BONMET
Motion GmbH

Catalog

CHAPTER 1 INTRODUCTION

1.1 PRODUCTS BRIEF INTRODUCTION

Bonmet AC servo driver is a fully digitized AC system; it has small volume, fully protection, good reliability, and high integration by employing international newly digital signal processor (DSP), large-scale programmable gate array and intelligent power module (IPM), and by using the optional PID algorithm to achieve PWM control.

Servo system has advantages as the followings.

★ Avoid out-of step phenomenon

The servo system is combined the servo driver, servo motor with encoder and open-loop position controller to form a semi-closed loop control system. The position feedback signal is fed to the servo driver to ensure no out-of-step phenomenon.

★ Constant torque in a wide range of speed

The servo system has a constant torque from low to high speed in which the speed range is about 1:10000.

★ High speed, high accuracy

The maximum speed of servo motor reaches to 3000rpm. The in-position error is within 1/10000 r.

Note: The maximum speed of servo motor may be different form different type of servo motor.

★ Simple control and flexibility

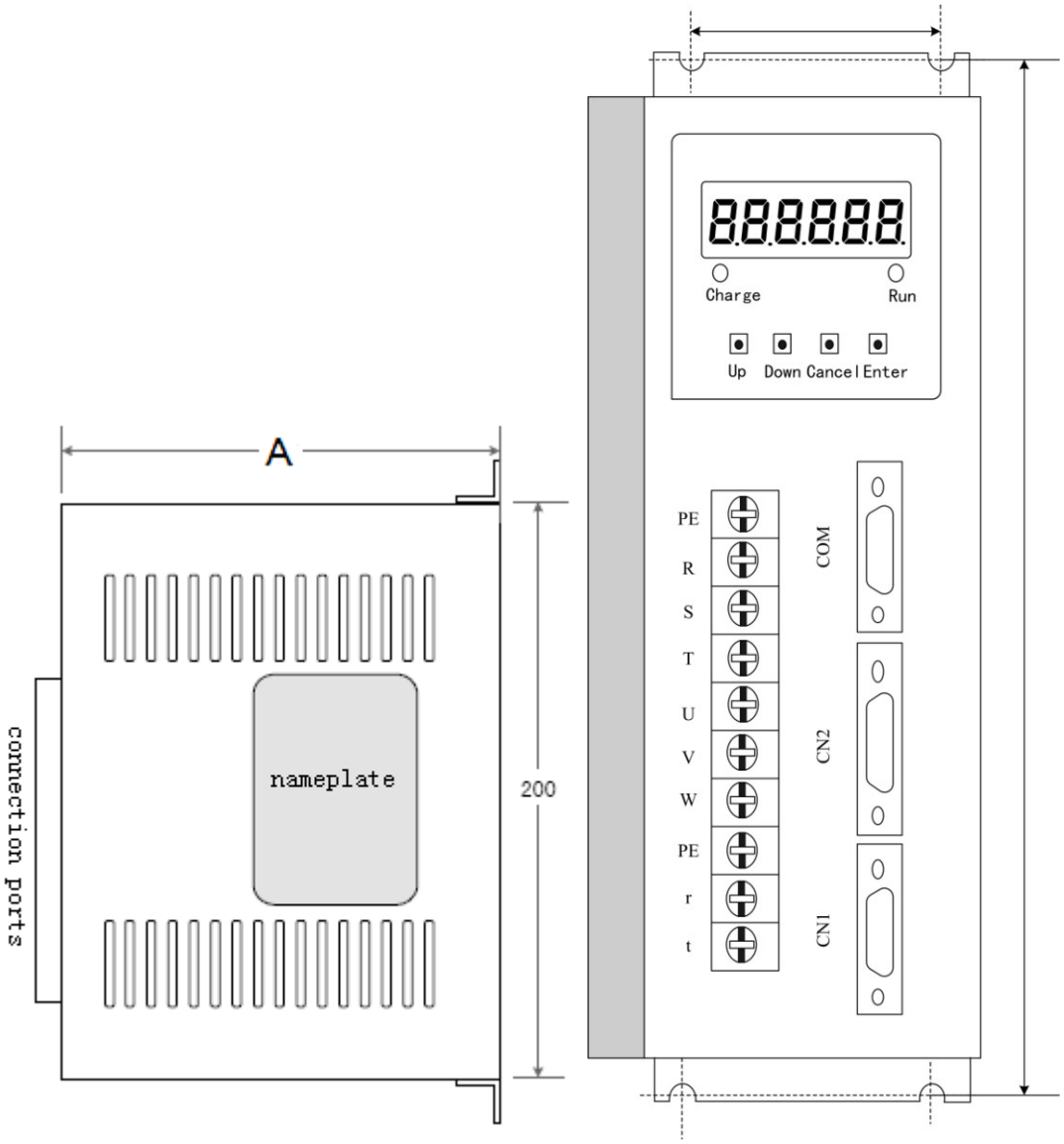
To meet different requirement, the servo driver can operate in a required operation mode and required characteristic by setting their parameters properly.

INSPECTION AT DELIVERY

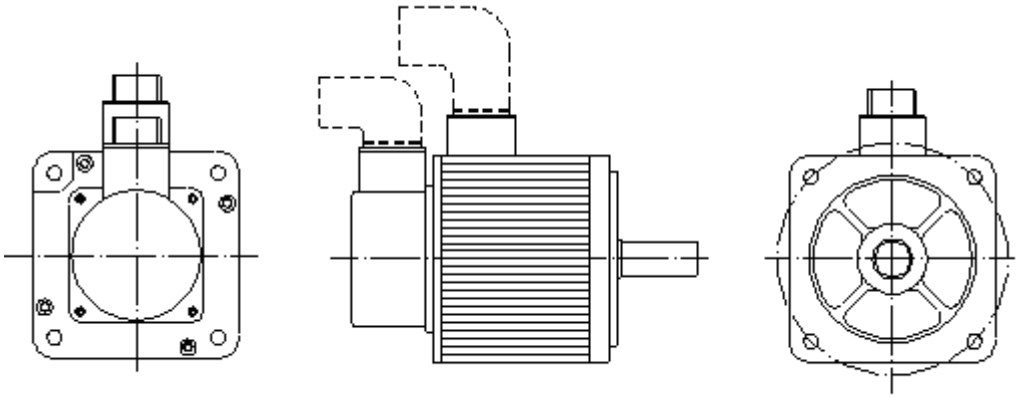
1) Check the following item after receiving the product
   (1) Check the package of the product to confirm the product is free from any damage or scratches by transportation.
   (2) After unpacking, check the nameplate to make sure that the servo amplifier and/or servo motor are the same as the order one by the customer.

1.3 PRODUCT OUTLINE DRAWINGS

1) The outline drawing of the servo driver



2) The outline drawing of the servo motor



CHAPTER 2 INSTALLATION

! NOTICE
★ Store and install of the products must meet requirements of environmental conditions. ★ Do not pile the products too much to prevent damage from pressing or falling. ★ Original product package must be used when transportation is again needed. ★ Use fireproofing material for installation and keep away form flammable matter in case to prevent on fire. ★ The servo driver must be installed inside a cabinet to keep free from dust, corrupt gas, liquid, conductance and easy burning material. ★ The servo driver and servo motor must keep away from vibration source and isolate from all impact . ★ Do not carry the servo motor by drawing the motor shaft, cables of motor or encoder.

2.1 ENVIROMENTAL CONDITIONS

Item	servo driver	servo motor
Ambient temperature Ambient humidity	0～55℃(non-freezing) 90% RH or less (non-condensing)	0～40℃(non-freezing) 90% RH or less(non-condensing)
Storage temperature Storage humidity	-20～80℃ 90%RH (non-condensing)	-25～70℃ ＜80%RH (non-condensing)
Ambience	Free from corrosive gas, flammable gas, oil mist, dust and dirt etc.	Free from corrosive gas, flammable gas, oil mist, dust and dirt etc
Altitude	1000m or less(above sea level)	2500m or less(above sea level)
Vibration	＜0.5G(4.9m/s^2)10～60HZ(non continuous operation)	

2.2 INSTALLATION OF SERVO DRIVER

! NOTICE
✧ The servo driver must be installed in control cabinet with good protection condition. ✧ The servo driver must be installed in the specified direction and kept in enough space between the driver unit and control box wall or other equipment to guarantee the condition of heat transmission. ✧ Do not install the driver unit on or nearby flammable matters to protect causing fire.

1) Environmental conditions for installation

(1)Protections

The servo driver must be installed in a control cabinet with good protection condition due to the driver unit has non-protection and kept free from corrosive gas, flammable gas, oil mist, metal dust, liquid and conductance matters etc.

(2)Temperature

Ambient temperature 0—50℃ and under 45℃ for continuous operation with guarantee the condition of heat transmission.

(3)Vibration and impact

Installation must ensure no harm vibration otherwise reduce vibration means must be taken for reducing vibration under 0.5G (4.5m/s^2). Do not put heavy objects on the servo driver to avoid impact.

2) Installation method

(1)Installation manner

There are two manners of installation can be used, the first one is the rear plate mounting and the second is the front-panel plate mounting. The installation direction is perpendicular to the mounted plate. Figure 2.1 shows the rear plate mounting. Figure 2.2 shows the front-panel plate mounting

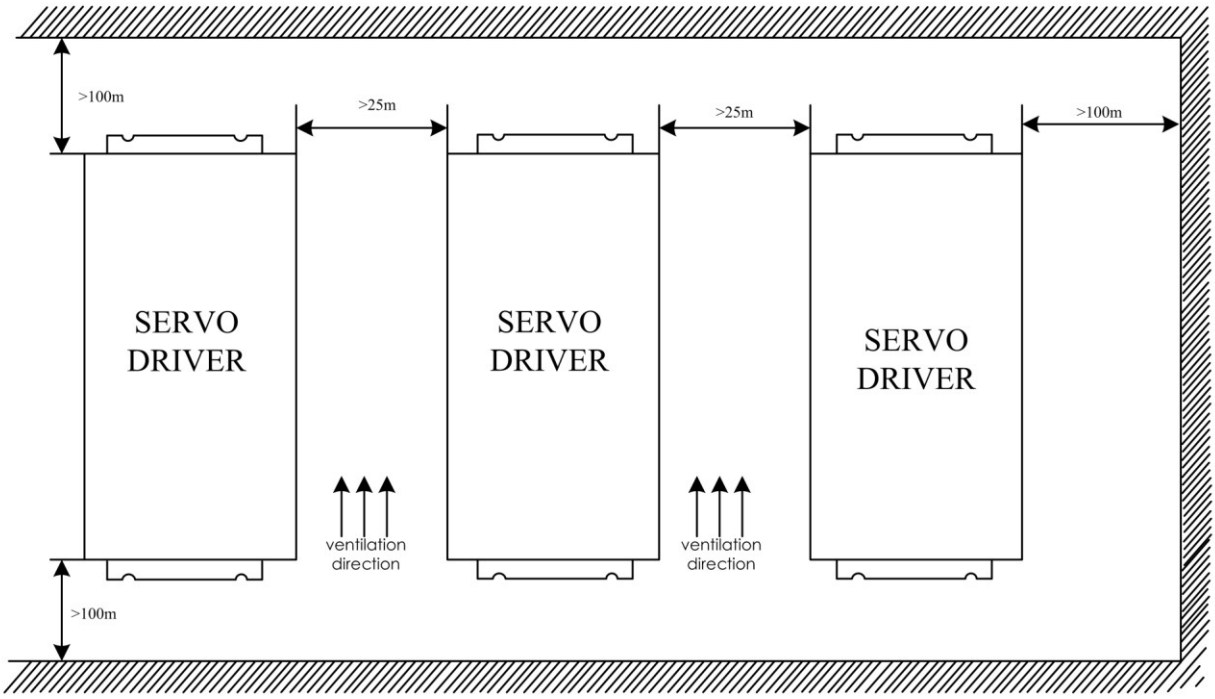


Figure 2.1 servo driver rear plate mounting

2.3 SERVO MOTOR INSTALLATION

! NOTICE

- ✧ Do not give shocks to the servo motor and encoder, or they may break.
- ✧ During transportation, do not catch cables, motor shaft of encoder to pull the servo motor.
- ✧ Do not subject the servomotor shaft to more than the permissible load, or servo motor may damage.
- ✧ Installation should be very firm to prevent loosing by vibration.

Note: please know more from attached servo motor manual.

CHAPTER 3 WIRING

! WARNING
✧ Any person who is involved in wiring or checking should be fully competent to do the work. ✧ Before wiring of checking, make sure that the voltage is safe at least 5 minutes after power-off otherwise you may get an electric shock.

! CAUTION
✧ Connect cables to correct terminals according to voltage level and polarity to prevent equipment damage of person injury. ✧ The protective earth terminals (PE, FG) should be connected to ground.

3.1 STANDARD WIRING

Connections of the servo driver are related to the control mode as following:

1) Position control mode

   Te standard wiring for position control mode is shown in ***FIG3.1***

2) Velocity control mode

   The standard wiring for velocity control mode is shown in ***FIG3.2***

3) Torque control mode

   The standard wiring for torque control mode is shown in ***FIG3.3***

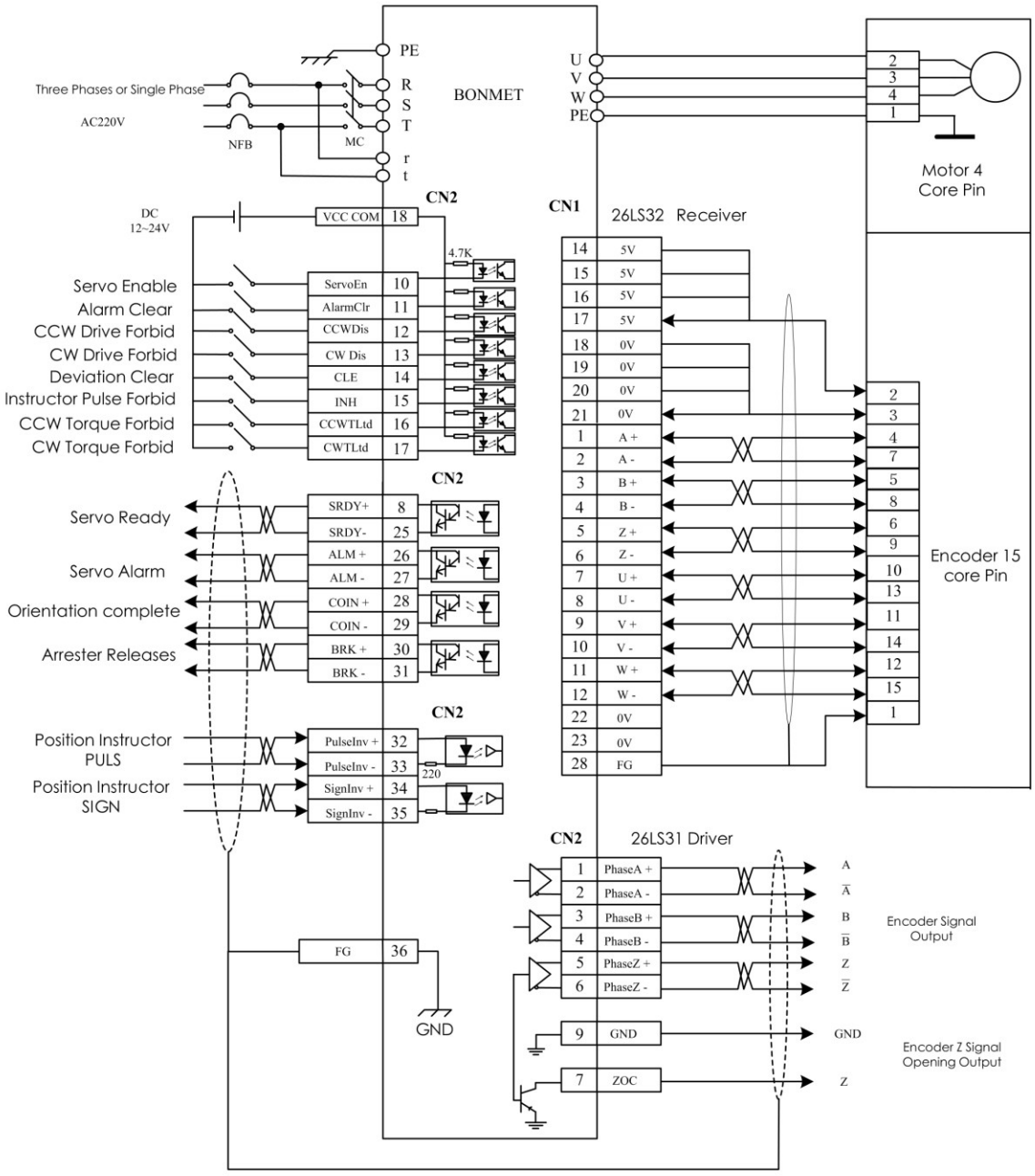
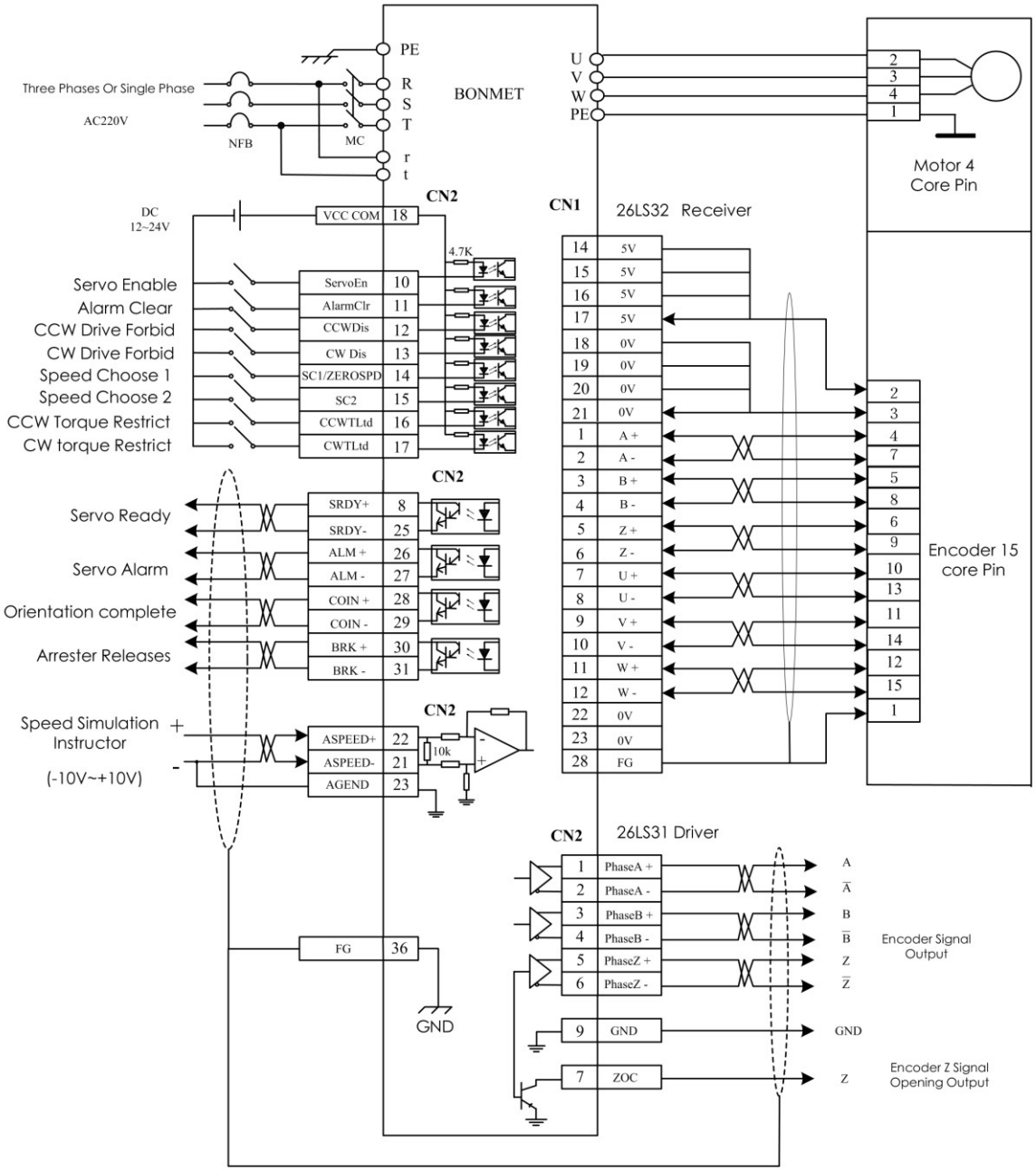

PE
R
S
T
r
t
BONMET
Three Phases or Single Phase
AC220V
NFB
MC
U
V
W
PE
Motor 4
Core Pin
CN2
DC
12~24V
VCC COM 18
4.7K
Servo Enable
Alarm Clear
CCW Drive Forbid
CW Drive Forbid
Deviation Clear
Instructor Pulse Forbid
CCW Torque Forbid
CW Torque Forbid
ServoEn 10
AlarmClr 11
CCWDis 12
CW Dis 13
CLE 14
INH 15
CCWTLtd 16
CWTLtd 17
CN1
26LS32 Receiver
14 5V
15 5V
16 5V
17 5V
18 0V
19 0V
20 0V
21 0V
1 A +
2 A -
3 B +
4 B -
5 Z +
6 Z -
7 U +
8 U -
9 V +
10 V -
11 W +
12 W -
22 0V
23 0V
28 FG
Encoder 15
core Pin
Servo Ready
Servo Alarm
Orientation complete
Arrester Releases
SRDY+ 8
SRDY- 25
ALM + 26
ALM - 27
COIN + 28
COIN - 29
BRK + 30
BRK - 31
Position Instructor
PULS
Position Instructor
SIGN
PulseInv + 32
PulseInv - 33
SignInv + 34
SignInv - 35
220
FG 36
GND
CN2
26LS31 Driver
1 PhaseA +
2 PhaseA -
3 PhaseB +
4 PhaseB -
5 PhaseZ +
6 PhaseZ -
9 GND
7 ZOC
A
B
Z
GND
Z
Encoder Signal
Output
Encoder Z Signal
Opening Output

FIG 3.1


PE
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BONMET
Three Phases Or Single Phase
AC220V
NFB
MC
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W
PE
Motor 4
Core Pin
DC
12~24V
CN2
VCC COM 18
4.7K
ServoEn 10
AlarmClr 11
CCWDis 12
CW Dis 13
SC1/ZEROSPD 14
SC2 15
CCWTLtd 16
CWTLtd 17
Servo Enable
Alarm Clear
CCW Drive Forbid
CW Drive Forbid
Speed Choose 1
Speed Choose 2
CCW Torque Restrict
CW torque Restrict
CN1
26LS32 Receiver
14 5V
15 5V
16 5V
17 5V
18 0V
19 0V
20 0V
21 0V
1 A +
2 A -
3 B +
4 B -
5 Z +
6 Z -
7 U +
8 U -
9 V +
10 V -
11 W +
12 W -
22 0V
23 0V
28 FG
2
3
4
7
5
8
6
9
10
13
11
14
12
15
1
Encoder 15
core Pin
CN2
SRDY+ 8
SRDY- 25
ALM + 26
ALM - 27
COIN + 28
COIN - 29
BRK + 30
BRK - 31
Servo Ready
Servo Alarm
Orientation complete
Arrester Releases
CN2
ASPEED+ 22
ASPEED- 21
AGEND 23
10k
Speed Simulation Instructor
(-10V~+10V)
+
-
FG 36
GND
CN2
26LS31 Driver
1 PhaseA +
2 PhaseA -
3 PhaseB +
4 PhaseB -
5 PhaseZ +
6 PhaseZ -
9 GND
7 ZOC
A
B
Z
Encoder Signal
Output
GND
Z
Encoder Z Signal
Opening Output

FIG 3.2

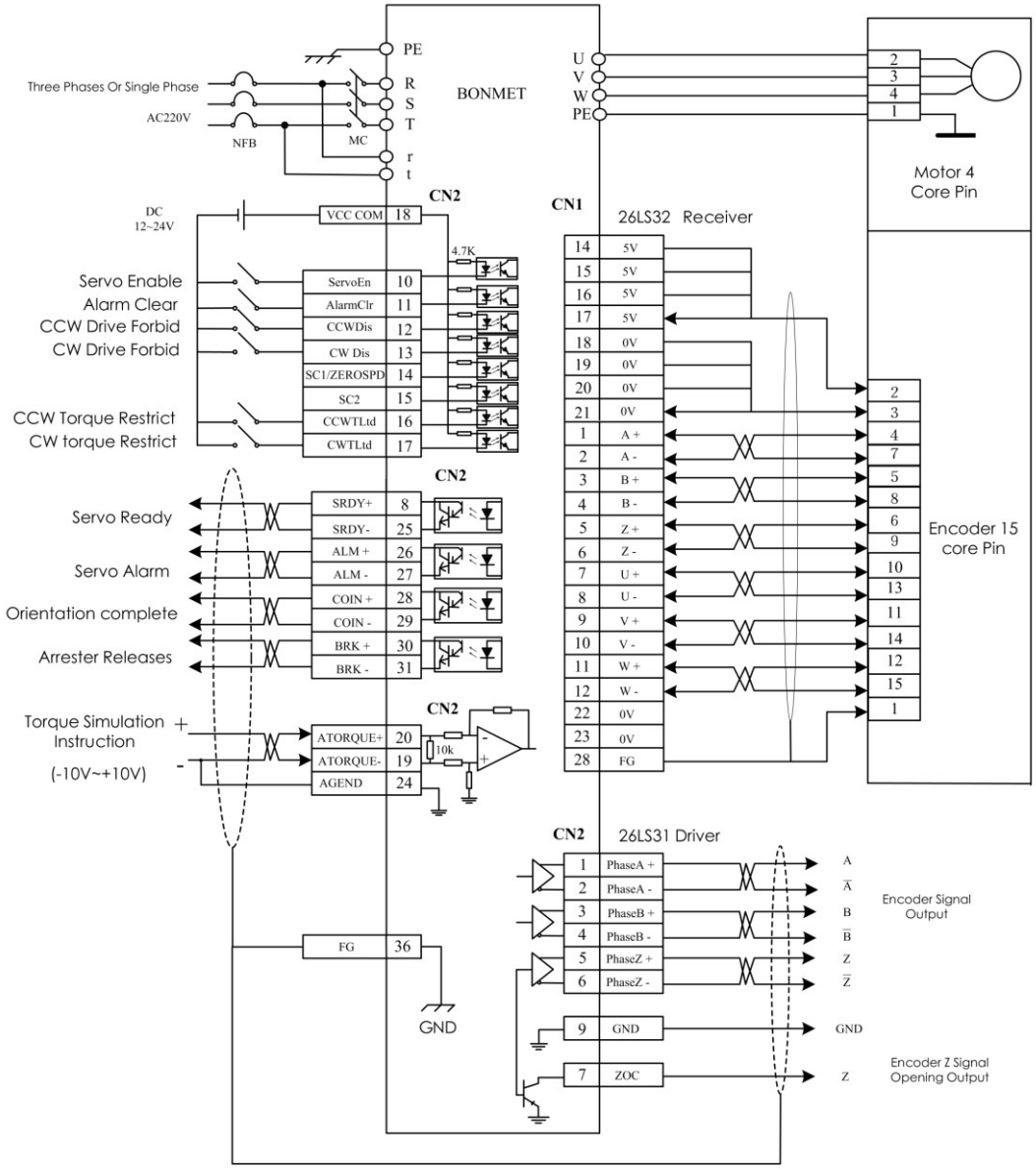


FIG 3.3

4) Wiring

(1)Power terminals TB

- Wire size: R,S,T,PE,U,V,W terminal wire size=>1.5mm^2 (AGW 14～16), r,t terminal wire size=>1.0mm^2(AGW 16～18)
- Grounding: the wire size for grounding is as bigger as possible. The PE terminals of the servo driver and servo motor are connected to the ground in one point. The grounding resistant should be less than 100NS.
- JUT-1.5-4 pre-insulated terminal is used for connecting wire terminals and make sure that the connections are fast.
- A phase isolated transformer for power supply is recommended to reducing

possibility of electric shock.

- A noise filter in series with power supply is recommended to enhance the ability of anti-interference. Please install a non-melt type breaker (NFB) to switch off power supply quickly in case of the servo driver failure.

(2) Control signals CN1, encoder signals CN2

- Wire size: use a screened cable (screened twisted pair type is best), wire size=>1.5mm^2 (AGW 24～26). The screening wire must be connected to PE(FG) terminal.
- Cable length: the length of cable is shorter as possible. The length of control cable CN2 is three meters or less. The length of encoder cable is 20 meters or less.
- Wire distribution: the cable wiring must be kept away from power wiring to prevent the influence of electromagnetic interference.
- Please provide a surge voltage smaller component to each inductance (coil) in related circuit. A direct current coil is connected with an anti-parallel flywheel diode and an AC coil is connected with a RC circuit.

(3)Communicate signals COM

- Wire size: use a screened cable, wire size=>1.5mm^2 (AGW 24～26). The screening wire must be connected to PE (FG) terminal.
- Cable length: the length of cable is shorter as possible. The length of communicate cable COM is less than 15 meters.
- Wire distribution: the cable wiring must be kept away from power wiring to prevent the influence of electromagnetic interference.

! NOTICE
✧ Connect the wires to the correct phase terminals (U, V, W) of the servo driver and servo motor. Otherwise the servo motor will not operate.
✧ The cables and wires must be fixed securely and are not closed to the heat sink of the servo driver and servomotor to prevent their insulation fracture getting worse from heat.
✧ Do not touch the servo driver and servomotor during operation or even though the power is switched because in the servo driver there is an electrolytic capacitor in which a high voltage will be kept for about five minutes after power off.

3.2 TERMINAL FUNCTIONS

1) Arrangement of connection terminals

CN1 is MDR26 connector. The socket is female and the plug is male.

CN2 is MDR36 connector. The socket is female and the plug is male.

COM is DB9 connector. The socket is male and the plug is female.

2) Power terminal block

Table 3.1 power terminal block

Terminal number	symbol	Name of signal	function
TB-1	PE	System ground	Grounding terminal Grounding resistance<100Ω Connect with input power ground form a common point
TB-2	R	Main power supply One phase of three phases	Main power input terminal,~220V, 50Hz Note: never connect R,S,T to U,V,W terminals of servo motor
TB-3	S		
TB-4	T		
TB-5	U	Servo driver outputs	Servo driver output terminals Connections must match with U,V,W terminals of the servo motor.
TB-6	V		
TB-7	W		
TB-8	PE	System ground	Grounding terminal Grounding resistance<100Ω Connect with input power ground form a common point
TB-9	r	Control power supply	Control circuit power supply terminals -220V, 50Hz
TB-10	t		

3) Control signal terminals CN2

Abbreviation of control mode: P stands for position control mode

S stands for speed control mode

T stands for torque control mode

Table 3.2 control signal input/output terminals CN2

Terminal number	Name of signal	Symbol	I/O	Mode	Function
18	The anode of input terminal	COM+	Type l		The anode of input terminal is used to driver the isolator of input terminal DC12-24V,current≥ 100mA
10	Servo enable	ServoEn	Type l		Input terminal of servo enable ServoEn ON: permit diver run ServoEn OFF: driver off ,motor is ij free mode Notel: make sure servo motor is quiescent before turn “ServoEn OFF” TO “ServoEn ON” Note2:input any command after 50 ms turning to ServoEn ON
11	Alarm	AlarmClr	Type l		Alarm clear terminal input AlarmClr ON: clear system’s alarm AlarmClr OFF: keep system’s alarm

12	CCW servo forbid	CCWDis	Type l		CCW servo forbid input terminal CCWDis ON: CCW driver permit CCWDis OFF:CCW driver forbid Notel: ① used in mechanical out of limit, CCW direction is zero torque when switch is off. ②also set "Pn8" to 001000 could achieve the same result.
13	CW servo forbid	CWDis	Type l		CW input terminal of dive forbid CWDis ON:CW drive permit CWDis OFF:CW drive forbid Notel: ① used in mechanical out of limit ,CW direction is zero torque when switch is off ②also set "Pn8" to 000100 could achieve the same result.
14	Deviation counter clear	CLE	Type l	P	Input terminal of deviation clear***(Pn4=2)*** CLE ON: clear deviation during position control
	Speed choose1	SC1	Type 1	S	During speed control***(Pn4=1)***choose inner speed***(Pn40=0)***,speed choose 1 Input terminal During speed control, the Combination of SC1 and SC2 choose different inner speed. SC1 OFF,SC2 OFF: inner speed choose1 SC1 ON,SC2 OFF: inner speed choose2 SC1 OFF,SC2 ON: inner speed choose3 SC1 ON,SC2 ON: inner speed choose4 Note: inner speed 1~4 can modify by Parameter
	Zero speed condition	ZEROSPD	Type 1	S	During speed control***(Pn4=1)***choose outer Simulative speed***(Pn9=01000)*** ZEROSPD ON: no matter what the simulative value, force speed to zero ZEROSPD OFF: speed Instruct simulative value
15	Command pulse forbid	INH	Type l	P	Input terminal of command pulse***(Pn4=2)*** INH ON: command pulse input forbid INH OFF: command pulse input efficient
	Speed choose 2	SC2	Type 1	S	During speed control***(Pn4=1)***choose inner speed***(Pn40=0)***,speed choose 2 Input terminal During speed control, the Combination of SC1 and SC2 choose different inner speed. SC1 OFF,SC2 OFF: inner speed choose1 SC1 ON,SC2 OFF: inner speed choose2 SC1 OFF,SC2 ON: inner speed choose3

					SC1 ON,SC2 ON: inner speed choose4
16	CCW torque Limit	CCWTLtd	Type 1		CCW torque limit input terminal CCWTLtd ON:CCW torque limit in Scope ***Pn26*** CCWTLtd OFF:CCW torque is not limited by ***Pn26*** Note1:wether CCWTLtd valid or not,CCW torque is limited by ***Pn42***, under common condition, ***Pn42***>***Pn26***
17	CW torque Limit	CWTLtd	Type 1		CW input terminal of torque limit CWTLtd ON:CW torque limit in Scope ***Pn25*** CWTLtd OFF:CW torque is not limited by ***Pn25*** Note1:wether CWTLtd valid or not,CW torque is limited by ***Pn42***, under common condition, |***Pn42***|>|***Pn25***|
8	Servo ready input	SRDY +	Type 2		Input terminal of servo ready SRDY ON: correct control power source and main power source; no alarm from servo driver, servo ready input is ON SRDY OFF: main power source is detached or exist alarm from driver, servo ready input is off.
27		SRDY -			
25	Servo alarm output	ALM+	Type 2		Output terminal of servo alarm ALM ON: no alarm from servo driver, servo alarm output is ON ALM OFF: exist alarm from servo driver ,servo alarm output is OFF
26		ALM-			
28	Positioning complete output	COIN+	Type 2	P	Output terminal of positioning complete COIN ON: positioning complete output is on when deviation clear in the range of positioning range preset, otherwise output OFF(output close) COIN ON: when speed is equal or over Hypothesis speed, speed come to output ON, otherwise output OFF(output close)
				S	
		COIN-		P	
				S	
30	Mechanical brake release	BRK+	Type 2		When motor have Mechanical brake, the port can control brake. BRK ON: linking electricity, brake is not valid, motor can operate BRK OFF: break close, break is valid ,motor can not operate
31		BRK-			
32	Command pulse PLUS input	PulseInv +	Type 3	P	Input terminal of outside command pulse Note 1:set parameter ***Pn52*** to achieve pulse input type
33		PulseInv -			

34	Plus command SIGN input	SignInv +	Type 3	P	1) ***Pn52***=0:command pulse+ signal type 2) ***Pn52***=1:CCW/CW command pulse type 3) ***Pn52***=2:2 phases command pulse type
35		SignInv -			
21	Simulative speed command input	ASPEED+	Type 4	S	Input terminal of outside simulative speed, input 10kΩ ,input scope is -10V~+10V
22		ASPEED-			
23	Simulative Grounding	AGND			The grounding line of simulative inputting
19	Simulative torque command input	ATORQUE+	Type 4	T	Input terminal of outside simulative torque, input 10kΩ ,input scope is -10V~+10V
20		ATORQUE-			
24	Simulative Grounding	AGND			The grounding line of simulative inputting
1	Encoder A signal	PhaseA+	Type5		1. Encoder ABZ signal servo output(26LS31 output, is equal in RS422) 2. Non-isolative output
2		PhaseA-			
3	Encoder B signal	PhaseB+	Type5		
4		PhaseB-			
5	Encoder Z signal	PhaseZ+	Type5		
6		PhaseZ-			
7	Encoder Z Electrode Opening output	ZOC	Type6		1. Encoder Z signal output from Electrode Opening, when Encoder Z signal Appearant,output ON, otherwise output OFF 2. Non-isolatively output
9	Encoder public grounding	GND			Encoder public grounding line
36	Shield grounding	FG			Shield grounding line

3.3 ENCODER SIGNAL TERMINALS CN1

Table 3.3 Encoder signal terminals CN1

Terminal number	Name of signal	Function		
		sign	T/O	description
14 15 16 17	Power 5V	+5V		+5V is used for the optical encoder of servo motor. If the encoder cable is longer ， it is necessary to use multiple wires in parallel..
18 19 20 21	Power to the public	OV		

22 23				
1	Encoder A+ input	A+	Type7	Connect to A+ of encoder
2	Encoder A- input	A-		Connect to A- of encoder
3	Encoder B+ input	B+	Type7	Connect to B+ of encoder
4	Encoder B- input	B-		Connect to B- of encoder
5	Encoder Z+ input	Z+	Type7	Connect to Z+ of encoder
6	Encoder Z- input	Z-		Connect to Z- of encoder
7	Encoder U+ input	U+	Type47	Connect to U+ of encoder
8	Encoder U- input	U-		Connect to U- of encoder
9	Encoder V+ input	V+	Type7	Connect to V+ of encoder
10	Encoder V- input	V-		Connect to V- of encoder
11	Encoder W+ input	W+	Type4	Connect to W+ of encoder
12	Encoder W- input	W-		Connect to W- of encoder
26	Shield grounding line	FG		Shield grounding line terminals

3.4 INTERFACE CIRCUIT TERMINAL DISPOSITION

Figure3.1 the dispositive figure of servo driver interface circuitCN2.CN2 is Core connector 36.

Figure3.2 the dispositive figure of servo driver interface circuit CN1. CN1 is Core connector 26.

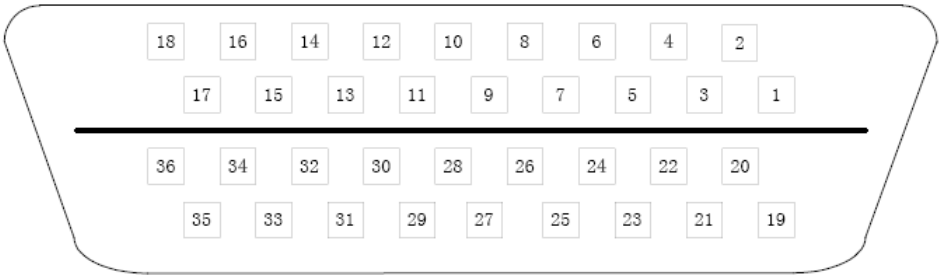


Figure3.1Plug-welding of drivers CN2 plugs (CONTROL)(looked face to Plug-welding)

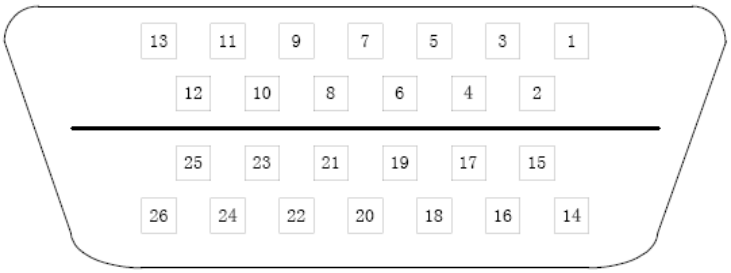


Figure3.2Plug-welding of drivers CN1 plugs (FEEDBACK)(looked face to Plug-welding)

3.5 INPUT/OUTPUT INTERFACE CIRCUIT

3.5.1 Switching signal input interface (type1)

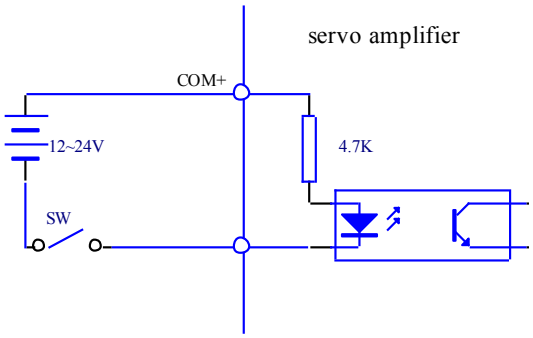
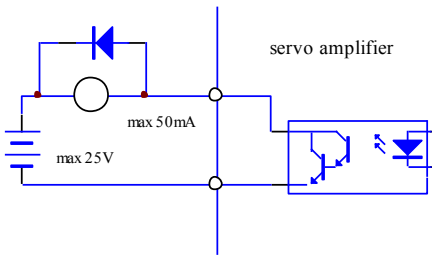


Figure 3.3 type1 of switching signal input interface

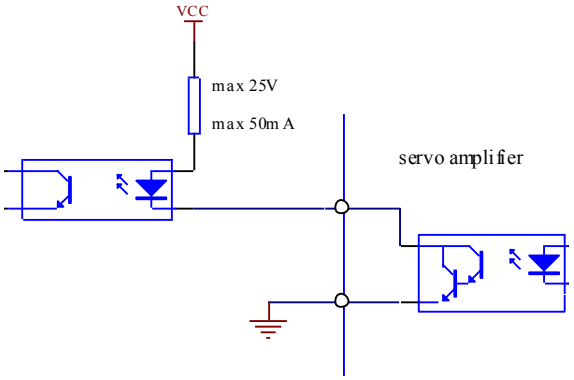
(1)The customer should provide an external power supply. DC 12—24V, current≧100mA

(2)It should be noted that if the polarity of the external power supply is reversal the servo drive is not to work.

3.5.2 Switching signal output interface (type2)



A: relay connect



B: optocoupler connection

Figure 3.4 type2 of switching signal output interface

(1) The customer provides the external power supply. Be careful, the polarity of power supply must be correct. Otherwise, the output circuit of the servo driver may damage.

(2) The output circuit is an open collector form. Its maximum sink current is limited to 50mA and the external maximum voltage is 25 volts. Therefore do not exceed the above limitations for all digital output terminals. Otherwise, overloaded of short-circuited will damage the servo driver.

(3) If the output load is an inductance load such as relay, it is necessary to connect a flying-wheel diode to the relay coil in opposite direction against DC positive pole. Be careful; if such a diode is in wrong direction the output circuit will blow down.

3.5.3 Pulse signal input interface(type3)

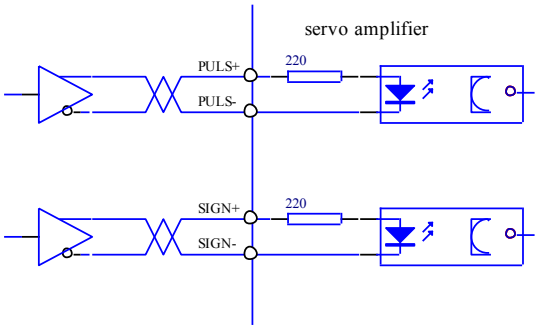


Figure3.5 type3 of the differential drive mode of pulse input interface

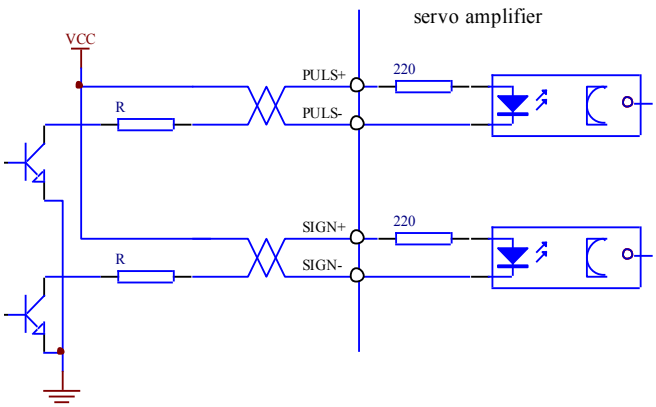


Figure3.6 type3 of the differential drive mode of pulse input interface

(1) To transmit the data pulse signal correctly it is recommended to use the differential line drive circuit as shown in Figure3.6.

(2) When used the differential driver circuit the IC AM26LS31,MC3487,the same kind of RS422 line drive will be adopted.

(3) When used the single-end drive circuit as shown in Figure 3.7, the transmission rate will slow down. The driving to current is 10-15mA and external maximum voltage is limited to 25 volts. According to the above condition the resistor can be determined. The experience data are following:

VCC=24V,R=1.3---2K;VCC=12V,R=510Ω---820Ω； VCC=5V，R=80Ω---120Ω。

(4)To drive the single-end circuit the customer will provide an external power supply. Please pay attention to the polarity of the power supply, or the servo driver may cause failure.

(5) The command pulse mode is shown in table 3.4, in which the arrow stands for pulse counting edge. The pulse timing and its parameter are shown in able 3.5.

When two-phase pulses is uses rate should be less than 500KHz

Table 3.4 pulse input mode

Command pulse mode	CCW	CW	Parameter valuc
Pulse train sign			0 pulse + signal
CCW pulse train CW pulse train			1 CCW pulse/CW pulse
A phase pulse B phase pulse			2 two phase command pulse

Table 3.5 Timing chart parameters of the input pulse

Parameters	Line drive	Driving from single end inputting
t_{ck}	>2μs	>5μs
t_h	>1μs	>2.5μs
t_l	>1μs	>2.5μs
t_{rh}	<0.2μs	<0.3μs
t_{rl}	<0.2μs	<0.3μs
t_s	>1μs	>2.5μs
t_{qck}	>8μs	>10μs
t_{qh}	>4μs	>5μs
t_{ql}	>4μs	>5μs
t_{qrh}	<0.2μs	<0.3μs
t_{qrl}	<0.2μs	<0.3μs
t_{qs}	>1μs	>2.5μs

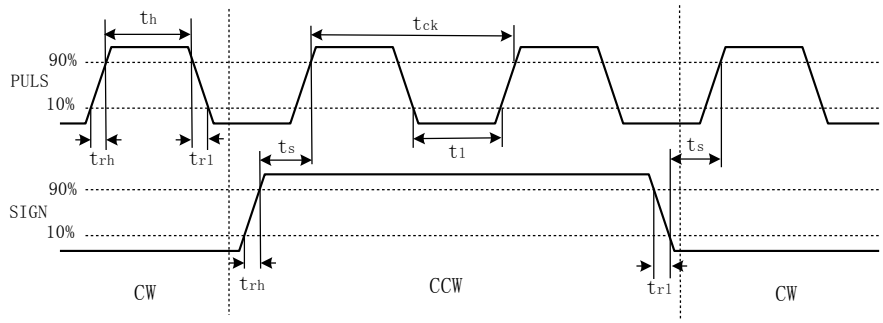


Figure 3.8 timing chart of Pulse+ sign input interface(maximum pulse ≧500KHz)

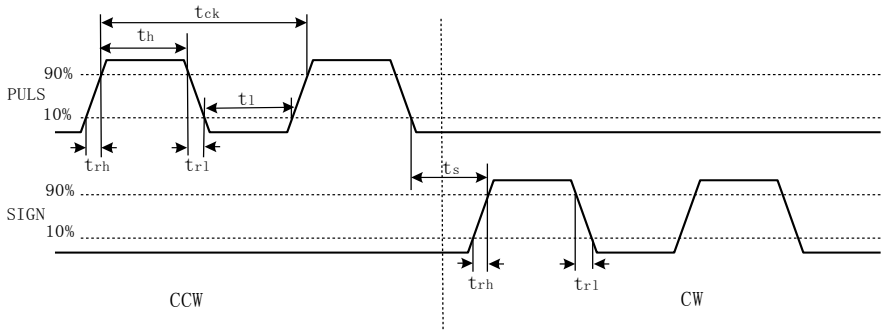


Figure 3.9 timing chart of CCW/CW pulse input interface(maxinun pulse rate≦500KHz)

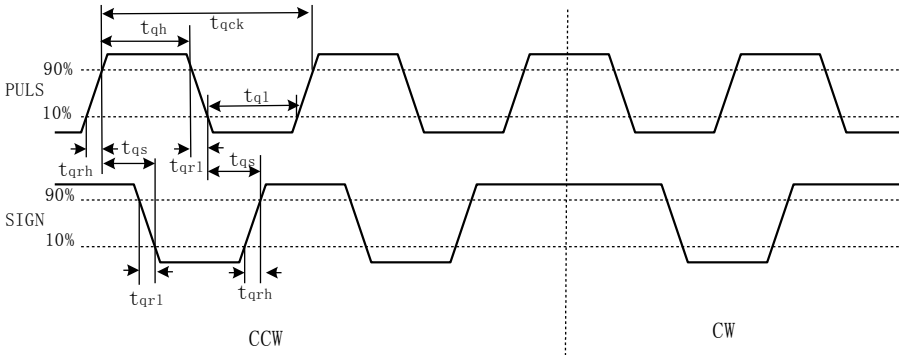


Figure 3.10 Timing chart of two phase pulse input interface(maxinun pulse rate≦125KHz)

3.5.4 Analog input interface

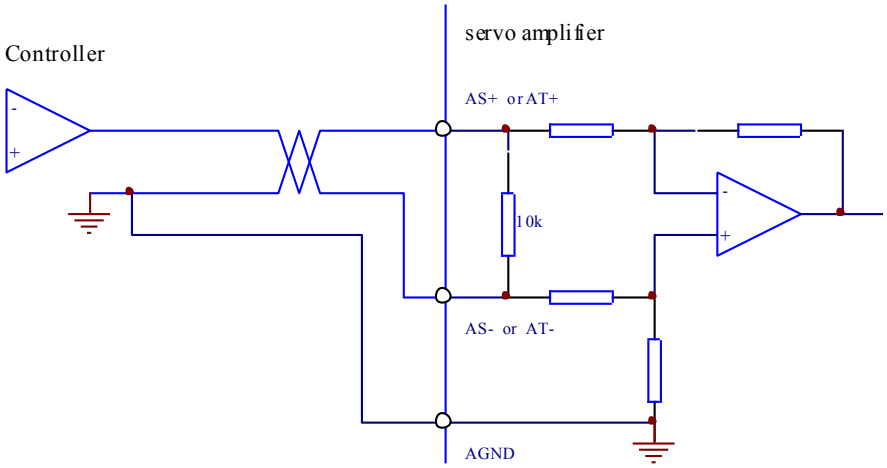


Figure 3.10a Simulation differential input interface (type4)

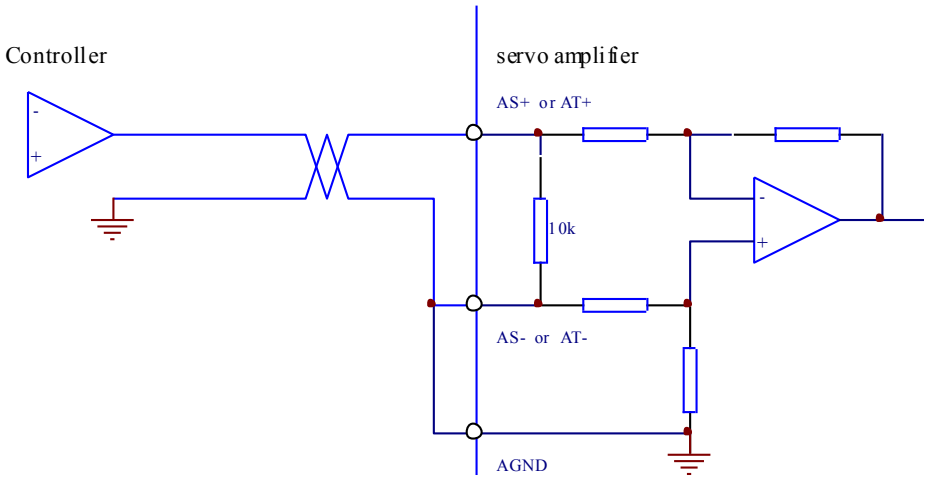


Figure 3.10b Single-ended analog input interface (type4)

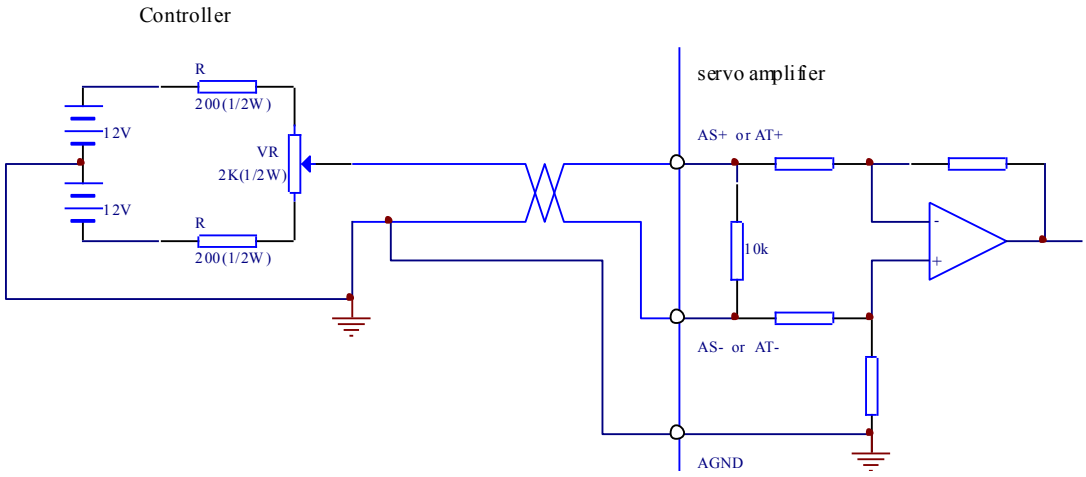


Figure 3.10c input interface of Analog difference Potentiometers (type4)

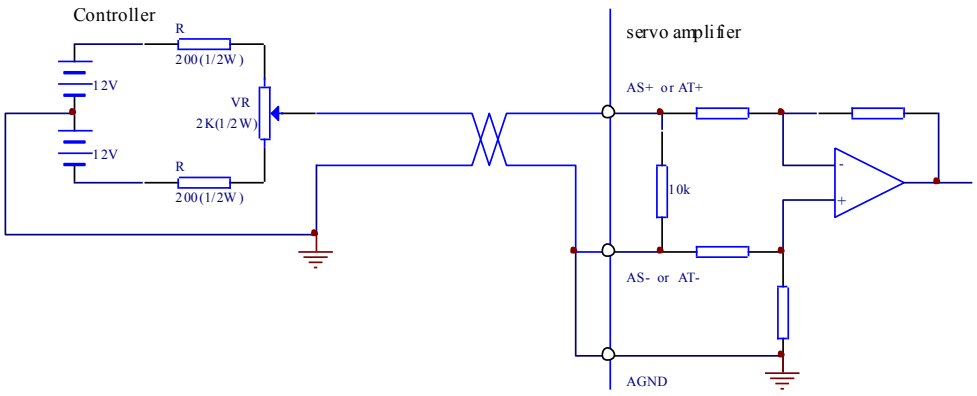


Figure 3.10d input interface of single-ended analog potentiometer (type4)

(1) Analog input interface is differential manner, according to different laws, which can be accessed as two forms: differential and single-ended, the input impedance is 10kΩ, the input voltage range is -10V~+10V.

(2) In the differential form, Simulation Ground connect with Negative input terminal in Drivers Side, it need three lines connecting from Controllers to drive.

(3) In the single-ended form, Simulation Ground connect with Negative input terminal in Drivers Side, it need two lines connecting from Controllers to drive

(4) The Performance of differential form is Superior than single-ended, it can Inhibit Common-mode interference.

(5) Input voltage range can not exceed -10V~+10V, or else drive may damage; It suggest that connect by shielded cable to reduce noise interference;

(6) It is normal thing that Analog input interface exists bias , and can adjust parameters ***Pn16*** of zero deviation compensation Simulation

(7) Interface is non-confined(Non-insulated)

CHAPTER 4 PARAMETERS

NOTICE
● Any person who involved in parameter adjustment should be fully familiar with the meaning of parameters. Any error of the parameter setting may cause equipment damaged and/or person injured. ● It is recommended than the parameter adjustment is firstly made under no-load operation condition.

4.1 PARAMETER LIST

Parameters presetting in the following table is matching BONMET serials servo motor.

Different motor with different parameters.

Short form of control type: P is position control type.

S is speed control type.

T is torque control type.

Table 4.1 Parameter list

No	Name	Suitable type	Parameter range	Presetting	Unit
0	Software edition		—	—	
1	Driver Mode		—	—	
2	User parameter protection code		0～32766	0	
3	Display state		0～18	1	
4	Motor Control Mode		0～6	1	
5	Arrester Set when motor stop		1～1000	10	ms
6	Arrester Set When Motor operate		1～1000	10	ms
7	Speed of Arrester when Motor is running		0～3000	30	rpm
8	Contrary sign control on the low 6 bit of the Upper controller input ports		0～63	0	
9	Contrary sign control on the high 4 bit of the Upper controller input ports		0～15	0	
10	Contrary sign control on the encoder input ports		0～63	0	

11	The low 6 bit of the upper controller input ports force ON		0～63	0	
12	The high 4 bit of the Upper controller input ports force ON		0～3	0	
13	Contrary sign control on the high 4 bit of Upper controller output ports		0～15	0	
14	Contrary sign control on the low 3 bit of Upper controller output ports		0～7	0	
15	The instructed input gaining of Simulation torque		10～300	100	
16	the Bias compensation of Simulation torque		-30000～30000	0	mv
17	Reverse enable of Simulation torque inputting		0~1	0	
18	The instructed input gaining of Simulation speed		10～300	100	
19	the Bias compensation of Simulation speed		-30000～30000	0	mv
20	Reverse enable of Simulation speed inputting		0~1	0	
21	Low-pass bandwidth of Simulation speed inputting		0~1000	300	Hz
22	Overload alarm of user's torque		1~400	100	
23	Users' detection time of torque overload		1~32766	100	ms
24	The biggest limit of torque		1 ~ 400	120	
25	CW internal torque limit		1 ~ 400	150	
26	CCW internal torque limit		1 ~ 400	150	
27	CW external torque limit		1 ~ 400	150	
28	CCW external torque limit		1 ~ 400	150	
29	Maximum speed limit dealing in torque mode		0~3000	3000	rpm
30	Speed proportional gaining		1~1000	100	
31	Speed integral gaining		1~1000	50	
32	Low-pass bandwidth of Speed		1~1000	500	Hz
33	Low-pass filter bandwidth of torque instructor		1~1000	800	Hz
34	Time constant of velocity		1~10000	10	s

	linear acceleration				
35	Time constant of velocity linear deceleration		1~10000	10	s
36	Internal speed 1		-3000~3000	1500	rpm
37	Internal speed 2		-3000~3000	1500	rpm
38	Internal speed 3		-3000~3000	1500	rpm
39	Internal speed 4		-3000~3000	1500	
40	Internal or external speed command selection		0～1	0	
41	Set JOG mode speed		0～3000	1500	rpm
42	Set the biggest speed limit		0～3000	3000	rpm
43	Reached speed		0～3000	1500	rpm
44	Position loop proportional gaining		1～30000	5000	
45	Differential coefficient ratio of position loop		0～10000	0	
46	The cut-off frequency of position feed forward		1～300	100	Hz
47	Position instructor smooth filter constant		0~1000	0	
48	Denominator of position gear case		1~30000	20	
49	First position instructor pulse numerator		1~30000	20	
50	Second position instructor pulse numerator		1~30000	20	
51	Dynamic electronic gear is effective		0~1	0	
52	Position instructor pulse input mode		0~2	0	
53	Contrary sign control on the direction of position instructor pulse		0~1	0	
54	In-position range		1~30000	1	
55	Range of position exceeded detection		0~30000	30000	
56	Invalid of position exceeded detection error		0~1	1	
57	Demonstrating mode setting		0~2	2	
58	Torque mode torque value 1		-200~200	10	
59	Torque mode time 1		1~30000	60	s
60	Torque mode torque value 2		-200~200	-10	
61	Torque mode time 2		1~30000	60	s

62	Torque mode torque value3		-200~200	20	
63	Torque mode time 3		1~30000	60	s
64	Torque mode torque value 4		-200~200	-20	
65	Torque mode time 4		1~30000	60	s
66	Torque mode torque value 5		-200~200	30	
67	Torque mode time 5		1~30000	60	s
68	Torque mode torque value 6		-200~200	-30	
69	Torque mode time 6		1~30000	60	s
70	Torque mode torque value 7		-200~200	80	
71	Torque mode time 7		1~30000	60	s
72	Torque mode torque value 8		-200~200	-80	
73	Torque mode time 8		1~30000	60	s
74	Torque mode torque value 9		-200~200	100	
75	Torque mode time 9		1~30000	60	s
76	Torque mode torque value 10		-200~200	-100	
77	Torque mode time 10		1~30000	60	s
78	Speed mode torque value 1		-3000~3000	10	rpm
79	Speed mode time 1		1~30000	60	s
80	Speed mode torque value 2		-3000~3000	50	rpm
81	Speed mode time 2		1~30000	60	s
82	Speed mode torque value 3		-3000~3000	250	rpm
83	Speed mode time 3		1~30000	60	s
84	Speed mode torque value 4		-3000~3000	1250	rpm
85	Speed mode time 4		1~30000	60	s
86	Speed mode torque value 5		-3000~3000	2500	rpm
87	Speed mode time 5		1~30000	60	s
88	Speed mode torque value 6		-3000~3000	-10	rpm
89	Speed mode time 6		1~30000	60	s
90	Speed mode torque value 7		-3000~3000	-50	rpm
91	Speed mode time 7		1~30000	60	s
92	Speed mode torque value 8		-3000~3000	-250	rpm
93	Speed mode time 8		1~30000	60	s
94	Speed mode torque value 9		-3000~3000	-1250	rpm
95	Speed mode time 9		1~30000	60	s
96	Speed mode torque value 10		-3000~3000	-2500	rpm
97	Speed mode time 10		1~30000	60	s
98	1st high bit of Position mode position instructor		-9999~9999	0	
99	1st low bit of Position mode position instructor		-9999~9999	2500	
100	2nd high bit of Position mode position instructor		-9999~9999	0	
101	2nd low bit of Position mode		-9999~9999	2500	

	position instructor				
102	3rd high bit of Position mode position instructor		-9999~9999	0	
103	3rd low bit of Position mode position instructor		-9999~9999	2500	
104	4th high bit of Position mode position instructor		-9999~9999	0	
105	4th low bit of Position mode position instructor		-9999~9999	2500	
106	5th high bit of Position mode position instructor		-9999~9999	-1	
107	5th low bit of Position mode position instructor		-9999~9999	0	
108	6th high bit of Position mode position instructor		-9999~9999	10	
109	6th low bit of Position mode position instructor		-9999~9999	0	
110	7th high bit of Position mode position instructor		-9999~9999	-10	
111	7th low bit of Position mode position instructor		-9999~9999	0	
112	8th high bit of Position mode position instructor		-9999~9999	20	
113	8th low bit of Position mode position instructor		-9999~9999	0	
114	9th high bit of Position mode position instructor		-9999~9999	10	
115	9th low bit of Position mode position instructor		-9999~9999	0	
116	10th high bit of Position mode position instructor		-9999~9999	-30	
117	10th low bit of Position mode position instructor		-9999~9999	0	

4.2 THE FUNCTION OF RARAMETERS

No	Name	Function	Parameter range	Presetting
0	Software edition	Could examine software edition, but can't modify.	—	—
1	Driver Mode	Could examine Driver type, but can't modify.	—	—
2	User parameter protection	In order to modify correct, under common condition， if parameter need to establish， first,establish the parameter to 28977,then establish	0～32766	0

	code	parameter.At last, establish the parameter to non 28977 to be sure the parameter will not be modified incorrect.		
3	Display state	Select display condition on servo driver after inputting current. 0: Display motor's torque 1: Display motor's speed 2: Display current position low for 5 bit 3: Display current position high for 5 bit 4: Display torque command value 5: Display speed command value 6: Display position command (command pulse accumulate value) low for 5 bit 7: Display position command (command pulse accumulate) high 5 bit 8: Display motor's current 9: Display motor's absoluteness position 10: Display line speed 11: Display position deviation for low 5 bit 12: Display position deviation for high 5 bit 13: Display control mode 14: Display alarm code 15: Display inputting terminals' condition for low 4 bit 16: Display inputting terminals' condition for high 6 bit 17: Display outputting terminals' condition 18: Display encoder's inputting signals	0～18	1
4	Motor Control Mode	(1) Modify this parameter to select control mode of Servo driver. 0: Torque control mode 1: Speed control mode 2: Position control mode 3: JOG control mode 4: Speed test mode 5: Adjust parameters mode 6: Torque/Speed/Position demo mode (2) Speed control mode, speed command inputting from input terminals(***Pn40***)。When use internal speed mode，set SC1and SC2 can choose the internal speed, SC1 OFF， SC2 OFF： Internal speed 1； SC1 ON， SC2 OFF： Internal speed 2； SC1 OFF， SC2 ON ： Internal speed 3；	0～6	1

		SC1 ON， SC2 ON ： Internal speed 4； (3) Position control mode, position command inputting from pulse input interface (4) JOG mode, press Up and hold ,the motor run as JOG speed, release the key motor stop; press Down and hold the motor run towards the contrary direction, release the key the motor stop. (5) Speed test control mode, the speed instructors input by keyboard to test the servo driver and motor (6) Autoset mode, adjust position ,torque, speed input port zero point compensation and internal circuit parameters		
5	Arrester Set when motor stop	(1) The delay time of Definition electrical machinery duration of runs shuts off from the electrical machinery electric current to the mechanical brake movement (output terminal BRK turns OFF by ON) (2) This parameter is in order to make mechanical brake movement, avoids damaging the brake after the electrical machinery to decelerate from the high speed revolving to low speed..	1～1000 ms	10
6	Arrester Set When Motor operate	(1) the speed value of Definition electrical machinery duration of runs shuts off from the electrical machinery electric current to the mechanical brake movement (output terminal BRK turns OFF by ON) (2) The actual operating time is ***Pn5*** or the time which the electrical machinery decelerates to the ***Pn6*** value needs,. takes the minimum value in the both	1～1000 ms	10
7	Speed of Arrester when Motor is running	The speed value of Definition electrical machinery duration of runs shuts off from the electrical machinery electric current to the mechanical brake movement (output terminal BRK turns OFF by ON)	0～3000	30
8	Contrary sign control on the low 6 bit of the Upper controller input ports	(1) Take anti-import terminals installed. Do not take the anti-terminal, in a timely and effective closure, disconnect switch when void; from the anti-terminal, in a timely closure invalid, when effectively disconnect switch. (2) With six binary said that the bit is 0 that representatives from the importation of non-terminal, one that representatives from the	0～63	0

<table>
<tr><td></td><td></td><td>anti-import terminals. Several representatives of the binary input terminals are as follows:
<table><tr><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>Servo En</td><td>AlarmClr</td><td>CCWDis</td><td>CWDis</td><td>CCW TLtd</td><td>CW TLtd</td></tr></table>ServoEn ： Servo enable;
AlarmClr： Alarm removed;
CCWDis ： CCW direction driving is prohibited
CWDis ： CW direction driving is prohibited
CCWTLtd： CCW torque limit；
CWTLtd ： CW torque limit；</td><td></td><td></td></tr>
<tr><td>9</td><td>Contrary sign control on the high 4 bit of the Upper controller input ports</td><td>(1) Take anti-import terminals installed. Do not take the anti-terminal, in a timely and effective closure, disconnect switch when void; from the anti-terminal, in a timely closure invalid, when disconnect switches effective.
(2) With four binary said that the bit is 0 that representatives from the importation of non-terminal, one that representatives from the anti-import terminals. Several representatives of the binary input terminals are as follows:
<table><tr><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>CLE/SC1/ZEROSPD</td><td>INH/SC2</td><td>SIGN</td><td>PULS</td></tr></table>CLE/SC1/ZEROSPD：Deviation reset the counter / speed choose 1 / zero speed clamp;
INH/SC2：Pulse directive is prohibited/speed choose 2;
SIGN：Pulse pulse-position instruction
PULS：Bullet-position order pulse;</td><td>0～15</td><td>0</td></tr>
<tr><td>10</td><td>Contrary sign control on the encoder input ports</td><td>(1) Take anti-import terminals installed。The terminals do not take anti - import，Effective in a timely closing, disconnect switch when void; from the anti-terminal, in a timely closure invalid, when effectively disconnect switch
(2) With six binary said，The bit is 0 that representatives from the input terminal is not anti - Control，For 1 representatives from the anti-importation terminal. Binary representatives of the binary input terminals are as follows：
<table><tr><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table></td><td>0～63</td><td>0</td></tr>
</table>

<table>
<tr><td></td><td></td><td>
<table>
<tr><td>Phase U</td><td>Phase V</td><td>Phase W</td><td>Phase A</td><td>Phase B</td><td>Phase Z</td></tr>
</table>
PhaseU： Photoelectric Incremental EncoderU；
PhaseV： Photoelectric Incremental Encoder V；
PhaseW： Photoelectric Incremental Encoder W；
PhaseA： Photoelectric Incremental Encoder A；
PhaseB： Photoelectric Incremental Encoder B；
PhaseZ： Photoelectric Incremental Encoder Z；
</td><td></td><td></td></tr>
<tr><td>11</td><td>The low 6 bit of the Upper controller input ports force ON</td><td>
(1) connectivity to external control ON / OFF, if the terminal has been made mandatory ON,it need not require external connections. the internal of driver will set ON automatically.
(2) With six binary said that the bit is 0 that is not representative of the input terminals mandatory ON, representatives for the 1 that the input terminal compellable to ON. Several representatives of the binary input terminals are as follows:
<table>
<tr><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>ServoEn</td><td>Alarm Clr</td><td>CCW Dis</td><td>CWDis</td><td>CCW TLtd</td><td>CW TLtd</td></tr>
</table>
ServoEn ： Servo enable;
AlarmClr： Alarm removed;
CCWDis ： CCW direction driving is prohibited
CWDis ： CW direction driving is prohibited
CCWTLtd： CCW torque limit；
CWTLtd ： CW torque limit；
</td><td>0～63</td><td>0</td></tr>
<tr><td>12</td><td>The high 4 bit of the Upper controller input ports force ON</td><td>
(1) connectivity to external control ON / OFF, if the terminal has been made mandatory ON,it need not require external connections.the internal of driver will set ON automatically.
(2) With four binary said that the bit is 0 that is not representative of the input terminals mandatory ON, representatives for the 1 that the input terminal compellable to ON. Several representatives of the binary input terminals are as follows:
<table>
<tr><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>CLE/SC1/ZEROSPD</td><td>INH/SC2</td><td>SIGN</td><td>PULS</td></tr>
</table>
</td><td>0～3</td><td>0</td></tr>
</table>

<table>
<tr><td></td><td></td><td>CLE/SC1/ZEROSPD：Deviation reset the counter / speed option 1 / zero speed clamp;
INH/SC2：Pulse directive prohibiting / speed option 2;
SIGN：Bullet-position order pulse;
PULS：position instructing Pulse pulse-position</td><td></td><td></td></tr>
<tr><td>13</td><td>Contrary sign control on the high 4 bit of Upper controller output ports</td><td>(1) anti-establish output terminal .To the anti-established terminal, the definition of dead lining and on and standard definition is exactly opposite.
(2) With four binary said that the bit is 0 that the representatives do not take anti-output terminals, one that representatives from the anti-output terminal. Several representatives of the binary input terminals are as follow:
<table><tr><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>SRDY</td><td>ALM</td><td>COIN</td><td>BRK</td></tr></table>SRDY：Servo ready;
ALM：Servo alarm;
COIN：Positioning completed / speed and accessibility;
BRK：Mechanical brake release.</td><td>0～15</td><td>0</td></tr>
<tr><td>14</td><td>Contrary sign control on the low 3 bit of Upper controller output ports</td><td>(1) anti-establish output terminal .To the anti-established terminal, the definition of dead lining and on and standard definition is exactly opposite.
(2) With three binary said that the bit is 0 that the representatives do not take anti-output terminals, one that representatives from the anti-output terminal. Several representatives of the binary input terminals are as follow:
<table><tr><td>2</td><td>1</td><td>0</td></tr><tr><td>PhaseA_O</td><td>PhaseB_O</td><td>PhaseZ_O</td></tr></table>PhaseA_O：output A of motor rotor position ;
PhaseB_O：output B of motor rotor position ;
PhaseZ_O：output Z of motor rotor position ;</td><td>0～7</td><td>0</td></tr>
<tr><td>15</td><td>The instructed input gaining of Simulation torque</td><td>(1) set Proportion relations between simulation torque input voltage and actual operating of motor torque the unit of stetted value is 100% / 0.1 V;
(2) The default value is 100, corresponding 100% / 10 V, that means generating 100% of rated</td><td>10～300</td><td>100</td></tr>
</table>

		torque when input 10 V voltage.		
16	the Bias compensation of Simulation torque	(1) the zero bias compensation of the simulation of torque input (2) set value's units for **mv**;	-30000～30000 mV	0
17	Reverse enable of Simulation torque inputting	(1) Polar repercussions of Simulation torque inputting (2) Setting to 0, for the command of simulation of torque is Pros, torque direction is CW; (3) Setting to 1, analog speed directive is pros, torque direction is the CCW	0~1	0
18	The instructed input gaini of Simulation speed	(1) set Proportion relations between simulation speed input voltage and actual operating of motor torque (2) the unit of set value is 3000rpm/ 0.1 V; (3) The default value is 100, corresponding 3000rpm / 10 V, that means generating 3000rpm of rated torque when input 10 V voltage.	10～300	100
19	the Bias compensation of Simulation speed	(1) the zero bias compensation of the simulation of speed input (2) set value's units for **mv**;	-30000～30000 mV	0
20	Reverse enable of Simulation speed inputting	(1) Polar repercussions of Simulation speed inputting (2) setting to 0, for the instructor of simulation of speed is Pros, torque direction is CW; (3) setting to 1, analog speed directive is pros, speed direction is the CCW	0~1	0
21	Low-pass bandwidth of Simulation speed inputting	(1) low-pass filter of Simulation speed inputting (2) the larger the setting, the faster the impact of speed which response by speed inputting Simulation ,the bigger the impact of noise of signal ; the smaller the setting, the slower the impact of speed which response by speed inputting Simulation ,the smaller the impact of noise of signal	1~1000 Hz	300
22	Overload alarm of user's torque	(1) Users set torque overload value. the value is the percentage of rated torque, torque limit values regardless of the direction of positive reverse all protection; (2) Under the motor torque> ***Pn22***, duration> ***Pn23***	1~400	100

		circumstances, the driver alarm, warning of the ***Err-18***, motor to stop		
23	Users' detection time of torque overload	(1) Users' detection time of torque overload, unit is milliseconds; (2) under the motor torque> ***Pn22***, duration> ***Pn23*** circumstances, the driver alarm, warning of the ***Err-18***, motor to stop	1~32766 ms	100
24	The biggest limit of torque	(1) installed torque limit values in all modes of operation (2) Nothing to do with the direction of rotation, two-way effective. (3) Set value is the percentage of the rated torque, for example, set to the 1 times the rated torque, the value set for the 100. (4) Internal and external torque limit are still valid.	1 ~ 400	120
25	CW internal torque limit	(1) Used to set the CW internal torque limit. (2) This value is a percentage of rated torque. For example, if the torque limit is double rated torque then the parameter is set by 200. (3) The toque limit is always valid at any time. (4) If the value is higher than the allowed maximum torque the actual maximum toque limit is equal to the allowed maximum torque.	1 ~ 400	150
26	CCW internal torque limit	(1) Used to set the CCW internal torque limit. (2) This value is a percentage of rated torque. For example, if the torque limit is double rated torque then the parameter is set by 200. (3) The toque limit is always valid at any time. (4) If the value is higher than the allowed maximum torque the actual maximum toque limit is equal to the allowed maximum torque.	1 ~ 400	150
27	CW external torque limit	(1) Used to set the CW external torque limit.。 (2) This value is a percentage of rated torque，For example, if the torque limit is equal to rated torque then the parameter is set by 100 (3) Only the CW external torque limit is valid when t CW torque limit input terminal is on.。 (4) When the CW external torque limit is valid the actual torque limit is the minimum value among the allowed maximum torque, the CW internal torque limit and the CW external torque limit.	1 ~ 400	150
28	CCW external torque	(1) Used to set the CCW external torque limit.。 (2) This value is a percentage of rated torque，For example, if the torque limit is equal to rated toque	1 ~ 400	150

	limit	then the parameter is set by 100 (3) Only the CCW external torque limit is valid wher the CCW torque limit input terminal is on.。 (4) When the CCW external torque limit is valid the actual torque limit is the minimum value among the allowed maximum torque, the CCW internal torque limit and the CCW external torque limit.		
29	Maximum speed limit dealing in torque mode	(1) the motor running speed limit within the parameters in The torque control，parameter units is rpm； (2) To prevent speeding phenomenon caused by light load.	0~3000	3000
30	Speed proportional gaining	(1) Used for setting the speed loop proportio gaining, the unit is ×0.1. (2) The higher the plus setting, the greater the stiffne will be. The value is determined according to the type of servo driver and the load. (3) In general, the larger load in under no oscillation condition the higher gaining the better	1~1000	100
31	Speed integral gaining	(1) setting the seed loop integration time constant, the unit is ×0.01ms。 (2) The smaller the time constant, the greater the stiffness and the faster the integration. (3) The value is determined according to the type of servo driver and the load. In general, the larger load inertia the higher the setting value will be	1~1000	50
32	Low-pass bandwidth of Speed	(1) Setting characteristics of speed detection filter. (2) The smaller the value, the lower the cut off frequency, the smaller the noise from motors. If large load inertia may be appropriately reduced settings. If number is too small, resulting in slow response, might give rise to oscillations. (3) The greater the value, the higher the cutoff frequency, the faster the speed of response to feedback. If you need a higher response rate you can increase settings appropriately.	1~1000 Hz	500
33	Low-pass filter bandwidth of torque	(1) Set instructions bandwidth which outputting to torque loop. (2) The smaller the value, the lower the cutoff frequency, the smaller the noise from motors. If	1~1000 Hz	800

	instructor	large load inertia may be appropriately reduced settings. If numerical is too small, resulting in slow response, might give rise to oscillations. (3) The greater the value, the higher the cutoff frequency, the faster the speed of response to feedback. If you need a higher response rate you can increase settings appropriately.		
34	Time constant of velocity linear acceleration	(1) Set value is the time that motor accelerating from 0 to 1000 r / min, set up units × 0.1s; (2) Characteristics Of acceleration and deceleration is linear; (3) Only for speed control mode, position control mode void; (4) If the drive combined with the outside position loop to use, this parameter should be set to 0.	1~10000	10
35	Time constant of velocity linear deceleration	(1) Set value is the time that motor decelerating from 1000 r / min to 0, set up units × 0.1s; (2) Characteristics Of acceleration and deceleration is linear; (3) Only for speed control mode, position control mode void; (4) If the drive combined with the outside position loop to use, this parameter should be set to 0.	1~10000	10
36	Internal speed 1	(1) Set up internal rate of 1 (2) In Speed control mode, when SC1 OFF, SC2 OFF, the internal rate of 1 as a choice speed instructions.	-3000~3000	1500
37	Internal speed 2	(1) Set up internal rate of 2 (2) In speed control mode, when SC1 ON, SC2 OFF, the internal rate of 2 as a choice of speed instructions.	-3000~3000	1500
38	Internal speed 3	(1) Set up internal rate of 3 (2) In speed control mode, when SC1 OFF, SC2 ON, internal rate of 3 as a choice speed instructions.	-3000~3000	1500
39	Internal speed 4	(1) Set up internal rate of 4 (2) In speed control mode, when SC1 ON, SC2 ON, internal rate of 4 as a choice speed instructions.	-3000~3000	1500
40	Internal or external speed command selection	(1) Set to 0, speed instructions from internal velocity; (2) Set to 1, speed instructions from external analog input	0～1	0

41	Set JOG mode speed	Set JOG operating speed.	0～3000	1500
42	Set the biggest speed limit	(1) Set the maximum speed of the servo motor. (2) Nothing to do with the direction of rotation. (3) If the installation of more than rated speed, the actual speed limit for the maximum rated speed.	0～3000	2500
43	Reached speed	(1) Set arrival rate, units are rpm. (2) In non-position control mode, if the motor faster than the set value, SCMP ON, otherwise SCMP OFF. (3) In the position control mode, not using this parameter. (4) Nothing to do with the direction of rotation。 (5) Comparators with hysteretic characteristics。	0～3000	1500
44	Position loop proportional gaining	(1) Set the position loop proportional plus. (2) The higher the plus setting, the greater the stiffne and the smaller droop pulse will be. If the value is too large it may cause overshoot or oscillation. (3) The value is determined according to the type of servo driver and the load.	1～1000	100
45	Differenti al coefficient ratio of position loop	(1) Set the feed forward plus for position loop. (2) The greater the feed forward plus, the higher the speed response of the control system and the worse the stable of position loop resulting in an oscillation may occurs (3) This parameter is usually set zero if very fast response is not required.	0～1000	0
46	The cut-off frequency of position feed forward (LPF)	(1) Used to set the cut-off frequency of LPF of position feed forward loop. the unit is Hz (2) This LPF will play the role of increasing stability for compound position control.	1～300	100
47	Position instructor smooth filter constant	(1) Smoothen instructor pulse from filter. exponential accelerate and decelerate, the value shows time constant. the unit is ms. (2) Filter cannot loose input pulse, but it may lead to command delay. (3) This filter is used for 1. Upper controller doesn't have accelerate and decelerate function	0~1000	0

		2. Electron gear ratio is too big. (＞10) 3. Lower command frequency 4. Exist step jump, imbalance when running the motor. (4) Filter is ineffective if setting parameter as 0		
48	Denominator of position gear case	(1) Used to set the multiplier for pre-scale (electric gear) (2) Under the position control mode it is convenient to match every pulse source by setting ***Pn48*** and ***Pn49*** parameters to meet the required resolution (angle/pulse) (3) P×G=N×C×4 P: Input command pulse value G: Electron gear ratio = (sub-frequency molecule)/ (electric gear denominator) N：Motor's circumrotate C: Encoder's resolving ability. This system is C=2500 (4) (For example) when input command pulse is 6000, one motor circle. $G=\frac{N\times C\times 4}{P}=\frac{1\times 2500\times 4}{6000}=\frac{5}{3}$ So set ***Pn49***=5, ***Pn48***=3 Recommending electron gear ratio range: 1/50≤G≤50	1~30000	20
49	First position instructor pulse numerator	(1) Set up the first location-frequency pulse Directive (electronic gear). (2) The use of dynamic electronic gear must be set parameters ***Pn50*** = 3, then input terminal INH (Directive pulse Prohibition) functions into electronic control gear switching input terminal; (3) When INH terminal OFF, the importation of electronic gear for ***Pn49***/***Pn48*** When INH terminal ON, the importation of electronic gear for ***Pn50***/***Pn48***; by controlling INH terminal, the electronic gear ratio change Numerical. (4) Attention to the first and second sub-frequency electronic gear denominator is the same parameter.	1~30000	20
50	Second position instructor	(1) Set up the first location-frequency pulse Directive (electronic gear). (2) The use of dynamic electronic gear must be set	1~30000	20

	pulse numerator	parameters ***Pn50*** = 3, then input terminal INH (Directive pulse Prohibition) functions into electronic control gear switching input terminal; (3) When INH terminal OFF, the importation of electronic gear for ***Pn49***/***Pn48*** When INH terminal ON, the importation of electronic gear for ***Pn50***/***Pn48***; by controlling INH terminal, the electronic gear ratio change Numerical. (4) Attention to the first and second sub-frequency electronic gear denominator is the same parameter.		
51	Dynamic electronic gear is effective	(1) Set to 0, dynamic electronic gear invalid. input terminal INH's function is to pulse directive prohibited. (2) Set to 1, the dynamic electronic gear is effective, the input terminal INH's function is switching electronic gear. When INH terminal OFF, the importation of electronic gear for ***Pn49***/***Pn48*** When INH terminal ON, the importation of electronic gear for ***Pn50***/***Pn48***; by controlling INH terminal, the electronic gear ratio change	0~1	0
52	Position instructor pulse input mode	(1) establish the input form of location directive pulse (2) be set for one of three input ways by parameters 0：Pulse + symbol;； 1：CCW pulse / CW pulse; 2：Two-phase quartered input pulses; (3) CCW is observed from the axial of the servo motor, anti-direction rotating is defined as positive.	0~2	0
53	Contrary sign control on the direction of position instructor pulse	Be establish as: 0：normal； 1：Location directive pulse is reversing direction.	0~1	0
54	In-position range	(1) Set location positioning under the control of the pulse completed. (2) This option provides a position control mode driver determine whether the basis for the completion of positioning. When the location of	1~30000	1

		the remaining deviation counter pulse of less than or equal to the parameters set value, the drive that positioning has been completed, the complete signal COIN ON position, otherwise COIN OFF. (3) When in position control mode, the output signal COIN complete positioning, in other control methods, the rate of output signal SCMP.		
55	Range of position exceeded detection	(1) Located Alarm Detection scope of the ultra-poor. (2) In position control mode, the counter when the position deviation over the parameters of numerical values, position servo drives will alarm.	0~30000	30000
56	Invalid of position exceeded detection error	Be set as: (1) 0:position ultra-poor Alarm Detection is effective; (2) 1:Location-tolerance Alarm Detection is invalid, ultra-poor position to stop detection errors	0~1	1
57	Demonstrating mode setting	(1) Set up demonstration mode of motor control modes: torque, velocity or position control mode. (2) Set to 0, the drive will work in the torque control mode, the torque control value and control time so as ***Pn58***/***Pn59***～***Pn76***/ ***Pn 77***, implementing ***Pn60***/***Pn61*** after implementing ***Pn58***/***Pn59*** to ***Pn76***/ ***Pn 77*** posterior circulation to ***Pn58***/***Pn59***; (3) Set to 1, the drive will work in the speed control mode, speed control and the control of time so as ***Pn78***/***Pn79***～***Pn96***/ ***Pn97***, implementing ***Pn80/Pn81*** after implementing ***Pn78/Pn79*** to ***Pn96 / Pn 97***after cycle to ***Pn78/Pn79***; (4) Set to 2, the drive will work in the position control mode, position control values so as ***Pn98 ~ Pn117***, implementing n ***Pn99*** after implementing ***Pn98*** to ***Pn117*** posterior ***circulating to Pn98***;	0~2	2
58	Torque mode torque	(1) Set up demonstrating the 1st torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque,	-200~200	10

	value 1	for example, if set to the 0.5 times the rated torque, the value is set for 50.		
59	Torque mode time 1	(1) Set up the 1st torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
60	Torque mode torque value 2	(1) Set up demonstrating the 2nd torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	-10
61	Torque mode time 2	(1) Set up the 2nd torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
62	Torque mode torque value3	(1) Set up demonstrating the 3rd torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	20
63	Torque mode time 3	(1) Set up the 3rd torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
64	Torque mode torque value 4	(1) Set up demonstrating the 4th torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	-20
65	Torque mode time 4	(1) Set up the 4th torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
66	Torque mode torque value 5	(1) Set up demonstrating the 5th torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	30
67	Torque mode time 5	(1) Set up the 5th torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
68	Torque mode	(1) Set up demonstrating the 6th torque value under the demonstration model condition.	-200~200	-30

	torque value 6	(2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.		
69	Torque mode time 6	(1) Set up the 6th torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
70	Torque mode torque value 7	(1) Set up demonstrating the 7th torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	80
71	Torque mode time 7	(1) Set up the 7th torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
72	Torque mode torque value 8	(1) Set up demonstrating the 8th torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	-80
73	Torque mode time 8	(1) Set up the 8th torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
74	Torque mode torque value 9	(1) Set up demonstrating the 9th torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	100
75	Torque mode time 9	(1) Set up the 9th torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
76	Torque mode torque value 10	(1) Set up demonstrating the 10th torque value under the demonstration model condition. (2) Set value is the percentage of the rated torque, for example, if set to the 0.5 times the rated torque, the value is set for 50.	-200~200	-100
77	Torque mode time 10	(1) Set up the 10th torque constant time of torque demonstration mode under demonstration mode torque condition (2) Set up units for seconds.	1~30000	60
78	Speed	(1) Set up 1st speed value of speed demonstration	-3000~30	10

	mode torque value 1	model under demonstration mode condition. (2) Value unit is installed rpm.	00	
79	Speed mode time 1	(1) Set up the 1st speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
80	Speed mode torque value 2	(1) Set up 2nd speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	50
81	Speed mode time 2	(1) Set up the 2nd speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
82	Speed mode torque value 3	(1) Set up 3rd speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	250
83	Speed mode time 3	(1) Set up the 3rd speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
84	Speed mode torque value 4	(1) Set up 4th speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	1250
85	Speed mode time 4	(1) Set up the 4th speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
86	Speed mode torque value 5	(1) Set up 5th speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	2500
87	Speed mode time 5	(1) Set up the 5th speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
88	Speed mode torque value 6	(1) Set up 6th speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	-10
89	Speed	(1) Set up the 6th speed duration of speed	1~30000	60

	mode time 6	demonstration model under demonstration model; (2) Set up units for seconds.		
90	Speed mode torque value 7	(1) Set up 7th speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	-50
91	Speed mode time 7	(1) Set up the 7th speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
92	Speed mode torque value 8	(1) Set up 8th speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	-250
93	Speed mode time 8	(1) Set up the 8th speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
94	Speed mode torque value 9	(1) Set up 9th speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	-1250
95	Speed mode time 9	(1) Set up the 9th speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
96	Speed mode torque value 10	(1) Set up 10th speed value of speed demonstration model under demonstration mode condition. (2) Value unit is installed rpm.	-3000~3000	-2500
97	Speed mode time 10	(1) Set up the 10th speed duration of speed demonstration model under demonstration model; (2) Set up units for seconds.	1~30000	60
98	1st high bit of Position mode position instructor	(1) Set up the 1st high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 1st position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
99	1st low bit of Position	(1) Set up the 1st low bit of position instructor value in position demonstration mode.	-9999~9999	2500

	mode position instructor	(2) Set up Units pulse，Motor corresponding 10000 pulse week，the 1st position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)		
100	2nd high bit of Position mode position instructor	(1) Set up the 2nd high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 2nd position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
101	2nd low bit of Position mode position instructor	(1) Set up the 2nd low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 2nd position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	2500
102	3rd high bit of Position mode position instructor	(1) Set up the 3rd high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 3rd position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
103	3rd low bit of Position mode position instructor	(1) Set up the 3rd low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 3rd position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	2500
104	4th high bit of Position mode position instructor	(1) Set up the 4th high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 4th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
105	4th low bit of Position mode position	(1) Set up the 4th low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 4th position instructor pulse is	-9999~9999	2500

	instructor	(high bit of position instructor num *10000+low bit of position instructor pulse num)		
106	5th high bit of Position mode position instructor	(1) Set up the 5th high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 5th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	-1
107	5th low bit of Position mode position instructor	(1) Set up the 5th low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 5th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
108	6th high bit of Position mode position instructor	(1) Set up the 6th high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 6th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	10
109	6th low bit of Position mode position instructor	(1) Set up the 6th low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 6th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
110	7th high bit of Position mode position instructor	(1) Set up the 7th high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 7th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	-10
111	7th low bit of Position mode position instructor	(1) Set up the 7th low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 7th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse	-9999~9999	0

		num)		
112	8th high bit of Position mode position instructor	(1) Set up the 8th high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 8th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	20
113	8th low bit of Position mode position instructor	(1) Set up the 8th low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 8th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
114	9th high bit of Position mode position instructor	(1) Set up the 9th high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 9th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	10
115	9th low bit of Position mode position instructor	(1) Set up the 9th low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 9th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0
116	10th high bit of Position mode position instructor	(1) Set up the 10th high bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 10th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	-30
117	10th low bit of Position mode position instructor	(1) Set up the 10th low bit of position instructor value in position demonstration mode. (2) Set up Units pulse，Motor corresponding 10000 pulse week，the 10th position instructor pulse is (high bit of position instructor num *10000+low bit of position instructor pulse num)	-9999~9999	0

CHAPTER 5 ALARMS AND HANDLE

! NOTICE
★ Any person who involved in inspection should be fully competent to do the work. ★ Before starting maintenance and/or inspection make sure that it takes more than 5 minute after power-off. Otherwise you may get an electric shock. ★ When any alarm has occurred always remove its cause according to the alarm code and then can put it into operation again. ★ Before reset an alarm it is necessary to confirm that the SON is invalid to prevent accident form that the servo motor may suddenly start by any cause.

5.1 ALARM LIST

Table 5.1 Alarm list

Alarm Code	Alarm name	Content
-	Normal	
1	INITI	Initial system failed
2	ZPUL	Encoder Z pulse error
3	UVW	UVW signal illegal
4	DIFFSIGA	Encoder difference signal error
5	ENCCOUN	Encoder counter error
6	IPM	IPM module error
7	RELAY	Relay in main power supplier disconnects
8	OV	Higher voltage of main power supplier
9	LV	Lower voltage of main power supplier
10	BRAKE	Brake circuit error

11	AF	Unbalance gains in UVW current detection
12	EEPROM	EEPROM fails or BIP checkout fails
13	CIRHI	Current overshoot in U, V or W wire
14	FREQBRAKE	Frequently brake warning
15	DRIPROH	Both of CCW and CW driving prohibit
16	PDCOUNT	Position deviation counter's absolute value more than 2^30
17	OVPOSITION	Position command overflow warning
18	TOROVER	Torque overload warning
19	OVSPEED	Overshoot speed

5.2 WAYS TO SOLVE ALARM

Table 5.2 Alarm and solving ways

Alarm code	Alarm name	Running mode	Cause	Solving ways
1	INITI		① power supplier's voltage is too high	① decrease the power supplier's voltage
2	ZPUL		① Z pulse is not in existence, encoder damaged ② cable is in badness situation ③ shield grounding lines connect abnormally ④ encoder interface circuitry fault	① change encoder ② check the encoder interface circuitry
3	UVW		① encoder UVW signal damaged ② cable is in badness situation ③ shield grounding lines connect abnormally ④ encoder interface circuitry fault	① change encoder ② check the encoder interface circuitry

4	DIFFSIGA		① Connector disconnect ② Encoder damaged	① connect connector ② change encoder
			① encoder damaged ② encoder lines error ③ encoder disk damaged ④ fake Z signal existed	①change encoder
			① encoder connect error	①check circuitry
			①grounding abnormal	① grounding correctly ② check shield grounding lines
5	ENCCOUN		⑤ encoder damaged ⑥ encoder lines error ⑦ encoder disk damaged ⑧ fake Z signal existed	①change encoder
			① encoder connect error	①check circuitry
			①grounding abnormal	③ grounding correctly ④ check shield grounding lines
6	IPM	Occurs When connected to a main power	①PCB Fault	①change servo driver
		Occurs in the cour of motor operatior	① voltage supply is too low ② overheat	① check servo driver ② repower ③ change servo driver
			①Short circuit among U,V,W	①check circuitry
			①grounding abnormal	①grounding correctly
			① Motor insulation damaged	①change motor
			①Get disturbed	① increase circuitry filter ② far from the disturb source
7	RELAY	Occurs When connected to a main power	① Main power disconnect	①Check the main power

		Occurs in the cour of motor operation	② Motor broken	①change motor
8	OV	Occurs when connects to control power supplier	① Electro-circuit board error	①Change Servo Driver
		Occurs when connects to main power supplier	① power supplier's voltage too high ② power supplier's wave error	①check the power supplier
		Occurs during motor running	① Brake resistance disconnect	①Reconnect the circuitry
			① Brake transistor broken ② Inside brake resistance broken	①Change Servo Driver
			① Shortage of brake loop capacity	①Decrease frequency of on and off ②Increase time constant of accelerate and decelerate ③Reduce torque limit ④Reduce loading inertia ⑤Change larger power servo driver and servo motor
9	LV	Occurs When connected to a ma power	① PCB Fault ② Power insurance damage ③ Soft-start circuitry Fault ④ Rectifier damage	① Change Servo drives
		Occurs in the cour of motor operation	① Low Voltage Power ② temporary blackout More than 20 ms	①Checks Power
			① Not enough power capacity ② Instantaneous Power Fail	
			①Overheated Radiator	①Check load conditions

10	BRAKE	Occurs When connected to a main power	①PCB Fault	①Change servo driver
		Occurs in the cour of motor operatior	①Brake resistance disconnect	① reconnect the brake resistance
			①Brake transistor is broken ②Inner brake resistance broken	①Change servo driver
			① Shortage of bra capacity	1 Increase time constant of accelerate and decelerate 2 Reduce torque limitation 3 Reduce loading inertia 4 Repalce with larger pow servo driver and servo mot
			① power supplier's voltage too high	①check the power supplier
11	AF		① Lost gain balance in U, V, W current detection circuit	① change servo driver
12	EEPROM		① Chip or electro circuit error	① Change Servo Driver ② After repaired, set driver type and then recover default parameters.
13	CIRHI		①short circuit among U,V,W	①check circuitry
			①grounding abnormal	①grounding correct
			① motor insulati damaged	①change motor
			①driver damaged	①change servo driver
14	FREQBRAKE		① power supplier's voltage is too high ② brake resistance is too big ③ too heavy load	① decrease the power supplier's voltage ② change a smaller brake resistance ③ lighten the load
15	DRIPROH		① CCW,CW driving prohibition input ports all disconnect	①check circuitry, input ports
16	PDCOUNT	Occurs during motor running	①motor is blocked up ② input code pulse abnormal	① check the load ② check code pulse ③ check the motor whether running under the code or not

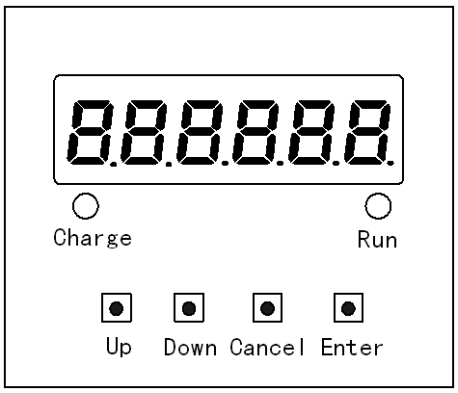
17	OVPOSITION	Occurs when connects to control power supplier	①PCB fault	①change servo driver
		Connected to main power supplier and control line, inputting dictate pulse, and motor zero speed	① Wrong connect among U, V, W in the motor ②Leading lines of encoder error	①Correct connection
			① Encoder error ② Encoder ZERO point change	① change motor ② readjust the encoder ZERO point
		To occur in the course of motor operation	① Small position overshoot range	① Increase position overshoot range
			① Scale plus is too small in Position	①Increase plus
			①Torque shortage	①Check torque limit valve ② Decrease load capacity. ③ Change Bigger Power servo motor and servo drive
			① frequency of Instructions pulse is too high	①Reduced frequency
			①Encoder ZERO point change	①readjust the encoder ZERO point
18	TOROVER		① Unsuitable parameter ② Unexpected load occurs	① change parameter ② check load
19	OVSPEED	Occurs when connects to control power supplier	① Control electro-circuit board error ② Encoder error	①Change servo driver ② Change servo motor
		Occurs during motor running	① Too big inputting dictate pulse frequency	① Setting correct inputting pulse
			① Time constant of accelerate and decelerate is too small, causing too big speed over modification	① Increase time constant of accelerate and decelerate

			① The inputting electron gear rate is too big	① Correct setting parameters
			①Encoder error	①Change motor

CHAPTER 6 DISPLAY AND OPERATION

The Faceplate by 6 LED numerical code tube monitor and 4 key-press Up、Down、Cancel、Enter，Uses for display system each kind of condition, the setting parameter and so on. The operation is the lamination operation，Cancel、Enter key expression level backlash and advance， Enter Has enters, the determination significance，Cancel Has the withdrawal, the cancellation significance；Up、Down The expression increases, the reduced serial number or the value size。If presses down Up、Down key and the maintenance，Then has the redundant effect，And the maintenance time longer, the redundant speed is higher。

If any one or many digital tubes glitters，which means error or warning appeared . ***CHARGE*** The indicating lamp lightens expresses the host power source is already on electricity and has electric charge in the host power's capacitor，***RUN*** The indicating lamp lightens expresses the servo system is in operation.



6.1 1ST

1st uses for to choose the operating mode，Altogether has 7 ways，With Up、Down the key changes the way，Presses the Enter key to enter the designation way 2nd，Presses Cancel the key to return 1st from 2nd..

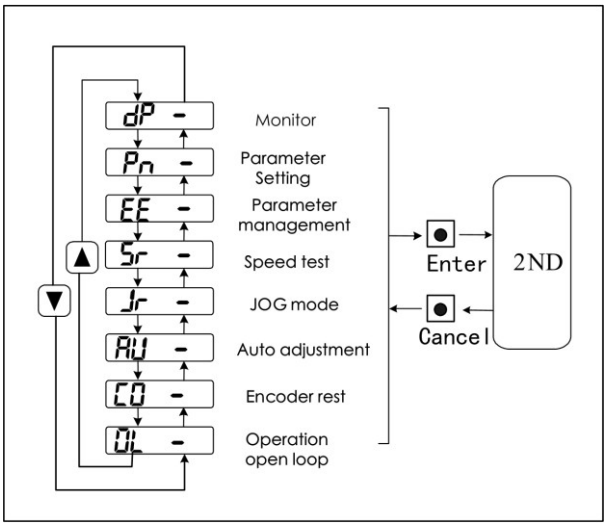


Figure 6.1 Block diagram for selecting operation mode

6.2 2ND

6.1 Monitor mode

Select "dP -" in the first layer. Press "Enter" key to move to monitor mode .There are Twenty-one State displayed. Using " Up "or " Down " key to select the display mode. Then press "Enter "key again to move to specific Display State.

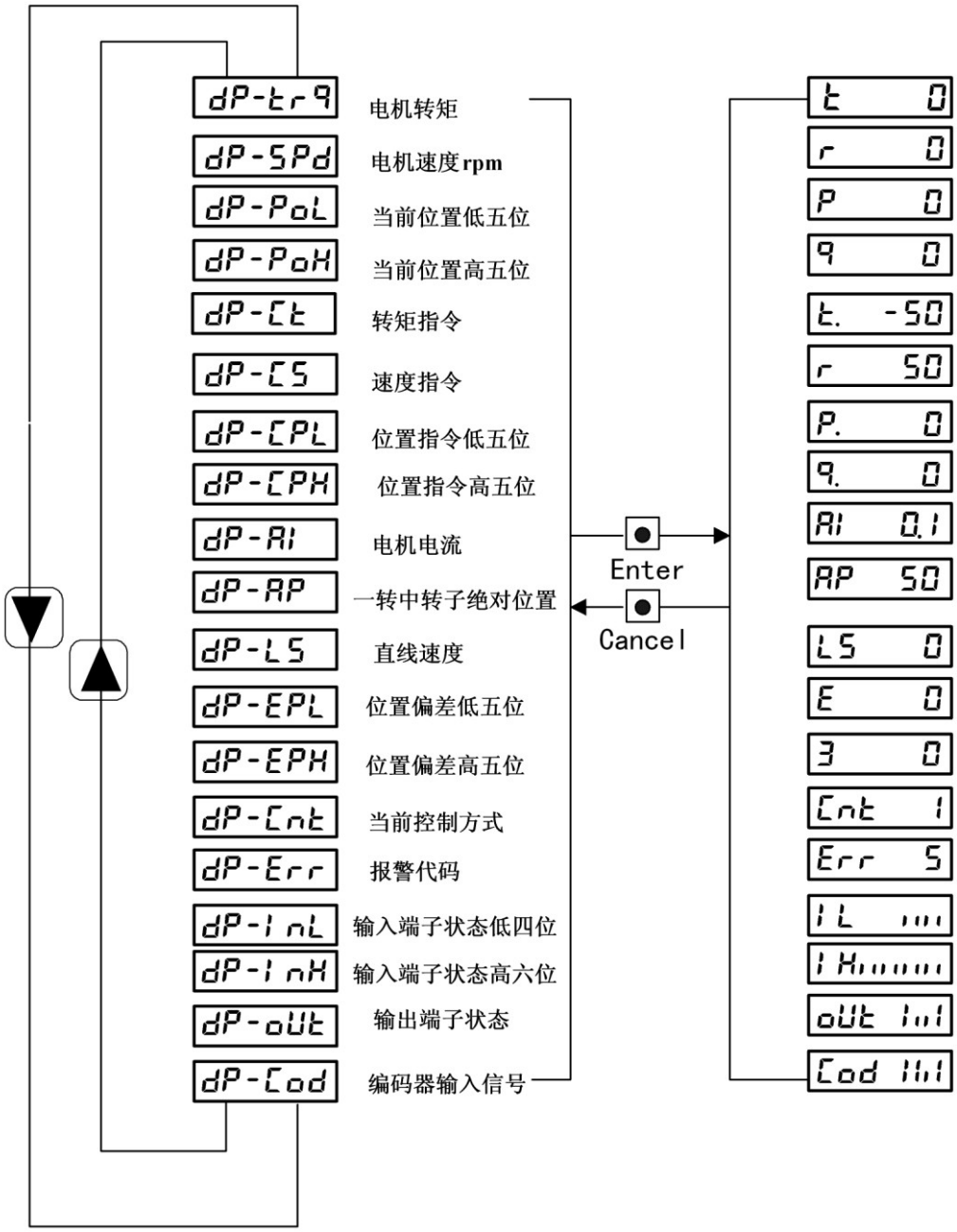


Figure 6.2 Block diagram of operation for monitor mode

Note 1: The quantity of input pulse is the product of the number of position controller output pulse times the electric gear ratio.

Note 2: The pulse unit is equivalent to an internal pulse unit. In the servo drive 10000 pulses is corresponding to one revolution. The quantity of pulse is indicated by 5 high-digits plus 5 low-digits. The calculation will be:

Quantity of pulse =5 high-digit ×100000 +5 low-digit

Note 3: Control mode: 0-Torque Control

1-Speed Control

2-Position Control

3-JOG Operation

4-Speed Test Operation

5-Auto Adjustment

6-Demo

Note 4: If the displayed digit reached six digits (for example: -12345) the prompt letter will not be displayed

Note 5: The position command pulse rate is equal to the pulse output rate of position controller. The positive value stands for CCW and negative for CW in 0.1 KHz scale

Note 6: Electrical machinery electric current I computational method:

$$I = \sqrt{\frac{1}{3}(I_U^2 + I_V^2 + I_W^2)}$$

Note 7: Alarm display:

"Err—" indicates normal condition and no alarm.

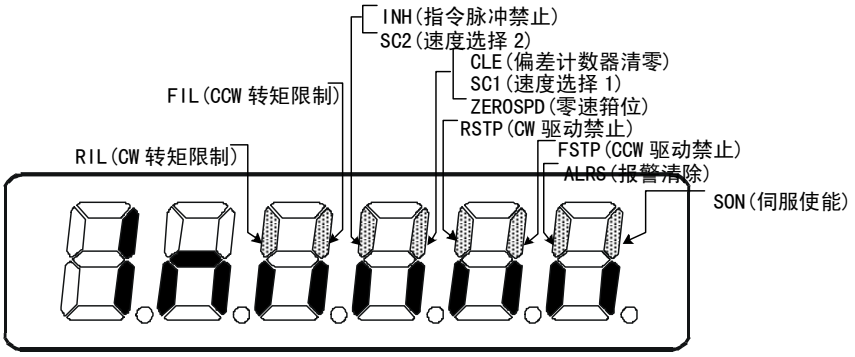


Figure 6.3 Input terminal demonstration (The pen delimits lightens expresses ON, extinguishes expresses OFF)

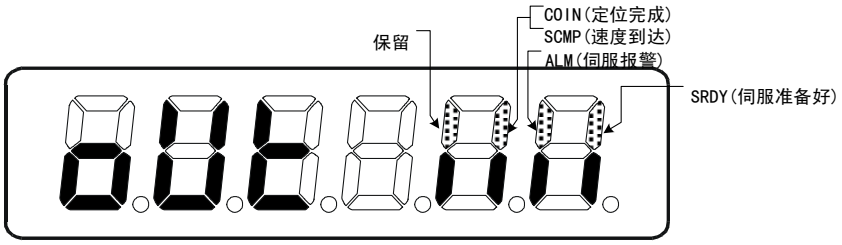


Figure 6.4 Output terminal demonstration (The pen delimits lightens expresses ON, extinguishes expresses OFF)

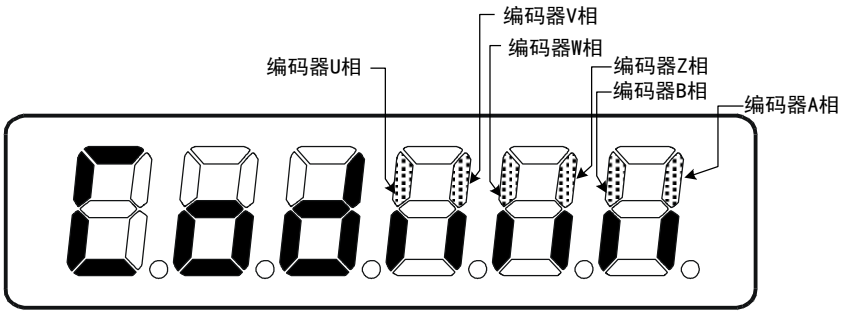


Figure 6.5 Encoder signal demonstration (The pen delimits lightens expresses ON, extinguishes expresses OFF)

6.2 Parameters setting

To enter the parameter setting mode, select "Pn-" in the first layer of menu and then press Enter key. Use Up and Down Key to select the parameter number , then press Enter key to display parameter value on the LED. To modify the parameter setting use Up and Down key to increase or decrease the value. press Up or Down Key once, the parameter value increase or decrease by one. If press and hold Up or Down key the parameter value increase or decrease continuously. The most right decimal point of LED is lighted during parameter modification. To stop or confirm the modification, press Enter key and cause the most right decimal point of LED to go dark .soon after the parameter confirmed ,the parameter is active to the servo drive. Using Up, Down and Enter keys the above operation can be repeated. To return to parameter number select mode ,press Cancel key .To cancel a parameter modification, press Cancel key (do not press the Enter key) to restore the old parameter value and return to parameter number select mode.

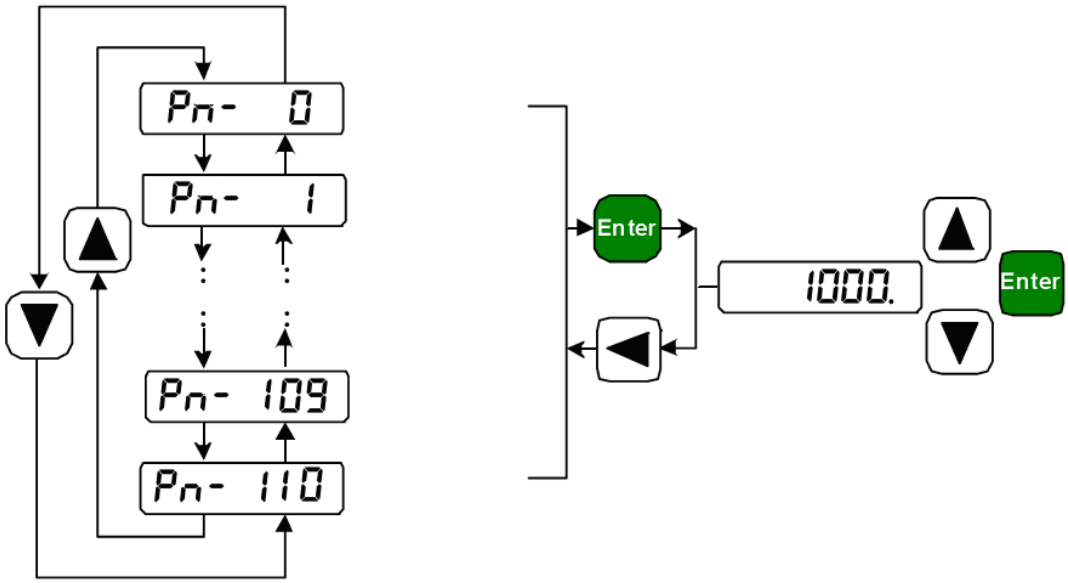


Figure 6.6 block diagram for parameter setting.

6.3 Parameter manage

The parameter management processes the data of EMS memory and EEPROM. To enter the parameter management mode, select 'EE-"in the first layer of menu and then press Enter key. there are 5 operation mode and can be selected by Up or Down key. For instant, select the "EE-SR0" and then press and hold the Enter key for more than 3 seconds to display "START" on the LED indicating that the parameters is writing to EEPROM. Waiting for about 1~2 second the LED displays "FINISH" if the writing is successful or "ERROR" if fail. To return to the operation mode selection, press Cancel key.

EE-SR0 (parameter write):it means that the contents of EMS memory will be transferred to EEPROM parameter section. The modified parameters are only stored in the EMS memory and will lose after power-of. To save the modified parameters permanently it is necessary to carry out parameter- write operation to transfer the modified parameters in the EMS memory to EEPROM parameter section. The new parameters will restore from EEPROM parameter section to EMS memory when power-on again.

EE-LD0 (parameter read):it means that the contents of EEPROM parameter section will be transferred to the EMS memory. The same action can be done automatically when power-on. After power is on the contents of EMS memory has the same contents as the EEPROM parameter section does. When parameter modification is carried out the contents of EMS memory will be changed. To recover the parameters just power-on, read the EEPROM parameter section to EMS memory if the parameters are not satisfied or confused.

EE-SR1(parameter backup):it means that the contents of EMS memory will be transferred to EEPROM backup section. The whole EEPROM section is divided into two sections, the one is the EEPROM parameter section and the other is the EEPROM backup section. Use the EEPROM parameter section for power-on, parameter-write and parameter-read. Use the EEPROM backup section for parameter backup and restore. In order to get a better group of parameters, modify parameters and try running, then store the satisfied parameters to the EEPROM backup section and again . If fail o do so, recover the former parameters from EEPROM backup section and try again or stop. If got a better set of parameter, you had better to save them to EEPROM parameter section and EEPROM backup section to deal with the case that parameter might be changed by accident. If so ,you can transfer data from EEPROM backup section to the EMS memory and EEPROM parameter section.

EE-LD1 (restore backup): it means that the connects of EEPROM backup

section will be transferred to EMS memory only, but not to the EEPROM parameter section. In order to use the backup parameter for many times; perform the parameter-write to change the contents of EEPROM parameter section will be used.

EE-Def (Restore default values):It means that the default values will be transferred to EMS memory and EEPROM parameter section. It is also used for the next power-on. If the servo drive can not run normally due to the confused parameters, use “EE-Def” to restore the default values. For doing so, make sure that the parameter NO.1 must match with the servo amplifier type because the default values are different for the different servo amplifier type. Then use “EE-dEF" to restore correct default values.

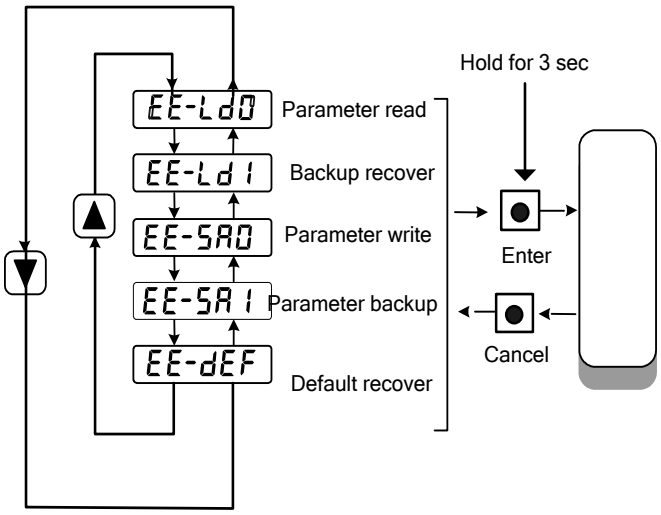


Figure 6.7 Block diagram for parameter management

Figure 6.8 the meaning of parameter management

6.4 Speed test operation

To enter the speed test operation mode ,select“Sr -”in the first layer of menu and then press the Enter key. The prompt“S”show the servo drive is in speed control mode and the displayed value indicates the speed in r/min.Use Up、Down key to increase motor speed in CCW direction (or decrease in CW

direction) .

Figure 6.9 Block diagram for speed test operation

6. 5 Jog operation

Chooses in 1st "JF -" ，And presses the Enter key to enter the JOG movement way，Namely the spot moves the way. The JOG movement prompt symbol is "J"，The value unit is r/min，The system is in the speed control way，The speed instruction provides by the pressed key. After enters the JOG operation，Presses down Upthe key and the maintenance，Electrical machinery according to JOG speed movement，The pine operates the pressed key，The electrical machinery stops the extension，Maintenance zero fast；Presses down Downthe key and the maintenance，Electrical machinery according to JOG speed reverse movement，The pine operates the pressed key，The electrical machinery stops the extension，Maintenance zero fast。The JOG speed establishes by parameter ***Pn42***.

Figure 6.10 JOG Operation diagram

6.6 Simulation quantity automatic accent zero

Chooses "AU-" in 1st，And presses the Enter key to enter the zero operating mode. After automatic accent zero，The user also may continue to revise ***Pn20*** (or ***Pn17***), carries on manual accent zero.

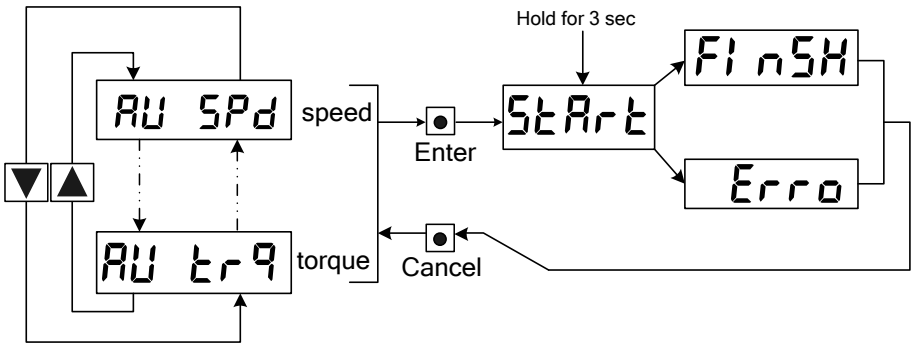


Chart 6.11 Simulation quantity automatic accent zero functional block diagram

CHAPTER 7 OPERATION

7.1 EARTHS

1. Reliably earth the servo driver and the servo motor, in order to avoid receiving an electric shock, the protection earth terminal of servo driver must be put through with the control box protection earth. Because Power supplier for servo driver by power tube under the PWM technology, the driver and the connection possibly receive the influence from switch noise , in order to conform to the EMC standard, therefore connections as thickness as possible, earth resistance as small as possible.

7.2 STEP OF WORKING

7.2.1 Power Supplier Connection

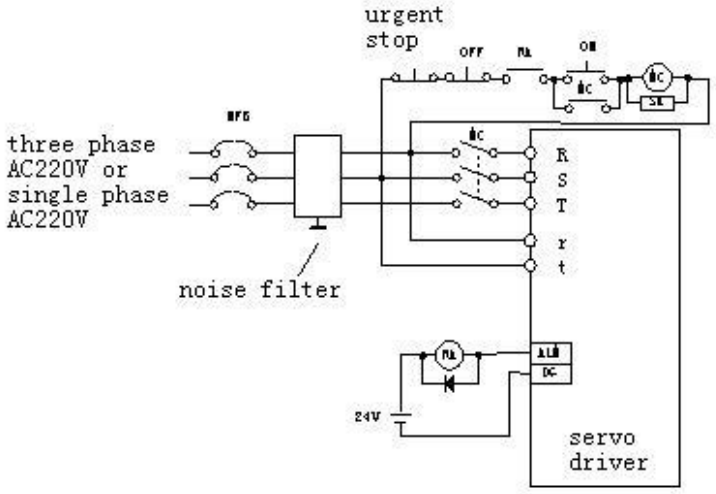
1)Connecting power supplier onto inputting power terminal in the main electro-circuit by electromagnetism contactor, (Three phase connect R, S, T; and single phase connect R, S)

2)Don't connect power supplier of control electron-circuit , later than put though the main electron-circuit. Servo ready (SRDY) is ON if just putting the main electron-circuit.

3)After putting through the main electron-circuit, servo read (SRDY) will be ON in 1.5 seconds, and it can adept servo enable (ServoEn) signal. If it checks the servo enable effective, driver output effective, motor is prompting with running condition.. If it checks the servo enable ineffective or any alarm, electron-circuit cuts off and motor is in free condition.

4) Connect servo enable and power supplier through, basic pole electron-circuit put through in 1.5 seconds.

5)Higher frequency on-off power supplier could break soft start circuit and energy-cost brake circuit. The on-off frequency should in the limits of 5 times per hour and less than 30 times per day. If circuit cut off due to higher temperature of driver and motor, make sure cooling the equipment more than 30 minutes and restart power supplier.



7.2.2 Timing sequence Diagram

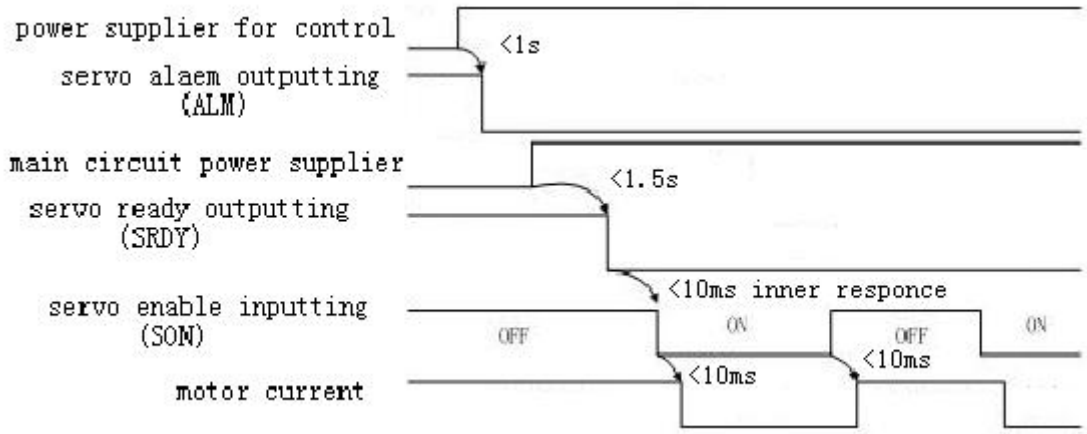


Figure 7.2 Power connected timing sequence Diagram

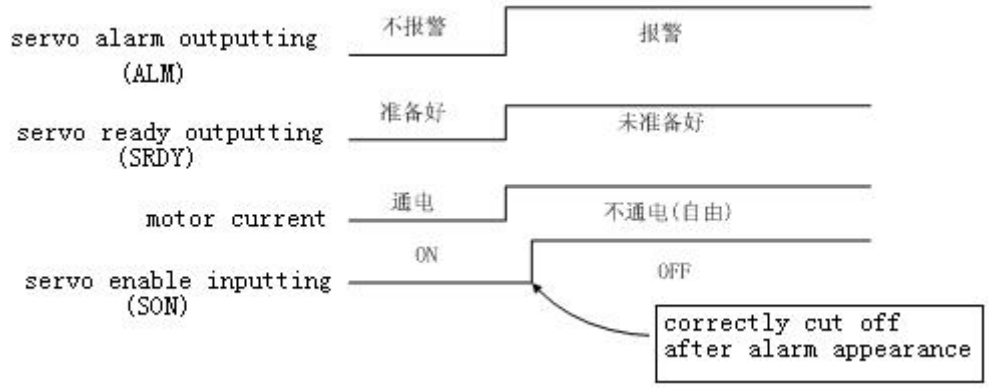


Figure 7.3 alarm timing sequence Diagram

7.3 MECHANICAL BRAKE USE

Mechanical brake（Maintains brake）uses to lock in vertical or slantwise work table connected with the servo motor, avoid the work table to drop when the power source loses be cut off. Realizes this function, must select and purchase servo motor which have Mechanical brake. The arrester only use for protect the work table, cannot use in to decelerate and stop.

Figure 7.4 is the wiring diagram of arrester，using signal BRK which come from servo driver and control the arrester. Pay attention to power supply, it must be enough capability and provide from user. Suggest to install surge absorber to control the surge voltage from the movement of relay pass/break. Also use the diode as surge absorber; it will be make some brake lag.

Figure 7.5 on normal condition，the order of mechanical brake when servo motor stopped, then servo motor hold position by power supply continue, the arrester from releases to brake, after stable period(refer to parameter ***Pn7***) remove the power supply.

Figure 7.6 In the motor operation, the speed is bigger than 30r/min,cut off the

power supply, the arrester continues to assume the release condition, after delay a period of time, the arrester work again. This is for avoid the damage of arrester after the servo motor from high speed revolve to low speed. The delay is parameter ***Pn8***or the servo motor speed decelerates to the parameter ***Pn7*** value, takes the minimum value both of them.

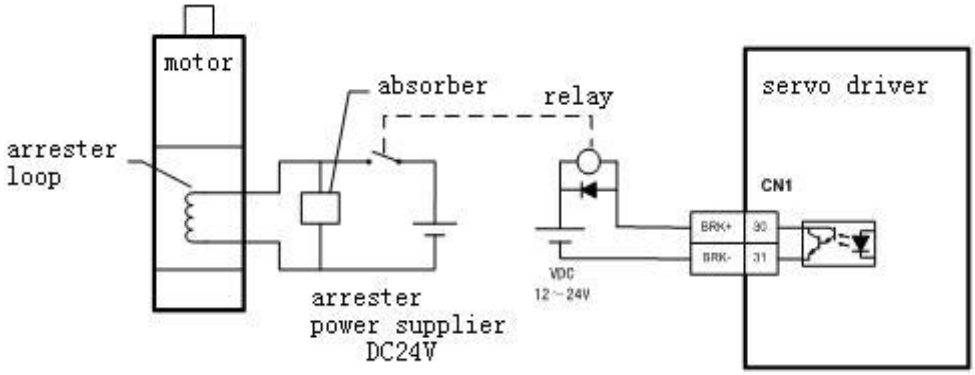


Figure 7.4 wiring diagram of Mechanical brake

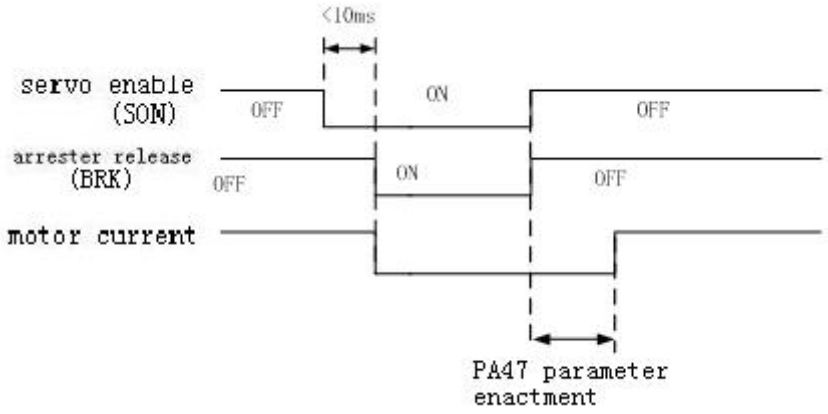


Figure 7.5 order of Mechanical brake when stop (speed < 30r/min)

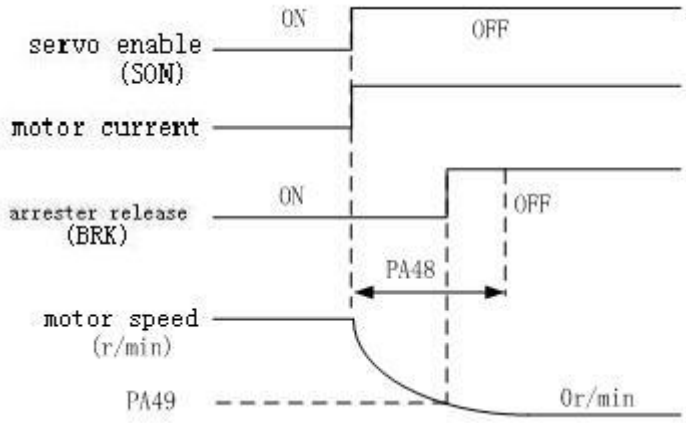


Figure 7.6 order of Mechanical brake when operation

7.4 ATTENTION

(1) The limits from servo driver and motor is the start-up and the stop frequency, need to satisfy two conditions at the same time.

1) Allowable frequency for servo driver

Make sure the permitted frequency range in higher frequency start & stop application fields. The permitted frequency range is different from different motor style, capability, loading inertia and motor speed. .First set the period of time that speed change to prevent the huge regeneration power (If under the position control, set ***Pn47***,else if under the speed control, set ***Pn34*** & ***Pn35***). Under the condition of m times motor inertia, the permitted start & stop frequency and recommended acceleration & deceleration time showed as following:

Multiple of loading inertia	Permitted start & stop time
m≤3	＞100 times/minutes; Less than 60mS for acceleration & deceleration
m≤5	60～1000 times/minutes; Less than 150mS for acceleration & deceleration
m>5	＜60 times/minutes; More than 150mS for acceleration & deceleration

If cannot satisfy the request, user may use reduces internal torque limitation (parameter ***Pn25,Pn28***), reduces the motor highest rotational speed (parameter ***Pn42***) method.

2）The maximum allow bale start/stop rate and acceleration/deceleration time also depend on the type of servo motor and on the load conditions, running time, environmental temperature, etc. to avoid overheating alarm and influence on the servo motor life-time, please refer to the servo motor guide and adjust according to reality

situations.

(2) In general, the load inertia should be less than 5 times the inertia of the motor. If the load inertia is large than the above mentioned it may cause over voltage or brake abnormal alarm during deceleration. To deal with the above problem, use the following treatments.

1) Reduce the torque limit (parameter ***Pn25,Pn28***) and current limit;

2) Reduce the maximum speed of the servo motor (parameter ***Pn42***);

3) Install external regeneration brake equipment;

(3) In the servo driver is loaded with the encoder electric power supply, in order to guarantee the encoder normal work, must maintain the output voltage is 5V±5%.When user use very long electric cable, possibly make the voltage loss, in this case, please use the multi-cores for the encoder, reduces the electric cable pressure drop.

7.5 TEST OPERATIONS

7.5.1 Check before operation

Installed and connected, please check the following items before power-on:

- Check encoder connections are correct or not？especially the R,S,T and U,V,W, Check the servo driver and servo motor are firmly installed
- Check the inputting voltage
- Check power and motor wiring are not shorted or grounded
- Check encoder connections are correct or not
- Check the power terminal TB and inputting voltage.

7.5.2 Test operation with power-on

1． Before electrify

- no load within motor
- strike by motor accelerate and decelerate, must fix up the motor
- If the motor installed already, had to pay attention to the mechanical position specially, avoided surmounting the traveling schedule to create the machinery damage.

2. Connection

Figure 7.7

- Main circuit end , three-phase AC 220V，connect to R、S、T，single-phase AC 220V，connect to terminal R、S；
- Control pressure terminal r , t connect to single-phase AC 220V;
- Connecting to CN1, encoder signal and servo motor；
- Connecting to CN2, inputting control signals as per figure；

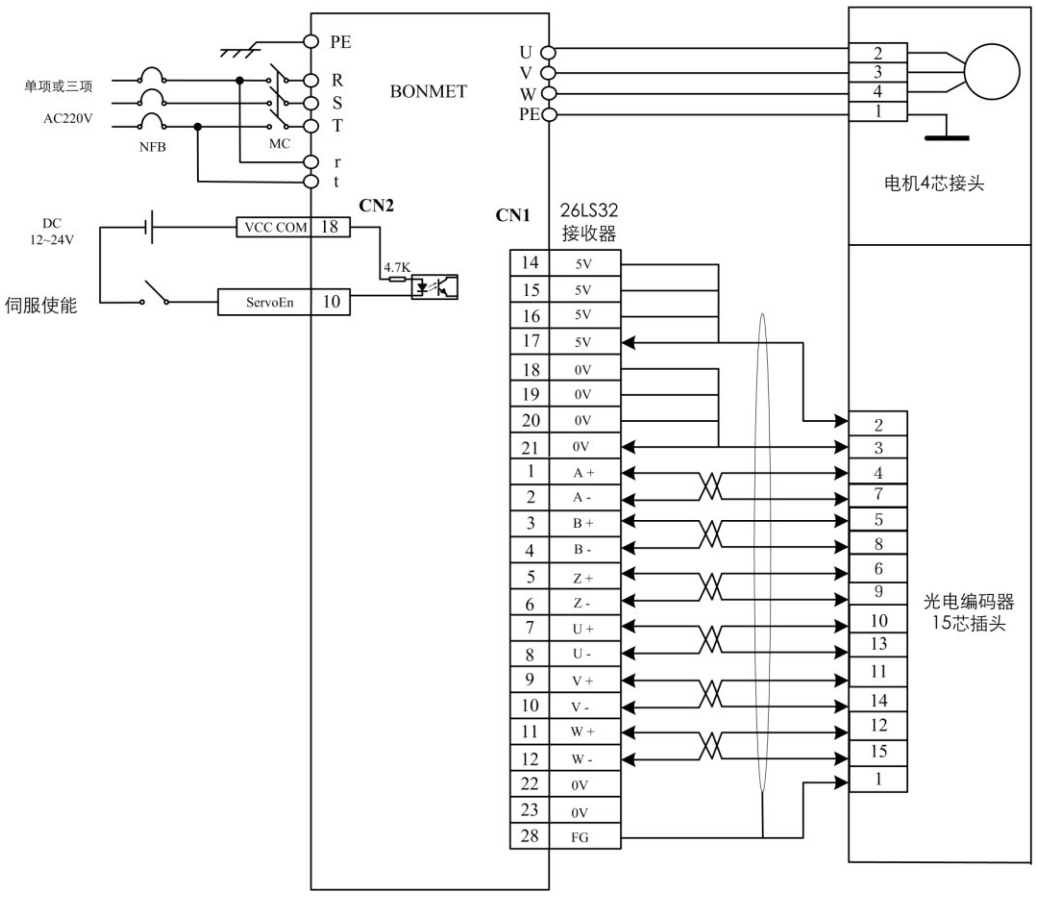


Figure 7.7 Test operation Figure

3．JOG operation

1) Putting through the main circuit power, displayer on servo driver bright Please check the connection if alarm appeared.

2) Set parameter as following:

NO.	meaning	parameter	default
Pn4	choose of control fashion	3	1

3) Make sure none of alarm or other abnormal cases, servo enable (ServoEn) ON, motor is prompting in zero speed condition.

4) Getting speed test run by key operation. Prompt of JOG mode is “J 0”---r/min and system in speed control mode, the size and direction of speed are according to parameter ***Pn41***. Pressing the key ↑ to get the speed and running direction caused by parameter ***Pn41***. Pressing the key ↑ to get the inverse running at the

speed and direction caused by parameter ***Pn41***.

5) If the external control servo enables (ServoEn) not to be convenient, may set parameter ***Pn8*** as 100000, forces the servo to enable (ServoEn) ON, does not need exterior wiring to control ServoEn.

4．Speed operation

1）Connect to control circuit power source (main circuit power does not meet temporarily), the driver display bright, if has alarm, please inspect the connection.

2) Putting through the main circuit power

3) Set parameter as following:

NO.	meaning	parameter	default
Pn4	choose of control fashion	4	1

4) Make sure none of alarm or other abnormal cases, servo enable (ServoEn) ON, motor is prompting in zero speed condition.

5) Getting speed test run by key operation. Prompt of speed test run is “S 0”---r/min and system in speed control mode. The speed dictate supplied by keys ↑ and ↓ to change speed dictate. Motor runs at the given speed.

6) If the external control servo enables (ServoEn) not to be convenient, may set parameter ***Pn8*** as 100000, forces the servo to enable (ServoEn) ON, does not need exterior wiring to control SON.

7.6 POSITION OPERATION MODE

1．Connection

Figure 7.8，

- Main circuit end , three-phase AC 220V，connect to R、S、T，single-phase AC 220V，connect to terminal R、S；
- Control pressure terminal r , t connect to single-phase AC 220V;
- Connecting to CN1, encoder signal and servo motor；
- Connecting to CN2, inputting control signals as per figure；

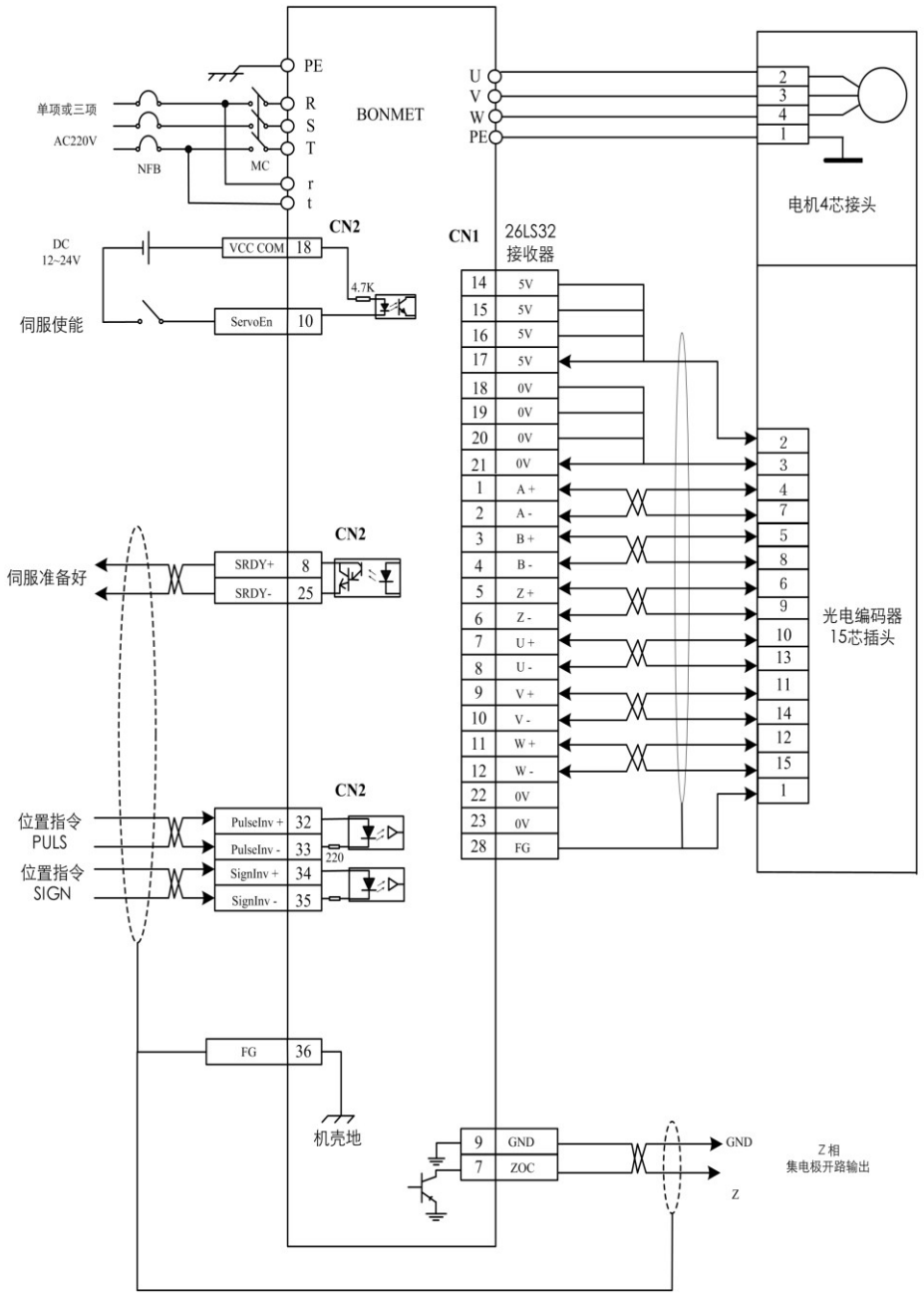


Figure7.8 connection drawing of position control

2．Operation

1）Putting through the main circuit power, displayer on servo driver bright Please check the connection if alarm appeared.

2）set the parameter to EEPROM as follow:

NO.	Meaning	Parameter	Default
Pn4	choose of control fashion	2	1
Pn48	electric gears denominator	User setting	20
Pn49	electric gears numerator	User setting	20

3) No alarm and abnormity，make (ServoEn) ON，”RUN” bright；Director send the low frequency pulse to drive motor operation in low speed.

3．Setting position resolving index and electron gear

The servo drive’s encoder is 10000 pulse/turn，get through the setting of electric gears, parameter ***Pn48,Pn49,Pn50*** would be get discretional pulse.

Note：user may give molecule and the denominator hypothesis random value obtain any ratio, but should better not have to surpass 1/50~50 scope.

Note: When INH terminal OFF, the importation of electronic gear for ***Pn49***/***Pn48*** When INH terminal ON, the importation of electronic gear for ***Pn50***/***Pn48***; by controlling INH terminal, the electronic gear ratio change Numerical.

7.7 SIMPLE COMMECTION UNDER SPEED CONTROL MODE

1．Connection

- Figure 7.9 to connect，
- Main circuit end , three-phase AC 220V，connect to R、S、T，single-phase AC 220V，connect to terminal R、S；
- Control pressure terminal r , t connect to single-phase AC 220V;
- Connecting to CN1 encoder signal and servo motor；
- Connecting to CN2, inputting control signals as per figure；
- If only makes the velocity modulation control, does not have to connect the encoder output signal; If exterior director is the positional, needs to connect the encoder output signal.

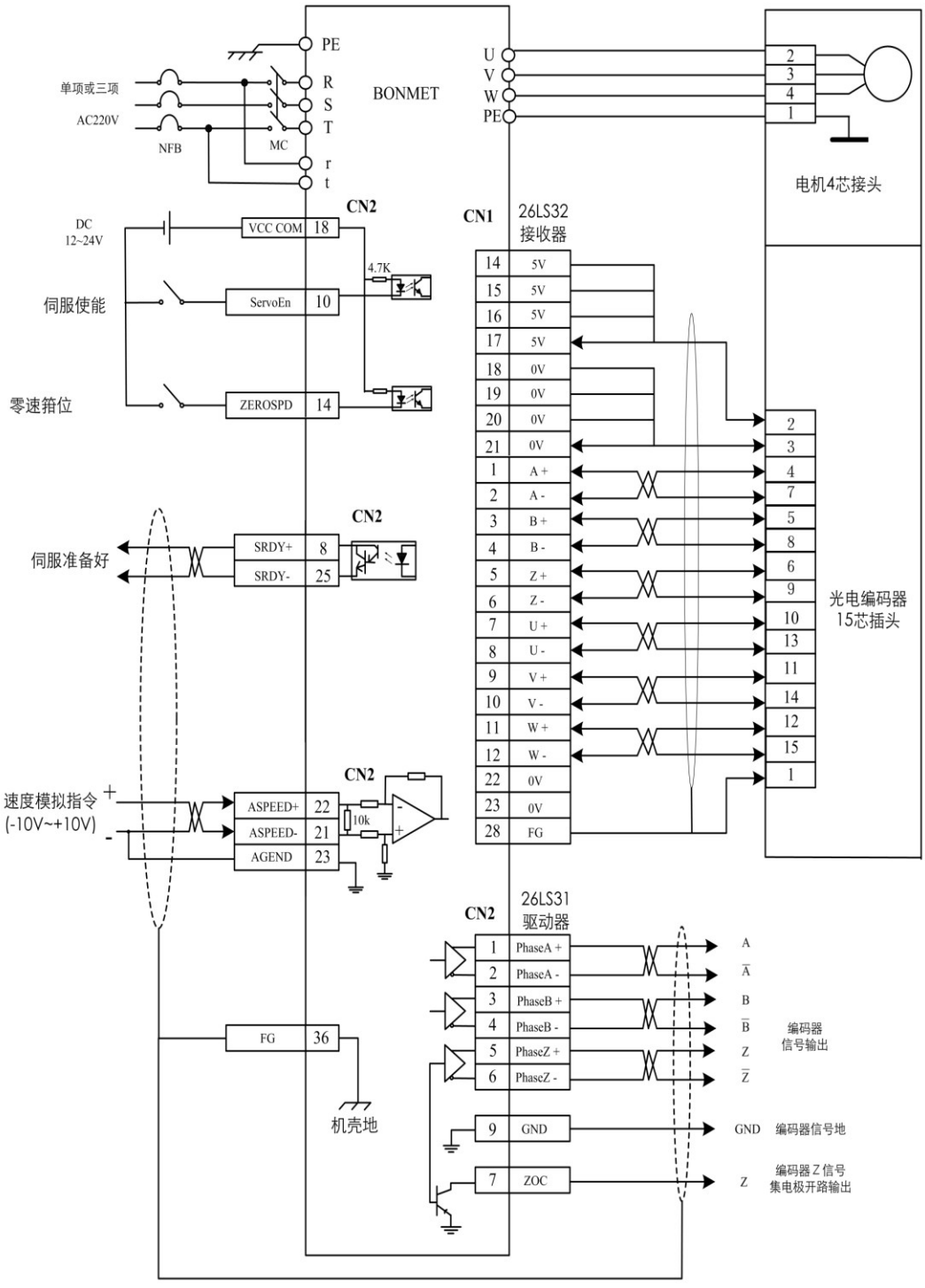


Figure 7.9 The simple wiring diagram of speed control mode

2．Operation

1）Putting through the main circuit power, displayer on servo driver bright Please check the connection if alarm appeared. Set the parameter to EEPROM as follow:

Parameter number	Significance	Parameter value	Factory Default
Pn4	Control Options	1	1
Pn40	Internal and external directives to choose speed	1	0
Pn34	Speed up time constant	0	10
Pn35	decelerating time constant	0	10
Pn18	directive Gain of simulation speed	settings As required	300 (r/min) / V
Pn19	partial instructions compensation of Simulation speed	0	0

2) Adds an adjustable DC voltage to the simulation speed input port, from 0 starts to increase this voltage gradually, guarantees the electrical machinery rotational speed to make the corresponding change along with the instruction; Adds the negative voltage, the electrical machinery should reverse.
3) If assigns when simulation instruction voltage for zero voltage (0V), because on the position controller and the driver is zero-bias voltage, the servo motor possible idling, adjust parameter ***Pn19***, compensate zero-bias, make the servo motor to zero fast;
4) Adjust parameter ***Pn17, Pn18*** to change input plus and direction.

7.8 CONNECTION OPERATION IN TORQUE CONTROL MODE

1．Connection

Figure 7.10：

- Main circuit end , three-phase AC 220V，connect to R、S、T，single-phase AC 220V，connect to terminal R、S；
- Control pressure terminal r , t connect to single-phase AC 220V;
- Connecting to CN1, encoder signal and servo motor；
- Connecting to CN2, inputting control signals as per figure；

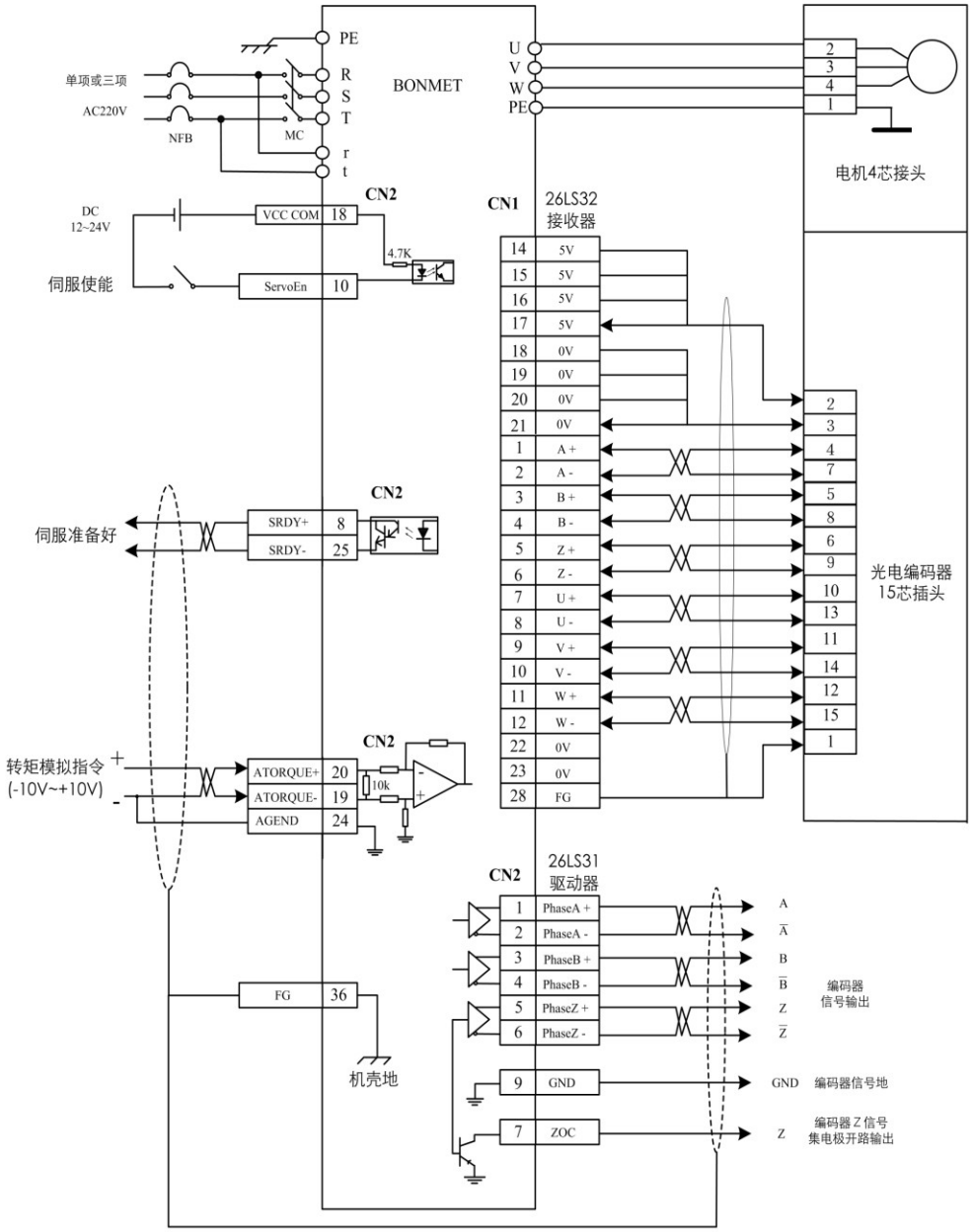


Figure 7.10 Simple wiring diagram Control Torque mode

2．Operation

1）Putting through the main circuit power, displayer on servo driver bright Please check the connection if alarm appeared., Set the parameter to EEPROM as follow:

Parameter number	Significance	Parameter value	Factory Default
Pn4	Control Options	0	1
Pn15	directive Gain of simulation torque	settings As required	100
Pn17	Simulation torque command direction take the anti -direction	0	0
Pn16	Partial instructions compensation of Simulation torque	0	0
Pn29	Torque control speed limits	settings As required	2500

3) appropriate load on motor shaft;
4) Adds an adjustable DC voltage to the simulation torque input port, from 0 starts to increase this voltage gradually, the motor outputs the corresponding torque; Adds the negative voltage, the servo motor outputs the reverse torque;
5) If the simulation instruction voltage is 0, the servo motor has the torque output, may adjust parameter***Pn16***, make it for the zero torque;
6) Adjust parameter ***Pn15, Pn17*** to change input plus and direction.
7) Please specially pay attention, when the load is small, it's easy too fast. Parameter ***Pn29*** may carry on the regulating to the servo motor, prevents over speed when under loading;
8) Surpasses rating torque when is at the overload condition, only continue a short time, its characteristic refers to system overload characteristic

7.9 DYNAMIC ELECTRON GEARS USE

The dynamic electronic gear function is refers in driver system movement, through input control signal, dynamic cut electron gear ratio. This function is: On the position machine maximum output pulse frequency is low, when the electron gear ratio is small, the position resolution is high, but the maximum speed is low; When the electron gear ratio is big, the position resolution is low, but the maximum speed is high. In order to use, must obtain the high position, also requests the high maximum speed, has set two electron gear ratio, through on position machine output control signal, switch in dynamic.

For example, in the numerical control machine, set the first electron gear ratio to be small, the second electron gear ratio is bigger, when machining, the speed is not generally very high, on the position machine output control signal chooses the first

electron gear ratio, may obtain the high position resolution; When rapid traverse, on the position machine output control signal chooses the second electron gear ratio, may obtain the high traveling speed.

7.9.1 Brief connection

Figure 7.12

- Main circuit end , three-phase AC 220V，connect to R、S、T，single-phase AC 220V，connect to terminal R、S；
- Control pressure terminal r , t connect to single-phase AC 220V;
- Connecting to CN1, encoder signal and servo motor；
- Connecting to CN2, inputting control signals as per figure；

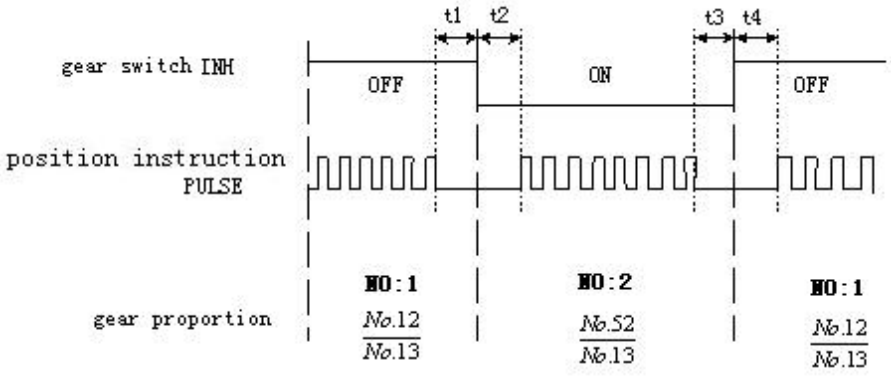
7.9.2 Operation

1）Set the parameter to EEPROM as follow:

Parameter number	Significance	Parameter values	Factory Default
PN4	Control Options	2	1
PN49	The first elements of electronic gear	User settings	20
PN50	Denominator of electronic Gear	User settings	20
PN48	Location directive smoothing filter	0	0
PN47	Dynamic electronic gear is effective	1	0
PN51	The second elements of electronic gear	User settings	20

2) Through control input port INH to realize electron gear switch. When INH port OFF, the input electron gear is ***Pn50/Pn49***; When INH port ON, the input electron gear is ***Pn51/Pn50***;

3) Note :when the electrons witch，must satisfy Figure7.11， In inputs INH change around at least 10ms, do not have to send the pulse.



t1, t2, t3, t4 >10mS

Figure 7.11 timing sequence of dynamic electronic gear

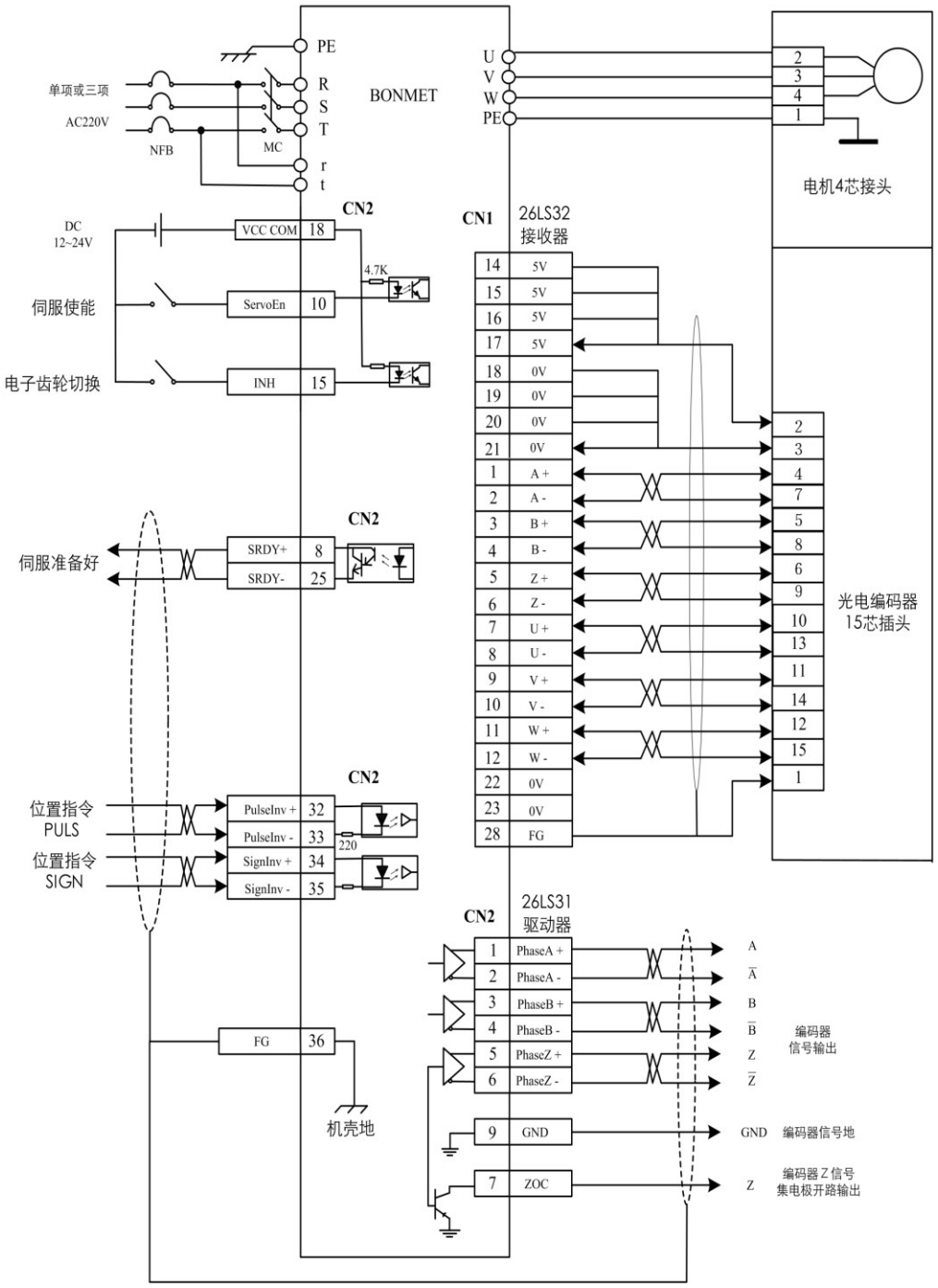


Figure 7.12 Using wiring diagram of dynamic electronic gear

7.10 THE USER TORQUE OVERLOAD REPORTS TO THE POLICE THE FUNCTION

In order to prevent the accident occurs when certain situations, creates the electrical machinery load not normally to elevate, possibly destroys certain mechanisms, designed the user torque overload to report to the police the function。

When this function is effective, actuation system examination electrical machinery torque, when the discovery torque is higher than assigns the parameter value, after and continues period of time, the driver reports to the police, reports the alarm signal is ***Err-18***, the electrical machinery stops the extension. Needs to use when the user torque overload reports to the police the function, establishes ***Pn23> 0***, reasonably establishes ***Pn22,Pn23*** outside, enables it to care about when the application the event occurs produces as soon as possible reports the error, but cannot occur under the regular service condition reports to the police by mistake.

7.11 ADJUSTMENT

7.11.1 Basic plus adjustment

- Speed control loop

  1) 【 Speed scale plus 】 (Parameter ***Pn30***) setting, make it as big as possible if there is no vibration. Usually, load inertia is bigger and the 【Speed scale plus 】is bigger.

  2) 【 Speed integral time constant 】 (Parameter ***Pn31***) setting, make it smaller according to presetting condition. If【 Speed integral time constant 】is too small, response time will be promoted, but will vibrate easily. Usually, bigger load leads to bigger 【 Speed integral time constant 】.

- Position Control loop

  1) Setting suitable 【 Speed scale plus 】 and 【 Speed integral time constant 】 according to the upper description.

  2) 【 Positing forward plus 】 (Parameter ***Pn44***) Setting as 0%

  3) 【 Position forward plus 】 (Parameter ***Pn44***) can be as bigger as possible in stable range. If【 Position scale plus 】is too bigger, track characteristic of position dictate will be good, and lag error will be small, but it will vibrate easily during positioning stop.

  4) Increasing position forward plus can cause higher track characteristic of position dictates.

  【 Note1 】When system is not stable, increasing 【 Position forward plus 】 could get higher acceleration and deceleration time constant.

  Setting 【position scale plus】according to the following table.

Stiffness	【position scale plus】
Lower stiffness	10～20/S
Middle stiffness	130～50/S
Higher stiffness	50～70/S

7.11.2 Basic parameter adjustment

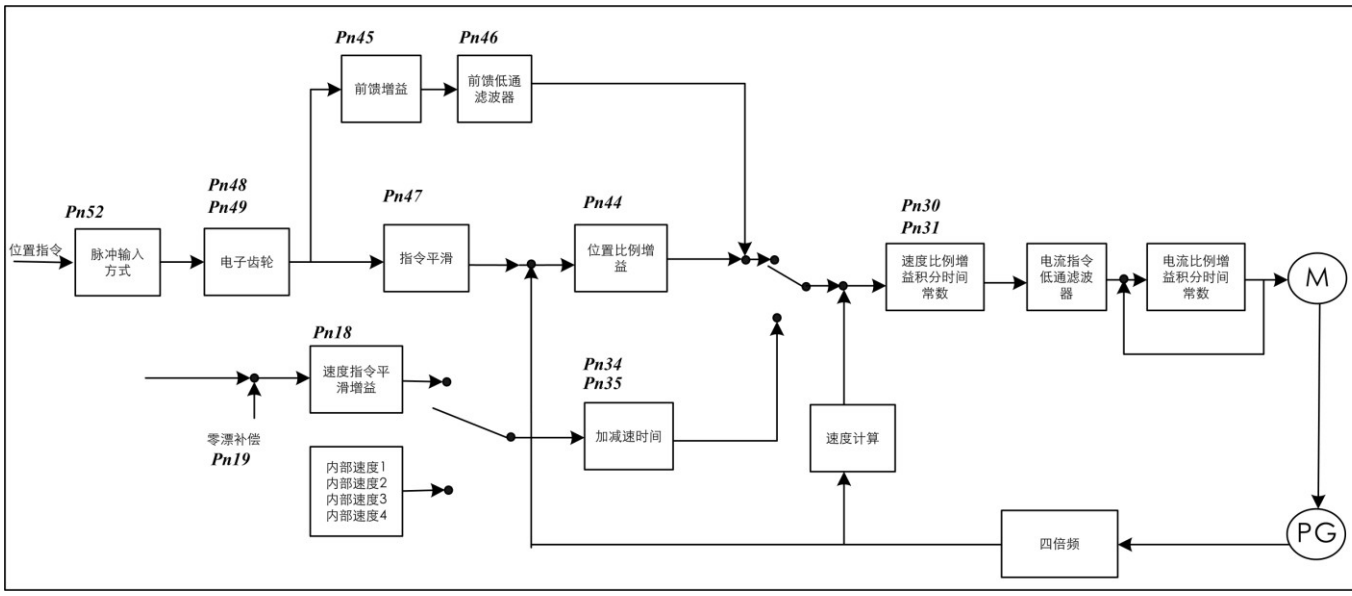


Figure 7.13 basic parameter adjustment

7.12 FREQUENTLY ASKED QUESTIONS

7.12.1 Restores default parameter

Below occurs when the situation, please use restores lacks the province parameter (to leave the plant parameter) the function：

- The parameter is adjusted chaotically, the system is unable the normal work；
- When preserved parameter, the system exactly falls the electricity, creates the system self-recovery to lack the province parameter, but the model code and this driver and the electrical machinery do not match;
- The driver needs to replace the first electrical machinery, newly trades the electrical machinery and the first wife electrical machinery model is different；

Restores lacks province parameter the step to be as follows：

② revises password parameter ***Pn2*** is 28977；

③ lacks the parameter the default value to read in EEPROM。Chooses in 1st "EE-"，Presses the Enter key to enter the parameter management way。First needs to choose the operation pattern, altogether has 5 kind of patterns, with ↑, ↓ the key chooses First needs The choice "", then presses down the Enter key and maintains above for 3 seconds, the monitor demonstrated "", indicated the parameter is reading in EEPROM, after probably waits for a 1~2second time, if writes operates successfully, the monitor demonstrates" start", if is defeated, then demonstrates "error". The choice operation pattern, altogether has 5 kinds of patterns, with Up, Down the key chooses.

4)

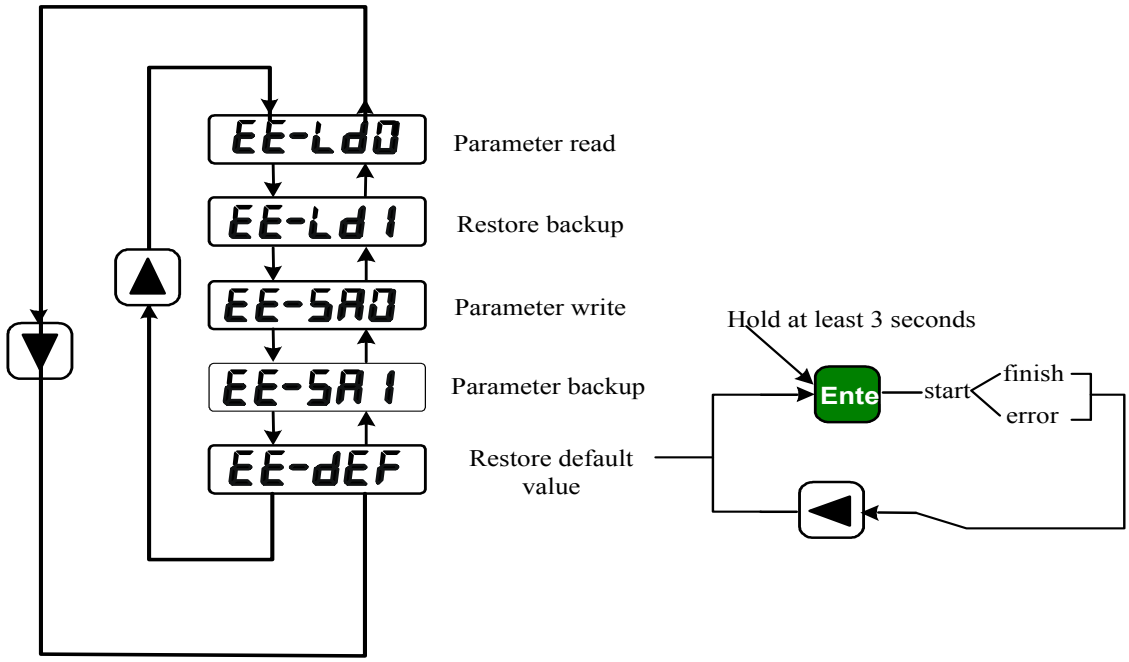


Figure 7.14 resume to default parameter

5) after on step operates successfully, closes the driver power source, then on the electricity, the operation completes again。

7.12.2 Frequently appears Err-2, Err-3, Err-5

These report to the police the explanation photo electricity encoder and its the tie cable existence question, first solves from following several aspects:

- Tie cable and plug whether do have the contact undesirable tendency；
- Whether the tie cable shielded wire does weld；
- Driver earth PE port whether good earth；
- Electrical machinery earth terminal and driver earth PE port whether connects good；
- If the tie cable is longer, possibly creates the power source on electric cable pressure drop oversized, please change to many cores to connect the encoder 5V and the 0V power source
- The tie cable do not have with strong electricity electric cable altogether trough, to try the change tie cable to walk the line;

  If above the measure cannot be effective, please with seller relation.

7.13 INTERRELATED INFORMATION

7.13.1 Setting position resolving index and electron gear

Position resolving index (one electron route △ 1) is according to per turn route △ S of servo motor and feedback pulse P_t of encoder. Their relation is as following:

$$\Delta l = \frac{\Delta S}{P_t}$$

In the equation，

△ l：Route of per pulse (mm);

△ S：Per turn route of servo motor (mm/turn)

P_t：Per turn feedback pulse of Encoder (pulse/turn)

Because there is four times frequency circuit in the system, per turn resolving of encoder is Pt=4×C, C is per turn resolving of encoder. In this system, C=2500 and Pt=10000 pulse/turn.

Dictate pulse multiply the electron gear ratio G to get the position control pulse.

So one pulse route △ 1* is as:

$$\Delta l^* = \frac{\Delta S}{P_t} \times G$$

In the equation，G is electron gear numerator of dictate pulse / electron gear denominator of dictate pulse.

7.13.2 Time position control lag pulse

When with pulse string control servo electrical machinery, between the instruction pulse and the feedback pulse has a bad value, calls the lag pulse, This value accumulates in the position deviation counter below, it with the instruction pulse frequency $\varepsilon = \frac{f^* \times G}{K_p}$ ctronic gear compares with the position proportion increases has relates

In the formula，

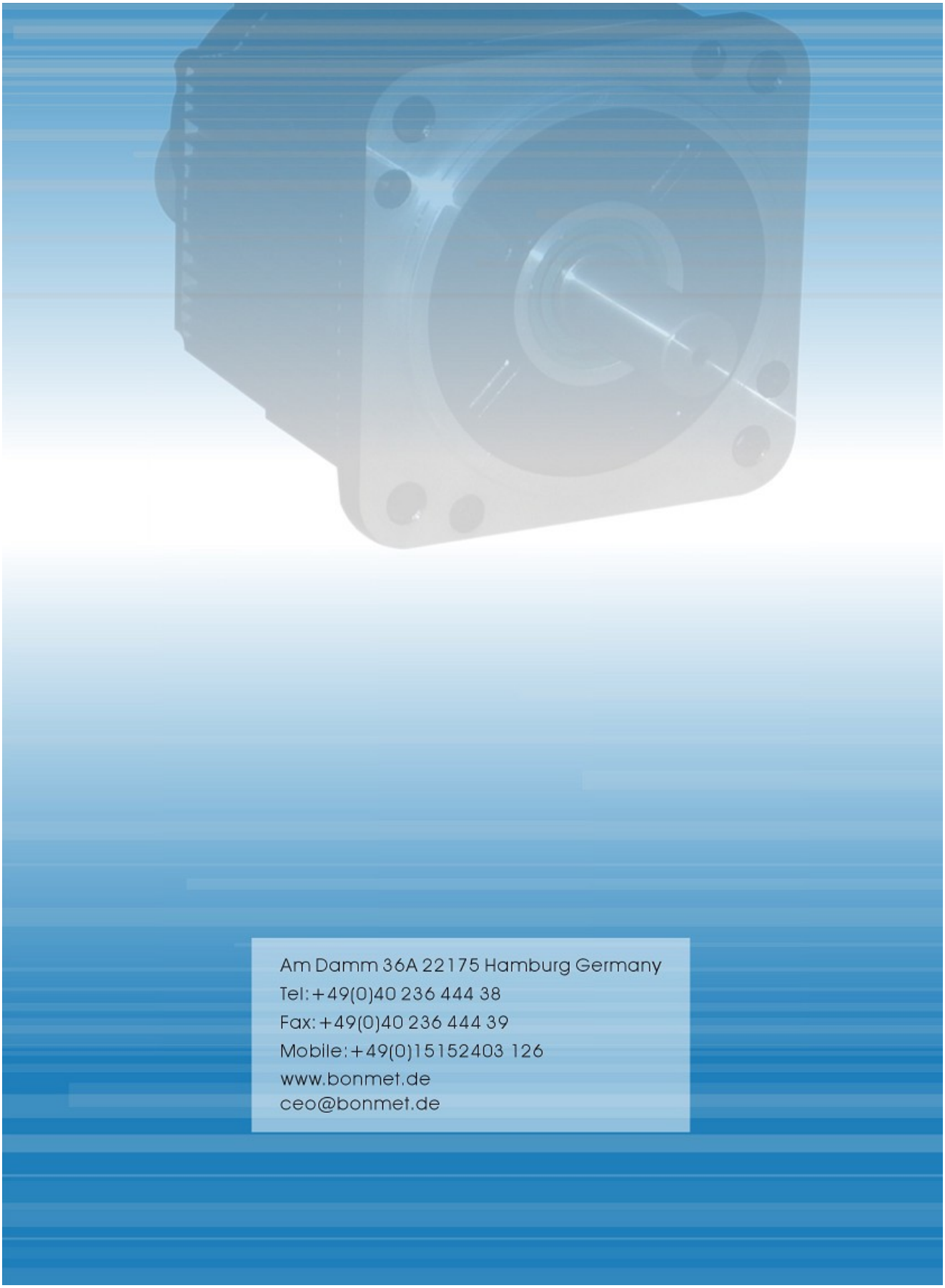
ε：Lag pulse (pulse)；

f^*：Instruction pulse frequency (Hz)；

K_p：Position proportion gain (1/S)；

G：Electronic gear ratio。

[Note 1] above the relations are [increase in position forward feed] are under 0% condition obtain, if [position forward feed increases] > 0%, then the lag pulse can be smaller than the previous type predicted value.



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