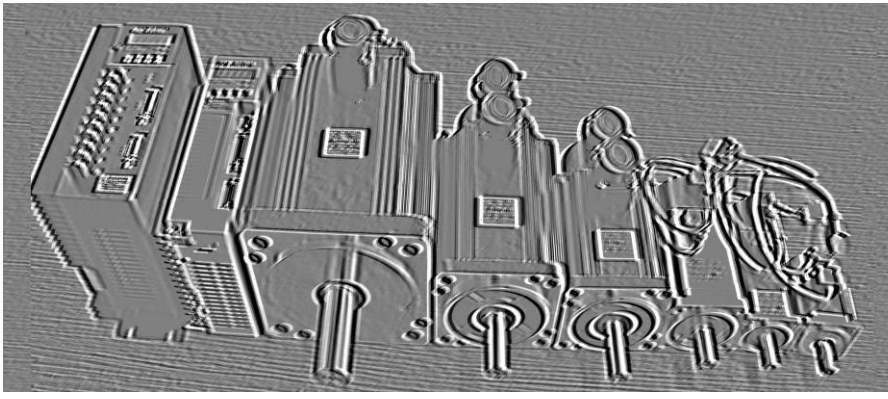
13ic/83ic absolute value series

Connection and Debugging Manual for AC Servo-Driver Motor

V022400 Version



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Important Safety Information

I. Personnel Safety

- This product is a high-voltage heavy current product. Make sure that personal are within the safety area of moving mechanisms.
- Improper operation may cause accidents such as electric arc burn or electric shock, etc.
- It is not allowed to operate, wire and electrify the product without following this manual.

II. Site Safety

- This product is a high-voltage heavy current product. It is not allowed to electrify and use the product where there are combustible or corrosive gases; otherwise fire and explosion may be caused.
- It is not allowed to electrify and use the product where combustible or corrosive articles drop; otherwise fire and explosion may be caused.
- It is not allowed to use the product in the places with high humidity, moisture and metal powder; otherwise dangerous accidents such as electric shock, etc. may be caused.

III. Product and Equipment Safety

- This product is a high-voltage heavy current product. Incorrect connection may lead to damage to the Product.
- PE terminal must be connected to a ground wire and make sure that the ground wire is reliably grounded.
- AC 220V power supply is suitable for this product. Do not connect an AC380V one to the servo driver.
- The U, V and W of the product should be connected with the motor. They are outputs. Do not connect them with input power supply.
- The U, V and W of the product should be connected with the motor. They are outputs. Do not connect them with input power supply.
- Tighten all terminals. The materials of all matching wires should be strictly selected according to power.
- Power distribution and touching of the terminals are not allowed when the driver is electrified.
- Do not touch the terminals within five (5) minutes after power off.
- It is not allowed to touch the motor and cables when the motor is in operation in order to avoid accidental injuries such as scalding and wrench, etc.

Remarks

It is hereby declared that :

- 2A/3A/5A/ shown in the manual or nameplate are the abbreviations for 20A/30A/50A.

Chapter I Installation

1.1 Outline Dimensions of the Servo Driver

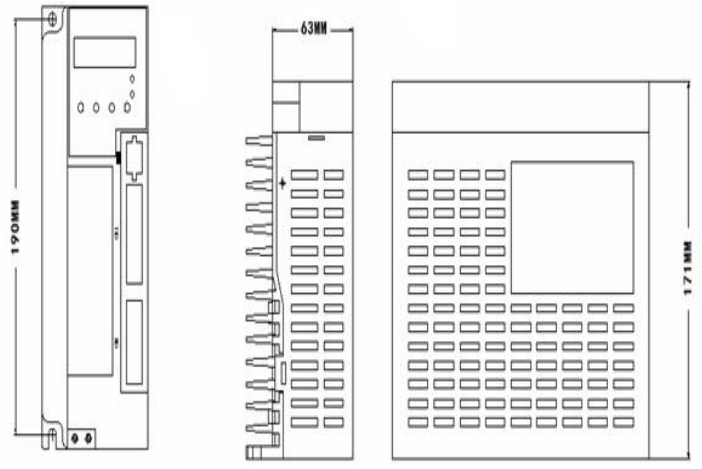


Figure 1.1 Outline Dimensional Drawings
For the Servo Driver of 30A/30A

1.11 Outline Dimensions of the Servo Driver

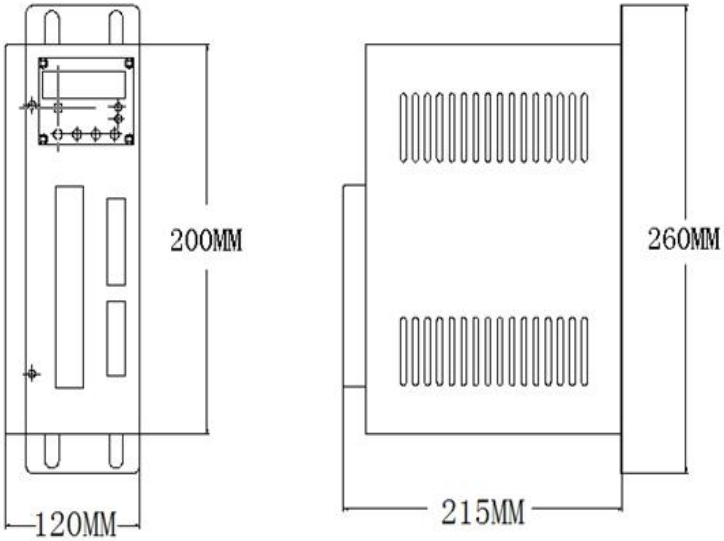


Figure 1.2 Outlines Dimensional Drawings
For the Servo Driver of 50A/75A

1.2 Installation Dimensions for the Servo Driver

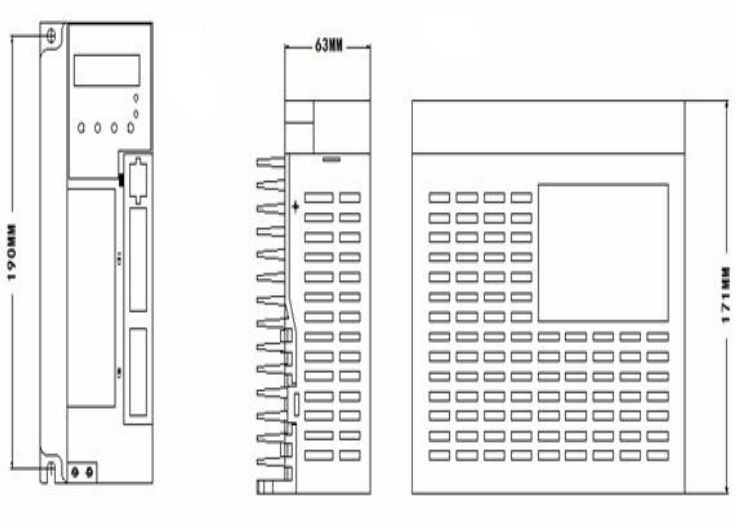


Figure 1.11 Installation Dimensions
For the Servo Driver of 30A/30A

1.21 Installation Dimensions for the Servo Driver

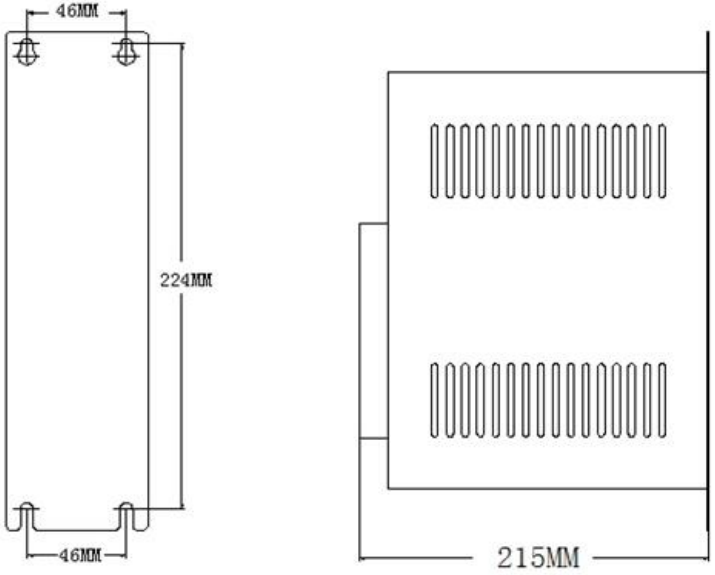


Figure 1.21 Installation Dimensions
For the Servo Driver of 50A/75A

1.3 Installation Site

I. To make sure that the servo driver works in order, it is necessary to ensure that the temperature around the driver is below 50℃ and that the relative humidity is below 90%. The long-term safe working temperature should be below 40℃.

II. The servo driver is subject to failures when used in a severe environment with corrosive gases, high humidity, metal powder, water or processing liquids. Therefore, the working environment should be fully taken into consideration during the use and installation.

III. The vibration acceleration of the equipment which is directly or indirectly connected with the servo driver should be below 0.5G (4.9m/S2) or less in order to ensure long-term stable operation of the servo driver.

IV. The servo driver could be disturbed when it is disturbing other facilities at the same time, so attention must be paid to the wiring of heavy current and weak current during the installation of a electric cabinet or a complete set of equipment. The servo driver is unable to work in order and also probably led to produce malfunction due to strong external disturbing signals or the serious effect on the power line of the servo driver and control signal. At the same time, the control equipments such as an upper computer also cannot work stably under the disturbance of the servo driver due to poor wiring. Pay attention to installing some devices such as a sound magnetic ring, a wave filter and an isolation transformer at the source of the disturbance and in the places which are disturbed. Pay special attention that the wire of control signal is easily subject to disturbance; therefore reasonable wiring and shielding measures
should be taken.

1.4 Direction and Space of Installation

I. Pay attention to the direction of installation (Figure 1.3).
II. Pay attention to the spacing of installation (Figure 1.3).
III. Four (4) M5 bolts can fix the servo driver with a spring washer added.
IV. The servo must be installed in a relatively closed space, with ventilation maintained in the electric cabinet and a filter screen installed at the vent to prevent the entry of dust. Clear the filter screen periodically to prevent air flow from being blocked.

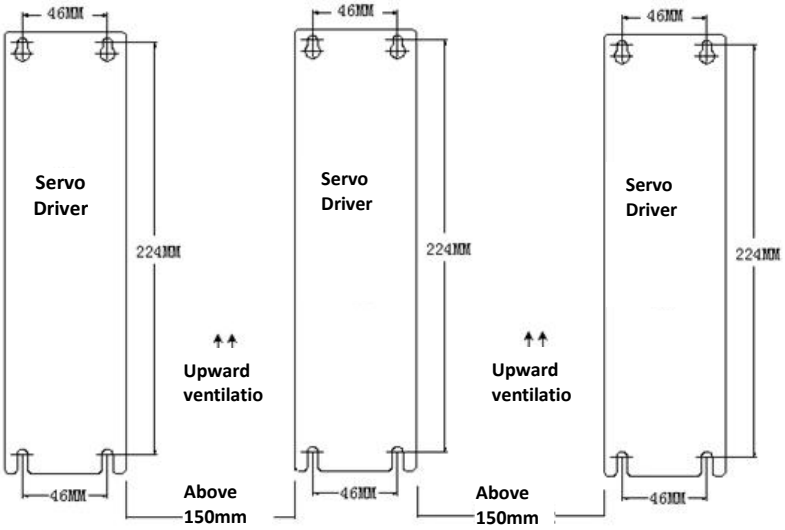


Figure 1.3 Direction of Installation

Chapter II Sketches of Functions

2.1 Basic Functions of DO-13i Series of Servos

Type		DO-1000 (20A/30A/50A/75A)
Control power supply and major loop source		L: Electrify for Single phase or three phase AC 220V ; H: Electrify for three-phase 380V
Environment	Temperature	Working temperature: 0-55 C Storage temperature: -40 C-80 C
	Humidity	No more than 90%(without condensation)
	Air index	No dust (conductive media such as metal powder, etc.) n the electric cabinet
Control mode		1. Position control 2. Speed control 3. Torque control 4. JOG operation 5. Four Internal speed control 6. Internal position control 7. Internal torque control 8. Position & speed control 9. Speed & torque control
External I/O		1. Servo enable 2. Reset 3. Position deviation reset 4. Pulse, CCW, and CW disabled. 5. Position switching 6. Speed selection 7. Zero speed clamping 8. The second reset 9. Extended functions (options) such as orientation and permissible etc. 10. Orientation accomplished
Encoder feedback		131072p/r(standard); frequency division permissible (options)
Communication mode		1. RS485(standard) 2. RS232 (option)
Load inertia		5 times smaller than that of the motor
Monitoring function		Speed, current position, command pulse accumulation, position deviation motor current, operation status, input and output terminals, and Z pulse signal, etc.
Protection function		Over voltage, over current, over speed, overload and incorrect feedback, etc.
Alarm function		Alarms (LED flashing; red lamp on) are often given off when the servo operates abnormally.
Gain adjustment		Gain adjustment can be carried out to match motor performance when the motor operates or stops.
Adaptive motor		Refer to Table 2.22 2.23 2.24 2.25 2.26 2.27

2.2 Type Selection of the Servo Driver

DO-13i B 30 L
(1) (2) (3) (4) (5)

(1) Series: Dealer's common types of servo drivers are adaptable to multiple specifications of servo motors and industries with rich forms of database.

(2) Feedback elements: 1000 2500C/T incremental type and wiring saving type encoders, 13i single/multi-loop bus type (2^{17}bit (131072)), and 83i single/multi (loop bus type (2^{23}bit (8388608))

(3) Control mode: B position control, C all-function type, T special type and A bus type(MECHATROLINK)

(4) IPM module specification: 15A,2A short for 20A,3A short for 30A,5A short for 50A,75A

(5) Main circuit voltage: L single phase or three phase 220V; H three phase 380V; default 220V when this voltage is omitted.

- DO-13i series of servo drivers are matched with Tamagawa multi-loop bus type and have to connect with Servo Motors equipped with Tamagawa multi-loop bus type.
- DO-13i series of servo drivers control operations by automatically recognize the model of motors. It drops the habits of incremental encoder of matching servo motor by changing model codes. Parameters of DO-13i series of servo driver to control motor are all read then servo motor bus type encoder is electrified.
- Code of restoring model will not work when the clients of DO-13i series of servo drivers are operating on the motor, but it's necessary for manufacturer to write motor parameters into encoder. In this session, advanced instructions of drivers are required when operating functions like writing parameters and zero setting absolute positions.(Refer to 2.22～2.27)
- DO-13i series of servo drivers add Port CN3 485 ModbusRTU Communication Protocol as standard to read the absolute position of servo motor and parameter numbers (also register address).

Encoder Parameter Writing Checking Diagram

Type Code	Applicable Driver	Applicable Motor	Power (kW)	Rated Current (A)	Rated Toque (Nm)
0	(220V) DO-13iC20L DO-13iC30L	60ST-M00630LMB	0.2	1.5	0.6
0		60ST-M01330LMB	0.4	2.8	1.3
0		60ST-M01930LMB	0.6	3.5	1.9
0		80ST-M01330LMB	0.4	2.6	1.3
1		80ST-M02430LMB	0.75	4.2	2.4
1		80ST-M0330LMB	1.0	4.2	3.3
0		90ST-M02430LMB	0.75	3.0	2.4
0		90ST-M03520LMB	0.73	3.0	3.5
1		90ST-M04025LMB	1.0	4.0	4
1		110ST-M02030LMB	0.6	4.0	2
1		110ST-M04030LMB	1.2	5.0	4

Table 2.22 DO-13iC20L (three-phase/single-phase 220V electrify)

Type Code	Applicable Driver	Applicable Motor	Power (kW)	Rated Current (A)	Rated Toque (Nm)
0	(220V) D0-13iC30L	60ST-M00630LMB	0.2	1.5	0.6
0		60ST-M01330LMB	0.4	2.8	1.3
0		60ST-M01930LMB	0.6	3.5	1.9
0		80ST-M01330LMB	0.4	2.6	1.3
1		80ST-M2430LMB	0.75	4.2	2.4
1		80ST-M03330LMB	1.0	4.2	3.3
0		90ST-M02430LMB	0.75	3.0	2.4
0		90ST-M03520LMB	0.73	3.0	3.5
1		90ST-M04025LMB	1.0	4.0	4
4		110ST-M02030LMB	0.6	4.0	2
4		110ST-M04030LMB	1.2	5.0	4
5		110ST-M05030LMB	1.5	6.0	5
5		110ST-M06020LMB	1.2	6.0	6
6		110ST-M06030LMB	1.8	8.0	6
9		130ST-M04025LMB	1.0	4.0	4
9		130ST-M05025LMB	1.3	5.0	5
14		130ST-M06025LMB	1.5	6.0	6
14		130ST-M07720LMB	1.6	6.0	7.7
11		130ST-M07725LMB	2.0	7.5	7.7
15		130ST-M07730LMB	2.4	9.0	7.7
14		130ST-M10015LMB	1.5	6.0	10
15		130ST-M10025LMB	2.6	10.0	10
15		130ST-M15015LMB	2.3	9.5	15
15		130ST-M12020LMB	2.4	10.0	12

Table 2.23 DO-13iC30L (three-phase/single-phase 220V electrify)

Type Code	Applicable Driver	Applicable Motor	Power (kW)	Rated Current (A)	Rated Toque (Nm)
14	(220V) DO-13iC50L	130ST-M07720LMB	1.6	6.0	7.7
11		130ST-M07725LMB	2.0	7.5	7.7
15		130ST-M07730LMB	2.4	9.0	7.7
14		130ST-M10015LMB	1.5	6.0	10
15		130ST-M10025LMB	2.6	10.0	10
15		130ST-M12030LMB	2.3	9.5	15
17		130ST-M15015LMB	3.9	17.0	15
17		130ST-M15025LMB	3.6	16.5	12
17		150ST-M18020LMB	3.8	16.5	15
17		150ST-M23020LMB	3.6	16.5	18
19		150ST-M27020LMB	4.7	20.5	23
19		150ST-M12020LMB	5.5	20.5	27
15		150ST-M17215LMB	2.4	10.0	12
12		150ST-M19015LMB	2.7	10.5	17
12		180ST-M21520LMB	3.0	12.0	19
13		180ST-M27010LMB	4.5	16.0	21
12		180ST-M27015LMB	2.9	12.0	27
13		180ST-M35015LMB	4.3	16.0	27
13		180ST-M35010LMB	3.7	16.0	35

Table 2.24 DO-13iC50L (three-phase 220V electrify)

Type Code	Applicable Driver	Applicable Motor	Power (kW)	Rated Current (A)	Rated Toque (Nm)
14	(220V) DO-13iC75L	130ST-M07720LMB	1.6	6.0	7.7
11		130 ST-M07725LMB	2.0	7.5	7.7
15		130 ST-M07730LMB	2.4	9.0	7.7
14		130 ST-M10015LMB	1.5	6.0	10
15		130 ST-M10025LMB	2.6	10.0	10
15		130 ST-M15015LMB	2.3	9.5	15
17		130 ST-M15025LMB	3.9	17.0	15
17		150 ST-M12030LMB	3.6	16.5	12
17		150 ST-M15025LMB	3.8	16.5	15
17		150 ST-M18020LMB	3.6	16.5	18
19		150 ST-M23020LMB	4.7	20.0	23
19		150 ST-M27020LMB	5.5	20.5	27
15		150 ST-M12020LMB	2.4	10.0	12
12		180 ST-M17215LMB	2.7	10.5	17
12		180 ST-M19015LMB	3.0	12.0	19
17		180 ST-M21520LMB	4.5	16.0	21
12		180 ST-M27010LMB	2.9	12.0	27
13		180 ST-M27015LMB	4.3	16.0	27
13		180 ST-M35010LMB	3.7	16.0	35
19		180 ST-M35015LMB	5.5	24.0	35
19		180 ST-M48015LMB	7.5	32.0	48

Table 2.25 DO-13iC75L (three-phase 220V electrify)

Type Code	Applicable Driver	Applicable Motor	Power (kW)	Rated Current (A)	Rated Toque (Nm)
103	(380V) DO-13iC25H DO-13iC50H	130ST-M07720HMB	1.6	4.0	7.7
109		130 ST-M07725HMB	2.0	5.5	7.7
113		130 ST-M07730HMB	2.4	6.5	7.7
112		130 ST-M10015HMB	1.5	4.5	10
113	(380V) DO-13iC50H	130 ST-M10025HMB	2.6	7.0	10
113		130 ST-M15015HMB	2.3	7.0	15
116		130 ST-M15025HMB	3.9	11.5	15
116		150 ST-M12030HMB	3.6	11.5	12
116		150 ST-M15025HMB	3.8	11.5	15
116		150 ST-M18020HMB	3.6	10.5	18
120	(380V) DO-13iC75H	150 ST-M23020HMB	4.7	13.5	23
120		150 ST-M27020HMB	5.5	13.5	27
113		150 ST-M112020HMB	2.4	7.0	12
113		180 ST-M17215HMB	2.7	6.5	17
113		180 ST-M19015HMB	3.0	7.5	19
114		180 ST-M21520HMB	4.5	9.5	21
113		180 ST-M27010HMB	2.9	7.5	27
114		180 ST-M27015HMB	4.3	10.0	27
114		180 ST-M35010HMB	3.7	10.0	35
116		180 ST-M35015HMB	5.5	12.0	35
125		180 ST-M48015HMB	7.5	20.0	48

Table 2.26 DO-13iC25H/50A/75A (three-phase 380V electrify)

Type Code	Applicable Driver	Applicable Motor	Power (kW)	Rated Current (A)	Rated Toque (Nm)
102	(380V) DO-13iC75H	130ST-M04025HMB	1.0	3.0	4
102		130 ST-M05020HMB	1.0	3.0	5
10		130 ST-M05025HMB	1.3	3.5	5
112		130 ST-M06025HMB	1.5	4.5	6
103		130 ST-M07720HMB	1.6	4.0	7.7
109		130 ST-M07725HMB	2.0	5.5	7.7
109		130 ST-M07730HMB	2.4	6.5	7.7
112		130 ST-M10015HMB	1.5	4.5	10
113		130 ST-M10025HMB	2.6	7.0	10
113		130 ST-M15015HMB	2.3	7.0	15
116		130 ST-M15025HMB	3.9	11.5	15
116		150 ST-M15025HMB	3.8	11.5	15
116		150 ST-M18020HMB	3.6	10.5	18
120		150 ST-M23020HMB	4.7	13.5	23
120		150 ST-M27020HMB	5.5	13.5	27
122		180 ST-M18020HMB	3.6	12.5	18
123		180 ST-M23020HMB	4.7	15.0	23
124		180 ST-M27020HMB	5.5	18.0	27
125		180 ST-M36015HMB	5.6	22.5	36
126		180 ST-M45015HMB	4.0	30.5	45
127		180 ST-M55015HMB	8.6	35.0	55

Table 2.27 DO-13iC75H (three-phase 380V electrify)

Chapter III Wiring

3.1 Notices

- The servo driver is a high voltage e heavy current product. Improper connection may cause damage to personnel and equipment.
- PE terminal must be connected to a ground wire and make sure that the ground wire is reliably grounded.
- AC 220V power supply is suitable for L series. AC 380V power supply is suitable for H series. Make sure of the correct connection.
- The U, V and W of the product should be connected with the motor. They are outputs. Do not connect them with input power supply.
- Do not connect the three-phase outputs U, V and W of the product in an incorrect sequence; Because incorrect connection may lead to motor racing, damage to equipment, and over current burnout to the product.
- Tighten all terminals. The materials of all matching wires should be strictly selected according to power.
- Power distribution and touching of the terminals are not allowed when the driver is electrified.
- Do not touch the terminals within five (5) minutes after power down.
- It is not allowed to touch the motor and cables when the motor is in operation in order to avoid accidental injuries such as scalding and wrench, etc. 3.2 Wiring Requirements

3.2Conduct Demand

- A three-phase isolation transformer is preferred for power supply.
- The required diameters of R, S, T and U, V, W, PE wires should be equal to or greater than $1.5mm^2$.
- All power terminals should be cold-pressed ones, firm and reliable.
- CN1 and CN2 are high-density signal plugs that need cables with a shielding layer.
- The wires for connecting PE terminals should be yellow-green ones with a diameter equal to or greater than $2.5mm^2$.

3.3 Wiring Methods

- A three-phase isolation transformer is preferred for power supply.
- The required diameters of R, S, T and U, V, W, PE wires should be equal to or greater than $1.5mm^2$.
- All power terminals should be cold-pressed ones, firm and reliable.
- CN1 and CN2 are high-density signal plugs, with both ends of the shielding layer grounded and connected with the housing.
- The wires for connecting PE terminals should be put through with the equipment housing ground wire and connected to the earth.

3.4 Typical Wiring

3.4.1 Position Control (pulse type)

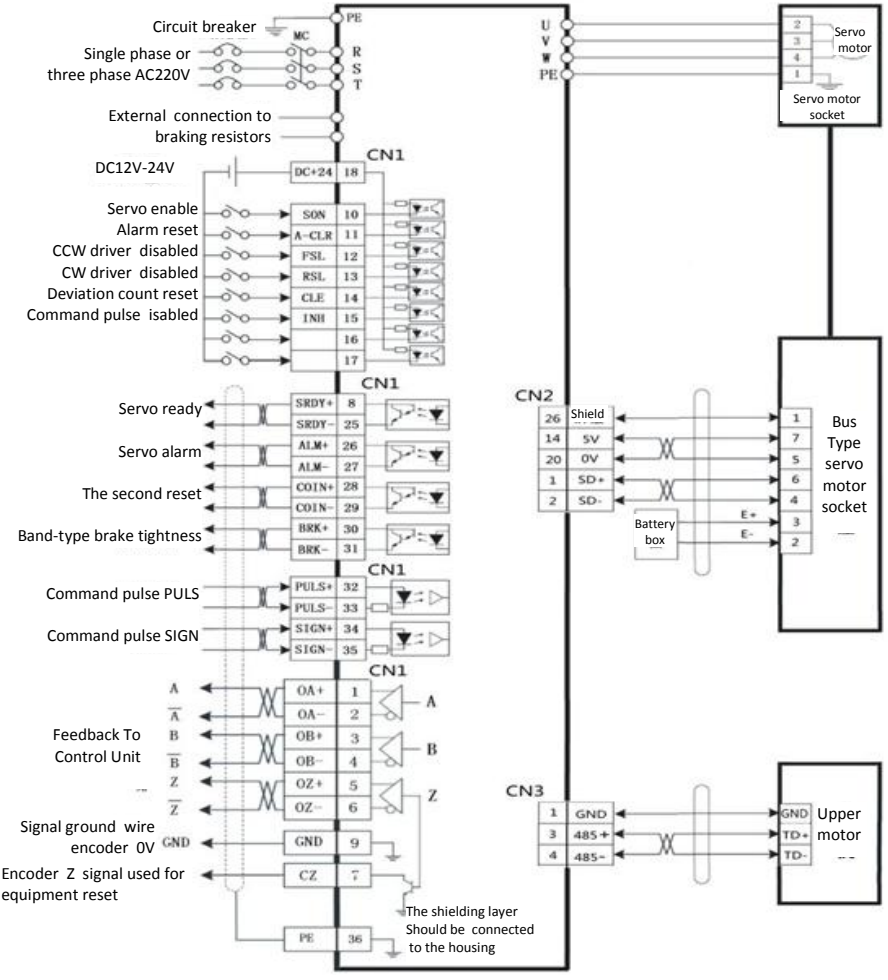


Figure 3.1 Wiring of Position Control

3.4.2 Speed Control (analog value)

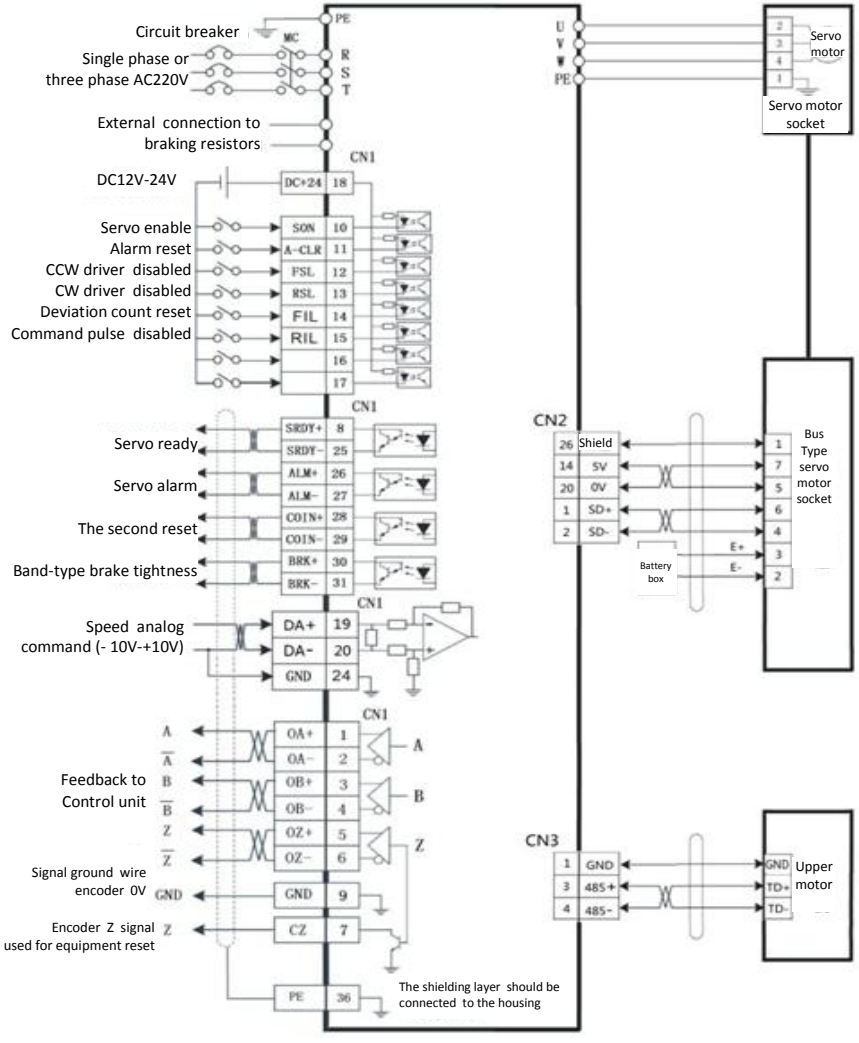


Figure 3.2 Wiring of Speed Control

3.4.3 Torque Control (analog value)

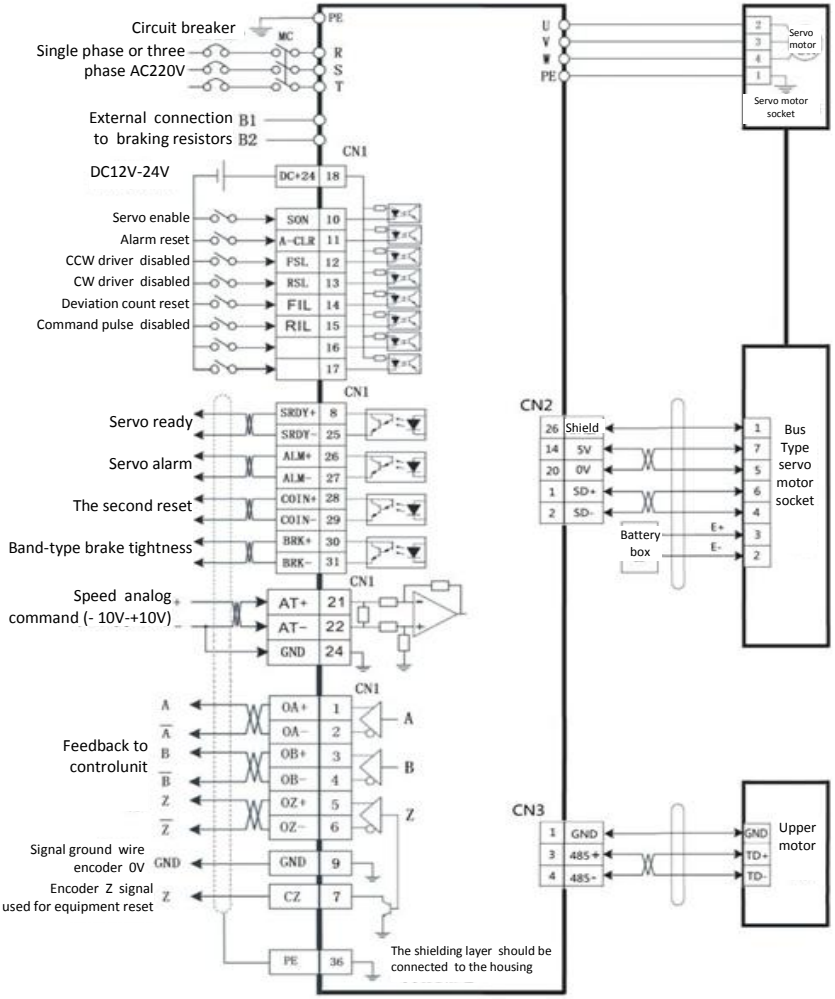


Figure 3.3 Wiring of Torque Control

3.4.4 Wiring Diagram for Bus Type Motor Encoder

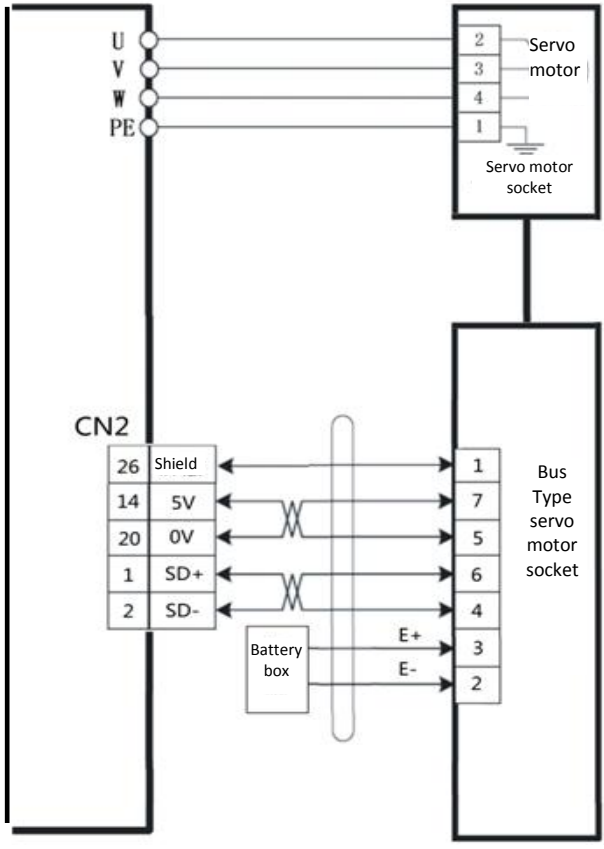


Figure 3.4 Wiring Diagram for Tama-gawa Multi-loop Absolute Value Encoder

3.4.5 Wiring Diagram for the Band-type Brake of the Servo Motor

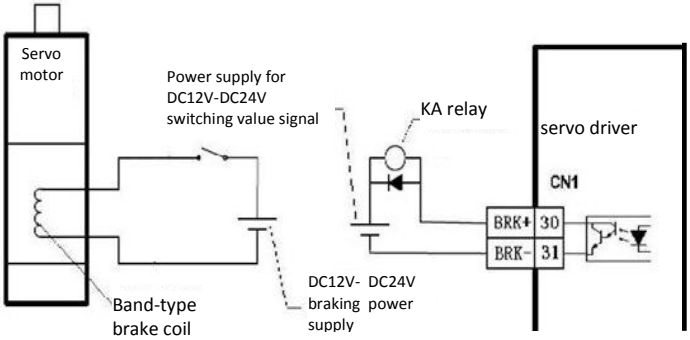


Figure3.5 Wiring Diagram for Band-type Brake Motor

Pin No.	Pin mark	Function Description
1	DC+	DC power supply positive pole DC24V+
2	DC-	DC power supply negative pole 0V
3	PE	Housing ground wire

Table 3.1 Socket for Servo Motor Band-type Brake

- It is required that the band -type brake braking power supply, should be separated from the upper computer and the DC power supply of the driver to prevent interference.
- The braking power supply for the band-type brake has positive and negative poles, which should not be connected reversely to prevent short circuit.
- In order to improve braking effect and response, a diode may be added at both ends of the braking coil(pay attention to the positive and negative poles of the diode)

Chapter IV Interfaces

4.1 Definitions of Servo Control Power Supply and Heavy Current Terminal

Mark	Signal Name	Function
R	Control circuit and main circuit power supply (switched in via the isolation transformer)	R, S and T can be connected to a signal-phase or three-phase 220V 50HZ power supply. The control power supply for the driver and the power supply for the main circuit are designed in an integrated manner. Note that It should not be connected to U, V and W.
S		
T		
PE	Power supply ground wire	Connected to the equipment housing and the power supply earth of the workshop.
B1	External connection braking resistors	to Normally not used, because the driver has a built-in resistor.
B2		
U	Output to the servo motor	U, V and W on the servo terminals must correspond to the ones on the servo motor and prevent misplacement. In case of incorrect connection, the motor will pulsate, the servo will alarm, and the servo and motor could be damaged. No connection with power supply R, S and T.
V		
W		
PE	Motor ground wire	Connected to the PE for the housing of the servo motor.

4.2 Definitions of CN1 Interface and Control Signal Input/output

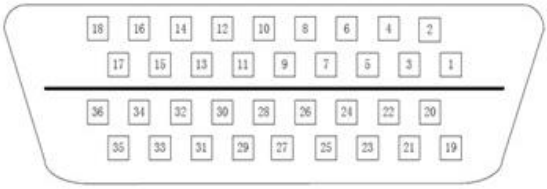


Figure 4.1 Front Elevation of 36-core Plug Soldering Terminal of CN1 Interface

Pin	Mark	Signal Name	Function
18	+24	Input Supply positive	power Common end for input terminal (connected to +12V-+24V power supply)
10	SON	Servo Enable	Enable terminal： When 0V is switched off, SON is OFF: The driver stops and the motor is in free state. When 0V is switched on, SON is ON: The driver works and the motor is in locking state. Commands can be received after enabling for 40MS. This signal cannot be switched on and off frequently and used for startup and shutdown of the motor.
11	A-CLR	Alarm Clearance/Mode	Alarm clearance/mode switching terminal: When 0V is switched off, A-CLR is OFF and the alarm device is in normal state or keeps an alarm state. When 0V is switched on, A-CLR is ON and the alarm is cleared. ● When PA32= 1, mode switching is available.
12	FSL	CCW Disabled	Driver The servo motor is not allowed to rotate the terminal disabled anticlockwise. ● When Parameter PA20= 0, When 0V is switched off, FSL is OFF and the servo motor can rotate. When 0V is switched on, FSL is ON and the servo motor is not allowed to rotate ● Have the same function as a limit switch; PA55 can be set to normal open or normal close. ● Used in combination with Parameter PA20. When FS is 1, this function is shielded.

Pin	Mark	Signal Name	Function
13	FSR	CW Disabled	Driver The servo motor is not allowed to rotate the terminal clockwise. ● When Parameter PA20 = 0, When 0V is switched off, FSR is OFF and the servo motor can rotate clockwise. When 0V is switched on, FSR is ON and the servo motor is not allowed to rotate clockwise. ● Have the same function as a limit switch; PA55 can Be set to normal open or normal close. ● Used in combination with Parameter PA20. When FSR Is 1, this function is shielded.
14	CLE	Deviation Counter Reset	Reset Terminal 1 of the position deviation counter: ● In the case of position control PA4 = 0 ● When 0V is switched off, CLE is OFF and the value won't change. ● When 0V is switched in, CLE is ON and the counter resets.
	SC1	Terminal 1 for Selection	Terminal 1 for selection of internal speed s: ● The mode of the internal speed when PA4 = 1 and PA22 internal speeds = 0 : Four types of internal speeds are selected via the combination of SC1 (Pin 14) and SC2 (Pin 15) as well as the make-and-break of 0V. SC1 OFF, SC2 OFF: internal speed 1; SC1 ON, SC2 OFF: internal speed 2; SC1 OFF, SC2 ON: internal speed 3; SC1 ON, SC2 ON: internal speed 4; Four types of speeds can be modified via PA24, PA25, PA26 , and PA27 .
	ZERO	Zero Speed Clamping	The analog value of speed command reset terminal ● The mode of the external analog speed when PA4 = 1 and PA22 = 1: ZERO is OFF when 0V is switched off, and the speed command is an analog input value. ZERO is ON when 0V is switched on, and the speed command is reset to zero.
	CCW	0-+10 Positive Rotation	● External analog value control PA22=2 ; 0-+10V controls positive rotation
	RIL	CCW	During torque control, the motor is limited to rotate the torque terminal clockwise. Limit When 0V is switched on, the value of Parameter PA38 is effective; otherwise it is ineffective. ● During torque control , Parameter PA34 plays a limiting role all the time.

Pin	Mark	Signal Name	Function
15	INH	Command Pulse Disabled	The command pulse disabled terminal: ● In the mode of external position control when Parameter PA4= 0: When 0V i s switched off, INH is OFF and the command pulse input is effective. When 0V is switched on, INH is ON and the command pulse input is disabled.
	SC2	Terminal 2 for Selection of Internal Speeds	Terminal 2 for selection of internal speeds: ●The mode of the internal speed when PA4= 1 and PA22 = 0: Four types of internal speeds (set via PA24 - PA27) are selected via the combination of SC1 (Pin 14) and SC2 (Pin 15) as well as the make -and-break of 0V. SC1 OFF, SC2 OFF: internal speed 1; SC1 ON, SC2 OFF: internal speed 2; SC1 OFF, SC2 ON: internal speed 3; SC1 ON, SC2 ON: internal speed 4;
	FIL	CCW Torque Limit	During torque control, the motor is limited to rotate the terminal counterclockwise. When 0V is switched on, the value of Parameter PA38 is effective; otherwise it is ineffective. ●During torque control , Parameter PA35 plays a limiting role all the time.
	CW	0-+10 Reverse Rotation	●External analog value control PA22=2 ; 0-+10V control forward rotation.
8	SRDY+	The Servo is Ready Output.	Example: Pin 8 is connected to +24V and Pin 25 to for upper computer. When the servo is in normal state, the upper computer is able to receive the electrical level of +24V. When the servo alarms, +24V is disconnected from the upper computer. Example: Pin 25 is connected to 0V and Pin 8 to the upper computer. When the servo is in normal state, the upper computer is able to receive the electrical level of 0V. When the servo alarms, 0V is disconnected from the upper computer (normal close). ●Electrical level inversion or normal open/ normal close switching can be done via Parameter PA57.
25	SRDY-		

Pin	Mark	Signal Name	Function
26	ALM+	Servo Alarm Output	Example: is connected to +24V and Pin 27 to the upper computer. When the servo alarms, the upper computer is able to receive the electrical level of +24V. When the servo is in normal state, +24V is disconnected From the upper computer. Example: Pin 27 is connected to 0V and Pin 26 to the upper computer. When the servo is in normal state, the upper computer is able to receive the electrical level of 0V.When the servo alarms; 0V is disconnected from the upper computer (normal close). ● Electrical level inversion or normal open/ normal close switching can be done via Parameter PA57.
27	ALM-		
28	COIN+	The Second Reset (used for Siemens) Positioning Done (PA42 switching)	Example: Pin 28 is connected to +24V and Pin 2 9 to the upper computer. When positioning is done, speed is reached, or in zero position , the upper computer is able to receive the electrical level of +24V; otherwise +24V is or speed disconnected from the upper computer reached Example: Pin 29 is connected to 0V and Pin 28 to the upper computer. When positioning is done, speed is reached, or in zero position , the upper computer is able to receive the electrical level of 0V; otherwise 0V is disconnected from the upper computer. ● Electrical level inversion or normal open/ normal close switching can be done via Parameter PA57. ● Primarily used for reset of Siemens 801 and 802numeric controls in the machine tool industry.
29	COIN-		
30	BRK+	Mechanical Brake (band-type brake) Tightness	The output end of the band-type brake switch: Example: Pin 30 is connected to +24V and Pin 31 to the positive pole of the relay coil. After the motor is enabled, the coil of the intermediate relay is able to receive the electrical level of +24V; otherwise +24V is disconnected from the relay. Example: Pin 31 is connected to 0V and Pin 30 to the negative pole of the relay coil. After the motor is enabled, the coil of the intermediate relay is able to receive the electrical level of 0V; otherwise 0V is disconnected from the relay. ● Electrical level inversion or normal open/ normal close switching can be done via Parameter PA57. ● PA47 is used to set delayed switching on of the band -type brake. ● PA48 is used to set enabled delayed switching off.
31	BRK-		

Pin	Mark	Signal Name	Function
32	PLUS+	Plus input for command pulse	External command pulse input terminal: ● PA36、PA37 set pulse filtering index. Anti-interference ● When it comes to position control, the form of inputting pulse is set by parameter PA14 PA14=0, pulse+ direction(default) PA14=1, CCW/CW pulse pattern PA14=2, diphase command pulse pattern
33	PLUS-		
34	SIGN+	Sign input for command pulse	
35	SIGN-		
19	DA+	Analog speed command input	External analog speed command input terminal Speed control analog command input range is-10V～+10V
20	DA-		
23	GND	Analog input ground	Analog input ground
21	AT+	Analog torque command input	External analog torque command input terminal Speed control analog command input range is -10V～+10V
22	AT-		
24	GND	Analog input ground	Analog input ground
1	OA	Encoder phase A	The difference of ABZ signal of the encoder is the output and the fed back by the driver to the upper computer
2	OA		
3	OB	Encoder phase B	
4	OB		
5	OZ	Encoder phase Z	
6	OZ		
7	CZ	Encoder Z-phase signal is output by the open circuit of the collecting electrode	Used for setting to find out the zero point. There is only one Z-phase signal when the motor rotates for one circle Encoder's Z-phase signal is output by the collecting electrode open circuit.CZ is ON(electrified) when the Encoder's Z-phase signal is outputting ,otherwise CZ outputs OFF.(Status of end)
9	GND	Encoder 0V	Encoder's 0V(the command ground, and can share the same ground with Pin 36)
36	PE	The ground wire is shielding layer	To be connected with the housing. Improve anti-interference by short circuiting PE with the digital ground wire to ensure the reliable grounding, according to different upper computers.

4.3 Definitions of CN2 Interface and Encoder Input Signal

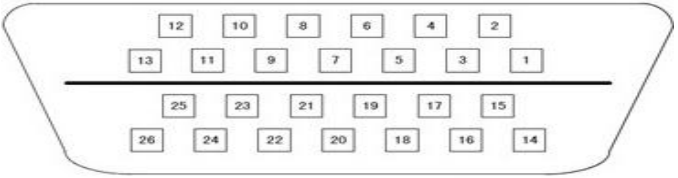


Figure 4.2 Front Elevation of 26-core Plug Soldering Terminal of CN2 Interface

PIN	Mark	Signal Name	Function
14	+5V	+5V Power Supply For Encoder	Provide power for encoder to shield cables
20	0V	0V Ground Wire for Encoder	
1	SD+	Encoder Positively Input	Connected to servo motor encoder SD+
2	SD-	Encoder Negatively Input	Connected to servo motor encoder SD-
26	PE	Ground Wire for Shielding Layer	Connected with housing to ensure reliable grounding.

4.3.1 The Definition of Port CN3 and 485

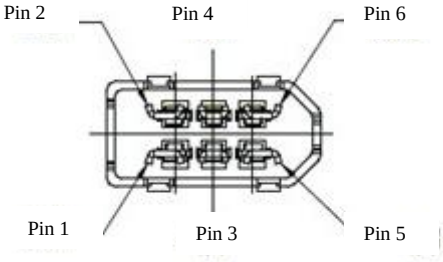


Figure 4.3 Front Elevation of CN3 Plug Soldering Port CN3 of Driver

1: Definition of Port CN3 of Driver (modbus standard protocol)

PIN	1,2	3	4	5	6
Mark	GND	485+	485-	empty	empty

Pin 6

4.4 Principle of the Input Interface for Switching Value

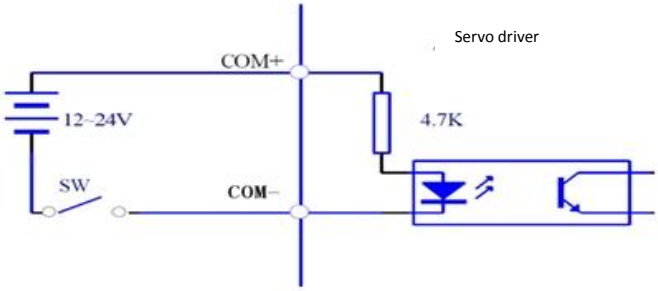


Figure 4.3-a Input Interface for Switching Value Servo Controller

- The input interface should be externally connected to a power supply of DC12V-24V with a current equal to or greater than 105MA.
- Inverse connection of the positive and negative poles may damage the driver and make it unable to work normally.

4.5 Principle of the Output Interface for Switching Value

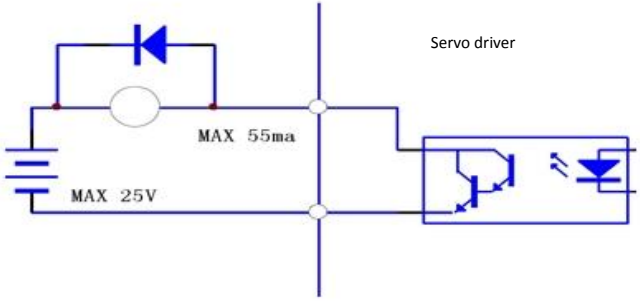


Figure 4.3-b Output Interface for Switching Value Servo Controller

- The maximum output voltage is 25V and the maximum output current is equal to or less than 55MA.
- Inverse connection of the positive and negative poles may damage the driver and make it unable to work normally.
- The output load is a inductive component which should be inversely connected in parallel with a free-wheeling diode (Make sure that the poles are correctly connected; otherwise the driver will be damaged. Inverse connection of the poles is equal to short circuit).

4.6 Principle of the Input Interface for Pulse Value

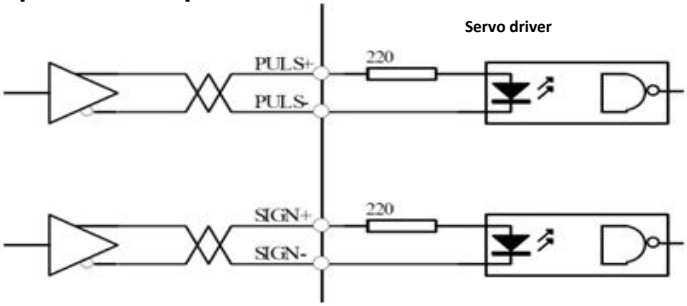


Figure 4.4-a Differential Output Mode of Pulse Servo Controller

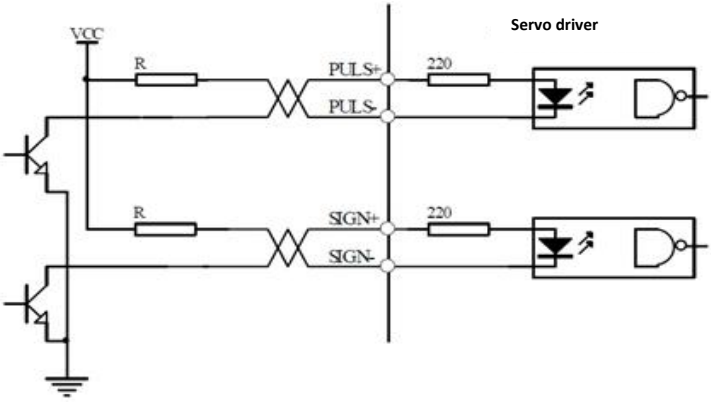


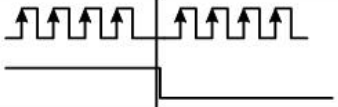
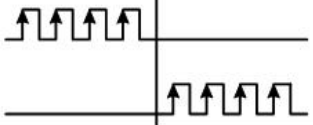
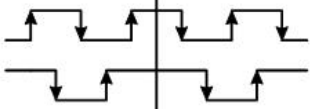
Figure 4.4-b Single-ended Output Mode of Pulse Servo Controller

●To make sure the differential output mode of pulse is relatively reliable, it's suggested to use RS422 wire driver like AM26LS31.

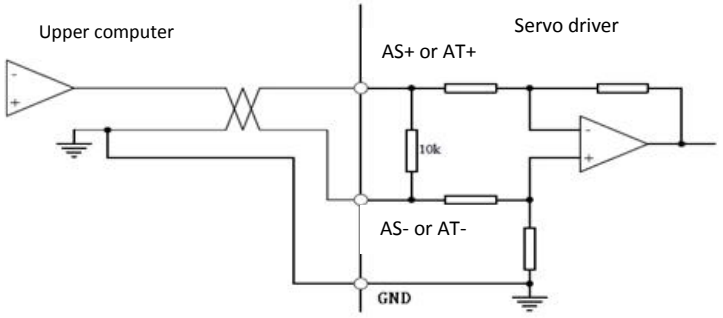
●The power supply is provided externally under the single-ended output mode and the working frequency will decrease. There are empirical data below:

Input Voltage Vcc	Series Resistance R
24v	1.4K-2K
12v	500Ω-820Ω
5V	80Ω- 120Ω

4.6.1 Input Mode of Pulse

Input Mode	CCW Operation	CW Operation	Parameter
Selection Pulse+ direction			of Pulse Parameter PA14=0
CCW pulse CW pulse			Parameter PA14=1
AB-biphasic Orthogonal pulse			Parameter PA14=2l

4.7 Principle of the Input Interface of Analog Value



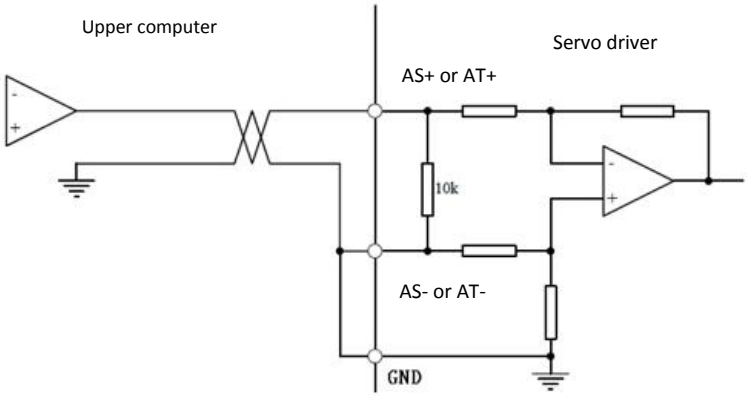


Figure 4.5-b Interface for Analog Single-end Input

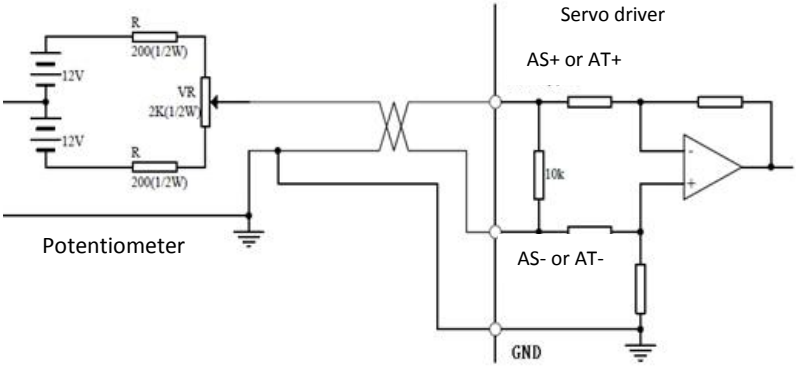


Figure 4.5-c Input Interface for Analog Differential Potentiometer

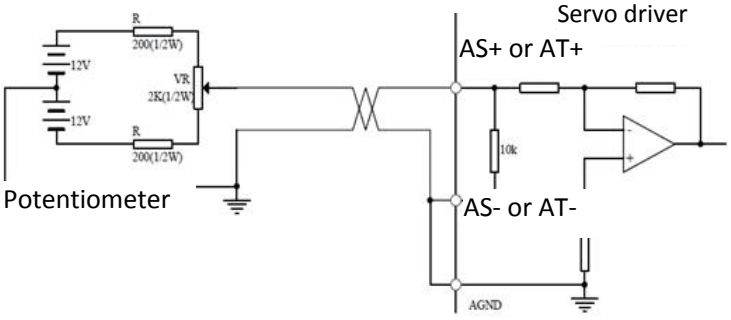


Figure 4.5-d Input Interface for Analog Single-end Potentiometer

- Analog input voltage value should not exceed the range of -10V~+10V;otherwise the driver will be damaged
- The analog value has a deviation indeed, because wires and the interface circuit will be weakened and interfered. A cable with a shielding layer used for connection with its both ends grounded is suggested. Parameter PA49 can be used to set the threshold voltage(unit: r/min)
- The analog value has a deviation indeed, so it must be adjusted. Parameter PA45 can be used to make compensation for deviation value.

4.8 Principle of Feedback Interface

4.8.1 CN1 Output Interface for Encoder Signal (from the driver of deviation signal to the upper computer)

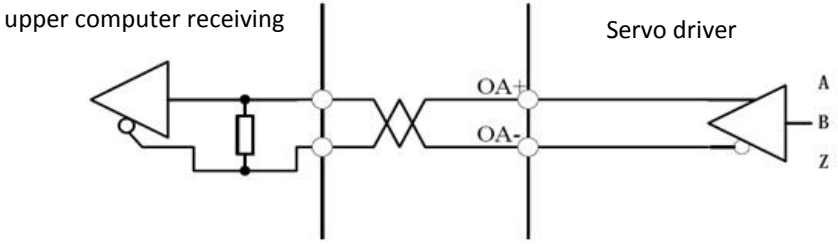


Figure 4.6 n1 Output Interface for Encoder

- The signal of the end=coder passes the differential driver Am26LS31 and is not a non-isolated output.
- The upper computer cab receives the signal via AM26LS32 or a high-speed photo coupler.

4.8.2 CN1 Input Interface for Encoder Z Signal(from Pin7、 Pin9 to upper computer to reset)

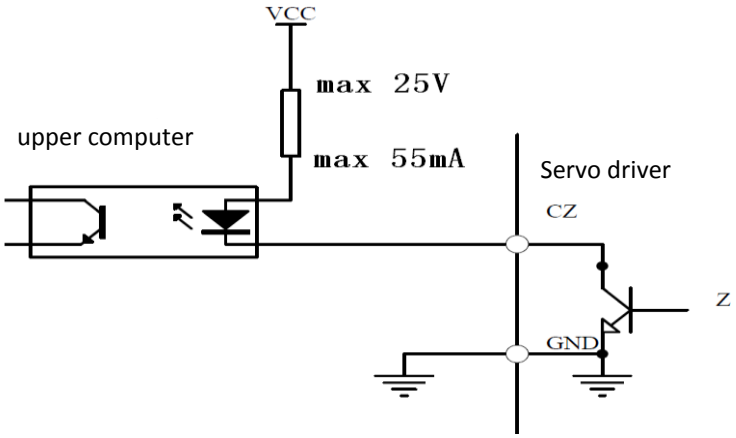


Figure 4.7 CN1 Input Interface for Photoelectric Encoder Z Signal

- This Z signal is electrode-collecting open-circuit outputting, not isolated, encoder Z signal is accessible not closed.
- Receiving this signal requires high speed optocoupler.

Remarks

Chapter V Display and Operation

5.1 Operation Panel

The operation panel is comprised of six LED digital tube displays and four keys ↑ , ↓ , ← and Enter , one red lamp Alm , and one green lamp Run , which are used to display all kinds of statuses of the system and to set parameters.

Figure 5.1 Operation Panel

Operations are layered operations as follows:

← refers to the back, exit and cancel of a layer;

Enter refers to the advance, entry and confirmation of the hierarchy

↑ and ↓ refers to increasing or decreasing a sequence number or a value.

When the red indicating lamp Alm is on, it means that there is an alarm; and the alarm is displayed on the digital tube.

When the green indicating lamp Run , it means the motor is in enable working state.

● When the decimal points at the lower right corner of the digital tube, it means a parameter is being modified.

● When the red indicating lamp Alm is on and the alarm number "Err—xx" is flashing, there is a driver alarm. Cut off the power supply and find out the cause of the alarm.

5.2 Components of Parameter Structure

The first layer is used for mode selection. There are totally seven modes. Press ← to return the main menu. Use ↑ and ↓ to select a mode. Press Enter to enter the second layer of a selected mode. Press ← to go back to the first layer.

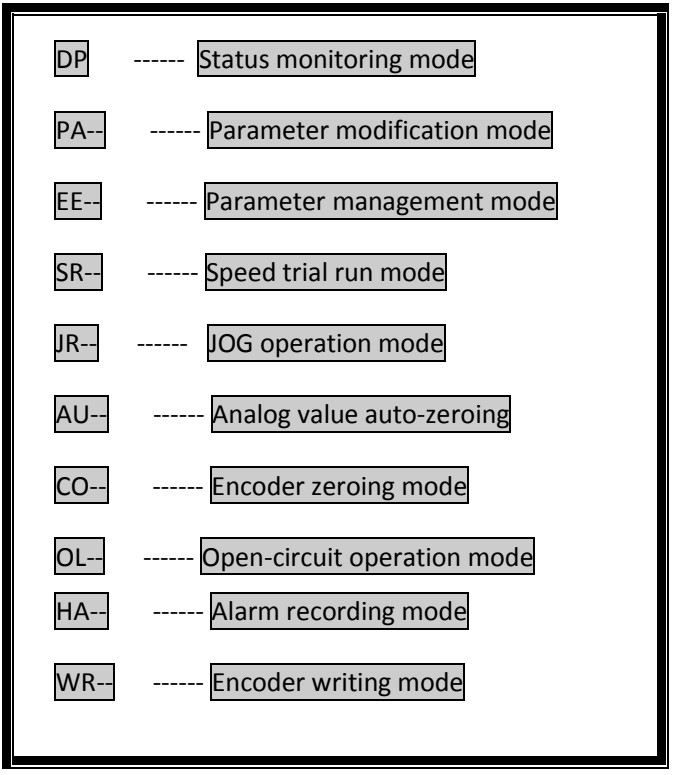


Figure 5.1 Modes Operation

5.2.1 Status Monitoring Mode（DP--）

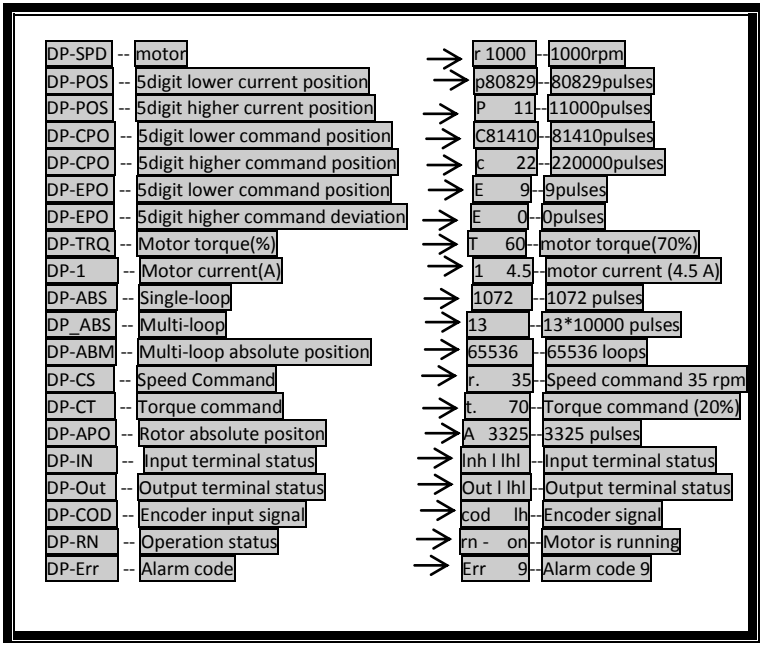


Table 5.2Table of Monitoring

- The input pulse value is a pulse that is magnified by an input electronic gear.
- The unit of the pulse value is the unit of the internal pulse of the servo, 131072 pulses per revolution.
- The absolute position of the rotor in one revolution is shown in single-loop high-digit DP-ABS and low-digit DP-ABS decimal.
- Motor multi-loop signal is shown in DP-ABS decimal. The power supply is required to be electrified normally or signals will be zeroed.

5. The display of the input terminal status is shown in the following figure:

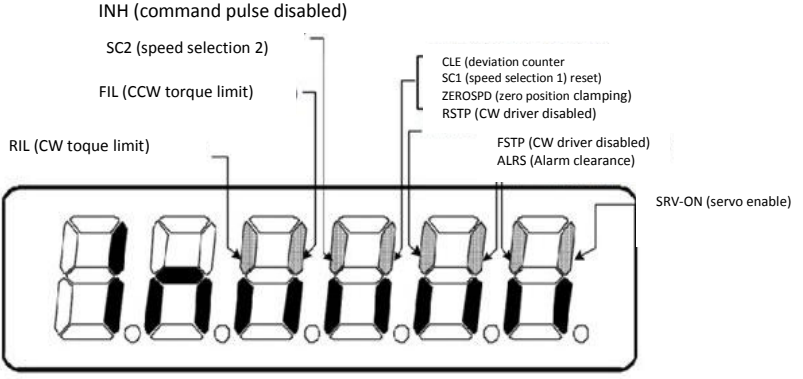


Figure 5.2 Display of Input Terminal Status

(When strokes lighten and there is signal input, the input terminal is ON; when it goes out, the input terminal is disconnected to OFF.)

6.The Display of the Output Terminal Status is Shown in the Following Figure:

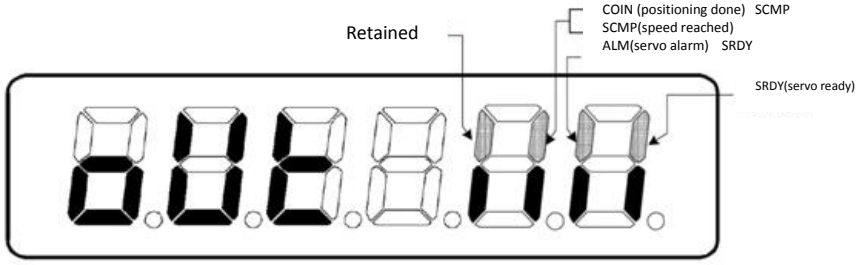


Figure 5.3 Display of Input Terminal Status

(When strokes lighten and there is signal input, the input terminal is ON; when it goes out, the input terminal is disconnected to OFF.)

7.The Display of the Encoder Status is Shown in the Following Figure:

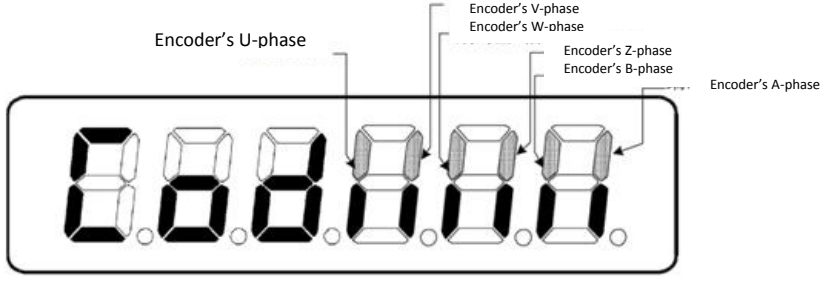


Figure 5.4 Status Display of Encoder Feedback Signal

(When strokes lighten and there is signal input, the encoder is ON; when it goes out, the encoder is disconnected to OFF.)

5.2.2 Parameter Modification Mode (PA--)

Press Enter to enter the parameter modification mode —PA--， Press ↑ and ↓ to increase or decrease a parameter number，Press Enter to enter to modify a parameter， The decimal points at the lower right corner of the digital tube will lighten when a parameter is being modified， and they will go out when Enter is pressed again. Press ← to return.

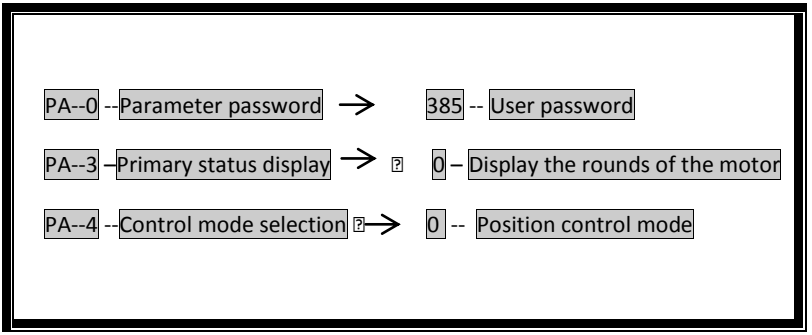


Table 5.3 Operation of Parameter Modification Mode

5.2.3 Parameter Management Mode (EE--)

Press Enter to enter the parameter management mode "**EE—"**， Press ↑ and ↓ to increase or decrease a parameter，Finding a menu that should be stored or restored and pressing Enter for more than 3 seconds will make "**Finish"** display, which means that the operation is successful and will be effective after power cut off，"**Error—"** will appear in case of failure or incorrect password inputting.

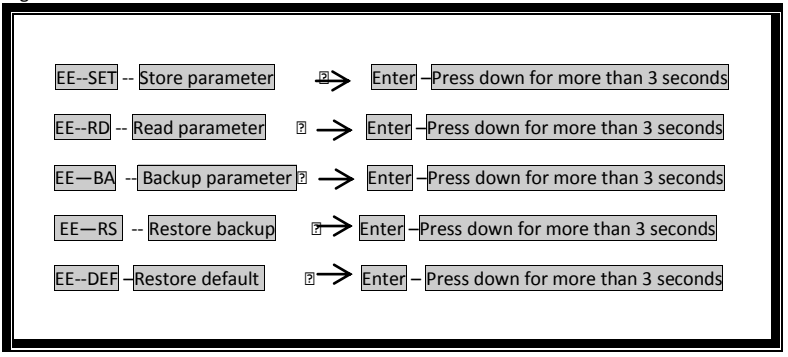


Table 5.4 Operation of Parameter Management Mode

1. **EE—SET writes in parameter**. The password for Parameter PA—0 should be 315, mainly used to store a parameter permanently. Parameter can be used when machine is electrified again, and will nor be affected by power off as long as storage is done.

2. **EE—BD backup parameter** means writing parameters with better effect in current servo state in the EEPROM backup area and EE—RS is used in combination of EE—BD.

3. **EE—BD restore backup** means restoring the backup parameters in the backup area from EEPROM into a parameter table.

4. **EE—BD restore** default is used to when the new adaptive motor is debugged restore a default in case of parameter confusion or unclear reasons, etc.

- This restoring has no effect on motor parameters ,for servo motor parameters are read from encoders .

5.2.4 JOG Operational Mode (Jr- -)

Press Enter to enter the jog operation mode "**Jr--"**. Press Enter to enter jog operation mode "**J--**". The jog speed is set via Parameter PA21. Press ↑、↓ to switch directions of motor.

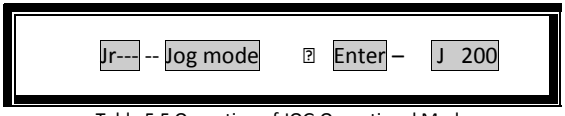


Table 5.5 Operation of JOG Operational Mode

5.2.5 Speed Trial Run Mode (Sr- -)

Press Enter to enter the speed trial run mode "**Sr--**". Press Enter to enter the jog operational mode "**S--**", speed command and motor direction. Press ↑ and ↓ to change the magnitude and negative/positive of a value.

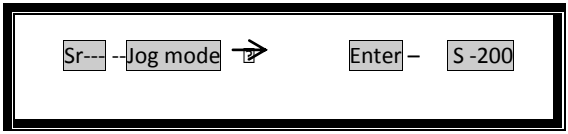


Table 5.6 Operation of Speed Trial Run Mode

5.2.6 Automatic Zeroing Mode of Analog Value (AU- -)

I. Zeroing of Speed Analog Value

Press" Enter "to enter the analog value zeroing mode "**AU--spd**" and press"Enter "again for more than 3 seconds to enter the zeroing mode of speed analog value "**Start**". After that, "**Finish**" will be displayed and the zero drift value will be automatically stored to PA45 (or PA39). Thereafter the zero drift value stored in PA45 (or PA39) can be also modified manually and then stored manually.

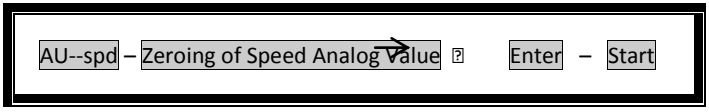


Table 5.7a Operation of Zeroing Mode of Speed Analog Value

● Parameter PA49 Can Be Used to Set the Threshold Voltage (unit: rpm)

II. Zeroing of Torque Analog Value

Press "Enter "to enter the analog value zeroing mode "**AU—trq**" and press "Enter " again for more than 3 seconds to enter the zeroing status of speed analog value "**Start**". After that, "**Finish**" will be displayed and the zero drift value will be automatically stored to PA45 (or PA39). Thereafter the zero drift value stored in PA45 (or PA39) can be also modified manually and then stored manually.

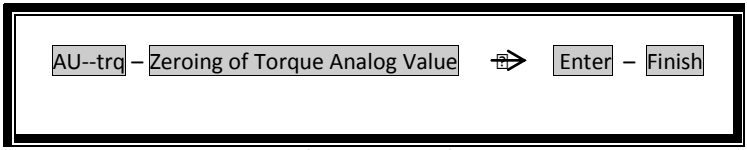


Table 5.7b Operation of Zeroing Mode of Torque Analog Value

5.2.7 Automatic Zeroing Mode of Encoder (CO- -)

I. Automatically Zero Checking of Encoder

When parameter PA0=620: For zeroing accuracy of motor checking only. Press " Enter " to enter "**CO--**" encoder zeroing mode, and press "Enter" for 3 more seconds, displaying"A.2000" means it is locked. Servo motor is locked and when it is accomplished it will display the zero point deviation of motor.

- This function cannot be used to zero bus-type encoder, only to check the zero point position.

II. Automatically Zeroing Check of Encoder (Only for Motor Manufacturer)

When parameter PA0=620: For zeroing accuracy of motor checking only. Press " Enter " to enter "**CO--**" encoder zeroing mode, and press "Enter "for 3 more seconds, displaying"A.2000" means it is locked. When servo motor is locked it will display the zero deviation of the motor and then immediately zero.

- More circulating operations will improve the accuracy of zeroing in every motor, and this function will help to zero and reset.

III. Relative settings of zeroing mode

PA4=4 zeroing mode,PA53=0001 inner enable.

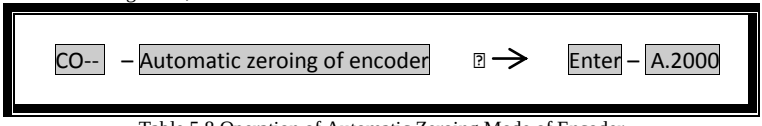


Table 5.8 Operation of Automatic Zeroing Mode of Encoder

5.2.8 Open Loop Operation Mode(OL--)

I. Open Loop Operation

Press Enter to enter the open loop operation mode "**OL--**". Press Enter again for more than 3 seconds and the open loop operation mode starts up and the motor rotates. This function is not suggested to operate for a long time.

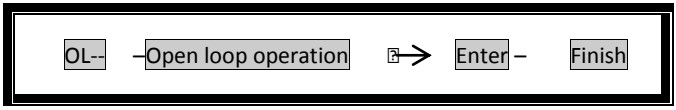


Table 5.9 Operation of Open Loop Operation Mode

5.2.9 Encoder Writing Mode (WR--)

I. Motor codes writing encoder (Refer to codes table in Chapter II)

When PA0=620, PA1, set relative codes to motor (relative current value is available as well)

Press "Enter" to enter "WR--" encoder writing mode, and press "Enter" again for more than 3 seconds, then "Finish" will display showing the operations work successfully, and will be effective when power is off. Otherwise if it fails or the password is incorrect it will display "Error--".

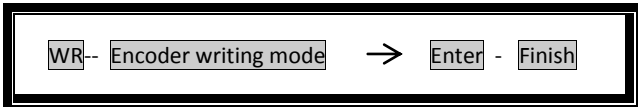


Table 5.10 Encoder Writing Mode Operations

Chapter VI Parameters

6.1 List of Parameters [PA Mode]

Parameter	Parameter Name	Unit	Range of Parameter	Default
0	Parameter Password	*	0-9999	315
1	Incremental Encoder Motor Model	*	*	*
2	Software Version	*	*	15
3	Initial Status Display	*	0-21	0
4	Control Mode Selection	*	0-6	0
5	Speed Proportional Gain	Hz	50-500	150
6	Speed Integral Time Constant	mS	1-1000	20
7	Torque Filter	%	20-500	100
8	Speed Detection Filter	%	20-500	100
9	Position Proportional Gain	1/S	1-500	80
10	Position Feed-forward Gain	%	0-100	0
11	Cut-off Frequency of Position Feed-Forward Filter	Hz	1-1200	300
12	Pulse Dividing Frequency Numerator of Position Command	*	1-32767	1
13	Pulse Dividing Frequency Denominator of Position Command	*	1-32767	1
14	Position Command Pulse Input Pattern.	*	0-2	0
15	Position Command Pulse Direction Reverse	*	0-1	0
16	Positioning Completion Range	Pulse	0-30000	20
17	Position Over Proof Detection Range	x100 pulse	0-30000	400
18	Position Over Proof Incorrect and Ineffective	*	0-2	0
19	Smoothing Filter for Position Command	0.1mS	0-30000	0
20	Disabled Input of Driver Ineffective	*	0-2	1
21	JOG Operation Speed	r/min	-3000-3000	120
22	Selection of Internal and External Speeds	*	0-2	1

Parameter	Parameter Name	Unit	Range of Parameter	Default
23	Maximum Speed Limit	r/min	0-4000	3600
24	Internal Speed 1	r/min	-3000-3000	0
25	Internal Speed 2(Motor Zeroing Current)	r/min	-3000-3000	100
26	Internal Speed 3	r/min	-3000-3000	300
27	Internal Speed 4	r/min	-3000-3000	-100
28	Arrival Speed	r/min	0-3000	500
29	Torque Command Input Gain of Analog Value	0.1V/100%	10-100	50
30	User Torque Overload Alarm Value	%	50-300	200
31	User Torque Overload Alarm Detection Time	mS	10-30000	0
32	Control Mode Switching Permissible	*	0-1	0
33	Reversion of Torque Input Direction of Analog Value	*	0-1	0
34	Internal CCW Torque Limit	%	0-300	300*
35	Internal CCW Torque Limit	%	-300-0	-300*
36	Command Pulse Signal Filter Factor	*	0-3	1
37	Command Direction Signal Filter Factor	*	0-3	0
38	External CCW and CW Torque Limit	%	0-300	100
39	Zero Drift Compensation for Analog Value Torque	*	-2000-2000	0
40	Acceleration Time Constant	mS	1-10000	100
41	Deceleration Time Constant	mS	1-10000	100
42	Multi-function Terminal Switch	Binary	0000-1111	0001
43	Analog Speed Command Gain	(r/min) / V	10-3000	300
44	Reversion of Analog Speed Command Direction	*	0-1	0
45	Zero Drift Compensation for Analog Speed Command	*	-5000-5000	0
46	Analog Speed Command Filter	Hz	0-1000	300
47	Setting of the Delayed Conduction of the Band-type Brake When the Motor is Enabled.	×10mS	0-200	80

Parameter	Parameter Name	Unit	Range of Parameter	Default
48	Setting of Enable Time Delay When the Band-type Brake of the Motor is Closed.	×10mS	0-200	0
49	Analog Value Voltage Threshold Value Speed Control	r/min	0-3000	0
50	Speed Limited During Torque Control	r/min	0-5000	3600*
51	Dynamic Electronic Gear Effective	*	0-1	0
52	Pulse Dividing Frequency Numerator of the Command on the Second Position	*	1-32767	1
53	4 Digit Lower Input Terminal Forced ON input	Binary system	0000-1111	0000
54	4 digit Higher Input Terminal Forced ON Input	Binary system	0000-1111	0000
55	4 Digit Lower Input Terminal Reversion Setting	Binary system	0000-1111	0000
56	4Digit Higher Input Terminal Reversion Setting	Binary system	0000-1111	0000
58	Time Setting of Demonstration Mode 2	0.1S	1-30000	600
59	Demonstration Mode Selection	*	0~2	0
60	Current Loop Proportional Gain	*	*	800
61	Current Loop Integral Time Constant	*	*	5
62	Remain(Modification Banned)	*	*	*
63	Motor Encoder Zeroing Deviation Value	Pulse	-32768~32768	16384
64	Remain(Modification Banned)	*	*	*
65	Incremental Encoder Loop Value	Pulse	0~131072	2500
66	Encoder Type Selection	*	0~2	2
67	Motor Nominal Current	0.1A	0~130	100
68	Speed Proportion Gain Index	*	0~500	100
69	Demonstration Mode 2 Highest Torque Limit	r/min	0~6000	3000
70	Driver Feedback Pulse Output Setting	Pulse	0~30000	10000
71	Feedback Pulse Output Direction Selection	*	0~1	1
72	Feedback Pulse Output Electronic Gear Numerator	*	1~32767	1

Parameter	Parameter Name	Unit	Range of Parameter	Default
73	Feedback Pulse Output Electronic Gear Denominator	*	1~32767	1
74	Servo Receive Pulse Double Frequency Index Switch	*	0~1	0
75	Remain(Modification Banned)	*	*	*
76	Remain(Modification Banned)	*	*	*
77	Remain(Modification Banned)	*	*	*
78	Remain(Modification Banned)	*	*	*
79	Remain(Modification Banned)	*	*	*
80	485 Communication Axis Address Setting	*	0~5000	1
81	485 Communication Band Rate Selection	*	0~3	2
82	485 Communication Parity Check Selection	*	0~1	0
83	Remain(Modification Banned)	*	*	*
84	Shield Battery Alarm	*	0~1	0
85	Permission for 3# Alarm	*	0~1	0
86	Remain(Modification Banned)	*	*	*
87	Remain(Modification Banned)	*	*	*
88	Parameter Store	*	0~1	0
89	Remain(Modification Banned)	*	*	*
90	Encoder Single-loop Value 16 Digit Lower Storage	Decimal	0~65536	0
91	Encoder Single-loop Value 16 Digit Higher Storage	Decimal	0~1	0
92	Encoder Multi-loop Value 16 Digit Lower Storage	Decimal	0~65536	0
93	Remain(Modification Banned)	*	*	*
94	Remain(Modification Banned)	*	*	*
95	Round Monitor	r/min	0~5000	*
96	Current Monitor	0.1A	0~130	*

Parameter	Parameter Name	Unit	Range of Parameter	Default
97	Alarm Code Monitor	*	1~32767	*
98	Remain(Modification Banned)	*	*	*
99	Resetting 40#Alarm (Power off)	*	0~1	0

6.2 Detailed Explanation of Parameters

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
0	Parameter Password	A. The User Password Is 315. B. Password For Motor Manufacturer Is 510(Careful Use Only) C. Password For Driver Manufacturer Is 620(Careful Use Only)	0-9999 [315]
1	Type Code	A. This Function Is Available For Incremental Encoder. B. This Function Is Shielded In Bus-Type Encoder.	0-9999 [0]
2	Software Version	A. Only Software Version No. Is Displayed And Read Only. B. This Parameter Is Comprehensive Number For Software And Hardware.	0-9999 [15]
3	Initial Status Display	The Initial Display Status Of The Digital Tube When The Driver Is Switched On Display 0: Display Motor Speed 1: Display The Lower 5 Digit At The Current Position 2: Display The Higher 5 Digit At The Current Position 3: Display The Lower 5 Digit Of Position Command (Command Pulse Accumulation); 4: Display The Higher 5 Digit Of Position Command (Command Pulse Accumulation); 5: Display The Lower 5 Digit Of Position Deviation; 6: Display The Higher 5 Digit Of Position Deviation; 7: Display Motor Torque; 8: Display Motor Current; 9:Single-Loop Absolute Position Low Digit 10:Multi-Loop Absolute Position Low Digit 11: Display Position Command Pulse Frequency; 12: Display Speed Command 13: Display Torque Command; 14: Display The Absolute Position Of The Rotor In One Revolution; 15: Display Input Terminal Status; 16: Display Output Terminal Status; 17: Display Encoder Input Signal; 18: Display Operation Status; 19: Display Alarm Code;	0-19 [0]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
4	Control Mode Selection	0: Position Control Mode ; 1: Speed Control Mode: A- The Internal And External Speeds Are Selected Via Parameter PA22; B- Use Pin 14 SC1 And Pin 15 SC2 In Combination In The CN1 Interface To Select 4 Internal Speed: SC1 OFF, SC2 OFF: Internal Speed 1. The Rotational Speed Is Set Via PA24. SC1 ON, SC2 OFF: Internal Speed 2.The Rotational Speed Is Set Via PA25. SC1 OFF, SC2 ON: Internal Speed 3.The Rotational Speed Is Set Via PA26. SC1 ON, SC2 ON: Internal Speed 4.The Rotational Speed Is Set Via PA27. 2: Control Mode For Trial Run; 3: JOG Control Mode The Rotational Speed Is Set Via Parameter PA21. 4: Encoder Zeroing Mode Used To Adjust The Zero Point Of The Coding Mask Before The Delivery Of The Motor 5: Open Loop Operation Mode: Used To Detect The Motor And The Encoder. 6: Torque Control Mode	0-6 [0]
5	Speed Proportional Gain	A. Increase The Proportional Gain Of Rigid Set Speed Loop Regular B. The Greater The Set Value Is, The Higher The Gain Is And The Greater The Rigidity Is. The Value Of The Parameter Is Determined According To The Specific Model Of The Servo Driver System And Load Condition. Generally, The Greater The Load Inertia Is, The Greater The Set Value Is. C. Set A Greater Value As Much As Possible Without Oscillation Produced By The System.	50-500 [150]
6	Speed Integral Time Constant	A. Set The Time Constant For The Integral Of The Speed Loop Regulator. B. Able To Inhibit Motor Overshooting. The Smaller The Set Value Is, The Faster The Integral Speed Is. A Too Small Set Value Easily Produces Overshooting, While A Too Great Set Value Slows The Response. C. The Set Value Is Determined According To The Specific Model Of The Servo Driver System And Load Condition. Generally, The Greater The Load Inertia Is, The Greater The Set Value Is.	1-1000 [20]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
7	Torque Filter	A. Used To Remove Noises And Set The Characteristic Of The Torque Command Filter. B. Used To Inhibit The Resonance To Be Produced By The Torque. C. The Greater The Value Is, The Greater The Cut-Off Frequency Is And The Smaller The Vibration And Noise Produced By The Motor Is. Where The Load Inertia Is Very Great, The Set Value Can Be Increased Appropriately. A Too Great Value Can Slow The Response And Could Lead To Oscillation. D. The Smaller The Value Is, The Smaller The Cut-Off Frequency Is And The Faster The Response Is. Where A Greater Torque Is Needed, The Set Value Can Decreased Appropriately.	20-500 [100]
8	Speed Detection Filter	A. Used To Remove Noises And Set The Characteristic Of The Speed Detection Filter. B. The Greater The Value Is, The Greater The Cut-Off Frequency Is And The Noise Produced By The Motor Is. Where The Load Inertia Is Very Great, The Set Value Can Be Changed Appropriately. A Too Great Value Can Slow The Response And Could Lead To Oscillation. The Smaller The Value Is, The Greater The Cut-Off Frequency Is And The Faster The Speed Feedback Response Is. Where A Faster Speed Response Is Needed, The Set Value Can Be Decreased Appropriately.	20-500 [100]
9	Position Proportional	A. Used To Set The Proportional Gain Of The Position Loop Regulator. B. The Greater The Set Value Is, The Greater The Gain Is, And The Greater The Rigidity Is, Gain And The Smaller The Hysteretic Value Of Position Under The Same Condition Of Frequency Command Pulse. However, A Too Great Set Value May Lead To Oscillation Or Overshooting. C. The Value Of The Parameter Is Determined According To The Specific Model Of The Servo Driver System And Load Condition.	1-500 [80]
10	Position Feed-Forward	A. Used To Set The Feed-Forward Gain Of The Position Loop. B. When The Feed-Forward Gain Is Set To 100%, It Means That The Hysteretic Gain Value Of Position Is Always Zero Under The Command Pulse Of Any Frequency. C. Increase Of Feed-Forward Gain Of The Position Loop Is Able To Improve The High Speed Response Characteristic Of The Control System, But It Makes The Position Loop Of The Control System Unstable And Easily Produce Oscillation. D. The Feed-Forward Of The Position Loop Generally Is Zero Unless A Very High Response Characteristic Is Needed.	0-100 [0]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
11	Cut-Off Frequency Position Feed-Forward Filter	A. Used To Set The Cut-Off Frequency Of The Low-Pass Filter Of The Position Loop Of Feed-Forward Value. B. The Function Of This Filter Is To Increase The Stability Of Composite Position Control.	1-1200 [300]
12	Dividing Frequency Pulse Numerator Of Position Command	A. Where The Program Of The System Makes Lead Screw Move 5 Mm (5000 Pulses), The Motor Needs To Rotate One Revolution. Pa12/Pa13=Pulse Numerator/Pulse Denominator= Actual Feedback/Command Pulse =The Number Of Wires For The Motor Encoder (2500 Wires) X The Number Of Frequency Doublings (4) Of Position =10000/5000=2/1 B. Where The Motor Is Connected Directly To The Lead Screw With A Pitch Of 6mm: Pa12/Pa13=10/Lead Screwpitch(6)=5/3 Note: A Nc Machine Can Be Set More Visually By Referring To B. Range Of Gear Ratio: 1/100≤G≤100	1-32767 [1]
13	Dividing Frequency Pulse Denominator Command		1-32767 [1]
14	Input Mode For Position Command Pulse	Three Types Of Pulse Input Modes Can Be Set: 0: Pulse + Sign 1: CCW Pulse/CW Pulse; 2: Two-Phase Orthogonal Pulse Input. Refer To Figure 4.4-C Pulse Mode On Page 28.	0-2 [0]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
15	Reversion Of The Direction Of Position. Command Pulse	0: Default Direction. 1: Direction Reversion.	0-1 [0]
16	Positioning Completion Range	A. When The Value In The Position Deviation Counter Is Less Than Or Equal To The Set Value During Position Control, Positioning Completion Is Coin On; Otherwise Is Off. B. The Positioning Completion Range Is A Speed Arrival Signal In Other Control Modes.	0-3000 [20]
17	Position Over Proof Detection Range	When The Count Value Of The Position Deviation Counter Is More Than The Set Value Of This Parameter Under The Mode Of Position Control, The Servo Driver Alarms.	0-3000 [400]
18	Detection Of Over Proof's On-Off	0: Detection Is Effective. 1: 4 # Alarms Are Shielded And Parameter PA17 Is Ineffective. 2:4# And 6# Alarm S Shielded And Parameter PA17 Are Ineffective.	0-2 [0]
19	Smoothing Filter For Position Command	Mainly For Occasions When There Is No Acceleration And Deceleration, Or Not With Exponential Form Of Acceleration And Deceleration. This Parameter Can Be Used For Smooth Filtering Of Command Pulse And Optimize Acceleration And Deceleration. This Filter Loses No Pulses, But The Execution Speed Is Possible To Be Delayed.	0-3000 [0]
20	Ineffective Input Of Driver Disabled	0: The Disable Inputs Of CCW And CW Are Effective. 1: The Disable Inputs Of CCW And CW Are Ineffective. 2: The Disable Inputs Of CCW And CW, And No Alarm.	0-2 [1]
21	JOG Operation Speed	The Setting Of Forward And Reverse Speeds When The JOG Mode Is Set	-3000-3000 [120]
22	Selection Of Internal And External Speeds	0: This Parameter Is Got From An Internal Speed. 1: This Parameter Is Got From An External Analog Value (-10V-+10V). 2: This Parameter Is Got From An External Analog Value (0-+10V; Pins 14 And 15 Are Used To Control Forward And Reverse Directions.	0-2 [1]
23	Maximum Speed Limit	The Setting Of The Maximum Speed Limit Of The Servo Motor Is Related To The Servo Motor. The Maximum Speed Of The Motor Should Be Set According To The Parameter Motor Model.	0-5000 [3600]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
24	Internal Speed	When PA4=1 And P22 =0: When Pin CNISC1 Is OFF And Pin SC2 Is OFF, This Parameter Is Internal Speed 1.	-3000-3000 [0]
25	Internal Speed 2/Zeroing Current	A. When Pa4=1 And Pa22=0 When Pin Cnisc1 Is On And Pin Sc2 Is Off, This Parameter Is Internal Speed B. When Pa4 Is Equal To 4, Set The Percentage Of The Motor Zeroing Current.	-3000-3000 [100]
26	Internal Speed 3	When PA4=1 And PA22=0: When Pin CNISC1 Is OFF And Pin SC2 Is ON, This Parameter Is Internal Speed	-3000-3000 [300]
27	Internal Speed 4	When PA4=1 And PA22=0 : When Pincnisc1 Is ON And Pin SC2 Is ON, This Parameter Is Internalspeed4 .	-3000-3000 [-100]
28	Arrival Speed	In Non-Position Mode: When The Motor Speed Is More Than This Set Value, COIN Is ON; Otherwise COIN Is OFF This Parameter Is Only Used For Distinguishing Of The Motor Speed And Has No Directivity.	0-3000 [500]
29	Torque Command Input Gain Of Analog Value	A. Used To Set The Proportional Relation Between The Input Voltage Of Analog Value Torque And The Actual Operation Torque Of The Motor; B. The Unit Of The Set Value Is 0.1v/100%; C. The Default Value Is 50, Which Corresponds To 5v/100%, Namely Inputting 5v Voltage Will Produce 100% Rated Torque.	10-100 [50]
30	User Torque Overload Alarm Value	① Used To Set The Overload Value Of The User Torque. This Value Is The Percentage Of The Rated Torque. The Limited Values Of The Torque Have No Directivity And Both Forward And Reverse Limited Values Are Protected. ②When PA31>0, Motor Torque >PA30 And The Duration >PA31, The Driver Alarms With An Alarm No. Err-29 And Motor Stops Rotating. After The Alarm, The Driver Must Be Electrified Again To Clear The Alarm.	0-300 [200]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
31	Torque Overload Alarm	The Unit Of The User Torque Overload Detection Time Is Millisecond; When This Time Is Zero, The Alarm Function Of The User Torque Overload Is Ineffective. Detection Time	0-30000 [0]
32	Control Mode Switching Permissible	0: Pin 11(A-CLA) Of CN1 Is Only Effective For Alarm Clearance. 1: When Parameter PA4=0, Pin 11 (A-CLA) Of CN1 Is Only Effective For Switching Of Position And Speed (Default Position Effective When Parameter PA 4=1, Pin 11 (A-CLA) Of CN1 Is Only Effective For Switching Of Speed And Torque (Default Position Effective). When Parameter PA 4=6, Pin 11 (A-CLA) Of CN1 Is Only Effective For Switching Of Torque And Position (Default Position Effective).	0-1 [0]
33	Reversion Of Torque Input Direction Of Analog Value	Used For Polarity Reversion Of The Torque Input Polarity Of Analog Value. 0: When The Torque Command Of The Analog Value Is Positive, The Torque Direction Is CCW; 1: When The Speed Command Of The Analog Value Is Positive, The Torque Direction Is CW;	0-1 [0]
34	Internal CCW Torque Limit	Used To Set The Percentage Of The Internal Torque Limit Of The Motor CCW Direction. Example: If This Parameter Is Set To Two Times Of The Rated Torque, The Set Value Is 200; This Set Value Is Limited And Effective All The Time.	0-300 [250]
35	Internal CW Torque Limit	Used To Set The Percentage Of The Internal Torque Limit Of The Motor CW Direction. Example: If This Parameter Is Set To Two Times Of The Rated Torque, The Set Value Is -200; This Set Value Is Limited And Effective All The Time.	0- -300 [-250]
36	Command Pulse Signal Filter Index	When PA4=0, This Parameter Is Effective During Position Control. The Greater The Set Value Is, The Strong The Anti-Interference To The Command Pulse Is; At The Same Time, The Smaller Received Pulse Frequency Could Make The Pulse Unable To Be Received. Make Adjustment To The Advance And Lag Of The Time Sequence Of The Pulse And The Direction Signal.	0-3 [1]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
37	Command Direction Signal Filter Signal Factor	When PA4=0, , This Parameter Is Effective During Position Control. Make Adjustment To The Advance And Lag Of The Time Sequence Of The Pulse And The Direction.	0-3 [0]
38	External Torque Limit	When PA4=6, Pin 14 Or Pin 15 Of CN1 Is Connected With 0V: CCW, CW Torque Percentage Limit, Positive And Negative Effect At The Same Time . PA38 Is Less Than The Set Values PA 34 And PA35.	0-300 [100]
39	Zero Drift Compensation For Analog Value Torque Command	The Zero Drift Compensation Value To The Analog Value Torque Input Is Namely Positive And Negative Offsets.	-2000-2000 [0]
40	Acceleration Time Constant	The Set Value Means The Acceleration Time Of The Motor From 0-1000r/Min. Linear Acceleration And Deceleration Characteristics Are Only Used For The Speed Control Mode. If The Upper Computer Has Acceleration And Deceleration Characteristics, This Parameter Should Be Set To Zero.	1-10000 [100]
41	Deceleration Time Constant	The Set Value Means The Deceleration Time Of The Motor From 1000-0r/Min. Linear Acceleration And Deceleration Characteristics Are Only Used For The Speed Control Mode. If The Upper Computer Has Acceleration And Deceleration Characteristics, This Parameter Should Be To Zero.	1-10000 [100]
42	Multi-Function Terminal Switching	0: Alarm 15 Takes Effect. 1: Alarm 15 Is Shielded. [0001] 0:Choose Reset/1:Choose Position Fix Done .[0010] 0: When It Comes To Torque, Parameter PA50 Limits Max Speed./1:When It Comes To Torque, The Second Analog Value Limits Max Speed.[0100]	0000-1111 [0001]
43	Analog Value Speed Command Gain	Used To Set The Proportional Relation Between The Speed Input Voltage Of Analog Value And The Actual Operation Speed Of The Motor. Example: ±10V Voltage Corresponds To Positive And Negative 3000revolutions And Can Be Set To 3000/10 =300 R/Min/V; Namely 1V Corresponds To 300 Revolutions.	10-3000 [300]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
44	Reversion Of Analog Value Speed Command Direction	Used For Polarity Reversion Of The Speed Input Of Analog Value. 0: When The Speed Command Of The Analog Value Is Positive, The Speed Direction Is CCW; 1: When The Speed Command Of The Analog Value Is Positive, The Speed Direction Is CW;	0-1 [0]
45	Zero Drift Compensation For Analog Value Speed Command	The Zero Drift Compensation Value To The Analog Speed Torque Input Is Namely Positive And Negative Offsets. This Parameter Is Automatically Modified And Stored During The Automatic Zeroing Of The Analog Value. Refer To Table 5.7a On Page 41.	-5000-5000 [0]
46	Analog Speed Command Filter	This Filter Is A Low-Pass Filter To The Speed Input Of The Analog Value. The Greater The Set Value, The Faster The Response Speed To The Analog Value Of The Speed Input Is And The Greater Noise Is; The Smaller The Set Value, The Slower The Response Speed To The Analog Value Of The Speed Input Is And The Smaller Noise Is;	0-1000 [300]
47	Setting of the Delayed Conduction Of The Band-Type Brake When The Motor Is Enabled.	When The Maximum Value Of This Parameter Is 500, This Parameter Means The Time From Enabling The Motor To BRK+ And BRK- Is Delayed Conduction Of The Band-Type Brake When The Diver Is Normally Electrified. The Band-Type Brake Is Not Conducted During Alarm	0-500 [80]
48	Setting Of The Enable Time Delayed When The Band-Type Brake Of The Motor Is Closed.	When The Maximum Value Of This Parameter Is 500, The Band-Type Brake Is Delay For 5 Seconds (Default 0.8 S). This Parameter Means The Time From Disconnection Of BRK+ And BRK- To Enabling Delay When The Diver Is Normally Electrified. The Band-Type Brake Is Not Time Delayed During Alarm.	0-500 [0]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
49	Analog Value Voltage Threshold Value Speed Control	Used To Set The Threshold Values Of Positive And Negative Going Voltages Of The Analog Value During Speed Control.	[0]
50	Speed Limit During Torque Control	A: This Parameter Is The Maximum Speed Limit During Torque Control. Note: Idle Load Easily Leads To Over Speed.	1-5000 [2500]
51	Dynamic Electronic Gear	0: CN1 Interface And The Function (Command Pulse Disabled) Of Input Terminal INH Are Effective. 1: CN1 Interface And The Function (Dynamic Electronic Gear Switching) Of Input Terminal INH Are Effective. When INH Terminal Is OFF, The Input Electronic Gear PA12/PA13; When INH Terminal Is ON, The Input Electronic Gear Is PA52/PA13.	0-1 [0]
52	Dividing Frequency Pulse Numerator Of The Command On The Second Position	When Command PA51=1 Is Disabled When INH Terminal Is OFF, The Input Electronic Gear Is No.12/No.13; When INH Terminal Is ON, The Input Electronic Gear Is PA52/PA13;	0-32767 [1]
53	Lower 4 Digit Input Terminal Forced ON Input	Ons And Offs Of The Following Functions Are Performed Using The Changes Of Parameters 0 And 1 But Without Using An External Circuit. SON: Servo Enable: [0001] A-CLR: Alarm Clearance [0010] FSTP: CCW Driver Disabled [0100] RSTP: CW Driver Disabled [1000]	0000-1111 [0000]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
54	Higher 4 Digit Terminal Forced ON Input	CLE/SC1/ZEROSPD: Deviation Counter Reset/Speed Selection 1/Zero Speed Clamping: [0001] INH/SC2: Command Pulse Disabled/Speed Selection 2 [0010] FIL: CCW Torque Limit [0100] RIL: CW Torque Limit [1000]	0000-1111 [0000]
55	Lower 4 Digit Input Terminal Logic Reversion	To Realize The Reversion Of The Functions Using The Changes Of Parameters 0 And 1 (Namely The Reversion Of The Original External Switch Circuit Input; Normal Open Turns To Normal Close And Normal Close Changes To Normal Open). SON: Servo Enable [0001] A-CLR: Alarm Clearance [0010] FSTP: CCW Driver Disabled [0100] RSTP: CW Driver Disabled [1000]	0000-1111 [0000]
56	Higher 4 Digit Input Terminal Logic Reversion	To Realize The Reversion Of The Functions Using The Changes Of Parameters 0 And 1 (Namely The Reversion Of The Original External Switch Input Circuit; Normal Open Changes To Normal Close And Normal Close Changes To Normal Open). CLE/SC1/ZEROSPD: Deviation Counter Reset Peed Selection 1/Zero Speed Clamping; [0001] INH/SC2: Command Pulse Disabled/Speed Selection 2; [0010] FIL: CCW Torque Limit [0100] RIL: CW Torque Limit [1000]	0000-1111 [0000]
57	Output Terminal Logic Reversion	To Realize The Reversion Of The Functions Using The Changes Of Parameters 0 And 1 (Namely The Reversion Of The Original External Switch Input Circuit; Normal Open Changes To Normal Close And Normal Close Changes To Normal Open). SRDY: Servo Ready; [0001] ALM: Servo Alarm; [0010] COIN: Positioning Completed/Speed Reached; [0100] BRK: Motor Band-Type Brake; [1000]	0000-1111 [0010]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
58	Time Setting Of Demonstration Mode 2	Used To Set The High-Speed Ageing Time Of The Servo Motor (Unit: 0.1minute) In Demonstration Mode 2.	1-30000 [600]
59	Demonstration Mode Selection	When PA0=510,PA4=0 It Is Effective. 0:Demonstration Mode Is Off; 1: Low-Speed Demonstration 2:High-Speed Demonstration	0~2 [0]
60	Current Loop Proportional Gain	Driver Will Automatically Adjust This Parameter According To The Model Of Motor	0~32767 [500]
61	Current Loop Integrate Time Constant	Driver Will Automatically Adjust This Parameter According To The Model Of Motor	0~2 [0]
62	Remain	Remain(Modification Unable)	0~32767[5]
63	Encoder Zero Offset	Value Is Effective When PA0=4 And Motor Encoder Reset Offset	*
65	Incremental Encoder Wiring Quantity	Incremental Encoder Wiring Quantity：This Parameter Is Ineffective When Bus-Type Encoder Is In Use.	-32767~32767 [0]
66	Encoder Type Selection	Normal Incremental Photoelectric Encoder；1：Normal Incremental Wire-Saving Photoelectric Encoder 2:Tama-Gawa Bus-Type Multi-Loop Absolute Value Encoder(131072 Wire)；	0~32767 [2500]
67	Motor Rated Current	Motor Rated Current Value：Eg. The Rated Current Of 130ST-M03215LMB Is 4.5A While The Related Parameter Value Is 45；	0~2 [2]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
68	Speed Proportional Gain Index	Driver Will Automatically Adjust This Parameter According To Model Of The Motor; This Parameter Is The Index Of Parameter PA5;The Gain Of Servo Motor Is PA5*PA68；	0~130 [100]
66	Speed Limit For Demonstration Mode	In Demonstration 2,The Highest Speed Limit Appears In Quick Demonstration.	0~500 [100]
70	Driver Feedback Pulse Output	Feedback Pulse Output Is Able To Be Set; The Quantity Of The Output Of The Feedback Pulse In One Rotation Of Motor.	0~32767 [3000]
71	Pulse Output Direction Selection	Direction Selection Of Feedback Pulse Output 0:Forward Output Of A/B Feedback Signal;	1~30000 [10000]
72	Numerator Of Pulse Output	Effective When PA70=0;Feedback Pulse Outputs Electronic Gear Numerator	0~1 [1]
73	Denominator Of Pulse Output	Effective When PA70=0;Feedback Pulse Outputs Electronic Gear Denominator	0~32767 [1]
74	Received Pulse Frequency Doubling Switch	Received Pulse Frequency Doubling Switch Of Servo Driver 0:PA12/PA13 Is 1/1 Servo Receives 10000 Pulse/R 1: PA12/PA13 Is 1/1 Servo Receives 131072 Pulse/R	0~1 [0]
80	485 Communication Axis Address	A,485 Communication Modbus Rtu Protocol Stands For Address:1、2、3..... B, Machine Tool Using And Reading Absolute Position Corresponds To: X Axis、Y Axis、Z Axis.....	1~32767 [1]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
81	485 Communication Baud Rate	Related Baud Rate 0:4800 1:9600 2:19200 3:38400; Number Digit Is 8; Stopping Digit Is 1; RTU Pattern; The Longest Reading Length Is 10;	0~3 [2]
82	485 Communication Parity-Check Selection	0:Odd Check; 1: Even Check	0~1 [0]
84	40# Battery Alarm Shield	0:Used As Absolute Value Encoder. Enable 40# Battery To Alarm To Make Sure Of The Accuracy Of Multi-Loop Signal, And Alarm Can Be Cleared Only When Parameter PA99 Is Confirmed To Be 1;1: Used As Incremental Encoder. Shield 40# Alarming, Namely Available Even Without Battery, And Now There Is No Memory Of Multi-Loop Signal;	0~1 [0]
85	3#Alarm Permissible	Default Shield Undervoltage Alarm; 1:3# Undervoltage Alarm Permissible	0~1 [0]
88	Parameter Storage	Parameters For Communication: When Parameter 0 Turns To Parameter 1, Operate Storing Parameter Once And Turn To 0;	0~1 [0]
90	Lower 16 Digit Of Encoder Single-Loop Value	A, Decimal: Display 0, 1...32767,-32768...-1,0;B, 0,1...65535,65536 In 485 Communication Unsigned Data Reading. 91 Higher 16 Digit Of Encoder Single-Loop Value//A, Decimal, Single-Loop Value=PA90+PA91*65536;B, Display 0,1;	0~65536 [0]
91	Higher 16 Digit Of Encoder Single-Loop Value	A, Decimal, Single-Loop Value=PA90+PA91*65536;B, Display 0,1;	0~1 [0]

Parameter No.	Parameter Name	Detailed Explanation of Functions	Rang of parameter [Default]
92	Lower 16 Digit Of Encoder Multi-Loop Value	A, Decimal: Display 0, 1...32767,-32768...-1,0;B, 0,1...65535,65536 In 485 Communication Unsigned Data Reading; C, This Parameter Will 40# Alarm If It Is Lost Because Of Power Off, And The Alarm Can Only Be Cleared Via Parameter PA99. Power Down And CLR Terminal Cannot Clear The Alarm; D, Multi-Loop Value=PA92*131072;	0~65536 [0]
95	Rounds Monitor	Communication Can Read The Rounds Value In Motor	0~5000
96	Current Monitor	Communication Can Read The Current Value In Motor	0~5000
97	Alarming Codes Monitor	Communication Can Read The Alarming Codes In Servo Driver	0~5000
99	Reset Battery Power Off 40# Alarm	A, This Parameter Can Not Be Stored And Only Used For Battery Alarm Resetting; B, This Parameter Is Only Effective When PA84=0; C, When PA84=0:Alarm Appears When Battery And Motor Encoder Wires Disconnect, And When They Are Connected, Alarm Can Be Removed Only When This Parameter Turns To 1; D, When PA84=0: Alarm Cannot Be Cleared In No-Battery Or Battery-Low-Voltage Condition To Make Sure Of The Accuracy Of Multi-Loop Signal. The Normal And Steady Battery Voltage Is 3.6V.	0 [0]

Chapter VII Failures and Diagnosis

7.1 List of Alarms (Table 7.1)

Alarm No.	Alarm Name	Failure Diagnosis
1	Over Speed	The Speed Of The Servo Motor Exceeds The Set Value.
2	Main Circuit Over Voltage	The Voltage Of Three-Phase Or Two-Phase Power Supply Is Too High Or The Brake
3	Main Circuit Under Voltage	The Voltage Of Three-Phase Or Two-Phase Power Supply Is Too Low.
4	Position Over Proof	The Value Of The Position Deviation Counter Exceeds The Set Value And Or The Voltage Is Too Low.
5	Motor Overheat	The Temperature Of The Motor Is Too High.
6	Motor Stalling	The Motor Is Jammed And Unable To Rotate Freely, Or The Load Is Too Great.
7	Driver Disablement Abnormal	CCW And CW Has No Input Or Parameter Pa20 Is Not 1.
11	Position Deviation Counter Overflow	The Absolute Value Of The Value Of The Position Deviation Counter Exceeds 230.
12	Encoder Failure	The Signal Of The Encoder Is Incorrect.
13	Software Failure	The Chip Of The Circuit Board Fails.
14	IPM Module Failure	IPM Intelligent Module Fails.
16	Over Current	The Current Of The Motor Is Too Great.
17	Overload	The Driver And The Motor Overloads (Instantaneous Over Current) And Are Unable To Rotate Freely.
20	Brake Failure	The Braking Resistor Or Circuit Fails.
22	Encoder Count Incorrect	Encoder Count Abnormal.
29	Motor Thermal Overload	The Electric Thermal Value Of The Motor Exceeds The Set Value.
34	Speed Response Failure	Speed Error Is Too Great For A Long Time.
35	Hot Reset	The System Is Hotly Reset.
36	EEPROM Failure	EEPROM Incorrect.
37	Housing Electric Leakage Failure	External Short Circuit Or The Motor Leakage
39	User Torque Overload Alarm	The Load Of The Motor Exceeds The Value And Duration Set By The User.
40	Encoder Z-Pulse Loss	Encoder Z-Pulse Incorrect.
42	Encoder UVW Signal Broken	Encoder UVW Signal Is Incorrect Or Not Matched To The Encoder.
43	Encoder UVW Signal Interference	All-High Electrical Level Or All-Low Electrical Level Exists In UVW Signal.

7.2 Troubleshooting

(Table 7.2)

Alarm No.	Alarm Name	Operation Status	Cause	Solution
1	Over Speed	Power On	●Driver Or Motor Failure	★Replace The Driver.
			●Check Parameters	★Check Whether Internal Enable
		Being Enabled	●Short Circuit Between Motor And UVW	★Check The Wire Of The Motor.
			●Encoder Position 0 Deviation	★Motor Encoder Zeroing
			● The Parameters Of The Servo Incorrect	★Restore The Parameters
		During The Operation Of The Motor Connector.	● Motor Connector Short Circuited	★Check That There Is No Water In The Motor
			●Command Speed Of Too Fast	★Reduce The Command Speed.
			●Acceleration/Deceleration Unstable	★Adjust The Acceleration/Deceleration Constant.
			●Load Too Great	★Reduce The Load.
2	Main Circuit	Power On	● Power Supply Voltage Too High	★Reduce The Voltage.
			● Power Supply Waveform Abnormal	★Replace The Power Supply.
			● Servo Driver Failure	★Replace The Servo Driver. In Operation
		Over Voltage	●Circuit Board Failure	★Replace The Servo Driver.
			● Braking Circuit Failure	★Check The Braking Resistor.
3	Main Circuit Under Voltage	Being Enabled	● Main Power Supply Voltage Too Low	★Replace The Power Supply.
			●Circuit Board Failure	★Replace The Servo Driver.
			●Soft Start Circuit Failure	★Replace The Servo Driver.
		In Operation	● Transformer Capacity Insufficient	★Increase The Transformer Capacity
			●Power Supply Wire Loose	★Tighten Wiring Terminals
			●Circuit Board Failure	★Replace The Servo Driver.
4	Position Over Proof	In Operation	● Command Speed Too Faster	★Reduce The Command Speed.
			● Input Voltage Too Low	★Check R/S/T Power Supply.
			● Parameter PA17 Too Small.	★Increase The Parameter Appropriately.
			●Wire Loose	★Check And Tighten The Wire.
Alarm	Alarm	Operation Status	Cause	Solution

No.	Name			
5	Motor Overheat	Power On	● Motor Damaged	★Replace The Motor.
			● Sensor Wire Broken	★Check The Wire And Replace The Sensor.
		In Operation	●Motor Power Too Small	★ Replace The Current Motor By A High-Power Motor.
			● Motor Interface Short Circuited	★Take Waterproof And Dustproof Measures
			● Servo Parameters Incorrect	★Match A Right Motor Model.
6	Motor Stalling	In Operation	●Transmission Partially Jammed	★Disconnect The Mechanical Part.
			●Load Too Great	★Reduce The Load
			●Motor Failure	★Replace The Motor.
7	Disable	Power On	● Check Parameters And Wires	★PA20, CW And CWW Wires Abnormal
8	Position Deviation Counter Overflow	In Operation l	● Motor Stalling	★Check The Load.
			● Command Frequency Abnormal	★ Reduce The Speed Of The Upper Computer
			●Wiring Incorrect	★Check The Wire And Connect The Shielding Layer.
			●Encoder Damaged	★The Encoder Is A Fragile Article And Should Be Replaced
			● Encoder 5V Voltage Low	★Shorten The Wire Or Replace The Driver.
		n Operation	● CN2 Plug Contact Poor	★Tighten The CN2 Connector.
			●Hidden Trouble Exists In Cable Faulty	★Replace The Cable. Welding.
			● Circuit Board Chip Fail	★Find Out The Disturbance And Replace Servo
11	IPM Module Failure	Power On	●Circuit Board Failure	★Replace The Servo Driver.
			● Short Circuit Between U, V And W Of	★ Check The Wire And Replace The Motor
		In Operation	● Motor Failure	★Check The Wire And Replace The Motor
			● Poor Contact To Power Supply	★ Check The Wire And Prevent Interference
12	Over Current	Power On Or In Operation	● Motor Damaged	★Replace The Motor.
			●Short Circuit Among U, V And W	★Check The Wire And Replace The Servo Driver
			●Overload	★Replace The Current Motor By A High-Power Motor

Alarm No.	Alarm Name	Operation Status	Cause	Solution
13	Overload	Power On	● Motor Damaged And Water Inlet	★Replace The Motor.
			●Circuit Board Failure	★Replace The Servo Driver
		In Operation	● Mechanical Overload	★Reduce The Load.
			●Mechanical Transmission Not Freely	★Check Mechanical Transmission Parts.
			●Short Circuit Among U, V And W	★Check The Cable.
			●The Band-Type Brake Fails To Loosen.	★Ensure That Power Supply For The Band-Type Brake Is Stable.
14	Brake Failure	Power On	●Circuit Board Failure	★Replace The Servo
		In Operation	●Brake Resistor Failure	★Check Brake Resistor Wiring
			●Low Brake Capacity	★Lengthen Acceleration/Deceleration Time
			●Mechanical Inertia Too Large	★Reduce Mechanical Inertia
			●Incorrect Wiring Among Encoder UVW	★Check The Wiring And Change It
			● Unstable Encoder Power Supply	★Make Sure 5V Power Supply Is Stable
			●Incorrect Encoder Wiring Numbers	★Adjust Parameter's Related Wiring Numbers
16	Motor Thermal Overload	Power On	● Servo Parameter Incorrect	★Restore The Factory Value.
		In Operation	●Mechanical Transmission Not Freely	★Add Lubricant And Reduce Load.
			●Overload Time Too Long	★Reduce Load; Start/Stop Is Smooth.
17	Speed Response Failure	In Operation	● Long-Time Error Too Great	★Adjust Parameter Position
			●Start/Start Time Too Short	★Adjust The Acceleration/Deceleration Time
20	ROM Alarm	In Operation	● Parameter Storage Alarm	★Restore The Parameter And Replace The Servo.
22	D/A Chip Failure	In Operation	●Change The Control Panel	★Restore The Parameter And Replace The Servo.
29	Torque Insufficient	In Operation	● Set Torque Exceeded	★Check Parameters PA30 And PA31.
			● Check The Model Selection Of The Motor.	★Readapt The Motor Again.
			● Mechanical Overload	★Disconnect The Load And Try Again.
34	Mismatching Of Software Versions	In Operation	●Software Burning Error	★Replace Driver
			●Fail To Restore Factory Value	★DEF Restore Parameters

Alarm No.	Alarm Name	Operation Status	Cause	Solution
35	Communication Error	In Operation	●CRC Checking Error	★Check Communication Parameters And Wiring Of CN3 And Upper Computer
36	Bus-Type Encoder Receiving Error	In Operation	●Encoder Wiring Disconnection	★Tighten Encoder Wires
			●Encoder Failure	★Replace Encoder
			●Encoder Wiring Error	★Replace Correct Wire
37	Bus-Type Encoder Value Checking Error	In Operation	●Encoder Wiring Disconnection	★Tighten Encoder Wires
			●Encoder Failure	★Replace Encoder
			●Encoder Wiring Error	★Replace Correct Wire
39	Bus-Type Encoder Feedback Disconnection	In Operation	●Encoder Wiring Disconnection	★Tighten Encoder Wires
			●Encoder Failure	★Replace Encoder
			●Encoder Wiring Error	★Replace Correct Wire
40	Bus-Type Encoder Battery Power Off	In Operation	●Battery Wire Loosen	★Check The Battery Wiring
			●Battery Overdue	★Change The Battery
			●Encoder Failure	★Change The Encoder
42	Motor Parameter Reading Error	In Operation	●Encoder Parameter Incorrect	★Change The Motor
			●Encoder Wiring Loosen	★Change Encoder Wires
43	Motor Power Match Failure	In Operation	●Motor Power Too Large	★Change A Lower-Power Motor
			●Drive Current Too Small	★Change A Higher-Power Driver

- If Alm Red Light On And Alarm Code "Err--Xx" In Electronic Tube Flashes, It Is Driver Alarm, And Need To Cut Off The Power And find out the reason of alarms.

Remarks

Chapter VIII Debugging and Application

8.1 Notices to Quick Debugging

I. Confirm that wiring is correct.

- R, S, T and U, V, W should not be connected reversely and loosely.
- Check whether the input voltage of L series is three-phase 220V or input voltage of H series is three-phase 380V.
- Check that Pin 18 in CN1 interface is correctly connected with +24V and that Pins 36 and 9 in CN1 interface are correctly connected with 0V. Poles should not be connected reversely.
- Check that +5V in CN2 interface is correctly connected. Poles should not be connected reversely.
- Check Pin1 or 2 in interface CN3 must be connected with upper computer 0V.
- Check whether the cable for the motor is short circuited or grounded.
- The wiring for the same motor should correspond to the same driver.

II. Determine Energizing Sequence.

- The heavy current and control electricity of DO-13I series of servos are electrified at the same time.
- If the brake of the band-type brake motor is not controlled by the servo, the brake should not be electrified until the servo is enabled for more than 1 second. Only in this way can the position precision and safety of the equipment be guaranteed.
- Due to integrated design of the heavy current and control of DO-13I series of servos and adoption of power-down delay discharge, the internal heavy current is immediately cut off after power supply is cut off and the delay discharge of display and control circuits automatically cuts off after several seconds.

For successful use of drivers, please carefully read the sequence diagram below:

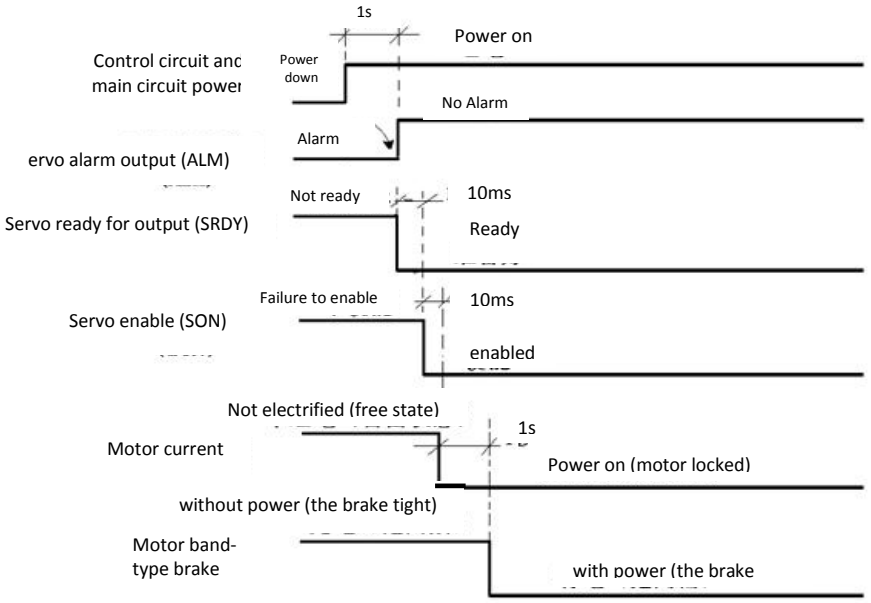


Figure 8.1 Sequence Diagram for Energizing and Alarm

8.2 Position Control (Quick Adjustment of Parameters After Power On)

Example: A DO-13iC30L driver matches a 110ST-M05415LMB motor (position control).

1. Make sure that the three-phase 220V voltage between R, S and T is correct after power on.
2. Do not connect the servo enable signal temporarily. Check whether there is any alarm and observe the red lamp (ALM). If the red lamp is not on, the operation is normally and you can go to the next step.
3. Driver will start the adaptation of parameters via bus-type encoder when electrified

a. Enter the parameter management mode "EE--", transfer to "**DP-def**" and then press down Enter for three seconds. When "**Finish**" appears, it means the default value has been restored according to the current adapted motor and will be effective only after power down.

b. After power on again, check several key parameters (Refer to Table 8.1 below) of position control and confirm that they are correct; the upper computer can send out an enable signal (or internal enable) and send out an pulse after the green lamp (**RUN**) is on. Observe the dynamic effect of the motor, appropriately modify the gain and adjust the characteristic of the motor.

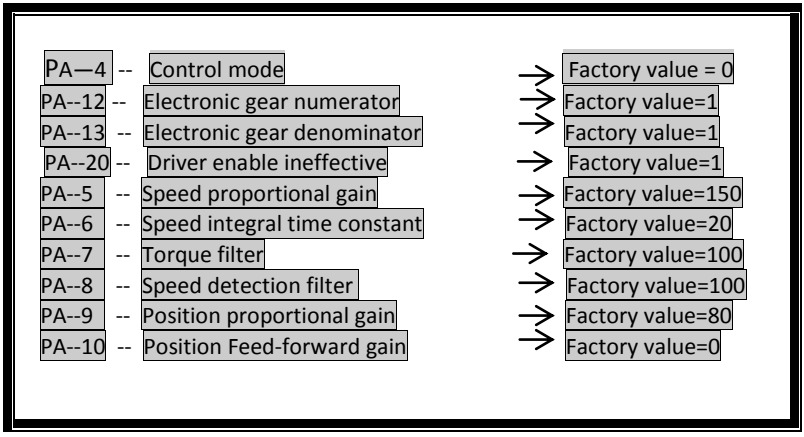


Table 8.1 Adjustment of Key Parameters of Position Control

8.3 Speed Control (Quick adjustment of parameters after power on)

Example: A DO-13iC30L driver matches a **110ST-M05415LMB** motor (speed control)

1. Confirm that the three-phase 220V voltage between R, S and T is correct after power on.

2. Confirm that the wiring of the differential input of the speed analog value or the single-end input is correct.

3. Do not connect the servo enable signal temporarily. Check whether there is any alarm and observe the red lamp (**ALM**). If the red lamp is not on, the operation is normally and you can go to the next step.

4. Driver will start the adaptation of parameters via bus-type encoder when electrified

a. Enter the parameter modification mode to change PA-0 into －385‖ password and then change Parameter PA-1 into －49‖ as the motor type code (see Table 2.2 on Page 8).

b. Enter the parameter management mode "**EE--**", transfer to "**DP-def**" and then press down "Enter" for three seconds. When "**Finish**" appears, it means the default value has been restored according to the current adapted motor and will be effective only after power down.

c. After power on again, check several key parameters (See Table 8.2 below) of speed control and confirm that they are correct; the upper computer can send out an enable signal (or internal enable), and send out an analog signal after the green lamp (**Run**) is on and after automatic zeroing. Observe the dynamic effect of the motor, appropriately modify the gain and adjust the zero drift value.

PA--4	Control mode	Set to 1
PA--20	Driver disablement ineffective	Factory value=1
PA-22	Internal and external speed command selection	Set to 1
PA-40	Acceleration time constant	Set as required
PA-41	Deceleration time constant	Set as required
PA-43	Analog speed command gain	Set as required
PA-45	Analog speed zero drift compensation	Set as required
PA-49	Analog zero speed threshold position	Set as required

Table 8.2 Adjustment of Key Parameters of Speed Control

8.4 Torque Control (Quick adjustment of parameters after power on)

Example: A DO-13iC30L driver matches a **110ST-M05415LMB** motor (torque control).

1. Confirm that the three-phase 220V voltage between R, S and T is correct after power on.

2. Confirm that the wiring of the differential input of the torque analog value or the single-end input is correct.

3. Do not connect the servo enable signal temporarily. Check whether there is any alarm and observe the red lamp (**ALM**). If the red lamp is not on, the operation is normally and you can go to the next step.

4. Driver will start the adaptation of parameters via bus-type encoder when electrified

a. Enter the parameter management mode "**EE--**", transfer to "**DP-def**" and then press down "Enter" for three seconds. When "**Finish**" appears, it means the default value has been restored according to the current adapted motor and will be effective only after power down.

b. After power on again, check several key parameters (See Table 8.2 below) of torque control and confirm that they are correct; the upper computer can send out an enable signal (or internal enable), and send out an analog value signal after the green lamp (**RUN**) is on and after automatic zeroing. Observe the dynamic effect of the motor, appropriately modify the gain and adjust the zero drift value.

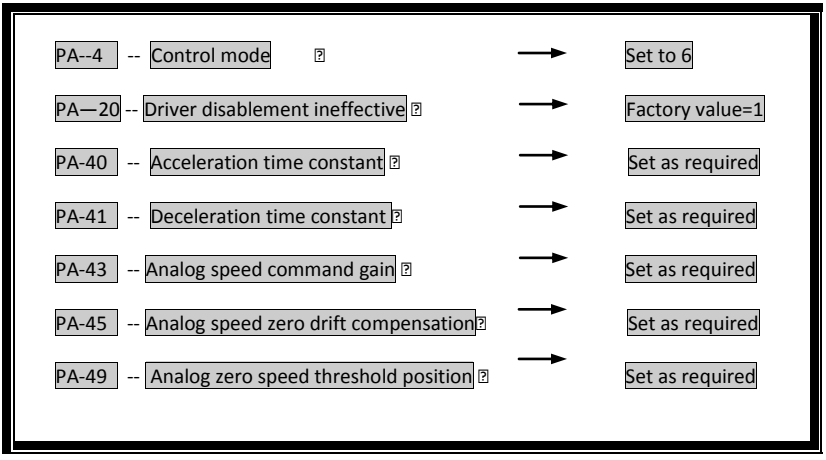


Table 8.3 Adjustment of Key Parameters of Torque Control

8.5 Dynamic Electronic Application

- Mainly used for application of position control.
- Dynamic electronic application

  Dynamic electronic application refers to dynamically switching the electronic gear proportion via the make-and-break of the input terminal during the operation of the servo driver.
- It is mainly reflected on the limit of the maximum output frequency of the upper computer. When the proportion value of the electronic gear is very small, pulse resolution ratio is high and the maximum speed can not be reached. However, in order to reach the maximum speed, the proportion value of the electronic gear of the upper computer is very great at this time. Low position resolution ratio can affect transmission precision. (It is possible that system send one pulse only when system commands 2 microns). In order to improve speed and transmission precision, multiple electronic gears with different gear ratios are added for switching so as to gain better effect.
- Example: In the application of numerical control machines, set the first electronic gear ratio "1/1" "PA12/PA13", the second electronic gear ratio "10/1" "PA52/PA13".

  ……

  G91 G01 X 10 F100 // The first electronic gear ratio is 1:1, it is 10 mm.

  M 16 // Numerical machine M code PLC outputs a point to make INH have a signal.

  G91 G01 X10 F100 // The second electronic gear ratio is 10:1, it is 100 mm.

  M17 // Numerical machine M code PLC closes the INH signal.

  M30 // Program ends.

PA--4	--	Control mode	→ Set to zero
PA—20	--	Driver disablement ineffective	→ Factory value =1
PA-12	--	Electronic gear numerator	→ 1
PA-13	--	Electronic gear denominator	→ 1
PA-52	--	Numerator of the second electronic gear ratio	→ 1

Table 8.4 Adjustment of Parameters of Electronic Gear Ratios

8.6 Debugging of Typical Problems

I. (Run) the Enable Green Lamp Fails to Be on.

a. Check whether the voltages of three phases R, S and T are normal.
b. Check whether the +24V for Pin 18 of CN1 interface is correct.
c. Check whether Pin 10 of CN1 interface is connected with 0V.
d. If the above all are normal and the green lamp still fails to be on, try again by using the internal enable PA53=0001.

II. Alarms When "Err—36,Err— 15,Err—37,Err—39,Err—40,Err—44" Appears.

A photoelectric encoder is a very typical fragile, sensitive component, so it should be protected in every aspect.
a. The above alarms indicate that the encoder or the wiring of the encoder is abnormal.
b. Check whether both ends of the shielding layer are well grounded or impurity conductor in plug.
c. Check that whether a too long wire will lead to attenuation to 5V power supply of the encoder.
d. The photoelectric encoder may be damaged due to interference. Check whether there is a strong magnetic/heavy current circuit. If so, isolate the circuit as much as possible.

III. The Servo Motor Jitters.

a. Confirm whether the load and inertia of the servo motor is within the permissible range of the motor.
b. Adjust Parameters PA-5, PA-6, PA-9
c. Add or reduce parameters according to the jitter conditions when the motor is running with high speed and low speed.

IV. The Servo Motor Gives out Noise.

a. Confirm whether the load and inertia of the servo motor is within the permissible range of the motor.
b. Adjust Parameters PA-5, PA-7, PA-8, PA-9
c. Add or reduce parameters according to the noise given out by the motor when the motor is running with high speed and low speed and stops.

V. Setting of Electronic Gear Ratio

Take the NC machine as an example:

a. The servo motor is directly connected with the lead screw (The lead screw rotates for one revolution when the motor rotates one revolution).

- If the numerical control system programming is 10 mm, then sent out 10000 pulse
- The photoelectric encoder has 2500 wires.
- The pitch of the lead screw is 6mm.

PA12 / PA13:
= (command value mm) *(the number of wires of the encoder) *(quadruple frequency)/ (pitch)*(the number of pulses)
= 10 *2500 *4/6 *10000
= 5/3
viz. PA12=5, PA13=3 .

b. There is a reducer between the servo motor and the lead screw (The lead screw rotates for 2 revolutions when the motor for 5 revolutions).

- If the numerical control system programming is 10 mm, then sent out 10000 pulses
- The photoelectric encoder has 2500 wires.
- The pitch of the lead screw is 6mm.

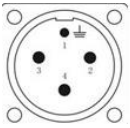
PA12 / PA13:
= (command value mm) *(the number of wires of the encoder) *(quadruple frequency)*(the revolution number of the motor)/ (pitch)*(the number of pulses)* (the revolution number of the lead screw)
= 10 *2500 *4 *5/6 *10000 *2
=2 5/6
Viz. PA12=25, PA13=6 .

Chapter IX Servo Motor

9.1 Definition of the Servo Motor Plug and Wiring

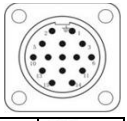
I. Power Socket (with 4 prongs)

Winding lead	u	v	W	⏚
Socket No.	2	3	4	1



U, V and W are the lead ends of the winding coil of the servo motor. A round plug is dedicated for the motor with Seat 80.

II. Socket for Feedback Elements

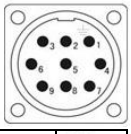


● Socket (with 15 prongs) for standard incremental encoder (F)

Signal	+5V	U+	0V	U-	A+	V+	A-	V-	B+	W+	B-	W-	Z+	z-	⏚
Socket No.	2	10	3	13	4	11	7	14	5	12	8	15	6	9	1

A+, B+, Z+, A-, B-, Z-, U+, U-, V+, V-, W+, and W- signals are the output signals of incremental encoder.

● Socket (with 9 prongs) for wire saving incremental encoder (F1):



Signal	+5 V	0V	A+	A-	B+	B-	Z+	Z-	⏚
Socket No.	2	3	4	7	5	8	6	9	1

A+, B+, Z+, A-, B-, and Z- signals (composite signals) are the output signals of the wire saving incremental

encoder.

A round plug is dedicated for the motor with Seat 80.

● Socket (with 7 prongs) for Bus-type encoder (M):

Signal	+5V	0V	SD+	SD-	E+	E-	
Socket No.	7	5	6	4	3	2	1

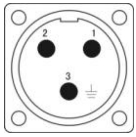
SD+ and SD- are data output signals; E+ and E- are battery leads.

●Socket (with 7 prongs) for rotatable transformer (R)

Signal	R1	R2	S1	S3	S2	S4	
Socket No.	2	3	4	5	6	7	1

R1-R2 are primary signals, S1-S3 and S2-S4 are secondary signals.

III. Socket for Power-off Brake (Band-type Brake):



Power supply	VDC(direct current power supply) without requirements on polarity access.		
Socket No.	1	2	3

Power-off brake parameters allocated for Seat 110
Working pressure: 24VDC (-15%-+10%), working current: ≤0.6A, braking torque: ≥8Nm
Power-off+ brake parameters allocated for Seat 130
Working pressure: 24VDC (-15%-+10%), working current: ≤0.6A, braking torque: ≥12Nm
Safe brake parameters allocated for Seat 150
Working pressure: 100VDC (-15%-+10%), working current: ≤0.4A, braking torque: ≥30Nm

9.2 Description of Model Selection of Servo Motors

● Parameter characteristics

Seat (mm): 80, 110, 130, 150 Rated torque (Nm): 1.3-27
Rated speed (rpm): 1500,2000,2500,3000 Rated power (kW): 0.4-5.5
Standard matching feedback elements: Bus-type encoder
Power-off brake: Select matching
Insulation level: B Protection level: closed self-cooling IP65
Number of pole-pairs: 4 Installment mode: flange plate
Ambient temperature: 0-55^{0}C Ambient humidity: < 90% (without condensation)
Magnetization mode: permanent magnet
Working voltage of adaptive driver (VAC): 220

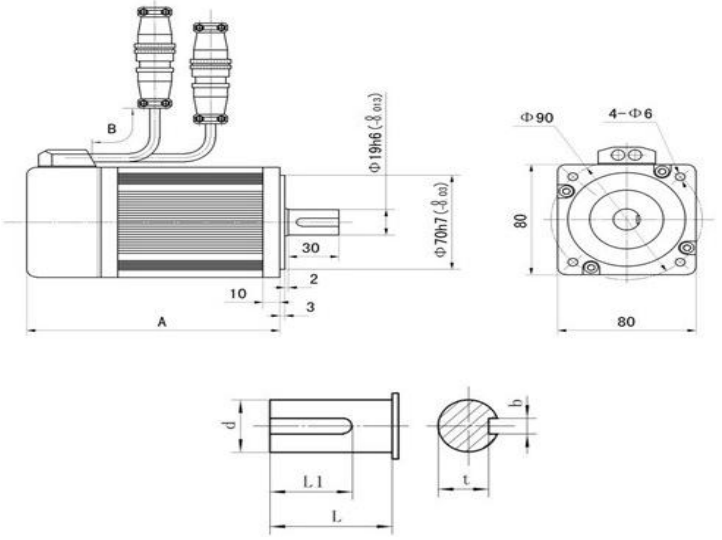
●Description of type codes of servo motors:

110	ST	–	M	020	30	L	M	B	Z
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Seat No.
(2) AC Permanent magnet synchronous servo motor
(3) Type of feedback element: photoelectric encoder
(4) Rated torque: three figures ×0.1Nm
(5) Rated speed: two figures ×100rpm
(6) Working voltage of the driver (VAC): 220
(7) Standard encoder codes: E—multi-loop bus-type encoder (131072 C/T)
M—single-loop bus-type encoder (131072 C/T)
(8) Medium inertia
(9) A power-off has been installed.

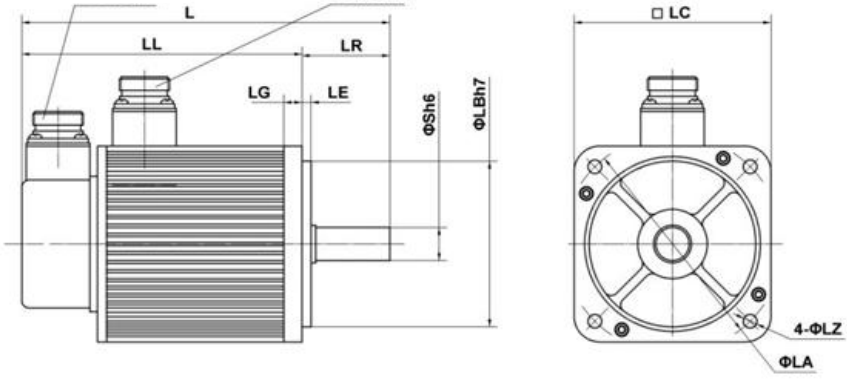
9.3 Dimensions of Servo Motors

Seat 80:

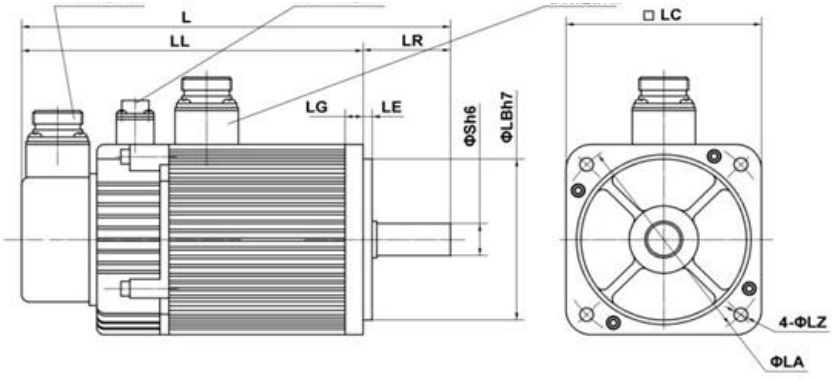


Type	A (mm)	B (mm)	L (mm)	L1 (mm)	d (mm)	b (mm)	t (mm)
80ST-M01330LMB	128	500	30	25	Φ19 0-0.013	6 0-0.03	15.5 0-0.1
80ST-M02430LMB	150	500	30	25	Φ19 0 -0.013	6 0-0.03	15.5 0-0.1
80ST-M03330LMB	165	500	30	25	Φ19 0 -0.013	6 0-0.03	15.5 0-0.1

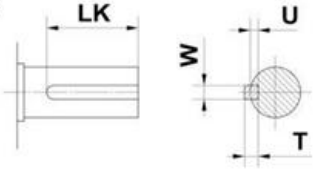
Encoder connector **Motor connector**



Encoder connector **Brake connector** **Motor connector**



spiale end



110 Seat No.	L	LL	LR	LE	LG	LC	LA	LZ	S	LB	T	U	W	LK
110ST-M02515 110ST-M02420	214 (256)	158 (200)	56	5	12	110	130	9	19	95	6	3.5	6	40
110ST-MO3215	241 (283)	185 (227)	56	5	12	110	130	9	19	95	6	3.5	6	40
110ST-M04820 110ST-M05415	256 (298)	200 (242)	56	5	12	110	130	9	19	95	6	3.5	6	40
110ST-M06415	273 (315)	217 (259)	56	5	12	110	130	9	19	95	6	3.5	6	40

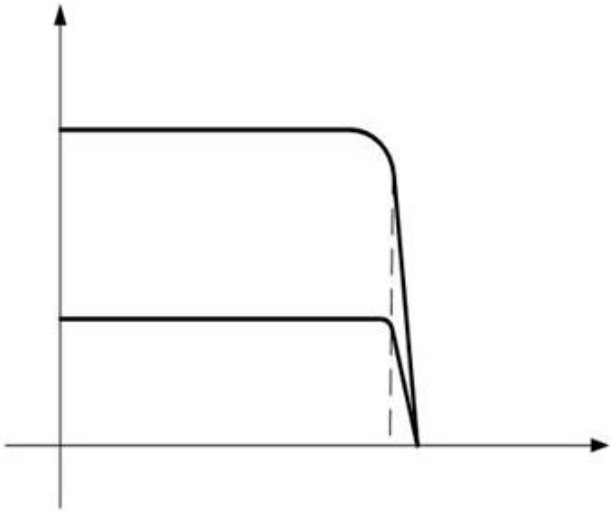
130 Seat No.	L	LL	LR	LE	LG	LC	LA	LZ	S	LB	T	U	W	LK
130ST-M03215	221 (263)	163 (205)	58	6	12	130	145	9	22	110	6	3.5	6	40
130ST-M04820 130ST-M05415	229 (271)	171 (213)	58	6	12	130	145	9	22	110	6	3.5	6	40
130ST-M06415	239 (281)	181 (223)	58	6	12	130	145	9	22	110	6	3.5	6	40
130ST-M07220	253 (295)	195 (237)	58	6	12	130	145	9	22	110	6	3.5	6	40
130ST-M09620 130ST-M09615	277 (319)	219 (261)	58	6	12	130	145	9	22	110	6	3.5	6	40
130ST-M14320 130ST-M14615	325 (367)	267 (309)	58	6	12	130	145	9	22	110	6	3.5	6	40

150 Seat No.	L	LL	LR	LE	LG	LC	LA	LZ	S	LB	T	U	W	LK
150ST-M14615 150ST-M14320	312 (374)	231 (293)	81	6	14	150	174	11	28	130	7	4	8	60
150ST-M19115	331 (393)	250(312)	81	6	14	150	174	11	28	130	7	4	8	60
150ST-M22315 150ST-M23920	361 (423)	280 (342)	81	6	14	150	174	11	28	130	7	4	8	60
150ST-M28715 150ST-M26320	387 (449)	306 (368)	81	6	14	150	174	11	28	130	7	4	8	60

180 Seat No.	L	LL	LR	LE	LG	LC	LA	LZ	S	LB	T	U	W	LK
180ST-M18020	321 (393)	242 (314)	79	4	20	180	200	13.5	35	150	8	5	10	63
180ST-M23020	345 (417)	266 (338)	79	4	20	180	200	13.5	35	150	8	5	10	63
180ST-M27020	365 (437)	286 (358)	79	4	20	180	200	13.5	35	150	8	5	10	63
180ST-M36015	399 (471)	320 (392)	79	4	20	180	200	13.5	35	150	8	5	10	63
180ST-M45015	431 (503)	352 (424)	79	4	20	180	200	13.5	35	150	8	5	10	63
180ST-M55015	463 (535)	384 (456)	79	4	20	180	200	13.5	35	150	8	5	10	63

● Curve Diagram of Torque and Speed:

All series all set servo



Mmax of LB and LBB series servo motor is equal to 3Mn; Mmax output status is the short time work of the servo motor. Please refer to the output capacity of the matching driver before use.

Appendix 1

Siemens NC System Matched for Drivers

(To match Siemens 802S/801/802S/808D)

1. Setting requirements for driver parameters

Parameter No.	Parameter Name	Unit	Parameter Range	Default
5	Speed ratio gain	Hz	50~2000	150
36	filter factor of command pulse signal	%	0～3	1

Note:

- When a Siemens NC system is matched for the driver, PA36 should be equal to 1 and PA37 to 0; Otherwise repeated position precision will be affected.
- If reset deviations are not uniform, appropriately increase Parameter 5 of the driver.
- Pins 36 and 9 of the CN1 interface port must be connected with the shielding layer and metal casing of the system; otherwise reset precision will be affected.

2. Setting requirements for Siemens system parameters

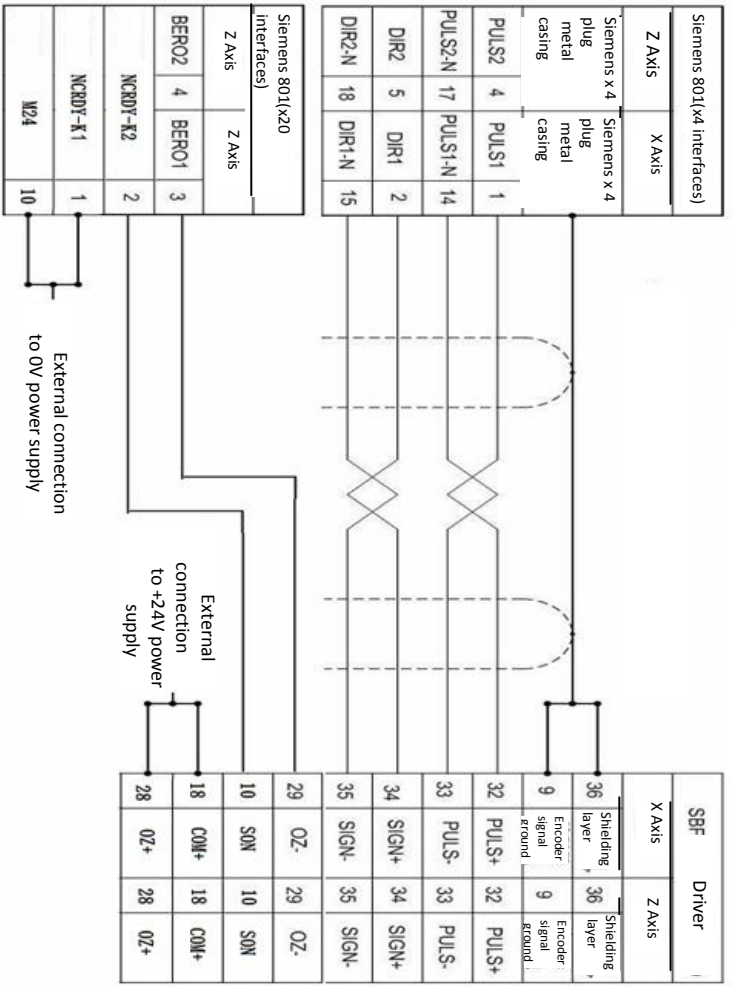
Parameter No.	Parameter Name	Required value
34040	Search for Z-Pulse Speed	500-2000

Note:

- If reset deviations differ a lot, appropriately increase Parameter 34040 of the driver

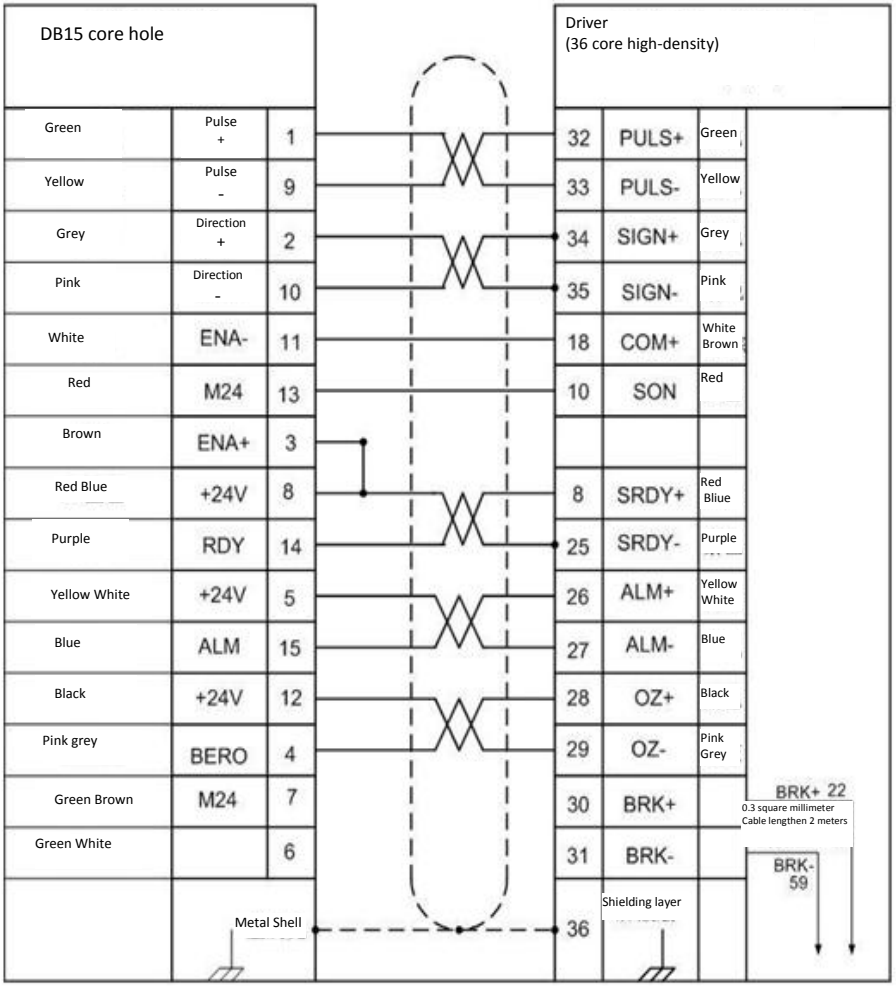
Appendix 2

Wiring Diagram for Siemens 801/802S



Appendix 3

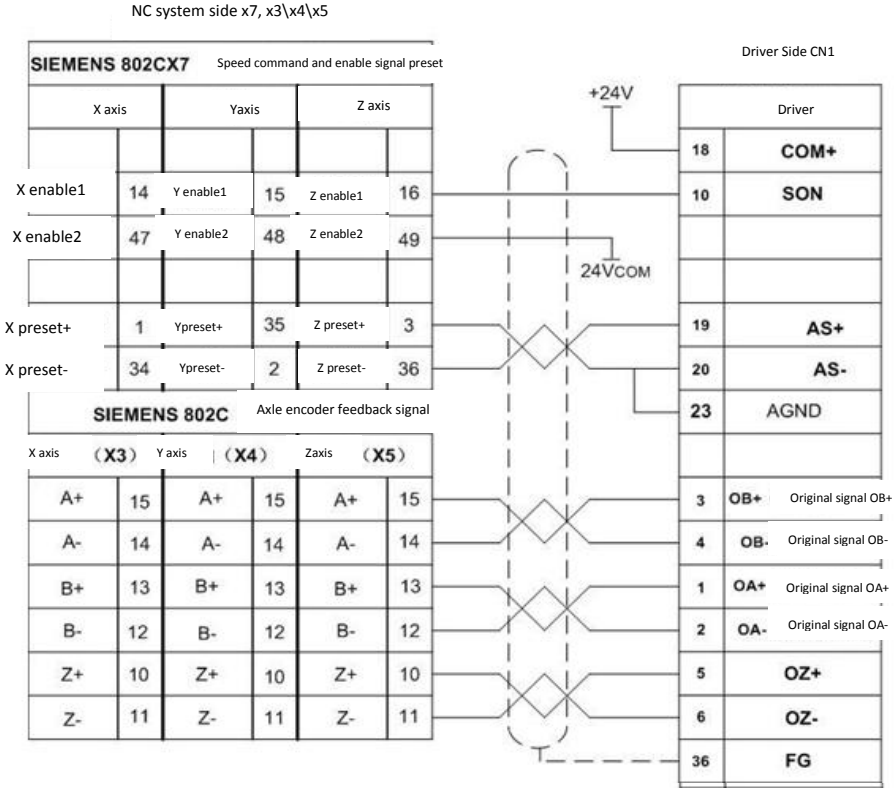
Wiring Diagram of Driver Matching Siemens 808D System



When make pair wires, one piece are made according to the diagram above while no extension wire weld Pin30 and 31 for another. Driver parameter modification : PA-36 turns to 2, PA-57 modification methods: when system displays that driver alarms while actually doesn't, parameter can be modified this parameter by reversing the bottom two of 0000, namely change 1 to 0 and change 0 to 1.

Appendix 4

Wiring Diagram of Driver Matching Siemens 802C System



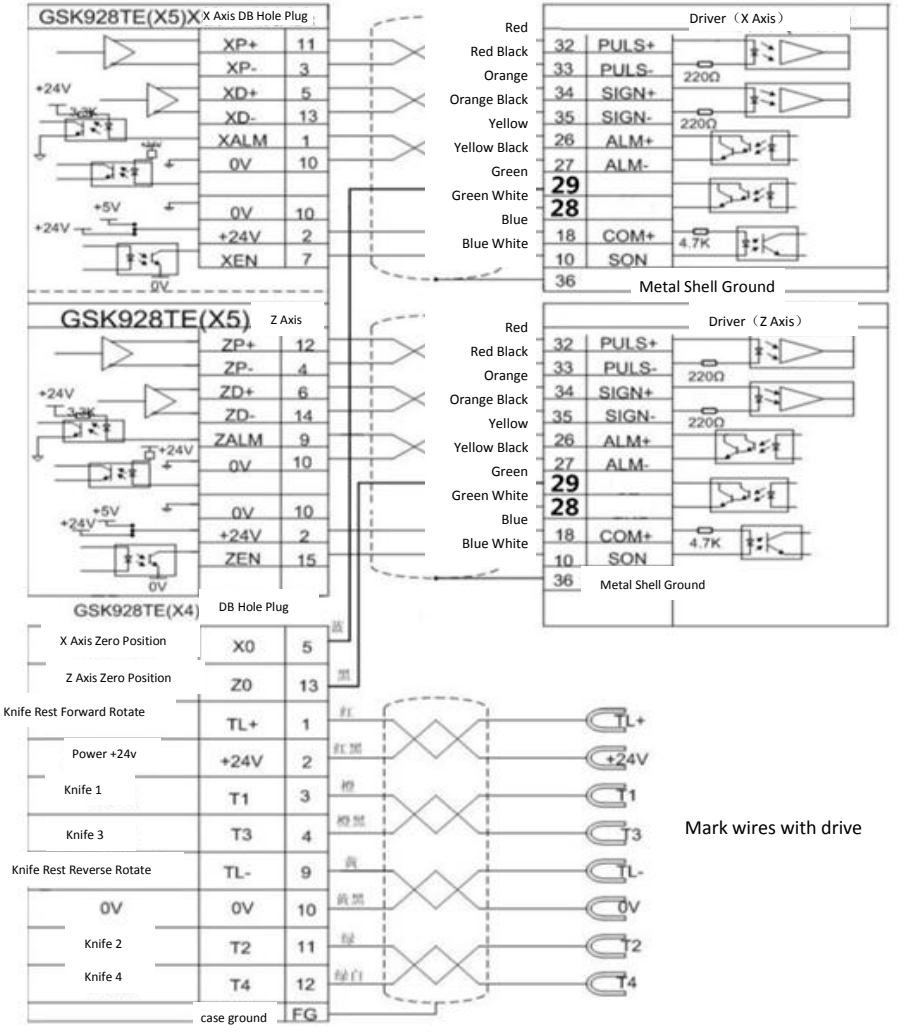
Driver parameter adjustment: Adjust PA-4 to 1, PA-22 to 1 and adjust PA-43 as required

Siemens 802C system parameter adjustment: Parameter 30130 of Siemens 802C system should be changed to "1".

After wiring as per the above the wiring diagram, first adjust the parameters above, electrify the system and the driver, open the driver enable, keep the system in zero speed state, and adjust the AU-Spd of the driver (automatic adjustment of speed bias of analog value). The adjustment method thereof: Find AU in the first menu interface of the driver and press enter once again to display AU-Spd. Then press down enter for 3 seconds and FINISH (success) will be displayed. Finally store the parameters.

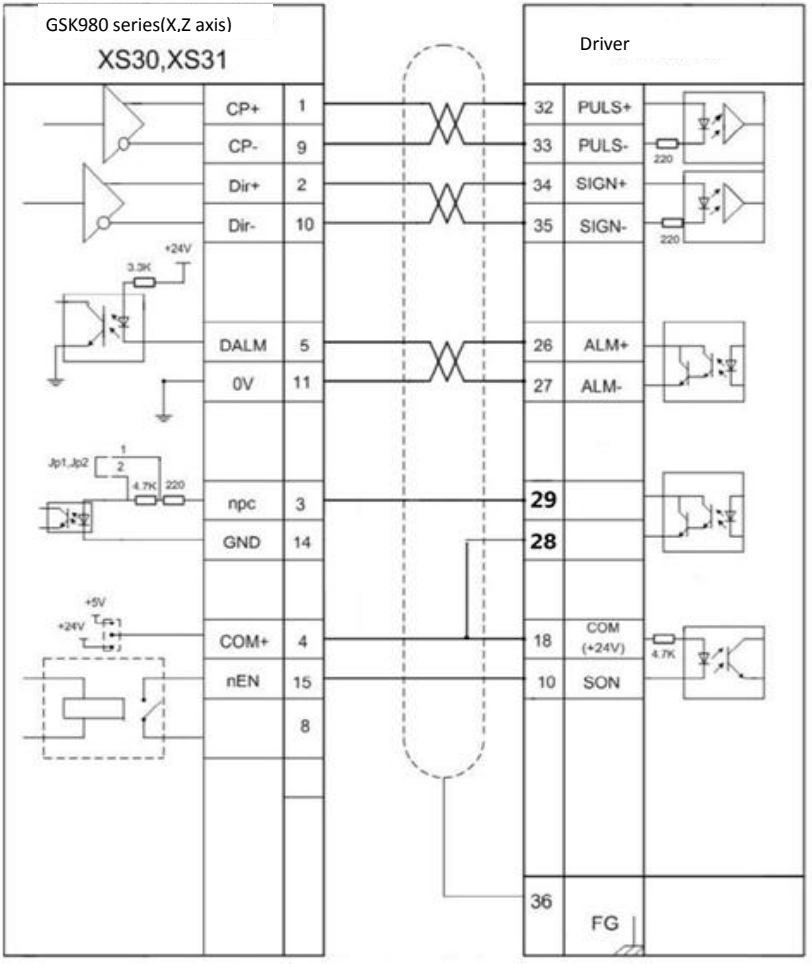
Appendix 5

Wiring Diagram of Driver Matching GSK928 System



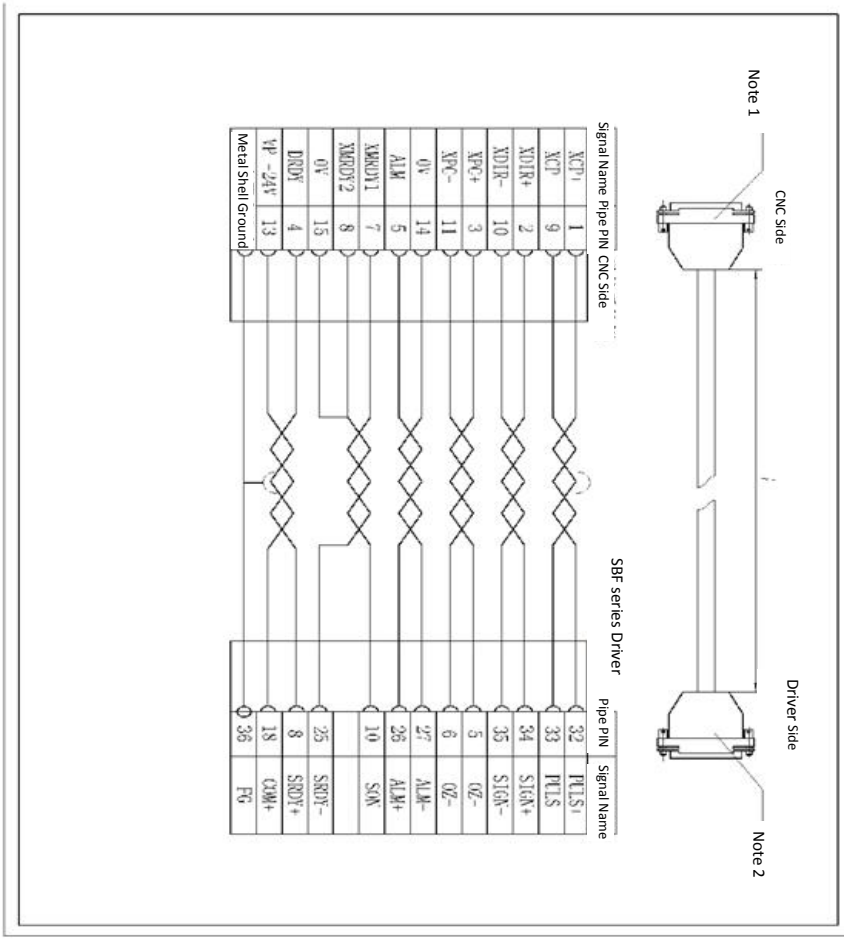
Appendix 6

Wiring Diagram of Driver Matching GSK928 System



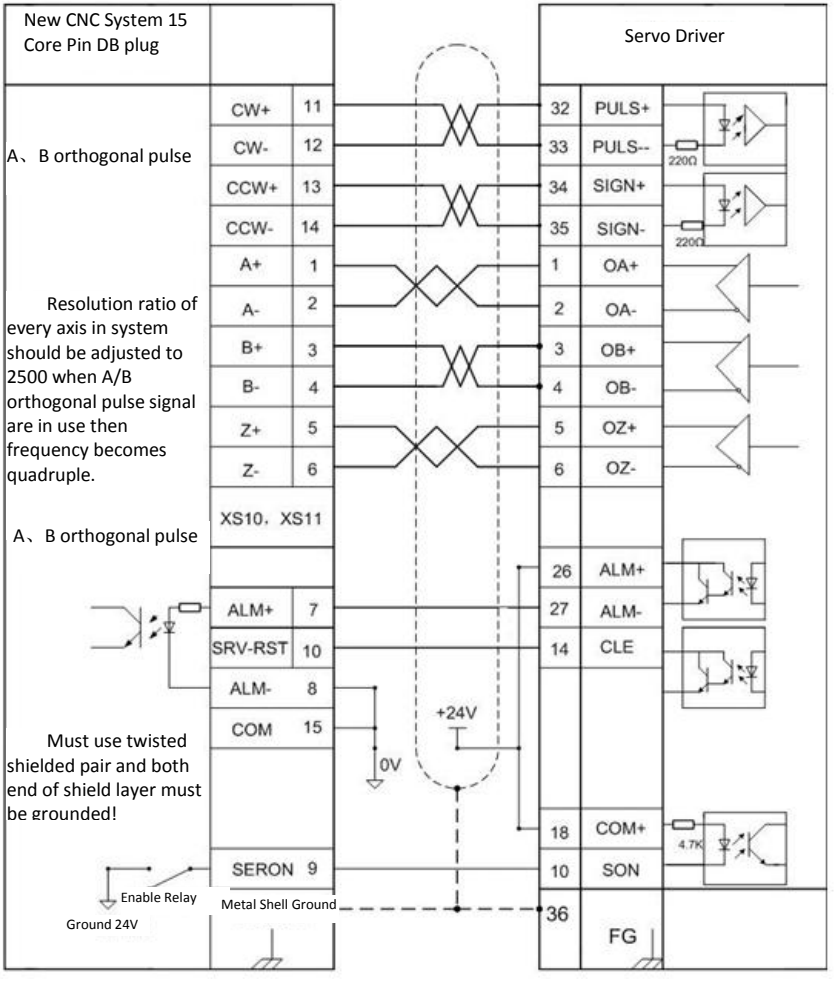
Appendix 7

Wiring Diagram of Driver Matching KNDCNC System



Appendix 8

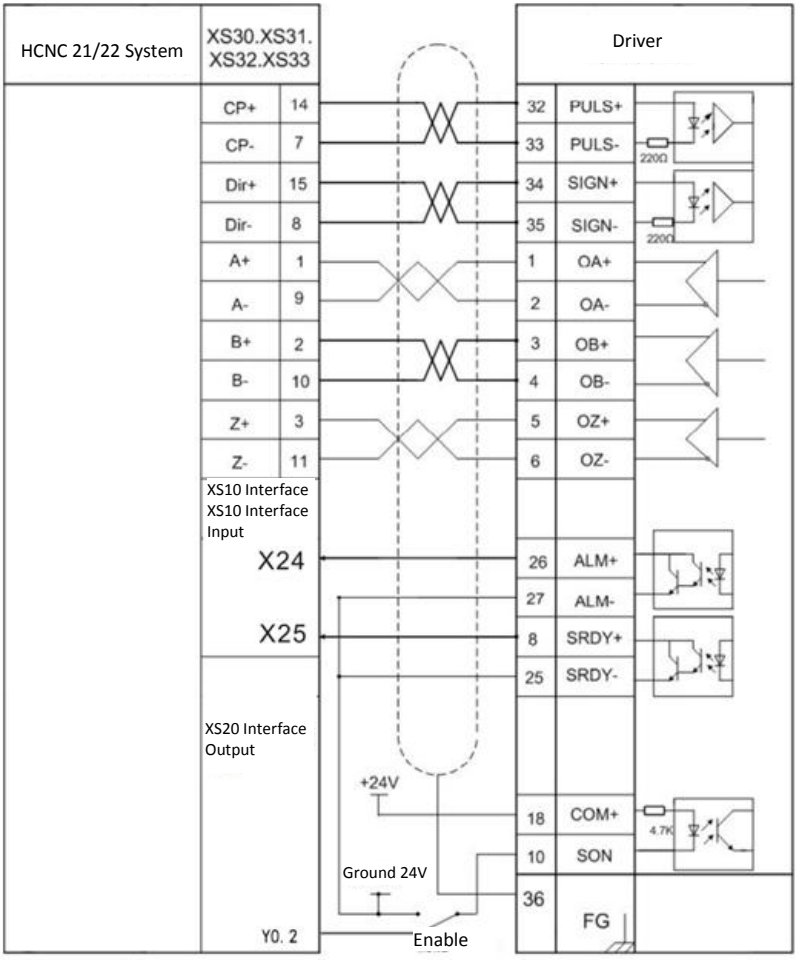
Wiring Diagram of Driver Matching New EZ4 System



Wiring Diagram of Position Control Method

Appendix 9

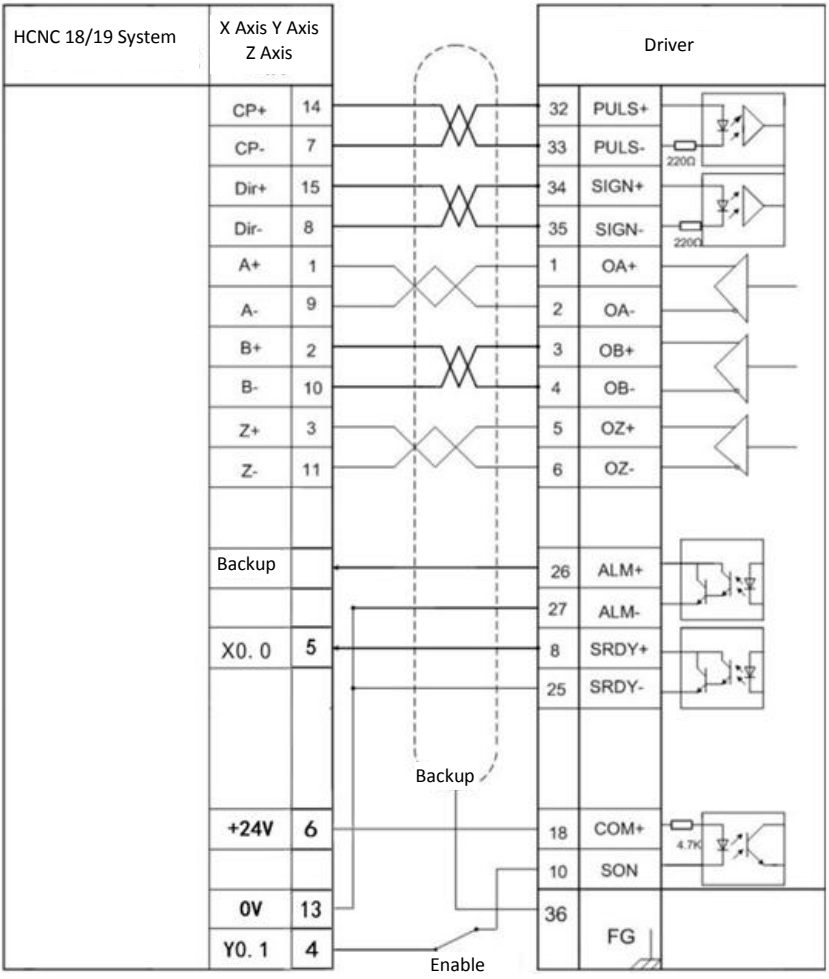
Wiring Diagram of Driver Matching HCNC 21/22 System



Wiring Diagram of Position Control

Appendix 10

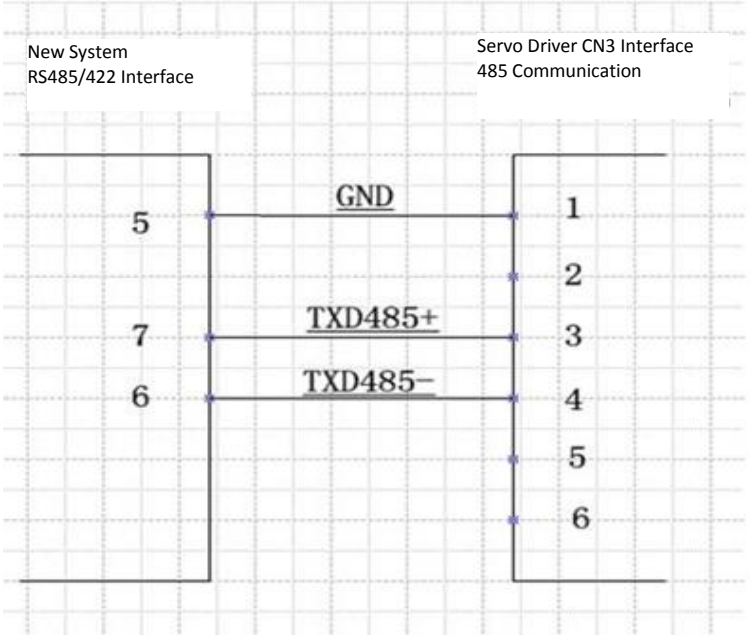
Wiring Diagram of Driver Matching HCNC 18/19 System



Wiring Diagram of Position Control

Appendix 11

Wiring Diagram of Absolute Cn3 Interface
(Driver and New System)



Note：GND must be welded or communication will disconnect.s

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