

# Servo Motor Instruction Manual

## 1. Installation and Wiring

### 1.1 Installation notes of motor

- ◆ **Location:**  
Indoors, where the driver is not subjected to rain water and direct sun beams.  
Avoid the place where the driver is subjected to corrosive gases, flammable gases, grinding liquids, oil mists, iron powders and cutting particles.  
Place in well ventilated, and humid- and dust- free space.  
Easy maintenance, inspections and cleaning are also important.
- ◆ **How to install:**  
The motor can be installed either vertically or horizontally. Observe the following notes.
  - A. Horizontal mounting---- Place the motor with the cables outlet facing down to prevent the entry of oil and water.
  - B. Vertical mounting---- If the motor is coupled with mechanical devices, make sure the oil and water of the mechanical device does not enter into the motor.
- ◆ Don't hit the end bracket of the motor; otherwise the encoder will be damaged.
- ◆ Flexible coupling is recommended in order to keep the radial load smaller than the permissible value.
- ◆ Don't hit the shaft with a hammer directly while attaching/detaching the coupling to the motor shaft. (Otherwise the encoder or the end bracket will be damaged.)
- ◆ Make sure that both of radial and thrust load be applied to the motor shaft during installing and running becomes within the specified value of each model.

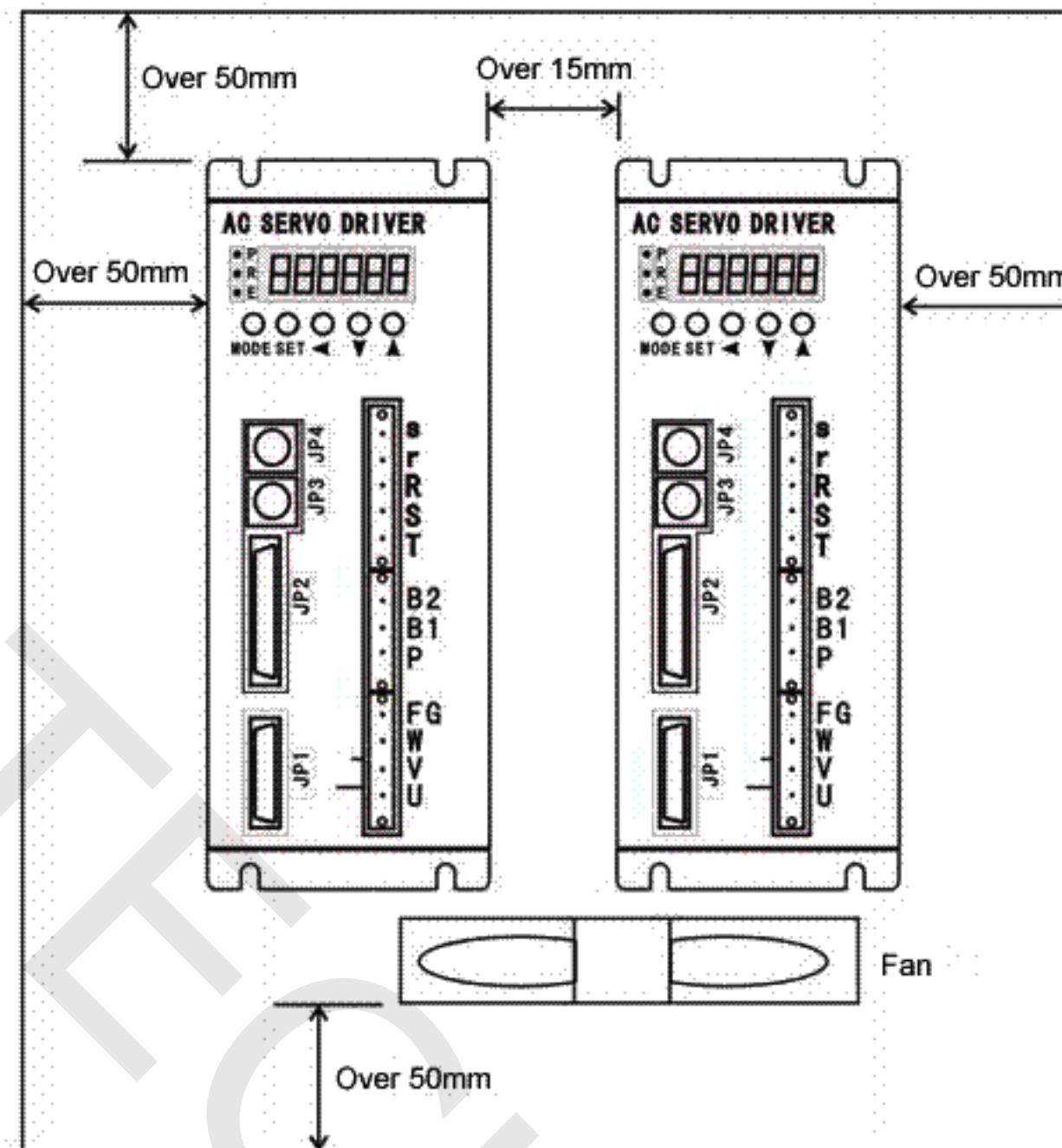
### 1.2 Installation notes of driver

- ◆ **Location:**  
Indoors, where the driver is not subjected to rain water and direct sun beams.  
Avoid the place where the driver is subjected to corrosive gases, flammable gases, grinding liquids, oil mists, iron powders and cutting particles.  
Place in a well ventilated, and humid- and dust- free space.  
Place in a vibration-free place.
- ◆ **How to install:**  
Place the driver vertically. Allow enough space surrounding for ventilation.
- ◆ Fit to noncombustible such as metal.
- ◆ If it is possible, please install fans to provide a uniform distribution of temperature in control box.
- ◆ When the power supply of the driver is shared with machines such as electric welding machine or a discharge processing machine, or even when it is not shared but a source of a high-frequency noise is in the surrounding environment, take actions such as inserting an insulating transformer and a noise filter to the power supply.
- ◆ Allow enough space to ensure enough cooling, ventilation and dry.
- ◆ Avoid the place where the driver is subjected to vibration and knockout.
- ◆ Prevent metal grinding rust and iron powders to enter into the driver possibly.
- ◆ Make sure that the driver is fixed firmly during installation.
- ◆ Be sure to use a crimp contact with insulated coating for connection to each terminal on the terminal block.
- ◆ Avoid the damage to the driver , a 10 seconds of interval between power off and power on again is preferable.
- ◆ After shutting off the driver supply, leave it at least for 10 minutes or more to touch the driver



terminals. Failure to observe this instruction could result in electric shocks.

- ◆ On installation of two or more servo drivers, leave a large clearance between the top of the servo amplifier and the internal surface of the control box, and install a fan to prevent the internal temperature of the control box from exceeding the environmental conditions.



Installation diagram of multiple drivers

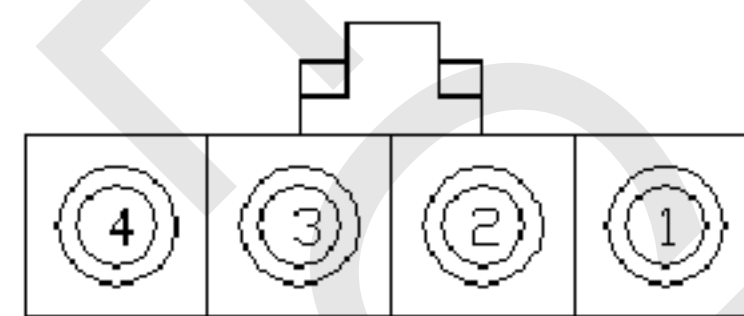
### 1.3 Wiring notes

Item	Purpose	Wiring type	Specification	Remarks
1	Power wires	Proper wire gauge, environmental conditions	Leave a space of 30cm or more between the power wires and do not wire them in the same duct.	Ensure that wire gauge is proper to the motor current
2	Motor wires			Ensurer that motor phase sequence is matching the driver
3	Signal wires	Twisted-pair shielded wire	The max. length of the command input wire is 3m.	
4	Encoder wires		The max. length of the encoder input wire is 20m.	
5	Grounding wires	Wires as heavy as possible	One-point grounding must be applied, and the max. grounding resistance is 100Ω .	If the motor is electrically insulated from the machine, ground the motor.
6	Analog signal wires	Shielded wire		
7	Regenerative brake resistor			Well connected and well ventilated
8	Brake			the surge absorbing diode is needed

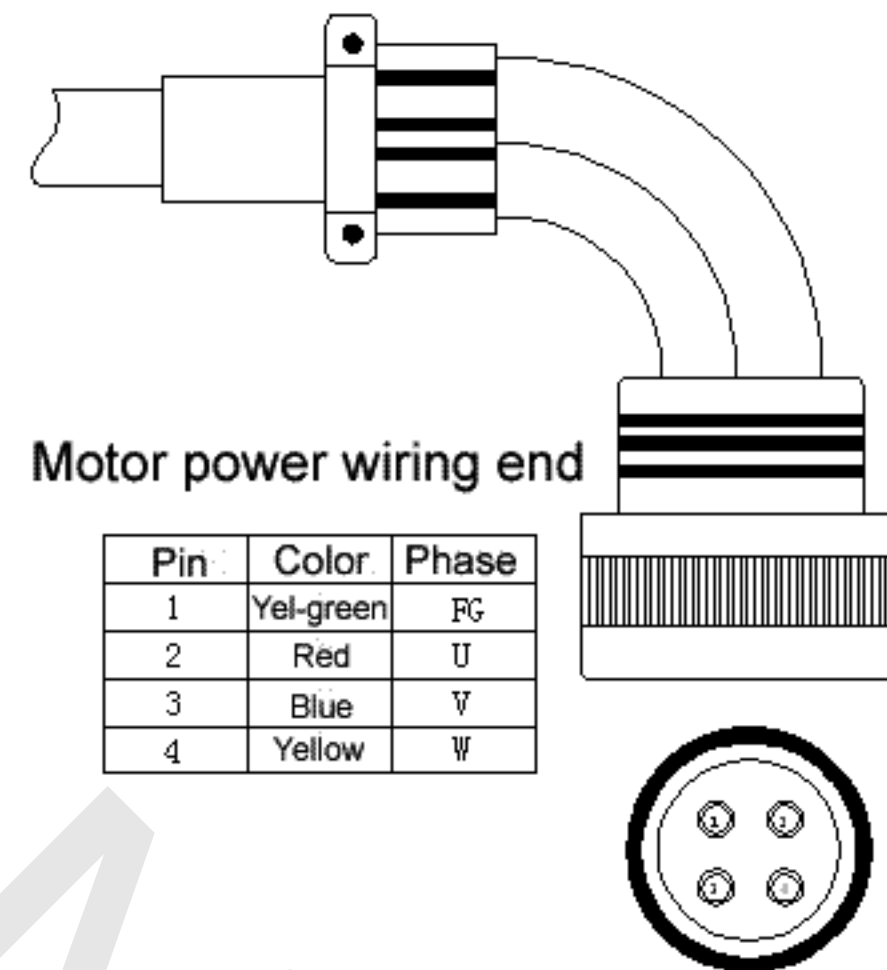
## 1.4 Motor power cord define

Motor		Symbol			
Motor model	Drawing type	U	V	W	FG
40BL(3)~76BL(3)	Plastic 4-cord plug	1 (Red)	2 (Blue)	3 (Yellow)	4 (Green/Yellow)
92BL(3)~123BL(3)	Connector	1 (Red)	2 (Blue)	3 (Yellow)	4 (Green/Yellow)

Motor power wiring end



Pin	Color	Phase
1	Red	U
2	Blue	V
3	Yellow	W
4	Yel-green	FG



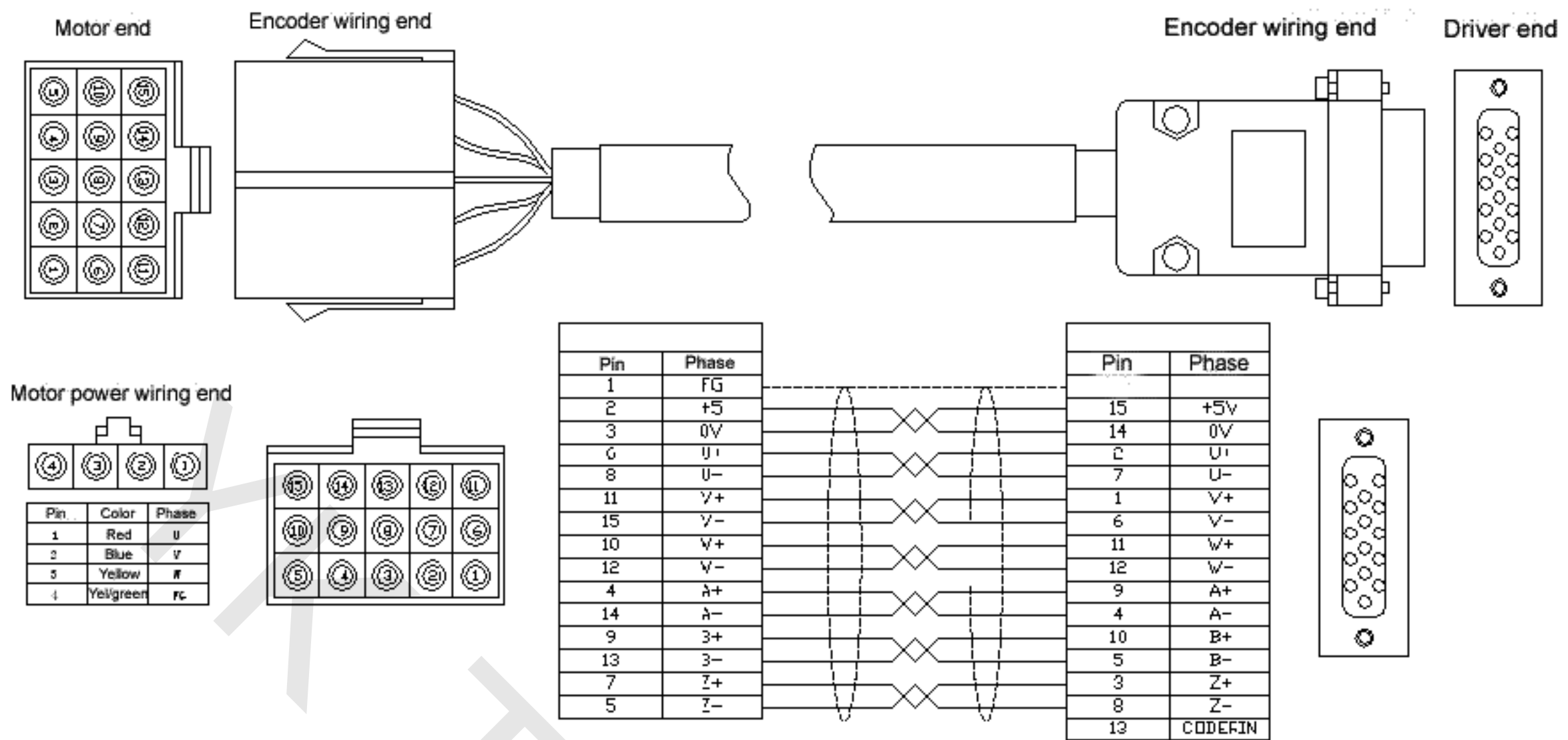
Motor power wiring end

Pin	Color	Phase
1	Yel-green	FG
2	Red	U
3	Blue	V
4	Yellow	W

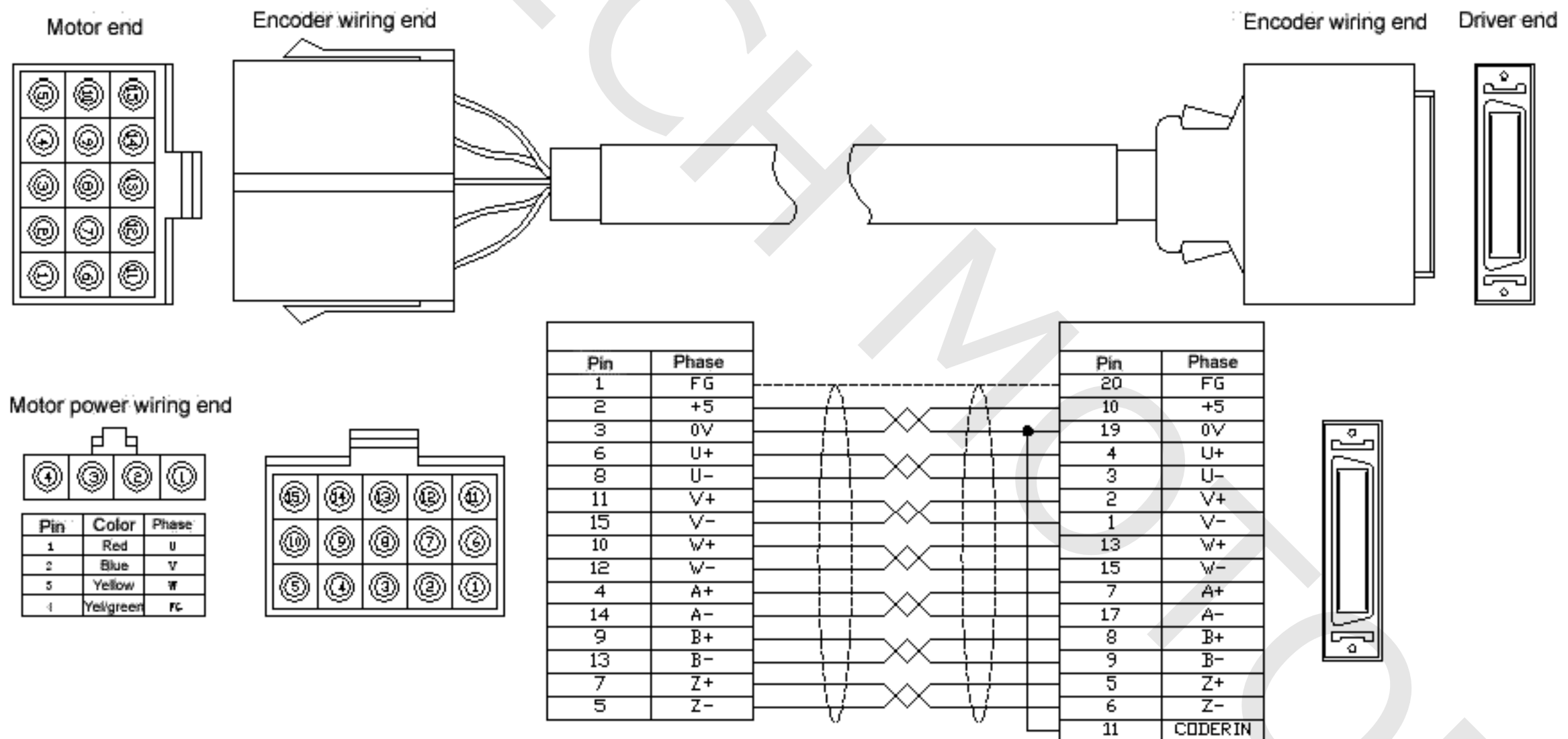
## 1.5 Motor encoder wire definition

- 1) On the side of the motor is plastic plug, and on the side of the driver is D-type connector. (The power of the motor is between 30 and 100 watts.)

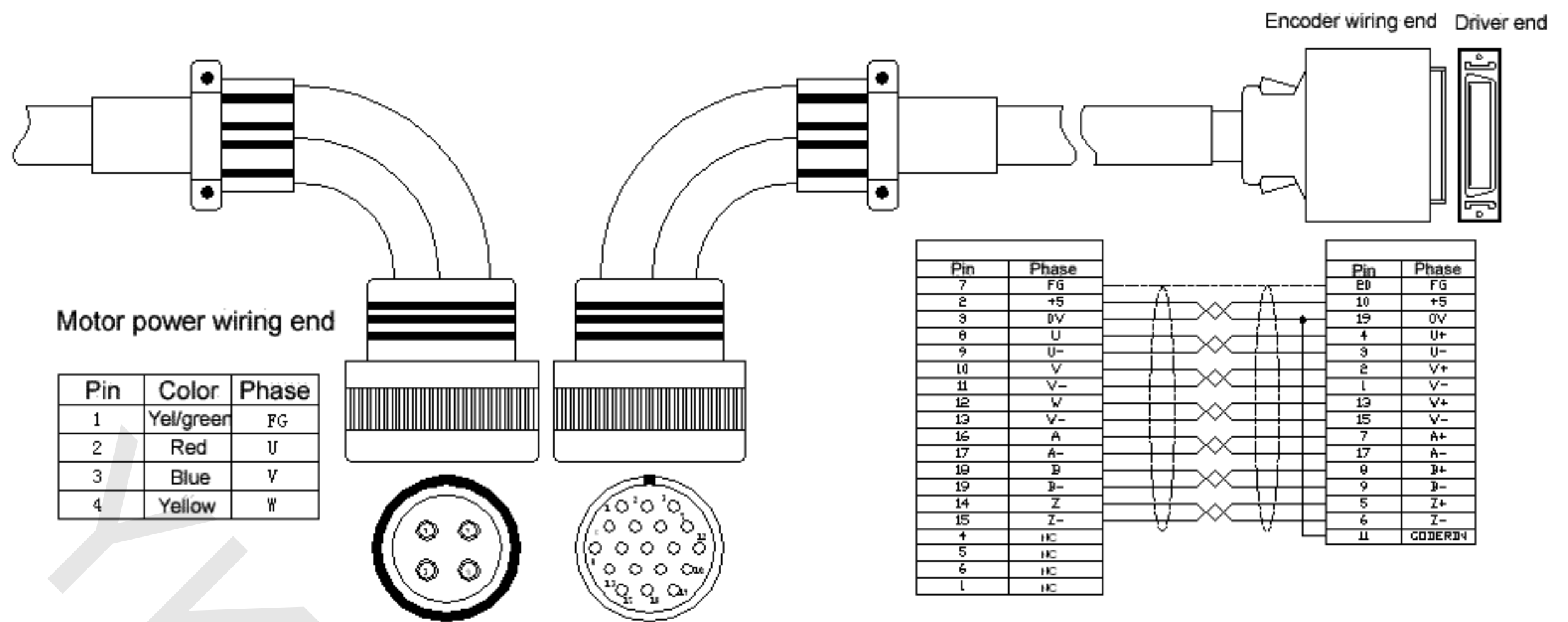




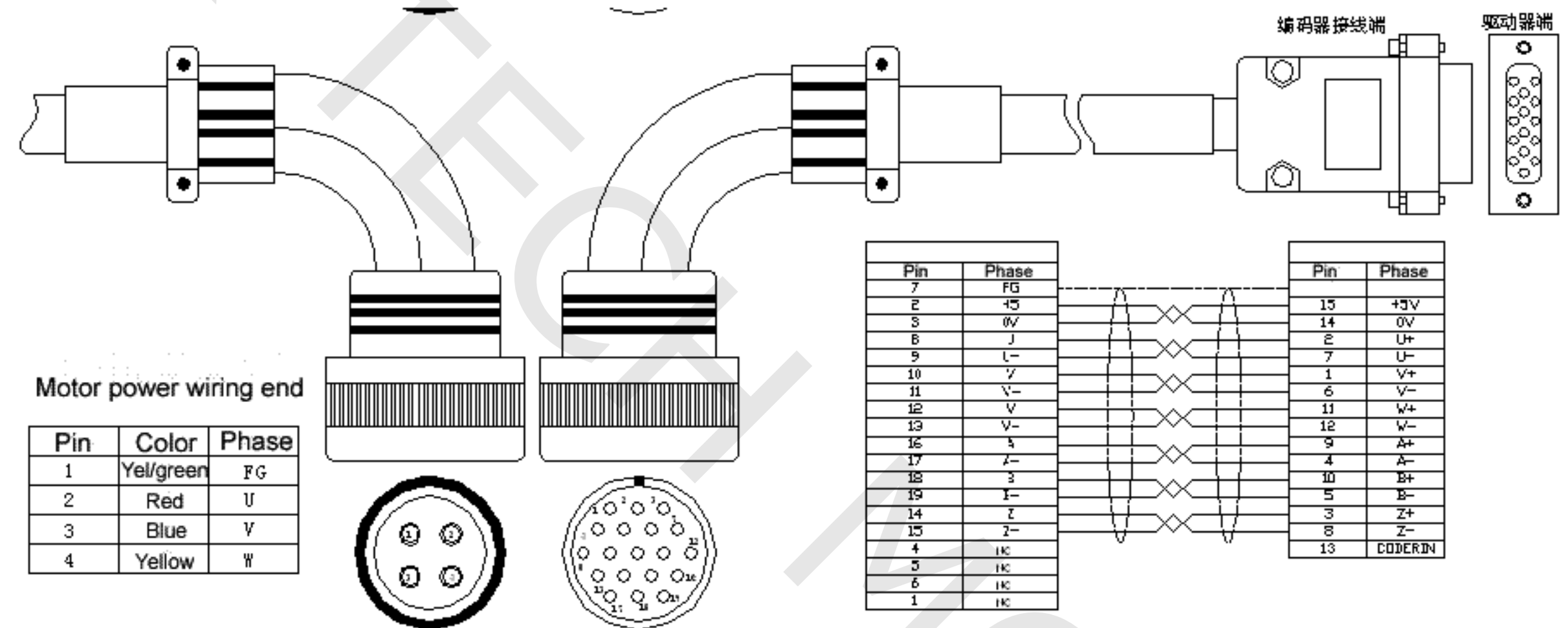
2) On the side of the motor is plastic plug, and on the side of the driver is SCSI-type connector.



3) On the side of the motor is plug, and on the side of the driver is SCSI-type connector.(the motor power is between 200 and 1500 watts)



4) On the side of the motor is plug, and on the side of the driver is D-type connector.(the motor power is between 2000 and 4000 watts)



## 2. Control mode and wiring (PSDA-0233A4----PSDA-1533A4)

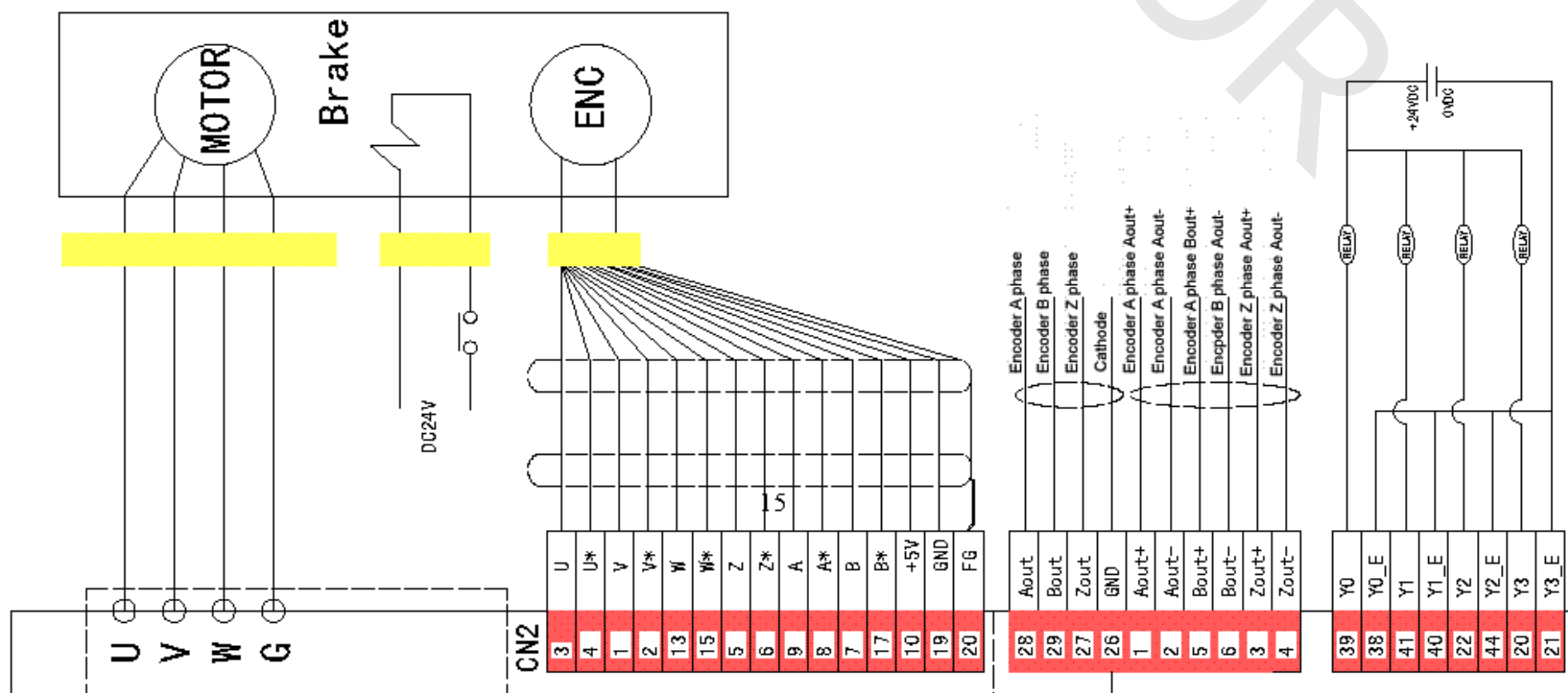
### 2.1 Position control mode:

Parameters must be changed: Control mode Pr51:=1

Need to be changed: Pulse mode Pr5E:= 0: Pulse+Sign 1: Phase pulse 2: CW+CCW

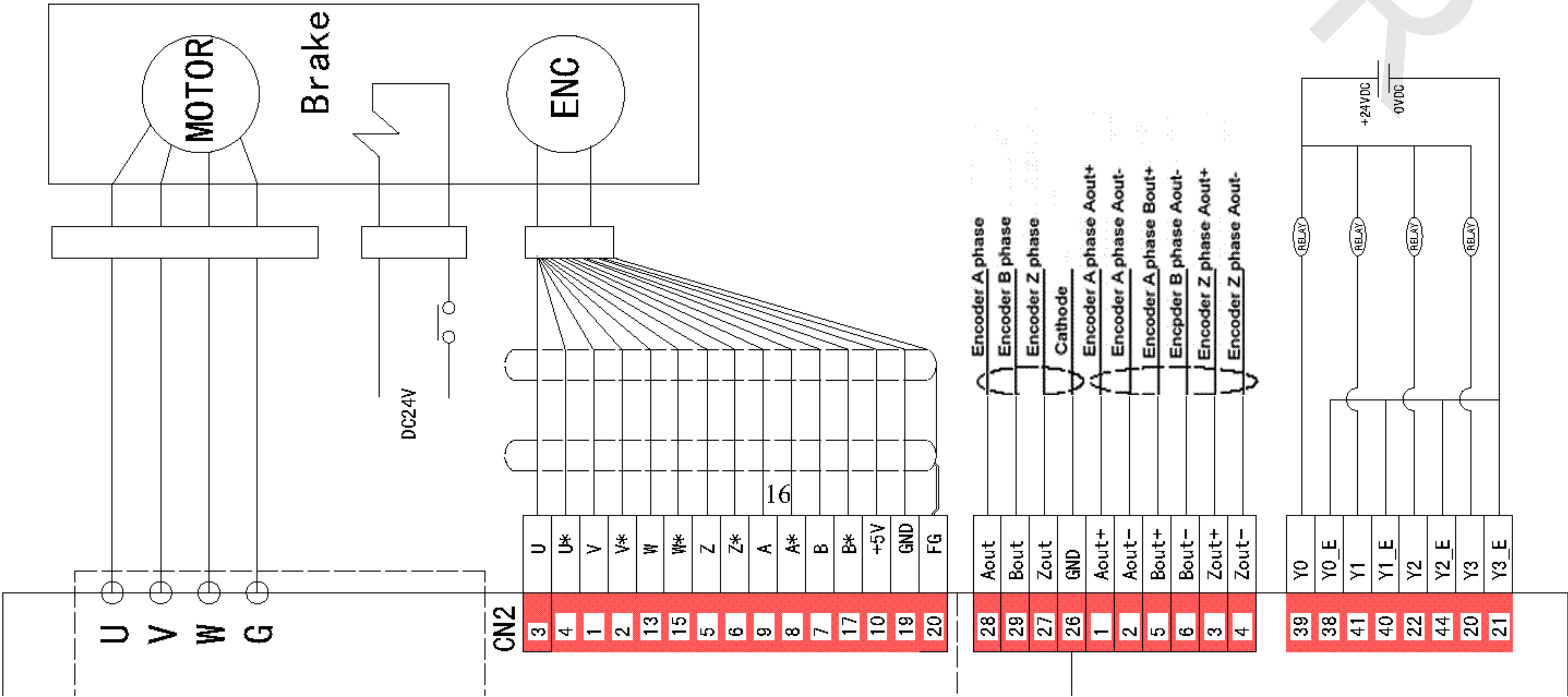
Need to be changed: Motor rotating direction Pr5B= 0: CW 1: CCW

Need to be changed: Electronic gear ratio, numerator Pr34/ denominator Pr35



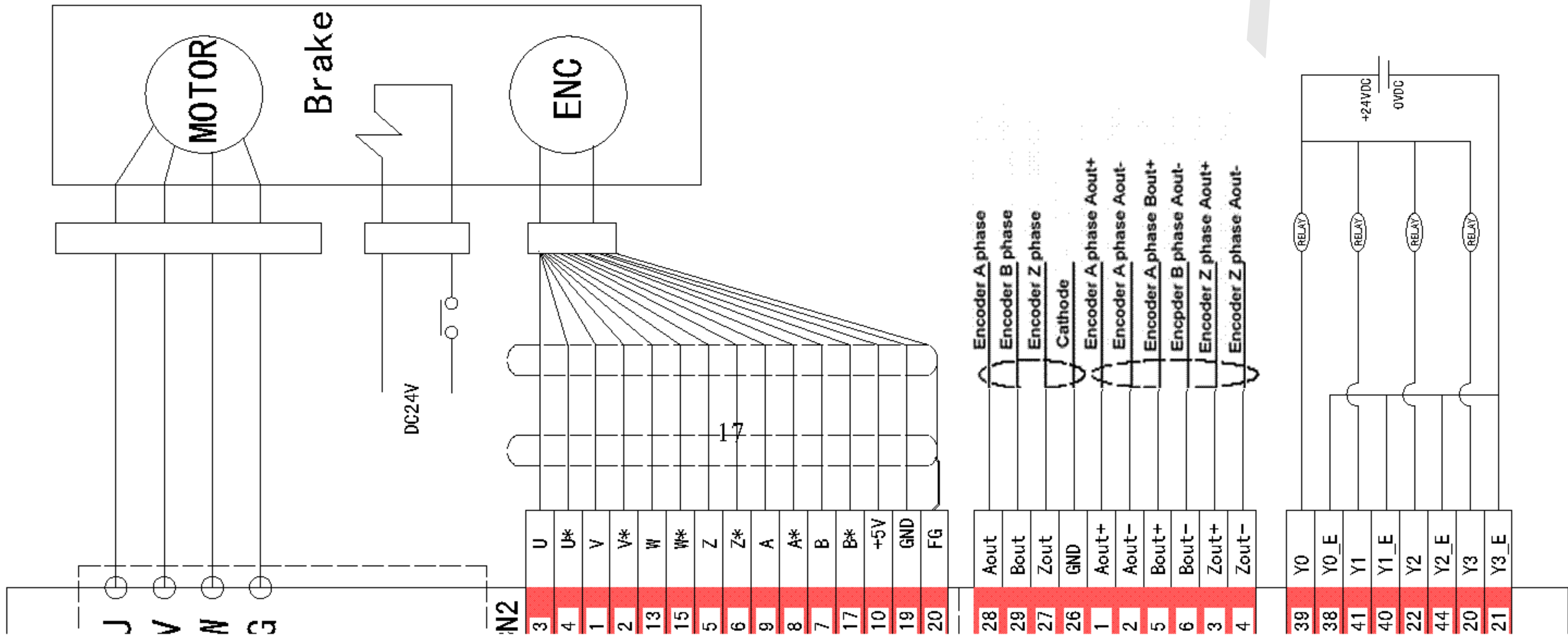
2.2 Speed control mode:

- Parameters must be changed: Control mode Pr51:=2
- Need to be changed: Speed input gain Pr48
- Need to be changed: Motor rotating direction Pr5B= 0: CW 1: CCW



2.3 Torque Control Mode:

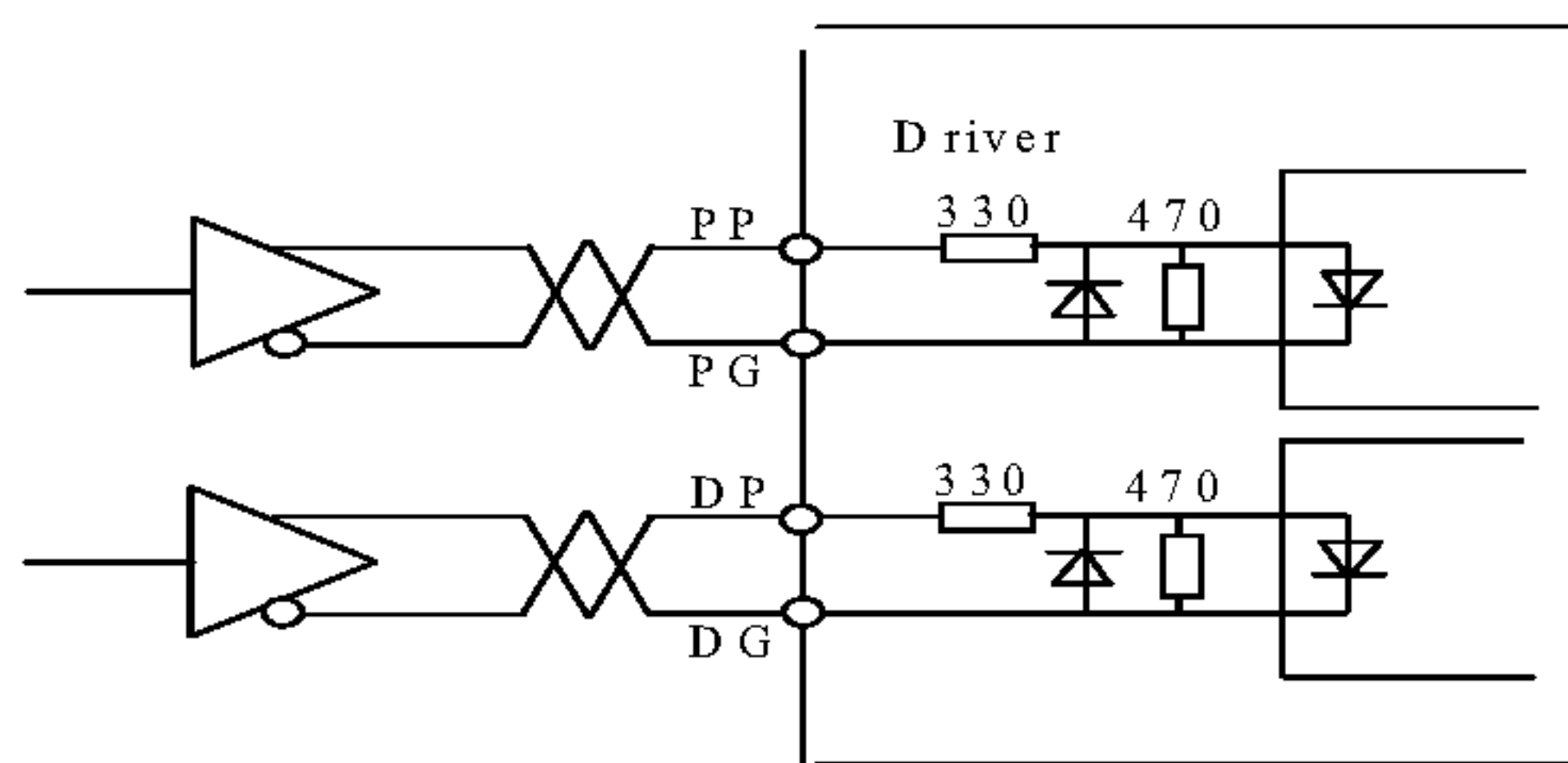
- Parameters must be changed: Control mode Pr51:=3
- Need to be changed: Torque input gain Pr4E
- Need to be changed: Motor rotating direction Pr5B= 0: CW 1: CCW





### 3. Pulse input method and wiring diagram

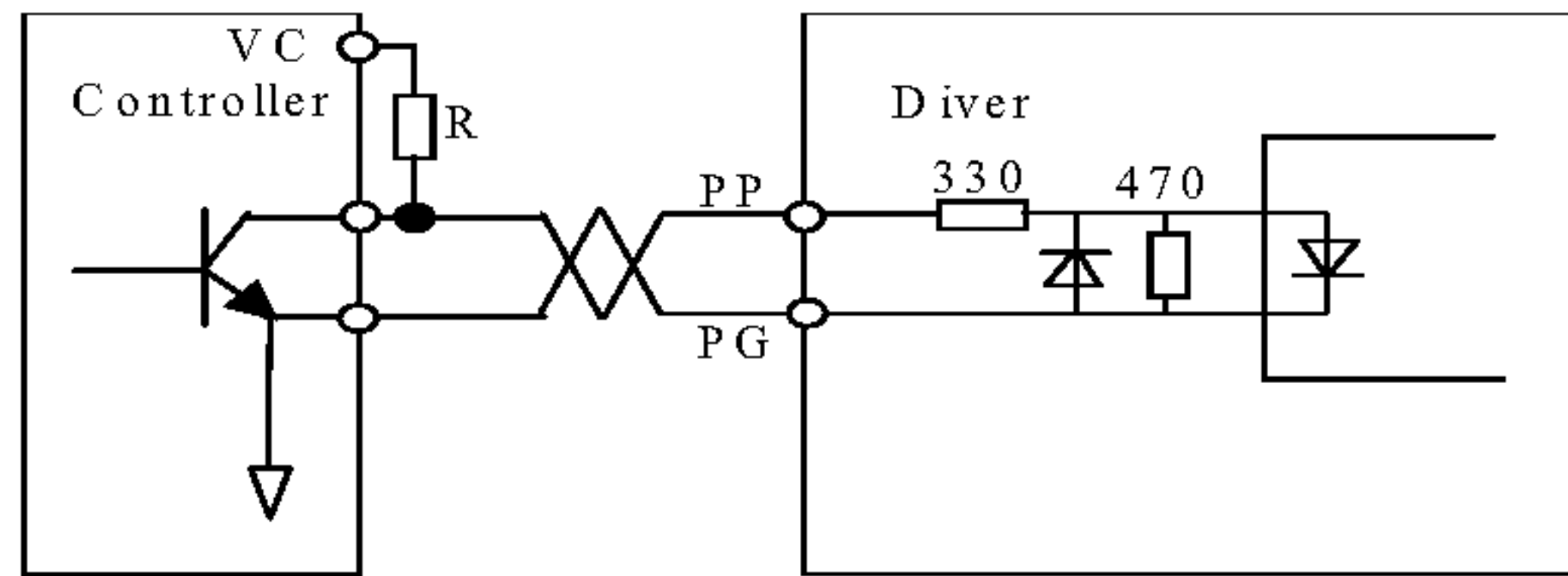
Output of the controller is line driver (proper to long distance and high frequency)



Line driver interface diagram

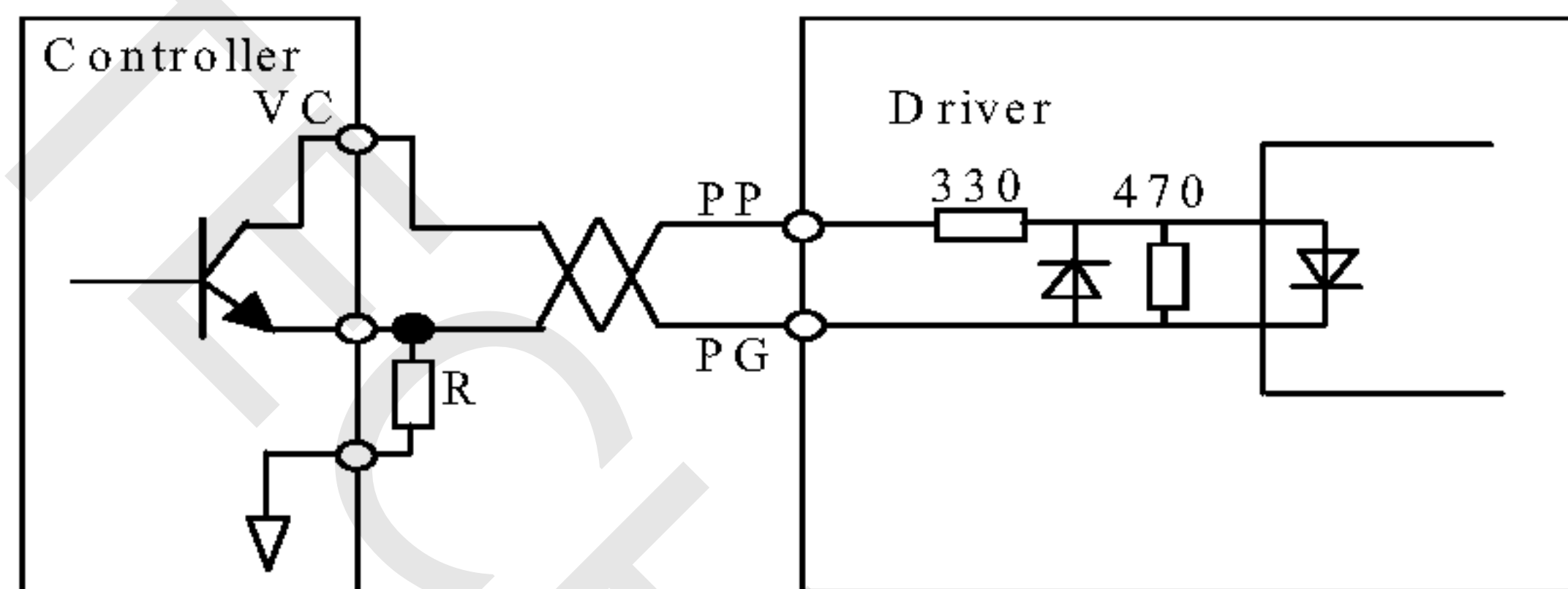


Output of the controller is open collector



Open collector interface diagram

Output of the driver is emitter follower

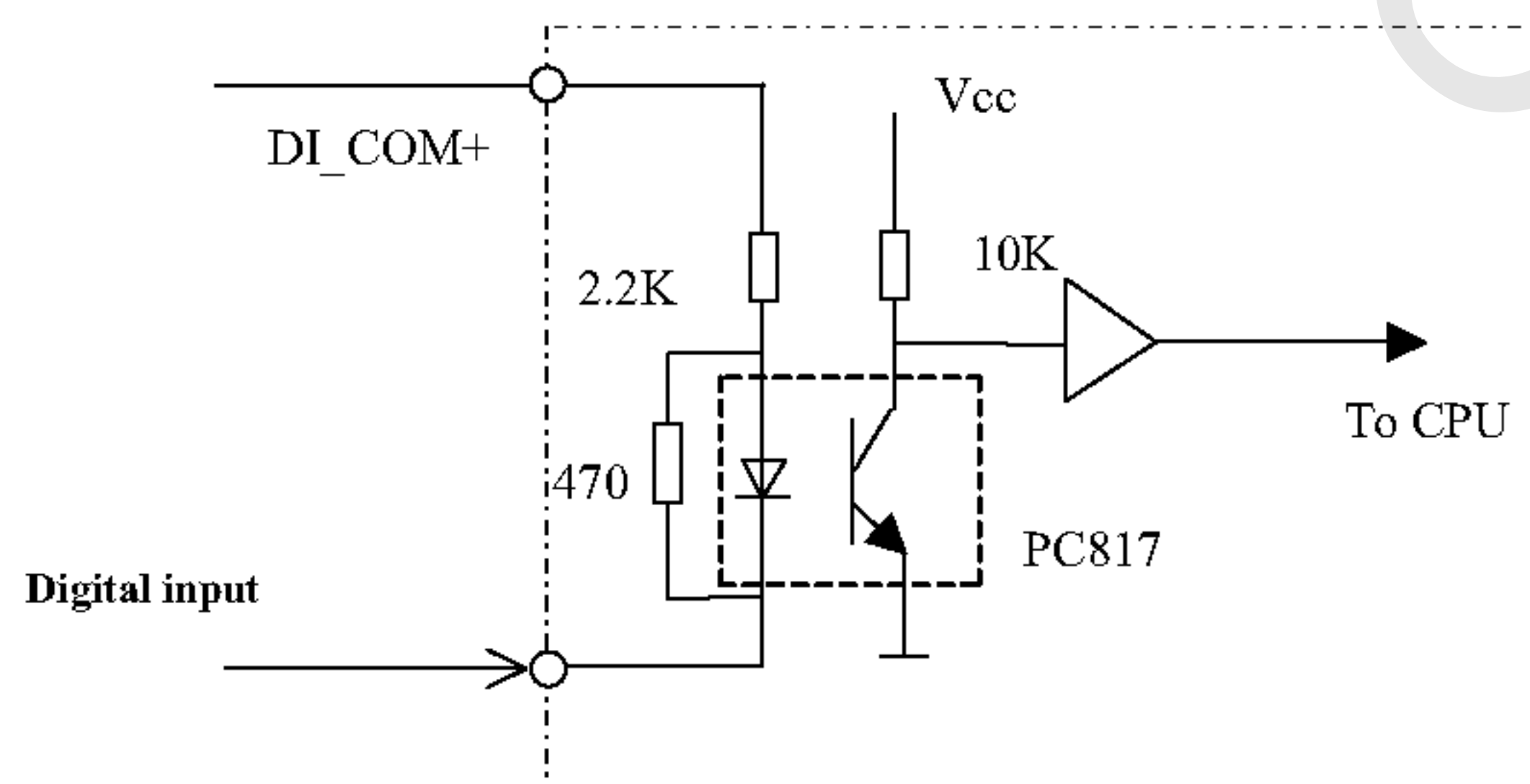


Emitter follower Interface diagram

Note: VC = 24V, R = 1.2K~1.8K; VC = 12V, R = 510~820

## 4. Digital Input and Output wiring

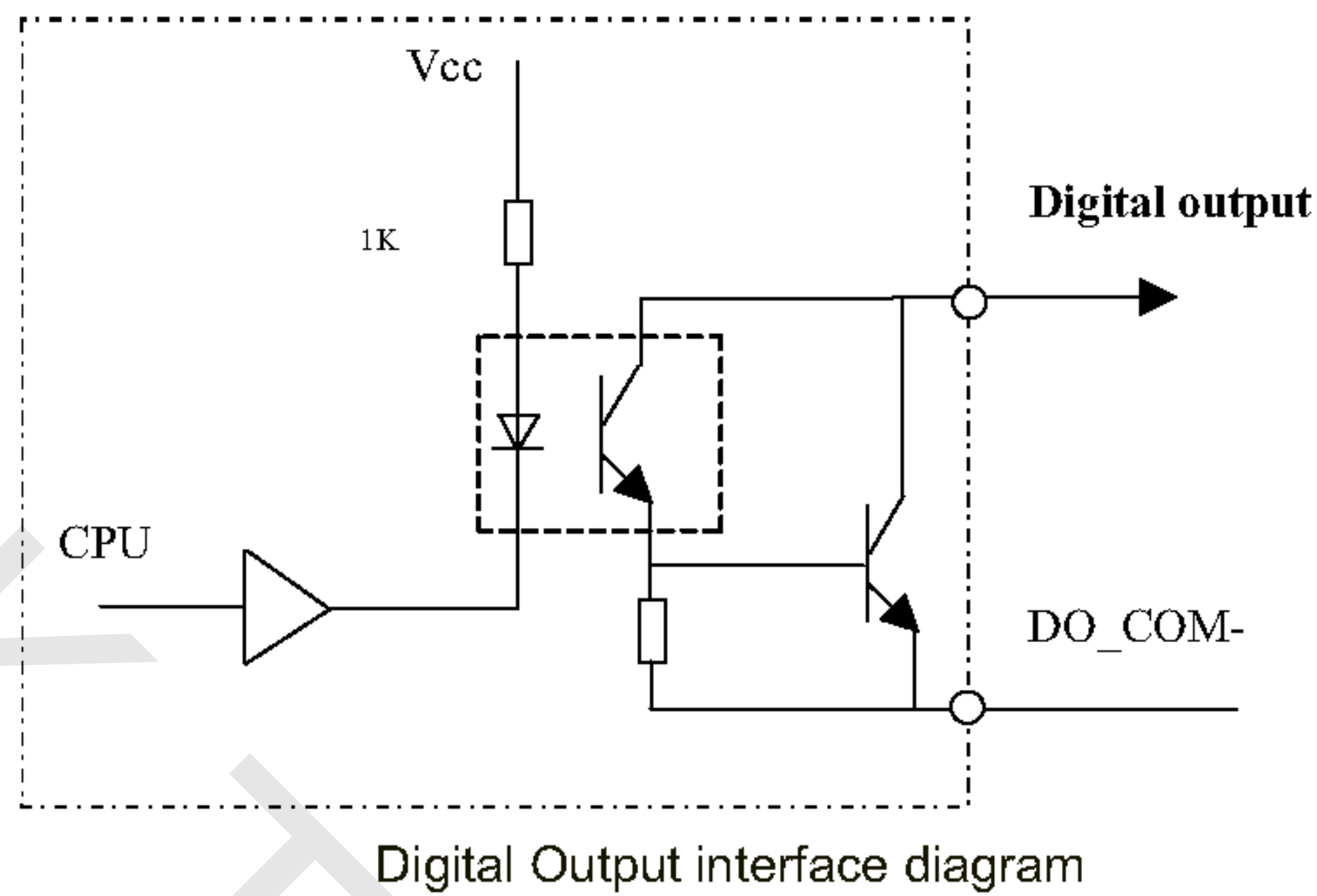
### Digital Input



Digital Input interface diagram

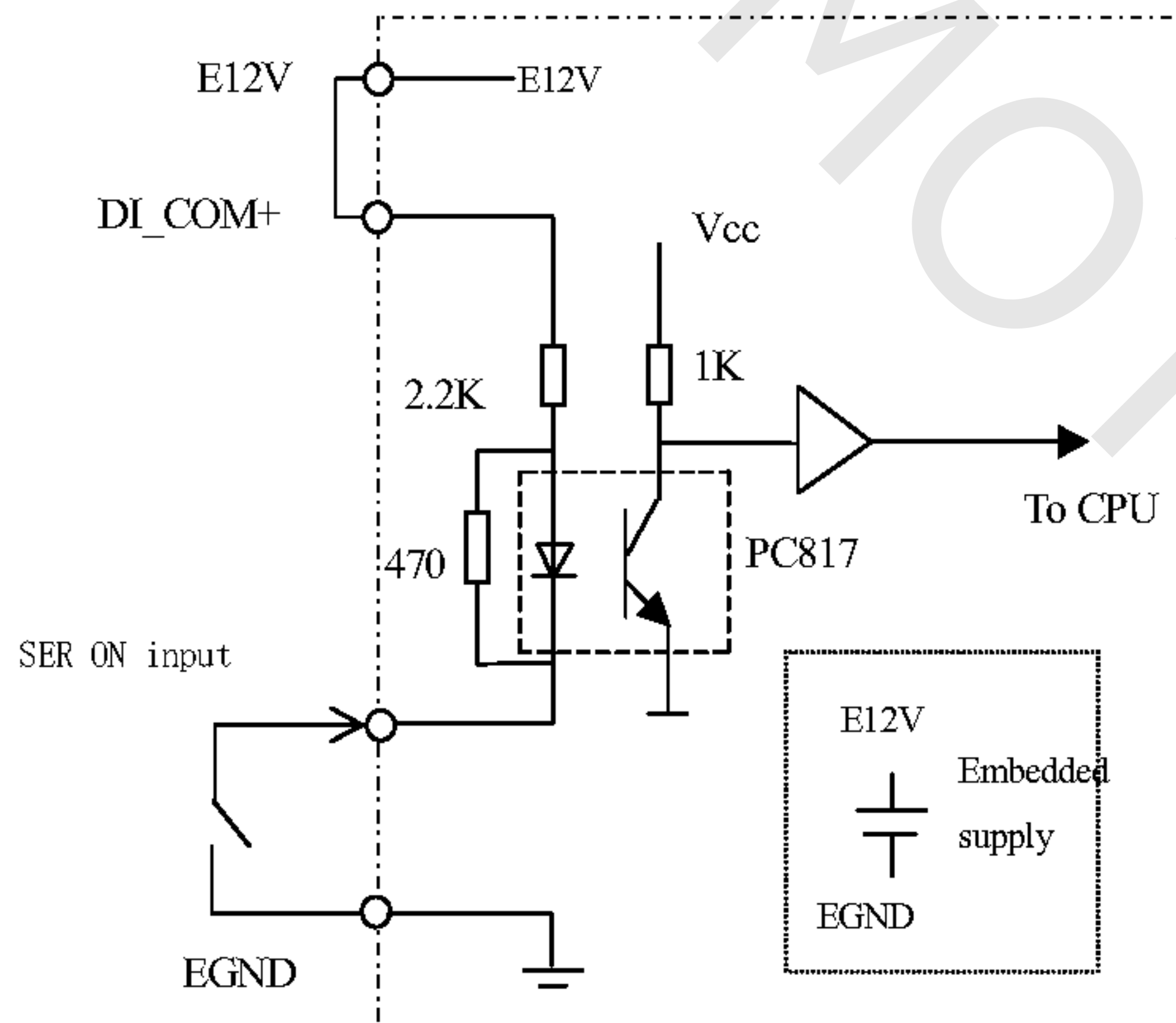
## Digital Output

The digital output with the 50mA /50V drive capability.



## Adopting the inner 12V power as the interface power

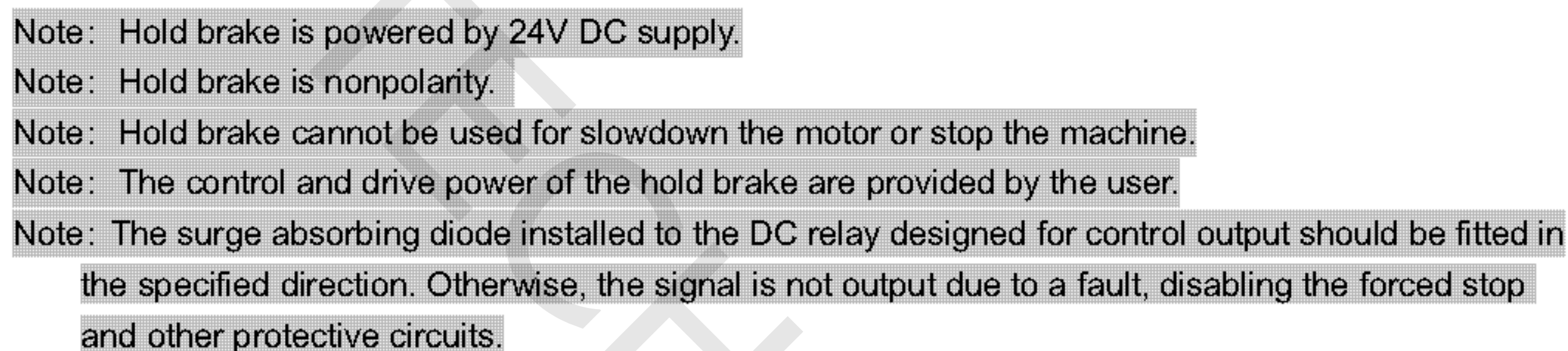
The driver provides an isolated 12V DC supply for the use of the interface. An example of use this supply to interface SER\_ON signal is shown as the following. Any other digital input signal can also adopt this method.



Adopting embedded isolated supply as SER\_ON signal interface power

## 5. Wiring of hold brake





PSDA SERIES

POWER  
RUN  
ERROR

SEE - 01

MODE SET ◀ ▼ ▲

21



	MODE Button	Mode	Use this button to change work mode
	SET Button	Set	Parameter set button
Keyboard	◀Button	Shift	Use this button to shift the digit
	▼Button	Decrement	Press this button to decrease the value
	▲Button	Increment	Press this button to Increase the value

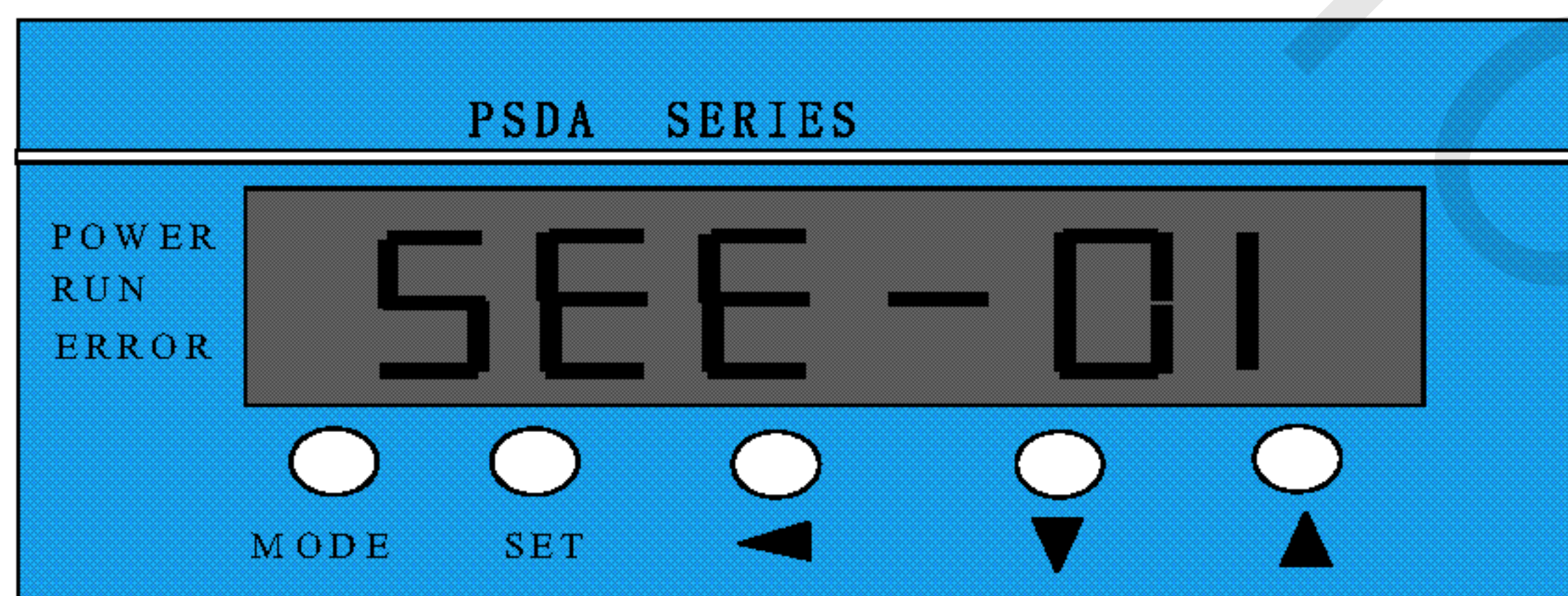
## 7. Operation Mode of the Pannel

by MODE Key 4 mode can be cyclaly selected

Mode	Symbol	Function
Monitor mode	SEE-01	Select 12 watching items to display, such as current, speed, and so on
Parameter mode	PA-SET	Query or Modify parameters
Data save mode	EE-ALL	Save modified parameters to EEPROM
Auxiliary mode	AF-ENC	Query input or output status, and so on

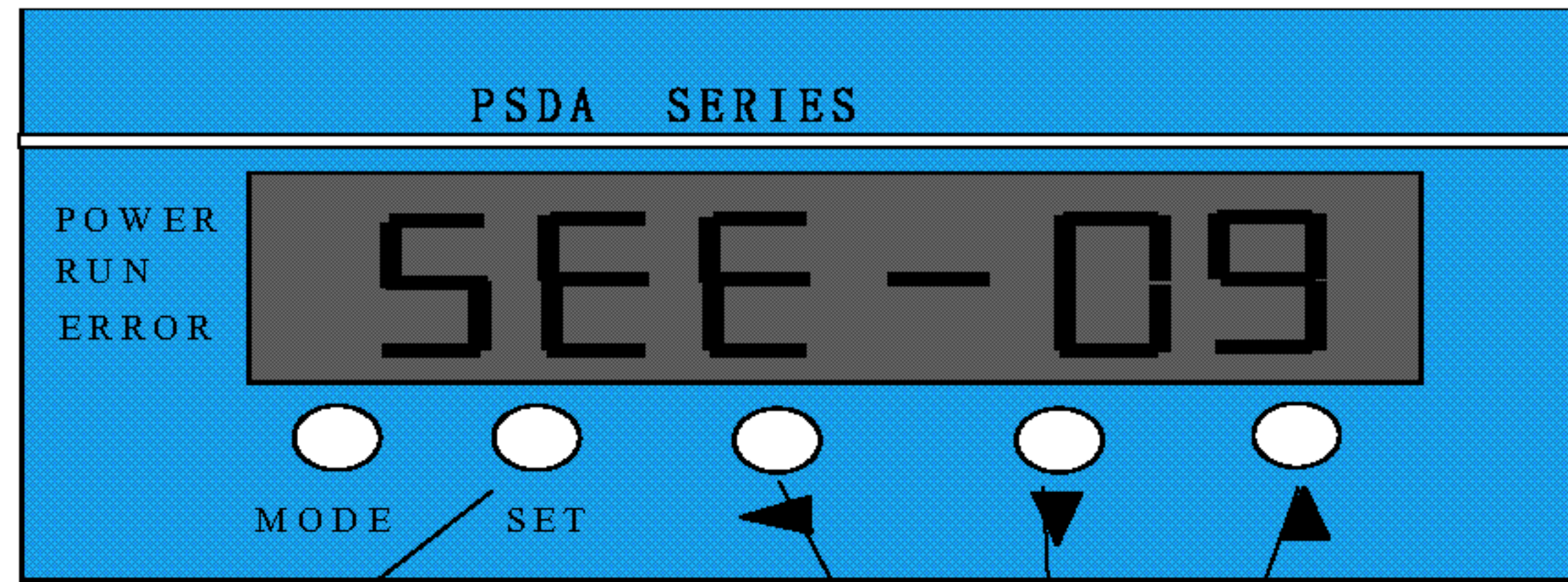
### 7.1 Monitor Mode

Enter monitor mode – Press Mode key, until **SEE – XX** displayed, XX means current watching item



Change watching item – Press Up key and Down key to change value



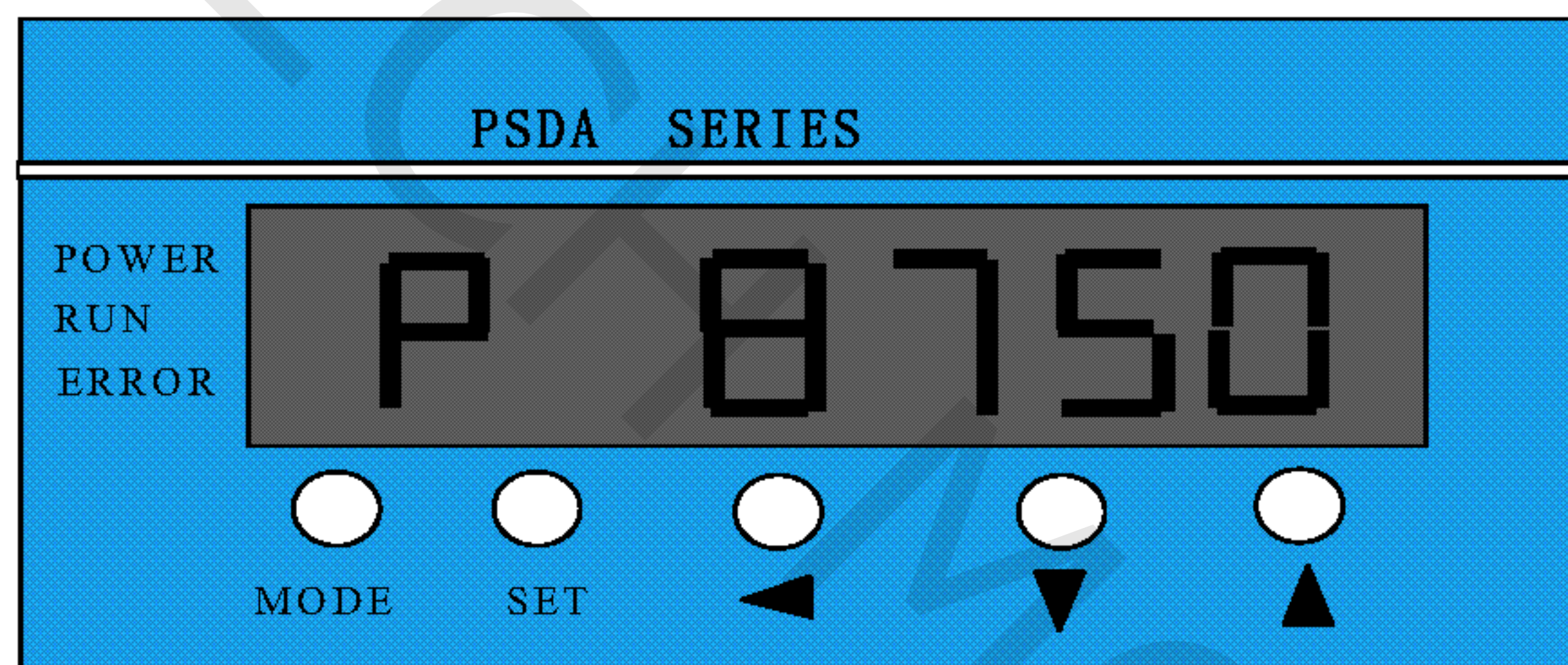


(2) Press SET key to confirm

(1) Press these three key, change 01 into 09

Display watching item – press SET key to confirm, and system display the actual dynamic data

Shown as the following, P means rotor position , 8750 means current actual position



## 7.2 Parameter Mode

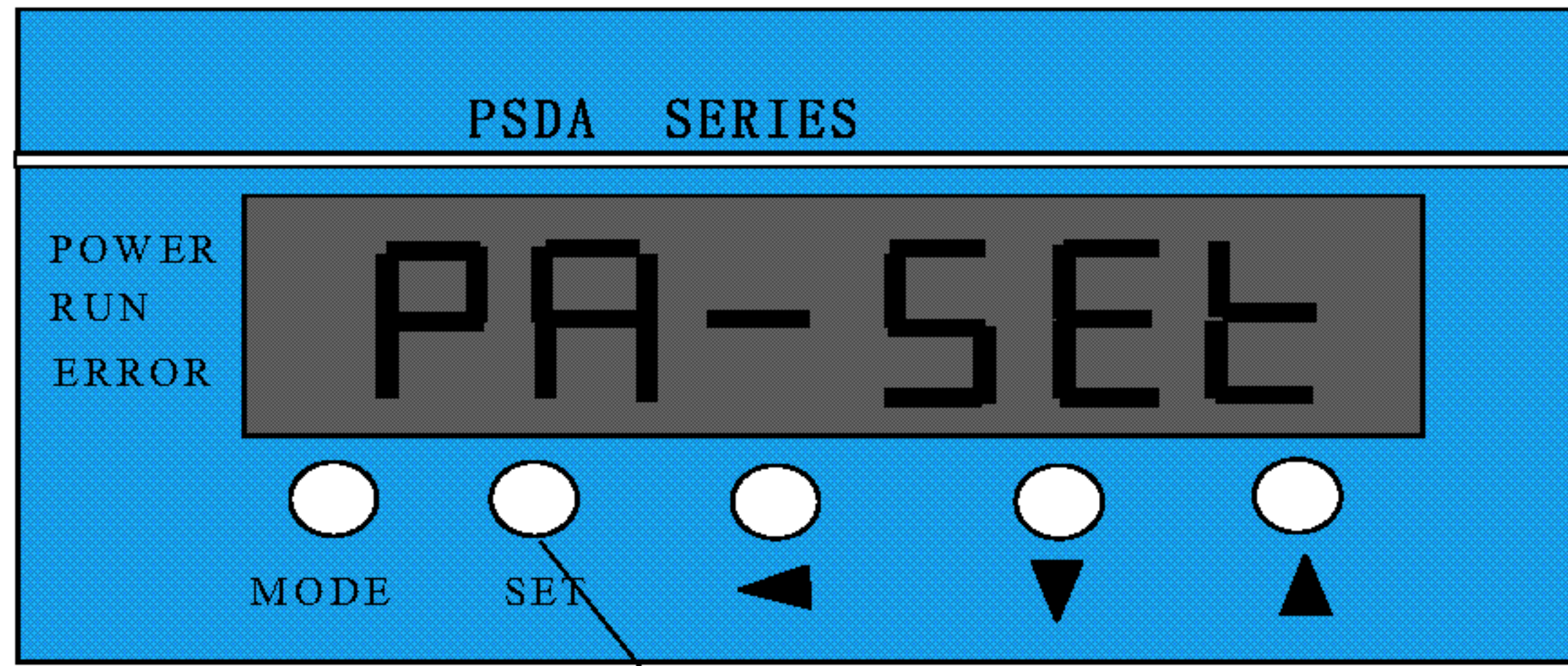
### Modifying permission Switch

Avoiding unwanted modification of the parameters, the driver sets a special parameter, i.e., Pr60, to control the permission of the modification. Only when Pr60 equals to 5678, the modification of the parameters is permitted.

Note: Some parameters will take effect only after modified and powered on again.

Enter parameter mode – Press Mode key until **PA – SEt** displayed

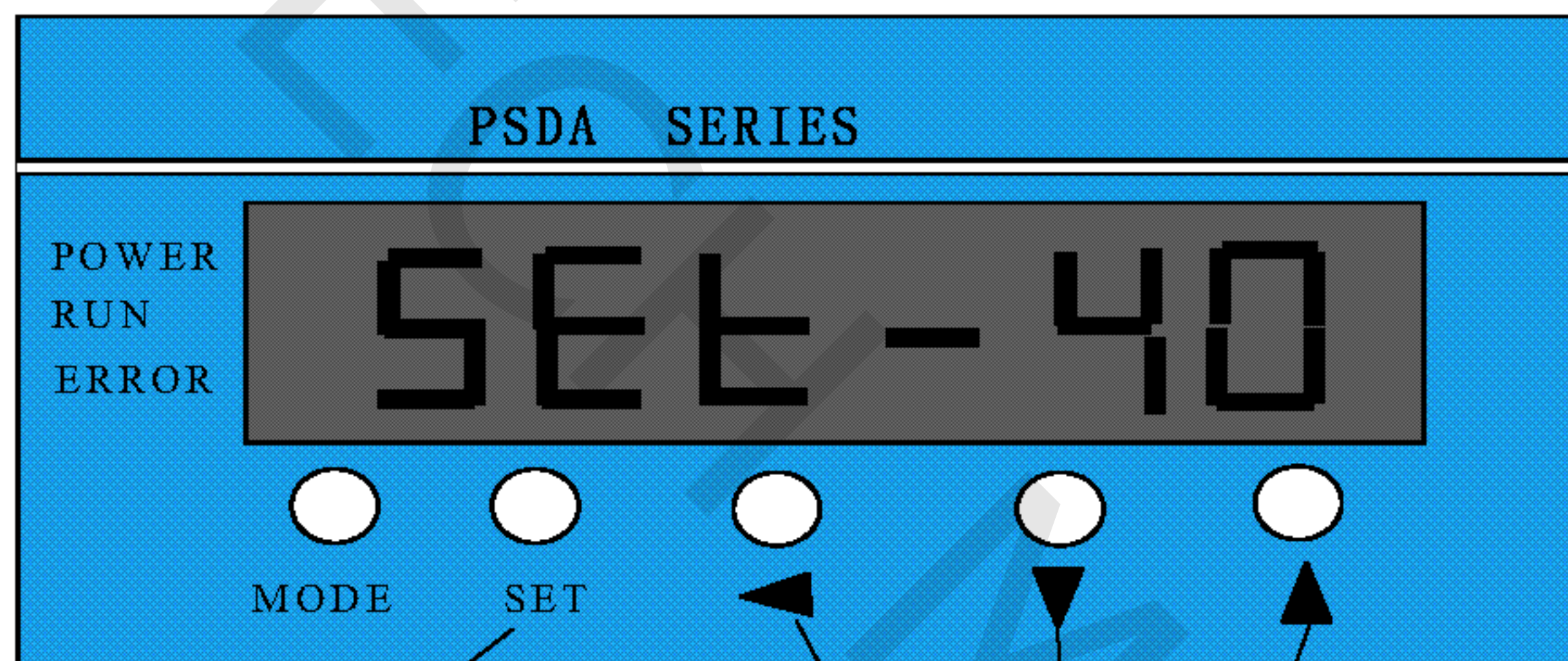




After PA – SET displayed, press SET key to confirm parameter mode

Select Parameter No. – Press SET key, confirm to set up parameters and **SEt – XX** will be displayed

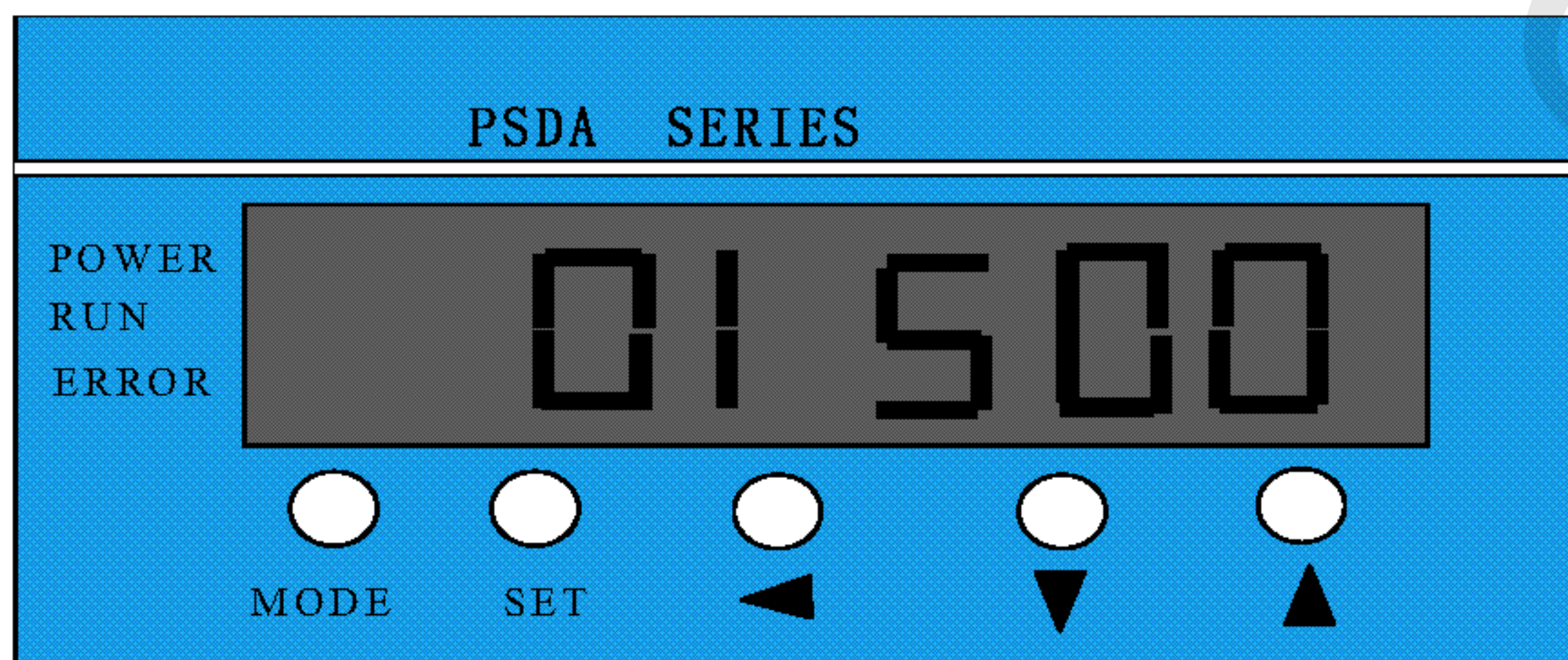
Press shift key to select the setting position, press Up / Down key to change the value of the selected setting position, until the wanted parameter No. is displayed. For example, Pr40 is wanted to be modified, then change the XX into 40.



(2) Press SET key to confirm

(1) Press these three key, change the value into 40

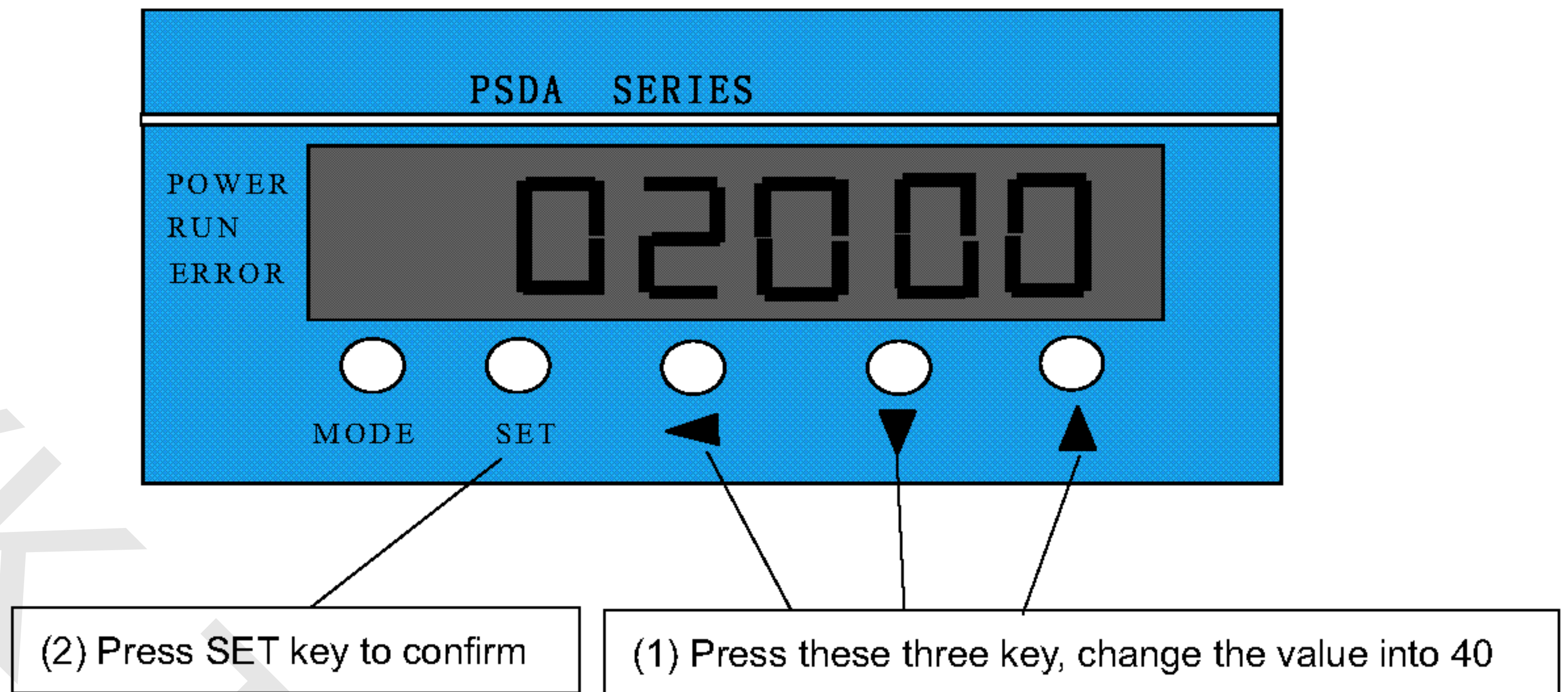
Set the new value – after selected the No., and pressed SET key, then current value will be displayed



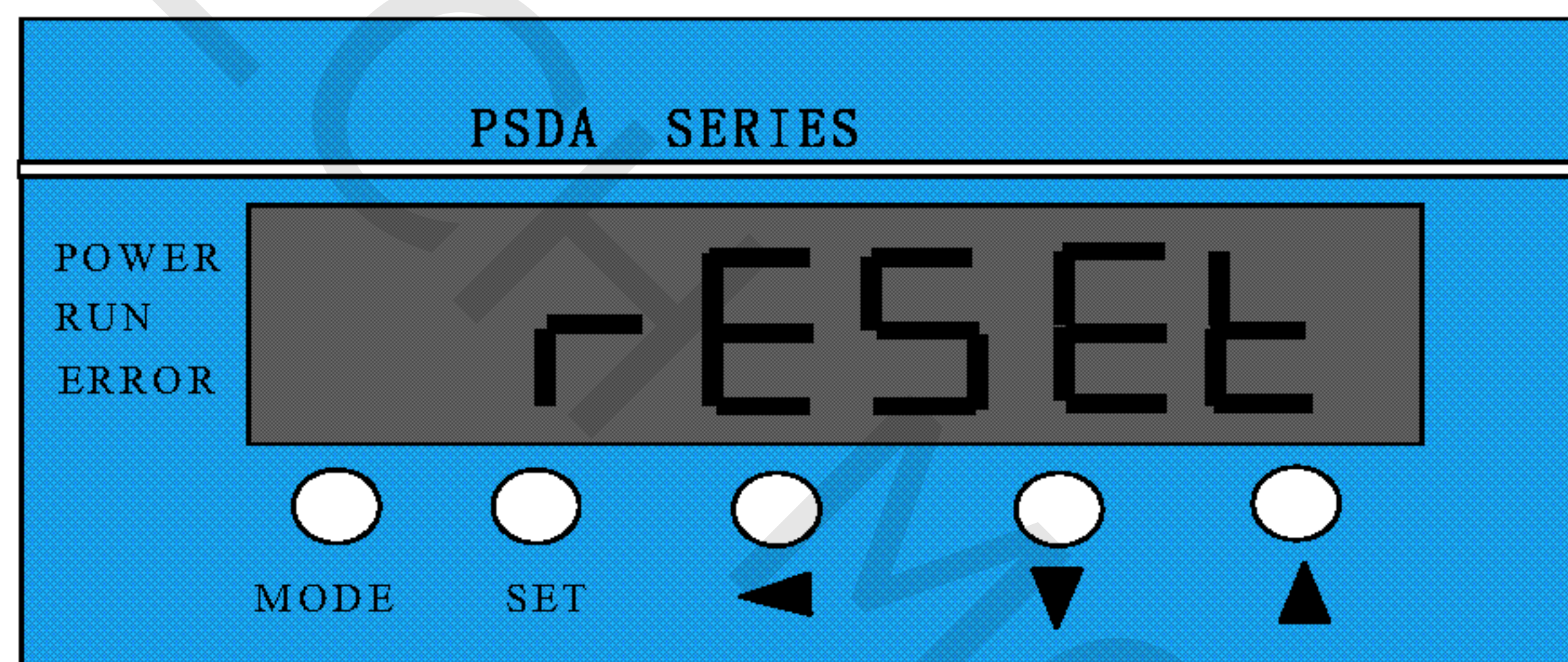
Sets Pr40 as 2000. Press shift key to select the setting position, press Up / Down key to change the value of the selected setting position, until the new value is set. Then press SET key to confirm the



modification. After one second **Set-XX** will be displayed again, that means you can set any other parameter No.



If the current parameter needs powering again for taking effect, then **reset** will be displayed. And the modification will be saved into EEPROM automatically.



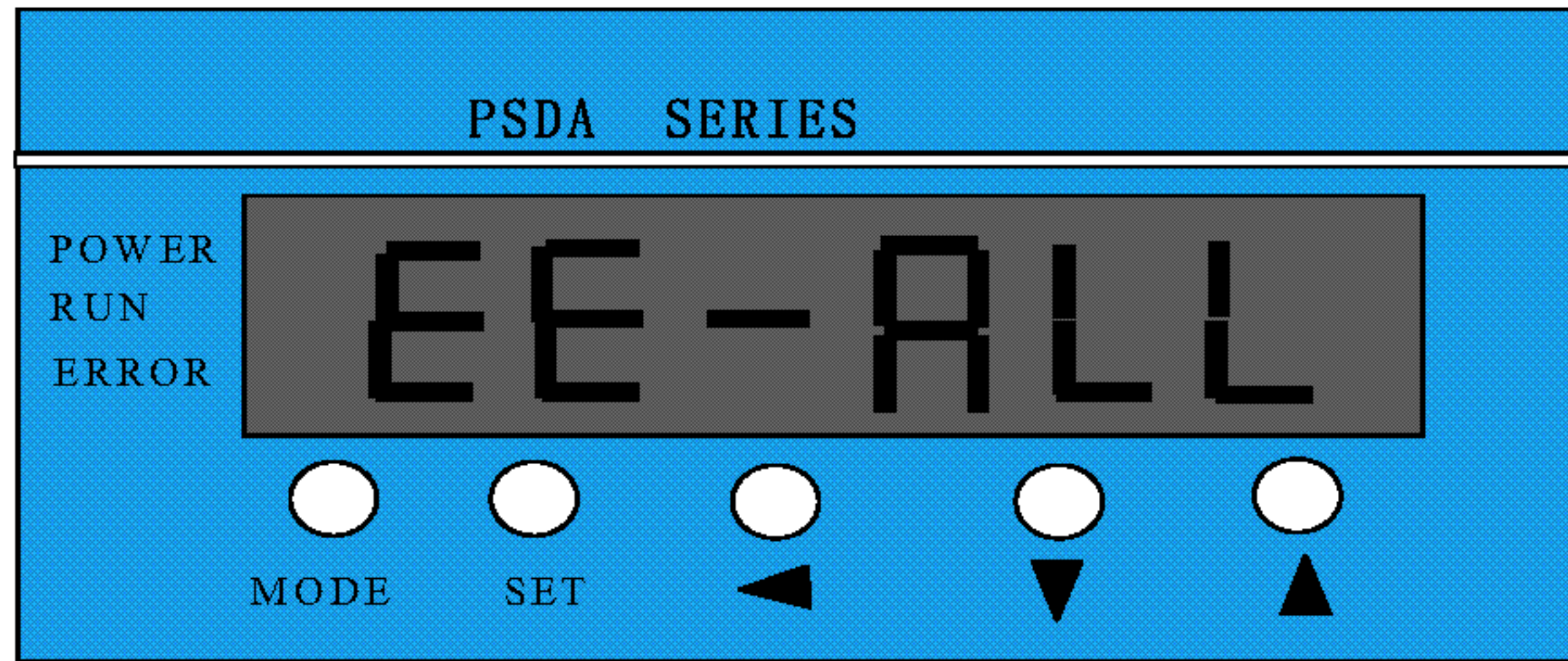
**Note:** Do not set any out of range data as the parameter value, which would not be accepted.

### 7.3 Data Save Mode

If data save mode is not run, then any modification (except automatically saved into EEPROM one) would be lost after power off.

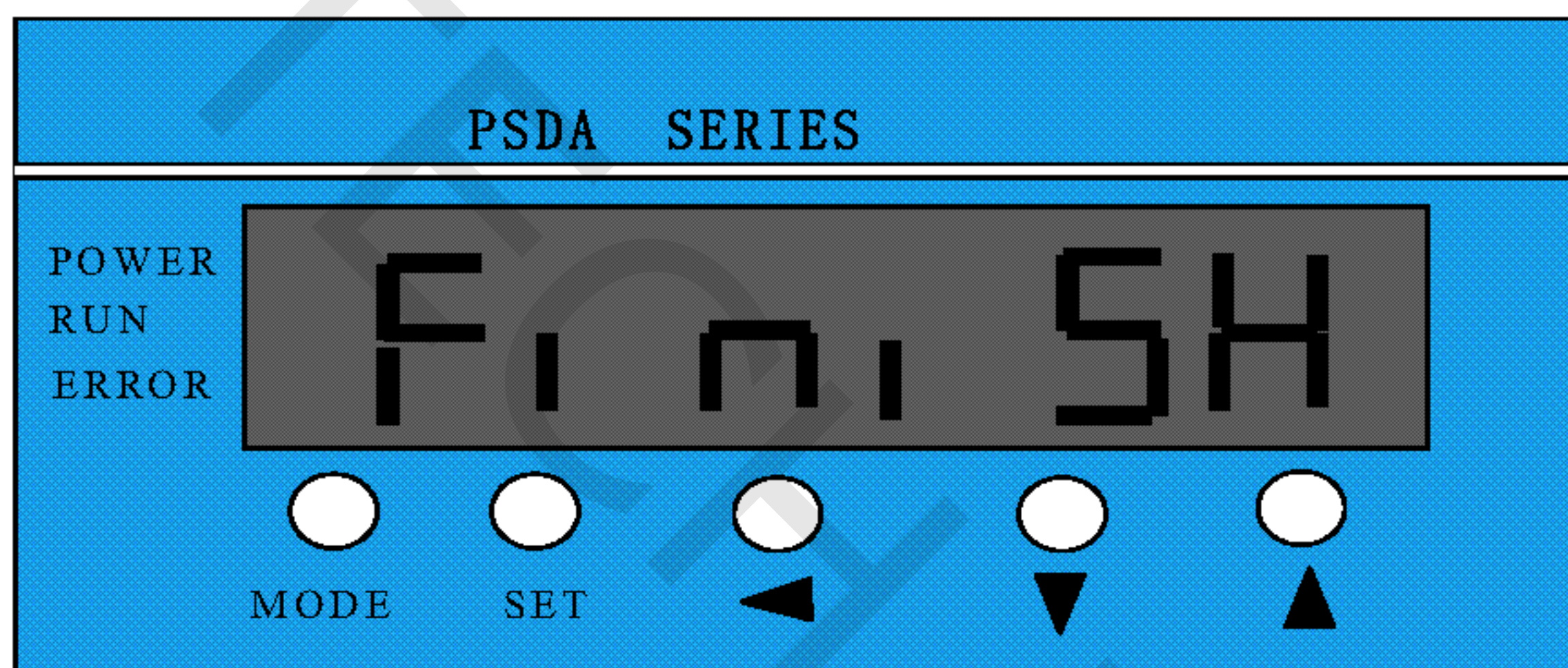
**Enter data save mode – Press Mode key , until **EE – ALL** displayed**





Save data into EEPROM – press SET key, then save action will start

During the save process, “–” will be displayed to mean the progress. After success saved into EEPROM, then **Finish** will be displayed.



## 8. Try to run without load (JOG Mode)

After connect the motor and the driver correctly, then we can test the driver and the motor by JOG mode.

Step 1: release the load from the motor

Step 2: Connect the motor cable and the encoder cable of the motor to the driver, let the control cable unplg, power on the driver.

Step 3: Select the auxiliary function 09, . i.e., JOG mode.

Step 4: Set Pr40, adjust the JOG speed of the motor.

Step 5: Press the UP key or DOWN key, let the motor clockwise or counter clockwise rotating

Step 6: Release the key, then the motor stop and the rotor unlocked.

## 9. Position Mode

### 9.1 parameter setting

Para. No.	Parameter description	Range	Reference setting	Instruction
20	Velocity loop integration time constant	0 – 32767	122	
21	Velocity loop gain	0 – 32767	12500	
30	cpKpp_Step	1 – 100	10	



31	1 <sup>st</sup> position loop gain	1 – 100	50	
32	2 <sup>nd</sup> position loop gain	1 – 100	100	
34	Electronic gear numerator	1 – 10000	20	
35	Electronic gear denominator	1 – 10000	1	
3A	In-position range	0-32767	120	
4A	Output pulse division ratio	0 – 32	0	
51	Control mode	0 – 5	1	0: internal speed mode 1: position mode 2: analog speed input mode 3: torque mode 5: APCM mode (embedded PLC)
52	Communication BAUD rate	0 – 3	2	0: 57600Bps 1: 38400Bps 2: 57600Bps 3: 115200Bps 4: 9600Bps
5B	Rotating direction inverse	0 – 1	0	0: normal 1: rotating direction inverse
5E	Command pulse input mode	0 – 2	0	0: pulse + sign pulse : PP-positive, PG – negative direction: DP – positive, DG – negative 1: 90 degree two-phase PP, PG – pulse positive & negative DP, DG – pulse positive & negative 2: CW/CCW (OPTIONAL) PP, PG-CW pulse positive & negative DP,DG-CCW pulse positive & negative
60	Password of parameter setting	0 – 65535	5678	Pr60:=5678, setting is permitted

## 9.2 Parameter adjustment procedure of position mode

Step1: According to the system requirements, set control mode. Pr51

Step 2: According to the output type of the controller, set pulse input mode. Pr5E

Step 3: According to the required direction, set rotating direction inverse. Pr5B

Step 4: According to the load, mechanical, the highest pulse frequency of the controller, set electronic gear numerator and denominator, Pr34, Pr35.

Step 5: According to the load, mechanical, run speed and performance, set speed and position loop gain.

### 1, Control mode

parameter	Name	Value	Function	Default	Remarks
51	Control mode	0	0: internal speed mode	1	Write to EEPROM, taking effect after power on again.
		1	1: position mode		
		2	2: external analog speed mode		
		3	3: torque mode		
		5	5: APCM mode (embedded PLC)		



## 2, Pulse input mode

parameter	Name	Value	Function	Default	Remarks
5E	Pulse mode	0	0: pulse + sign	0	Write to EEPROM, taking effect after power on again.
		1	1: 90 degree two phase		
		2	2: CW+CCW		

## 3, Rotating direction polarity

parameter	Name	Value	Function	Default	Remarks
5B	Rotating direction inverse	0	0: normal	0	Write to EEPROM, taking effect after power on again.
		1	1: inverse		

## 4, Electronic gear ratio

parameter	Name	Value	Function	Default	Remarks
34	Electronic gear numerator	1~10000	Command pulse frequency multiplication	1	Write to EEPROM, taking effect after power on again.
35	Electronic gear denominator	1~10000	Command pulse frequency division	1	

Example: require resolution of 500 pulse per round, then set Pr34:=20, Pr35: 1.

## 5, parameters of speed and position loop

parameter	Name	Value	Function	Default	Remarks
20	Velocity loop integration time constant	0 – 32767	Adjust velocity loop response	122	Parameter of velocity loop
21	Velocity loop gain	0 – 32767	Adjust velocity loop rigidity	12500	Parameter of velocity loop
31	1 <sup>st</sup> position gain	1 – 100	Adjust position loop rigidity	50	Parameter of position loop
32	2 <sup>nd</sup> position gain	1 – 100	Adjust position loop rigidity	60	Parameter of position loop

### 9.3 Gain adjustment procedure of position mode [adjust velocity loop first , then position loop](#)

- 1: Increase the value of Pr21 (velocity loop gain) gradually, until the motor (machine) does not generate abnormal sound and vibration.
- 2: Increase the value of Pr32 (position loop gain) gradually, until the motor (machine) does not generate abnormal sound and vibration.
- 3: Increase the value of Pr20 (velocity loop integration time constant) according to the in-position time.

Note: with a too smaller value, positional errors may not be converged.

#### Velocity loop gain (Pr21) :

- ◆ The value larger, the gain higher, and the speed response faster.
- ◆ Parameter setting should refer to the load. Generally, the load inertia is more larger, the setting value should be more larger.

#### Velocity loop integration time constant (Pr20):

- ◆ The value larger, the speed errors integration faster, and the rigidity of velocity loop larger.
- ◆ Parameter setting should refer to the load. Generally, the load inertia is more larger, the setting value should be more smaller

#### 2<sup>nd</sup> position loop gain (Pr32) and 1<sup>st</sup> position loop gain (Pr31):

- ◆ The value larger, the gain larger, and the rigidity higher.
- ◆ Parameter setting should refer to the load.

Note: Parameter setting should refer to the load. If a load is of a significant difference from another one,



the parameter should be adjusted correspondingly .

**Note:** During adjugement, if a shock occurs, release the servo-on signal or switch off the power as soon as possible. Then decrease the value and try again.

## 10. Parameter setting on hold brake

parameter	Name	Value	Function	Default	Remarks
70	Hold brake control word	0—65535	0: standard motor 64: motor with brake	0	
4C	Mechanical Brake action set-up at motor standstill	0 – 500	Defines the duration from OFF of the brake release signal (BRKOFF)(i.e. brake engaged) to the shutdown of motor current (servo free) in transition to Servo-OFF during the halt of the motor.	0	Delay time
4D	Mechanical brake action set-up at motor in motion	0 – 500	Defines the duration from OFF of the brake release signal (BRKOFF)(i.e. brake engaged) to the shutdown of motor current (servo free) in transition to Servo-OFF during the motor in motion, not during the halt as handled by Pr4C.	0	Delay time
66	Servo on delay time	0 – 500	Define the duration from ON of the brake close signal (BRKON) (i.e. brake set free) to the power on of motor current (servo lock) in transition to Servo-ON	0	Delay time

## 11. Alarm description, Possible cause and corrective action

The PSDA driver has various protective functions. When one of the protections is activated, the motor trips according to the timing chart , and the Servo Alarm Output (ALM) is turned off.

Actions to be taken after trip events

- After a trip event, the LED touch panel displays an alarm code no., and no Servo-ON occurs.
- Any trip status is cleared by keeping A-CLR (Alarm Clear Input) on for at least 120 ms after A-CLR off.
- The overload protection can be cleared by A-CLR at least 10 seconds after the occurrence of the event. If the control power connection between r and t is opened, the time limiting operation is cleared.



- The alarms mentioned above can also be cleared with the LED touch panel.

<Notes>

Protections marked with \* cannot be cleared with A-CLR (Alarm Clear Input). They should be cleared by turning the power off, removing the causes, and then turning the power on again

Code	Protecion	cause	Corrective action
Err – 01	Over current	<p>The current flowing in the converter is larger than the specified value.</p> <ol style="list-style-type: none"> <li>1) The driver failed (due to defective circuits or IGBT parts).</li> <li>2) Motor wires (U, V and W) are shorted.</li> <li>3) Motor wires (U, V and W) are grounded. Motor burned</li> <li>5) Poor connection of Motor wires</li> <li>6) The relay for the dynamic brake is melted and stuck due to the fre quent Servo-ON/OFF.</li> <li>7) The motor is not compatible with the driver.</li> </ol>	<ol style="list-style-type: none"> <li>1) Disconnect the motor wires, and enter Servo-ON. If this trouble hap-pens immediately, replace the driver with a new one (that is working correctly).</li> <li>2) Check if the U, V and W wires are shorted at the connections. Reconnect them, if necessary.</li> <li>3) Measure the insulation resistance between U/V/W and earth wire. If the resistance is not correct, replace the motor with a new one.</li> <li>4) Measure the resistance between U,V and W. If they are unbalanced, replace the motor with a new one.</li> <li>5) Check if the U/V/W connector pins are firmly secured with screws. Loosened pins should be fixed firmly.</li> <li>6) Replace the driver with a new one. Do not start or stop the motor by entering Servo-ON or OFF.</li> <li>7) Check the capacity of the motor and driver on the nameplate. If the motor is not compatible with the driver, replace it with a correct one.</li> </ol>
Err – 02	Over voltage	<p>The line voltage is larger than the specified acceptable range, so that the P-N voltage of the converter is larger than the specified value, or the line voltage was raised by a condensive load or UPS (Uninterruptible Power Supply).</p> <ol style="list-style-type: none"> <li>1)The internal regenerative discharge resistor is disconnected.</li> <li>2) The eternal regenerative discharge resistor is not suitable so that regenerative energy cannot be absorbed.</li> <li>3) The driver (circuit) failed.</li> </ol>	<p>Measure the terminal-to-terminal voltages (between R, S and T). Remove the causes. Feed a power of correct voltage.</p> <ol style="list-style-type: none"> <li>1) Measure the P-B2 resistance of the driver using a circuit tester. If it read .Aa, the connection is broken. Replace the resistor. Insert an external regenerative discharge resistor between the P and B1 terminals. .</li> <li>2) Use a resistor having the specified resistance for specified Watt.</li> <li>3) Replace with a new driver (that is working correctly for another axis).</li> </ol>
Err – 03	Under voltage	<p>The P-N voltage of the main power converter is lower than the specified value during ervo-ON.</p> <ol style="list-style-type: none"> <li>2) The main power line voltage is too low, an instantaneous outage occurred, the power source is too small, the main power is turned off, or the main power is not fed.</li> <li>3) Too small power source: the line voltage dropped due to the inrush current at power on.</li> </ol>	<p>Measure the terminal-to-terminal voltages (between R, S and T).</p> <ol style="list-style-type: none"> <li>1) Increase the capacity of the main power or replace it with a larger one. Or remove the causes of the failure of the magnetic contact, and then restart the power source.</li> <li>2) Increase the capacity of the main power. For the required capacity.</li> <li>3) Correct the phase (R, S and T) connections of the main power.</li> <li>4) Check the timing of power-on (for both the main power and control power).</li> </ol>
Err – 04	Over heat	<p>The radiator is heated up to exceed the limit temperature. The power elements of the driver is overheated. Overload.</p>	<p>The heat sink is heated up to exceed the limit temperature. The power elements of the driver is overheated. Overload.</p>
Err – 06	Encoder error	<ol style="list-style-type: none"> <li>1. Encoder is damaged.</li> <li>2. Encoder is not well connected with the driver.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check encoder.</li> <li>2. Check wiring.</li> </ol>



Err – 07	EEPROM read / write error		Set all the parameters again. If this error occurs frequently, the driver may have been broken. Replace the driver with a new one. Return the old driver to the sales agent for repair.
Err – 08	Parameters initiation fault	1) The data contained in the parameter storage area of the EEPROM is broken, so erroneous data is retrieved. 2) The check code of the EEPROM is broken, so erroneous data is retrieved.	The driver may have been broken. Replace the driver with a new one. Return the old driver to the sales agent for repair.
Err – 09	No encoder	1) Encoder cable is not connected. 2) Encoder cable may be broken.	1) Re-connect encoder cable. 2) Check encoder cable.
Err – 11	position error too large	1) The motor velocity exceeds the specified limit. 2) The position error pulse is larger than Pr63 (position error limit). The motor operation does not respond to the commands.	1) Decrease the target speed (command values). 2) Adjust the electronic gear ratio so that the frequency of the command pulse is 500 kpps or less. If an overshoot occurs, readjust the gains. Correct the encoder wiring per the wiring diagram..B Check whether the motor operates per the position command pulse or not. See the torque monitor to check if the output torque is saturated. Readjust the gains. Maximize the value of Pr12 (torque limit set-up). Correct the encoder wiring per the wiring diagram. Increase the acceleration and deceleration time. Reduce the load and velocity.
Err – 12	CW over-travel limits	The CW over-travel limits is not active.	Check the switches, wires and power supply that constitute the circuits.. Check the value of Pr59. Correct the wiring, if necessary.
Err – 13	CCW over-travel limits	The CCW over-travel limits are not active.	
Err – 14	Overload	Overload protection is activated via the specified time limiting operation when the integration of a torque command exceeds the specified overload level. Caused by a long operation with a torque that exceeds the specified torque limit. 1) Long operation with more load and torque than the rating. 2) Vibration or hunting due to incorrect gains. Cause vibration and/or abnormal sound. 3) Motor wires connected wrong or broken 4) The machine is hit against a heavy hing, or suddenly becomes heavy in operation. The machine is en tangled. 5) The electromagnetic brake is ON. 6) In a system of multiple drivers, some motors are wired incorrectly to other axis.	Monitor the torque (current wave) using an oscilloscope to check whether the torque is surging or not. Check the load factor and overload alarm messages. 1) Increase the capacity of the driver and motor. Lengthen the ramp time of cceleration/ deceleration. Reduce the motor load. 2) Readjust the gains. 3)Correct the motor wiring per the wiring diagrams. Replace cables. 4)Free the machine of any tangle . Reduce the motor load. 5)Measure the voltage at the brake wiring connections. Turn off the brake. 6) Correct the motor and encoder wiring to eliminate the mismatching between the mo.
Err – 15	Module Fault		If power on again and the fault is still existence, please replace with a new driver.

## 12. Annexed table

### 12.1 Monitor mode

Monitor item	Monitor content	Display format	Instruction
00	Motor speed	r ±XXXX	+: CW – : CCW xxxx actual speed



01	Referance speed	$n \pm XXXX$	+: CW – : CCW xxxx reference speed
02	Instant current A	$a \pm XXXX$	+: CW – : CCW xxxx phase U current
03	Instant current B	$b \pm XXXX$	+: CW – : CCW xxxx phase V current
04	Current	$I \pm X.XXX$	+: CW – : CCW xxx.x winding current
05	Referance current	$F \pm X.XXX$	+: CW – : CCW x.xxx reference current
06	Position error	EXXXXX	E: error, XXXXX position error in pulses (10000ppr)
07	Torque in percent	tXXXXX	T: torque in percent XXXXX value
08	Zero point position of encoder	oXXXXX	O: Zero position, XXXXX value
09	Rotor position	PXXXXX	P: rotor position, XXXXX value
10	UVW status of encoder	H0000X	H: UVW status of encoder, X: UVW status, example X=3, means U, V:= 0, W:=1
11	Heat sink temperature	C000XX	C: heat sink temperature XX value
12	Inverter bridge voltage	UXXXX.X	U: inverter DC bridge voltage, XXXX.X value

## 12.2 Auxiliary function

Auxiliary function No.	Symbol	Function
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0	AF-ENC FUN-00	Query digital input / output status. Such as Servo-on, CW and CCW inhibit, and so on.
1	AF-ENC FUN-01	Query alarm information.
2	AF-ENC FUN-02	Query serial number.
3	AF-ENC FUN-03	Input authorized code.
4	AF-ENC FUN-04	Reset all the parameters to the default value.
5	AF-ENC FUN-09	JOG fuction. For trial operation.

### 12.3 Parameter table

Parameter	Parameter description	Instruction	Range
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no,			
12	Max. current of motor	Unit: 1/10 fold, not permit to modify by user	10 – 30
13	Measuring range of current sensor	Unit: 1/10A, not permit to modify by user	50 – 500
14	Rated current of motor	Unit: 1/10A, not permit to modify by user	5 – 100
15	Rated speed of motor	Unit: rpm, not permit to modify by user	500 – 5000
20	Velocity loop integration time constant		0 – 32767
21	Velocity loop gain		0 – 32767
30	cpKpp_Setp	the duration from 1 <sup>st</sup> position loop gain to the 2 <sup>nd</sup>	1 – 100
31	1 <sup>st</sup> position loop gain		1 – 100
32	2 <sup>nd</sup> position loop gain		1 – 100
34	Electronic gear numerator		1 – 50000
35	Electronic gear denominator		1 – 50000
36	Acc- / deceleration time of position mode	The duration of motor speed changing from 0 to rated speed, or from rated speed to 0 3000rpm.	
3A	In-position range	. You can set-up the output timing of the in-position signal (COIN: CN I/F ), completing the travel of the motor (work), after the command pulse entry. . The in-position (positioning complete) signal (COIN) will be fed-out when the position error counter pulsed fall within a preset range	0-30000
40	1 <sup>st</sup> internal speed	1 <sup>st</sup> internal speed	10 – 3000
41	2 <sup>nd</sup> internal speed	2 <sup>nd</sup> internal speed	10 – 3000
41	3 <sup>rd</sup> internal speed	3 <sup>rd</sup> internal speed	10 – 3000
43	4 <sup>th</sup> internal speed	4 <sup>th</sup> internal speed	10 – 3000
44	5 <sup>th</sup> internal speed	5 <sup>th</sup> internal speed	10 – 3000
45	6 <sup>th</sup> internal speed	6 <sup>th</sup> internal speed	10 – 3000
46	7 <sup>th</sup> internal speed	7 <sup>th</sup> internal speed	10 – 3000
47	8 <sup>th</sup> internal speed	8 <sup>th</sup> internal speed	10 – 3000
48	Analog speed input gain		10 – 2000
49	Analog Speed input offset		0 – 65535
4A	Output pulse division ratio	Output pulse division ratio for close-loop control.	0 – 63
4C	Mechanical Brake action set-up at motor standstill	Defines the duration from OFF of the brake release signal (BRKOFF)(i.e. brake engaged) to the shutdown of motor current (servo free) in transition to Servo-OFF during the halt of the motor.	0 – 500
4D	Mechanical brake action set-up at motor in motion	Defines the duration from OFF of the brake release signal (BRKOFF)(i.e. brake engaged) to the shutdown of motor current (servo free) in transition to Servo-OFF during the motor in motion, not during the halt as handled by Pr4C.	0 – 500
51	Control mode	0: internal speed mode 1: position mode 2: external speed input mode 3: torque mode 5: APCM mode (embedded PLC mode)	0 – 5
52	Communication baud rate	0: 57600Bps 1: 38400Bps 2: 57600Bps 3: 115200Bps 4: 9600Bps	0 – 3
53	Encoder type	0: 8000PPR 1: 10000PPR	0 – 1
58	Software version		
Parameter no,	Parameter description	Instruction	Range
59	Digital input logic inverse	D9 D8 D7 D6 D5 D4 D3 D2 D1 D0	0 – 2074



		Ser_ON									
5A	Digital output logic inverse	D1 ALROUT	D0 Coin								0 – 255
5B	Rotating direction inverse	0: Normal 1: Rotating direction inverse									0 – 1
5E	Pulse input mode	0: pulse + sign pulse: PP – positive, PG – negative direction: DP – positive, DG – negative  1: 90 degree two-phase PP, PG-positive and negative of one phase DP, DG-positive and negative of another phase  2: CW+CCW (optional) PP, PG-CW pulse's positive and negative DP, DG-CCW pulse's positive and negative									0 – 1
60	Password for parameter setting	5678: permit to set parameters.  Other value, not permit to set parameters.									0 – 65535
61	Machine No.	For net work.									0 – 255
66	Servo ON delay time	Define the duration from ON of the brake close signal (BRKON) (i.e. brake set free) to the power on of motor current (servo lock) in transition to Servo-ON									300-10000
67	Under voltage protection value	When the inverter bridge voltage less than this value a undervoltage error will be tripped.									Unit: 1/10V
68	Over voltage protection value	When the inverter bridge voltage greater than this value a undervoltage error will be tripped.									Unit: 1/10V
6B	Human & machine interface type	0: OP-320 1: HITECH 2: EASYVIEW/WINVIEW 3: MD-204									
70	Driver control word	0: standard motor  64: motor with brake									