encoder Z phase output	
	Encoder PULSE input	2/1	SA+/SA-	encoder A phase/orthogonal PULSE A phase input / single PULSE train input P	RS422 standard
		7/6	PB+/PB-	encoder B phase/orthogonal PULSE B phase input / single PULSE direction input D	
		12/11	DZ+/DZ-	encoder Z phase	
T5	Communication encoder input	12/13	PV1/G1	encoder power supply provides terminal /power common port	DC5V 200mA
		8/3	A+/A-	A/DATA INCRE/BUS	Corresponding encoder standard
		9/4	B+/B-	B/INCRE	
		15/14	Z+/Z-	Z/BAT/INCRE/Battery	
	Thermal protection input	11	T1	Motor thermal protection signal input	N.C./ N.O.

General version control wiring diagram (taking 7.5kW GHXB driver as an example)

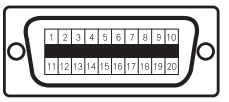


Input and output signals description (GHXB Series)

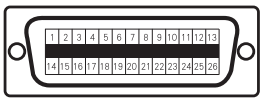
Table 2-7 Input and output signal function description

Port	Type	Pin	Name	Function	Signal standard
T0	Communication			Communicate with computer	RS232
T1	High-speed bus interface			MechatroLink, PowerLink, Ethercat Bus communication	Standard Ethernet
T2	Analog input	1	FS	10V power for speed setting is provided inside common port	DC10V 50mA
		4/7	FC	Analog input /output common terminal	0V
		2	FV	-10V~+10V analog input, input impedance: 20KΩ	Analog signal
		3	FI	Analog input impedance may be selected for 0~10V , 4~20mA input impedance: 20K/500Ω	
	Analog output	5/6	DA1/DA2	-10~10Voutput	
	Programmable optocoupler output	8	Q3	When fn.21 =0, Hn.19=0, A2.24=2, Q3 is servo enable When fn.21 does not equal 0, Hn.19=8, and A2.24=0, Q3 is the output point of star Angle switch	24V optocoupler output 10mA
		9	Q4	When fn.21 =0, Hn.20=0, A2.25=5, Q4 is the zero speed of the motor When fn.21 does not equal 0, Hn.20=9, and A2.25=0, Q4 is the star Angle switch completion flag	
		10/11	Q5/Q6	Programmable output	
	Control power	12	SC	Control signal common terminal	DC24V 100mA
	485 communication interface	13/14	D+/D-	485 communication interface	RS485 standard
	CAN communication interface	15/16	CANH/CANL	CAN communication interface	CAN communication standard
	Orthogonal/ directional pulse input interface	17/18	PA+/PA-	Orthogonal/directional pulse input interface	RS422 standard
		19/20	DB+/DB-	Orthogonal/directional pulse input interface	
T3	Control power supply	1	PV	DC24V power supply terminal	DC24V 100mA
		2	SC	DC24V power supply 0V terminal /control signal public terminal	
	NPN/PNP select	3	DP	NPN/PNP select, DP connections to PV is NPN, and DP connecting to SC is PNP	PNP: 0V input effective NPN:24V input effective
	Control signal input	4	ST	Control enabling and reset	
		5	RET	Reset	
		6	I1	run enabling/forward	
		7	I2	Reverse	
		8	I3	Orientation	
		9	I4	Rigid tapping / position mode	
		10	I5	External proximity switch orientation signal input	
		11	I6	Swing	
		12	I7	Joggingforward	
		13	I8	Jogging reverse	
		14	I9	Second orientation sign	
		15	I10	External I / O self-tuning	
		16	I11	When fn.21 =0, Hn.11=0, A2.17=2, I11 is 24V pulse signal When fn.21,=3 or 4, HHN.11=6, A2.17 does not equal 2, I11 is the feedback signal of external contact of star Angle switching Angle contact	
		17	I12	When fn.21 =0, Hn.12=0, A2.17=2, I12 is 24V pulse signal When fn.21 does not equal 0, HHN.12=5, and A2.17 does not equal 2, I12 is the manual star Angle switching input	
	Programmable optocoupler output	24	Q1	Drive ready, set via A2.20	24V optocoupler output 10mA
		25	Q2	Speed reached , set through A2.21	
	Relay output	18/19/20	M0A/M0B/M0C	Output accurate stop ends (in place) output,set through A2.22	AC250V 1A DC30 1A
		21/22/23	M1A/M1B/M1C	Driver fault output	
T4	Encoder output	3/4	PV2/G2	Preset power, provided by digital system, system without electrify inspection may go without.	DC5V200mA
		5/15	OA+/OA-	Encoder A phase output	line driver output RS 422 standard
		10/14	OB+/OB-	Encoder B phase output	
		9/13	OZ+/OZ-	Encoder Z phase output	
	Encoder PULSE input	2/1	SA+/SA-	Encoder A phase/orthogonal PULSE A phase input /single PULSE train input P	RS422 standard
		7/6	PB+/PB-	Encoder B phase/orthogonal PULSE B phase input /single PULSE direction input D	
		12/11	DZ+/DZ-	Encoder Z phase	
T5	Communication encoder input	12/13	PV1/G1	Encoder power supply provides terminal /power common port	DC5V 200mA
		8/3	A+/A-	A/A/SIN/DATA increment /sine and cosine / resolver / absolute value	Corresponding encoder standard
		9/4	B+/B-	B /B/COS/CLK increment /sine and cosine / resolver / absolute value	
		15/14	Z+/Z-	Z /R/REF increment /sine and cosine / resolver	
	Thermal protection input	11	T1	Motor thermal protection signal input	N.C./ N.O.

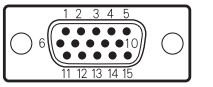
Connector terminal arrangement



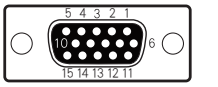
T2 20-pin high density plug



T330-pin high density plug



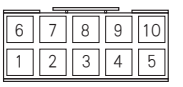
T4 D-type 15-pin plug (pin)



T5 D-type 15-pin plug (hole)

Definition of motor side encoder interface

Definition ofrectangular connector



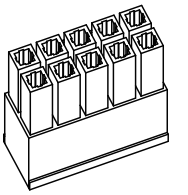
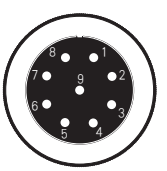


Table2-9 Definition of rectangular connector interface

Pin number / Signal (color) / Encoder type	1	2	3	4	5	6	7	8	9	10
Sine and cosine encoder	E (shielded)	R+ (grey)	B+ (blue)	A+ (green)	5V (grey pink)	T1 (purple)	R- (pink)	B- (red)	A- (yellow)	0V (white green)
Incremental encoder	E (shielded)	Z+ (yellow)	B+ (green)	A+ (white)	5V (red)	T1 (purple)	Z- (orange)	B- (blue)	A- (grey)	0V (black)
Absolute encoder	E (shielded)	VB (brown)	-	SD+ (blue)	5V (red)	T1 (purple)	Z- (brown black)	-	SD- (blue black)	0V (black)
Rotary encoder	-	REF+ (red white/ orange white)	COS+ (red)	SIN+ (yellow)	-	-	REF+ (yellow white/ black white)	COS- (black)	SIN- (blue)	-
Smart card	E	VB	-	SD+	5V	PV	-	-	SD-	0V

Round ST1210/S9



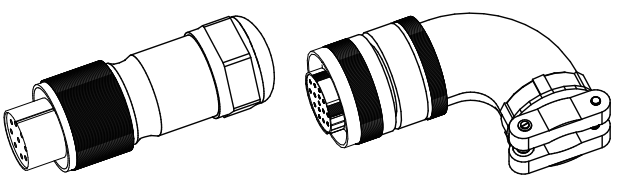
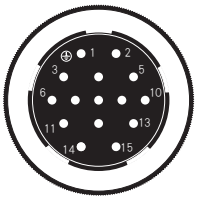


Table 2-10Definition of round ST1210/S9connector interface

Pin number / Signal (color) / Encoder type	1	2	3	4	5	6	7	8	9
Absolute encoder	Z- (brown black)	SD- (blue black)	VB (brown)	SD+ (blue)	T1 (purple)	E (shielded)	-	0V (black)	5V (red)
Smart card	-	SD-	VB	SD+	PV	E	-	0V	5V

Round YD18K15TS/YD28K15TS



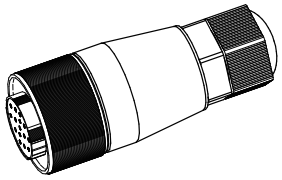
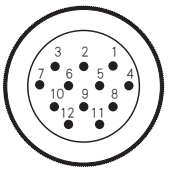


Table 2-11 Definition of round YD18K15TS/YD28K15TSconnector interface

Pin number / Signal (color) / Encoder type	1	2	3	4	5	6	7	13	14	15
Sine and cosine encoder	E (shielded)	A+ (green)	A- (yellow)	B+ (blue)	B- (red)	R+ (grey)	R- (pink)	T1 (purple)	5V (grey pink)	0V (white green)
Incremental encoder	E (shielded)	A+ (white)	A- (grey)	B+ (green)	B- (blue)	Z+ (yellow)	Z- (orange)	T1 (purple)	5V (red)	0V (black)
Absolute encoder	E (shielded)	SD+ (blue)	SD- (blue black)	-	-	VB (brown)	Z- (brown black)	T1 (purple)	5V (red)	0V (black)
Rotary encoder	-	SIN+ (yellow)	SIN- (blue)	COS+ (red)	COS- (black)	REF+ (red white/ orange white)	REF- (yellow white/ black white)	T1 (purple)	-	-
Smart card	E	SD+	SD-	-	-	VB	-	PV	5V	0V

圆形WY20J12TE



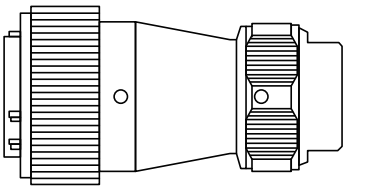


表2－12 圆形WY20J12TE连接器接口定义

Pin number / Signal (color) / Encoder type	1	2	3	4	5	6	7	8	9	10	11	12
Sine and cosine encoder	R- (brown white)	A- (green white)	R+ (brown)	A+ (green)	TF1 (grey)	TF2 (grey white)	B- (blue white)	0V (red white)	B+ (blue)	5V (red)	TS1 (black)	TS2 (black white)
Incremental encoder	Z- (brown white)	A- (green white)	Z+ (brown)	A+ (green)	TF1 (grey)	TF2 (grey white)	B- (blue white)	0V (red white)	B+ (blue)	5V (red)	TS1 (black)	TS2 (black white)

Control power supply wiring

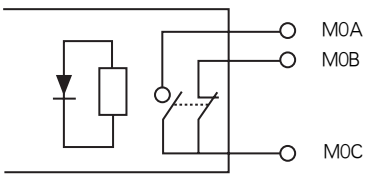
In addition to analog control terminal, all of other control terminals of GH series AC servo driver are equipped with optocoupler isolation. Power of the optocoupler isolation may select from internal of the driver or external power provided by the user according to the actual requirements. To ensure better isolation effect, it is recommended to use external DC24V isolation power provided by user.

The wiring of relay output signal

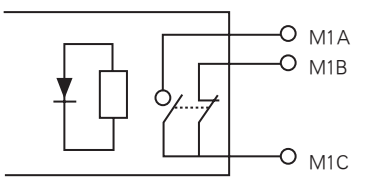
GH AC servo driver provides two relay output points.

Output standard: AC250V 1A DC30V 1A

Accurate stop relay output schematic diagram



Fault relay output schematic diagram



Transistor output wiring precautions

- The maximum oad capacity of output tape of transistor output QI/Q2 is 20 mA, and the output voltage is DC24V.
- If the output terminal needs 0V, intermediate relay may be installed for switching as shown in Figure 2-14.
- If the output terminal drives inductive load (e.g., electromagnetic relay, intermediate relay), surge voltage absorbing circuit shall be added as shown in Figure 2-14.

If follow current diode is installed in surge absorption circuit (for DC electromagnetic circuit), attention must be paid to polarity during installation.

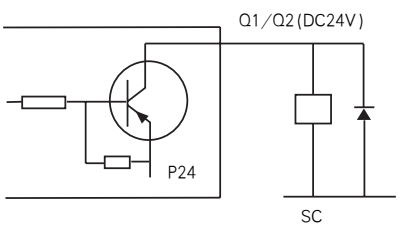


Figure 2-14 Transistor output circuit

Wiring of analog input signal

GH AC servo driver selects two analog input interfaces of FI and FV, as well as a group of power interface FS and FC for analog input. Please see Table 2-13 for signal function description.

Table 2-13 Analog interface signal description

Signal	Function	Signal standard
FI	Unipolarity analog input terminal A2-01=1	0~10V, input impedance: 20KΩ
FV	Bipolarity analog input terminal A2-01=0	-10V~+10V analog input, input impedance: 20KΩ
FS	inside provided speed setting power	DC10V, 50mA,
FC	analog common port	0V
E	Shielding layer connecting terminal	

Wiring requirements

- Connect to signal source or control signal with multi-core shielded cable or stranded shielded wire.
- The near-end of shielding layer of the case (end near the driver) shall be connected to the connector housing.
- During wiring, the control cables shall be arranged more than 30cm away from the main circuit and strong power line (including power line, motor line, relay, contactor connecting cable), and avoid parallel layout. Vertical wiring is recommended to prevent malfunction of the driver due to interference.
- Filter magnetic ring provided by the manufacturer shall be used for long distance wiring. It shall be installed at the side near the driver.

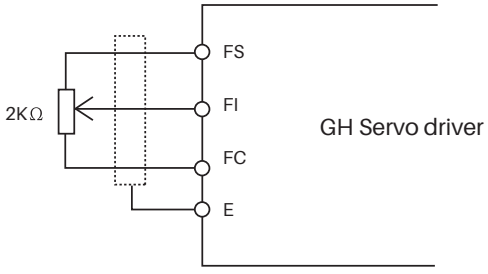


Figure 2-15 Conduct speed setting with internal power

FV terminal wiring example

CNC system uses bipolar (-10V ~ +10 V) analog output. The speed is determined by the value of the analog, the direction of rotation is determined by polarity of the analog as shown in Figure 2-16.

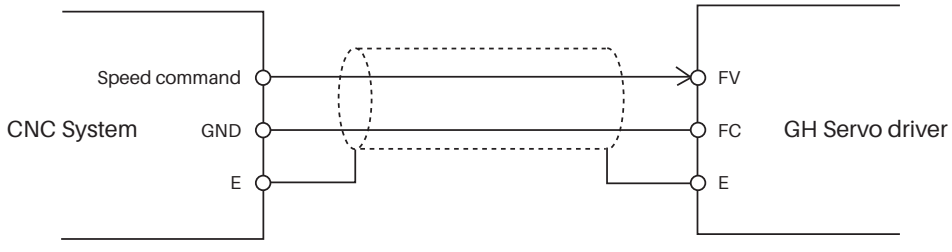


Figure 2-16 Bipolar speed setting is conducted by CNC system

Forbid

- It's prohibited to connect the signal line and OV reversely. The signal line is likely to be burned, and reverse operation may be caused for bipolar.
- It's prohibited to connect high-voltage to analog signal terminal. The driver may be burned.

Connection of the encoder interface

A group of encoder input interface T5 and encoder input interface T4 are provided on main board of GH series AC servo driver. Please see Table 2-14 and Table 2-15 for interface definition.

Table 2-14 Encoder input interface T5

Signal	Description	Signal standard
PV1	Encoder power supply DC5V	DC5V/200mA
G1	Encoder power ground 0V	
A+	A phase PULSE same-phase input (+)	Line drive mode RS422 standard
A-	A phase PULSE reverse -phase input (-)	
B+	B phase PULSE same-phase input (+)	
B-	B phase PULSE reverse -phase input (-)	
Z+	Z phase PULSE same-phase input (+)	
Z-	Z phase PULSE reverse-phase input (-)	
T1	Motor thermal protection input terminal	NC/NO

Table 2-15 Encoder output interface T4

Signal	Description		Signal standard
PV2	Encoder power supply DC5V	Or external sensor power supply	DC5V/200mA Note: the connection is not required when used as speed/position feedback of the CNC system
G2	Encoder power ground 0V		
OA+	A phase PULSE same-phase input (+)		Line drive mode RS422 standard
OA-	A phase PULSE reverse-phase input (-)		
OB+	B phase PULSE same-phase input (+)		
OB-	B phase PULSE reverse-phase input (-)		
OZ+	Z phase PULSE same-phase input (+)		
OZ-	Z phase PULSE reverse-phase input (-)		
SA+	Pulse/encoder A-phase input (+)		Line drive mode RS422 standard
SA-	Pulse/encoder A-phase input (-)		
PB+	Pulse/encoder B-phase input (+)		
PB-	Pulse/encoder B-phase input (-)		
DZ+	Pulse/encoder Z-phase input (+)		
DZ-	Pulse/encoder Z-phase input (-)		

Encoder wiring precautions

- The encoder cable must be shielded twisted pair cable.
- The shielding layer shall be connected to the connector housing

⚠ Forbid

- It's prohibited to connect the DC5V power reversely. It's likely to burn the DC5V power or encoder of the driver.
- It's prohibited to reverse the A, B phase sequence. Otherwise, the motor will not function properly, or even burn the motor or driver.

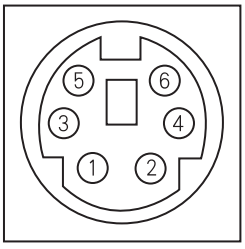
Connection of serial communication port

GH DRIVER provides users with a R S232A serial communication interface T0 for connection with computer to realize transmission of program and parameters. The port is connected with computer through RS232-P1 cable.
Please see Table 2-16 for definition of serial communication interface T0

Table 2-16 T0 interface definition

Pin	Name	Description	Pin	Name	Description
1	VCC	DC5V	4	NC	Used by manufacturer
2	GND	0V	5	TX	Send terminal
3	RX	Receive terminal	6	NC	Used by manufacturer

T0 interface diagram



GENERAL PURPOSE CABLE MODEL: RS 232-P1

⚠ Caution

- Please select the standard cable provided by the manufacturer for communication.

GH DRIVER

3

Manipulator application

The chapter describes the functions and methods of application of the manipulator.

Digital tube display

Configuration and key functions of the 0.4 ~ 18.5kw driver digital tube manipulator

The chapter defines and describes terms and phrases for operation and state of 0.4 ~ 18.5kw driver manipulator, defines the operation methods of driver and manipulator. Please read carefully. It's very helpful for proper use of the 0.4 ~ 18.5kw driver.

Manipulator

The manipulator is one of the standard equipment of 1.0~ 18.5kw driver. User may carry out parameter setting, state monitoring, operation control and other operations to the driver through the manipulator. It's very important to be familiar with function and operation of the manipulator for proper application of 0.4 ~ 18.5kw series driver. Please read the manual carefully before using.

Manipulator appearance diagram

Manipulator of 1.0~ 18.5kw driver is mainly composed of two parts of LED digital tube and keys. The appearance and functional zones are shown in Figure 3-1.

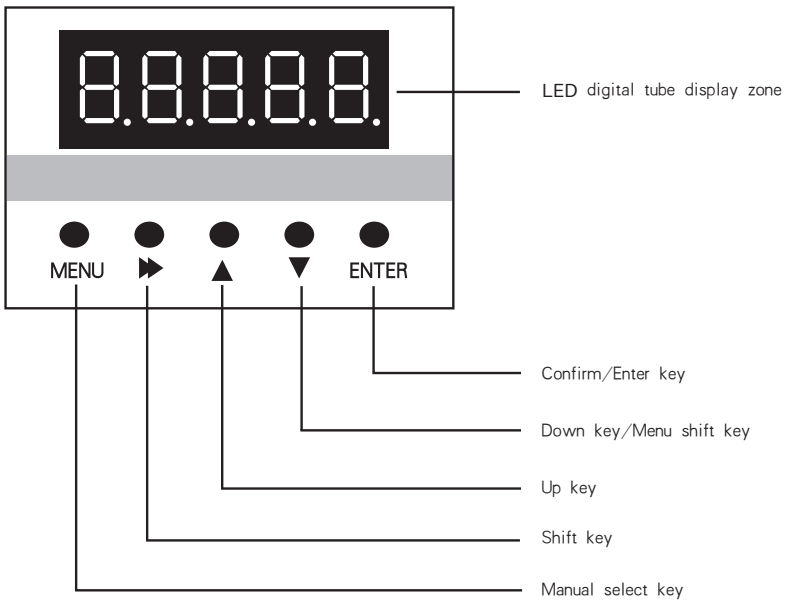


Figure 3-1 Manipulator diagram

Manipulator key function description

Please see Table 3-1 for function description of the manipulator key

Table 3-1 Manipulator key function

Key	Name	Function
MENU	Menu selection switching key	switching key of each menu item;
▶▶	Shift key	It's used to switch data bit of the parameter number when browse parameter items; When modifying data in program state, it can be used to modify the modified bit of the modified data.
▲	Up key	Increase menu item, parameter item or modified parameter value progressively.
▼	Down key	Decrease menu item, parameter item or modified parameter value progressively.
Enter	Confirm / enter key	Press the key in program state to return to the previous menu. Enter the next level menu; Complete selection of the parameter group in1-level menu; Complete parameter value checking operation in 2-level menu; Complete modification and storage operation of the parameter value in 3-level menu.

The operating state of the driver

0.4~ 18.5kw driver has four operating states after power-on: standby, operating, programming and fault alarm. They are described as follows:

Standby state

0.4~18.5kw driver is in standby state after power-on and before receiving any operating control order. The default standby state display function code of LED digital tube is F.0 . User may make LED circling switch display U1, U2, U3, A1, A2 , A3, Bn,Cn,Dn,En, Fn,Hn,Pn,Sn,parameter groups by press MENU key. After press ENTER key, user may make LED circling switch display monitoring parameters defined in function parameter group by pressing ▲ , ▼ and ▶▶ key, and then press ENTER key to check /monitor its value.

In the process of use, if you want to modify the contents of the Sn parameter group, it will be limited by the advanced password parameter sn.00. After entering the advanced password, you can modify some parameters of Sn, the Sn system,Parameters are important parameters of the drive and should be modified carefully.

Operating state

When 0.4~18.5kw driver in standby and no-fault state, it will enter operating state after receiving operating order.

User may make LED circling switch display U1, U2, U3, A1, A2 , A3, Bn,Cn,Dn,En,Fn,Hn,Pn,Sn parameter groups by press MENU key. After press ENTER key, user may make LED circling switch display monitoring parameters defined in function parameter groups by pressing ▲ , ▼ and ▶▶ key, and then press ENTER key to check /monitor its value.

Setting, modifying or editing state

For 0.4~18.5kw driver, user may switch to the state in which function code parameters can be modified through MENU, ▶▶, ▲ , ▼ and ENTER on the operator panel. The state is programming state.

Function parameter value is displayed in programming state, and the bit to be modified is flashing.

Fault alarm state

In the state, 0.4~18.5kw driver fails and displays the fault code.

LED displays fault code in fault state, and user may conduct fault reset operation by ▶▶ .

Operative mode of the manipulator

Standby state

The state of the manipulator is shown in Figure 3-2 when the driver is in standby state. The LED digital tube default display F.0 . At this point, user may press MENU to enter menu items, and check or modify parameters.

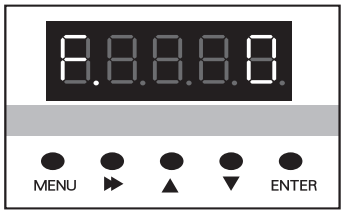


Figure 3-2 Standby state

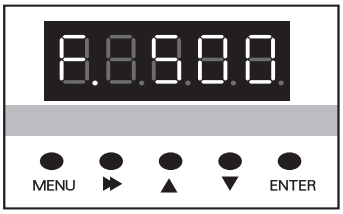


Figure 3-3 Operating state

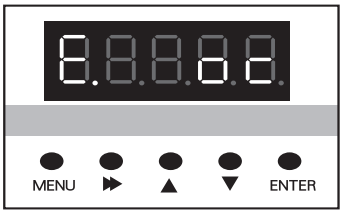


Figure 3-4 Fault alarm state

Operating state

The driver enters operating state after receiving correct operation command in standby state. As shown in Figure 3-3, the LED digital tube default displays the set speed of the driver, e.g F. 500. In this state, user may press MENU to enter menu items, and check or modify parameters.

Fault alarm state

When fault is detected as the driver is in operating, standby or programming state, the driver will stop and enter fault state immediately as shown in Figure 3-4.

When a fault occurs, user may enable conduct drive reset through ▶▶ key. If the fault has disappeared, it returns to the standby state; if the fault still exists, the fault code will be displayed again.

Use method of the manipulator

The section mainly introduces use of the manipulator, and basic operations of functions.

Parameter setting operation process

Parameter setting method of manipulator of 0.4 ~ 18.5kw driver adopts three-level menu structure. Parameter value of menu items can be checked and modified conveniently.

The three-level menu: menu item (1-level menu), parameter tem (2-level menu) and parameter setting (3-level menu). The operation process is shown in Figure 3-5.

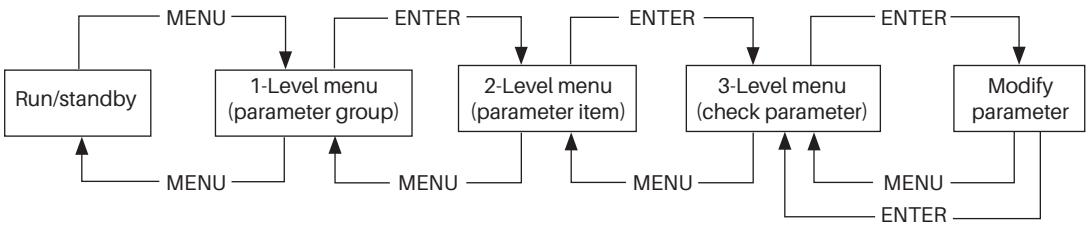


Figure 3-5 3-Level menu opertion flow chart

During operation in 3-level menu, user may return to 2-level menu by pressing MENU or ENTER (see Figure 3-5 and Figure 3-6). The difference between the two operations: after press ENTER key, the set parameter value will be saved to the controller, and then return to 2-level menu; it will return to 2-level menu directly without saving the parameter value by pressing MENU. The detail operational procedures of 3-level menu are shown in Figure 3-6.

Modify the parameters with the manipulator

The flow chart of modify the parameters with the manipulator is shown in Figure 3-6.

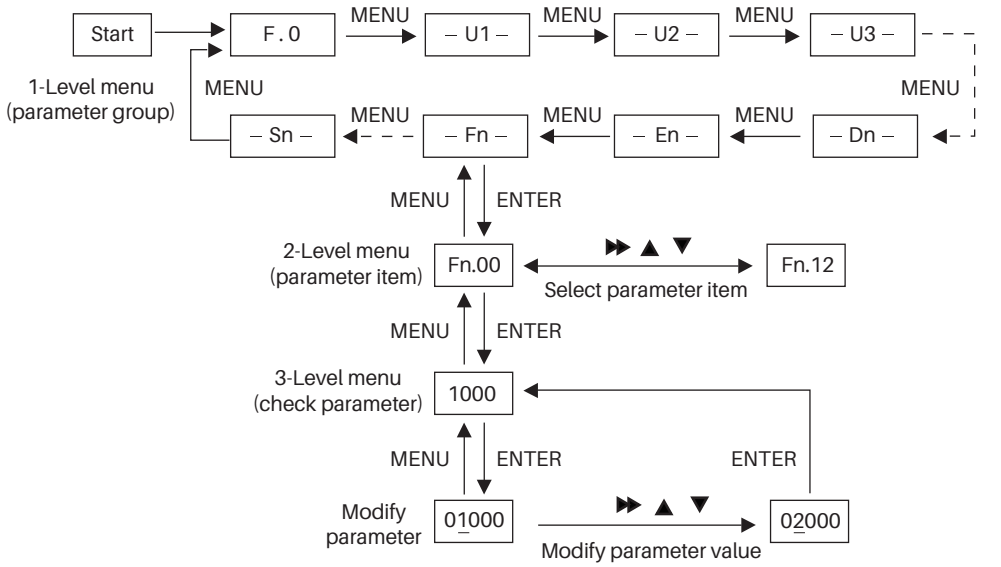


图3－6　三级菜单操作流程图

★ Description

Ten menu items are included in 1-level menu: U1menu, U2 menu, U3 menu, A1 menu, A2 menu, A3 menu, Bn menu、Cn menu、Dn menu、En menu、Fn menu、Hn menu、Pn menu、Sn menu

Please see parameter description for specific functions in 2-level menu.

Monitor operating state with the manipulator

Operation state, interface state and fault information of the driver can be monitored respectively through U1, U2 and U3 of the manipulator.

Operation state monitoring

Operation state monitoring includes set speed F, output speed O, feedback speed b, output current A, Bus voltage U and DC bus voltage U of the driver. Please see Figure 3-7 for monitoring method.

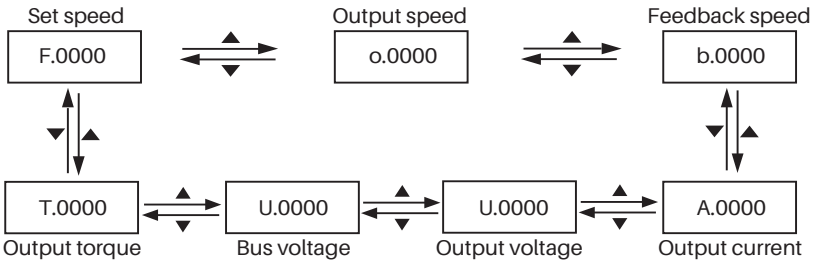


Figure 3-7 Flow Chart of Driver Operation Monitoring

U2 status monitoring

The U2 state monitoring parameter set includes the encoder count values U2.00 and U2.01 of the driver; Input point U2.03, U2.04, output point U2.05, analog input U2.06, U2.07, U2.08; Analog output U2.09, U2.10, U2.11; Angle value and pulse value of the current absolute position of the encoder U2.14, U2.15, U2.16 and U2.17; Values of T2 and T3 pulse ports U2.18 and U2.19; Driver temperature U2.23; Motor temperature U2.24; Driver status U2.25, U2.26, U2.27, U2.28; Power on time, runtime U2.29, U2.30;

The monitoring method is the same as viewing the monitoring parameters, just select the corresponding parameters in U2. The parameter number is shown in U2 operation monitoring parameter table 2.

Fault information monitoring

The control panel will display the current fault message code when the driver is in fault state. The fault record of the driver can be checked through U3. The check operation is same with monitoring parameter, only needs to select corresponding parameter in U3. Please see fault state recording parameter table U3 for parameter number.

Configuration and key functions of the 22~315kw driver digital tube manipulator

The chapter defines and describes terms and phrases for operation and state of 22~315kw driver manipulator, defines the operation methods of the driver and manipulator. Please read carefully. It's very helpful for proper use of the 22~315kw driver.

Manipulator

The manipulator is one of the standard equipment of 22~315kw driver. User may carry out parameter setting, state monitoring, operation control and other operations to the driver through the manipulator. It's very important to be familiar with function and operation of the manipulator for proper application of 22~315kw series driver. Please read the manual carefully before using.

Manipulator appearance diagram

Manipulator of 22~315kw driver is mainly composed of three parts of LED digital tube, LED indicator and key. The appearance and functional zones are shown in Figure 3-8.

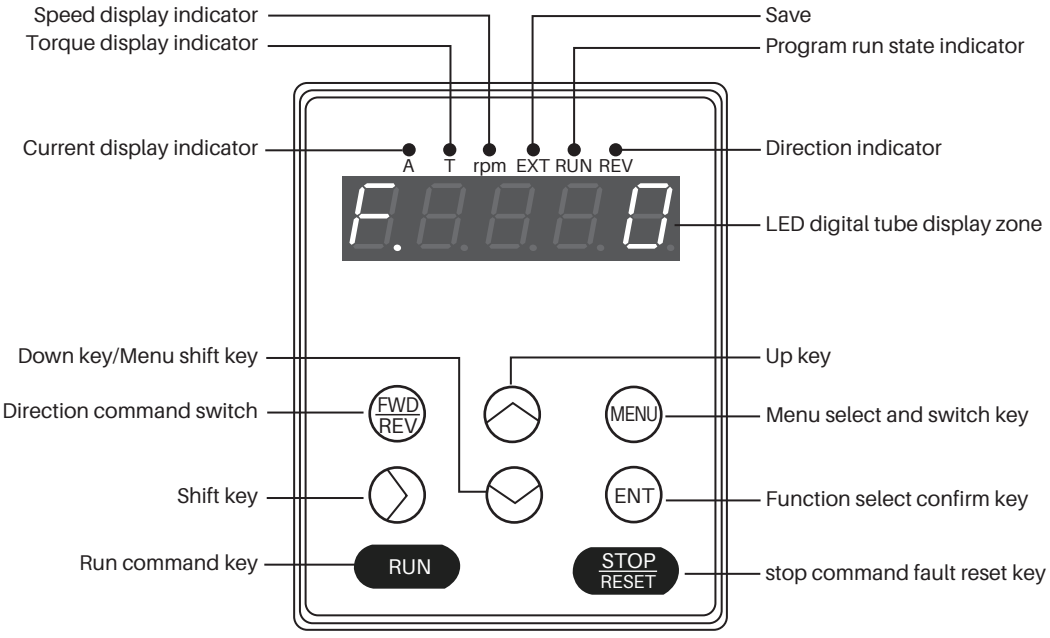


Figure 3-8 Manipulator diagram

Manipulator key function description

Please see Table 3-2 for function description of the manipulator key

Table 3-2 Manipulator key function

Key	Name	Function
MENU	Menu select and switch key	switching key of each menu item
ENT	Confirm / enter key	Press the key in program state to return to the previous menu; Enter the next level menu; Complete selection of the parameter group in 1-level menu; Complete parameter value checking operation in 2-level menu; Complete modification and storage operation of the parameter value in 3-level menu.
/\	up key	Increase menu item, parameter item or modified parameter value progressively.
\/	down key	Decrease menu item, parameter item or modified parameter value progressively.
>	Shift key	It's used to switch data bit of the parameter number when browse parameter items. It may change the bit to be modified of the modified data when modify data in the program state.
RUN	run command key	It's used to start the driver in driver control mode
STOP/RESET	fault reset key	It's used to reset driver reset when the driver is in fault alarm state.
FWD/REV	direction command switch key	It's used to select rotation direction of the driver in manipulator command control mode.

Manipulator LED indicator description

There are six LED indicators on the manipulator. They are on or off in various states. The detail description is as follows:

Current display indicator A

It has two states of on and off which indicates that the data displayed in the current LED digital tube display zone iscurrent parameter or not. On means current parameter is displayed in the LED digital tube display zone; off means that it's not current parameter displayed in the LED digital tube display zone.

Torque display indicator T

It has two states of on and off which indicates that the data displayed in the current LED digital tube display zone is torque parameter or not. On means torque parameter is displayed in the LED digital tube display zone; off means that it's not torque parameter displayed in the LED digital tube display zone.

Speed display indicator rpm

It has two states of on and off which indicates that the data displayed in the current LED digital tube display zone is speed parameter or not. On means speed parameter is displayed in the LED digital tube display zone; off means that it's not speed parameter displayed in the LED digital tube display zone.

Indicator EXT

Save;

Run state indicator RUN

It has two states of on and off which indicates the run state of the system under various operating control orders. On means the driver is in operating state; off means the driver is shutdown.

Operating direction indicator REV:

It has two states of on and off which indicates the current operating direction of the driver. On means reverse operation of the driver; off means forward operation of the driver.

The operating state of the driver

22~315kw driver has four operating states after power-on: standby, operating, setting, modifying or editing and fault alarm. They are described as follows:

Standby state

22~315kw driver is in standby state after power-on and before receiving any operating control order. The Run state indicator (RUN) on operation panel is off, and the default tandby state display function code of LED digital tube is F.0 . User may make LED circling switch display U1, U2, U3, A1, A2 , A3, Bn,Cn,Dn,En,Fn,Hn,Pn,Sn parameter groups by press MENU key.After pressing ENT to make LED circling switch display monitoring parameters defined in function parameter group, and then press ENT to check / monitor its value.

In the process of use, if you want to modify the contents of the Sn parameter group, it will be limited by the advanced password parameter sn.00. After entering the advanced password, you can modify some parameters of Sn, the Sn system Parameters are important parameters of the drive and should be modified carefully.

Operating state

When 22~315kw driver in standby and no-fault state, it will enter operating state after receiving operating order.

In normal operating state, the Run state indicator (RUN) on operation panel is on. User may make LED circling switch display U1, U2, U3, A1, A2 , A3, Bn,Cn,Dn,En,Fn,Hn,Pn,Sn parameter groups by press MENU key. Press Λ , V and > after pressing ENT to make LED circling switch display monitoring parameters defined in function parameter groups, and then press ENT to check /monitor its value.

Editing state

For 22~315kw driver, user may switch to the state in which function code parameters can be modified through MENU , ENT , Λ , V and > on the operator panel. The state is programming state.

Function parameter value is displayed in programming state, and the bit to be modified is flashing.

Fault alarm state

In the state, 22~315kw driver fails and displays the fault code.

LED displays fault code in fault state, and STOP/RESET may enable user conducting fault reset operation.

Operative mode of the manipulator

Standby state:

The state of the manipulator is shown in Figure 3-9 when the driver is in standby state. The LED digital tube default display F.0 . At this point, user may press MENU to enter menu items, and check or modify parameters.

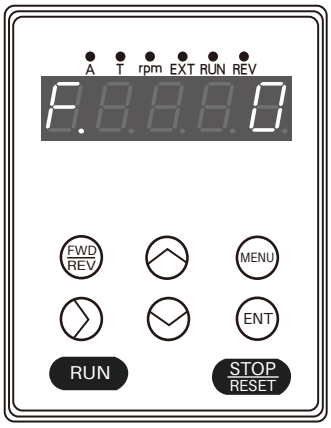


Figure 3-9 Standby state

Figure 3-10 Operating state

Figure 3-11 Fault alarm state

Operating state

The driver enters operating state after receiving correct operation command in standby state. As shown in Figure 3-10, the LED digital tube default displays the set speed of the driver, e.g F. 500 . In this state, user may press MENU to enter menu items, and check or modify parameters.

Fault alarm state

When fault is detected as the driver is in operating, standby or programming state, the corresponding fault information will be displayed immediately as shown in Figure 3-11.

When a fault occurs, the driver may enable driver reset through STOP/RESET . If the fault has disappeared, it returns to the standby state; if the fault still exists, the fault code will be displayed again.

Use method of the manipulator

The section mainly introduces use of the manipulator, and basic operations of functions.

Parameter setting operation process

Parameter setting method of manipulator of 22~315kw driver adopts three-level menu structure. Parameter value of menu items can be checked and modified conveniently.

The three-level menu: menu item (1-level menu), parameter tem (2-level menu) and parameter setting (3-level menu). The operation process is shown in Figure 3-12.

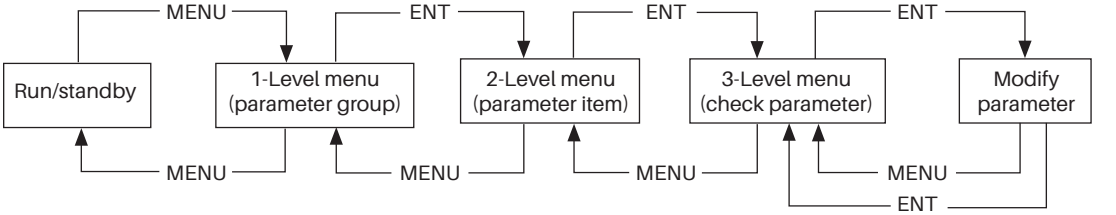


Figure 3-12 3-level menu operation flow chart

During operation in 3-level menu, user may return to 2-level menu by pressing or (see Figure 3-12 and Figure 3-13). The difference between the two operations: after press ENTER key, the set parameter value will be saved to the controller, and then return to 2-level menu; it will return to 2-level menu directly without saving the parameter value by pressing MENU.

The detail operational procedures of 3-level menu are shown in Figure 3-13.

Modify the parameters with the manipulator

The flow chart of modify the parameters with the manipulator is shown in Figure 3-13.

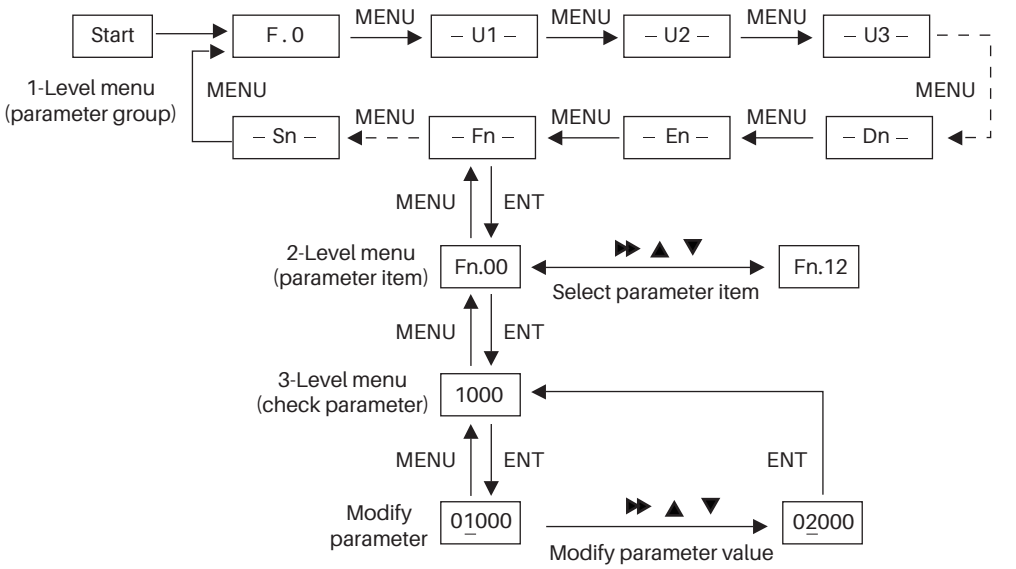


Figure 3-13 3-level menu operation flow chart

★Description:

10 menu items are included in 1-level menu: U1menu, U2 menu, U3 menu, A1 menu, A2 menu, A3 menu, Bn menu、Cn menu、Dn menu、En menu、Fn menu、Hn menu、Pn menu、Sn menu

Please see parameter description for detailed function in 2-level menu.

Monitor operating state with the manipulator

Operation state, interface state and fault information of the driver can be monitored respectively through U1, U2 and U3 of the manipulator

Operation state monitoring

Operation state monitoring includes set speed F, output speed O, feedback speed b, output current A, bus voltage U and DC bus voltage U of the driver. Please see Figure 3-14 for monitoring method.

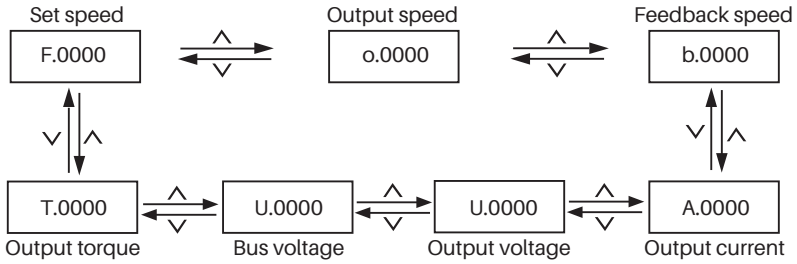


Figure 3-14 Driver operation state monitoring flowchart

U2 status monitoring

The U2 state monitoring parameter set includes the encoder count values U2.00 and U2.01 of the driver; Input point U2.03, U2.04, output point U2.05, analog input U2.06, U2.07, U2.08; Analog output U2.09, U2.10, U2.11; Angle value and pulse value of the current absolute position of the encoder U2.14, U2.15, U2.16 and U2.17; Values of T2 and T3 pulse ports U2.18 and U2.19; Driver temperature U2.23; Motor temperature U2.24; Driver status U2.25, U2.26, U2.27, U2.28; Power on time, runtime U2.29, U2.30;

The monitoring method is the same as viewing the monitoring parameters, just select the corresponding parameters in U2. The parameter number is shown in U2 operation monitoring parameter table 2.

Fault information monitoring

The control panel will display the current fault message code when the driver is in fault state. The fault record of the driver can be checked through U3. The check operation is the same as monitoring parameter, only needs to select corresponding parameter in U3. Please see parameter table of parameter number.

GH DRIVER

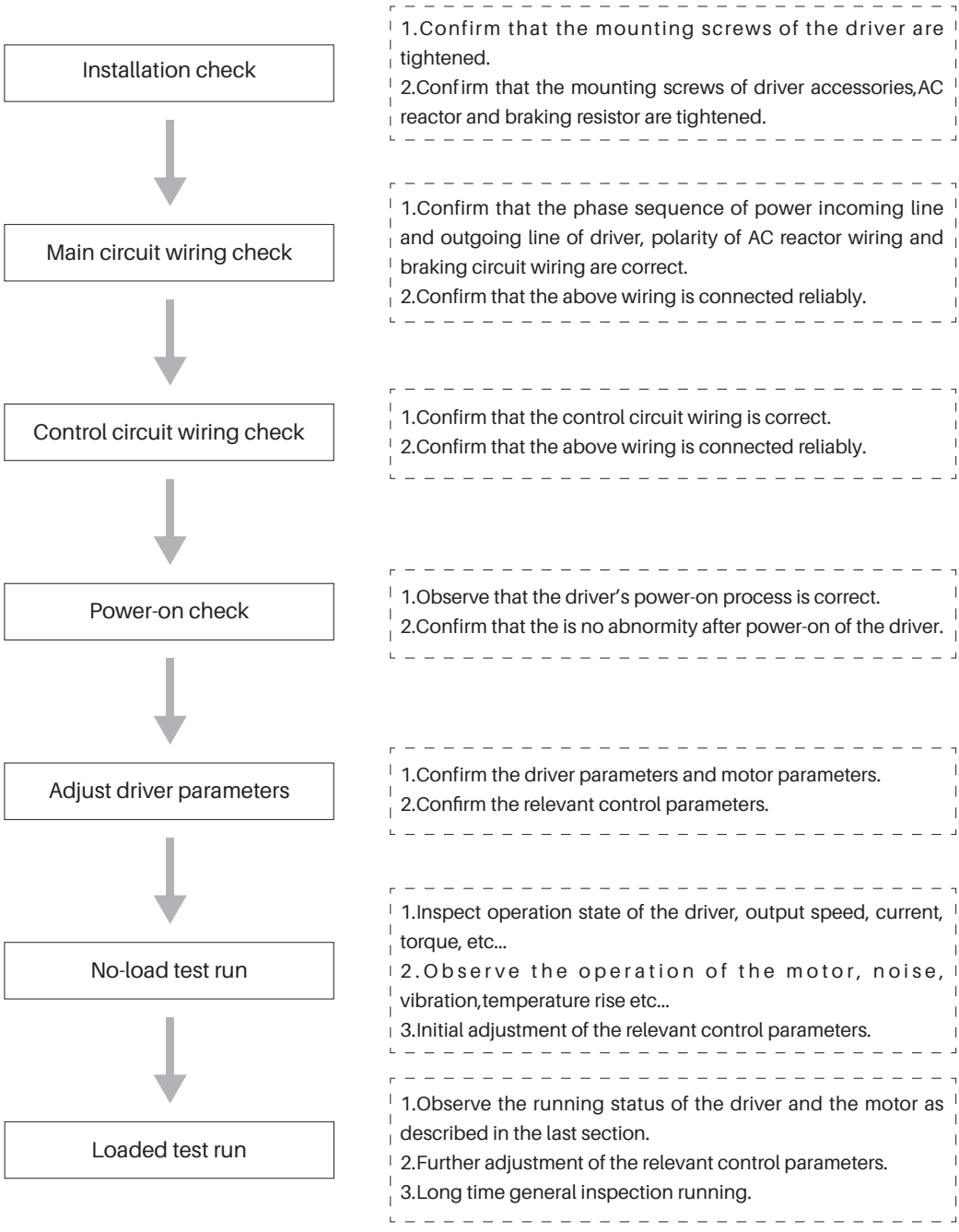
4

Test run

The chapter describes methods and precautions for initial test run of the driver

Basic procedure of test run

The initial power-on operation of the driver shall be carried out by the following procedures, otherwise, accident, damage to equipment or other hazards are likely to happen.



Confirmation of the connection of the main circuit

Please confirm the following contents in connection of the main circuit

1. Connect the connecting wire on driver R / S / T to 3-phase power frequency power supply. The voltage of the power supply shall meet the requirements of the drive.
2. The driver is equipped with built-in braking unit. The braking resistor is connected to P / PB. Do not connect any connect wire to N terminal.

3. When the output terminal of the driver is connected to the motor, it shall beensured that their phase sequences are same, otherwise, he motor cannot operate normally, and prone to burn the equipment. If shield cable is used for output cable, the shielding layer at the ends of the cable shall be connected respectively to ground terminal of the drive and motor.
4. When filtering magnet ring is installed on the output line, it shall be close to the driver side as possible. The shielding layer and ground line cannot pass through the magnet ting, and the magnet ting cannot be in contact with the U / V / W terminal.
5. The driver and motor must be well grounded.
6. Confirm all connecting wire are connected reliably.

⚠ Caution

- The wire connection must be inspected carefully before initial power-on of the driver, otherwise, it's prone to accidents

Motor and driver parameters confirmation

The initial parameters of GH series AC servo driver shall be basically in conformity with the practical application. Most of the parameters do not need modification. For initial application, user shall modify or confirm part of the parameters as required.

Parameters need to be confirmed in test run

- Motor and driver parameters: D1, D1-00 ~ D1-05.
- Basic control parameters:A2, A2-00~ A2-35.
- Control relevant parameter:A3, A3-00~ A3-69.

Loaded test run

Attention shall be paid to the following contents during loaded test run of the driver:

1. Loading gradually from small to large. Please inspect or contact with the manufacturer for over loading.
2. Monitor feedback speed, output current and output torque of the driver constantly during loading; observe motor vibration and noise and temperature rise continuously. The equipment shall be shutdown timely for any abnormalities.
3. To avoid accident, the motor shall be stopped before adjusting motor parameters. The parameter regulating quantity shall not be too big.
4. Do not make overload test or destructive test to avoid burning of the driver and motor.

⚠ Caution

If the following situations occur, please shut down immediately and inspect, or contact the manufacturer.

1. Major fluctuation of feedback speed, output current and output torque of the driver, or reach the limit.
2. The motor operation is abnormal with abnormal vibration and noise.
3. Mechanical equipment abnormalities

GH DRIVER

5

Parameter list

The chapter describes all of parameters of the driver.

Parameter list description

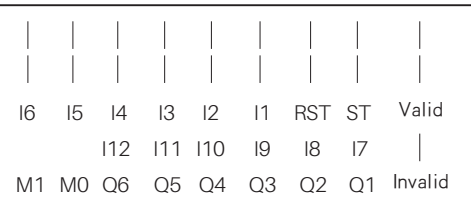
The contents of the parameter list are described as follows:

Function code: Code of parameter group and parameter number;
Name: Name of the parameter;
Description: Detailed description about function and effective setting value of the parameter;
Setting range: The range of effective setting value of parameter;
Unit: Parameter setting unit;
Factory setting: Original factory parameter setting;
Change: Parameter changing properties (ie, allow changing or not and change condition) are as follows:
"O" the parameter setting can change when the driver is in downtime and in running state.
"×" the parameter setting can't change when the driver is in servo enabled state.
"*" the parameter value is actual test record value, it can't change.
"Δ" the revised parameter setting need to electricity to effect
Apply motor Apply motor type as follow:
Synchronous: the parameter is applicable to the synchronous motor only.
Asynchronous: the parameter is applicable to the asynchronous motor only.
Synchronous/Asynchronous: the parameter is applicable to the synchronous and asynchronous motor.

Running monitoring parameter U1

Function code	Name	Description	Unit	Change	Apply motor
U1.00	Set speed/frequency	Max speed<1000rpm, display speed; Max speed≥1000rpm, display frequency	Speed: rpm Frequency:Hz	*	Synchronous/ Asynchronous
U1.01	Output speed/frequency				Synchronous/ Asynchronous
U1.02	Feedback speed/frequency				Synchronous/ Asynchronous
U1.03	Driver output current	Monitor drive output current	A	*	Synchronous/ Asynchronous
U1.04	Drive output voltage	Monitor drive output voltage	V	*	Synchronous/ Asynchronous
U1.05	Driver DC bus voltage	Monitor DC bus voltage=AC power line voltage*1.414	V	*	Synchronous/ Asynchronous
U1.06	Motor actual feedback torque	Monitor motor output torque, display as per the motor rated torque percentage	%	*	Synchronous/ Asynchronous

Running monitoring parameter U2

Function code	Name	Description	Unit	Change	Apply motor
U2.00	Motor encoder counting value	Monitor motor encoder counting value	Pulse	*	Synchronous/ Asynchronous
U2.01	Second encoder counting value	When Encoder input, 4 frequency multiplication counting When single pulse input, 1 frequency multiplication counting When double pulse input, 4 frequency multiplication counting	Pulse	*	Synchronous/ Asynchronous
U2.02	Following error	Following error	Pulse	*	Synchronous/ Asynchronous
U2.03	State of input points I1 to I6, ST, RST		-	*	Synchronous/ Asynchronous
U2.04	State of input points I7 to I12				
U2.05	state of output M0, M1, Q0 to Q6		-	*	Synchronous/ Asynchronous

Function code	Name	Description	Unit	Change	Apply motor
U2.06	Analog quantity input FVdigital	Analog quantity -10 to 0 to +10V Digital 0 to 2047 to 4095	-	*	Synchronous/ Asynchronous
U2.07	Analog quantity input FIdigital	Analog quantity 0 to +10V Digital 0 to 4095	-	*	Synchronous/ Asynchronous
U2.08	Analog quantity input FTdigital	Analog quantity 0 to +10V Digital 0 to 4095	-	*	Synchronous/ Asynchronous
U2.09	FV Analog quantity input voltage value	FV Analog quantity input voltage value monitoring	V	*	Synchronous/ Asynchronous
U2.10	FI Analog quantity input voltage value	FI Analog quantity input voltage value monitoring	V	*	Synchronous/ Asynchronous
U2.11	FT Analog quantity input voltage value	FT Analog quantity input voltage value monitoring	V	*	Synchronous/ Asynchronous
U2.12	Analog quantity output DA1 digital 1	Analog quantity -10 to 0 to +10V Digital 0 to 2047 to 4095	-	*	Synchronous/ Asynchronous
U2.13	Analog quantity output DA2 digital	Analog quantity -10 to 0 to +10V Digital 0 to 2047 to 4095	-	*	Synchronous/ Asynchronous
U2.14	Motor encoder current absolute position angle value	Motor encoder current absolute position	deg	*	Synchronous/ Asynchronous
U2.15	Motor encoder current absolute position pulse counting value	Motor encoder current absolute position pulse counting value	pulse	*	Synchronous/ Asynchronous
U2.16	Second encoder current absolute position angle value	Second encoder current absolute position angle value	deg	*	Synchronous/ Asynchronous
U2.17	Second encoder single circle relative pulse position pulse counting value	Pulse counting value for current single circle position and relative pulse position of zero point	pulse	*	Synchronous/ Asynchronous
U2.18	T2 pulse port counting value	T2 pulse port counting value	pulse	*	Synchronous/ Asynchronous
U2.19	T3 pulse port counting value	T3 pulse port counting value	pulse	*	Synchronous/ Asynchronous
U2.20	T2 pulse speed	T2 pulse speed, resolution:0.001rpm	rpm	*	Synchronous/ Asynchronous
U2.21	T3 pulse speed	T3 pulse speed, resolution:0.001rpm	rpm	*	Synchronous/ Asynchronous
U2.22	Second encoder/T4 pulse speed	Second encoder/T4 pulse speed,resolution:0.001rpm	rpm	*	Synchronous/ Asynchronous
U2.23	Servo drive temperature	Monitor temperature of drive module	℃	*	Synchronous/ Asynchronous
U2.24	Temperature of the motor	Monitor temperature of the motor	℃	*	Synchronous/ Asynchronous
U2.25	Servo drive status 1	bit 0: Power on bit 1: Servo be ready bit 2: Servo running bit 3: Fault bit 4: CW bit 5: CCW bit 6: Acceleration bit 7:deceleration bit 8:speed arrival bit 9:zero speed arrival bit 10:positioning running bit 11:Rough positioning completion bit 12: Fine positioning completion bit 13:positive torque output status bit 14:counter torque output status bit 15: torque arrival	-	*	Synchronous/ Asynchronous

Function code	Name	Description	Unit	Change	Apply motor
U2.26	Servo drive status 2	bit 0: zero torque status bit 1: magnetic pole position study completed bit 2: Motor self-tuning completed bit 3:brake output bit 4: Arrival software positive limit bit 5: Arrival software opposite limit bit 6: Arrival hardware positive limit bit 7:Arrival hardware opposite limit bit 8:Arrival speed limit bit 9:Arrival torque limit bit 10:jog state bit 11:braking state bit 12: Motor star/delta connection bit 13:Star/delta switch bit 14:analog study failure mark bit 15:first encoder over Z valid	-	*	Synchronous/ Asynchronous
U2.27	Servo drive status 3	bit 0:second encoder over Z valid bit 11: Study inertia state, 1 is valid bit 12: following error in rough range bit 13: following error in fine adjustment range	-	*	Synchronous/ Asynchronous
U2.28	Servo drive status 4	reserve	-	*	Synchronous/ Asynchronous
U2.29	Drive power on time	Display the drive accumulative power on time	h	*	Synchronous/ Asynchronous
U2.30	Drive running time	Display the drive accumulative running time	h	*	Synchronous/ Asynchronous
U2.31	Current torque display	Current torque display	N.m	*	Synchronous/ Asynchronous

Malfunction state record parameter U3

Function code	Name	Description	Unit	Change	Recommend motor
U3.00	Current fault code	Current drive fault code	—	*	Synchronous/ Asynchronous
U3.01	last 1st fault code	Display the content before1st fault	—	*	Synchronous/ Asynchronous
U3.02	last 2nd fault code	Display the content before 2ndfault	—	*	Synchronous/ Asynchronous
U3.03	last 3rd fault code	Display the content before 3rdfault	—	*	Synchronous/ Asynchronous
U3.04	last 4th fault code	Display the content before 4th fault	—	*	Synchronous/ Asynchronous
U3.05	last 5th fault code	Display the content before 5th fault	—	*	Synchronous/ Asynchronous
U3.06	last 6th fault code	Display the content before 6th fault	—	*	Synchronous/ Asynchronous
U3.07	last 7th fault code	Display the content before 7th fault	—	*	Synchronous/ Asynchronous
U3.08	last 8th fault code	Display the content before 8th fault	—	*	Synchronous/ Asynchronous
U3.09	last 9th fault code	Display the content before 9th fault	—	*	Synchronous/ Asynchronous

Function code	Name	Description	Unit	Change	Apply motor
U3.10	One time fault time	Drive power on time when one time fault occurs	h	*	Synchronous/ Asynchronous
U3.11	two times fault time	Drive power on time when two times fault occurs	h	*	Synchronous/ Asynchronous
U3.12	Three times fault time	Drive power on time when three times fault occurs	h	*	Synchronous/ Asynchronous
U3.13	Four times fault time	Drive power on time when four times fault occurs	h	*	Synchronous/ Asynchronous
U3.14	Five times fault time	Drive power on time when five times fault occurs	h	*	Synchronous/ Asynchronous
U3.15	Six times fault time	Drive power on time when six times fault occurs	h	*	Synchronous/ Asynchronous
U3.16	Seven times fault time	Drive power on time when seven times fault occurs	h	*	Synchronous/ Asynchronous
U3.17	Eight times fault time	Drive power on time when eight times fault occurs	h	*	Synchronous/ Asynchronous
U3.18	Nine times fault time	Drive power on time when nine times fault occurs	h	*	Synchronous/ Asynchronous

Basic parameter A1

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A1.00	Parameter level selection	0: user level parameter 1: advanced parameter	0,1	–	0	○	Synchronous/ Asynchronous
A1.01	Control mode selection	0: closed loop vector control 1: open loop vector control 2: V/F control 3: Motor model selection	0~3	–	3	×	Synchronous/ Asynchronous
A1.02	Command mode selection	0: Terminal operating mode 1: Panel operating mode 2: Site-bus mode 3: Multifunction terminal 4: Bus＋PLC model 5: Motion control＋PLC model	0~5	–	0	×	Synchronous/ Asynchronous
A1.03	Control method	0: Speed control 1: Position control 2: Torque control 3: Current control	0~3	–	0	○	Synchronous/ Asynchronous
A1.04	Parameter self-identification	121: Static learning motor parameters 221: Rotation learning motor parameters	0~65535	–	0	○	Synchronous/ Asynchronous
A1.05	Prohibit the Enable	0: Invalid 1: Prohibit any means to Enable	0,1	–	0	○	Synchronous/ Asynchronous
A1.06	Fixed length shear type	0: Chasing scissors 1: Fly shear	0，1	–	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A1.06 ~ A1.10	Save	-	—	—	—	—	—
A1.11	Parameter backup	400: Parameter backup set 401: Clear backup parameters	0~6553.5	—	0	X	Synchronous/ Asynchronous
A1.12	parameter recovery	9055: Parameter recovery	0~6553.5	—	0	△	Synchronous/ Asynchronous
A1.13 ~ A1.79	Save	—	—	—	—	—	—
A1.80	IPM motor ID index 1	IPM motor index table corresponds to max torque X 1/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.81	IPM motor ID index 2	IPM motor index table corresponds to max torque X 2/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.82	IPM motor ID index 3	IPM motor index table corresponds to max torque X 3/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.83	IPM motor ID index 4	IPM motor index table corresponds to max torque X 4/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.84	IPM motor ID index 5	IPM motor index table corresponds to max torque X 5/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.85	IPM motor ID index 6	IPM motor index table corresponds to max torque X 6/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.86	IPM motor ID index 7	IPM motor index table corresponds to max torque X 7/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.87	IPM motor ID index 8	IPM motor index table corresponds to max torque X 8/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.88	IPM motor ID index 9	IPM motor index table corresponds to max torque X 9/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.89	IPM motor ID index 10	IPM motor index table corresponds to max torque X 10/10 d-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.90	IPM motor Iq index 1	IPM motor index table corresponds to max torque * 1/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.91	IPM motor Iq index 2	IPM motor index table corresponds to max torque * 2/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.92	IPM motor Iq index 3	IPM motor index table corresponds to max torque * 3/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.93	IPM motor Iq index 4	IPM motor index table corresponds to max torque * 4/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.94	IPM motor Iq index 5	IPM motor index table corresponds to max torque * 5/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.95	IPM motor Iq index 6	IPM motor index table corresponds to max torque * 6/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.96	IPM motor Iq index 7	IPM motor index table corresponds to max torque * 7/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A1.97	IPM motor Iq index 8	IPM motor index table corresponds to max torque * 8/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.98	IPM motor Iq index 9	IPM motor index table corresponds to max torque * 9/10 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous
A1.99	IPM motor Iq index 10	IPM motor index table corresponds to max torque * 1010 q-axis current	0~6553.5	A	0	×	Synchronous/ Asynchronous

User self-defined parameter A2

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A2.00	Control method selection	0: Terminal operating mode 1: Panel operating mode 2: Site-bus mode 3: Multifunction terminal	0~3	—	—	×	Synchronous/ Asynchronous
A2.01	Analog quantity polarity selection	0: Bipolar±10V 1: Unipolar0-10V	0,1	—	1	×	Synchronous/ Asynchronous
A2.03	Positioning mode	0: motor encoder positioning 1: spindle encoder positioning 2: approach switch positioning	0~2	—	0	×	Synchronous/ Asynchronous
A2.04	Save	—	—	—	—	—	—
A2.05	Pulse position joint control mode selection	0: Directly into pulse position mode when I4 connected 1: When I4 is connected, perform accurate stop firstly, and enter pulse position mode after accurate-stop is completed and output pulse position joint control signal	0,1	—	0	×	Synchronous/ Asynchronous
A2.06	Modbus communication enabling state set	0: Stop 1: CW 2: CCW	0~2	—	0	O	Synchronous/ Asynchronous
A2.07 ~ A2.10	Save	—	—	—	—	—	—
A2.11	ST deceleration model selection	When A2.12=1, set the stop mode of canceling ST. 0: slow down and stop 1: free stop	0,1	—	0	×	Synchronous/ Asynchronous
A2.12	ST function selection	0: ST terminal invalid 1: IO terminal and Modbus control enabling	0,1	—	0	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A2.13	Accurate stop mode selection	0: accurate stop as per current speed direction 1: accurate stop as per the direction of A2.14 setting	0,1	—	0	×	Synchronous/ Asynchronous
A2.14	Accurate stop direction selection	0: positive accurate stop 1: reverse accurate stop	0,1	—	0	×	Synchronous/ Asynchronous
A2.15	I1 function selection	0: Analog speed control 1: pulse speed control	0,1	—	0	×	Synchronous/ Asynchronous
A2.16	Pulse port selection	Bit0: Pulse input type setting function on or off 0: off 1: on Bit1: Pulse input portT4 type 0: pulse+dir 1: orthogonal pulse Bit2: Pulse input portT3 type 0: pulse+dir 1: orthogonal pulse Bit3: Pulse input portT2 type 0: pulse+dir 1: orthogonal pulse	0~15	—	15	×	Synchronous/ Asynchronous
A2.17	Pulse input selection	0: T4 port 1: T2 port 2: T3 port	0~2	—	0	×	Synchronous/ Asynchronous
A2.18	Pulse position Feedback source selection	0: 1st coded disc T5 motor encoder 1: 2nd coded disc T4 spindle encoder	0,1	—	0	×	Synchronous/ Asynchronous
A2.19	I4 function selection	0: analog quantity rigid tapping 1: pulse rigid tapping	0,1	—	0	×	Synchronous/ Asynchronous
A2.20	Q1 function selection	0:No output 1: Torque alarm output 2: Servo enabling 3: Drive be ready 4:Speed arrival 5: Motor zero speed 6: accurate stop completed 7: Pulse position combination control completed 8: Encoder IO self-tuning completed	0~8	—	3	×	—
A2.21	Q2 function selection				4	×	Synchronous/ Asynchronous
A2.22	MOA function selection				6	×	Synchronous/ Asynchronous
A2.24	Q3 function selection				2	×	—
A2.25	Q4 function selection				5	×	
A2.26	DA1 analog output	0: Inner register 1: Current torque command, according to the maximum torque ratio output 2: Current torque feedback, according to the maximum torque ratio output 3: Current speed command, according to the maximum speed ratio output 4: Current speed feedback, according to the maximum speed ratio output 5: Current current feedback, according to the maximum current ratio output 21: Current torque command absolute value 22: Current torque feedback absolute value 23: Current speed command absolute value 24: Current speed feedback absolute value	0~24	—	0	×	
A2.27	DA2 analog output				0	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A2.28	Save	–	–	–	–	–	–
A2.29							
A2.30	I5 function selection	0: invalid 1: Torque control 2: Low speed function 3: Zero speed lock shaft 4: outer fault input(normal close) 5: approach switch positioning	0~5	–	0	×	Synchronous/ Asynchronous
A2.31	I5 torque control source selection	0: FV potentiometer 1: Modbus communication(Address D103)	0~1	–	0	×	Synchronous/ Asynchronous
A2.32	I5 self-tuning function selection	0: Close self-tuning of syn motor encoder 1: open self-tuning of syn motor encoder, self-tuning and output complete signal when I10 is valid	0~1	–	0	×	Synchronous/ Asynchronous
A2.33	T2 port pulse counting direction selection	0: incremented counts 1: decremented counts	0~1	–	0	×	Synchronous/ Asynchronous
A2.34	T3 port pulse counting direction selection	0: incremented counts 1: decremented counts	0~1	–	0	×	Synchronous/ Asynchronous
A2.35	T4 port pulse counting direction selection	0: incremented counts 1: decremented counts	0~1	–	0	×	Synchronous/ Asynchronous
A2.36	Save	–	–	–	–	–	–
A2.37	T4 port pulse output direction selection	0:A leads B 1:B leads A	0~1	–	0	×	Synchronous/ Asynchronous
A2.38	T4 port pulse output Z phase width selection	0: 1/4T 1: 1/2T 2: 1T	0~2	–	0	×	Synchronous/ Asynchronous
A2.39	Q3 function selection				2	×	–
A2.40	Save	–	–	–	–	–	–
~							
A2.95							
A2.96	PLC initial running run flag	123:PLC already finished initial running and configure I/O port completed Other: PLC never run, I/O without configuration	0~123	–	0	×	Synchronous/ Asynchronous
A2.97	Application version No	838: new protocol standard spindle program	–	–	838	×	Synchronous/ Asynchronous
A2.98	A2A3 version No	A2A3 version No updated with program	–	–	003	×	Synchronous/ Asynchronous
A2.99	Inner PLC version No	PLC inner version No, updated with program	0~1000	–	–	×	Synchronous/ Asynchronous

User self-defined parameter A3

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.00	Motor encoder direction	0: positive count 1: reverse count	0, 1	—	0	×	Synchronous/ Asynchronous
A3.01	Motor running direction	0: CCW is positive running 1: CW is positive running	0, 1	—	0	×	Synchronous/ Asynchronous
A3.02	10V Corresponding max torque when I5 control torque	Set I5 as potentiometer torque control, FV input 10V Corresponding max torque value	0~32767	0.1N.m	10	○	Synchronous/ Asynchronous
A3.03	Modbus torque setting when I5 torque control	Set I5 as toque value of Modbus communication torque control, Address is D103	-32767 ~32767	0.1N.m	0	○	Synchronous/ Asynchronous
A3.00	Motor encoder direction	0: positive count 1: reverse count	0, 1	-	0	×	Synchronous/ Asynchronous
A3.01	Motor running direction	0: CCW is positive running 1: CW is positive running	0, 1	-	0	×	Synchronous/ Asynchronous
A3.02	10V Corresponding max torque when I5 control torque	Set I5 as potentiometer torque control, FV input 10V Corresponding max torque value	0~32767	0.1N.m	10	○	Synchronous/ Asynchronous
A3.03	Modbus torque setting when I5 torque control	Set I5 as toque value of Modbus communication torque control, Address is D103	-32767 ~32767	0.1N.m	0	○	Synchronous/ Asynchronous
A3.04	Torque threshold value output	The torque alarm point output when the real torque is bigger than the setting value	0~32767	0.1N.m	50	○	Synchronous/ Asynchronous
A3.05	10V Corresponding max speed when I5 low speed control	Analog voltage input 10V corresponding motor max speed when set I5 as low speed function	0~60000	rpm	500	○	Synchronous/ Asynchronous
A3.06	Motor encoder pulses	Set T5 port motor encoder pulses	0~10000	pulse	1024	×	Synchronous/ Asynchronous
A3.07	Spindle encoder pulse	Set T4 port spindle encoder pulse	100~ 16384	pulse	1024	×	Synchronous/ Asynchronous
A3.08	Zero speed shaft locking time without enabling	Set the zero speed shaft locking time after canceling I/O	0~20000	ms	100	○	Synchronous/ Asynchronous
A3.09	Primary deceleration time	Set the deceleration time after canceling I/O	0~20000	0.01s/ Krpm	80	○	Synchronous/ Asynchronous
A3.10	I5 external fault input emergency stop deceleration time	Motor emergency stop time when set I5 as external fault input	0~20000	0.01s/ Krpm	60	○	Synchronous/ Asynchronous
A3.11	Save	—	—	—	—	—	—
A3.12	Modbus communication control speed setting	Set motor speed when Modbus communication control	0~32767	rpm	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.13	Speed ring second set of parameters switching threshold	Set the speed threshold when the second set of PI parameters take effect.When the output speed is less than the set speed value, the second set of parameters is used; when the value is 0, the second set of PI parameters is not enabled	0~6000	rpm	0	○	Synchronous/ Asynchronous
A3.14	Speed loop second proportional gain	Set Speed loop second proportional gain(Kp2)	0~65535	–	300	○	Synchronous/ Asynchronous
A3.15	Speed ring second integral time constant	Set speed ring second integral time constant(Ti2)	0~65535	–	20	○	Synchronous/ Asynchronous
A3.16 ~ A3.22	Save	–	–	–	–	–	–
A3.23	Analog speed control 10V corresponding max speed	Analog voltage input 10V corresponding motor max speed when set analog speed control	0~60000	rpm	6000	○	Synchronous/ Asynchronous
A3.24	Speed control acceleration time	Set speed ring acceleration time when set speed control	0~20000	0.01s/ Krpm	80	○	Synchronous/ Asynchronous
A3.25	Speed control deceleration time	Set speed ring deceleration time when set speed control	0~20000		80	○	Synchronous/ Asynchronous
A3.26	Save	–	–	–	–	–	–
A3.27	Speed loop scale gain during speed control	Set speed loop scale gain Kp. The gain is higher and the rigidity is bigger with greater value. Set the value as high as possible without vibration in the system	0~65535	–	100	○	Synchronous/ Asynchronous
A3.28	Speed control integral time	Set speed ring speed integral time constant Ti. The setting is lower and the rigidity is bigger.	0~65535	–	40	○	Synchronous/ Asynchronous
A3.29	Save	–	–	–	–	–	–
A3.30	Maximum speed limit during Rigid tapping	Set the maximum speed of motor during analog Rigid tapping	0~60000	rpm	1500	○	Synchronous/ Asynchronous
A3.31	Rigid tapping acceleration time	Set speed loop acceleration time during Rigid tapping	0~60000	0.01s/ Krpm	80	○	Synchronous/ Asynchronous
A3.32	Rigid tapping deceleration time	Set speed loop deceleration time during analog Rigid tapping	0~20000	0.01s/ Krpm	80	○	Synchronous/ Asynchronous
A3.33	speed loop scale gain at Rigid tapping	Set speed loop scale gain Kp at analog/ pulse Rigid tapping. The gain is higher and the rigidity is bigger with greater value. Set the value as high as possible without vibration in the system	0~65535	–	100	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.34	speed loop integral time at Rigid tapping	Set speed loop integral time Ti at analog/ pulserigid tapping. The rigidity is higher with lower value	0~65535	–	40	○	Synchronous/ Asynchronous
A3.35	Position loop scale gain at rigid tapping	Set position loop scale gain at pulserigid tapping. The gain is higher and the rigidity is bigger with greater value. It is easy to cause vibration when the value is too large.The smaller the value is, the slower the response will be and the larger the following error will be.	0~65535	–	200	○	Synchronous/ Asynchronous
A3.36	Rigid tapping position loop feedforward	Set position loop feed forward Kw at pulse rigid tapping	0~65535	–	0	○	Synchronous/ Asynchronous
A3.37	Save	–	–	–	–	–	–
A3.38	First positioning bias	Set pulses for first positioning	0~ 4294967295	Pulse	0	○	Synchronous/ Asynchronous
A3.39	Save	–	–	–	–	–	–
A3.40	Positioning speed	Look for encoder phase Z pulse or speed of the approach switch	0~30000	rpm	100	○	Synchronous/ Asynchronous
A3.41	Save	–	–	–	–	–	–
A3.42	Positioning acceleration time	Set Positioning acceleration time	0~20000	0.01s/ Krpm	60	○	Synchronous/ Asynchronous
A3.43	Positioning deceleration time	Set positioning deceleration time	0~20000	0.01s/ Krpm	60	○	Synchronous/ Asynchronous
A3.44	Positioning speed ring scale gain	Set positioning speedloop scale gain Kp. The gain is higher and the rigidity is bigger with higher set value.	0~65535	–	100	○	Synchronous/ Asynchronous
A3.45	Positioning speed ring Integration time	Set speed loop speed integral time Ti at positioning. The rigidity is higher, integral speed is faster with lower value	0~65535	–	40	○	Synchronous/ Asynchronous
A3.46	Positioning first gain	Set positioning first position loop scale gain.	0~60000	–	800	○	Synchronous/ Asynchronous
A3.47	Positioning second gain	Set positioning second position loop scale gain, the value is normally lower the first gain value.	0~60000	–	300	○	Synchronous/ Asynchronous
A3.48	Positioning gain switching threshold	Positioning first gain and second gain switching threshold. When the When the residual distance is less than the set value, switch the second positioning gain; otherwise, use the first positioning gain	0~10	0.01R	1	○	Synchronous/ Asynchronous
A3.49	Second orientation position	Set pulses of Second orientation position	0~ 4294967295	pulse	1000	○	Synchronous/ Asynchronous
A3.50	Save	–	–	–	–	–	–
A3.51	Swing speed limit	Set the swing speed limit value	0~60000	rpm	10	○	Synchronous/ Asynchronous
A3.52	Swing positive direction range	Set swing positive direction range	0~36000	deg	6000	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.53	Swing reverse direction range	Set swing reverse direction range	0~36000	deg	6000	○	Synchronous/ Asynchronous
A3.54	Swing acceleration speed	Set swing speed loop acceleration time	0~30000	0.01s/ Krpm	200	○	Synchronous/ Asynchronous
A3.55	Swing deceleration speed	Set swing speed loop deceleration time	0~30000	0.01s/ Krpm	200	○	Synchronous/ Asynchronous
A3.56	Swing current	Set swing output max torque current as per the percentage of motor rated current: Dn. 01XA3.56/100	0~30000	%	10	○	Synchronous/ Asynchronous
A3.57	Swing first gain	Set swing first position loop scale gain	0~60000	—	300	○	Synchronous/ Asynchronous
A3.58	Swing second gain	Set swing second position loop scale gain, the value is normally lower than the first gain value	0~60000				Synchronous/ Asynchronous
A3.59	Swing gain switching threshold	Swing position first and second gain switching thresholds.When the residual distance is less than the set value, switch the second positioning gain; otherwise, use the first positioning gain	0~10	0.01R	5	○	Synchronous/ Asynchronous
A3.63	Jog positive running speed	Set Jog positive running speed	0~20000	rpm	200	○	Synchronous/ Asynchronous
A3.64	Jog reverse running speed	Set Jog reverse running speed	0~20000	rpm	200	○	Synchronous/ Asynchronous
A3.65	Jog acceleration time	Set speed loop acceleration time at Jog	0~20000	0.01s/ Krpm	80	○	Synchronous/ Asynchronous
A3.66	Jog deceleration time	Set speed loop deceleration time at Jog	0~20000	0.01s/ Krpm	80	○	Synchronous/ Asynchronous
A3.96	T4 encoder absolute position	Pulse counting value for Current single turn position of second encoder and zero point relative pulse position of the second encoder	0~ 4294967295	pulse	0	×	Synchronous/ Asynchronous
A3.98	T5 encoder absolute position	Motor encoder current absolute position pulse counting value	0~ 4294967295	pulse	0	×	Synchronous/ Asynchronous

Bn bus parameters group

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Bn.00	Modbus station	Modbus slave station No setup	1~254	–	1	△	Synchronous/ Asynchronous
Bn.01	Modbus communication baud rate	0: 9600 1: 19200 2: 38400 3: 57600 4: 115200	0~4	bps	1	△	Synchronous/ Asynchronous
Bn.02	Modbus odd even check	Powerlink bus slave station No setting	0~2	–	0	△	Synchronous/ Asynchronous
Bn.03	Modbus High and low byte selection	Ethernet-IP slave station No setting	0, 1	–	0	△	Synchronous/ Asynchronous
Bn.04	485 Terminal resistance selection	Mechatrolink II slave station No setting	0, 1	–	0	△	Synchronous/ Asynchronous
Bn.05	Modbus-TCP IP address	Modbus-TCP IP setting， 192.168.a.b， Bn.05: a×256+b	0~65535	–	512	△	Synchronous/ Asynchronous
Bn.06	High speed fieldbus selection	0: Ethercat 1: Profinet 2: Powerlink 3: Ethernet-IP 4: Mechatrolink II 5: Mechatrolink III 6: Profibus 7: TCP/IP 8: CANopen	0~8	–	0	△	Synchronous/ Asynchronous
Bn.07	Profinet MAC address	Profinet MAC address setting	1~255	–	1	△	Synchronous/ Asynchronous
Bn.08	Powerlink station No	Powerlink bus slave station No setting	1~239	–	1	△	Synchronous/ Asynchronous
Bn.09	Ethernet-IP station	Ethernet-IP slave station No setting	0~255	–	0	△	Synchronous/ Asynchronous
Bn.10	Mechatrolink II station No	Mechatrolink II slave station No setting	0~255	–	4	△	Synchronous/ Asynchronous
Bn.11	Mechatrolink III station No	Mechatrolink III slave station No setting	0~255	–	4	△	Synchronous/ Asynchronous
Bn.12	SYNTEC Servo axis configuration	0: Axis of rotation 1: Linear axis	0,1	–	0	△	Synchronous/ Asynchronous
Bn.13	Bus interpolation cycle setting	Bus cycle time	0~65535	ms	3	X	Synchronous/ Asynchronous
Bn.14	Bus domain time parameter setting	If the bus communication disconnect time exceeds this preset, it will be considered disconnected	0~65535	ms	200	X	Synchronous/ Asynchronous
Bn.15	Bus interrupt cycle	Bus interrupt cycle (automatically retrieved from the bus)	0~65535	us	1	*	Synchronous/ Asynchronous
Bn.16	Bus speed gear ratio numerator L	Bus speed instruction gear ratio numerator	0~ 4294967295	–	1	○	Synchronous/ Asynchronous
Bn.17	Bus speed gear ratio numerator H						

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Bn.18	Bus speed gear ratio denominator L	Bus speed instruction gear ratiodenominator	0~ 4294967295	_	1	○	Synchronous/ Asynchronous
Bn.19	Bus speed gear ratio denominator H						
Bn.20	Mechatrolink bus master station selection	0: Syntec cnc controller 1: LNC controller 2: KND controller 3: LYNUC controller 4: LTNC controller 5: HUST controller 6:KEYENCE HMI&PLC	0~6	_	0	△	Synchronous/ Asynchronous
Bn.21	Ethercat bus master station selection	0: Beckhoff controller 1: i5 controller 2: CPTEK controller 3: HNC controller	0~3	_	0	△	Synchronous/ Asynchronous
Bn.22	Profibus slave station No.	Profibus slave station No setting	1~255	_	1	X	Synchronous/ Asynchronous
Bn.23	CIA 402 ZRN method	CIA 402 ZRN method setting	0~35	_	0	○	Synchronous/ Asynchronous
Bn.24	CIA402 ZRN bias	CIA402 ZRN bias setting	0~359	Degree	0	○	Synchronous/ Asynchronous
Bn.25	CIA402 positioning bias	CIA402 positioning bias setting	0~6553.5	Degree	0	○	Synchronous/ Asynchronous
Bn.26	Save	_	_	_	_	_	_
~							
Bn.29							
Bn.30	CAN station No	0: Master station 1~20: Slave station	0~20	_	0	○	Synchronous/ Asynchronous
Bn.31	CAN Terminal resistance electronic switch	0: Unable 1: Enable	0, 1	_	0	○	Synchronous/ Asynchronous
Bn.32	CAN slave station enable selection	CAN slave station enable selection setting	0~9	_	0	○	Synchronous/ Asynchronous
Bn.33	CAN Execution cycle setting	CAN Execution cycle setting	0~20	_	0	○	Synchronous/ Asynchronous
Bn.34	CAN model	0: CTB 1: CANOPEN 2: The Big Dipper 3: EV car 4: Upper computer	0~4	_	0	○	Synchronous/ Asynchronous
Bn.35	CAN communication expiration time	CAN communication expiration time setting	0~1000	_	0	○	Synchronous/ Asynchronous
Bn.36	CAN Baud Rate	nkbps[n=10、20、50、100、250、500、1000]	0~65535	kbps	500	X	Synchronous/ Asynchronous
Bn.37	Mechatrolink bus stop mode selection	0: Accurate stop after Z 1: I5 proximity switch accurate stop	0,1	_	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Bn.38	Bus off enable mode	0: free stop 1: Trigger emergency stop, power down storage	0,1	_	0	○	Synchronous/ Asynchronous
Bn.39	Bus bit control lower 16 bits	Bit0: Servo encabling Bit1: Servo reset Bit2: EMERGENCY STOP Bit3: Bus connection completed Bit4: Current position reset	0~ 4294967296	_	0	*	Synchronous/ Asynchronous
Bn.40	Bus bit control higher 16 bits						
Bn.41	Control mode	Specified current servo operation mode 0: Speed control 1: Interpolation position 2: Torque mode 3: Positioning mode 4: Back to zero mode	0~65535	_	0	*	Synchronous/ Asynchronous
Bn.42	Target speed control lower 16 bits	The target speed is given and the minimum speed unit is operated according to the servo	_2147483647 _2147483647	0.001 rpm	0	*	Synchronous/ Asynchronous
Bn.43	Target speed control higher 16 bits						
Bn.44	Target position control lower16 bits	Given the target position, if it is in the interpolation mode, it represents the target interpolation position; if it is in the positioning mode, it represents the target positioning position	0~ 4294967296	pulse	0	*	Synchronous/ Asynchronous
Bn.45	Target position control higher16 bits						
Bn.46	ZRN bias lower 16bits	takes effect in ZRN(back to zero) mode, as the preset zero bias position	0~ 4294967296	pulse	0	*	Synchronous/ Asynchronous
Bn.47	ZRN bias higher 16bits						
Bn.48	Zero returning (ZRN) first speed	takes effect in back to zero mode, the first ZRN speed in the process of back to zero	0~65535	rpm	0	*	Synchronous/ Asynchronous
Bn.49	Zero returning (ZRN) second speed	takes effect in back to zero mode, the second ZRN speed in the process of back to zero	0~65535	rpm	0	*	Synchronous/ Asynchronous
Bn.50	Motor position reset L	Encoder reset bias	0~ 4294967296	pulse	0	*	Synchronous/ Asynchronous
Bn.51	Motor position reset H						
Bn.52	Bus interrupt count	Bus interrupt count	0~65535	_	0	*	Synchronous/ Asynchronous
Bn.53 ~ Bn.58	Save	_	_	_	_	_	_
Bn.59	Drive state L	servo state of post back to bus	0~ 4294967296	_	0	*	Synchronous/ Asynchronous
Bn.60	Drive state H						

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Bn.61	Current speed lower 16 bits	Current feedback speed is calculatedby bus gear ratio	_2147483647 _2147483647	rpm	0	*	Synchronous/ Asynchronous
Bn.62	Current speed higher 16 bits						
Bn.63	Motor position L	Actual motor position, determined by the position feedback source to decide whether it is the first or second encoder feedback.	0~ 4294967296	pulse	0	*	Synchronous/ Asynchronous
Bn.64	Motor position H						
Bn.65	Motor over Z count L	Actual motor over Z counts, determined by the position feedback source to decide whether it is the first or secondencoder feedback	0~ 4294967296	_	0	*	Synchronous/ Asynchronous
Bn.66	Motor over Z count H						
Bn.67	Motor latch position L	Actual motor latch position, determined by position feedback source to decide whether it is the first encoder feedback or the second encoder feedback	0~ 4294967296	pulse	0	*	Synchronous/ Asynchronous
Bn.68	Motor latch position H						
Bn.69	Motor load rate	Motor load rate is calculated by actual torque feedback	0~1000	%	0	*	Synchronous/ Asynchronous
Bn.70	Turn on PROFINET bus clock flag	0: Not enabled 1: enabled	0,1	_	0	○	
Bn.71	CIA402Accurate stop bias setting mode	0: Parameter setting 1: Bus assignment	0,1	_	0	○	Synchronous/ Asynchronous
Bn.72	CIA402Current feedback selection	0: Torque current 1: Driver output current	0,1	_	0	○	Synchronous/ Asynchronous
Bn.73 ~ Bn.77	Save	_	_	_	_	_	_
Bn.78	Last motor encoder count value L	Last motor encoder count value	0~ 4294967296	pulse	0	○	Synchronous/ Asynchronous
Bn.79	Last motor encoder count value H						

User parameters Cn

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Cn.00	Motor running direction	0: anticlockwise is forwardrunning 1: clockwise is forward running	0,1	–	0	X	Synchronous/ Asynchronous
Cn.01	acceleration time	speed modeacceleration time	0~200.00	s	0.8	○	Synchronous/ Asynchronous
Cn.02	deceleration time	speed modedeceleration time	0~200.00	s	0.8	○	Synchronous/ Asynchronous
Cn.03	Acceleration start S-curve time	Acceleration start S-curve time setting	0~200.00	s	0	○	Synchronous/ Asynchronous
Cn.04	Acceleration close S-curve time	Acceleration close S-curve time setting	0~200.00	s	0	○	Synchronous/ Asynchronous
Cn.05	Deceleration start S-curve time	Deceleration start S-curve time setting	0~200.00	s	0	○	Synchronous/ Asynchronous
Cn.06	Deceleration close S-curve time	Deceleration close S-curve time setting	0~200.00	s	0	○	Synchronous/ Asynchronous
Cn.07	Emergency deceleration time	Emergency deceleration time for external emergency stop input	0~200.00	s	0.8	○	Synchronous/ Asynchronous
Cn.08	Enable close delay time	After slowing down and stopping, the module will be closed in time to prevent rotation	0~200.00	s	0.4	○	Synchronous/ Asynchronous
Cn.09	parking pattern selection	0:Slow down and stop 1:Free stop	0,1	–	1	○	Synchronous/ Asynchronous
Cn.10	Load current limit	Output max torque current=Cn.10×Dn.01/100	0~1000	%	150	○	Synchronous/ Asynchronous
Cn.11	Energy consumption brake current limit	0: not enabled Brake output maximum torque current = Cn. 11 x Dn. 01/100	0~1000	%	0	○	Synchronous/ Asynchronous
Cn.12	DC braking starting speed	When the parking mode is deceleration parking, the dc braking is triggered when the current speed is less than cn.12, and the dc braking is not started when cn.12 is 0	0~60000	rpm	0	○	Synchronous/ Asynchronous
Cn.13	DC brake current limitation	Maximum output current of DC braking = Cn. 13 x Dn. 01/100	0~1000	%	50	○	Synchronous/ Asynchronous
Cn.14	DC braking delay time	DC braking holding time after motor zero speed	0~200.00	s	0	○	Synchronous/ Asynchronous
Cn.15	Motor control parameters matching	Automatic matching of motor control parameters	1	–	0	X	Synchronous/ Asynchronous
Cn.16	Motor 1 current loop proportional parameter	current loop proportional parameter Kp setting	0~30000	–	100	○	Synchronous/ Asynchronous
Cn.17	Motor 1 current loop integral time constant	Current loop integral time constant Ti setting	0~300.00	–	4	○	Synchronous/ Asynchronous
Cn.18	Motor 1 current loop decoupling function	0: turn off decoupling function of current loop 1: turn on decoupling function of current loop	0, 1	–	0	X	Synchronous/ Asynchronous
Cn.19	Motor 1 speed loop proportional gain	Speed loop proportional gain Kp setting	0~65535	–	300	○	Synchronous/ Asynchronous
Cn.20	Motor 1 speed ring integral time constant	Speed ring integral time constant Ti setting	0~65535	–	40	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Cn.21	Motor 1 speed loop 2nd proportional gain	Speed loop proportional gain Kp setting, effective when the output speed is lower than the set value of cn.23	0~65535	-	300	○	Synchronous/ Asynchronous
Cn.22	Motor 1 speed ring 2nd integral time constant	The speed integral time constant Ti is set, and the output speed takes effect when it is lower than the set value of cn.23	0~65535	-	20	○	Synchronous/ Asynchronous
Cn.23	Motor 1 speed loop PI parameter switching speed	0: the second proportional gain and integral time constant of the speed loop are invalid When the set value is not equal to 0, and the output speed is less than the set value, cn.21 and cn.22 will take effect	0~6000.0	rpm	0	○	Synchronous/ Asynchronous
Cn.24 ~ Cn.28	Save	–	–	–	–	–	–
Cn.29	Motor 1 position loop proportional gain	Position loop proportional gain Kp setting	0~65535	–	100	○	Synchronous/ Asynchronous
Cn.30	Motor 1 position loop 2nd proportional gain	Position loop 2nd proportional gain Kp setting, effective when the output speed is lower than the set value of Cn.31	0~65535	–	0	○	Synchronous/ Asynchronous
Cn.31	Motor 1 position loop proportional gain switching speed	0: position loop 2nd proportional gain is invalid When the set value is not equal to 0 and the output speed is less than the set value, Cn.30 will take effect	0~6000.0	rpm	0	○	Synchronous/ Asynchronous
Cn.32	Motor 1 position loop speed feed forward	Position loop speed feedforward setting	0~6000.0	%	0	○	Synchronous/ Asynchronous
Cn.33	Motor 1 position loop smoothing index	0: no smoothing, the larger the value, the better the smoothing, but more lag	0~65535	–	0	○	Synchronous/ Asynchronous
Cn.34 ~ Cn.36	Save	–	–	–	–	–	–
Cn.37	Motor 2 current loop proportional gain	Current loop proportional gain Kp setting	0~30000	–	100	○	Synchronous/ Asynchronous
Cn.38	Motor 2 current loop integral time constant	Current loop integral time constant Ti setting	0~300.00	–	4	○	Synchronous/ Asynchronous
Cn.39	Motor 2 speed loop proportional gain	Speed loop proportional gain Kp setting	0~65535	–	300	○	Synchronous/ Asynchronous
Cn.40	Motor 2 speed loop integral time constant	Speed loop integral time constant Ti setting	0~65535	–	40	○	Synchronous/ Asynchronous
Cn.41	Motor 2 speed loop 2nd proportional gain	Speed loop proportional gain Kp setting, effective when the output speed is lower than the set value of Cn.43	0~65535	–	300	○	Synchronous/ Asynchronous
Cn.42	Motor 2 speed loop 2nd integral time constant	Speed integral time constant Ti setting, and the output speed takes effect when it is lower than the set value of Cn.43	0~65535	–	20	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Cn.43	Motor 2 speed loop PI parameter switching speed	0: speed loop 2nd proportional gain, integral time constant invalid When the set value is not equal to 0, and the output speed is less than the set value, Cn.41 and Cn.42 will take effect	0~6000.0	rpm	0	○	Synchronous/ Asynchronous
Cn.44	Motor 2 position loop proportional gain	Position loop proportional gain Kp setting	0~65535	–	0	○	Synchronous/ Asynchronous
Cn.45	Motor 2 position loop 2nd proportional gain	Position loop 2nd proportional gain Kp setting, effective when the output speed is lower than the set value of cn.46	0~65535	–	0	○	Synchronous/ Asynchronous
Cn.46	Motor 2 position loop proportional gain switching speed	0: position loop 2nd proportional gain is invalid When the set value is not equal to 0 and the output speed is less than the set value, cn.45 will take effect	0~6000.0	rpm	0	○	Synchronous/ Asynchronous
Cn.47	Motor 2 position loop speed feed forward	Position loop speed feedforward setting	0~6000.0	%	0	○	Synchronous/ Asynchronous
Cn.48 ~ Cn.50	Save	–	–	–	–	–	–
Cn.51	Zero speed switch to position mode selection	0: Invalid 1: Valid	0,1	–	0	X	Synchronous/ Asynchronous
Cn.52	Notching filter filtering function	0: disable 1: Start notch filter1 2: Start notch filter2 3: Start notch filter3 4: Start notch filter4	0~4	–	0	X	Synchronous/ Asynchronous
Cn.53	Resonance detection data source selection	0: feedback speed 1: torque current Other: customization	0~100	–	0	X	Synchronous/ Asynchronous
Cn.54	FFTMaximum frequency of oscillation detected	FFT Maximum frequency of oscillation detected	0～32767	Hz	0	✳	Synchronous/ Asynchronous
Cn.55 ~ Cn.57	Save	–	–	–	–	–	–
Cn.58	Feedback velocity filter time coefficient	Feedback velocity filtering time =PWM cycle cn.58	0~20	–	0	X	Synchronous/ Asynchronous
Cn.59	Back end low pass filter coefficient	speed loop outputs the low pass filter coefficient	0~256	–	60	X	Synchronous/ Asynchronous
Cn.60	Reverse electromotive force identification current/low speed minimum current	Percentage of rated current.When the counter electromotive force coefficient is identified, it represents the set operating current;For open-loop vector control, represents the minimum output current of the set low speed	0~100	%	30	X	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Cn.61	Estimated coefficient of stator resistance	In the case of open loop vector control, speed of stator resistance on-line estimation, 0 means no on-line estimation of resistance	0~200	-	1	○	Synchronous/ Asynchronous
Cn.62	Turning angle estimation parameter 1	Open loop vector control, Turning angle estimation coefficient, this parameter is a debugging parameter, the user do not change	1~1000	-	20	○	Synchronous/ Asynchronous
Cn.63	Turning angle estimation parameter 2	Open loop vector control, Turning angle estimation coefficient, this parameter is a debugging parameter, the user do not change	1~1000	%	30	○	Synchronous/ Asynchronous
Cn.64	Minimum running speed	The percentage of the rated speed, the minimum operating speed set when the open loop vector speed is controlled	0~100	%	2	X	Synchronous/ Asynchronous
Cn.65 ~ Cn.69	Save	–	–	–	–	–	–
Cn.70	Carrier frequency self adjustment	0: disable 1: enable	0,1	–	1	×	同
Cn.71 ～ Cn.73	Save	–	–	–	–	–	–
Cn.74	Resonant frequency of notch filter 1	Resonant notch filter 1 set frequency	0～32767	–	0	×	同/异
Cn.75	1 harmonic amplitude of notch filter1	1 harmonic amplitude setting of notch filter	-32767 ~32767	–	0	×	同/异
Cn.76	Resonant frequency of notch filter 2	Resonant notch filter 2 set frequency	0～32767	–	0	×	同/异
Cn.77	1 harmonic amplitude of notch filter2	2harmonic amplitude setting of notch filter	-32767 ~32767	–	0	×	同/异
Cn.78	Resonant frequency of notch filter 3	Resonant notch filter 3 set frequency	0～32767	–	0	×	同/异
Cn.79	1 harmonic amplitude of notch filter3	3 harmonic amplitude setting of notch filter	-32767 ~32767	–	0	×	同/异
Cn.80	Resonant frequency of notch filter 4	Resonant notch filter 4 set frequency	0～32767	–	0	×	同/异
Cn.81	1 harmonic amplitude of notch filter4	4 harmonic amplitude setting of notch filter	-32767 ~32767	–	0	×	同/异

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Cn.82 ～ Cn.89	Save	–	–	–	–	–	–
Cn.90	Maximum output voltage ratio	Output maximum voltage ratio setting	60~120	%	100	X	Synchronous/ Asynchronous
Cn.91	Voltage closed loop KP	Voltage closed loop KP setting	30~2000	–	60	X	Synchronous/ Asynchronous
Cn.92	Voltage closed loop TI	Voltage closed loop TI setting	20~2000	–	100	X	Synchronous/ Asynchronous

Motor driving parameter Dn

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Dn.00	First Motor type selection	0: AC induction motor(IM) 1: surface-mounted permanent magnet(SPM) motor 2: interior permanent magnet synchronous motor (IPM)	0~2	–	0	X	Synchronous/ Asynchronous
Dn.01	First motor rated current	First motor rated current	0~6000.0	A	11.5	X	Synchronous/ Asynchronous
Dn.02	First motor rated speed	First motor rated speed	0~60000	rpm	1500	X	Synchronous/ Asynchronous
Dn.03	First motor rated voltage	First motor rated voltage	0~20000	V	380	X	Synchronous/ Asynchronous
Dn.04	First motor rated power	First motor rated power	0~6000.0	KW	5.5	X	Synchronous/ Asynchronous
Dn.05	First motor power factor	First motor power factor	0~1.00	–	0.86	X	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Dn.06	First motor rated frequency	First motor rated frequency	0~6000.0	HZ	50.8	X	Synchronous/ Asynchronous
Dn.07	First motor rated torque	First motor rated torque	0~60000	N.m	35	X	Synchronous/ Asynchronous
Dn.08	number of pole-pairs	number of pole-pairs	0~10000	pairs	2	X	Synchronous/ Asynchronous
Dn.09	First motor Max output speed	First motor Max output speed	0~60000	rpm	8000	X	Synchronous/ Asynchronous
Dn.10	First motor counter potential coefficient	First synchronous motor no-load counter potential coefficientper thousand turns	0~65535	V	110	X	Synchronous
Dn.11	First motor moment of inertia	First motor moment of inertia	0~60000	$kg{\cdot}cm^2$	0	X	Synchronous/ Asynchronous
Dn.12	First motor load inertia ratio	The ratio of the load inertia of the first motor and the rotor inertia of the motor	0~400	—	0	X	Synchronous/ Asynchronous
Dn.13	First motor stator resistance	First motor stator resistance	0~65.535	Ω	0	X	Synchronous/ Asynchronous
Dn.14	First motor rotor resistance	First motor rotor resistance	0~65.535	Ω	0	-	Synchronous/ Asynchronous
Dn.15	First motor d axis inductance Stator leakage inductance	Synchronous motor represents d axis inductance Asynchronous motor represents stator leakage inductance	0~655.35	mH	0	X	Synchronous/ Asynchronous
Dn.16	First motor q axis inductance rotor leakage inductance	Synchronous motor represents q axis inductance Asynchronous motor represents rotor leakage inductance	0~655.35	mH	0	X	Synchronous/ Asynchronous
Dn.17	first motor excitation inductance	first motor excitation inductance	0~6553.5	mH	0	X	Asynchronous
Dn.18	The q axis current limiting coefficient of the first motor weak magnetic field	Maximum q axis current =d axis current X Dn.18	0~1000	—	10	X	Asynchronous
Dn.19	first motor pre-excitation time	First motor pre-excitation time setting	0~30000	ms	0	X	Asynchronous
Dn.20	Minimum excitation current of the first motor	Minimum excitation current of the first motor	0~300.00	A	0.01	X	Asynchronous
Dn.21	First motor constant power maximum speed	first motor constant power maximum speed	0~60000	rpm	1500	X	Synchronous/ Asynchronous
Dn.22	First motor slip compensation coefficient	First motor slip compensation coefficient	0~1000	—	200	X	Asynchronous
Dn.23	First motor peak torque	Motor theoretical peak torque	0~65535	N.m	40	X	Synchronous/ Asynchronous
Dn.24	Save	—	—	—	—	—	—
Dn.25	2nd motor rated current	2nd motor rated current	0~6000.0	A	11.5	X	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Dn.26	2nd motor rated speed	2nd motor rated speed	0~60000	rpm	1500	×	Synchronous/ Asynchronous
Dn.27	2nd motor rated voltage	2nd motor rated voltage	0~20000	V	380	×	Synchronous/ Asynchronous
Dn.28	2nd motor rated power	2nd motor rated power	0~6000.0	KW	5.5	×	Synchronous/ Asynchronous
Dn.29	2nd motor power factor	2nd motor power factor	0~1.00	—	0.86	×	Asynchronous
Dn.30	2nd motor rated frequency	2nd motor rated frequency	0~6000.0	HZ	50.8	×	Synchronous/ Asynchronous
Dn.31	2nd motor rated torque	2nd motor rated torque	0~60000	N.m	35	X	Synchronous/ Asynchronous
Dn.32	2nd motor number of pole-pairs	number of pole-pairs	0~10000	pairs	2	×	Synchronous/ Asynchronous
Dn.33	2nd motor Max output speed	2nd motor Max output speed	0~60000	rpm	8000	×	Synchronous/ Asynchronous
Dn.34	2nd motor counter potential coefficient	2nd synchronous motor no-load counter potential coefficientper thousand turns	0~65535	V	110	×	Synchronous
Dn.35	2nd motor moment of inertia	2nd motor moment of inertia	0~60000	kg·cm^2	0	X	Synchronous/ Asynchronous
Dn.36	2ndmotor load inertia ratio	The ratio of the load inertia of the 2nd motor and the rotor inertia of the motor	0~400	—	0	×	Synchronous/ Asynchronous
Dn.37	2nd motor stator resistance	2nd motor stator resistance	0~65.535	Ω	0	×	Synchronous/ Asynchronous
Dn.38	2nd motor rotor resistance	2nd motor rotor resistance	0~65.535	Ω	0	-	Synchronous/ Asynchronous
Dn.39	2nd motor d axis inductance Stator leakage inductance	Synchronous motor represents d axis inductance Asynchronous motor represents stator leakage inductance	0~655.35	mH	0	×	Synchronous/ Asynchronous
Dn.40	2nd motor q axis inductance rotor leakage inductance	Synchronous motor represents q axis inductance Asynchronous motor represents rotor leakage inductance	0~655.35	mH	0	X	Synchronous/ Asynchronous
Dn.41	2nd motor excitation inductance	2nd motor excitation inductance	0~6553.5	mH	0	X	Asynchronous
Dn.42	The q axis current limiting coefficient of the 2nd motor weak magnetic field	Maximum q axis current =d axis current X Dn.18	0~1000	—	10	X	Asynchronous
Dn.43	2nd motor pre-excitation time	2nd motor pre-excitation time setting	0~30000	ms	0	X	Asynchronous
Dn.44	Minimum excitation current of the 2nd motor	Minimum excitation current of the 2nd motor	0~300.00	A	0.01	X	Asynchronous
Dn.45	2nd motor constant power maximum speed	2nd motor constant power maximum speed	0~60000	rpm	1500	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Dn.46	2nd motor slip compensation coefficient	2nd motor slip compensation coefficient	0~1000	–	10	×	Asynchronous
Dn.47	2nd motor peak torque	Motor theoretical peak torque	0~65535	N.m	40	×	Synchronous/ Asynchronous
Dn.48 ~ Dn.50	Save	–	–	–	–	–	–
Dn.51	IPM control method	0:Motor model automatic control 1:Motor model data control	0,1	–	0	△	Synchronous/ Asynchronous
Dn.52	motor identification	1: motor parameters self-learning 2: motor parameters and control parameters are self-learning 3: motor dynamic self-learning	0~3	–	0	X	Synchronous/ Asynchronous
Dn.53	VF curve type selection	0: Custom VF curve 1: n power curve	0,1	–	1	X	Asynchronous
Dn.54	n power curve	n power curve	1.0~3.0	–	1	X	Asynchronous
Dn.55	Minimum output frequency	Motor minimum output frequency setting	0~2000.0	Hz	0.5	○	Asynchronous
Dn.56	Minimum output frequency voltage	Motor minimum output frequency voltage setting	0~2000.0	V	5	○	Asynchronous
Dn.57	Intermediate output frequency	Motor intermediate output frequency setting	0~2000.0	Hz	25	○	Asynchronous
Dn.58	Intermediate output frequency voltage	Motor intermediate output frequency voltage setting	0~2000.0	V	200	○	Asynchronous
Dn.59	Rated output frequency	Motor rated output frequency setting	0~2000.0	Hz	50	○	Asynchronous
Dn.60	Rated output frequency voltage	Motor rated output frequency voltage setting	0~2000.0	V	400	○	Asynchronous
Dn.61	Maximum output frequency	Motor maximum output frequency setting	0~2000.0	Hz	50	○	Asynchronous
Dn.62	Torque compensation	Motor Torque compensation setting	0~50	%	0	○	Asynchronous
Dn.63	VF filter coefficient	VF filter coefficient	26~276				

Encoder parameter En

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
En.00	Motor encoder type (T5)	0: CTB encoder 1: TTL 2: TTL_UVW 3: Resolver 4: Sin-cosine encoder 10: Tamagawa 8401 encoder 11: Tamagawa 8401 encoder 8501 encoder 12: Tamagawa N8 13: Tamagawa N9 20: Biss RENISHAW RESA30USAxB 30: HEIDENHAIN RCN2380 31: HEIDENHAIN RCN2310 40: Nikon MAR-HX50AHN10 41: Nikon MAR-HX50AUN11 50: Sick Hiperface 60: Fargo 70: YuHeng 23seat	0~100	—	0	Δ	Synchronous/ Asynchronous
En.01	Encoder pulses(T5)	Encoder pulses setting	0~10000	Pulse	2500	Δ	Synchronous/ Asynchronous
En.02	Resolver poles	Resolver poles setting	0~100	—	1	Δ	Synchronous/ Asynchronous
En.03	Encoder ounting direction (T5)	0: Anticlockwise counting 1: Anticlockwise counting	0,1	—	0	X	Synchronous/ Asynchronous
En.04	Encoder subdivision bits(T5)	Sin-cosine encoder subdivision bits	0~32	—	12	Δ	Synchronous/ Asynchronous
En.05	Second encoder/ pulse number(T4)	Second encoder/ pulse number	100~ 16384	pulse	1024	Δ	Synchronous/ Asynchronous
En.06	Second encoder/ pulse direction selection(T4)	0: Counterclockwise increment count 1: Counterclockwise subtraction count	0,1	—	0	○	Synchronous/ Asynchronous
En.07	Motor encoder output fractional frequency number	Number of output pulses after frequency division=En.20/2En.07	0~1024	—	0	○	Synchronous/ Asynchronous
En.08	Motor encoder output direction	0: A is ahead of Bpositive 1: B is ahead of Apositive	0,1	—	0	○	Synchronous/ Asynchronous
En.09	Motor encoder output Z phase width	0: 1/4T 1: 1/2T 2: 1T	0~2	—	0	○	Synchronous/ Asynchronous
En.10	Self-learning time of magnetic pole position (T5)	Self-learning time setting of magnetic pole position	0~20.0	s	2	X	Synchronous/
En.11	Self-learning mode of magnetic pole position (T5)	0: Manual self-learning 1: Power on the drive for self-learning 2: The first time to enable self-learning after power on 3: Drive electrostatic learning after power on 4: Enable static learning for the first time	0~4	—	0	X	Synchronous/

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
En.12	Manual self-learning instruction for magnetic pole position (T5)	0: invalid 1. Learning method of magnetic pole location 2: static learning trigger of magnetic pole position	0~2	—	0	X	Synchronous
En.13	Self-learning value of magnetic pole position lower 16 bits (T5)	Self-learning value of magnetic pole position lower 16 bits	0~65535	—	0	x	Synchronous
En.14	Self-learning value of magnetic pole position higher 16 bits(T5)	Self-learning value of magnetic pole position higher 16 bits(T5)	0~65535	—	0	x	Synchronous
En.15	Encoder learning duty ratio	Record the learning duty ratio information and then directly record the duty ratio of the next learning, which can be learned quickly	0~65535	—	0	x	Synchronous
En.16	Encoder learning record information	Record the learning information, mainly the rated current and carrier frequency information. If the information corresponds to the current learning, use the recorded duty ratio to run	0~65535	—	0	x	Synchronous
En.17	Encoder learns the Z position record	When the incremental encoder learns, it needs to record the magnetic pole position with Z as the fixed point	0~360.00	Degree	0	x	Synchronous
En.18	Encoder frequency reduction	Encoder resolution frequency reduction valueEn.20= theoretical resolution >>En.18	0~32	—	0	x	Synchronous/ Asynchronous
En.19	Encoder card selection	0: common smart card 1: MEDx smart card 2: no smart card	0~2	—	0	x	Synchronous/ Asynchronous
En.20	Encoder resolution L(T5)	Encoder resolution low 16 bit monitoring	0~65535	pulse	0	*	Synchronous/ Asynchronous
En.21	Encoder resolution H(T5)	Encoder resolution high 16 bit monitoring	0~65535	pulse	0	*	Synchronous/ Asynchronous
En.22	Relative Angle of single turn (T5)	Relative Angle monitoring of current single turn position and custom zero point	0~360.00	angle	0	*	Synchronous/ Asynchronous
En.23	Single turn relative pulse position L(T5)	Relative pulse position low 16 bits monitoring of current single turn position and custom zero point	0~65535	pulse	0	*	Synchronous/ Asynchronous
En.24	Single turn relative pulse position H(T5)	Relative pulse position high 16 bits monitoring of current single turn position and custom zero point	0~65535	pulse	0	*	Synchronous/ Asynchronous
En.25	Single turn custom zero point offset value L(T5)	The offset value of single turn custom zero point and encoder zero point with low 16 bits setting	0~65535	pulse	0	*	Synchronous/ Asynchronous
En.26	Single turn custom zero point offset value H(T5)	The offset value of single turn custom zero point and encoder zero point withhigher 16 bits setting	0~65535	pulse	0	*	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
En.27	Encoder Z phase counting value (T5)	Encoder Z phase counting value monitoring	0~65535	-	0	*	Synchronous/ Asynchronous
En.28	Absolute encoder multi-turn count value(T5)	Absolute encoder multi-turn count value monitoring, suitable for TAMAGAWA absolute encoder 8401/8501	0~65535	-	0	*	Synchronous/ Asynchronous
En.29	Multi-turn custom zero point offset value L(T5)	Multi-turn custom zero point and encoder zero point offset value low 16 bit setting	0~65535	pulse	0	X	Synchronous/ Asynchronous
En.30	Multi-turn custom zero point offset value H(T5)	Multi-turn custom zero point and encoder zero point offset value high16 bit setting	0~65535	pulse	0	X	Synchronous/ Asynchronous
En.31	First encoder speed sampling cycle (T5)	First encoder speed sampling cycle setting	1~1000	ms	10	○	Synchronous/ Asynchronous
En.32	Second encoder speed sampling cycle (T4)	Second encoder speed sampling cycle setting	1~1000	ms	10	○	Synchronous/ Asynchronous
En.33	Second encoder Z phase counting value (T4)	Second encoder Z phase counting value monitoring	0~65535	—	0	*	Synchronous/ Asynchronous
En.34	Second encoder Z phase single turn latch (T4)	Second encoder Z phase single turn latch monitoring,latch the single turn position when over Z, used for single turn absolute position calculation	0~65535	—	0	*	Synchronous/ Asynchronous
En.35	Second encoder resolution L(T4)	second encoder resolution low 16 bit monitoring	0~65535	pulse	0	*	Synchronous/ Asynchronous
En.36	Second encoder resolution H(T4)	second encoder resolution high 16 bit monitoring	0~65535	pulse	0	*	Synchronous/ Asynchronous
En.37 ~ En.44	Save	—	—	—	—	—	—
En.45	Electric Angle compensation coefficient	Electric Angle compensation coefficient	0~150	—	0	○	Synchronous/ Asynchronous
En.46 ~ En.48	Save	—	—	—	—	—	—
En.49	Sine-cosine encoder calibration	0: no operation 1: start operation 2: end operation	0~2	—	0	○	Synchronous/ Asynchronous
En.50	Sine-cosine encoder diagnostic function	0: invalid 1: valid	0~1	—	0	X	Synchronous/ Asynchronous
En.51	Sine-cosine encoder A phase amplitude value	En.51< 0.5V or En.51> 1.5V encoder abnormal	0~3.3	V	0	*	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
En.52	Sine-cosine encoder B phase amplitude value	En.52< 0.5V or En.52> 1.5V encoder abnormal	0~3.3	V	0	*	Synchronous/ Asynchronous
En.53	Sine-cosine encoder ZA phase amplitude value	En.53< 0.5V or En.53> 1.5V encoder abnormal	0~3.3	V	0	*	Synchronous/ Asynchronous
En.54	Sine-cosine encoder ZB phase amplitude value	En.54< 0.5V or En.54> 1.5V encoder abnormal	0~3.3	V	0	*	Synchronous/ Asynchronous
En.55	Sine-cosine encoderphase Amidpoint value	|En.55-1.65V|>=0.25V encoder abnormal	0~3.3	V	0	*	Synchronous/ Asynchronous
En.56	Sine-cosine encoderphase B midpoint value	|En.56-1.65V|>=0.25V encoder abnormal	0~3.3	V	0	*	Synchronous/ Asynchronous
En.57 ~ En.69	Save	–	–	–	–	–	–
En.70	Encoder reset	0: invalid 1: motor encoder 2: second encoder encoder 3: first pulse input (T2) 4: second pulse input (T3) 5: reset the single turn relative position	0~5	–	0	○	Synchronous/ Asynchronous
En.71	encoder reset setting low 16 bits	Encoder reset setting value	0~ 4294967295	pulse	0	○	Synchronous/ Asynchronous
En.72	encoder reset setting high 16 bits						
En.73 ~ En.98	Save	–	–	–	–	–	–
En.99	Encoder delay processing mechanism	111：Delayed half cycle processing, which requires the encoder to reply quickly enough, otherwise the data will be easily lost; Others: Delay 1.5 cycle processing	0～65535	–	0	X	Synchronous/ Asynchronous

Fn function parameters

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Fn.00	Positioning mode selection	0: absolute position 1: incremental location 2: relative Z phase positioning 3: position synchronization 4: real-time positioning 5: single turn absolute positioning 6: external IO quasi-stop 7: swing positioning	0~7	—	3	○	Synchronous/ Asynchronous
Fn.01	Target positioning low 16 bits	Target positioning low 16 bits setting	0~65535	pulse	0	○	Synchronous/ Asynchronous
Fn.02	Target positioning high 16 bits	Target positioning high 16 bits setting	0~65535	pulse	0	○	Synchronous/ Asynchronous
Fn.03	Positioning first gain	first gain during positioning	0~60000	—	300	○	Synchronous/ Asynchronous
Fn.04	Positioning second gain	Second gain during positioning	0~60000	—	50	○	Synchronous/ Asynchronous
Fn.05	Positioning gain switching distance threshold	Positioning the first and second gain switching threshold value, switch to the second gain when the residual distance is less than this value,Otherwise, use the first gain	0~10.00	0.01R	0.1	○	Synchronous/ Asynchronous
Fn.06	Positioning maximum speed	Positioning maximum speed setting	0~30000	rpm	300	○	Synchronous/ Asynchronous
Fn.07	Positioning minimum speed	Positioning minimum speed setting	0~60000	rpm	1	○	Synchronous/ Asynchronous
Fn.08	Positioning curve	0: Linear positioning 1: Square root positioning	0，1	—	0	○	同/异
Fn.09	Save	_	—	—	—	—	—
Fn.10	Positioning direction	0:CCW 1:CW	0~150	—	0	○	Synchronous/ Asynchronous
Fn.11	Rough positioning scope	When the residual positioning distance is less than Fn.11XFn.13, it is judged as rough positioning arrival, output rough positioning arrival signal	0~65535	Pulse	15	○	Synchronous/ Asynchronous
Fn.12	Fine positioning scope	When the residual positioning distance is less than Fn.12XFn.13, it is judged as fine positioning arrival, output fine positioning arrival signal	0~65535	Pulse	5	○	Synchronous/ Asynchronous
Fn.13	Positioning resolution	Positioning resolution	0~65535	Pulse	1	○	Synchronous/ Asynchronous
Fn.14	Positioning detection window time	When execution positioning meets the preset Fn.14 time of the positioning arrival range, the corresponding positioning arrival signal will be output	0~65535	—	1	○	Synchronous/ Asynchronous
Fn.15	swing forward scope	swing forward position	0~65535	ms	50	○	Synchronous/ Asynchronous
Fn.16	swing reverse scope	swing reverse position	0~3.3	V	0	*	Synchronous/ Asynchronous
Fn.17	swing speed upper limit	maximum speed during swing	0~60000	rpm	50	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Fn.18	swing acceleration time	Acceleration time during swing	0~300.00	s/krpm	1	○	Synchronous/ Asynchronous
Fn.19	swing deceleration time	Deceleration time during swing	0~300.00	s/krpm	1	○	Synchronous/ Asynchronous
Fn.20	swing current	swing output max torque current=Fn.20×Dn.01/100	0~1000	%	10	○	Synchronous/ Asynchronous
Fn.21	Star-Delta switching mode	0: no switching 1: automatic, automatic switchingaccording to the feedback speed , output multi-function output point, enableaccording to the delay time. 2: manually switch through the multi-function DI point, and enable according to the delay time 3: automatic, automatically switch according to the feedback speed, output multi-function output point, multi-function DI as the trigger point for enablefeedback 4: manually switch through the multi-function DI point, which is feedback to enable as the trigger point of the contactor	0~4	–	0	X	Asynchronous
Fn.22	Star-delta switching speed	When the actual speed exceeds this preset value, it will be switched to delta connection; otherwise, it will be star connection	0~30000	rpm	3000	X	Asynchronous
Fn.23	Star-delta switching speed tolerance	Dead zone range of star-delta switch,That is SPD> (Fn.22 + Fn.23) is deltaconnection, When SPD< (Fn.22-Fn.23), which is star connection. All other conditions, maintain the previous state	0~30000	rpm	100	X	Asynchronous
Fn.24	Star-delta switching time	This parameter determines the switching enable time	0~30000	ms	100	X	Asynchronous
Fn.25	Delay time of opening brake	When the detection needs to open the brake, firstly enable the motor, and then delay the preset time, and then open the brake	0~20000	ms	200	○	Synchronous/ Asynchronous
Fn.26	Delay time of closing brake	When the detection needs to close the brake, firstlyclose the brake, keep enable state, delay the preset time, and then close the enable	0~20000	ms	200	○	Synchronous/ Asynchronous
Fn.27	Emergency electrical braking time	When the driver alarm occurs, drive lower bridge armshort, let the permanent magnet motor fast brake stop	0~30000	ms	0	X	Synchronous
Fn.28	PID function selection	0:Invalid 1:valid	0,1	–	0	X	Synchronous/ Asynchronous
Fn.29	PID inputting method	0: internal register given 1: FV analog given 2: FI analog given 3: FT analog given	0~3	–	0	X	Synchronous/ Asynchronous
Fn.30	PID feedback method						
Fn.31	PID internal given register	Internal given register that performs a given operation as per a percentage of the relative instruction	0~100.0	%	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Fn.32	PID internal feedback register	Internal feedback register operates as per a percentage of the relative feedback	0~100.0	%	0	○	Synchronous/ Asynchronous
Fn.33	PID given feedback range	PID given feedback range is dimensionless unit, used for the PID given display fn.52 and PID feedback display fn.53	0~65535	—	0	○	Synchronous/ Asynchronous
Fn.34	Direction of PID action	The polarity of PID output can be reversed. Using this feature, the reverse characteristic load can be used to reduce the output frequency of servo after increasing the target value of PID 0: positive 1: reverse	0,1	—	0	X	Synchronous/ Asynchronous
Fn.35	PID proportional gain 1	PIDregulator first set of proportional gain Kp	0~20000	—	10	○	Synchronous/ Asynchronous
Fn.36	PID integral time 1	PID regulator first set of integral time Ti	0~20000	—	100	○	Synchronous/ Asynchronous
Fn.37	PID differential coefficient 1	PID regulator first set of differential coefficient Kd	0~20000	—	0	○	Synchronous/ Asynchronous
Fn.38	PID proportional gain 2	PIDregulator second set of proportional gain Kp	0~20000	—	10	○	Synchronous/ Asynchronous
Fn.39	PID integral time 2	PID regulatorsecond set of integral time Ti	0~20000	—	100	○	Synchronous/ Asynchronous
Fn.40	PID differential coefficient 2	PID regulator second set of differential coefficient Kd	0~20000	—	0	○	Synchronous/ Asynchronous
Fn.41	PID parameter switching source	The first and second PID switching source selection: 0: no switching, just use the first set 1: internal register switch 2: switch through DI terminal 3: automatic switching through PID output	0~3	—	0	○	Synchronous/ Asynchronous
Fn.42	PID internal switch register	0: use the first set of pids 1: use the second set of PID	0,1	—	0	○	Synchronous/ Asynchronous
Fn.43	PID output automatic switching threshold value	When the PID output is greater than this parameter, switch to the first set, otherwise the second set	0~100.0	%	0	○	Synchronous/ Asynchronous
Fn.44	PID output source selection	0: speed output 1: torque output 2: internal registers	0~2	—	0	○	Synchronous/ Asynchronous
Fn.45	PID output upper limit	Limited function PID output maximum, different calculation results with different output source: Fn.44=0:PID output upper limit is dn.09XFn45 Fn.44=1:PID output upper limit is the maximum torqueXFn45	0~100.0	%	0	○	Synchronous/ Asynchronous
Fn.46	PID reverse cut-off output	PID output reverse limit output percentage, some cases do not allow reverse running and use when reverse torque occurs. Fn.44=0:PID reverse cut-off output is dn.09XFn46 Fn.44=1:PID reverse cut-off output is the max torqueXFn46	0~100.0	%	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Fn.47	PID given acceleration and deceleration time	PID to the quantitative acceleration and deceleration time, can alleviate the impact caused by too fast change	0~50.00	s	0	○	Synchronous/ Asynchronous
Fn.48	PID feedback filter coefficient	PID feedback low-pass filter, 0 means no filtering, the larger the value, the more obvious the filtering effect, the more obvious the lag	0~512	–	0	○	Synchronous/ Asynchronous
Fn.49	PID output filter coefficient	PID output low-pass filter, 0 means no filtering, the larger the value, the more obvious the filtering effect, the more obvious the lag	0~512	–	0	○	Synchronous/ Asynchronous
Fn.50	PID Register output internal register	When PID selects memory register output, the output register address	-100.0～ 100.0	–	0	○	同/异
Fn.51	PID Feedback loss detection window time	Time setting of PID feedback loss detection window	0～50.00	–	0	○	同/异
Fn.52	PID given display	Based on the given percentage X fn.33	0~65535	–	0	*	Synchronous/ Asynchronous
Fn.53	PID feedback display	Based on the percentage of feedback X fn.33	0~65535	–	0	*	Synchronous/ Asynchronous
Fn.54	PID integral term reset	0: invalid 1: reset	0~1	–	0	○	Synchronous/ Asynchronous
Fn.55	External DI05 positioning count	This parameter represents the number of times a DI05 signal is triggered when external DI05 is used as a reference source for positioning	0~65535	–	0	*	Synchronous/ Asynchronous
Fn.56	External DI05 positioning latch position L	When external DI05 is used as the positioning reference source, the data of position latch when DI05 is triggered	0~ 4294967295	pulse	0	*	Synchronous/ Asynchronous
Fn.57	External DI05 positioning latch position H						
Fn.58	External di05 interrupt polarity	External di05 interrupt polarity: 0: Rising edge 1: Falling edge	0，1	–	0	○	同/异
Fn.59	Save	–	–	–	–	–	–
Fn.60	Forward speed limit in torque mode	Upper limit of forward speed in torque mode	0~60000	rpm	0	○	Synchronous/ Asynchronous
Fn.61	Negative speed limit in torque mode	Negative speed upper limit in torque mode	0~60000	rpm	0	○	Synchronous/ Asynchronous
Fn.62	Torque command acceleration time	In torque mode, the target torque acceleration time is the time from 0% to 100% of the rated torque	0~30.00	S	1	○	Synchronous/ Asynchronous
Fn.63	Torque command deceleration time	In torque mode, the target torque deceleration time is the time from 100% deceleration to 0% rated torque	0~30.00	S	1	○	Synchronous/ Asynchronous
Fn.64	Target torque value	Set the target torque of motor and percentage of rated torque	-500.0 ~500.0	%	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Fn.65	Torque output value	Motor output torque, percentage of rated torque	-500.0 ~500.0	%	0	*	Synchronous/ Asynchronous
Fn.66 ~ Fn.79	Save	—	—	—	—	—	—
Fn.80	DA1 output source selection	0: internal register 1: current torque instruction, output in proportion to the maximum torque 2: current torque feedback, output in proportion to the maximum torque 3: current speed instruction, output in proportion to the maximum speed 4: current speed feedback, output according to the proportion of the maximum speed 5: current current feedback, output in proportion to the maximum output current 21: absolute value of current torque instruction 22: absolute value of current torque feedback 23: absolute value of the current speed instruction 24: absolute value of current speed feedback	0~24	—	0	○	Synchronous/ Asynchronous
Fn.81	DA2 Output source selection						
Fn.82	DA1 zero bias	DA1、DA2 output offset setting, set the offset amount if 0	-100.00 ~100.00	%	0	○	Synchronous/ Asynchronous
Fn.83	DA2 zero bias						
Fn.84	DA1 outputs the internal registers	Digital quantity -100% ~ 0 ~ 100% Analog values -10 ~ 0 ~ 10V Analog quantity is 0 ~ 5V ~ 10V	-10.00 ~10.00	%	0	○	Synchronous/ Asynchronous
Fn.85	DA2 outputs the internal registers						
Fn.86	DA1 output gain	DA1 and DA2 output gain setting. The actual output value needs to be multiplied by the gain value for output, which is equivalent to setting the slope	-10.00 ~10.00	—	1	○	Synchronous/ Asynchronous
Fn.87	DA2 output gain						
Fn. 88	DA1 output range selection	0: output according to 0 ~ 10V Digital quantity -100% ~ 0 ~ 100% analog quantity 0 ~ 5V ~ 10V 1: output according to -10v ~ 10V Digital quantity -100% ~ 0 ~ 100% analog quantity -10 ~ 0 ~ 10 v	0, 1	—	0	○	Synchronous/ Asynchronous
Fn. 89	DA2 output range selection						
Fn. 90	Velocity arrival range	When the difference between the given speed and the feedback speed is less than fn.90, and the duration exceeds fn.91, output the state of speed arrival	0~ 30000	The RPM	15	○	Synchronous/ Asynchronous
Fn. 91	Speed arrival window time		0~ 30000	ms	100	○	Synchronous/ Asynchronous
Fn. 92	Zero speed arrival range	When the difference between the feedback speed and zero speed is less than fn.92 and diration time exceeds fn.93, output the state of zero speed arrival	0~ 30000	The RPM	5	○	Synchronous/ Asynchronous
Fn. 93	Zero speed arrival window time		0~ 30000	ms	100	○	Synchronous/ Asynchronous
Fn. 94	Torque arrival range	When the difference between the given torque and the feedback torque is less than fn.94, andduration exceeds fn.95, output the state of torque arrival	0~500.0	%	0	○	Synchronous/ Asynchronous
Fn. 95	Torque arrival window time		0~30000	ms	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Fn. 96	Zero torque reach range	When the difference between feedback torque and zero torque is less than fn.96and duration time exceeds fn.97,output the state of zero torque arrival	0~500.0	%	0	○	Synchronous/ Asynchronous
Fn. 97	Zero torque arrival window time		0~30000	ms	0	○	Synchronous/ Asynchronous

Hn interface parameter set

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Hn. 00	ST enabled terminal	0: PLC control 1: enable input	0, 1	—	0	○	Synchronous/ Asynchronous
Hn. 01	I1 multi-function input terminal function selection	0: defined by internal PLC program 1: quasi-deactivated proximity switch signal input (I5 only, other I points are set to be invalid) 2: external fault input 3: emergency stop input 4: second motor selection 5: star/delta switch 6: switch the external contact signal of the contactor 7: positive limit switch input 8: reverse limit switch input 9: function PID parameter switching 10: function PID integral term reset 11: magnetic pole position learning trigger 100: forward jog 101: reverse jog 102: zero speed lock shaft 103: real-time positioning start 104: reset and start 105: swing function selection 106: torque/speed switching 107: position/speed switch 108: motor enable	0~200	—	0	x	Synchronous/ Asynchronous
Hn. 02	I2 multi-function input terminal function selection						
Hn. 03	I3 multi-function input terminal function selection						
Hn. 04	I4 multi-function input terminal function selection						
Hn.05	I5 multi-function input terminal function selection						
Hn. 06	I6 multi-function input terminal function selection						
Hn. 07	I7 multi-function input terminal function selection						
Hn. 09	I9 multi-function input terminal function selection						
Hn. 10	I10 multi-function input terminal function selection						
Hn. 11	I11 multi-function input terminal function selection						
Hn. 12	I12 multi-function input terminal function selection						

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Hn. 13	RES reset terminal	0: PLC control 1: reset input	0, 1	–	0	○	Synchronous/ Asynchronous
Hn. 14	Filter time constant of multifunctional input terminal	Input terminal filtering time	0~200	–	0	○	Synchronous/ Asynchronous
Hn. 15	Terminal trigger mode	DI terminal trigger mode: if set to normally open, it will take effect when closed; if set to normally closed, it will take effect when disconnected. Configuration by bit: 0: normally open, 1: normally closed Bit0: ST bit7: I6 Bit1: RES Bit8: I7 Bit2: I1 Combination: I8 Bit3: I2 Bit10: I9 Bit4: I3 Bit11: I10 Bit5: I4 Bit12: I11 Bit6: I5 Bit13: I12	0~65535	–	0	○	Synchronous/ Asynchronous
Hn. 16	Input terminal level selection (for general use only)	0: external 0V is valid 1: external 24V (only for general use)	0, 1	–	0	○	Synchronous/ Asynchronous
Hn. 17	Q1 multi-function output terminal function selection	0: defined by internal PLC program 1: drive ready 2: zero velocity 3: the speed arrival 4: torque arrival 5: drive failure 6: coarse positioning is completed 7: fine positioning is completed 8: star/delta contactor 9: star/delta state 10: brake output 11: motor encoder z-phase output 12: magnetic pole position study completed 13: reaching the positive soft limit 14: the reverse soft limit is reached Speed limit reached 16: torque reaches limit 17: switch between the first motor and the second motor 18: coarse range of follow-up error 19: precision range of follow-up error	0~19	–	0	x	Synchronous/ Asynchronous
Hn. 18	Q2 multi-function output terminal function selection						
Hn. 19	Q3 multi-function output terminal function selection						
Hn. 20	Q4 multi-function output terminal function selection						
Hn. 21	Q5 multi-function output terminal function selection						
Hn. 22	Q6 multi-function output terminal function selection						
Hn. 23	M0 relay output function selection						
Hn. 24	M1 relay output function selection						

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Hn. 25	Drive internal control word 1	0: Disable 1: Effective bit0: Enable bit1: Reset bit2: Positioning trigger bit3: Emergency stop trigger bit4: Retain bit5: Zero speed lock shaft bit6: Star / Delta switch trigger bit7: Star / Delta contactor point bit8: Pole position learning trigger bit9: Function PID parameter trigger bit10: Position regulator deviation reset bit11: Motor parameter identification bit12: Motor inertia identification bit13: Phase current gain identification	0~ 0XFFFF	–	0	○	Synchronous/ Asynchronous
Hn. 26	Drive internal control word 2	Bit0: FV calibration request bit1: FI calibration request bit2: Forward Bit3: Reverse	0~ 0XFFFF	–	0	○	Synchronous/ Asynchronous
Hn. 27	Speed command selection	0: basic speed register (U1.00) 1: inching speed register (HHN.28) 2: FV analog quantity 3: FI analog quantity 4: T2 first pulse input port 5: T3 second pulse input port 6: T4 second encoder input port	0~6	–	0	○	Synchronous/ Asynchronous
Hn. 28	Jog speed is given as 16 bits lower	Set the jog speed with a resolution of 0.0001 RPM	0~ 900000000	RPM	0	○	Synchronous/ Asynchronous
Hn. 29	The jog velocity is given 16 bits higher						
Hn. 30	Location instruction selection	0: internal register (position value given by HHN.31, HHN.32) 1: motion control unit (CAM user) 2: input port of the second encoder (T4) 3: input port of the first pulse port (T2) 4: input port of the second pulse port (t3-24v)	0~4	–	0	X	Synchronous/ Asynchronous
Hn. 31	The position following instruction is 16 bits lower	Pulse following mode, used as incremental position instruction, for each regulation period of increased pulse instruction	- 2147483647 ~ 2147483647	Pulse/ms	0	○	Synchronous/ Asynchronous
Hn. 32	Position follow instruction high 16 bits						
Hn. 33	Position feedback selection	0: first encoder (T5) 1: second encoder (T4) 2: first pulse port (T2) 3: second pulse port (t3-24v)	0 ~ 3	–	0	X	Synchronous/ Asynchronous
Hn. 34	Torque instruction selection	0: internal register (torque value given by fn.64) 1: FV analog quantity 2: FI analog quantity 3: FT analog quantity	0 ~ 3	–	0	X	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Hn. 35	Analog calibration function selection	0: calibration function is on 1: calibration function is off	0, 1	—	0	○	Synchronous/ Asynchronous
Hn. 36	Minimum allowable threshold for analog calibration	The minimum threshold is the maximum value of analog quantity h1.36%, Any value below this value is invalid	0~50	%	10	○	Synchronous/ Asynchronous
Hn. 37	Error alarm range of analog calibration point	Percentage of allowable deviation range at analog scale points	0~100	%	20	○	Synchronous/ Asynchronous
Hn. 38	Analog positive offset	The forward deviation of analog value is set, which is valid when HHN.35 is 1	0~65520	LSB	0	○	Synchronous/ Asynchronous
Hn. 39	Analog offset in reverse	Set analog reverse offset, effective when HHN.35 is 1	0~65520	LSB	0	○	Synchronous/ Asynchronous
Hn. 40	FV analog fixed point velocity	Set the FV analog scale fixed point speed	0~65535	RPM	0	○	Synchronous/ Asynchronous
Hn. 41	FI simulates the fixed-point speed of the beacon	Set the speed of FI analog beacon	0~65535	RPM	0	○	Synchronous/ Asynchronous
Hn. 42	Analog filter time	Analog filter time	0~1500	us	1500	△	Synchronous/ Asynchronous
Hn. 43	The range of zero dead zone of analog data	Is considered to be when the digital quantity of the analog quantity is less than this value Zero speed	0~65520	LSB	20	○	Synchronous/ Asynchronous
Hn. 44	Maximum analog speed	The analog quantity corresponds to the maximum speed	0~60000	RPM	8000	○	Synchronous/ Asynchronous
Hn. 45	Automatic correction function of analog midpoint	0: shut down 1: open	0 , 1	—	0	○	Synchronous/ Asynchronous
Hn. 46	The analog quantity FV corresponds to a low speed of 16 bits	The speed and parameter resolution corresponding to the current analog quantity FV 0.0001 RPM	- 900000000 ~900000000	The RPM	0	*	Synchronous/ Asynchronous
Hn. 47	Analog quantity FV corresponds to 16 bits of higher rotation speed						
Hn. 48	Analog FI corresponds to 16 bits of low speed	Current analog FI corresponding speed, parameter resolution 0.0001 RPM	- 900000000 ~900000000	The RPM	0	*	Synchronous/ Asynchronous
Hn. 49	Analog FI corresponds to 16 bits higher speed						
Hn. 50	T0 port communication protocol selection	0: PLC communication 1: upper computer communication	0, 1	—	1	○	Synchronous/ Asynchronous
Hn. 51	T2 pulse input port type selection	0: invalid 1: A + B 2: PULSE + DIR	0~2	—	0	△	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Hn. 52	T2 pulse count direction	0: increment count 1: subtraction	0, 1	–	0	○	Synchronous/ Asynchronous
Hn. 53	T2 pulse position electron gear ratio numerator L	T2 position pulse electron gear ratio numerator setting	- 2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 54	T2 pulse position electron gear ratio numerator H						
Hn. 55	T2 pulse position electronic gear ratio denominator L	T2 position pulse electronic gear score master setting	- 2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 56	T2 pulse position electronic gear ratio denominator H						
Hn. 57	T2 pulse velocity electron gear ratio numerator L	T2 speed pulse electronic gear ratio numerator setting	- 2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 58	T2 pulse velocity electron gear ratio numerator H						
Hn. 59	T2 pulse speed electronic gear than the denominator L	T2 speed pulse electronic gear score master setting	- 2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 60	T2 pulse speed electronic gear ratio denominator H						
Hn. 61	T2 pulse velocity factor	U2.20= input pulse frequency 60/(HHN.61 4)	0~65535	pulse	1024	○	Synchronous/ Asynchronous
Hn. 62	T2 pulse velocity feedback filtering time	T2 pulse velocity feedback filtering time setting	0~10000	ms	4	○	Synchronous/ Asynchronous
Hn. 63	T3 pulse input port type selection	0: IO mode 1: A + B 2: PULSE + DIR	0~2	–	0	△	Synchronous/ Asynchronous
Hn. 64	T3 pulse count direction	0: increment count 1: subtraction	0, 1	–	0	○	Synchronous/ Asynchronous
Hn. 65	T3 pulse position electron gear ratio numerator L	T3 position pulse electronic gear ratio numerator setting	- 2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 66	T3 pulse position electron gear ratio numerator H						
Hn. 67	T3 pulse position electronic gear ratio denominator L	T3 position pulse electronic gear score master setting	- 2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 68	T3 pulse position electronic gear ratio denominator H						

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Hn. 69	T3 pulse speed electron gear ratio numerator L	T3 speed pulse electronic gear ratio numerator setting	-2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 70	T3 pulse speed electron gear ratio numerator H						
Hn. 71	T3 pulse speed electronic gear ratio denominator L	T3 speed pulse electronic gear score master setting	-2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 72	T3 pulse speed electronic gear ratio denominator H						
Hn. 73	T3 pulse velocity factor	U2.21= input pulse frequency 60/(HHN.73 4)	0~65535	pulse	1024	○	Synchronous/ Asynchronous
Hn. 74	T3 pulse velocity feedback filtering time	T3 pulse speed feedback filtering time setting	0~10000	ms	4	x	Synchronous/ Asynchronous
Hn. 75	T3 pulse filter selection (this parameter represents the cut-off frequency of the low-pass filter)	Zero: 30 m 1: 15 m 2: 7. 5 m 3: 3.75 m 4: 2.5 m 5: 1. 875 m 6: 1.25 m 7: 0.9375 m 8: 0. 625 m 9: 0.4688 m 10: 0.375 m 11: 0. 3125 m 12: 0. 2344 m 13: 0.1875 m 14: 0.1563 m 15: 0. 1172 m	0~15	–	6	△	Synchronous/ Asynchronous
Hn. 76	T3 pulse direction signal filtering frequency	Represents the cut-off frequency of the low-pass filter, Fre=60/ HHN.76, set to 0, no filtering	0~600	MHZ	60	○	Synchronous/ Asynchronous
Hn. 77	T4 pulse input port type selection	0: invalid 1: orthogonal 2: PULSE + DIR	0 ~ 2	–	0	△	
Hn. 78	T4 pulse position electron gear ratio numerator L	T4 position pulse electronic gear ratio numerator setting	-2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 79	T4 pulse position electron gear ratio numerator H						
Hn. 80	T4 pulse position electronic gear ratio denominator L	T4 position pulse electronic gear score master setting	-2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 81	T4 pulse position electronic gear ratio denominator H						
Hn. 82	T4 pulse speed electron gear ratio numerator L	T4 speed pulse electronic gear ratio numerator setting	-2147483647 ~2147483647	–	1	○	Synchronous/ Asynchronous
Hn. 83	T4 pulse speed electron gear ratio numerator H						

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Hn. 84	T4 pulse speed electronic gear ratio denominator L	T4 speed pulse electronic gear score master setting	-2147483647 ~2147483647	—	1	○	Synchronous/ Asynchronous
Hn. 85	T4 pulse speed electronic gear ratio denominator H						

Pn protection parameter set

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Pn. 00	Bus overvoltage alarm value	When the bus voltage exceeds this value, the alarm overvoltage e1.ov	0~1000	V	800	○	Synchronous/ Asynchronous
Pn. 01	Bus voltage undervoltage alarm window value	When the bus voltage is lower than this value and reaches the preset window time, Alarm undervoltage e1.uv	0~1000	V	400	○	Synchronous/ Asynchronous
Pn. 02	Bus voltage undervoltage alarm window time		0 ~ 60.0	S	0	○	Synchronous/ Asynchronous
Pn.03	Under voltage brake function	0: shut down 1: emergency stop, treat as emergency stop	0, 1	—	0	○	Synchronous/ Asynchronous
Pn. 04	Encoder z signal alarm shield	0: shielding, no detection and alarm 1: alarm e1.ec when encoder Z phase fault occurs	0~65535	—	1	○	Synchronous/ Asynchronous
Pn.05	Encoder battery alarm shield	0: shielding, no detection and alarm 1: alarm e1.ep when the encoder fails	0~65535	—	1	○	Synchronous/ Asynchronous
Pn. 06	Bus encoder alarm code	Bus encoder internal alarm information	0~65535	—	0	○	Synchronous/ Asynchronous
Pn. 07	Bus encoder communication error value	Bus encoder CRC check error count value	0~65535	—	0	○	Synchronous/ Asynchronous
Pn. 08	Failure alarm time of rotary transformer	Report when the resolver fault signal remains longer than this time E1. EL	0 ~ 20000	ms	20	○	Synchronous/ Asynchronous
Pn. 09	Encoder self check error count	When the resolver is used, it is expressed as the LOT fault error count; when the Renishaw encoder is used, it is expressed as the encoder itself Bug count	0~65535	—	0	*	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Pn. 10	Temperature protection selection	0: temperature switch 1: Temperature resistance pt3c 2: Temperature resistance kty84 3: Temperature resistance Pt100 9: Shielding	0~9	–	0	○	Synchronous/ Asynchronous
Pn. 11	Temperature channel selection	Thermistor / temperature switch channel selection: when multi-channel is selected, the temperature of U2 group motor is displayed according to the maximum temperature, and is selected by bit: Bit0:1 channel Bit1: 2 channels Bit2: 3 channels Bit3: 4 channels If there is no selection, it is configured according to 1 channel	0～65535	–	1	○	Synchronous/ Asynchronous
Pn.12	Motor temperature sensor alarm value	0: shield, do not detect motor temperature Others: alarm e1.oh2 when the detected temperature exceeds this value	0~200	degree	110	○	Synchronous/ Asynchronous
Pn. 13	Motor overspeed alarm value	0: shielding, do not detect motor feedback speed Others: alarm e1.os when motor feedback speed exceeds this value	0~30000	RPM	8500	○	Synchronous/ Asynchronous
Pn. 14	Motor stall alarm value	0: shielding, do not detect motor feedback speed Others: when the motor feedback speed exceeds this value alarm, when the difference between the motor feedback speed and the output speed is greater than (output speed) Pn.14), and the duration exceeds Pn.15 alarm e1.se	0~100.0	%	40	○	Synchronous/ Asynchronous
Pn. 15	Stall alarm detection time		0~3000.0	S	4	○	Synchronous/ Asynchronous
Pn. 16	The position follow-up error overrun threshold L	0: shielding, no position follow-up error is detected Others: alarm e1.op when position follow-up error exceeds this value	0 ~ 4294967295	pulse	0	○	Synchronous/ Asynchronous
Pn. 17	The position follow-up error overrun threshold H						
Pn. 18	Low speed overload alarm speed value	0: shielding, do not detect motor feedback speed Others: when the motor feedback speed is lower than pn.18, and the actual current exceeds pn.20 dn.01, and the duration exceeds pn.19, the alarm will be sent to e1.ol2	0~6000.0	RPM	5	○	Synchronous/ Asynchronous
Pn. 19	Low speed overload alarm time threshold		0~3000.0	S	2	○	Synchronous/ Asynchronous
Pn.20	Low speed overload alarm current multiple		0~100.0	–	1.2	○	Synchronous/ Asynchronous
Pn. 21	Motor overload protection gain	Motor overload protection parameters, can change the protection of the inherent curve sex	0.20 ~10.00	–	1	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Pn. 22	PID feedback loss detection window	When the PID feedback quantity is less than the feedback loss detection value, and the duration is longer than the PID feedback loss detection time, the servo state PID feedback abnormal setting. If one of these two parameters is 0, no feedback detection is performed	0~100.0	%	0	○	Synchronous/ Asynchronous
Pn. 23	PID feedback loss detection window		0~50.0	S	0	○	Synchronous/ Asynchronous
Pn.25	Battery alarm clear	If the multi turn absolute value encoder alarms EP, when the wiring and battery are OK, you can change this parameter to 1. If the parameter changes to 0, it means that the alarm can be eliminated. Restart or reset the driver can eliminate the alarm. If the parameter cannot change to 0 by itself, there is still a problem on the battery line. Please check.	0，1	—	0	○	Synchronous/ Asynchronous
Pn.26	OC3Protection level	This parameter is only valid for 18.5kw and above drivers 0: 1.033 times of the per unit hall value of OC3 alarm level 1: 1.19 times of the per unit hall value of OC3 alarm level	0，1	—	0	△	Synchronous/ Asynchronous
Pn.27	Carrier limit switch	This parameter is only valid for 18.5kw and above drivers 0: carrier frequency up to 4K 1: Carrier frequency up to 8K	0，1	—	0	△	Synchronous/ Asynchronous
Pn.28	EE alarm shielding	0: unshielded, read power code from base EE 1: Shield the alarm and read the power code from the main board	0，1	—	0	△	Synchronous/ Asynchronous
Pn.29	TA Real time detection forbidden	0：open 1：close	0，1	—	0	△	Synchronous/ Asynchronous
Pn.30	Current fault level	Current fault level display	0～65535	—	0	✶	Synchronous/ Asynchronous
Pn.31	Level 1 troubleshooting	0: off enable 1: Armature short circuit	0，1	—	0	○	Synchronous/ Asynchronous
Pn.32	Level 2 troubleshooting	0: off enable 1: Armature short circuit	0，1	—	0	○	Synchronous/ Asynchronous
Pn.33	Level 3 troubleshooting	0: off enable 1: Armature short circuit 2: Emergency stop	0～2	—	0	○	Synchronous/ Asynchronous
Pn.34	W OC3 Alarm shielding	The OC3 alarm can be turned off by this parameter. This function is only valid for drives of 30kW and above 0: do not close 1: Turn off w-hall OC3 detection	0，1	—	0	△	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Pn.35	External encoder fault alarm shielding	0: shielding, no detection and alarm 1: Alarm e1.ec2 when encoder failure	0，1	–	1	○	Synchronous/ Asynchronous
Pn.36 ~ Pn.43	Save	–	–	–	–	–	–
Pn.44	Line resistance detection	0: close 1: Open	0，1	–	0	×	Synchronous/ Asynchronous
Pn.45	UVLine resistance	UVLine resistance display	0～65.535	–	0	∗	Synchronous/ Asynchronous
Pn.46	VW Line resistance	VWLine resistance display	0～65.535	–	0	∗	Synchronous/ Asynchronous
Pn.47	WULine resistance	WULine resistance display	0～65.535	–	0	∗	Synchronous/ Asynchronous
Pn.48 Pn.49	Save	–	–	–	–	–	–
Pn.50	Temperature display of the first motor	Display the first temperature value	0～300	°C	0	∗	Synchronous/ Asynchronous
Pn.51	Second circuit motor temperature display	Display the second temperature value	0～300	°C	0	∗	Synchronous/ Asynchronous
Pn.52	Temperature display of the third motor	Display the third temperature value	0～300	°C	0	∗	Synchronous/ Asynchronous
Pn.53	Temperature display of the fourth motor	Display the fourth temperature value	0～300	°C	0	∗	Synchronous/ Asynchronous
Pn.54	Temperature switch status	Display the status of multi-channel temperature switch, 1 off, 0 closed, Display by bit: Bit0: state of the first temperature switch Bit1: state of the second temperature switch Bit2: state of the third temperature switch Bit3: fourth circuit temperature switch status	0～300	°C	0	∗	Synchronous/ Asynchronous
Pn.55 ～ Pn.59	Save	-	-	–	–	–	–
Pn.60	OC5alarm shielding	0: not shielded 1: Shielding	0，1	–	0	○	Synchronous/ Asynchronous
Pn.61	CPU fault alarm shielding	0: not shielded 1: Shielding	0，1	–	0	○	Synchronous/ Asynchronous
Pn.62 ～ Pn.89	Save	-	-	–	–	–	–
Pn.90	Special alarm instructions	Check alarm instructions sheet	0～65535	–	0	∗	Synchronous/ Asynchronous

Sn system parameter set

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Sn.00	Senior password	After entering the password, you can modify some parameters of Sn, Sn system Parameters are important parameters of the drive and should be modified carefully	0~65535	—	0	X	Synchronous/ Asynchronous
Sn. 01	Power code	Set the power code of the driver, modify it by professionals	0~255	—	0	△	Synchronous/ Asynchronous
Sn. 02	Hall unit value	Set the unit value of hall	0~50000	0.1 A	0	*	Synchronous/ Asynchronous
Sn.03	Driver rating	Drive rating display	0~6000.0	kw	0	*	Synchronous/ Asynchronous
Sn. 04	Driver input voltage	Based on the power code to determine the input voltage level	0 ~ 65535	V	0	*	Synchronous/ Asynchronous
Sn.05	Working voltage of brake unit	Set the starting voltage of braking unit conduction 200v servo parameter setting range of :350v-400v 400v servo parameter setting range :650v-780v	0 ~ 1000	V	750	X	Synchronous/ Asynchronous
Sn. 06	Carrier frequency	Set the carrier frequency of the drive. This parameter will be adjusted automatically according to the setting of Sn.01. User modification should be cautious. 1: 2 5: 10 2: 4 6: 12 3: 6 8: 16 4: 8	1～8	kHz	4	△	Synchronous/ Asynchronous
Sn. 07	Main program version number	Main program software version number	—	—	0	*	Synchronous/ Asynchronous
Sn. 08	Motor control program version number	Motor control program version number	—	—	0	*	Synchronous/ Asynchronous
Sn. 09	PLC program version number	PLC program version number	—	—	0	*	Synchronous/ Asynchronous
Sn. 10	Intelligent encoder card version number	Smart encoder card program version number	—	—	0	*	Synchronous/ Asynchronous
Sn. 11	PLC scanning period	PLC scanning period	0～ 65535	us	0	*	Synchronous/ Asynchronous
Sn. 12	PLC minimum execution cycle	The minimum execution cycle is recorded as the PLC runs	—	us	0	*	Synchronous/ Asynchronous
Sn. 13	Maximum PLC execution cycle	The maximum execution cycle is recorded while the PLC is running	—	us	0	*	Synchronous/ Asynchronous
Sn. 14	Maximum current display	Monitor the maximum output current RMS of the driver	0～ 6000.0	A	0	○	Synchronous/ Asynchronous
Sn. 15	Torque current setting	Torque current setting	—3000.00 ～3000.0	A	0	*	Synchronous/ Asynchronous
Sn. 16	Setting of magnetization current	Setting of magnetization current	—3000.00 ～3000.0	A	0	*	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
Sn.17	Torque current feedback	Torque current feedback	−3000.00 ～3000.0	A	0	*	Synchronous/ Asynchronous
Sn.18	Magnetizing current feedback	Magnetizing current feedback	−3000.00 ～3000.0	A	0	*	Synchronous/ Asynchronous
Sn.19	U phase current sampling	U phase current sampling AD value	0～ 4095	–	0	*	Synchronous/ Asynchronous
Sn.20	V phase current sampling	V phase current sampling AD value	0～ 4095	–	0	*	Synchronous/ Asynchronous
Sn.21	W phase current sampling	W phase current sampling AD value	0～ 4095	–	0	*	Synchronous/ Asynchronous
Sn.22	Motor control program update	1: Motor control program update	0～200	–	0	△	Synchronous/ Asynchronous
Sn.23	Use time setting	Enter the password first, then set the allowable cumulative power-on time. When set to 0, the usage time is no longer limited.	0～ 65535	h	0	○	Synchronous/ Asynchronous
Sn.24	Control program execution time	Monitor and control program execution time	0～ 65535	us	0	*	Synchronous/ Asynchronous
Sn.25	Parameter backup identifier	When this value is 888, it means that there is valid data in the parameter backup area	0～ 65535	–	0	*	Synchronous/ Asynchronous
Sn.26	Hall V phase current gain	The result after hall amplitude calibration	3000～ 5000	–	4096	△	Synchronous/ Asynchronous
Sn.27	Save	–	–	–	–	–	–
Sn.28							
Sn.29	Smart card parameter version	Smart card parameter version	0～ 65535	–	0	*	Synchronous/ Asynchronous
Sn.30	Application hardware version	Application hardware version	0～ 65535	–	0	*	Synchronous/ Asynchronous
Sn.31	Control hardware version	Application hardware version display	0～ 65535	–	0	*	Synchronous/ Asynchronous
Sn.32	A2, A3 display mode selection	0: Display parameter data 1: Display the corresponding address of parameters	0，1	–	0	○	Synchronous/ Asynchronous
Sn.33	Synchronous fast communication forbidden	0: synchronous fast communication enable 1: Synchronous fast communication forbidden	0，1	–	0	○	同/异

GH DRIVER

6

Set parameter by function

The chapter helps user for parameter setting and debugging by function of use.

6.1 Analog speed control

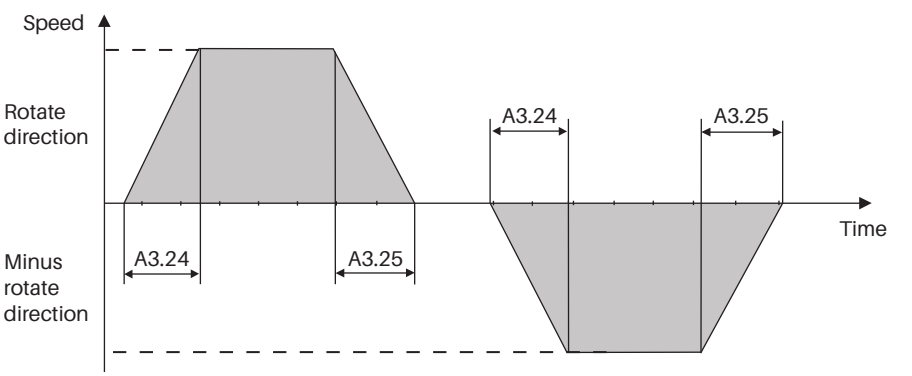
6.1.1 Terminal definition and function parameters

Analog value	Port	Signal	Function	position control parameter needs to be modified
±10V analog voltage	T2	FV	±10V analog voltage input	A2.01=0 A2.15=0
		FC	Analog voltage input common terminal	
	T3	I1	Operation enabling (forward or reverse is determined by polarity of the analog voltage)	
0~10V analog voltage	T2	FI	0~10V analog voltage input	A2.01=1 A2.15=0
		FC	Analog voltage input common terminal	
	T3	I1	Forward	
		I2	Reverse	

6.1.2 Relevant parameters of analog speed control

Function parameter	Item	Description	Set range	Unit	Factory setting
A3.23	corresponding max speed for 10V analog speed control	Corresponding max speed for 10V analog input voltage when set analog speed control	rpm	0-60000	6000
A3.24	Acceleration time during speed control	set motor acceleration time during speed control	0.01s/Krpm	0~20000	80
A3.25	Deceleration time during speed control	set motor deceleration time during speed control	0.01s/Krpm	0~20000	80
A3.27	speed ring ratio proportional gain during speed control	set speed ring proportional gain Kp, the value is higher, the gain is higher and the rigidity is greater. Set the parameter as high adapt possible without vibration generated by the system.	—	0~65535	100
A3.28	Speed ring integral time during speed control	set speed ringintegral time constant, the value is lower and the rigidity is greater	—	0~65535	40

6.1.3 Acceleration and deceleration control curve



6.1.4 Analog calibration and relevant parameter

Function code	Item	Description	Set range	Unit	Factory setting
Hn.35	Analog calibration function selection	0:Calibration function open 1:Calibration function close	-	0,1	0
Hn.36	Analog calibration allowable minimum threshold value	The minimum threshold value is the maximum value of the analog×H1.36 %, and the calibration is invalid when the value is lower than this value	%	0~50	10
Hn.37	Error warning range of analog calibrationpoint	The percentage of allowable deviation range of analog calibrationpoint	%	0~100	20
Hn.38	Analog positive bias	Set analog positive bias, Hn.35 is valid when it is 1	LSB	0~65520	0
Hn.39	Analog negative bias	Set analog negative bias, Hn.35 is valid when it is 1	LSB	0~65520	0
U2.09	Analog FV voltage value	FV analog quantity input voltage value monitoring	V	-10.00~10.00	0
U2.10	Analog FI voltage value	FI analog quantity input voltage value monitoring	V	0~10.00	0
Hn.40	FV analog calibration point speed	Set the speed of FV analog calibration point	rpm	0~65535	0
Hn.41	FI analog calibration point speed	Set the speed of FIanalog calibration point	rpm	0~65535	0
Hn.42	Analog filtering time	Analog filtering time	us	0~1500	1500
Hn.43	Analog zero speed deadzone range	When the digital quantity of analog quantity is less than this value, it is considered to be 0 velocity	LSB	0~65520	2
Hn.44	Analog max speed	The corresponding analog max speed	rpm	0~60000	8000
Hn.45	Automatic point correction function of analog quantity	0:Open 1: Close	-	0,1	0

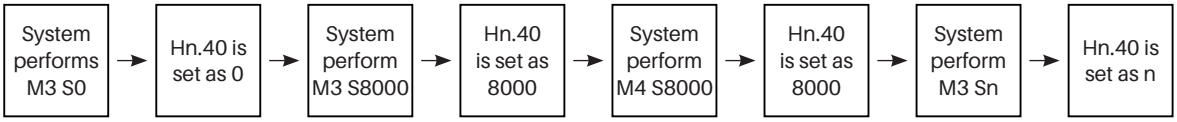
6.1.5 Analog calibration description (Take FV as example)

Analog calibration is a function for keeping the speed performed by driver consistent with the speed orders issued by the CNC system, and reduce speed deviation as possible. When deviation occurs between the speed performed by driver and the speed orders issued by the CNC system, analog calibration is required.

Unit of analog calibration is rpm. The system input 0 speed order in MDI mode, Hn.40 is set as 0, and the calibration begins, and then corresponding speed order shall be issued by the system for the point want to be calibrated, and the Hn.40 shall be set as the corresponding data. Each time Hn. 40 is updated, driver automatically calculates calibration factor again, and the detail practice is as follows:

For example: the system executesM3 S3000 order, the drive displays F. 2990, the deviation between actual operating speed and order issued by the system is 10 rounds. At this time, set parameter Hn. 40=3000 (the method of reverse calibration is same as forward calibration. The parameter is set as Hn. 40=3000 when the system execute M3 S3000).

The calibration operation flow chart is as follows (taking maximum speed A3.23=8000rpm as sample) :



Note: during first calibration (i.e., Hn.40=0), the maximum speed corresponding to ±10V must be set before setting the other speeds.

6.2 Pulse speed control

6.2.1 Terminal definition and function parameters

Orthogonal pulse speed forward/reverse

Definition	Port	Signal	Function	Relavent parameters need to modify
Enabling Control	T3	I1	Forward or/reverse rotation enabling (forward or reverse is determined by direction of the pulse)	A2.15=1
Pulse input port	T2	PA+	Orthogonal Pulse phase A input	A2.17=1 A2.16=15
		PA-		
		DB+	Orthogonal Pulse phase B input	
		DB-		
	T3	I11	24V high speed Pulse phase A input	A2.17=2 A2.16=15
		I12	24V high speed Pulse phase B input	
	T4	SA+	Orthogonal Pulse phase A input	A2.17=0 A2.16=15
		SA-		
		PB+	Orthogonal Pulse phase B input	
		PB-		

Direction+ pulse speed forward/reverse

Definition	Port	Signal	Function	Relavent parameters need to modify
Enabling Control	T3	I1	Forward or/reverse rotation enabling (forward or reverse is determined by direction of the pulse)	A2.15=1
Pulse input port	T2	PA+	Orthogonal Pulse phase A input	A2.17=1 A2.16=1
		PA-		
		DB+	Orthogonal Pulse phase B input	
		DB-		
	T3	I11	24V high speed Pulse phase A input	A2.17=2 A2.16=1
		I12	24V high speed Pulse phase B input	
	T4	SA+	Orthogonal Pulse phase A input	A2.17=0 A2.16=1
		SA-		
		PB+	Orthogonal Pulse phase B input	
		PB-		

6.2.2 Relevant parameters of pulse speed control

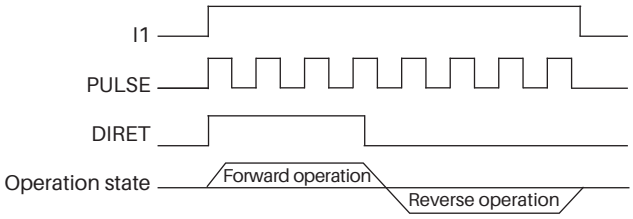
Function parameter	Item	Description	Unit	Set range	Factory setting
A3.24	speed control acceleration time	Set speed control acceleration time	0.01s/Krpm	0~20000	80
A3.25	speed control deceleration time	Set speed control deceleration time	0.01s/Krpm	0~20000	80
A3.27	Speed control scale gain	Set speed loop regulator scale gain. The gain is higher and the rigidity is bigger with greater value. Set the value as high as possible without vibration in the system	—	0~65535	100
A3.28	Speed control integral time	Set speed ring Ti regulator integral time. The rigidity is higher with lower value	—	0~65535	40

6.2.3 Pulse control sequence chart

Please see the following table for single pulse control interface, and see the right diagram for control sequence.

Control terminal	Function
SA+	PULSE+
SA-	PULSE-
PB+	DIR+
PB-	DIR-

Pulse interface of CNC system and GH X series

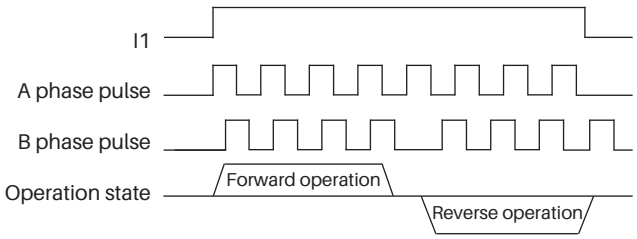


Single pulse input sequence chart

Please see the following table for dual pulse control interface, and see the right diagram for control sequence.

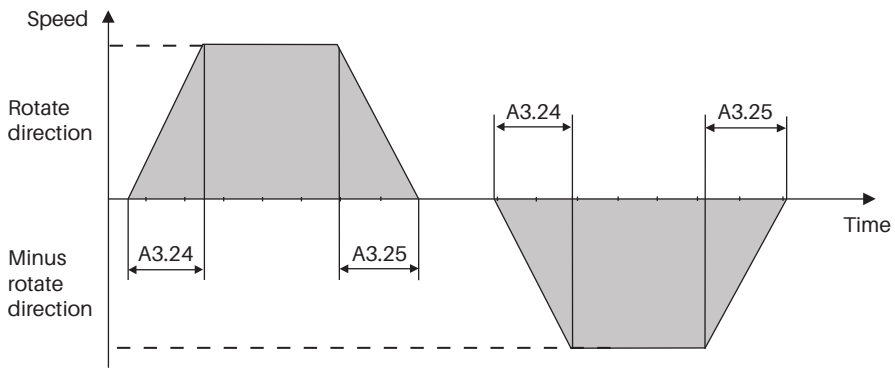
Control terminal	Function
SA+	PA+
SA-	PA-
PB+	PB+
PB-	PB-

Pulse interface of CNC system and GH X series



Dual pulse input sequence chart

6.2.4 Acceleration and deceleration control curve



6.3 Analog rigid tapping

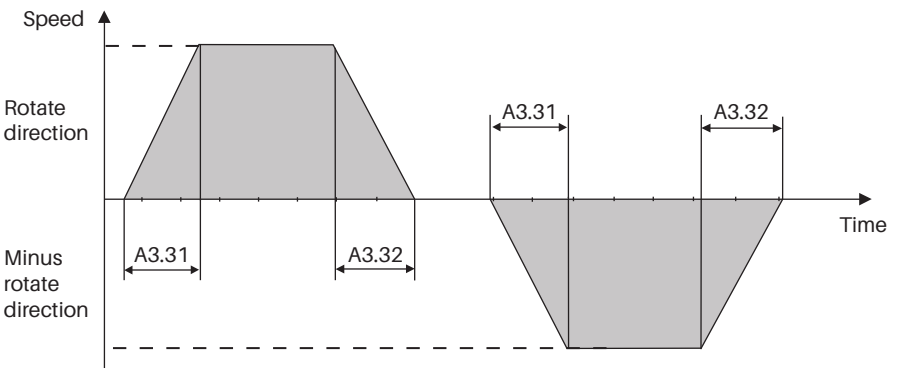
6.3.1 Terminal definition and function parameters

Pulse	Port	Signal	Function	position control parameter needs to be modified
±10V analog voltage	T1	FV	±10V analog voltage input	A2.01=0 A2.19=0
		FC	Analog voltage input common terminal	
	T3	I4	Rigid tapping (forward or reverse is determined by polarity of the analog voltage)	

6.3.2 Relevant parameters of analog rigid tapping

Function parameter	Item	Description	Unit	Set range	Factory setting
A3.30	maximum speed during rigid tapping	set maximum speed of motor during rigid tapping	rpm	0~60000	1500
A3.31	acceleration time during rigid tapping	Set acceleration time of motor during rigid tapping	0.01s/Krpm	0~20000	80
A3.32	deceleration time during rigid tapping	set deceleration time of motor during rigid tapping	0.01s/Krpm	0~20000	80
A3.33	Speed ring proportiongain during rigid tapping	set speed ring proportion gain during rigid tapping, the value is higher, the gain is higher and the rigidity is greater. Try to set large value When the system does not produce oscillations.	–	0~65535	100
A3.34	speed ring integral time during rigid tapping	set speed ring integral time Ti during rigid tapping , the value is smaller, the rigidity is greater.	–	0~65535	40

6.3.3 Acceleration and deceleration control curve



6.4 Pulse rigid tapping /pulse position

6.4.1 Terminal definition and function parameters

Orthogonal pulse rigid tapping

Definition	Port	Signal	Function	Position control parameter needs to be modified
Enable control	T3	I4	Forwardor/reverse rotation enabling (forward or reverse is determined by direction of the pulse)	A2.19=1
Pulse input port	T2	PA+	Orthogonal Pulse phase A input	A2.17=1 A2.16=15
		PA-		
		DB+	Orthogonal Pulse phase B input	
		DB-		
	T3	I11	24V High speed pulse phase A input	A2.17=2 A2.16=15
		I12	24V High speed pulse phase B input	
	T4	SA+	Orthogonal Pulse phase A input	A2.17=0 A2.16=15
		SA-		
		PB+	Orthogonal Pulse phase B input	
		PB-		

Direction+pulse rigid tapping

Definition	Port	Signal	Function	Position control parameter needs to be modified
Enable control	T3	I4	Forwardor/reverse rotation enabling (forward or reverse is determined by direction of the pulse)	A2.19=1
Pulse input port	T2	PA+	Orthogonal Pulse phase A input	A2.17=1 A2.16=1
		PA-		
		DB+	Orthogonal Pulse phase B input	
		DB-		
	T3	I11	24V High speed pulse phase A input	A2.17=2 A2.16=1
		I12	24V High speed pulse phase B input	
	T4	SA+	Orthogonal Pulse phase A input	A2.17=0 A2.16=1
		SA-		
		PB+	Orthogonal Pulse phase B input	
		PB-		

6.4.2 Relevant parameters of pulse rigid tapping /pulse position

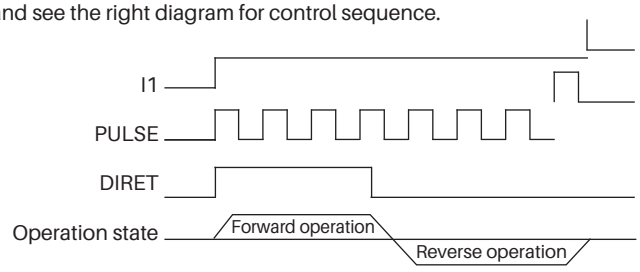
Function parameter	Item	Description	Unit	Set range	Factory setting
A3.33	Rigid tapping speed loop proportional gain	Set the analog/pulse rigid tapping speed loop proportional gain Kp, the higher the value, the higher the gain, the greater the stiffness.Try to set a larger value when the system does not produce oscillation	—	0~65535	100
A3.34	Rigid tapping speed loop integral time	Set the velocity integral time constant Ti of the velocity loop when the analog/pulse rigid tapping, the smaller the value, the greater the stiffness	—	0~65535	40
A3.35	Rigid tapping position loop proportional gain	When pulse rigid tapping is set, the position loop proportional gain Kp is set. The higher the value is, the faster the response to the position command will be, and the higher the stiffness will be. When the value is too large, it is easy to cause vibration.The smaller the value, the slower the response and the larger the following error	—	0~65535	200
A3.36	Rigid tapping position loop feed-forward	Set the position loop speed feed-forward Kw for pulse rigid tapping	—	0~65535	0

6.4.3 Pulse control sequence chart

Please see the following table for single pulse control interface, and see the right diagram for control sequence.

Control terminal	Function
SA+	PULSE+
SA-	PULSE-
PB+	DIR+
PB-	DIR-

Pulse interface of CNC system and GH X series

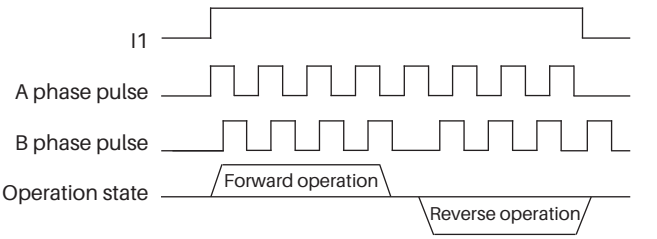


Single pulse input sequence chart

Please see the following table for single pulse control interface, and see the right diagram for control sequence.

Control terminal	Function
SA+	PA+
SA-	PA-
PB+	PB+
PB-	PB-

Pulse interface of CNC system and GH X series



Dual pulse input sequence chart

6.5 Accurate stop

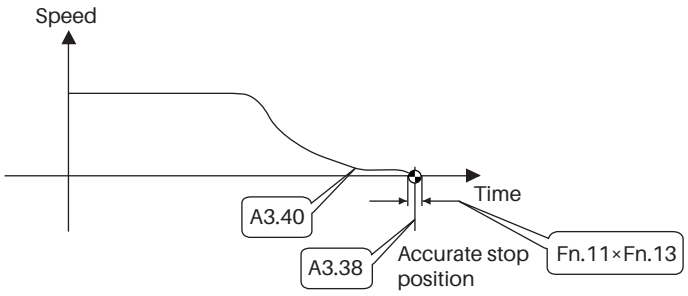
6.5.1 Terminal definition and function parameters

Accurate stop	Port	Signal	Function	position control parameter needs to be modified
Built-in encoder accurate stop	T3	I3	Accurate stop	A2.03=0
External encoder accurate stop		I3	Accurate stop	A2.03=1
Second accurate stop		I3	Accurate stop	A2.03=0/1/2
		I5	Approach switch input point	
		I9	Second accurate stop symbol	
Approach switch accurate stop		I3	Accurate stop	A2.03=2 A2.30=5
			Approach switch input point	

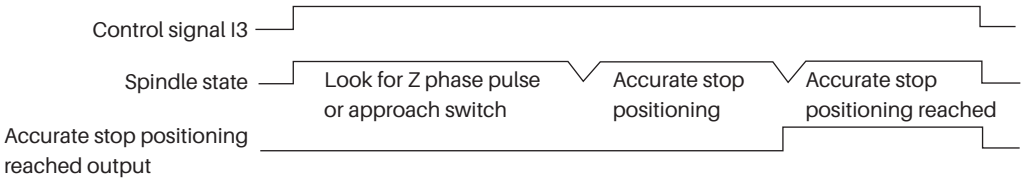
6.5.2 Relevant parameter of accurate stop

Function parameter	Item	Description	Unit	Set range	Factory setting
A3.38	First positioning bias	Set the pulse number of first accurate stop position	pulse	0~65535	0
A3.40	Positioning speed	Max speed of encoder Z-phase pulse or proximity switch signal	rpm	0~30000	100
A3.42	Positioning acceleration time	Set acceleration time of speed loop when positioning	0.01s/Krpm	0~20000	60
A3.43	Positioning deceleration time	Setdeceleration time of speed loop when positioning	0.01s/Krpm	0~20000	60
A3.44	Positioning speed loop proportional gain	Set the ratio of positioning speed loop proportional gain Kp. The higher the value, the higher the gain and the higher the rigidness	-	0~65535	100
A3.45	Positioning speed loopintegral time	Set the integral time constant Ti of the positioning speed loop. The smaller the value is, the faster the integral speed will be and the greater the rigidness will be	-	0~65535	40
A3.46	The first gain of positioning	Set the accurate stop first position loop proportional gain	-	0~60000	800
A3.47	The second gain of positioning	Set the second position of accurate stop loop proportional gain, which should be less than the first gain	-	0~60000	300
A3.48	Accurate stop gain switching threshold	The first and second gain switching thresholds.When the residual distance is less than the set value, switch the second positioning gain; otherwise, use the first gain	0.01R	0~10	1
A3.49	Second accurate stopposition	Set the pulse number of second accurate stop position	pulse	0~65535	1000

6.5.3 Accurate stop curve

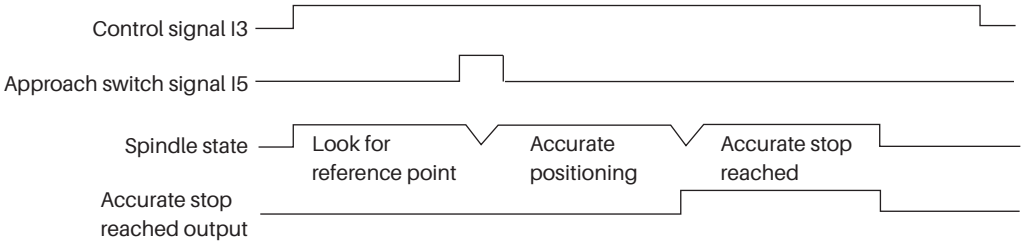


6.5.4 Accurate stop sequence chart



6.5.5 Approach switch accurate stop function

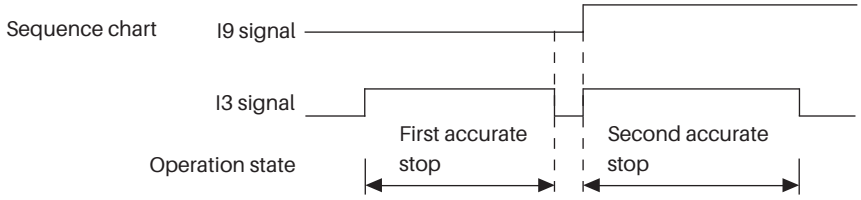
Proximity switch accurate stop is under non 1:1 rotating of spindle motor and spindle, also the external encoder cannot be installed due to mechanical structure reasons. Boss sensing mode is recommended.Its proximity switch control timing is shown in the figure below.



6.5.6 Second accurate stop function

The second accurate stop function is used for the second fixed point positioning as required by the user.

Note: when the second accurate stop is used, the function of I9 will change to first, second accurate stop select signal.



6.6 Swing

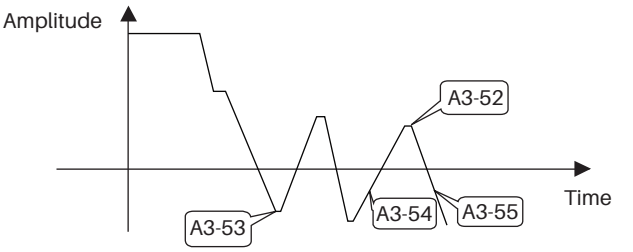
6.6.1 Port definition

Port	Signal	Function
T3	I6	Swing, for auto shifting of mechanical gear of the spindle system

6.6.2 Relevant parameter of swing

Function parameter	Item	Description	Unit	Set range	Factory setting
A3.51	Upper limit of swing speed	Set upper limit value of swing speed	rpm	0~60000	10
A3.52	swing forward scope	swing forward position	0.01°	0~36000	6000
A3.53	swing reverse scope	swing reverse position	0.01°	0~36000	6000
A3.54	swing acceleration	Speed loop acceleration time during swing	0.01s/Krpm	0~30000	200
A3.55	swing deceleration	Speed loop deceleration time during swing	0.01s/Krpm	0~30000	200
A3.56	swing current	Set the maximum torque current output of swing, and set it according to the percentage of motor rated current: Dn.01 × A3.56/100	%	0~30000	10
A3.57	The first gain of swing	Set the first position ring proportional gain of swing	-	0~60000	300
A3.58	The second gain of swing	Set the second position ring proportional gain of swing, the value should generally be less than the first gain	-	0~60000	100
A3.59	Swing gain switching threshold	The first and second gain switching thresholds of swing gain.When the residual distance is less than the set value, switch the second positioning gain; otherwise, use the first positioning gain.	0.01R	0~10	5

6.6.3 Swing process curve



6.7 Operation panel operation

The practice method is as follows:

1. The parameters that need to be modified: A1.02=1,A1.03=0.

2.In F. 0 menu, press the ENT key on the operation panel and enter digital input state, and then use the ∧ and ≫ keys on the panel to input the operating speed, and press ENT key again, and press ≫ key to make the motor run.

3. press ≫ key again, and the motor decelerates and stop running.

During operation of the motor, step 2 may be repeated at any time to change operation speed of the motor. If the operation direction of the motor needs to be changed, parameter Cn.00 may be set to realize.

Caution

Operation panel operation is only a simple operation mode which is generally for test. It's suggested that the speed of the motor shall not be set too high during operation of operation panel, shall recover their original values after test of operation panel, namely, A1.02=0,A1.03=0.

6.8 Modbus communication settlement

6.8.1 485 communication relevant parameter setting

Function parameter	Item	Description	Unit	Set range	Factory setting
Bn.00	Modbus communication station No.	Modbus slave station No. setting	-	0~255	1
Bn.01	Modbus Baud rate communication	0: 9600 1: 19200 2: 38400 3: 57600 4: 115200	-	0~4	1
Bn.02	Modbus odd-even check	0: none check 1: even check 2: odd check	-	0~2	0
Bn.03	modbus high-low bytes select	0: lower at front 1: higher at front	-	0 , 1	0
Bn.04	485 terminal resistance select	0: none 1: select	-	0 , 1	0
Bn.05	Modbus TCP IP address	Modbus TCP IP address setting, 192.168.a.b, Bn.05 is a×256+b	-	0~65535	0

Note: the driver shall be restarted after Modbus 485 communication check selection .

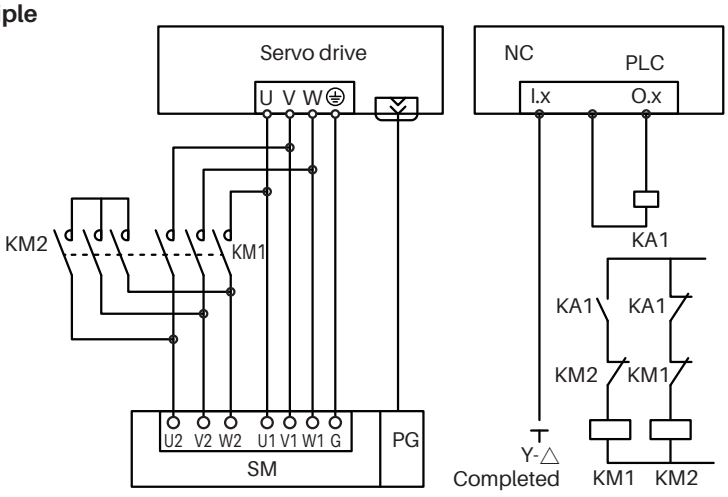
6.9 Star-Delta switch

Due to the special needs of machining, the motorized spindle is not only required to have a high speed, but also need to have a strong torque characteristics in the low speed zone, There will be Star-Delta switch for motorized spindle coilin order to meet the needs.Star-Delta switching devices are mostly composed of contactor and relay, and the general Star-Delta switching devices are provided by users themselves.Star-Delta switching control shall be provided by the upper computer system, switching logic must follow the principle of "switching under the condition of motor zero speed and enable closed", and then give enabling and rotating command, never use the switch with enabling.

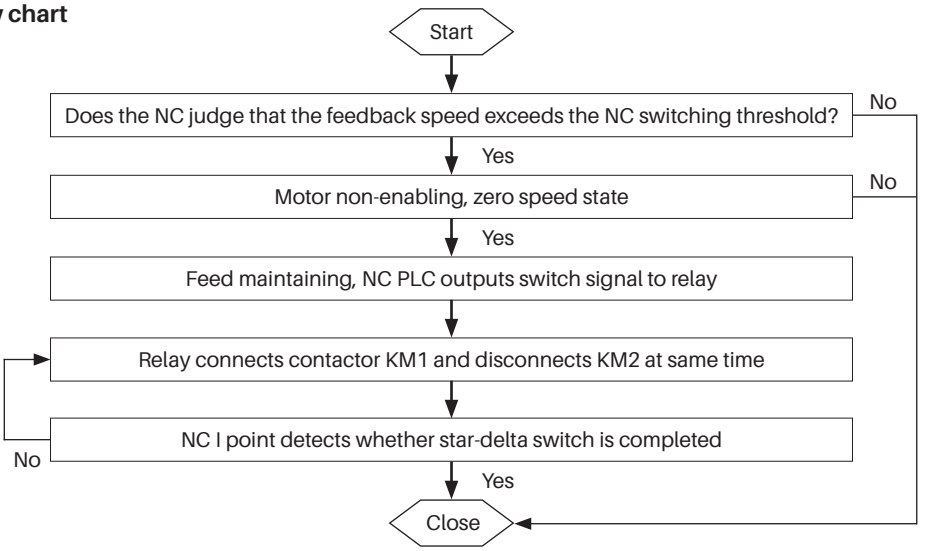
◆ Star-Delta conversion control method

The winding switching is controlled by the upper system, which simulates mechanical gear shifting to control. The switching output control signal is sent by the upper system through PLC, and the switching action status signal is fed back to the upper system through PLC.

Control wiring principle



Functional flow chart



Relevant parameter

Function code	Parameter name	Description	Unit	Parameter range	Initial value
Fn.21	Star-Delta switching method	0: No switching 1: automatic, automatic switching according to feedback speed, output multi-function output point and enableaccording to delay time 2: Manually switch through the multi-function DI pointand enable according todelay time 3: automatic, automatic switching according to feedback speed, output multi-function output pointandmulti-function DI is fed back to the enabler as the contact of contactor 4: Manually switch throughmulti-function DI pointandmulti-function DI is fed back to the enabler as the contact of contactor	-	0 ~ 4	1
Fn.22	Star-Delta switching speed	When the actual speed exceeds this preset value, then switch to Delta connection, or star connection	rpm	0 ~ 30000	3000
Fn.23	Star-Delta switching speed tolerance	Dead zone range of star-Delta switch, namely: When SPD> (Fn.22 +Fn.23) is Delta connection, When SPD< (Fn.22-Fn.23) is star-connection In other cases, keep the same state	rpm	0 ~ 30000	100
Fn.24	Star-Delta switching time	This parameter determines enable switch time	ms	0 ~ 3000	1000
Dn.01	Rated current of first motor	Rated current setting of first motor	A	0 ~ 6000.0	11.5
Dn.02	Rated speed of first motor	Rated speed setting of first motor	rpm	0 ~ 60000	1500
Dn.03	Rated voltage of first motor	Rated voltage setting of first motor	V	0 ~ 20000	380
Dn.04	Rated power of first motor	Rated power setting of first motor	KW	0 ~ 6000.0	5.5
Dn.05	Power factor of first motor	Power factor setting of first motor	-	0 ~ 1.00	0.86
Dn.06	Rated frequency of first motor	Rated frequency setting of first motor	HZ	0 ~ 6000.0	50.8
Dn.07	Rated torque of first motor	Rated torque setting of first motor	Nm	0 ~ 60000	35
Dn.08	Pole pairs of first motor	Pole pairs setting of first motor	pairs	0 ~ 10000	2
Dn.09	Max speed of first motor	Max speed output setting of first motor	rpm	0 ~ 60000	3000
Dn.21	Constant power max speed of first motor	Constant power max speed setting of first motor	rpm	0 ~ 60000	1500

Relevant parameter

Function code	Parameter name	Description	Unit	Parameter range	Initial value
Cn.16	Motor 1 current loop proportional parameter	Current loop proportional parameter KpSetting	-	0 ~ 30000	100
Cn.17	Motor 1 current loop integral time constant	Current loop integral time constant Ti setting	-	0 ~ 300.00	4
Dn.25	Rated current of second motor	Rated current setting of second motor	A	0 ~ 6000.0	11.5
Dn.26	Rated speed of second motor	Rated speed setting of second motor	rpm	0 ~ 60000	1500
Dn.27	Rated voltage of second motor	Rated voltage setting of second motor	V	0 ~ 20000	380
Dn.28	Rated power of second motor	Rated power setting of first motor	KW	0 ~ 6000.0	5.5
Dn.29	Power factor of second motor	Power factor setting of second motor	-	0 ~ 1.00	0.86
Dn.30	Rated frequency of second motor	Rated frequency setting of second motor	HZ	0 ~ 6000.0	50.8
Dn.31	Rated torque of second motor	Rated torque setting of second motor	N.M	0 ~ 60000	35
Dn.32	Pole pairs of second motor	Pole pairs setting of second motor	pairs	0 ~ 10000	2
Dn.33	Max speed of second motor	Max speed output setting of second motor	rpm	0 ~ 60000	8000
Dn.45	Constant power max speed of second motor	Constant power max speed setting of second motor	rpm	0 ~ 60000	1500
Cn.37	Motor 2 current loop proportional gain	Second motor current loop proportional gain Kp setting	-	0 ~ 30000	100
Cn.38	Motor 2 current loop integral time constant	Second motor current loop integral time constant Ti setting	-	0 ~ 300.00	4

6.10 S curve

6.10.1 S curve related parameters

Function code	Parameter name	Description	Unit	Parameter range	Initial value
Cn . 03	Acceleration starts S curve time	Acceleration starts S curve time setting	ms	0 ~ 2000	0
Cn . 04	Acceleration end S curve time	Acceleration end S curve time setting	ms	0 ~ 2000	0
Cn . 05	Deceleration starts S curve time	Deceleration starts S curve time setting	ms	0 ~ 2000	0
Cn . 06	Deceleration end S curve time	Deceleration end S curve time setting	ms	0 ~ 2000	0

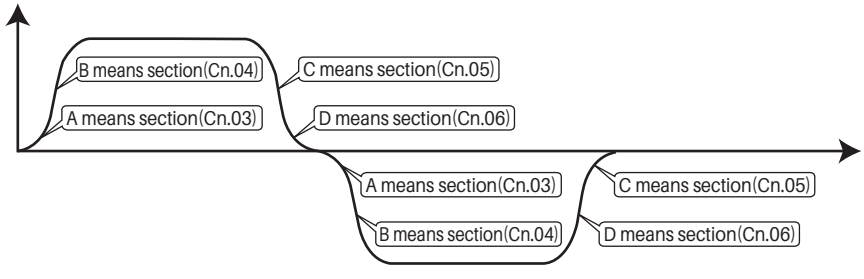
6.10.2 S-curve description

This module in accordance with the default parameters to draw the S speed curve, this module is based on T-curve, the part beyond S-curve is belonging to the T-curve;

S curve is divided into four sections, defined as ABCD, A is accelerated acceleration phase,corresponding parametercn.03, B is accelerated deceleration phase, corresponding parametercn.04, C is decelerated acceleration stage, corresponding parametercn.05, D is decelerated deceleration phase, corresponding parametercn.06, four stages of S curve time can be set separately (set by Cn.03 ~ Cn.06);

Principle is making the acceleration and deceleration into T-curve, not rectangular curve, the speed can be S-type;

6.10.3 S-curve graph



6.11 field bus application

According to different bus types and the host computer, the corresponding parameters can be set as follows:

Function code	Parameter name	Description	Unit	Parameter range	Initial value
A1.02	Command mode selection	0: terminal operation mode 1: panel operation mode 2: field bus mode 3: multi-functional logic DI mode	-	0~3	2
Bn.06	High speed field bus selection	0: Ethercat 1: Profinet 2: Powerlink 3: Ethernet-IP 4: Mechatrolink II 5: Mechatrolink III 6: Profibus	-	0~6	4
Bn.07	Profinet MAC address	Profinet MAC address setting	-	1~255	1
Bn.08	Powerlink station No.	Powerlink slave station No. setting	-	1~239	1
Bn.09	Ethernet-IP station No.	Ethernet-IP slave station No. setting	-	0~255	1
Bn.10	Mechatrolink II station No.	Mechatrolink II slave station No. setting	-	0~255	4
Bn.11	Mechatrolink III station No.	Mechatrolink III slave station No. setting	-	0~255	4
Bn.12	Mechatrolink III expand station No.	Mechatrolink III expand station No.	-	0~255	48
Bn.13	Bus interpolation cycle setting	Bus cycle time	ms	0~65535	3
Bn.14	Bus domain time parameters setting	If bus communication disconnect time exceeds, this preset value, which is considered as lost connection	ms	0~65535	200
Bn.15	Bus interrupt cycle	Bus interrupt cycle (retrieved automatically from the bus)	us	0~65535	1
Bn.16	Bus speed gear ratio numerator L	Bus speed command gear ratio numerator	-	1~4294967296	1
Bn.17	Bus speed gear ratio numerator H				
Bn.18	Bus speed gear ratio denominator L	Bus speed command gear ratiodenominator	-	1~4294967296	1
Bn.19	Bus speed gear ratio denominator H				
Bn.20	Mechatrolink bus master station selection	0:Syntec CNC controller 1:LNC CNC controller 2:LYNUC CNC controller 3:LT CNC controller 4:HUST CNC controller 5:KEYENCE controller	-	0~6	0
Bn.21	EtherCAT master station selection	0: Beckhoff controller 1: i5 CNC controller 2:CPTEC controller	-	0~2	0
Bn.22	Profibus slave station No.	Profibus slave station No. setting	-	1~255	1

6.12 DA1, DA2 analog output function

6.12.1 The relevant parameters as following

Function code	Parameter name	Description	Unit	Parameter range	Initial value
Fn.80	DA1 output source selection	0: Internal register 1:Current torque command output according to maximum torque ratio 2: Current torque feedback output according tomaximum torque ratio 3: Current speed commandoutput according to the ratio of maximum speed 4: Current speed feedback output according to the ratio of maximum speed 5: Current feedbackoutput according to the maximum proportional current 21:Current torque command absolute value 22:Current torque feedbackabsolute value 23:Current speed commandabsolute value 24:Current speed feedbackabsolute value	—	0～24	0
Fn.81	DA2 output source selection				
Fn.82	DA1 zero offset	Output offset setting, the offset value if the setting is 0	%	—100.00～100.00	0
Fn.83	DA2 zero offset				
Fn.84	DA1 outputs internal registers	Digital -100% ~ 0 ~ 100% Analog 0 ~ 5V ~ +10V Analog -10 ~ 0 ~ +10V	%	—100.00～100.00	0
Fn.85	DA2 outputs internal registers				
Fn.86	DA1 output gain	DA1 output gain setting. The actual output value needs to be multiplied by the gain value for output, which is equivalent to the slope setting	—	—10.00～10.00	1
Fn.87	DA2 output gain				
U2.12	Analog output DA1 voltage	Used for monitoring voltage output value: -10 ~ 0 ~ +10V	—	—10.00～10.00	0
U2.13	Analog output DA2 voltage				

6.12.2 Take DA1 analog output application scheme as an example to illustrate as follows:

Application Scheme 1:

When Fn.80 =0, the analog voltage value of DA1 is determined by the parameter Fn.84, namely the register value of D7584. The register value is -10000 ~ 10000, corresponding to the output voltage value of DA1 of -10 ~ +10V respectively.At this time, it can be used for user-defined function operation or internal PLC program operation to assign value to D7584 register, and output -10 ~ +10V voltage value in proportion.When using the analog output offset, adjust the offset by modifying Fn.82.

ApplicationScheme 2:

When Fn.80 does not equal 0, the voltage value of analog quantity representing DA1 is set by the inherent functions 1 ~ 24 at the bottom of the driver.When Fn.80 =4, represents the current speed feedback value according to the highest motor speed value Dn.09 proportional output voltage of -10 ~ +10V.When Fn.80 =24, the absolute value of current speed feedback is 0 ~ +10V in proportion to the output voltage of Dn.09 according to the maximum motor speed.When DA1 output is actually processed, Fn.86 output gain and Fn.82 zero offset function are added. The final calculation formula of the actual output voltage value is: DA1 voltage value =[(U1.02/ Dn.09)× Fn.86 + Fn.82]×10, and DA1 output voltage can be monitored in real time through U2.12.

GH DRIVER

7

Trouble shooting

The chapter introduces common faults and remedies of the driver.

List of fault alarm and remedies

Protection function is activated, and LED digital tube displays fault information, fault output relay is activated and driver stops output when drive fault occurs.

Please see Table 9-1 for faults and remedies of GH DRIVER.

For technical support, please contact the manufacturer.

Table 7-1 Faults and remedies

Error code	Error	Possible causes of failure	Countermeasure
E.ou	over voltage	When bus voltage detection exceeds the upper threshold (Pn. 00), alarm and reset.	● Check whether the brake resistance is appropriate ● Reducing Acceleration and Deceleration ● Check whether the input RST AC voltage is normal ● Observing bus voltage (U.0 or U1.05) ● This alarm cannot be shielded
E.Uu	Undervoltage	When bus voltage detection exceeds the lower threshold (Pn.01), alarm will be given and it can be reset.	● Check whether the input RST AC voltage is normal ● Observing bus voltage (U.0 or U1.05) ● This alarm cannot be shielded
E1. oc	over current	The driver 316J detects the high current signal and passes it to the CPU through the IO point. It can't be reset.	● Power-down test driver module ● Check whether motor parameters are set incorrectly ● Current during operation (A.0 or U1.03) ● This alarm cannot be shielded
E1. oc2	over current	● Current current exceeding 1.1 times of rated current of driver is less than 1.3 times of alarm point current. If this state lasts for 60 minutes, the alarm can be reset. ● Current current exceeding 1.3 times of rated current of driver is less than 1.5 times of alarm point current. If this state lasts for 30 minutes, alarm can be set and reset. ● Current current exceeding 1.5 times the rated current of the driver is less than 1.6 times the set alarm point current. If this state lasts for 15 minutes, the alarm can be reset. ● Current current exceeding 1.6 times the rated current of the driver is less than 1.7 times the set alarm point current. If this state lasts for 7.5 minutes, the alarm can be reset. ● Current current exceeding 1.7 times the rated current of the driver is less than 1.8 times the set alarm point current. If this state lasts for 5 minutes, the alarm can be reset. ● Current current exceeding 1.8 times the rated current of the driver is less than 1.9 times the set alarm point current. If this state lasts for 3 minutes, the alarm can be reset. ● Current current exceeding 1.9 times the rated current of the driver is less than 2 times the set alarm point current. If this state lasts for 1 minute, the alarm can be reset. ● If the current exceeds 2 times the rated current of the driver, and the state lasts for 30 seconds, the alarm can be reset.	● Power-down test driver module ● Check whether motor parameters are set incorrectly ● Current during operation (A.0 or U1.03) ● This alarm cannot be shielded

Error code	Error	Possible causes of failure	Countermeasure
E1. oc3	over current	When Holzer sampling reaches Holzer calibration current, it will alarm and reset.	● Power-down test driver module; ● Check whether the motor parameters are set incorrectly. ● Current during operation (A.0 or U1.03) ● This alarm cannot be shielded
E1. oH1	Alarm of module temperature overheating	Through temperature module AD detection, if the actual temperature exceeds 90 degrees, the alarm and it can be reset.	● Observation of current magnitude during operation (A.0 or U1.03) ● Observation of actual module temperature (U2.23) ● This alarm cannot be shielded"
E1. oH3	Motor Overheat Alarm 2	Providing input point status judgement to CPU through thermal switch in motor,it can be reset.	● Check whether the motor fan is normal or not ● Check whether the parameters of motor overheating alarm (Pn.10) are set incorrectly in normal opening and closing ● Pn.10=9 shield this alarm"
E1. EL	Encoder Coder disconnection	If the CRC test of encoder communication continues to make errors or the alarm code of the encoder itself continues to appear, alarm and it can be reset.	● Check whether the interface between driver and motor encoder is inserted properly ● Check whether the motor encoder card is abnormal ● Check the parameters (Pn.06 and Pn.07) to help find the cause of the failure ● This alarm cannot be shielded"
E1. EC	Z Signal Fault of Encoder	Encoder counting continues to accumulate. When encountering zero-bit signal, the accumulated value is cleared to compare the accumulated value. If the theoretical count of one circle of the encoder exceeds two times of that of the set encoder and occurs two times in a row, the alarm will be given and reset.	● Check whether the interface between driver and motor encoder is inserted properly ● Check whether the encoder Z signal is normal ● Check whether the encoder resolution is misconfigured ● Pn.04=0 shield this alarm"
E1. EC2	Z abnormal alarm of external encoder	External encoder counting continues to accumulate. When encountering zero-bit signal, the accumulated value is cleared to compare the accumulated value. If it exceeds the theoretical count of one circle of the encoder set twice in a row, it will alarm and reset.	● Inspection of external encoder cables ● P1.35=0 shield this alarm
E1. ES	Encoder Learning Fault	When the synchronous motor identifies the position of magnetic pole, it will alarm and reset if it overruns.	● Check motor rated current parameter Dn.01 ● Inspection of motor power wiring

Error code	Error	Possible causes of failure	Countermeasure
E1. EP	Encoder Battery Alarm	Tamagawa 8401/8501 battery alarm, when the battery alarm occurs, need to re-proofread the zero, because the zero will be lost, it can be reset	● Check encoder cables ● Check battery voltage ● P1.05=0 shield this alarm"
E1. ER	Signal error of 1vpp encoder	Abnormal detection of 1vpp signal	● Calibrate the encoder by En.49 ● Adjusting the distance between the detection head and the gear disc
E1. oS	Over Speed Alarm	If the actual speed exceeds the overspeed alarm threshold (Pn. 13) and lasts for 40 ms, the alarm will be alarmed. This parameter is set to 0 to directly alarm OS, which can be reset.	● Check if the overspeed alarm threshold (Pn.13) is not set properly ● Check encoder cables ● Check motor parameters ● This alarm cannot be shielded"
E1. oP	Overshoot of follow-up error	If the actual follow-up error exceeds the alarm threshold of follow-up error (Pn.16, Pn.17) and lasts for 50 ms, the alarm and it can be reset.	● Check whether the follow-up error thresholds (Pn.16, Pn.17) are inappropriate ● Check the rigidity parameters of position ring and velocity ring ● Pn.16=0, Pn.17=0 shield this alarm"
E1. SE	Over Speed Alarm	The difference between the output speed and the feedback speed is greater than the stall alarm threshold (Pn. 14) and lasts the alarm window time (Pn. 15). The alarm and it can be reset.	● Check whether the alarm thresholds for speed errors (Pn.14, Pn.15) are inappropriate ● Check the Rigid Parameters of Speed Ring ● Check if the encoder is abnormal ● Pn.14=0, Pn.15=0 shield this alarm"
E1. rA	Holzer anomaly	When the driver is powered on, after the initialization of AD, Holzer collects the intermediate value. If the difference between this value and the theoretical median value is 600 digits, i.e. 0.5V, the alarm will be alarmed and reset.	● Check whether Hall sampling values (Sn.19 and Sn.20) are near 2048. ● Check whether the interface between the control board and the main circuit is not well connected ● Check whether the main circuit unit Hall element is normal or not ● This alarm cannot be shielded"
E1. FE	High CPU usage	When the usage rate of motor control program exceeds 90%, it can alarm and reset.	● Check whether the carrier frequency parameters are set properly (Sn.06) ● This alarm cannot be shielded"
E1. EE	Base EE Reading Failure	● This alarm is activated only once. ● Read the power code from the driver EE. If the power code is not in the driver power code table, the alarm can be reset."	● Setting by power code parameters (Sn.01) ● This alarm cannot be shielded"

Error code	Error	Possible causes of failure	Countermeasure
E1. oL	overload motor	● Current current reaches 115% of motor rated current and lasts 80 minutes to alarm. ● Current current reaches 125% of motor rated current and lasts 40 minutes to alarm. ● Current current reaches 135% of motor rated current and lasts 15 minutes to alarm. ● Current current reaches 145% of motor rated current, and lasts 6 minutes to alarm. ● Current current reaches 155% of motor rated current, and lasts 4 minutes to alarm. ● Current current reaches 165% of motor rated current and lasts 2.5 minutes to alarm. ● Current current reaches 175% of motor rated current, and lasts 2 minutes to alarm. ● Current current reaches 185% of motor rated current, and lasts 1.5 minutes to alarm. ● Current current reaches 195% of motor rated current, and lasts 1 minute to alarm. ● Current current reaches 225% of motor rated current, and lasts 30 seconds to alarm. ● Current current reaches 245% of motor rated current, and lasts 10 seconds to alarm. ● The alarm curve can be adjusted by gain parameter (Pn.21)	● Check overload gain parameters (Pn.21) ● Check whether motor parameters are set incorrectly ● Current during operation (A.0 or U1.03) ● This alarm cannot be shielded"
E1. oL2	Motor low speed overload	When the actual speed of the motor is lower than the low-speed overload alarm speed threshold (P1.18) and the actual current exceeds the current calculated by the low-speed overload rate (P1.20) and lasts for the low-speed overload time (P1.19), the alarm can be reset.	● Check if overload time is too small ● Check whether motor parameters are set incorrectly ● Current during operation (A.0 or U1.03) ● Pn.18, Pn.19, Pn.20 have one for 0, then direct alarm ● This alarm cannot be shielded"
E1. CPU	Small CPU fault	By detecting the heartbeat of a small CPU, the heartbeat of a small CPU that lasts for 50 ms disappears, then the alarm is given and the heart can be reset.	● Check that the small CPU version number (Sn.08) is correct ● This alarm cannot be shielded"
E1. PA	Smart Card Parametric Abnormality	● Smart Card is not installed, but Smart Card is turned on ● Smart card not installed or wiring error"	● Check whether smart cards are installed ● Check Smart Card Parameters"
E1. JC	Main circuit contactor not suction	Driver voltage above 22KW is too low or contactor failure	● Check incoming voltage or contactor
E1.SrY	Motor parameter identification error	Failure alarm when identifying resistance and inductance parameters of motor	● Check rated motor parameters ● Check motor wiring ● Check drive Hall information is correct"

Common fault analysis

The drive and the motor may fail to operate to the design requirements due to parameter setting or wiring error during system startup. As no alarm code output from the driver, please make appropriate treatment referring to the section.

■ No display on drive after power-on

Trouble: the manipulator has no display after power-on of the driver. The trouble may be caused by several reasons, and shall be checked carefully. please remove all control lines before inspection.
Reason: drive rectifier bridge failure, inverter bridge failure, switching power supply failure or starting resistance failure.

◆ Main circuit indicator inspection

For situation which indicator is on, rectifier bridge is normal, charging resistor is normal and switching power supply failure, please contact manufacturer for repair or professional maintenance;
Please make further inspection when the indicator is off.

◆ Check the driver input power is normal or not.

Measure three-phase AC voltage of R / S / T terminal of the driver with multimeter and check for normality. Normal power supply: 330V <power <440V.
No voltage indicates power failure;
Please make further inspection when it's normal.

◆ Rectifier bridge inspection

Measure the rectifier bridge with multimeter by the method specified in " CTB product maintenance manual ".
If the rectifier bridge is normal and the charging resistor is burned, please contact manufacturer for repair or professional maintenance;
If the rectifier bridge is damaged, please replace the rectifier bridge. Manufacturer repair is recommended.

■ Cannot run

Trouble: does not rotate when driver power-on and displays f. 0 andCNC system sends operation order.
Reason: CNC system fails to send frequency command or operation order, control logic error and improper parameter setting may lead to non-operation. It shall be inspected carefully.

◆ Inspect the speed setting value on the driver, namely the displayed value of F.

Make the CNC system execute S1000 M3, and observe the display on driver is F. 1000 or not.
If it is F. 1000, check driver's output frequency U1-01, feedback frequency U1-02;
If it is not F. 1000, please inspect that the CNC system sent frequency command and operation command correctly or not.

◆ Test driver's output frequency O and feedback frequency b

If U1-01 is same with U1.00, the U1-02 is 0, please inspect motor and wiring, and contact manufacturer for repair or professional maintenance;
If U1-01 is not same with U1-00, or equals to 0, please inspect acceleration parameter A3.24, or contact with the manufacturer.

◆ Measure command signal sent by CNC system

If it's normal, the driver control panel receive signal falsely, please replace control panel or contact manufacturer for repair.
If it's not normal, check the CNC system interface and driver wiring as well as valid electrical level of driver signal.

◆ Check motor and wiring

Remove motor connection wire from driver, and measure insulation against ground of U, V, W of the motor by tramegger. Measure with the minimum ohms range of a multimeter to check the resistance among the 3-phase is in balance or not. Judge the motor and wiring is normal or not.
If it's normal, the driver module is burned;
If it's not normal, replace the motor or wiring.

◆ runs in low speed

Trouble: adjust set speed (frequency), the U1-00 set speed (frequency) on the manipulator is shown normal. However, the speed is very low (about dozens rpm), and does not change with the set speed.
Reason: motor encoder feedback abnormal or motor sequence error.

◆ Check the motor and encoder wiring

Normal wiring: U / V / W of motor and driver are connected correspondingly, and the wiring of encoder is correct.
Abnormal: adjust wiring;
Normal: inspect that the encoder line and physical line number of encoder are in conformity with A3-06.

◆ Inspect encoder signal

Method: driver power-on, respectively measure A + and A-, B + and B-, Z +and the Z- on control panel of the driver in standby state with DC 20V gear of multimeter.
The normal value is about +3 V or-3V.
Abnormal: inspect encoder cable, and monitor the countering of U2-00.
Normal: encoder failure, replace the encoder.

◆ Inspect encoder cable

Method: Remove both ends of the encoder cable respectively from the motor and driver, measure the core cables respectively with ohm gear of multimeter to check conduction.
Abnormal: encoder cable failure, replace the cable;
Normal: encoder failure, replace the encoder.

■ Speed setting error

Trouble: great deviation between the set speed (frequency) of U1-00on driver and set speed of S command on CNC system.
Reason: the parameter setting on driver or CNC system does not match, or analog interface failure.

◆ Adjust parameter setting of driver and CNC system

Check the drive parameters: A2-01 analog type A3-23 maximum output speed
Check the CNC system parameter setting:
If the settinGH are normal, measure voltage of analog port with multimeter.

◆ Check analog port voltage

Normal port voltage = set speed / maximum speed× 10 (V)
Take the maximum speed 8000 rpm of for example, it shall be inspected by the following table, and error within 0.1% is normal.

CNC system set speed rpm		400	800	1000	2000	4000	8000
analog port	Unipolar	0.50	1.00	1.25	2.50	5.00	10.00
Voltage	Bipolar	0.50	1.00	1.25	2.50	5.00	10.00
Driver displays set speed		400	800	1000	2000	4000	8000

Correct detection value: driver analog port failure, replace driver control panel;
Wrong detection value: CNC system analog output port failure, replace interface boardof the CNC system.

■ Accurate stop position is not accurate

Common phenomenon of inaccurate accurate stop:
Accurate stop angle has deviation with tool magazine after first use or replacement of motor and synchronous belt;
Position change of accurate stop after a certain time operation;
Occasional inaccurate stop position during operation

◆ Change of accurate stop position after a certain time operation

Phenomenon: deviation is stable after change of accurate stop position, and does not recover.
Inspect: the synchronous belt is loose or not; the synchronous belt wheel of motor is loose or not; the encoder of motor is loose or not.
Treatment: please make corresponding repair if the above phenomenon occurs, or contact with the manufacturer to replace encoder.

◆ Occasional inaccurate accurate stop position during operation

Please contact with the manufacturer to replace encoder after confirming the following situation.
○ The cables of encoder are connected reliably, and the shielding layer are well grounded.
○ The logic of accurate stop program of the CNC system is correct.
○ The fault still occasionally occurs after carrying out manual accurate stop in MDI mode several times.

■ Asynchronous motor alarming OC3 during deceleration

This question is generally considered from the following points:
○ Owing to the excessive rigidity of the current loop, it is necessary to adjust the current loop KP (Cn. 19) and the current loop integration time (Cn. 20).
○ If the excitation current is too large, the rated current (Dn. 01) and power factor (Dn. 05) need to be adjusted.
○ The magnetic field orientation is inaccurate and the slip compensation coefficient (Dn.22) needs to be adjusted.
○ The maximum current output is not suitable, and the maximum current output limit (Cn.10) needs to be adjusted.
○ The minimum excitation current is not suitable. Dn.20 needs to be adjusted. This parameter can be set to 0.1A.

■ PMSM alarming OC3 during deceleration

Causes may lie in:
○ Current loop rigidness is too high - adjust current loop KP (C1.31) and current loop integral time (C1.32)
○ Unsuitable max output current - adjust max current output limit (D1.26)
○ Motor short circuit to ground or turn to turn short circuit, need measure motor brake resistance and ground insulation

■ PMSM with slow acceleration and deceleration

Commonly, please check items below:
○ Motor encoder angle studying is not suitable
○ Max. current setting not suitable (Cn.10)
○ Motor acceleration and deceleration parameter not suitable (Cn.01、Cn.02)
○ Acceleration and deceleration setting is slow in CNC side

■ Asynchronous motor with slow acceleration and deceleration

Commonly, please check items below:

- ○ Max. current setting not suitable (Cn.10)
- ○ Motor acceleration and deceleration parameter not suitable (Cn.01、Cn.02)
- ○ Acceleration and deceleration setting is slow in CNC side
- ○ Field current configuration setting is small(Dn.01,Dn.05)
- ○ Magnetic field orientation is incorrect
- ○ High speed range current is limited (Dn.18), if it is set high, over current may happen

■ Over voltage alarm during deceleration

Driver displays E1. OV or E1. Uv1 alarm.

Reason: deceleration parameter of driver is set inappropriately and driver brake circuit fails or braking resistor burned.

◆ Check acceleration and deceleration parameters of the driver

Stop the driver, and increase setting value of A3.25. Increase 0.5 each time, and restart again to observe. Make further inspection if the alarm still exists.

◆ Inspect braking resistor

When the display is power off, measure resistance at both ends of the braking resistor with ohm gear of multimeter, If the resistance is infinite, the braking resistor is burned. If it's same with nominal resistor, the braking resistor is normal.

◆ Confirm driver fault

Make the driver run, and then measure DC bus (between P (+) and N) voltage during deceleration of the driver with DC 1000V gear of multimeter. Measured value greater than 750V indicates fault in brake circuit of the driver, or external brake unit, please contact with the manufacturer for repair.

■ Trouble due to encoder failure

- ○ Rotates in low speed smaller than 100 rpm, the operating current exceeds the rated current, and torque reaches100%, the speed setting dose not work.
- ○ During high-speed operation (greater than 3000 rpm), the speed cannot reach the set speed, and the torque reaches 100%.
- ○ During low-speed operation, it has obvious mechanical noise, the speed is non-uniform, the operation is not stable, and not in control of operating signal.
- ○ The rotates in high speed and not in control of operation signal.

■ E1. UV1 faults occur frequently

Fault cause: instable power voltage or power supply line failure

Check contents:

- ○ Instantaneous under voltage may be caused by thunderstorm weather, or time section with large power supply voltage fluctuation or start of large equipment.
- ○ Poor contact in power supply circuit. Please check contact of breaker, contactors, fuses in power supply circuit carefully for poor contact (shall be judged only by measurement of multimeter).

Treatment method:

- ○ Add regulated power supply for region with grid with unstable voltage.
- ○ Solve line fault.
- ○ Replace faulty low voltage electrical appliances

■ Leakage protection switch is actuated

Phenomenon: when the servo starts, the leakage protection switch trips.

Reason: the leakage protection switch is not the special type for servo (or transducer), the leakage protection value is set too small.

Remedies:

○ For common leakage protection switch, the recommended leakage protection value is 200maor cancel the leakage protection switch.

○ For special leakage protection switch for servo (or transducer), the leakage protection value is 30ma.

○ Add isolation transformer between common leakage protection switch and servo driver.

Alarm reset method

Alarm reset includes the following methods:

○ Enable signal again.

○ Turn off the driver, and power on again after driver power indicator is off

GH DRIVER

8 Maintenance

The chapter introduces the basic requirements and methods of routine maintenance of the driver.

Prompt

Hidden fault of the driver may be caused by effect of temperature, humidity, pH, dust, vibration and other factors of the service environment, as well as aging, wear of internal components of the driver and many other reasons. Therefore, routine inspection must be conducted to the driver and driving system during storage and application, and make maintenance regularly.

⚠ Caution

★ Dangerous high voltage exists during operation of the driver. Inappropriate operation may result in serious personal injury. Dangerous high voltage still exists for a period of time after the power is turned off.

★ Only trained and authorized qualified professionals can conduct driver maintenance.

★ Watch, ring and other metal objects of maintenance personnel must be removed before operation. Clothing and tools that meet insulation requirements must be applied during operation. Fail to observe the above requirements may lead to electric shock.

⚠ Danger

When inspect or maintain the driver, never touch the main circuit terminals or other components in the driver directly or through metal tools before confirm the following four items completely; otherwise there is a risk of electric shock.

Shut off the drive power supply reliably, and wait at least 5 minutes;

- Open cover plate of the driver after all LED indicators on the operating panel are off;
- Charging indicator (CHARGE light) at the right lower of internal of the driver is off;
- Measure voltage between main circuit terminal P (+), n (-) and confirm that the voltage is lower than 36VDC

⚠ Danger

- Don't leave screw, wire, tools and other metal items in the driver. Otherwise, the driver may be damaged.
- Never make unauthorized modification to the internal of the driver. Otherwise, the normal operation of the driver will be affected.
- There is electrostatic sensitive IC elements on the control panel in the driver. Do not touch IC elements on the control panel directly.
- Maintenance to main board of the driver shall be conducted only by manufacturer.

Routine maintenance

Routine maintenance shall be carried out during regular operation of the driver to guarantee excellent operating environment; and record daily operation data, parameter setting data, parameter changing and so on, establish and improve equipment application file.

Through routine maintenance and inspection, various abnormal situations may be found timely and find out causes, and eliminate hidden fault, ensure normal operation of equipment, and prolong service life of the driver.

List of routing maintenance item

Inspect object	Inspection main point and judge standard			Judge standard
	Inspection content	Cycle	Inspection method	
Service environment	(1)Temperature, humidity (2)Dust, moisture and dribbling (3)Gas	Any time	(1)digimite, hygrometer (2) observation (3)observation and nasil	(1) Ambient temperature is lower 45 , otherwise, derating operation. Humidity meets application requirements. (2) no accumulated dust, water leakage mark and condensation. (3) no abnormal color and foreign odor. Ambient temperature is lower 45 , otherwise, derating operation. Humidity meets application requirements.
Driver	(1)Vibration (2)Radiating and heating (3)Noise	Any time	(1) comprehensive observation (2) digimite and comprehensive observation (3) hearing	(1) stable operation without vibration. (2) fan works normally, wind speed and quantity are normal; no abnormal heating. (3)no abnormal noise.
Motor	(1)Vibration (2)Heating (3)Noise	Any time	(1) comprehensive observation and hearing (2) digimite (3) hearing	(1) no abnormal vibration and abnormal sound. (2)no abnormal heating. (3) no abnormal noise.
Operating state parameter	(1)Power supply input voltage (2)Driving output voltage (3)Driving output current (4)Internal temperature	Any time	(1)voltmeter (2)rectifier type voltmeter (3)ammeter (4)digimite	(1) meet requirement of specifications. (2) meet requirement of specifications. (3) meet requirement of specifications. (4) temperature rise lower than 40 .

Regular maintenance

To eliminate hidden fault, and guarantee long term table operation of high performance, user shall carry out a regular inspection to the driver every 3~6 months or shorter interval according to the service environment.

Regular inspection content

1. The connector is loose or not;
2. Check main circuit terminals for poor contact, and copper row connection for mark of overheat;
3. Check power cable, control cable for damage, especially cutting mark on skin which in contact with metal surface;
4. Check insulation binder of power cable nose for falling off;
5. Clean dust on printed circuit board and air passage completely. It is best to use the cleaner;
6. Before insulation test to the driver, all connections between driver, power supply and motor, and short all of main circuit input and output terminals with wire reliably, and then test against ground.

Insulation precautions

Please use qualified 500V Meg-ohmmeter (or corresponding gear of insulation tester). Do not use defective instrument.

- It's strictly prohibited to conduct insulation test against ground with only single main circuit terminal connected, or there will be a risk of damage to driver.
- Never make insulation test to control terminals, otherwise driver will be damaged.
- Do remove all of wires which short main circuit terminals after test.

7. For insulation test to motor, the connections between the motor and driver must be disconnected completely, and then test the motor separately.

Wearing parts of the driver

Wearing parts of the driver mainly includes cooling fan and electrolytic capacitor for filtering. Their service life are closely related with operating environment and maintenance status. In most cases, service life of fan is 30-40 thousand hours; service life of electrolytic capacitor is 40-50 thousand hours. The normal replacement age limit shall be determined referring to service life of wearing parts and on the basis of working time of the driver. Component shall be replaced when abnormalities is found during inspection. When replace wearing part, it's shall be ensured that the model and electrical parameter of the components are identical or very close to each other.

Routine inspection of common wearing parts

1. Fan

Damage causes: bearing wear, blade aging.

Criteria: check fan blades and other parts for cracks or other abnormalities when the driver is turned off; check operation of the fan for abnormal vibration, noise and so on when the driver is started.

2. Electrolytic capacitor

Damage cause: high ambient temperature, large PULSE power, electrolyte aging.

Criteria: frequent over-current, over-voltage in load operation of the driver; liquid leakage and safety valve protruding; the measured insulation resistance of static capacitance is abnormal or not.

Driver storage

1. Storage environment

Drive storage environment requirement

Environment characteristics	Requirement	Remarks
Ambient temperature	- 40~+70	The driver shall be stored in long term in environment with temperature lower than 30℃ to avoid condensation and freezing due to temperature variation
Ambient humidity	5~95% rh	Plastic film enclosure and desiccant and other measures may be applied
Other conditions	No direct sunlight, dust, corrosive or combustible gas, oil mist, steam, gas, dropping water, vibration and little salt.	

2. For long-term idle, it's recommended to turn the driver on for more than half an hour every 6 months during storage to prevent failure of electronic components, or conduct no-load operation to the driver.

Drive warranty

1. For fault or damage of the driver under normal application conditions, the warranty is valid within 12 months from the date of delivery. A reasonable repair cost shall be paid for fault or damage after 12 months;

2. A certain of repair cost shall be paid for the following situations even within the 12 months.

(1). Machine damage due to wiring and operation that not in accordance with the user manual;

(2). Damage caused by fire, floods and abnormal voltage;

(3). Damage caused when use the driver in abnormal function application;

Appendix1 (Previous version)

Running monitoring parameter U1

Function code	Name	Description	Unit	Apply motor
U1.00	Set speed/frequency	Max speed<1000rpm, display speed; Max speed≥1000rpm, display frequency	Speed: rpm Frequency:Hz	Synchronous/ Asynchronous
U1.01	Output speed/frequency			Synchronous/ Asynchronous
U1.02	Feedback speed/frequency			Synchronous/ Asynchronous
U1.03	Driver output current	Display driver output current	A	Synchronous/ Asynchronous
U1.04	Motor actual feedback torque	Display motor loaded torque	A	Synchronous/ Asynchronous
U1.05	Driver DC bus voltage	DC bus voltage=AC power line voltage*1.414	V	Synchronous/ Asynchronous
U1.06	following error	following error	Ring	Synchronous/ Asynchronous

Running monitoring parameter U2

Function code	Name	Description	Setting scope	Unit	Apply motor
U2.00	First coded disc counting	First coded disc counting accumulation	0~65535	Pulse	Synchronous/ Asynchronous
U2.01	Second coded disc counting	Second coded disc counting accumulation T2 pulse port pulse accumulation counting	0~65535	Pulse	Synchronous/ Asynchronous
U2.02	State of input points I1 to I6, ST, RST	I6 I5 I4 I3 I2 I1 RST ST Effective I12 I11 I10 I9 8 I7 M1 M0 Q6 Q5 Q4 Q3 Q2 Q1 Invalid	0~255	–	Synchronous/ Asynchronous
U2.03	State of input points I7 to I12				
U2.04	state of output M0, M1, Q0 to Q6				
U2.05	Analog quantity input FI digital	Analog quantity 0 to +10V Digital 0 to 4095	0~4095	–	Synchronous/ Asynchronous
U2.06	Analog quantity input FVdigital	Analog quantity -10 to 0 to +10V Digital 0 to 2047 to 4095	0~4095	–	Synchronous/ Asynchronous
U2.07	Analog quantity input DA1digital	Analog quantity -10 to 0 to +10V Digital 0 to 2047 to 4095	0~4095	–	Synchronous/ Asynchronous
U2.08	Analog quantity input DA2digital	Analog quantity -10 to 0 to +10V Digital 0 to 2047 to 4095	0~4095	–	Synchronous/ Asynchronous
U2.09	Temperature of driver module	Temperature of driver module	0~100	℃	Synchronous/ Asynchronous
U2.10	Temperature of CPU	Temperature of CPU	0~100	℃	Synchronous/ Asynchronous
U2.11	Pulse of the first coded disc distance Z	Pulse enumeration of the first coded disc distance Z	0~65535	Pulse	Synchronous/ Asynchronous
U2.12	Angle of the first coded disc distance Z	Pulse angle of single circle position distance Z	0~65535	Pulse	Synchronous/ Asynchronous
U2.13	Pulse of the second coded disc distance Z	Pulse enumeration of the first coded disc distance Z	0~65535	Pulse	Synchronous/ Asynchronous
U2.14	Angle of the second coded disc distance Z	Pulse angle of single circle position distance Z	0~360.00	0.01 degree	Synchronous/ Asynchronous
U2.15	Pulse counting of T2	Pulse T2 counting	0~360.00	0.01 degree	Synchronous/ Asynchronous
U2.16	Pulse counting of T3	Pulse T3 counting	0~65535	Pulse	Synchronous/ Asynchronous
U2.17	Temperature of the motor	Display the temperature of the motor	25~150	℃	Synchronous/ Asynchronous

Malfunction state record parameter U3

Function code	Name	Description	Unit	Apply motor
U3.00	Current fault code	See fault description for detail	–	Synchronous/ Asynchronous
U3.01	last 1st fault code		–	Synchronous/ Asynchronous
U3.02	last 2nd fault code		–	Synchronous/ Asynchronous
U3.03	last 3rd fault code		–	Synchronous/ Asynchronous
U3.04	last 4th fault code		–	Synchronous/ Asynchronous
U3.05	last 5th fault code		–	Synchronous/ Asynchronous

Initialization parameter A1

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A1.00	Parameter select	0: User parameter 1: System parameter	0,1	–	0	○	Synchronous/ Asynchronous
A1.01	Control mode selection	0: V/F control 1: Open loop control 2: Close loop control	0~2	–	0	*	Synchronous/ Asynchronous
A1.02	Power code	Power code read from base	-	–	0	*	Synchronous/ Asynchronous
A1.03	Driver rated power	Driver rated power display	0~65535	KW	0	*	Synchronous/ Asynchronous
A1.04	Year of Control ProgramRelease	Year of Control ProgramRelease	–	–	–	*	Synchronous/ Asynchronous
A1.05	User parameters restore factory settings	1: Restore factory settings	0,1	–	0	△	Synchronous/ Asynchronous
A1.06	System parameters restore factory settings	1: Restore factory settings	0,1	–	0	△	Synchronous/ Asynchronous
A1.07	Application program version number	Application program software version number	–	–	0	*	Synchronous/ Asynchronous
A1.08	Control program version number	Control program software version number	–	–	0	*	Synchronous/ Asynchronous
A1.09	PLC version number	PLC software version number	–	–	818	*	Synchronous/ Asynchronous
A1.10	Smart card version number	Small smart card procedure version number	–	–	0	*	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A1.11	Parameter version number	Driver parameter version number	-	-	4	*	Synchronous/ Asynchronous
A1.12	Procedure year	Procedure write year	-	-	2017	*	Synchronous/ Asynchronous
A1.13	Analog signal minimum calibration value	Calibration is invalid when the analog quantity calibration speed is lower than the value	0~10000	%	10	○	Synchronous/ Asynchronous
A1.14	Analog signal calibration error scope	Allowed error scope percent of the analog quantity calibration	0~100	%	20	○	Synchronous/ Asynchronous
A1.14	Analog signal calibration error scope	Allowed error scope percent of the analog quantity calibration	0~100	%	20	○	Synchronous/ Asynchronous
A1.15	Analog signal calibration mode	0: automatic calibration 1: manual calibration	0,1	-	0	○	Synchronous/ Asynchronous
A1.16	Analog signal hand-roll calibration positive bias	Set manual calibration positive bias of analog quantity	0~65520	LSB	0	○	Synchronous/ Asynchronous
A1.17	Analog signal hand-roll calibration negative bias	Set manual calibration negative bias of analog quantity	0~65520	LSB	0	○	Synchronous/ Asynchronous
A1.18	FI analog quantity voltage value	FI analog quantity input voltage value monitoring	0~10.00	0.01V	0	*	Synchronous/ Asynchronous
A1.19	FV analog quantity voltage value	FV analog quantity input voltage value monitoring	-10.00~ 10.00	0.01V	0	*	Synchronous/ Asynchronous
A1.20	FV analog quantity calibration order	Set FV analog quantity calibration speed	0~65535	rpm	0	○	Synchronous/ Asynchronous
A1.21	FI analog quantity calibration order	Set FI analog quantity calibration speed	0~65535	rpm	0	○	Synchronous/ Asynchronous
A1.22	FT analog quantity calibration order	Set FT analog quantity calibration speed	0~65535	rpm	0	○	Synchronous/ Asynchronous
A1.23	Analog quantity channel selection	0: No selection 1: FV 2: FI 3: FV FI FT	0~3	-	3	○	Synchronous/ Asynchronous
A1.24	Analog quantity filtering coefficient	Set analog quantity filtering times	0~65535	per time	2000	○	Synchronous/ Asynchronous
A1.25	Analog zero speed dead zone	It is considered as 0 speed when the analog quantity is less than the value	0~65535	LSB	0	○	Synchronous/ Asynchronous
A1.26	Analog quantity maximum speed	The analog quantity corresponding to the maximum speed	0~30000	rpm	8000	○	Synchronous/ Asynchronous
A1.27 A1.29	Save	–	–	–	–	–	–

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A1.30	Input filtering time	Calculation method: A1.30*0.5ms	0~30000	0.5ms	1	○	Synchronous/ Asynchronous
A1.31	Save	–	–	–	–	–	–
A1.32							
A1.33	Automatic correction function of midpoint of analog quantity	0: do not start 1: start	0,1	–	0	○	Synchronous/ Asynchronous
A1.34	Time of section A of curve S	set time of section A of curve S	0~2000	ms	10	○	Synchronous/ Asynchronous
A1.35	Time of section B of curve S	set time of section B of curve S	0~2000	ms	10	○	Synchronous/ Asynchronous
A1.36	Time of section C of curve S	set time of section C of curve S	0~2000	ms	10	○	Synchronous/ Asynchronous
A1.37	Time of section D of curve S	set time of section D of curve S	0~2000	ms	10	○	Synchronous/ Asynchronous
A1.38	IO assign function selection	Bit0: whether Q6 output as z? 0: z output 1: PLC control Bit1: whether I5 as external IO interrupt? 0:don't 1:do Bit2: M0 exclusive brake function 0:start 1:PLC control	0~65535	–	0	△	Synchronous/ Asynchronous
A1.39	Port com1 function selection	0: PLC communication 1: upper computer communication	0,1	–	0	×	Synchronous/ Asynchronous

User self-defined parameter A2

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A2.00	Control mode selection	0: Terminal operation mode 1: Panel operation mode 2: MechatrolinkBus instruction control 3: Ethercat 4: M3 5: Canopen 6: Profibus	0～6	–	0	×	Synchronous/ Asynchronous
A2.01	Analog quantity polarity selection	0: ±10V 1: 0-10V	0,1	–	1	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A2.02	Save	—	—	—	—	—	Synchronous/ Asynchronous
A2.03	Positioning mode	0: Motor encoder positioning 1: Spindle encoder positioning 2: Approach switch positioning	0～2	—	0	×	Synchronous/ Asynchronous
A2.04	Save		—	—	—	—	Synchronous/ Asynchronous
A2.05	Selection of Pulse Location Chain Mode	0: Direct access to pulse position mode when I4 is switched on 1: When I4 is switched on, the quasi-stop is executed first, and then the quasi-stop is completed before entering the pulse position mode and outputting the pulse position interlocking completion signal.	0、1	—	0	×	Synchronous/ Asynchronous
A2.06 ～ A2.10	Save	—	—	—	—	—	—
A2.11	Selection of ST deceleration mode	0: Slow down and stop when ST terminal is revoked 1: Free parking when removing ST terminals	0、1	—	0	×	Synchronous/ Asynchronous
A2.12	ST function selection	0: ST terminal invalid 1: ST as MODBUS communication enabled terminal	0、1	—	0	×	Synchronous/ Asynchronous
A2.13	Positioning mode	0: Positioning according to current speed direction 1: Positioning according to A2.14 parameter set direction	0、1	—	0	×	Synchronous/ Asynchronous
A2.14	Positioning direction selection	0: Positive positioning 1: Negative positioning	0、1	—	0	×	Synchronous/ Asynchronous
A2.15	I1 function selection	0: Analog quantity speed 1: Pulse speed	0、1	—	0	×	Synchronous/ Asynchronous
A2.16	Single and Double Pulse Selection for T2, T3 and T4 Pulse Input (Bit Settings)	Whether Bit0 Pulse Input Type SettingFunction is Open 0: Close, 1: open T4 Type of Bit1 Pulse Input Port 0: pules+directiong, 1: Orthogonal Pulse Bit2 pulse input T3 0: pulse+direction, 1: Orthogonal Pulse Bit3pulse input T2 0: pulse+direction, 1: Orthogonal Pulse	0～15	—	15	×	Synchronous/ Asynchronous
A2.17	Pulse port selection	0: T4 port(pulse type set by E1.15) 1: T2 port(pulse type set by E1.21) 2: T3 port(pulse type set by E1.27)	0～2	—	0	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A2.18	Feedback source at pulse position selection	0: First coded disc T5 motor encoder (parameter:E1.00, E1.01, E1.08, E1.09) 1: Second coded disc T4 spindle encoder(parameter:E1.15, E1.16)	0、1	—	0	×	Synchronous/ Asynchronous
A2.19	I4 function selection	0: Analog Rigid Tapping 1: Pulse Rigid Tapping	0、1	—	0	×	Synchronous/ Asynchronous
A2.20	Q1Functional selection	0: No output 1: Torque threshold output 2: Servo Enablation 3: Drive ready 4: Velocity arrival 5: Zero Speed of Motor 6: Quasi-stop completion 7: Pulse position interlocking	0～7	—	3	×	×
A2.21	Q2Functional selection				4		
A2.22	M0AFunctional selection				6		
A2.24	Q3Functional selection				2		
A2.25	Q4Functional selection				5		
A2.26	DA1Analog output	0: Speed 2: Current	0～2	—	0	×	×
A2.27	DA2Analog output				2		
A2.28	Save	-	—	—	—	—	—
A2.29							
A2.30	I5 high-power terminal function selection	0: No effective 1: Potentiometer Torque Control 2: Low Speed Function 3: Zero Speed Lock Shaft 4: External Fault Input (Emergency Stop, Normally Closed) 5: Proximity switch quasi-stop	0～5	—	0	×	Synchronous/ Asynchronous
A2.31	Save	-	—	—	—	—	—
～							
A2.98							
A2.99	PLC internal address	PLC internal version number	—	—	—	*	Synchronous/ Asynchronous

User self-defined parameter A3

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.00	Modbus Communication status bit	0: Stop 1: Positive rotation 2: Neigative rotation	0~2	-	0	×	Synchronous/ Asynchronous
A3.01	Torque threshold	Setting the Threshold of Torque Output	0~65635	0.1NM	50	×	Synchronous/ Asynchronous
A3.02	Torque Control Current Upper Limit of Potentiometer	Current upper limit of FV input 10V for potentiometer torque control	0~65635	0.1A	10	×	Synchronous/ Asynchronous
A3.03	I5 low speed control 10V corresponding maximum speed	When I5 is set as a low-speed function, the maximum speed of the motor corresponding to 10V analog voltage input	0~20000	rpm	500	×	Synchronous/ Asynchronous
A3.04 ~ A3.07	Save	—	—	—	—	—	—
A3.08	Withdraw I0 port 0 speed spindle locking time	Set Withdraw I0 port 0 speed spindle locking time	0~20000	ms	100	×	Synchronous/ Asynchronous
A3.09	Withdraw I0 port deceleration time	Set Withdraw I0 port deceleration time	0~20000	0.01s/ Krpm	80	×	Synchronous/ Asynchronous
A3.10	I5 emergency stop decele ration time	Deceleration time of motor when I5 is set as input of external fault (emergency stop)	0~20000	0.01s/ Krpm	10	×	Synchronous/ Asynchronous
A3.11	Save	—	—	—	—	—	—
A3.12	Speed setting during MODBUS communication control	Set speed setting during MODBUS communication control	0~30000	rpm	0	×	Synchronous/ Asynchronous
A3.13	Speed Ring Second Set of Parameter Effective Valve	The second set of PI parameters is the effective speed threshold. The second set of PI parameters is used when the speed is given to be less than the maximum speed multiplied by the percentage of the value.	0～1000	—	0	×	Synchronous/ Asynchronous
A3.14	Second Kp of Speed Ring	Setting the Second Speed Gain (Kp2)	0～30000	—	140	×	Synchronous/ Asynchronous
A3.15	Second Ti of Speed Ring	Setting the second velocity integral time constant (Ti2)	0～30000	—	15	×	Synchronous/ Asynchronous
A3.16 ~ A3.18	Save	-	—	—	—	—	—
A3.19	Corresponding speed when analog voltage DA1 outputs 10V	Set corresponding speed when analog voltage DA1 outputs 10V	0～65635	rpm	6000	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.20	Save	-	—	—	—	—	—
A3.21	Corresponding speed when analog voltage DA2 outputs 10V	Set corresponding speed when analog voltage DA2 outputs 10V	0~65635	0.1A	100	×	Synchronous/ Asynchronous
A3.20	Save	—	—	—	—	—	—
A3.23	Corresponding maximum speed whenanalog quantity speed control of 10V	Setting corresponding maximum speed when analog quantity speed control of 10V	0~20000	rpm	6000	×	Synchronous/ Asynchronous
A3.24	speed control acceleration time	Set speed control acceleration time	0~20000	0.01s/ Krpm	80	×	Synchronous/ Asynchronous
A3.25	speed control deceleration time	Set speed control deceleration time	0~20000	0.01s/ Krpm	80	×	Synchronous/ Asynchronous
A3.26	Save	—	—	—	—	—	—
A3.27	Speed control scale gain	Set speed loop regulator scale gain. The gain is higher and the rigidity is bigger with greater value. Set the value as high as possible without vibration in the system	0~30000	—	100	×	Synchronous/ Asynchronous
A3.28	Speed control integral time	Set speed ring PI regulator integral time. The setting is lower and the rigidity is bigger. The rigidity is higher with lower value	0~30000	—	40	×	Synchronous/ Asynchronous
A3.29	Save	—	—	—	—	—	—
A3.30	Rigid tapping/ pulse position maximum speed	Set the maximum speed of motor during Rigid tapping/ pulse position control	0~20000	rpm	1500	×	Synchronous/ Asynchronous
A3.31	Rigid tapping/ pulse position acceleration time	Set Rigid tapping/ pulse position acceleration time	0~20000	0.01s/ Krpm	80	×	Synchronous/ Asynchronous
A3.32	Rigid tapping/ pulse position deceleration time	Set Rigid tapping/ pulse position deceleration time	0~20000	0.01s/ Krpm	80	×	Synchronous/ Asynchronous
A3.33	Position loop feed-forward at Rigid tapping/ pulse position	The position ring response is faster when the value is greater	0～100	—	1000	×	Synchronous/ Asynchronous
A3.34	Position loop scale gain at Rigid tapping/ pulse position	Set positioning position ring scale gain. the response to the position order gain is faster and the rigidity is higher with higher set value. A too high value may cause position overshoot when start stops. The effect is slower and the error increases with lower value.	0~30000	—	100	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.35	Speed loop scale gain at Rigid tapping/ pulse position	Set speed loop scale gain at Rigid tapping/ pulse position. The gain is higher and the rigidity is bigger with greater value. Set the value as high as possible without vibration in the system	0~30000	—	100	×	Synchronous/ Asynchronous
A3.36	Speed loop integral time at Rigid tapping / pulse position	Set speed loop integral time at Rigid tapping/ pulse position. The rigidity is higher with lower value	0~30000	—	40	×	Synchronous/ Asynchronous
A3.37	Save	—	—	—	—	—	—
A3.38	First positioning bias	Set first positioning bias	0~65535	Pulse	0	×	Synchronous/ Asynchronous
A3.39	Save	—	—	—	—	—	—
A3.40	Positioning speed	Look for encoder phase Z pulse or speed of the approach switch	0~20000	rpm	100	×	Synchronous/ Asynchronous
A3.41	Save	—	—	—	—	—	—
A3.42	Positioning acceleration time	Set Positioning acceleration time	0~20000	0.01s/ Krpm	80	×	Synchronous/ Asynchronous
A3.43	Positioning deceleration time	Set positioning deceleration time	0~20000	0.01s/ Krpm	80	×	Synchronous/ Asynchronous
A3.44	Positioning position ring scale gain	Set positioning position ring scale gain. the response to the position order gain is faster and the rigidity is higher with higher set value. A too high value may cause position overshoot when start stops. The effect is slower and the error increases with lower value.	0~30000	—	100	×	Synchronous/ Asynchronous
A3.45	Positioning speed ring scale gain	Set positioning speed ring PI regulator scale gain. the gain is greater and the rigidity is higher with higher set value	0~30000	—	100	×	Synchronous/ Asynchronous
A3.46	Positioning speed ring integral time	Set positioning speed ring PI regulator integral time. the integrating speed is greater and the rigidity is higher with smaller set value	0~30000	—	40	×	Synchronous/ Asynchronous
A3.47	Second positioning bias	Set second positioning bias	0~65535	Pulse	1000	×	Synchronous/ Asynchronous
A3.48 ~ A3.50	Save	—	—	—	—	—	—
A3.51	Upper limit of swing speed	Setting the upper limit of swing speed	0~6000	0.1rpm	200	×	Synchronous/ Asynchronous
A3.52	Oscillating forward range	Setting forward range of swing	0~30000	Pulse	1000	×	Synchronous/ Asynchronous
A3.53	Oscillating reverse range	Setting the reverse range of swing	0~30000	Pulse	1000	×	Synchronous/ Asynchronous
A3.54	Oscillating acceleration	Setting Swing Acceleration	0~30000	0.01s/ Krpm	5000	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
A3.55	Swing deceleration	Setting Swing Deceleration	0~30000	0.01s/Krpm	5000	×	Synchronous/ Asynchronous
A3.56	Swinging current	Setting swing current	0~30000	0.1A	20	×	Synchronous/ Asynchronous
A3.57 ~ A3.62	Save	—	—	—	—	—	—
A3.63	Inching forward speed	Set Inching forward speed	0~20000	rpm	200	×	Synchronous/ Asynchronous
A3.64	Inching reverse speed	Set Inching reverse speed	0~20000	rpm	200	×	Synchronous/ Asynchronous
A3.65	Inching acceleration time	Set Inching acceleration time	0~20000	0.01s/Krpm	80	×	Synchronous/ Asynchronous
A3.66	Inching deceleration time	Set Inching deceleration time	0~20000	0.01s/Krpm	80	×	Synchronous/ Asynchronous

User parameters C1

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
C1.00	Motor forward direction	0: Anticlockwise is forward 1: Clockwise is forward	0、1	—	0	○	Synchronous/ Asynchronous
C1.01	Speed ring acceleration time	Speed ring T acceleration time	0~200.00	0.01s	0.80	○	Synchronous/ Asynchronous
C1.02	Speed ring deceleration time	Speed ring T deceleration time	0~200.00	0.01s	0.80	○	Synchronous/ Asynchronous
C1.03	Position operation feedback source	0: First code wheel (T5) 1: Second code wheel (T4) 2: First pulse port (T2) 3: Second pulse port (T3-24V)	0～3	—	0	×	Synchronous/ Asynchronous
C1.04	Position operation order source	0: Invalid 1: First code wheel (T5) 2: Second code wheel (T4) 3: First pulse port (T2) 4: Second pulse port (T3-24V) 5: Interior order	0～5	—	3	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
C1.05	Pulse speed order source	2: T4 3: T2 4: T3 Other : Invalid	0～5	—	0	×	Synchronous/ Asynchronous
C1.06	Positioning maximum speed	Positioning execute process maximum limit speed	0~30000	rpm	100	○	Synchronous/ Asynchronous
C1.07	Positioning acceleration time	Positioning process acceleration time of T type speed	0~300.00	0.01s	0.50	○	Synchronous/ Asynchronous
C1.08	Positioning direction	0: Forward 1: Reverse	0 , 1	-	0	○	Synchronous/ Asynchronous
C1.09	First positioning gain	First gain during positioning, the gain is greater	0~60000	-	300	○	Synchronous/ Asynchronous
C1.10	Second positioning gain	Second gain during positioning , the gain is smaller	0~60000	-	50	○	Synchronous/ Asynchronous
C1.11	Positioning gain switch point	Positioning first gain and second gain switch threshold , when the residue distance is smaller than the value, switch to second gain , otherwise, use first gain	0~600.00	0.01R	0.10	○	Synchronous/ Asynchronous
C1.12	Positioning minimum speed	Positioning process minimum speed	0~600.00	0.01rpm	0.01	○	Synchronous/ Asynchronous
C1.13	Third section positioning switch point	Third section positioning distance threshold , when the residue distance is smaller than the parameter, conduct third section positioning operation	0~300.00	0.01R	0	○	Synchronous/ Asynchronous
C1.14	Coarse positioning scope	When positioning residue distance is smaller than the value, it is determined that the positioning is reached, and output positioning reach signal	0~6.0000	Pulse	0.01	○	Synchronous/ Asynchronous
C1.15	Save	-	-	-	-	—	—
C1.16	Precise positioning scope	When positioning residue distance is smaller than the value, it is determined that the precise positioning is reached, and output precise positioning reach signal	0~3.0000	Pulse	0.01	○	Synchronous/ Asynchronous
C1.17	Swing forward scope	Swing forward position	0~30000	Pulse	300	○	Synchronous/ Asynchronous
C1.18	Swing reverse scope	Swing reverse position	0~30000	Pulse	300	○	Synchronous/ Asynchronous
C1.19	Swing speed upper limit	Maximum speed during swing	0~600.0	rpm	100.0	○	Synchronous/ Asynchronous
C1.20	Swing acceleration	Acceleration during swing	0~300.00	s/krpm	1.00	○	Synchronous/ Asynchronous
C1 . 21	Swing deceleration	Deceleration during swing	0~300.00	s/krpm	1 . 00	○	Synchronous/ Asynchronous
C1 . 22	Swing current	Swing current	0~300.00	A	3 . 0	○	Synchronous/ Asynchronous
C1 . 23	Save	—	—	—	—	—	—
C1 . 24							
C1 . 25	Positioning maximum deceleration	Take the deceleration as lower limit of deceleration after entering positioning module	0~200.00	—	0	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
C1.26	Broken enable delay time	Delay some time to brake enable after decelerate stop, otherwise it will swing	0~20000	ms	0	○	Synchronous/ Asynchronous
C1.27	Urgent decelerate speed	Decelerate speed when urgent stopped	0~20000	s/krpm	0	○	Synchronous/ Asynchronous
C1.28	save	–	–	–	–	–	–
C1.29	Order mode select	0: Terminal operation mode 1: Panel operation mode 2: Mechatrolink II bus order control 3: Ethercat bus 4: Mechatrolink III bus 5: Canopen	0~6	–	0	×	Synchronous/ Asynchronous
C1.30	Control mode	0: Speed control 1: Position control 2: Torque control	0~2	–	0	○	–
C1.31	Current ring scale gain	Current ring scale gain (KP)	0~30000	–	230	○	Synchronous/ Asynchronous
C1.32	Current ring integral time constant	Current ring integral time constant (TI)	0~300.00	–	3.00	○	Synchronous/ Asynchronous
C1.33	Speed ring scale gain	Speed ring scale gain(KP)	0~30000	–	200	○	Synchronous/ Asynchronous
C1.34	Speed ring integral time constant	Speed ring integral time constant (TI)	0~30000	–	40	○	Synchronous/ Asynchronous
C1.35	Speed ring second set parameter valid threshold	Second set PI parameter valid speed threshold , when the given speed is smaller than the maximumspeed times the value percent , use second set parameter	0~1000	–	0	○	Synchronous/ Asynchronous
C1.36	Speed ring second scale gain	Second speed gain (KP2)	0~30000	–	300	○	Synchronous/ Asynchronous
C1.37	Second speed integral time constant	Second speed integral time constant (TI2)	0~30000	–	20	○	Synchronous/ Asynchronous
C1.38	First position ring scale gain	High speed segment(KP)	0~60000	–	100	○	Synchronous/ Asynchronous
C1.39	Position ring feed-forward	Position ring speed feed-forward (kW)	0~60000	–	1000	○	Synchronous/ Asynchronous
C1.40 ~ C1.45	Save	–	–	–	–	–	–
C1.46	Current ring scale gain of angle joint shaft q	Current ring scale gain of angle joint shaft q (KP)	0~30000	-	100	○	Synchronous/ Asynchronous
C1.47	Current ring integral time constant of angle joint shaft q	Current ring integral time constant of angle joint shaft q(T1)	0~300.00	-	800	○	Synchronous/ Asynchronous

Motor driving parameter D1

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
D1.00	Rated current	Motor rated current	0~6000.0	A	11.5	×	Synchronous/ Asynchronous
D1.01	Rated speed	Motor rated speed	0~30000	rpm	1500	×	Synchronous/ Asynchronous
D1.02	Rated voltage	Motor rated voltage	0~3000	V	380	×	Synchronous/ Asynchronous
D1.03	Rated power	Motor rated power	0~3000.0	KW	5.5	×	Synchronous/ Asynchronous
D1.04	Power factor	Motor power factor angle	0~1.00	—	0.86	×	Asynchronous
D1.05	Rated frequency	Motor rated frequency	0~30000	HZ	50	×	Asynchronous
D1.06	Encoder Learning Information	Storage encoder learning information data, including current and carrier	0~65535	—	0	×	Asynchronous
D1.07	Encoder learning duty cycle	Storage of duty cycle data for encoder learning	0~65535	—	0	×	Asynchronous
D1.08	save	-	—	—	—	—	—
D1.09	Number of pole-pairs	Motor number of pole-pairs	0~10000	pairs	2	×	Synchronous/ Asynchronous
D1.10	Save	—	—	—	—	—	—
D1.11	Switch speed of star and delta	Switch to delta connection when the actual speed is larger than default value, or switch to star connection	0~30000	rpm	0	×	Asynchronous
D1.12	Motor protect rated current	Motor protect point current	0~6000.0	A	11.0	×	Synchronous/ Asynchronous
D1.13	Speed tolerance of star and delta switch	The dead zero of switch star and delta connection: it is delta connection when SPD>D1.11+D1.13. It is star when SPD<D1.11-D1.13. It keep last state when other situation	0~30000	rpm	0	—	Asynchronous
D1.14	Rated torque	Motor rated torque	0~3000.0	nm	35.0	×	Synchronous/ Asynchronous
D1.15	Switch time of star and delta	It decided the time of switch enable	0~3000	ms	0	—	Asynchronous
D1.16	Switch type of star and delta	0: No switch 1: Automatic, switch automatic according feedback speed, output Q3 2: Manual, switch via outside IO112	0~2	-	0	—	Asynchronous
D1.17	Maximum speed of star connection	The parameter work only when using the star-delta mode, it means maximum speed of star connection	0~30000	-	0	—	Asynchronous
D1.18	Save	-	-	-	-	—	—
D1.19	MAP Selection of IPM Motor	0: Download MAP 1: 205wp motor MAP 2: BT40A motor MAP	0~2	-	0	△	Synchronous
D1.20	Weak field area current curve	Qd current maximum scale	0~100	-	10	×	Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
D1.21	Slip compensation multiplying factor	Slip compensation multiplying factor multiply by 256	0~20000	-	180	×	Asynchronous
D1.22	Rotor time constant	Rotor time constant	0~30000	-	50	×	Asynchronous
D1.23	Slip maximum compensation	Slip compensation upper limit	0~30000	-	130	×	Asynchronous
D1.24	Synchronous motor Back-EMF per 1000 turns	Synchronous motor no-load Back-EMF per 1000 turns	0~30000	V	110	×	Synchronous
D1.25	Allowed output maximum speed	Allowed output maximum speed	0~30000	rpm	8000	×	Synchronous/ Asynchronous
D1.26	Allowed output maximum current	Allowed output maximum torque current	0~6000.0	A	22.0	○	Synchronous/ Asynchronous
D1.27	Constant power zone maximum speed	Interface speed between Constant power zone and falling power zone	0~30000	rpm	6000	×	Asynchronous
D1 . 28	Pre-excitation time	Motor pre-excitation time	0~30000	ms	0	×	Asynchronous
D1 . 29	Minimum excitation current	Excitation current lower limit	0~30000	0.01A	0.10	×	Asynchronous
D1 . 30	Motor type select	0: Synchronous motor 1: Asynchronousmotor	0 , 1	-	1	×	Synchronous/ Asynchronous
D1 . 31	Brake current limit	Brake torque current limit	0~6000.0	-	0	×	Synchronous/ Asynchronous
D1 . 32	Delta connection rated current	Delta connection rated current	0~6553.5	A	8.0	×	Asynchronous
D1 . 33	Delta connection rated speed	Delta connection rated speed	0~30000	rpm	1500	×	Asynchronous
D1 . 34	Delta connection power factor	Delta connection power factor	0~30000	-	10	×	Asynchronous
D1 . 35	Delta connection current protect value	Delta connection current protect value	0~30000	A	8.0	×	Asynchronous
D1.36	Delta connection weak field area current curve	Delta connection weak field area current curve	0~100	-	0	×	Asynchronous
D1.37	Delta connection constant power speed	Delta connection constant power maximum speed	0~30000	rpm	3000	×	Asynchronous
D1.38	Brake torque limit enabling	0: Do not use brake torque single parameter 1: Use smart torque single parameter	0 , 1	-	0	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
D1.39	Carrier wave cycle	0: 8k 1: 4k 2: 16k	0~2	-	0	△	Synchronous/ Asynchronous
D1.40	Save	-	-	-	-	-	—
D1.41	Delta connection weak field area current curve	Delta connection weak field area current curve	0~30000	rpm	0	×	Asynchronous
D1.42	Delta connection constant power speed	Delta connection constant power maximum speed	0~6000.0	A	11.0	×	Synchronous/ Asynchronous
D1.43	Speed tolerance of star and delta switch	The dead zero of switch star and delta connection: it is delta connection when SPD>D1.11+D1.13. It is star when SPD<D1.11-D1.13. It keep last state when other situation	0~30000	rpm	0	-	Asynchronous
D1.44	Rated torque	Motor rated torque	0~3000.0	nm	35.0	×	Synchronous/ Asynchronous
D1.45	Switch time of star and delta	It decided the time of switch enable	0~3000	ms	0	-	Asynchronous
D1.46	Rotor resistance	Rotor resistance setting	0~60.000	Ω	121	×	Asynchronous
D1.47	VFSelection of Curve Types	0: Custom VF curve 1: Linear curve 2: 2nd power curve 3: Cubic curve	0～3	-	1	×	Asynchronous
D1.48	Reactive Current Correction Coefficient	Setting of Correction Coefficient of Reactive Current	0~100.0	-	4	×	Asynchronous
D1.49	Low-pass filter parameters1	Low Pass Filtering, High Frequency Parameters	0~512	-	276	×	Asynchronous
D1.50	Low-pass filter parameters2	Low-pass filtering, low-frequency parameters	0~512	-	25	×	Asynchronous
D1.51	Minimum Output Frequency	Minimum Output Frequency Setting of Motor	0~50	Hz	0.5	×	Asynchronous
D1.52	Minimum Output Frequency Voltage	Setting of the lowest output frequency and voltage of motor	0~400	V	5	×	Asynchronous
D1.53	Intermediate output frequency	Intermediate Output Frequency Setting of Motor	0~50	HZ	25	×	Asynchronous
D1.54	Intermediate Output Frequency Voltage	Setting of intermediate output frequency and voltage of motor	0~400	V	200	×	Asynchronous
D1.55	Rated Output Frequency	Rated Output Frequency Setting of Motor	0~50	HZ	50	×	Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
D1.56	Rated Output Frequency Voltage	Rated Output Frequency Voltage Setting of Motor	0~400	V	400	×	Asynchronous
D1.57	Maximum Output Frequency	Maximum Output Frequency Setting of Motor	0~1000	HZ	50	×	Asynchronous
D1.58	Torque Compensation	Motor Torque Compensation Setting	0~50	%	0	×	Asynchronous

Encoder parameter E1

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
E1.00	Motor encoder type (T5)	0: TTL 1: resolver 2: Tamagawa multiple turns encoder 3: SSI 4: TTL _uvwless 5.N9 encoder 6.N8 encoder 7. Biss RENISHAW	0~8	-	0	△	Synchronous/ Asynchronous
E1.01	Motor optoelectronic code wheel line number (T5)	Motor TTL encoder line number during E1.00=0 or 4; Fluted disc number during E1.00=5 or 6	0~60000	Pulse	2500	△	Synchronous/ Asynchronous
E1.02	Encoder counting direction (T5)	0: Anticlockwise adding counting 1: Anticlockwise minus counting	0 , 1	-	0	○	Synchronous/ Asynchronous
E1.03	Save		-	-	-	—	—
E1.04	Speed fluctuate filtering parameter	The parameter is speed controller front-end filter using to feedback speed	0~50	-	1	×	Synchronous/ Asynchronous
E1.05	Torque feedback filtering parameter	The filtering parameter is what before from speed ring adjust output to current ring, it used in smoothing speed ring output command	0~256	-	10	×	Synchronous/ Asynchronous
E1.06	Encoder angle forward offset value (T5)	Angle forward offset value	0~36000	Pulse	0	×	Synchronous
E1.07	Encoder angle reverse offset value (T5)	Angle reverse offset value	0~36000	Pulse	0	×	Synchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
E1.08	Motor absolute value encoder single round bits / resolver single round bits (T5)	Motor absolute value encoder /resolver single round bits	0~100	-	17	△	Synchronous/ Asynchronous
E1.09	Motor absolute value encoder multiple turns bits (T5)	Multiple turns absolute value encoder multiple turns bits	0~100	-	16	△	Synchronous/ Asynchronous
E1.10	Resolver /absolute value encoder initial angle record lower 16 bits (T5)	Motor resolver initial phase angle lower 16 bits	0~65535	-	0	*	Synchronous
E1.11	Resolver /absolute value encoder initial angle record higher 16 bits (T5)	Motor resolver initial phase angle higher 16 bits	0~65535	-	0	*	Synchronous
E1.12	Driver encoder self-learning order (T5)	0: Invalid 123: Manual learning encoder angle 379: Pole position swing learning method	0~30000	-	0	×	Synchronous
E1.13	Encoder self-learning time	Set self-learning time	0~100.0	0.1s	5	×	Synchronous
E1.14	Encoder power on auto tuning	0: Manual self-learning 1: Driver power-on automatic learning 2: Automated learning for the first time after power-on	0~2	-	0	×	Synchronous
E1.15	Second encoder types (T4)	0: Invalid 1: Orthogonal 2: PULSE+DIR 4: N8 absulute 5: N9 encoder	0~5	-	0	△	Synchronous/ Asynchronous
E1.16	Second encoder line number (T4)	Second encoder line number	0~16384	Pulse	1024	△	Synchronous/ Asynchronous
E1.17	Second encoder counting direction (T4)	0: Anticlockwise adding counting 1: Anticlockwise minus counting	0 , 1	-	0	○	Synchronous/ Asynchronous
E1.18	Second encoder reduction ratio numerator (T4)	Second code wheel reduction ratio numerator	1~30000	-	4	×	Synchronous/ Asynchronous
E1.19	Second encoder reduction ratio denominator (T4)	Second code wheel reduction ratio denominator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.20	Second encoder speed feedback filtering time (T4)	Second code wheel speed feedback filtering times	0~100	ms	4	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
E1.21	First pulse input porttype (T2)	0: Invalid 1: Orthogonal 2: PULSE+DIR	0~2	-	1	△	Synchronous/ Asynchronous
E1.22	First pulse line number (T2)	Encoder number of 5V pulse port access	0~65535	Pulse	2500	△	Synchronous/ Asynchronous
E1.09	Motor absolute value encoder multiple turns bits (T5)	Multiple turns absolute value encoder multiple turns bits	0~100	-	16	△	Synchronous/ Asynchronous
E1.10	Resolver /absolute value encoder initial angle record lower 16 bits (T5)	Motor resolver initial phase angle lower 16 bits	0~65535	-	0	*	Synchronous
E1.11	Resolver /absolute value encoder initial angle record higher 16 bits (T5)	Motor resolver initial phase angle higher 16 bits	0~65535	-	0	*	Synchronous
E1.12	Driver encoder self-learning order (T5)	0: Invalid 123: Manual learning encoder angle 379: Pole position swing learning method	0~30000	-	0	×	Synchronous
E1.13	Encoder self-learning time	Set self-learning time	0~100.0	0.1s	5	×	Synchronous
E1.14	Encoder power on auto tuning	0: Manual self-learning 1: Driver power-on automatic learning 2: Automated learning for the first time after power-on	0~2	-	0	×	Synchronous
E1.15	Second encoder types (T4)	0: Invalid 1: Orthogonal 2: PULSE+DIR 4: N8 absulute 5: N9 encoder	0~5	-	0	△	Synchronous/ Asynchronous
E1.16	Second encoder line number (T4)	Second encoder line number	0~16384	Pulse	1024	△	Synchronous/ Asynchronous
E1.17	Second encoder counting direction (T4)	0: Anticlockwise adding counting 1: Anticlockwise minus counting	0 , 1	-	0	○	Synchronous/ Asynchronous
E1.18	Second encoder reduction ratio numerator (T4)	Second code wheel reduction ratio numerator	1~30000	-	4	×	Synchronous/ Asynchronous
E1.19	Second encoder reduction ratio denominator (T4)	Second code wheel reduction ratio denominator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.20	Second encoder speed feedback filtering time (T4)	Second code wheel speed feedback filtering times	0~100	ms	4	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
E1.21	First pulse input porttype (T2)	0: Invalid 1: Orthogonal 2: PULSE+DIR	0~2	-	1	△	Synchronous/ Asynchronous
E1.22	First pulse line number (T2)	Encoder number of 5V pulse port access	0~65535	Pulse	2500	△	Synchronous/ Asynchronous
E1.23	First pulse encoder counting direction (T2)	0: Anticlockwise adding counting 1: Anticlockwise minus counting	0 , 1	-	0	○	Synchronous/ Asynchronous
E1.24	First pulse electronic gear ratio numerator (T2)	First pulse port reduction ratio numerator	1~30000	-	100	×	Synchronous/ Asynchronous
E1.25	First pulse electronic gear ratio denominator (T2)	First pulse port reduction ratio denominator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.26	First pulse speed feedback filtering time (T2)	First pulse port speed feedback filtering times	0~100	ms	4	×	Synchronous/ Asynchronous
E1.27	Second pulse input port type (T3-24V)	0: IO mode 1: Orthogonal 2: PULSE+DIR	0~2	-	1	△	Synchronous/ Asynchronous
E1.28	Second pulse encoder line number (T3-24V)	Encoder line number access via 24V pulse port	0~65535	Pulse	2500	△	Synchronous/ Asynchronous
E1.29	Second pulse encoder counting direction (T3-24V)	0: Anticlockwise adding counting 1: Anticlockwise minus counting	0 , 1	-	0	○	Synchronous/ Asynchronous
E1.30	Second pulse electronic gear ratio numerator (T3-24V)	Second pulse port reduction ratio numerator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.31	Second pulse electronic gear ratio denominator (T3-24V)	Second pulse port reduction ratio denominator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.32	Second pulse speed feedback filtering time (T3-24V)	Second pulse port speed feedback filtering times	0~100	ms	4	×	Synchronous/ Asynchronous
E1.33	Denominator of Pulse Output of Absolute Encoder(T5)	T5 encoder pulse output frequency reduction bit set, the pulse output after four times the number of single-loop maximum right shiftE1.33	0~1024	-	4	○	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
E1.34	1 code wheel passing Z times lower 16 bits (T5)	Record the number of times the motor encoder passes through Z	0~30000	-	1	*	Synchronous/ Asynchronous
E1.35	1 code wheel passing Ztimes higher 16 bits (T5)						
E1.36	2 code wheel passing Z times lower 16 bits (T4)	Record the number of times the motor encoder passes through Z	0~30000	-	0	*	Synchronous/ Asynchronous
E1.37	2 code wheel passing Z times higher 16 bits (T4)						
E1.38	Interior synchronous order reduction ratio numerator	Interior synchronous order reduction ratio numerator	1~30000	-	1	×	Synchronous
E1.39	Interior synchronous order reduction ratio denominator	Interior synchronous order reduction ratio denominator	1~30000	-	1	×	Synchronous
E1.40	2 code wheel speed reduction ratio numerator	2 code wheel speed reduction ratio numerator	1~30000	-	1	×	Synchronous
E1.41	2 code wheel speed reduction ratio denominator	2 code wheel speed reduction ratio denominator	1~30000	-	1	×	Synchronous
E1.42	1 pulse port speed mode reduction ratio numerator	1 pulse port speed mode reduction ratio numerator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.43	1 pulse port speed mode reduction ratio denominator	1 pulse port speed mode reduction ratio denominator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.44	2 pulse port speed mode reduction ratio numerator	2 pulse port speed mode reduction ratio numerator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.45	2 pulse port speed mode reduction ratio denominator	2 pulse port speed mode reduction ratio denominator	1~30000	-	1	×	Synchronous/ Asynchronous
E1.46	encoder underclocking coefficient	Absolute value encoder underclocking use fractional frequency parameter, set as fractional frequency number, encoder digit=E1.08-E1.46	0~32	-	0	△	Synchronous/ Asynchronous
E1.46	encoder underclocking coefficient	Absolute value encoder underclocking use fractional frequency parameter, set as fractional frequency number, encoder digit=E1.08-E1.46	0~32	-	0	△	Synchronous/ Asynchronous
E1.47	Pulse output direct	0: A lead B positive 1: B lead A	0, 1	-	0	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
E1.48	Pulse output Z width	0: 1/4T 1: 1/2T 3: 1T	0~3	—	0	×	Synchronous/ Asynchronous
E1.49	Save	—	—	—	—	—	—
E1.50	SSI baud rate of motor encoder	0: 3.375M 1: 1.6875M 2: 0.8475M 3: 0.421875M 4: 0.210938M	0~4	—	2	△	Synchronous
E1.51	Working mode under SSI encoder	0: Singal SSI turn to singal 485 1: Ch1SSI turn to double 485 out 2: Ch2SSI turn to double 485 out	0~2	—	0	△	Synchronous
E1.52	MDEA card selection	0: Legacy card 1: MDEA card	0 , 1	—	0	△	Synchronous
E1.53	I5 outside interrupt enumeration	The parameter access I5 will plus 1 during setting I5 as outside IO interrupt	1~65535	—	0	*	Synchronous
E1.54	24V pulse filter selection	0: 30M 1: 15M 2: 7.5M 3: 3.75M 4: 2.5M 5: 1.875M 6: 1.25M 7: 0.9375M 8: 0.625M 9: 0.4688M 10: 0.375M 11: 0.3125M 12: 0.2344M 13: 0.1875M 14: 0.1563M 15: 0.1172M	1~15	—	0	△	Synchronous/ Asynchronous
E1.55	24V pulse direction filter selection	He parameter means low-pass filter cutoff frequency, Fre=60/E1.55, setting 0, no filter	1~600	MHz	0	○	Synchronous/ Asynchronous

Protection parameter P1

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
P1.00	Save	-	-	-	-	—	—
P1.01	Bus voltage over voltage alarm point	When bus voltage exceeds the value , alarm over voltage OV1	0~10000	V	800	×	Synchronous
P1.02	Bus voltage under voltage alarm point	When bus voltage is lower than the value , alarm under voltage UV1	0~10000	V	300	×	Synchronous
P1.03	Encoder alarm shielding	Encoder alarm shielding bit processing: bit0: EL alarm shielding bit1: EC alarm shielding bit2: EP alarm shielding Bit3: ES alarm shielding	0~65535	-	0	×	Synchronous
P1.04	PU alarm shielding	0: Start 1: Shielding PU	0 , 1	-	0	×	Synchronous/ Asynchronous
P1.05	Motor overheating alarm	0: Normally closed 1: Normally open 2: Do not alarm OH3	0~2	-	1	×	Synchronous/ Asynchronous
P1.06	Motor speed alarm point	Speed protect alarm upper limit	0~30000	rpm	8000	×	Synchronous/ Asynchronous
P1.07	Speed scope decision	Used to decision speed reached, zero speed	0~3000.0	rpm	0	○	Synchronous/ Asynchronous
P1.08	Save	-	-	-	-	—	—
P1.09	Thermistor measurement alarm	0: No start Other: Representation temperature value, alarm OH3 when measurement temperature value pass the alarm value continue 1s	0~300	degree	0	○	Synchronous/ Asynchronous
P1.10	Position follow-up error over proof threshold	Position pulse counter over proof, representation follow-up error reach 1.5 turn, endurance 50ms alarm when setting 1.5000, the parameter set 0 shielding alarm	0~3.0000	Pulse	10000	×	Synchronous/ Asynchronous
P1.11	Alarm short circle time	Let the bridge arm short circle when driver alarm, and let the motor brake stop quickly	0~30000	ms	30	○	Synchronous/ Asynchronous
P1.12	Tamagawa Encoder alarm code	Read the alarm code from encoder, ALM byte bit0: Over speed bit2: Enumeration error bit4: Encoder temperature over high bit5: Many turn enumeration abnormal bit6: Cell fault	0~65535	-	0	*	Synchronous/ Asynchronous
P1.13	Resolver fault determining filtering time	When resolver fault signal is kept over the time, alarm EL	0~20000	ms	5	○	Synchronous/ Asynchronous
P1.14	OC4 alarm shielding	1: Shielding 2: Start	0 , 1	-	0	×	Synchronous/ Asynchronous

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
P1.15	CPU heartbeat detection start	0: Shielding 1: Start	0,1	—	0	○	Synchronous
P1.16	Encoder communication calibration error counting	Encoder communication error and CRC calibration error when P1.16 always increase Encoder breakage when P1.16=8000 and no change	—	—	0	*	Synchronous
P1.17	Resolver fault error counting	Resolver LOT fault error counts	—	—	0	*	Synchronous
P1.18	Speed loss alarm test window	0: Shielding, no detection of motor feedback speed Others: When the motor feedback speed exceeds this value, alarm E1.SE will be is sued when the difference between the motor feedback speed and the output speed is greater than (output speed ∗Pn.18) and the duration exceeds Pn.19.	0~1.000	—	0.200	*	Synchronous/ Asynchronous
P1.19	Speed loss alarm test time		0~300.00	0.01s	4.00	*	Synchronous/ Asynchronous
P1.20	save	—	—	—	—	—	—
P1.21	Delay open brake time	Let motor enabled firstly when the test need open brake, then delay preset time, then open brake	0~20000	ms	0	○	Synchronous/ Asynchronous
P1.22	Close brake delay time	When test need close brake, close brake firstly, keep in enable status, delay the preset time and then turn off the enable	0~20000	ms	0	○	—
P1.23	Heartbeat frequency of large CPU	The heartbeat times of large CPU are theoretically 5 ms plus 1	0~65535	—	0	*	Synchronous/ Asynchronous
P1.24	Heartbeat frequency of small CPU	The number of heartbeats in a small CPU is theoretically 1ms plus 1	0~65535	—	0	*	Synchronous/ Asynchronous
P1.25	Low speed overload alarm speed value	0: Shielding, no motor feedback speed detection Others: When the motor feedback speed is lower than Pn.25, the actual current exceeds Pn.27∗Dn.01, and the duration exceeds Pn.26, alarm E1.OL2	0~6000.0	rpm	2.0	○	Synchronous/ Asynchronous
P1.26	Low speed overload alarm time threshold		0~200.00	s	1.00	○	Synchronous/ Asynchronous
P1.27	Low speed overload alarm current multiple		0~10.00	—	1.50	○	Synchronous/ Asynchronous

Communication parameter T1

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
T1.00	Modbus communication station No.	Modbus station No. setting	0~255	—	1	△	Synchronous/ Asynchronous
T1.01	Modbus Baud rate communication	For example 38400-->38.4	0~6000.0	—	38.4	△	Synchronous/ Asynchronous
T1.02	Modbus odd-even check	0: None check 1: Even check 2: Odd check	0~2	—	0	△	Synchronous/ Asynchronous
T1.03	Modbus high-low bytes select	0: Low at front 1: High at front	0，1	—	0	△	Synchronous/ Asynchronous
T1.04	485 terminal resistance select	0: None 1: Select	0，1	—	0	△	Synchronous/ Asynchronous
T1.05	Save	—	—	—	—	—	—
T1.06	ETHERCAT protocol select	0: Suit I5 system of SMTCL 1: Suit CPTEK forging machine	0，1	-	0	△	Synchronous/ Asynchronous
T1.07	Save	—	—	—	—	—	—
T1.08	ETHERCAT bus external sudden scram enabling	0: Turn off 1: Turn on	0，1	—	0	○	Synchronous/ Asynchronous
T1.09	Speed resolution	Velocity resolution=0.01rpm/(T1.09)	0~2	—	0	×	Synchronous/ Asynchronous
T1.10 ~ T1.16	save	—	—	—	—	—	—
T1.17	Bus Bit Control State	bit0: Whether to open hard stop or not 0: Invalid 1: Effective bit1、bit2: Quasi-stop mode 0: Quasi-stop of encoder 1: External IO Quasi-stop bit3: Disconnecting Enabling Mode 0: Direct disconnection 1: Triggering a sudden stop	0~65535	—	0	○	Synchronous/ Asynchronous
T1.18	Bus Interpolation Period Setting	Bus cycle time	1~200	ms	1	○	Synchronous/ Asynchronous
T1.19	Bus Domain Time Parameter Setting	Bus communication disconnection time exceeding this preset is considered disconnected	1~50000	ms	500	○	Synchronous/ Asynchronous
T1.20	Mechatrolink station No set	Mechatrolink station No setting	0~255	—	1	△	Synchronous/ Asynchronous
T1.21 ~ T1.27	Save	—	—	—	—	—	—

Function code	Name	Description	Setting scope	Unit	Factory setting	Change	Recommend motor
T1.28	Mechatrolink II Selection of Bus Master Station	0: New Algebraic Control System 1: Baoyuan CNC System 2: Baoyuan turret 3: Baoyuan ATC 4: KND CNC System	0~4	-	1	×	Synchronous/ Asynchronous
T1.29	Bus execution time	Bus execution interval period	1~65535	ms	0	*	Synchronous/ Asynchronous
T1.30 ~ T1.35	Save	-	-	-	-	—	—
T1.36	Monitoring Selection of Broad Number System1	Return the torque and current to the system when the speed of the system's return motor is set to 12 hours	10h、12h	-	10h	○	Synchronous/ Asynchronous
T1.37	Monitoring Selection of GST System2	Return the torque and current to the system when the speed of the system's return motor is set to 12 hours	10h、12h	-	12h	○	Synchronous/ Asynchronous
T1.38 ~ T1.47	save	—	—	—	—	—	—
T1.48	Mechatrolink speed deceleration ratio molecule	Setting Mechatrolink speed deceleration ratio molecule	0~65535	-	0	○	Synchronous/ Asynchronous
T1.49	Mechatrolink speed deceleration ratio denominator	Setting Mechatrolink speed deceleration ratio denominator	0~65535	-	0	○	Synchronous/ Asynchronous
T1.50	CAN station No set	0: Master station 1: Slave station	0~9	-	0	△	Synchronous/ Asynchronous
T1.51	CAN terminal resistance select	CAN terminal resistance select	0, 1	-	0	○	Synchronous/ Asynchronous
T1.52	CAN slave station number select	Slave station number select	0~255	-	0	○	Synchronous/ Asynchronous
T1.53	CAN communication task cycle set	When the value is 0, adjust cycle shall be worked as per default 2ms and set resolution as 0.1ms	0.5~50.5	0.1ms	1.0	×	Synchronous/ Asynchronous
T1.54	CAN protocol selection	0: CTB protocol 1: 402 protocol	0, 1	-	0	○	Synchronous/ Asynchronous
T1.55	CANOPEN time-out	CANOPEN time-out time setting, start the function when it isn't 0	0~30000	ms	0	○	Synchronous/ Asynchronous
T1.56	CANOPEN baud rate	Setting CAN baud rate by the parameter, if it want to set 500k, the parameter write 500	0~65535	KBPS	500	△	Synchronous/ Asynchronous
T1.57	CANOPENBit control	bit0: Limiting function 0: Disability 1: Enable	0~65535	-	0	○	Synchronous/ Asynchronous

Appendix

List of motor code

Motor Model	Code	Motor Model	Code	Motor Model	Code
Z18-40P7XA10-20XXX	11142	Z18-44P0XA20-40XXX	11472	Z18-46P5XB10-20XXX	12442
Z18-40P7XA10-30XXX	11143	Z18-44P0XA20-60XXX	11473	Z18-46P5XB10-30XXX	12443
Z18-40P7XA10-40XXX	11144	Z18-44P0XA20-80XXX	11474	Z18-46P5XB10-40XXX	12444
Z18-41P1XA15-30XXX	11162	Z18-45P5XA30-60XXX	11492	Z18-49P5XB15-30XXX	12462
Z18-41P1XA15-45XXX	11163	Z18-45P5XA30-90XXX	11493	Z18-49P5XB15-45XXX	12463
Z18-41P1XA15-60XXX	11164	Z18-45P5XA30-A2XXX	11494	Z18-49P5XB15-60XXX	12464
Z18-41P5XA20-40XXX	11172	Z18-42P2XB10-20XXX	12142	Z18-4011XB20-40XXX	12472
Z18-41P5XA20-60XXX	11173	Z18-42P2XB10-30XXX	12143	Z18-4011XB20-60XXX	12473
Z18-41P5XA20-80XXX	11174	Z18-42P2XB10-40XXX	12144	Z18-4011XB20-80XXX	12474
Z18-42P2XA30-60XXX	11192	Z18-43P7XB15-30XXX	12162	Z18-4015XB30-60XXX	12482
Z18-42P2XA30-90XXX	11193	Z18-43P7XB15-45XXX	12163	Z18-4015XB30-90XXX	12483
Z18-42P2XA30-A2XXX	11194	Z18-43P7XB15-60XXX	12164	Z18-4015XB30-A2XXX	12484
Z18-41P1XA10-20XXX	11242	Z18-44P0XB20-40XXX	12172	Z18-45P5XC07-15XXX	13132
Z18-41P1XA10-30XXX	11243	Z18-44P0XB20-60XXX	12173	Z18-45P5XC07-22XXX	13133
Z18-41P1XA10-40XXX	11244	Z18-44P0XB20-80XXX	12174	Z18-45P5XC07-30XXX	13134
Z18-41P5XA15-30XXX	11262	Z18-45P5XB30-60XXX	12182	Z18-47P5XC10-20XXX	13142
Z18-41P5XA15-45XXX	11263	Z18-45P5XB30-90XXX	12183	Z18-47P5XC10-30XXX	13143
Z18-41P5XA15-60XXX	11264	Z18-45P5XB30-A2XXX	12184	Z18-47P5XC10-40XXX	13144
Z18-42P0XA20-40XXX	11272	Z18-43P7XB10-20XXX	12242	Z18-4011XC15-30XXX	13162
Z18-42P0XA20-60XXX	11273	Z18-43P7XB10-30XXX	12243	Z18-4011XC15-45XXX	13163
Z18-42P0XA20-80XXX	11274	Z18-43P7XB10-40XXX	12244	Z18-4011XC15-60XXX	13164
Z18-43P0XA30-60XXX	11292	Z18-45P5XB15-30XXX	12262	Z18-4015XC20-40XXX	13172
Z18-43P0XA30-90XXX	11293	Z18-45P5XB15-45XXX	12263	Z18-4015XC20-60XXX	13173
Z18-43P0XA30-A2XXX	11294	Z18-45P5XB15-60XXX	12264	Z18-4015XC20-80XXX	13174
Z18-41P5XA10-20XXX	11342	Z18-47P5XB20-40XXX	12272	Z18-47P5XC07-15XXX	13232
Z18-41P5XA10-30XXX	11343	Z18-47P5XB20-60XXX	12273	Z18-47P5XC07-22XXX	13233
Z18-41P5XA10-40XXX	11344	Z18-47P5XB20-80XXX	12274	Z18-47P5XC07-30XXX	13234
Z18-42P2XA15-30XXX	11362	Z18-4011XB30-60XXX	12282	Z18-4010XC10-20XXX	13242
Z18-42P2XA15-45XXX	11363	Z18-4011XB30-90XXX	12283	Z18-4010XC10-30XXX	13243
Z18-42P2XA15-60XXX	11364	Z18-4011XB30-A2XXX	12284	Z18-4010XC10-40XXX	13244
Z18-43P0XA20-40XXX	11372	Z18-45P5XB10-20XXX	12342	Z18-4015XC15-30XXX	13262
Z18-43P0XA20-60XXX	11373	Z18-45P5XB10-30XXX	12343	Z18-4015XC15-45XXX	13263
Z18-43P0XA20-80XXX	11374	Z18-45P5XB10-40XXX	12344	Z18-4015XC15-60XXX	13264
Z18-44P0XA30-60XXX	11392	Z18-47P5XB15-30XXX	12362	Z18-4020XC20-40XXX	13272
Z18-44P0XA30-90XXX	11393	Z18-47P5XB15-45XXX	12363	Z18-4020XC20-60XXX	13273
Z18-44P0XA30-A2XXX	11394	Z18-47P5XB15-60XXX	12364	Z18-4020XC20-80XXX	13274
Z18-42P2XA10-20XXX	11442	Z18-49P5XB20-40XXX	12372	Z18-4010XC07-15XXX	13332
Z18-42P2XA10-30XXX	11443	Z18-49P5XB20-60XXX	12373	Z18-4010XC07-22XXX	13333
Z18-42P2XA10-40XXX	11444	Z18-49P5XB20-80XXX	12374	Z18-4010XC07-30XXX	13334
Z18-43P7XA15-30XXX	11462	Z18-4013XB30-60XXX	12382	Z18-4013XC10-20XXX	13342
Z18-43P7XA15-45XXX	11463	Z18-4013XB30-90XXX	12383	Z18-4013XC10-30XXX	13343
Z18-43P7XA15-60XXX	11464	Z18-4013XB30-A2XXX	12384	Z18-4013XC10-40XXX	13344

Motor Model	Code	Motor Model	Code	Motor Model	Code
Z18-4018XC15-30XXX	13362	Z18-4010XD05-10XXX	14322	Z18-4026XE10-20XXX	15242
Z18-4018XC15-45XXX	13363	Z18-4010XD05-15XXX	14323	Z18-4026XE10-30XXX	15243
Z18-4018XC15-60XXX	13364	Z18-4010XD05-20XXX	14324	Z18-4026XE10-40XXX	15244
Z18-4025XC20-40XXX	13372	Z18-4015XD07-15XXX	14332	Z18-4037XE15-30XXX	15262
Z18-4025XC20-60XXX	13373	Z18-4015XD07-22XXX	14333	Z18-4037XE15-45XXX	15263
Z18-4025XC20-80XXX	13374	Z18-4015XD07-30XXX	14334	Z18-4037XE15-60XXX	15264
Z18-4011XC07-15XXX	13432	Z18-4020XD10-20XXX	14342	Z18-4015XE05-10XXX	15322
Z18-4011XC07-22XXX	13433	Z18-4020XD10-30XXX	14343	Z18-4015XE05-15XXX	15323
Z18-4011XC07-30XXX	13434	Z18-4020XD10-40XXX	14344	Z18-4015XE05-20XXX	15324
Z18-4015XC10-20XXX	13442	Z18-4030XD15-30XXX	14362	Z18-4022XE07-15XXX	15332
Z18-4015XC10-30XXX	13443	Z18-4030XD15-45XXX	14363	Z18-4022XE07-22XXX	15333
Z18-4015XC10-40XXX	13444	Z18-4030XD15-60XXX	14364	Z18-4022XE07-30XXX	15334
Z18-4022XC15-30XXX	13462	Z18-4013XD05-10XXX	14422	Z18-4030XE10-20XXX	15342
Z18-4022XC15-45XXX	13463	Z18-4013XD05-15XXX	14423	Z18-4030XE10-30XXX	15343
Z18-4022XC15-60XXX	13464	Z18-4013XD05-20XXX	14424	Z18-4030XE10-40XXX	15344
Z18-4030XC20-40XXX	13472	Z18-4018XD07-15XXX	14432	Z18-4045XE15-30XXX	15362
Z18-4030XC20-60XXX	13473	Z18-4018XD07-22XXX	14433	Z18-4045XE15-45XXX	15363
Z18-4030XC20-80XXX	13474	Z18-4018XD07-30XXX	14434	Z18-4045XE15-60XXX	15364
Z18-47P5XD05-10XXX	14122	Z18-4026XD10-20XXX	14442	Z18-4018XE05-10XXX	15422
Z18-47P5XD05-15XXX	14123	Z18-4026XD10-30XXX	14443	Z18-4018XE05-15XXX	15423
Z18-47P5XD05-20XXX	14124	Z18-4026XD10-40XXX	14444	Z18-4018XE05-20XXX	15424
Z18-4011XD07-15XXX	14132	Z18-4037XD15-30XXX	14462	Z18-4030XE07-15XXX	15432
Z18-4011XD07-22XXX	14133	Z18-4037XD15-45XXX	14463	Z18-4030XE07-22XXX	15433
Z18-4011XD07-30XXX	14134	Z18-4037XD15-60XXX	14464	Z18-4030XE07-30XXX	15434
Z18-4015XD10-20XXX	14142	Z18-4010XE05-10XXX	15122	Z18-4037XE10-20XXX	15442
Z18-4015XD10-30XXX	14143	Z18-4010XE05-15XXX	15123	Z18-4037XE10-30XXX	15443
Z18-4015XD10-40XXX	14144	Z18-4010XE05-20XXX	15124	Z18-4037XE10-40XXX	15444
Z18-4022XD15-30XXX	14162	Z18-4015XE07-15XXX	15132	Z18-4055XE15-30XXX	15462
Z18-4022XD15-45XXX	14163	Z18-4015XE07-22XXX	15133	Z18-4055XE15-45XXX	15463
Z18-4022XD15-60XXX	14164	Z18-4015XE07-30XXX	15134	Z18-4055XE15-60XXX	15464
Z18-49P5XD05-10XXX	14222	Z18-4020XE10-20XXX	15142	Z18-4015XF05-10XXX	16122
Z18-49P5XD05-15XXX	14223	Z18-4020XE10-30XXX	15143	Z18-4015XF05-15XXX	16123
Z18-49P5XD05-20XXX	14224	Z18-4020XE10-40XXX	15144	Z18-4015XF05-20XXX	16124
Z18-4013XD07-15XXX	14232	Z18-4030XE15-30XXX	15162	Z18-4022XF07-15XXX	16132
Z18-4013XD07-22XXX	14233	Z18-4030XE15-45XXX	15163	Z18-4022XF07-22XXX	16133
Z18-4013XD07-30XXX	14234	Z18-4030XE15-60XXX	15164	Z18-4022XF07-30XXX	16134
Z18-4018XD10-20XXX	14242	Z18-4013XE05-10XXX	15222	Z18-4030XF10-20XXX	16142
Z18-4018XD10-30XXX	14243	Z18-4013XE05-15XXX	15223	Z18-4030XF10-30XXX	16143
Z18-4018XD10-40XXX	14244	Z18-4013XE05-20XXX	15224	Z18-4030XF10-40XXX	16144
Z18-4026XD15-30XXX	14262	Z18-4018XE07-15XXX	15232	Z18-4045XF15-30XXX	16162
Z18-4026XD15-45XXX	14263	Z18-4018XE07-22XXX	15233	Z18-4045XF15-45XXX	16163
Z18-4026XD15-60XXX	14264	Z18-4018XE07-30XXX	15234	Z18-4045XF15-60XXX	16164

Motor Model	Code	Motor Model	Code	Motor Model	Code
Z18-4018XF05-10XXX	16222	Z18-4060XG10-20XXX	17142	Z18-4065XH05-10XXX	18122
Z18-4018XF05-15XXX	16223	Z18-4060XG10-30XXX	17143	Z18-4065XH05-15XXX	18123
Z18-4018XF05-20XXX	16224	Z18-4060XG10-40XXX	17144	Z18-4065XH05-20XXX	18124
Z18-4030XF07-15XXX	16232	Z18-4090XG15-30XXX	17162	Z18-4090XH07-15XXX	18132
Z18-4030XF07-22XXX	16233	Z18-4090XG15-45XXX	17163	Z18-4090XH07-22XXX	18133
Z18-4030XF07-22XXX	16234	Z18-4090XG15-60XXX	17164	Z18-4090XH07-30XXX	18134
Z18-4037XF10-20XXX	16242	Z18-4037XG05-10XXX	17222	Z18-4132XH10-20XXX	18142
Z18-4037XF10-30XXX	16243	Z18-4037XG05-15XXX	17223	Z18-4132XH10-30XXX	18143
Z18-4037XF10-40XXX	16244	Z18-4037XG05-20XXX	17224	Z18-4200XH15-30XXX	18162
Z18-4055XF15-30XXX	16262	Z18-4055XG07-15XXX	17232	Z18-4090XH05-10XXX	18222
Z18-4055XF15-45XXX	16263	Z18-4055XG07-22XXX	17233	Z18-4090XH05-15XXX	18223
Z18-4055XF15-60XXX	16264	Z18-4055XG07-30XXX	17234	Z18-4090XH05-20XXX	18224
Z18-4026XF05-10XXX	16322	Z18-4075XG10-20XXX	17242	Z18-4132XH07-15XXX	18232
Z18-4026XF05-15XXX	16323	Z18-4075XG10-30XXX	17243	Z18-4132XH07-22XXX	18233
Z18-4026XF05-20XXX	16324	Z18-4075XG10-40XXX	17244	Z18-4132XH07-30XXX	18234
Z18-4037XF07-15XXX	16332	Z18-4110XG15-30XXX	17262	Z18-4160XH10-20XXX	18242
Z18-4037XF07-22XXX	16333	Z18-4110XG15-45XXX	17263	Z18-4160XH10-30XXX	18243
Z18-4037XF07-30XXX	16334	Z18-4110XG15-60XXX	17264	Z18-4250XH15-30XXX	18262
Z18-4050XF10-20XXX	16342	Z18-4045XG05-10XXX	17322	Z18-4110XH05-10XXX	18322
Z18-4050XF10-30XXX	16343	Z18-4045XG05-15XXX	17323	Z18-4110XH05-15XXX	18323
Z18-4050XF10-40XXX	16344	Z18-4045XG05-20XXX	17324	Z18-4110XH05-20XXX	18324
Z18-4075XF15-30XXX	16362	Z18-4066XG07-15XXX	17332	Z18-4160XH07-15XXX	18332
Z18-4075XF15-45XXX	16363	Z18-4066XG07-22XXX	17333	Z18-4160XH07-22XXX	18333
Z18-4075XF15-60XXX	16364	Z18-4066XG07-30XXX	17334	Z18-4160XH07-30XXX	18334
Z18-4030XF05-10XXX	16422	Z18-4090XG10-20XXX	17342	Z18-4210XH10-20XXX	18342
Z18-4030XF05-15XXX	16423	Z18-4090XG10-30XXX	17343	Z18-4210XH10-30XXX	18343
Z18-4030XF05-20XXX	16424	Z18-4090XG10-40XXX	17344	Z18-4315XH15-30XXX	18362
Z18-4045XF07-15XXX	16432	Z18-4132XG15-30XXX	17362	Z18-4132XH05-10XXX	18422
Z18-4045XF07-22XXX	16433	Z18-4132XG15-45XXX	17363	Z18-4132XH05-15XXX	18423
Z18-4045XF07-30XXX	16434	Z18-4132XG15-60XXX	17364	Z18-4132XH05-20XXX	18424
Z18-4060XF10-20XXX	16442	Z18-4055XG05-10XXX	17422	Z18-4200XH07-15XXX	18432
Z18-4060XF10-30XXX	16443	Z18-4055XG05-15XXX	17423	Z18-4200XH07-22XXX	18433
Z18-4060XF10-40XXX	16444	Z18-4055XG05-20XXX	17424	Z18-4200XH07-30XXX	18434
Z18-4090XF15-30XXX	16462	Z18-4090XG07-15XXX	17432	Z18-4265XH10-20XXX	18442
Z18-4090XF15-45XXX	16463	Z18-4090XG07-22XXX	17433	Z18-4265XH10-30XXX	18443
Z18-4090XF15-60XXX	16464	Z18-4090XG07-30XXX	17434	Z18-4400XH15-30XXX	18462
Z18-4030XG05-10XXX	17122	Z18-4110XG10-20XXX	17442		
Z18-4030XG05-15XXX	17123	Z18-4110XG10-30XXX	17443		
Z18-4030XG05-20XXX	17124	Z18-4110XG10-40XXX	17444		
Z18-4045XG07-15XXX	17132	Z18-4160XG15-30XXX	17462		
Z18-4045XG07-22XXX	17133	Z18-4160XG15-45XXX	17463		
Z18-4045XG07-30XXX	17134	Z18-4160XG15-60XXX	17464		