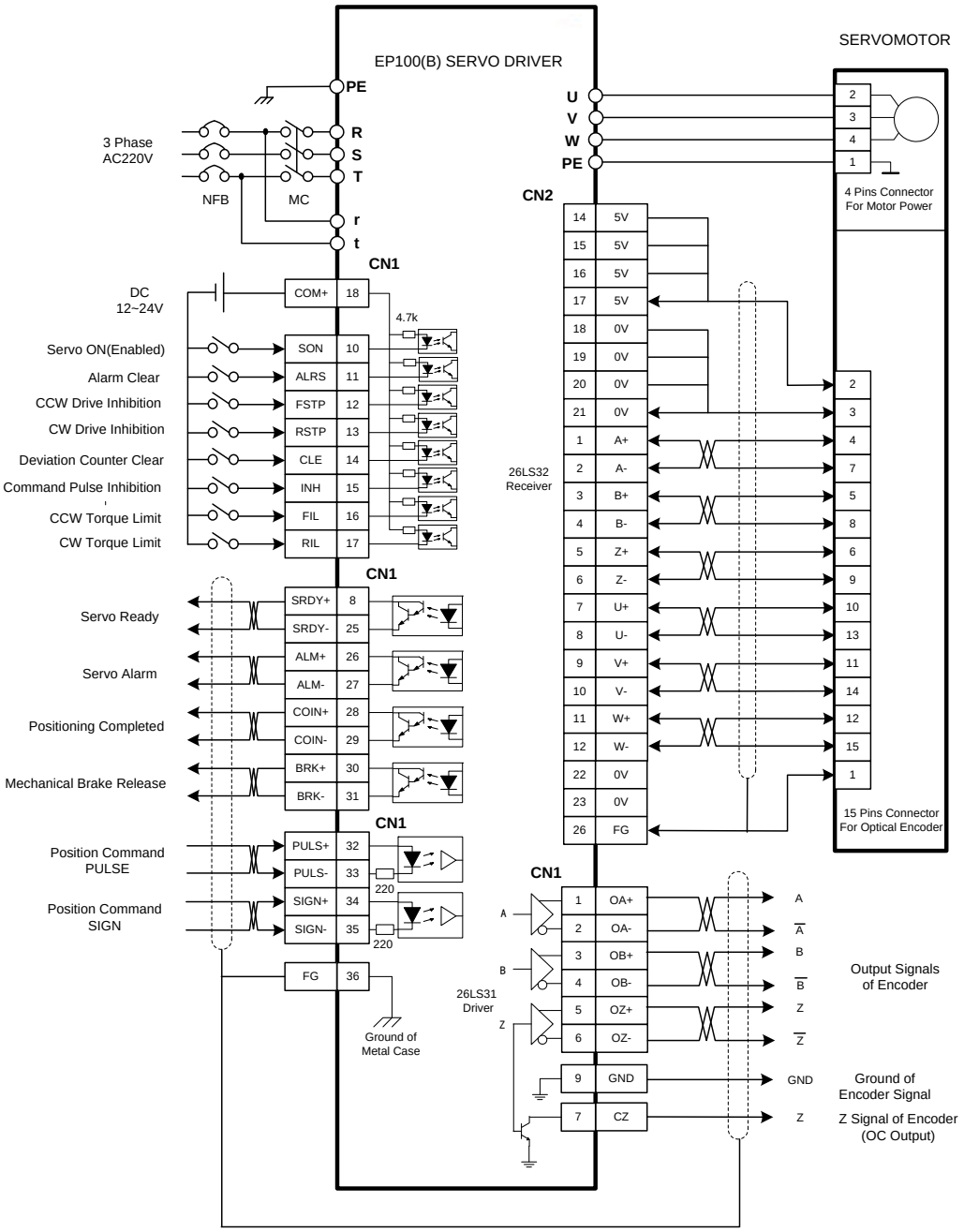
1.1 Standard wiring

Position control



Picture .1 Standard wiring for position control

1.2 Terminal disposition for interface

Figure 2 is the disposition chart of terminal connector CN1 for the servo driver. CN1 is the connector with 36 cores. Figure 3 is the disposition chart of terminal connector CN2 for the servo driver. CN2 is the connector with 26 cores.

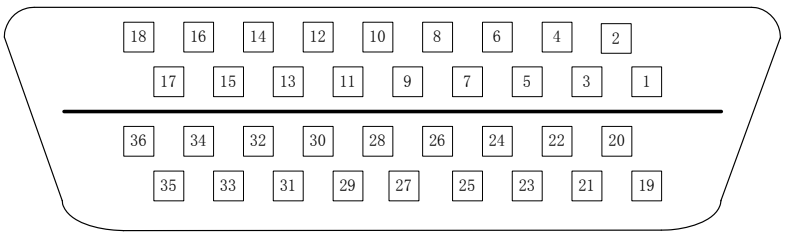


Figure 2 the soldering lug of the CN1 plug（face to lug）

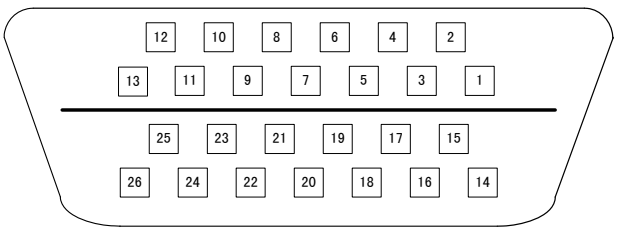


Figure 3 the soldering lug of the CN2 plug（face to lug）

1.3 Parameter table

The default value in the next table take 110ST-M02030 (matches the EP100-2A driver, the example. the parameter "*" symbol is possibly dissimilar in other models.

Table 1 User parameter table

Ordinal	Name	Usage	Range	Default	Unit
0	Password	P，S，T	0~9999	315	
1	Identity code of servo driver	P，S，T	0~51	30*	
2	Software version (read only)	P，S，T	*	*	
3	Status of initial display	P，S，T	0~21	0	
4	Control mode selection	P，S，T	0~6	0	
5	Proportional gain of speed loop	P，S	5~2000	150*	Hz
6	Integral time constant of speed loop	P，S	1~1000	20*	ms
7	Filter of torque	P，S，T	20~500	100	%
8	Filter for speed detection	P，S	20~500	100	%
9	Proportional gain of position loop	P	1~1000	40	1/s
10	Feed forward gain of position loop	P	0~100	0	%
11	Cut-off frequency of feed forward filter for position loop	P	1~1200	300	Hz
12	Numerator of frequency divider for position command pulse	P	1~32767	1	
13	Denominator of frequency divider for position command pulse	P	1~32767	1	
14	Input mode of position command pulse	P	0~2	0	
15	Reversing direction of position command pulse	P	0~1	0	
16	Positioning completed range	P	0~30000	20	pulse
17	Position deviation limit for error detection	P	0~30000	400	×100 pulse
18	Neglect excessive position deviation	P	0~1	0	
19	Smooth filter for position command	P	0~30000	0	0.1ms
20	Neglect drive inhibition inputs	P，S，T	0~1	0	
21	JOG running speed	S	-3000~3000	120	r/min
22	Internal/external speed command selection	S	0~2	1	
23	Maximum speed limit	P，S，T	0~4000	3600	r/min

Ordinal	Name	Usage	Range	Default	Unit
24	Internal speed 1	S	-3000~3000	0	r/min
25	Internal speed 2	S	-3000~3000	100	r/min
26	Internal speed 3	S	-3000~3000	300	r/min
27	Internal speed 4	S	-3000~3000	-100	r/min
28	Arrival speed	S	0~3000	500	r/min
29	Input gain of analog torque command	T	10~100	30	0.1V/100%
30	Alarm level of torque overload	P，S，T	1~300	300	%
31	Detection time for torque overload alarm	P，S，T	0~32767	0	ms
32	Permission of control mode exchange	P，S，T	0~1	0	
33	Inversing direction of analog torque command	T	0~1	0	
34	Internal torque limit in CCW direction	P，S，T	0~300	300*	%
35	Internal torque limit in CW direction	P，S，T	-300~0	-300*	%
36	External torque limit in CCW direction	P，S，T	0~300	100	%
37	External torque limit in CW direction	P，S，T	-300~0	-100	%
38	Trial running in speed mode; Torque limit in JOG operation	S	0~300	100	%
39	Zero offset compensation of analog torque command	T	-2000~2000	0	
40	Acceleration time constant	S	1~10000	0	ms
41	Deceleration time constant	S	1~10000	0	ms
42	S-curve acceleration/deceleration time constant	S	1~1000	0	ms
43	Gain of analog speed command	S	10~3000	300	(r/min) / V
44	Reversing direction of analog speed command	S	0~1	0	
45	Zero offset compensation of analog speed command	S	-5000~5000	0	
46	Time constant of filter for analog speed command	S	0~1000	300	Hz

Ordinal	Name	Usage	Range	Default	Unit
47	Action setting for electromagnetic brake when servomotor is in standstill	P，S，T	0~200	0	×10ms
48	Action setting for electromagnetic brake when servomotor is in motion	P，S，T	0~200	50	×10ms
49	Action speed for electromagnetic brake when servomotor is in motion	P，S，T	0~3000	100	r/min
50	Speed limit in torque control	T	0~5000	3600*	r/min
51	Electronic gear is available in dynamic	P	0~1	0	
52	Second numerator of frequency divider for position command pulse	P	1~32767	1	
53	Bottom four bits control word for forcing the input terminal to be ON	P，S，T	0000~1111	0000	Binary
54	Top four bits control word for forcing the input terminal to be ON	P，S，T	0000~1111	0000	Binary
55	Bottom four bits control word for inversing the terminal input signal	P，S，T	0000~1111	0000	Binary
56	Top four bits control word for inversing the terminal input signal	P，S，T	0000~1111	0000	Binary
57	Control word for inversing the terminal output signal	P，S，T	0000~1111	0000	Binary
58	Time constant of input terminal for removing the effect of vibrating contact	P，S，T	1~1000	16	0.1ms
59	Demonstration operation	P，S	0~1	0	

1.4 Alarm table

Table 2 Alarm table

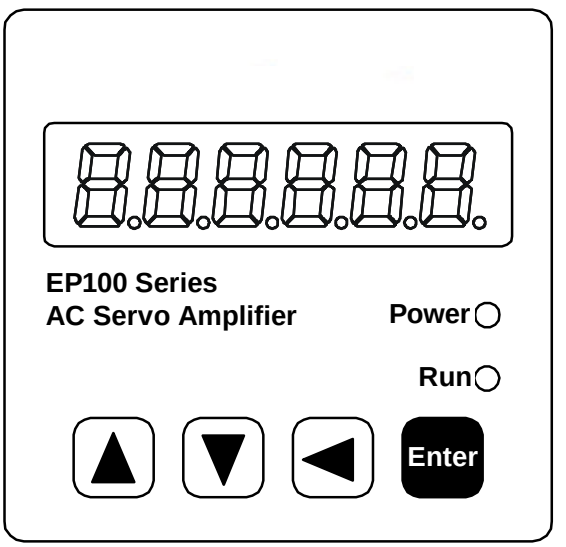
Alarm code	Alarm name	Alarm content
--	Normal	
1	Over speed	Servomotor speed exceeds the speed limit.
2	Over voltage of the main power supply	The voltage of the main power supply exceeds the specified value.
3	Under voltage of the main power supply	The voltage of the main power supply exceeds the specified value.
4	Position deviation exceeds the limit value	The counter of position deviation exceeds the setting limit value.
5	Servomotor over heat	The temperature of servomotor is too high
6	Saturation fault of the speed amplifier	The speed regulator is in saturation status for a long time
7	Drive inhibition is abnormal	CCWL、CWL the inputs of drive inhibition are OFF.
8	Overflow of position deviation counter	The absolute value of position deviation counter exceeds 2^{30}
9	Encoder signal fault	Lack of the signals of encoder
10	Under voltage of control power supply	The voltage of control power supply is too low.
11	IPM model fault	IPM intelligent model fault
12	Over current	Over-current of servomotor
13	Overload	Overload of servomotor and servo driver (instantaneous over heat)
14	Brake fault	Fault occurs in brake circuit
15	Encoder counter error	Encoder counter is abnormal.
16	Over-heat of servomotor	The heat load of servomotor exceeds the setting value (I^2t detection)
17	Speed response fault	Speed deviation is too big for a long time
19	Over heat reset	System was reset by over heat fault
20	EEPROM error	EEPROM is in error
21	U4 error	U4 is in error
22	Reserved	
23	U6 chip error	U6 chip or current sensor is in error
29	Over torque alarm	The torque of servomotor exceeds the setting value and sustained time

30	Lost Z signal of encoder	Z signal of encoder is loss.
31	UVW signals error of encoder	The UVW Signals error or pole number does not match with the servomotor
32	Illegal code of encoder UVW signals	UVW signals are all high level or low level

1.5 Display

The front panel consists of the display (6-digit, 7-segment LED) and four switching buttons (↑、↓、←、Enter). It is used for display the system status, parameter setting and so on. Operation is executed in layer. ← and Enter button expresses the layer going backward and forward respectively; The Enter button has the meaning of enter, confirm. The ← button has the meaning of exit, cancel. The ↑ and ↓ button expresses increase and decrease of serial number or value size respectively; if press down and hold the ↑ or ↓ button，then has the effect of repeat for doing so; And the longer of holding the higher of repeat rate.

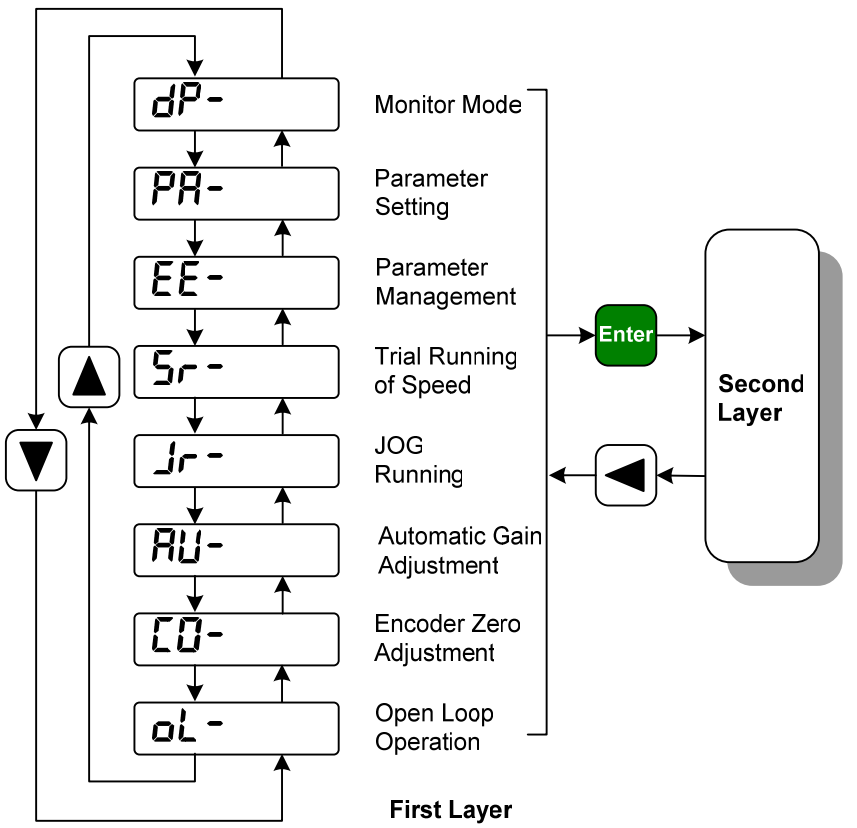
If 6 LED digit or decimal point of the most right side LED digit is twinkling, shows that any alarm occurs. If the POWER lamp lit indicates that the main power supply is on. If the RUN lamp has lit, indicates that the servomotor is in motion.



Picture 4 Front panel

1.6 Display First layer

Use the first layer to select the operation mode, There are seven operation mode can be selected by using ↑ or ↓ button， Then press down the Enter button for entering the second layer that has selected. After that if press down the ← button, then return to the first layer again.

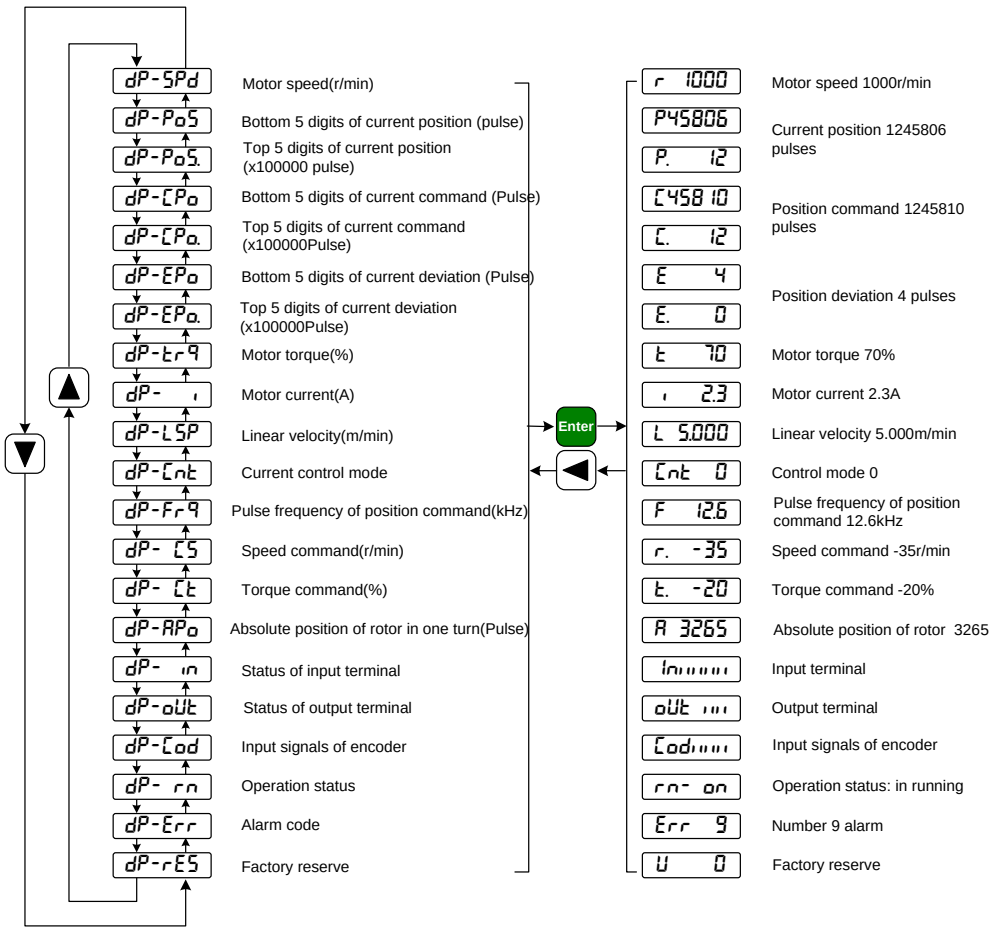


Picture 5 Diagram of operation mode selection

1.7 Display Second layer

1.7.1 Monitor mode

If has chosen the monitor mode "dP- " in the first layer, Press the Enter button to enter the monitor mode. There is twenty one monitor's status. Use ↑ and or ↓ button to select the needing monitor's status; Press the Enter button again to enter the concrete display condition.

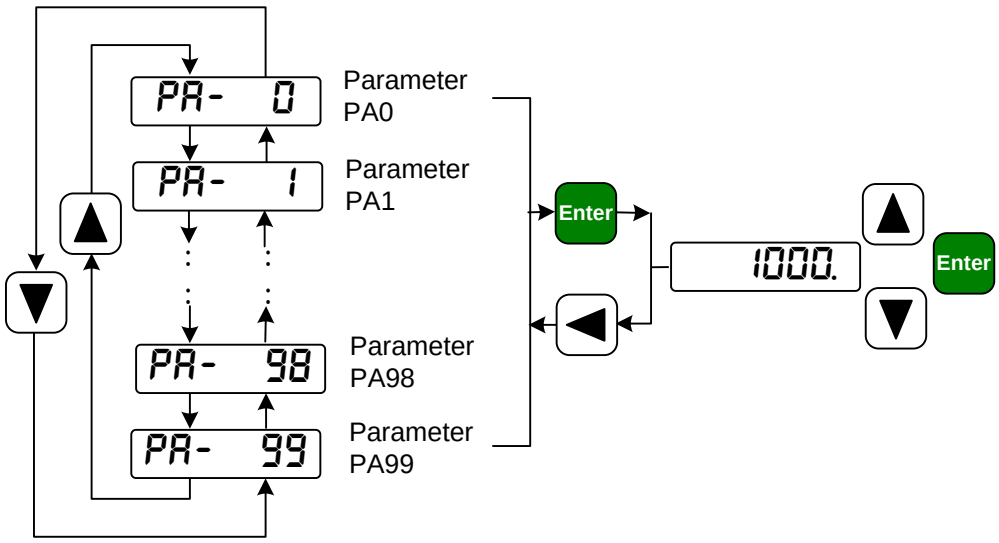


Picture 6 Diagram of monitor mode operation

1.7.2 Parameter setting

If has chosen the parameter setting mode "PA- " in the first layer, Press the Enter button to enter the parameter setting mode. Use ↑ and or ↓ button to select the number of parameter. Press the Enter button to display the value of selected parameter. Use ↑ and ↓

button to be able to modify the parameter value. Press ↑ (or ↓) button once to increase (or decrease) the parameter value by one. Pressing down and hold the ↑ (or ↓) button, the parameter can increase (or decrease) continuously. When the parameter value is modified, the decimal point on the most right sides LED is lit. Press Enter to confirm the parameter value to be effective, meanwhile the decimal point is turned off. The modified parameter value is immediately active to influence on the control. Hereafter pressing ↑ or ↓ button can continue to modify the parameter. After finishing modification of parameter, press the ← button to return to the parameter number selection. If the value of the parameter is not satisfied, do not press the Enter button and can press ← button to cancel and to resume the original parameter value and to return to the parameter number selection.



Picture 7 Diagram of parameter setting operation

1.7.3 Parameter management

Choose the parameter management mode "EE- " in the first layer. Press the Enter button for entering the parameter management mode in which operation is performed between the parameter list and the EEPROM.

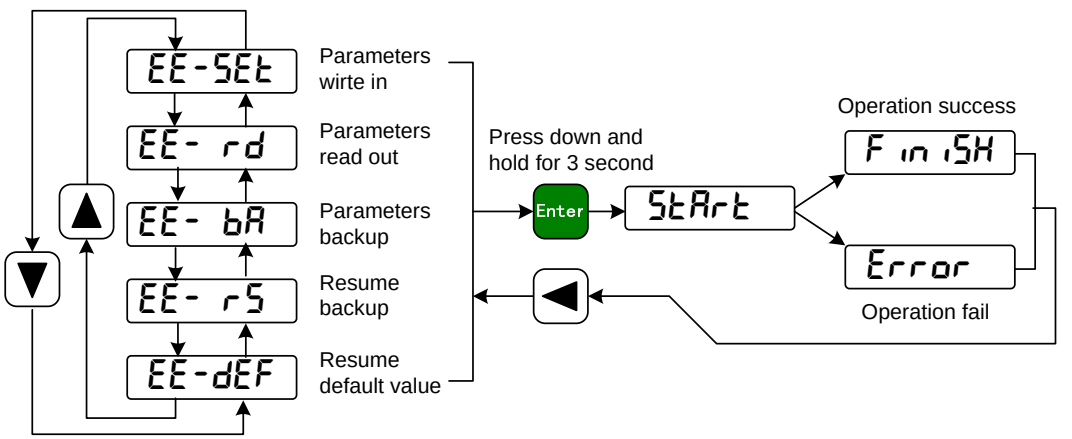
There are five operation modes. First use ↑ and or ↓ button to select an operation mode. Take "parameter write in" as the example, select "EE-SEt" and then pressing down and hold the Enter button at least three seconds to active the writing operation mode. The "StArt " is displayed in the front panel indicating that the parameter is writing into EEPROM. Waiting for about 1 to two second, if the writing operation is successful, then the "F in ISH" will display, if it is fail the "Error " will display. After finished the operation and then press the ← button for returning to the operation mode selection.

- EE-SEt Parameter write

  This operation indicates that the parameter in parameter list will write to EEPROM. The user has made change to a parameter. This only change the value of the parameter in parameter list, but in the next time when the power supply is on the parameter will restore its original value. Making permanent change to a parameter value, it is the need to carry out the parameter write operation and write the parameter to EEPROM, in later when the power supply is on and will be able to use the parameter.

- EE-dEF Resume default value

  This operation indicates that each default value of all the parameters will read and write to the parameter list and EEPROM. For the next time when power supply is on the default parameters will be used by now. When many parameters become confusion and cause abnormal operation, it is necessary to carry out this operation for resuming the default parameters. There are different default parameters for different servo driver model and the servomotor model. Therefore, before doing this operation the servo driver code (Parameter P001) and the servomotor code (Parameter P002) must be selected correctly.



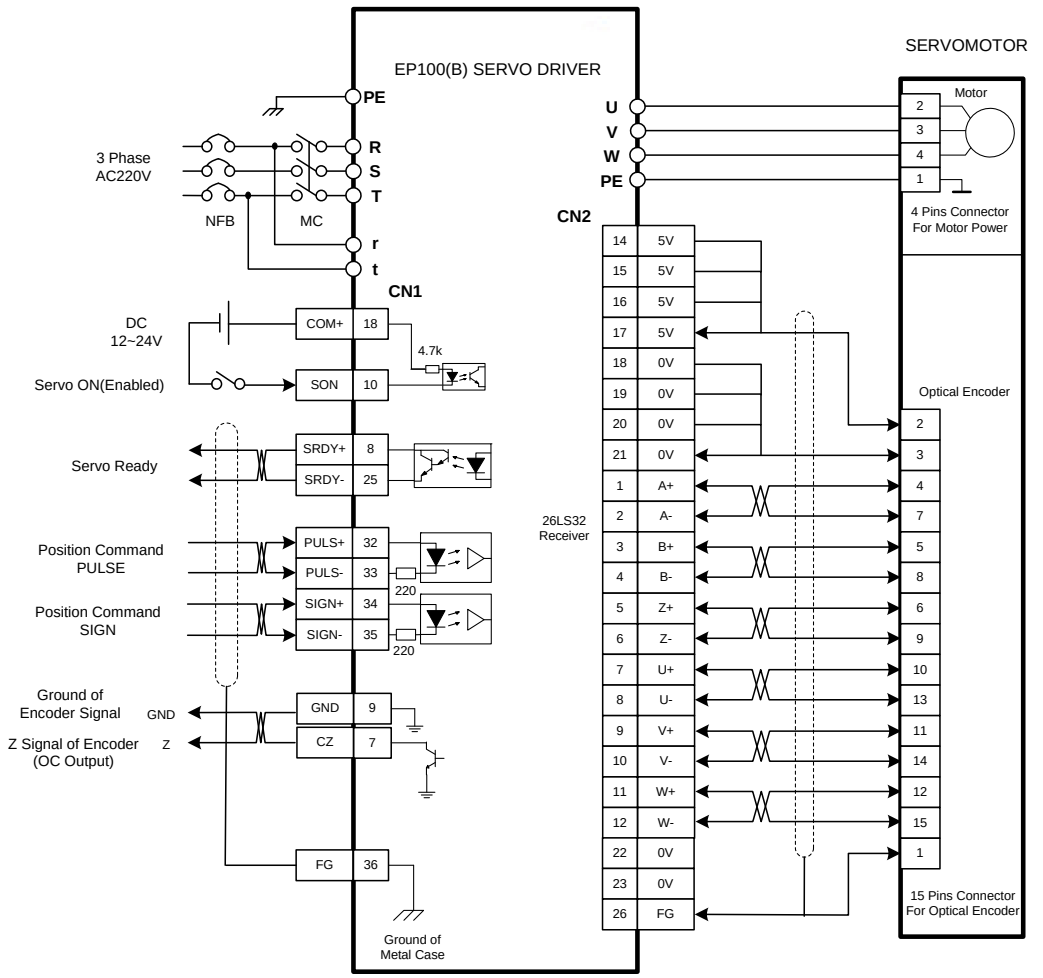
Picture 8 Diagram of parameter management operation

1.8 Operation of position control mode with simple wiring

1．Wiring

According to the picture 9 make the wiring carefully.

- The main circuit terminal R、S and T connect with three phase AC 220V power supply.
- The terminal ‘r’ and‘t’ of control power supply connect with single phase AC 220V power supply.
- The output terminals(U,V,W) must be connected with the servo motor connections(U,V,W) correspondently, otherwise the servo motor will stop or over speed.
- Using the encoder connector CN2 connect the servo driver with the servomotor.
- Using the control signal connector CN1 connect other wiring according to the drawing.



Picture 9 Simple wiring diagram of position control mode

2．Operation

- Turn on the control power supply and then the main power supply. The display of the front panel is lit. The POWER indicating LED is lit.
- Set parameters according to the table below：

Number of parameter	explanation	Setting value	Default value
PA4	Control mode selection	0	0
PA12	Numerator of electronic gear	By user setting	1
PA13	Denominator of electronic gear	By user setting	1
PA19	Smooth filter for position command	0	0
PA20	Neglect drive inhibition inputs	1	0

- Confirming that there is neither any alarm nor any unusual situation, the servo enable (SON) signal is given, then the RUN indicating LED lit and the servomotor is active at zero speed state by now. Send low frequency command pulse from the host controller to the servo driver and make the servomotor running under low speed.