R2608C
CLOSED LOOP STEP DRIVE

MANUAL

Chaprter 1   Product Introduction

Description

    R2608C is a new kind of closed loop step drive with 32-bit DSP chip based on the demand of market and the development of technology.By adopting the latest full close loop technology, R2608C can drive stepper motors with higher torque,higher precision ,smooth movement and lower noise at low speed.Through its output position signal and alarm signal,it can not only precisely monitor the real-time state of motor running,but also successfully improve the velocity of motor motion to a great extent. Different from normal types of closed loop step drives in the market, R2608C has three kinds of controlling modes including closed loop step mode, servo mode and open loop step mode, while the output current of R2608C can be adjusted automatically according to the load in servo mode. Therefore, it can reduce motor heating and the vibration to the minimum.The drive voltage ranges from AC18V to 80V/DC36V to 110V. And it is designed to use with the 2-phase stepper motors of all kinds with NEMA24and NEMA34 frame size with regulated current is under 6.0A.

Feature

- Adopting brand new special 32-bit DSP chip.
- Real-time control of current output to minimize motor heat according to load operation.
- It can drive with hybrid easy servo motors with flanges of NEMA 24 and NEMA34.
- Compare with open loop stepper motors, it is more stable and has less vibration.
- The highest response frequency:200Kpps.
- Opto-isolated signal Input/Output.
- It can remember the running position of motion precisely so that it is unnecessary to adjust its position when stops working.
- Protection functions including over current ,over voltage, tracking error and so on.
- It can connect with a external 4 digitals display board which can set parameters, electric gear ratio and instruction filtering and so on.
- Dimension: $150\times53\times97.5mm^3$. Net Weight: 0.6Kgs.

Application

    Because there are many advanced features over than open-loop stepper drives like higher torque, much lower motor heating, no loss of movement synchronization , as a result, R2608C is excellent for the applications in many machines, especially in small machines or medium sized equipment such as CNC routers, engraving machines,stripping machines, CNC laser cutting machines, CNC milling machines, automatic assembly machines and so on.

Electrical Parameter

Parameter	Min.	Typical Value	Max.	Unit
Continuous Output Current	0	6	8	A
Input Voltage	+18	--	80	VAC
Pulse Frequency	0	--	200	KHZ
Input Signal Current	7	10	20	MA

Chapter 2 Naming Rule And Diagram And Heat Cooling

Naming Rule

R	2	6	08	C
R: R series closed loop step	Phase: 2 phases	Current: Maximum output effective current 6 A	Voltage: Maximum working voltgae AC80V	It supports external key display

Dimension

Pic 2.1 Installation Dimension

Heat Cooling

(1) The environment temperature should be under 80℃.

(2) In order to create a good condition to abstract heat, please install the side of drive vertically.
    If it is necessary, please install a fan near the motor drive.

Adapting Motor

NEMA23 Series Closed Loop Step Motor

Model	Step Angle（°）	Length（mm）	Torque (N.m)	Current（A）	Resistance (Ω)	Inductance（mH）	Rotor Inertia（g.cm2）
NEMA23-1240	1.8	77.8	1.2	4	0.44	1.4	280
NEMA23-2050	1.8	98.3	2.0	5	0.38	1.7	480
NEMA23-3050	1.8	122.8	3.0	5	0.5	2.5	720

NEMA24 Series Closed Loop Step Motor

Model	Step Angle（°）	Length（mm）	Torque (N.m)	Current（A）	Resistance (Ω)	Inductance（mH）	Rotor Inertia（g.cm2）
NEMA24-3050	1.8	107.1	3.0	5	0.45	1.8	690

NEMA34 Series Closed Loop Step Motor

Model	Step Angle（°）	Length（mm）	Torque (N.m)	Current（A）	Resistance (Ω)	Inductance（mH）	Rotor Inertia（g.cm2）
NEMA34-0460	1.8	96	4.2	6	0.34	2.7	1800
NEMA34-0860	1.8	134.1	8.2	6	0.52	4.7	3600
NEMA34-1260	1.8	172.4	12.0	6	0.65	5.6	5400

Chaprter 3 Drive Terminals And Connection Wirings

There are 5 control terminals in R2608C and they are CN1, CN2, CN3, CN4 and CN5. CN1 is a terminal for control signal.CN2 includes arrival signal output and alarm signal output. CN3 is encoder signal terminal. CN4 includes power supply and motor wiring terminals. CN5 is RS485 communication terminal.

There is a DIP switch to use for setting high and low filter of the pulse direction port, RS485 matching resistance, direction, subdivisions, pulse modes and working modes as below:

SW1：RS485 matching resistance. When dials to OFF, it will macth resistance to make circuit short, which indicates no connection.

SW2：Pulse port filters. When dials to OFF, it doesn't filter the input signal and supports 200Kpps frequency input at most. When dials to ON, it filters input signal and supports 100Kpps frequency at most.

SW3：Direction port filters. When dials to OFF, it doesn't filter the input signal and supports 200Kpps frequency input at most. When dials to ON, it filters input signal and supports 100Kpps frequency at most.

SW4：Direction DIP switch and OFF is CCW while ON is CW as default.

SW5	SW6	SW7	SW8	SW10:ON(r/min)	SW10:OFF(p/r)
ON	ON	ON	ON	10	400
OFF	ON	ON	ON	20	800
ON	OFF	ON	ON	30	1600
OFF	OFF	ON	ON	50	3200
ON	ON	OFF	ON	60	6400
OFF	ON	OFF	ON	80	12800
ON	OFF	OFF	ON	100	25600
OFF	OFF	OFF	ON	150	51200
ON	ON	ON	OFF	200	1000
OFF	ON	ON	OFF	250	2000
ON	OFF	ON	OFF	300	4000
OFF	OFF	ON	OFF	400	5000
ON	ON	OFF	OFF	500	8000
OFF	ON	OFF	OFF	600	10000
ON	OFF	OFF	OFF	700	20000
OFF	OFF	OFF	OFF	800	40000

SW9：OFF: pulse+direction; ON is double pulses.

SW10：OFF: receives external pulse mode; ON: internal mode.

■ **CN1 Control Terminal**

Pic4.1 CN1 Control Terminal

No.	Signal	Name	Introduction
1	5PUL+	Pulse Signal+	Connect to +5V signal power supply.
2	5PUL-	Pulse Signal-	Input pulse signal is effective with the falling edge. When the motor executes an angular step，the input resistance is 220Ω.Low voltage 0-0.5V, high voltage is over than 4V, pulse width>2.5μs.
3	5DIR+	Direction Signal+	Connect to +5V signal power supply.
4	5DIR-	Direction Signal-	To change the direction of motor rotation. The input resistance is 220Ω. Low voltage 0-0.5V, high voltage> 4V, pulse width>2.5μS.
5	5ENA+	Enable Signal+	Connect to +5V signal power supply.
6	5ENA-	Enable Signal-	When low level is effective and the motor powers off, the drive stops working and motor is in free state.
7	COM24V HSC	24V common terminal	COM24V is a port for 24V common anode and cathode connections. If for 24V common anode connection, please connect 24V+ power supply to COM24V terminal and 24V- to PU-. If for 24V common cathode connection, please connect 24V+ power supply to PU+ and 24V- to COM24V terminal.

■ **CN2 Signal Terminal**

Pic 4.2 PEND And ALM Signal Terminal

No.	Signal	Name	Introduction
1	PEND+	Arrival Signal Output+	Arrival signal outputs through opto-isolation. The max withstand voltage is 30V and the max conduction current is 500mA.
2	PEND-	Arrival Signal Output-	
3	ALM+	Alarm Signal Output+	Alarm signal outputs through the opto-isolation. The max withstand voltage is 30V and the max conduction current is 500mA.
4	ALM-	Alarm Signal Output-	

■ **CN3 Encoder Feedback Signal Input Terminal**

Pic 4.3 CN3 Encoder Signal Terminal

Signal	Introduction
1、EZ+(Absolte encoder signal+)	Positive Z signal input （It is customization.）
2、EZ-(Absolte encoder signal-)	Negative Z signal inpu （It is customization.）
3、EB+	Positive B phase input
4、EB-	Negative B phase input
5、EA+	Positive A phase input
6、EA-	Negative A phase input
7、E5V	Positive 5V power terminal
8、EGND	Negative 5V power terminal

CN4 Power Supply And Motor Terminal

Pic 4.4 CN4 For Power Supply And Motor Cable

Signal	Color of motor wires		Remark
A+	1.White	2.Black	
A-	1.Green	2.Red	
B+	1.Blue	2.Yellow	
B-	1.Black	2.Blue	
AC	Black		Power Supply：AC18-80V
AC	Red		DC36V-110V

CN5 RS485 Communication Terminal

Pic 4.4 CN5 For RS485 Communication Port

No.	Signal	Name
1	RSA	A phase signal for RS485 communication
2	RSB	B phase signal for RS485 communication
3	GND	Ground

■ **PC Software Connection With The Drive**

Pic 4.5 Parameter Adjustment Wiring

⚠ **Note:**

1、The cable connected by the driver to the PC machine, text display or STU server debugger must be a dedicated cable (randomly attached to the user) . Please confirm to avoid damage before use.

2、The power supply which is applied by the drive and PC must be isolated. If not sure, please isolate the PC with an isolation transformer.

Application Wiring

Pic 4.6 Typical System Wiring

● **5V Signal Connection**

Common Anode   Common Cathode

● **24V Signal Connection**

Common Anode   Common Cathode

⚠ **Note:**

1. The input voltage can not be over than AC80V/110VDC;

2. The input control signal level is under +5V. When it is over than +5V, please connect it with COM24V HSC terminal.

3. The effective edges of input pulse signal can be modified.

4. It will display the error code if he driver temperature is over 80℃ and the driver stops working . When it falls to 50℃, It needs to recharge to make it restart working . The heat sink is needed when overheat occurs.

5. Please ensure that motor lines terminal with power cables should be connected well. And please use connecting plugs to make sure good connection.

Charpter 4 Functions Of Input And Output Terminals

In external pulse mode, the pulse terminal and direction terminal can only receive pulse signal. In I/O mode, the pulse terminal acts as input port 1 and the direction terminal acts as input port 2. Input port 1 f defines speed control signal input 1, and input port 2 defines speed control signal input 2, input port 3 defines enable signal input as default. Output port 1 defines arrival signal output and output 2 defines alarm signal output.

- **DI Function Introduction**

Value	Signal	Function	Introduction
0	NULL	No function	No function.
1	NEGLIMIT	Negative limit signal	In returning to zero mode, it is used to receive the negative limit signal.
2	POSLIMIT	Forward limit Signal	In returning to zero mode, it is used to receive the forward limit signal.
3	ORIGIN	Origin signal	In returning to zero mode, it is used to receive the origin signal.
4	SON	Enable signal	For drive enable control: OFF：Drive enabled. ON：Drive diseabled.
5	SPDSIGNAL1	Speed control signal 1	It is used for the input of control signal 1 of the IO port in speed mode.
6	SPDSIGNAL2	Speed control signal 2	It is used for the input of control signal 2 of the IO port in speed mode.
7	STOPSIGNAL	Stop signal	It is used in internal position mode: 1. When returning to zero, to stop returning to zero and complete it. 2. When the position is planned, to stop the displacement and clear the unfinished instruction.
8	POSIO1	Sart signal for Internal position 1	Start the internal position 1 through the I/O port 1 with rising edge,and the internal position 1 is set by the PA51 and PA52.
9	POSIO2	Sart signal for Internal position 2	Start the internal position 1 through the I/O port 2 with rising edge,and the internal position 2 is set by the PA16 and PA17.
10	HOMESTART	Homing start signal	In internal position mode, this port receives the back zero signal with the rising edge.
11	HALTSIGNAL	Suspended signal	1.For internal position mode: when the position planning is carried out, it will suspend the displacement, and at the next coming start signal, it would finish the rest of the trip with the rise edge. 2.For speed mode: after setting themotor speed, as long as the input port is valid, the motor will decelerate and stop working. If it is invalid, the motor will continue to run at the setting speed.
12	POSROUNDIO 3	Start signal for Internal position 2	Start the internal position 1 and position 2 through the I/O port. The internal position 1 is started with the rising edge , while the internal position 2 is started with the falling edge.
13	SPDSELECT	Speed selection	When in IO speed mode, set PA61 to 2 and it works in the speed of PA41. While the input port level is reversed, it works in the speed of PA42.

● **DO Function Introduction**

Value	Signal	Function	Introduction
0	OFF	Not valid	Forced output OFF 强制输出 OFF
1	ON	Valid	Forced output ON 强制输出 ON
2	PEND	Arrival signal	OFF：Position deviation value is less than PA36 parameter value. ON：Position difference is greater than PA36 parameter value.
3	ALRM	Alarm signal	OFF：Alarm. ON：No alarm.
4	Z_SIGNAL	Z signal output	OFF：received motor Z signal is low level. ON：received motor Z signal is high level.

Charpter 5 Internal Running Mode

1. When SW10=OFF，the drive is in pulse mode and it will work by the subdivisions. For example, if the subdivision is set to 1000, the drive will receive 1000 pulses to rotate a revolution.

2. When SW10=ON and PA28=1, the drive is in internal postion mode.

3.

Parameter	Introduction
PA28=2	When PA28=2(as default), it is in internal speed mode. 1. PA61=1(as default) is to control starting and stopping through I/O port and the DIP switches to control speeds. The 16 channels of speeds are shown in the silk screen, where the first and second speed can be set by PA41 and PA42. The input port function number is set to corresponding speed control signal 1 and speed control signal 2. The Controlling of the speed of the input signal is set by the PA63. PA63=0(as default): speed control signal 1 for starting and stopping, while speed control signal 2 is CCW and CW functions. PA63=1: speed control signal 1 for forward starting and stopping, while speed control signal 2 reverse starting. 3.PA61=0 is 485 controlling speed mode and the drive works at the speed set by PA53 through 485 controlling. When PA53=0, the motor stops rotating. When PA53 > 0,the motor runs with CCW direction, while PA53 < 0, the motor runs with CW direction. 　Note: When the driver is in speed mode, the acceleration time and deceleration time from 0 to the target speed can be set according to the PA58 (Rated Speed)and PA54(Acceleration Time), unit:ms. Moreover, acceleration and deceleration are the same　and deceleration time and acceleration time are consistent in speed mode. When it is needed to stop the motor rotation, please set the function number of the input port to 11.
PA28=1	When PA28=1, it is in internal position mode. 　The drive supports two stage positions. PA51 and PA52 set the first stage positio. While PA16 and PA17 set the second segment position. The first stage position can be started by PA50 control word which is discribled in the followings. And the internal position 1 can be set as starting signal by setting the funtion number to 8 of the input port and then it will start this stage position with the rising edge. For the second stage position, it can only start by setting the function number to 9 of the input port with the rising edge. The driver supports returning to zero function and it can work by setting values of PA50. The detailed description as below. Or by setting the input port function number to 10, it can also start returning to zero signal with the rising edge. The mode is set by PA66, and the drive supports mode 17,18,23,27,35 described as below:

	PA50: Control word 16-bit unsigned number, Bit0-Bit15. Bit 0: With 0->1 rising edge, the drive starts running and follow setting internal position values. The drive will not respond the command until it is finished positioning. Bit 1: With 0->1 rising edge, the internal position stops command and the drive slows down and stops. The rest pulses will be completed in next trip. Bit 2: With 0->1 rising edge, the internal position stops command and the drive slows down and stops. The rest pulses will be cleared. It would follow new setting internal position value in next trip. Bit 3: With 0->1 rising edge, it starts back to zero. Zeroing operation is required before the drive work in internal position mode. Remark: When it is in returning to zero, the internal position can not be started. the internal position run function. A new internal position instruction can not be start until the last internal position has been finished. PA85: The feedback state word in internal position mode which is unsigned 16 bits,and followed by Bit0-Bit15. Bit12 is the internal position flag bit. When it is 1, the driver is planning the position and makes the motor to rotate without responding to a new position start instruction. When the previous displacement has been completed or stopped and it is 0, the drive can respond to a new position start instruction. Bit8 is a bit of finishing returning to zero. When it is 0 and the driver is powered on for the first time, it can start returning to zero and finishes returning to zero after touch the sensor signal and the position is1. Bit9 is a returning to zero error bit. If there occurs a erro in returning to zero, it is 1.
PA66	Returning zero mode selection. And it currently supports mode 17,18,23,27,35. The describe as below:
PA66=17	Mechanical origin: reverse over-range switch. Deceleration point:: reverse over-range switch. A) The deceleration point signal is invalid when homing starts. Note: In the figure, "H" stands for high speed PA59 and "L" stands for low speed PA60.When homing starts and N-OT =0, it reverses with high speed.. When it encounters N-OT rising edge, it decelerates, reverses and forwards with low speed.. When encountering the falling edge of N-OT, it stops running. B) The deceleration point signal is effective when homing starts. When homing starts and N-OT=1, it starts to homing at low speed directly, and stops at the falling edge of N-OT.
PA66=18	Origin point: forward over-range switch..

Deceleration point: forward over-range switch.

A) The deceleration point signal is invalid when homing starts

正向限位

运动轨迹　　　　H

-L

正向限位信号

When homing starts and P-OT=0 , it forwards with high speed. When encountering the rising edge of P-OT, it decelerates, reverses and operates at low speed . When encountering the falling edge of P-OT, it stops.

B) The deceleration point signal is effective when homing starts.

正向限位

运动轨迹　　　　-L

正向限位信号

When homing starts and P-OT=1, it reverses with low speed directly. And when encountering the falling edge of P-OT , it shuts down.

Origin point: Origin switch.

Deceleration point: Origin switch.

A) The deceleration point signal is invalid when zeroing starts and it did not encounter the forward limit switch.

原点开关　　　　正向限位

运动轨迹　　　H

-L

原点开关信号

正向限位开关

PA66=23

When homing starts and HW=0, it forwards with high speed and does not encounter limit switch.When encountering rising edge of HW, it slows down and reverse with low speed. When encountering the falling edge of HW, it shuts down.

B) The deceleration point signal is invalid when returning to zero starts, and the forward limit switch is encountered.

原点开关　　　　正向限位

运动轨迹　　　-L　　-H　　　H

原点开关信号

正向限位开关

When homing starts and HW=0, it forwards with high speed and encounters limit switch. Then it

	automatically reverses and runs at high speed. When encountering rising edge of HW, it slows down and keeps reversing with low speed. When encountering the falling edge of HW, it shuts down. C) The deceleration point signal is effective when returning to zero starts. When homing starts and HW=1, it starts zeroing at a reverse low speed directly.When encountering the falling edge of HW, it shuts down.
PA66=27	Origin point: Origin switch. Deceleration point: Origin switch. A) The deceleration point signal is invalid when returning to zero starts and did not encounter limit switch. When homing starts and HW=0, it returns to zero with reversed high speed and does not encounter limit switch.When encountering rising edge of HW, it slows down, reverse and forwards with low speed. When encountering the falling edge of HW, it shuts down. B) The deceleration point signal is invalid when returning to zero starts and the reverse limit switch is encountered. When homing starts and HW=0, it returns to zero with reversed high speed and encounters limit switch.Then it automatically reverses and runs at high speed. When encountering rising edge of HW, it slows down and keeps forwarding with low speed. When encountering the falling edge of HW, it shuts down. C) The deceleration point signal is valid when zeroing.

	反向限位　　　　　　原点开关 运动轨迹　　　　　　　　　　　L 原点开关信号 反向限位开关 When homing starts and HW=1, it forwards with low speed directly. When encountering the falling edge of HW, it shuts down.
PA66=35	Current position is cleared.

Charpter 6 Parameter Adjustment Software

The drive can communicate with the computer through 485 interface. But a USB to 485 transfer tool is necessary.

Please check the identified serial port number in the computer device manager. Then open the software and select the corresponding serial port. Click "connection the driver" button and there would show that the driver has been connected and the it is online in the lower left corner of the software status bar.

Click the edit parameter button of the toolbar and open the parameter edit box and then click the read parameter button to read out parameters in the list.

Set SW10=ON to enter into the internal mode and set PA28 to 1 to enter into the internal position mode. Or set PA28 to 2 and PA61 to 0 entering into 485 control speed mode. Please power the drive off and then power it up. Click the point debugging button on the toolbar. After that, it will enter into 485 control point mode. Be aware that before returning to zero and starting position, please press "control to make clearing" button, and the corresponding function has the control word corresponding bit 0->1 change when starting.

- **Parameter List Of PA Groups**

No.	Name	Function	Range	Default Value
PA-0（*）	Current loop gain	1. If want to increase the output torque of the motor, it is recommended to increase the value of this parameter. 2. When the motor shocks or buzzes, it is recommended to reduce the value of this parameter. 3. In general, it is not recommended to change the default value of this parameter.	500-6000	2000
PA-1（*）	Current loop integral	1. PA1 works with PA0. When PA0 is adjusted to the limit and the motor is abnormal, PA1 can be used for fine-turning. 2. In general, it is not recommended to change the default value of this parameter.	1-80	25
PA-2	Position overrange alarm threshold	The actual value is the set value by 100(PA2 × 100) and 1000 pulses(10 × 100) as default would trigger position overrange alarm and cause error 4 in the drive.	1-5000	40
PA-3	Proportional coefficient of position loop	1. It is the position loop rigidity in servo mode(PA32=0). 2. When the motor shakes or vibrates when stops working, it is recommended to reduce the value of this parameter. 3. When the motor stops working, the motor shaft is loosed and can be screwed by a hand with the motor enable , which indicates that the motor rigidity is not enough and it is recommended to increase the parameter.	1-5000	100
PA-4（*）	Smooth instruction filter	The greater the value, the smoother the motor works, but the response speed will have a delay.	1-4096	128
PA-5	Proportional coefficient of speed loop	1. It is the speed loop rigidity in servo mode (PA32=0). 2. The greater the value, the greater the rigidity. When the motor is working and there occurs abnormal noise and vibration, it is recommended to reduce this parameter. 3. But if it is too big, it would result to vibrate. When the motor is working and there occurs abnormal noise and vibration, it is recommended to reduce the value of this parameter. 4. It is set to work with NEMA23 motors as default, so for bigger motors,please set bigger value.	1-5000	400
PA-6（*）	Integral coefficient of speed loop	1. The smaller the setting value, the faster the integral speed and the stronger the system resistance deviation and the greater the rigidity, but if it is too small, it is easy to produce overshoot.	1-5000	25

		2. It works with PA5. And any changes are not recommended for this parameter except for special circumstances.		
PA-7（＊）	Speed detection filtering coefficient	1. The feedback speed calculation filter can be set, and the value can be increased when the encoder feedback is not uniform. 2. It works with PA5. And any changes are not recommended for this parameter except for special circumstances.	1-32	10
PA-8	Maximum output motor current	The maximum output current of the motor can be set, and the actual output value is 1/10 of the setting value. For example, the setting value 60 means the output current can reach 6A. Different motors have different values.	1-60	60
PA-9	Incremental motor encoder resolution	With incremental motor, this parameter matches the encoder resolution. The motor encoder with 1000ppr is as default.	1-5000	1000
PA-10	Absolute encoder Z signal output width	It is 17 bits absoluted encoder and the minimum value is this value, while the maximum value is 131072 minus this value.When the absoluted position is smaller than the minimum value or bigger than the maximum value, Z signal output is valid.Otherwise the output is invalid.	1-30000	10000
PA-11	Effective pulse edge	0: The falling edge is effective.(Optical coupling from conduction to cutoff): 1：The rising edge is effective.(Optical coupling from cutoff to conduction): 	0-1	0
PA-12	The numerator of electric gear ratio	1. When there is no required subdivision in the drive subdivision table, PA12 and PA13 are used for it: The DIP switches need to set the same value as PA12 and 1000 is recommended. PA13 is the actual required subdivision: $$B=A\times\frac{PA13}{PA12}$$ A=subdivision in DIP swithes=PA12, B=actual required subdivision=PA13. For example: if it requires 1314 pulses to rotate a round. Please set the gear ratio numerator (PA12) as 1000 and PA13 as 1314. Then it can realize that when the controller sends 1314 pulses, the motor rotates a circle.	1-9999	1
PA-13	The denominator of electric gear ratio	The same as above.	1-9999	1
PA-14	Pulse mode	0：The pulse mode is controlled by SW9. SW9=OFF: pulse+direction.	0-1	0

		SW9=ON: CW/CCW. 1: Orthogonal pulse input and can not be changed by DIP switches.		
PA-15	Edge back zero bias	With the operation of back to zero mode(36 or 37), it is the distance back after hitting an obstacle.	-999-9999	400
PA-16	Circle numbers of internal position 2	To set the circle number through internal position IO2.	-9999-9999	-10
PA-17	Number of in-round pulses in internal position 2	For example: if it needs to rotate 10.5 rounds, and the subdivision is 4000, please set PA16=circle numbers, PA17=remainder × subdivision, so please set PA16=10 and PA17=(10.5-PA16)×4000=2000.	-9999-9999	0
PA-18（＊）	Software version		---	---
PA-19	Initial current	The locking current output by the drive in open loop mode or closed loop. And it is zero-lock current in servo mode. This value is the percentage of running current of parameter PA8. The default value is 50 which means the output current is 50%, PA19=50%×PA8=50% ×1.8A=0.9A.	1-100	50
PA-21	Determined value of the zero-back completion time	With 36 or 37 back to zero modes, when the current reaches that is considered to be zeroed, and continues to change the time corresponding to the parameter, it is considered that zeroing is completed.	0-9999	10
PA-22	Closed-loop mode current compensation	When the current fluctuation causes themotor to run unsteadily, to increase the value appropriately can reduce jitter. The actual compensation is 1/10 of the setting valuen. For example, the setting value is 10 and the compensation current is 1A.	0-40	0
PA-23	Second command filter coefficient	The value is bigger, the drive runs smoother and there will be no loss of pulse, but there would be instruction delay. When it is set as 1,the filter does not work.	1-5000	150
PA-24（＊）	Position advanced factor	To set the advanced angle given value.When the motor load is big, it is recommended to reduce this value. In general, it is unnecessary to modify this value.	1-1000	840
PA-25	Maximum current gain	The driver adjusts the current loop gain value according to the voltage. The adjustment value does not exceed the setting value.	1000-30000	20000
PA-26（＊）	Speed delay factor	To set speed correlation leading angle coefficient. The larger the value, the faster the given angle changes. In generally, it does not need to modify this parameter.	1-500	60

PA-27	Position current gain	It is the position current coefficient in closed loop mode. The bigger the value, the faster the response of the current outputs.	1-3000	100
PA-28	Motor running mode	When SW10=OFF, the drive receives external pulse control. When SW10=ON and PA28=1, the drive works in internal position mode, while PA28=2, the drive works in internal speed mode.	1-2	2
PA-29	Modbus485 communication address	It is used to set modbus 485 communication address. The drive can responed this address and the data frame of address 255. If need to modify communication address through 485 commnunication in PC software, the communication address 255 can be used for the modification. 	1-255	1
PA-30	Modbus485 communication baud rate	To set 485 serial communication baud rate. Baud rate=setting value*100, 96 means 9600.	3-1152	96
PA-31	Modbus485 communications parity check	0: No checking. 1: Odd checking. 2: Even checking.	0-2	0
PA-32（*）	Control modes	0：servo mode. It is constant current mode and the output current changes according to load and the motor heat is smaller. For lead screw application, servo mode is recommended. 1：open loop mode. It is used for working with open loop step motors. 3：closed loop mode. The output current is fixed and motor output torque is bigger, but the motor heat is higher. For soft structures like belt transmission, it is recommended to use closed loop mode.	0-3	3

		belt		
PA-33	Modbus485 communication word length	The default value is 8 which means the word length bit 8 and it is no checking commnunication word length. If PA31 is changed to 1 or 2, PA33 must be changed to 9. And before connecting the drive with PC, please choose odd or even which you set in the software: 	8-9	8
PA-34	Modbus485 communication stop bit	Value 1 is as default for stop bit. If change the value to 2, then 2 is for stop bit.	1-2	1
PA-35	Restore default parameters	When the parameter value is set to 356, the drive recovers the default parameters.	0-1000	0
PA-36	Location threshold	When given pulse is 0, the number of pulses in the pulse buffer is less than 20 ms, the drive outputs the arrival signal.	1-9999	20
PA-37（*）	Current gain initial speed	The motor speed exceeds this value and automatically adjusts the current loop gain. Generally do not make adjustments.	1-5000	100
PA-39	Feedforward coefficient of servo mode	When the drive works in servo mode control, it can increase the drive's early response ability by increasing the value, which leads to the sloshing of the motor when the motor locks the shaft.	0-500	0
PA-40（*）	Absolute encoder speed compensation	For high speed, the encoder response lag is large, which can be increased to compensate the position.	0-5000	150
PA-41	Internal speed 1	The drive works in speed mode and set IO port to control speed and the DIP switches control speed, the first speed value is decided by this parameter.	0-5000	10
PA-42	Internal speed 2	The drive works in speed mode and set IO port to control speed and the DIP switches control	0-5000	20

		speed, the first speed value is decided by this parameter.		
PA-43	Input Port 1 Function Number	This port is pulse input port as default. When it is used as internal speed and position mode, it Can match corresponding function input. The value 5 is used as speed control signal 1 function.	0-99	5
PA-44	Input Port 2 Function Number	This port is pulse input port as default. When it is used as internal speed and position mode, it Can match corresponding function input. The value 6 is used as speed control signal 2 function.	0-99	6
PA-45	Input Port 3 Function Number	The function sets the corresponding function input. The default value 4 is the enable signal function.	0-99	4
PA-46	Output port 1 function	The default value 2 is arrival signal output.	0-99	2
PA-47	Output port 2 function	The default value 2 is alarm signal output.	0-99	3
PA-48	The input port valid level is reversed	If values of three inputs are 0, it means conduction is effective. If all values are set to 7, it means there is no conduction. The forth bit is the effective level of Z signal.	0-7	0
PA-49	Output effective level counter	If values of two inputs are 0, it means conduction is effective. If both values are set to 3, it means there is no conduction.	0-3	3
PA-50	Internal position control word	This parameter is used to control the drive internal position mode when the zero start, run start and stop function. When the drive powers off, the function is disabled.	0-8	0
PA-51	Number of internal position cycles	number of cycles initiated by IO1 PA50 or internal position.	-9999-9999	10
PA-52	Number of pulses in the circle	For example: if it needs to walk 10.5 rounds, and the subdivision is 4000, please set PA51=10, PA52=2000.	-9999-9999	0
PA-53	Running speed	1. The fastest speed can be set in internal position mode. 2. The motor speed can be set in 485 controlling speed mode, unit : r/min. 3. If PA53=0, the motor stops running. If PA53＞0, the motor runs with CCW direction, while PA53＜0,the motor runs with CW direction.	-5000-5000	500
PA-54	Acceleration time	1.The required time from speed 0 to rated speed when setting stroke position in internal position mode. 2.The required time from speed 0 to rated speed or from rated speed to speed 0 when in speed control mode or homing mode, unit:ms.	10-5000	1000
PA-55	Deceleration time	The required time to slow down from rated speed to speed 0 when setting stroke position in internal position mode,unit: ms.	10-5000	1000
PA-57	Absolute/relative pattern	0：Relative position value.	0-1	0

		1：Absolute position value.		
PA-58（＊）	rated speed	1. To set the acceleration in position mode with PA54 and PA55 controlling. 2. To set the acceleration and deceleration with PA54 controlling.	1-5000	1000
PA-59	Back to zero in high speed	The speed value at high speed running in homing mode. Unit：r/min	1-1000	60
PA-60	Back to zero in low speed	The speed value at low speed running in homing mode. Unit：r/min	1-1000	10
PA-61	Control enabling of IO port in speed mode	1: in speed mode, PA41 and PA42 with DIP switches control motor speed. Speed control signal 1 and signal 2 control motor rotate. 0: in speed mode, the motor speed is decided byPA53 and it can be modified through 485 commnunication and does not need control signal and can start directly.	0-1	1
PA-62	Type of encoder	0: Incremental encoder. 1:17-bit absolute encoder.	0-1	0
PA-63	Speed mode action selection	0：Speed control signal 1 is for start and stop. Speed control signal 2 is for positive and negative functions. 1：Speed control signal 1 is for forward start and stop. Speed control signal 2 is for backforward start.	0-1	0
PA-65	Input port filtering time	The greater the value, the better the anti-interference performance, but the slower the response.	1-1000 ×1ms	2
PA-66	Homing mode	17: negative limit sensor; 18: positive limit sensor; 23: positive limit and original sensor; 27:negative limit and original sensor; 35: clear current position value and homing can be completed without sensor signal.	0-50	17
PA-81	Current position 16 bit low	Current position low 16 bits (in internal position mode, returning to zero will clear the current position and display coordinate system relative position. In pulse mode, it displays encoder position)		
PA-82	Current position 16 bit high	The current position is 16 bits high. The current position is calculated, assuming that the PA81 reads the position hexadecimal A, PA82 reads the hexadecimal B, then just to convert the current position (B<<16)|A to decimal can it work.		

Note: The parameters with (*) are unnecessary to set.

Charpter 7 Error Alarm

After the drive alarms, it is offline and the corresponding fault code is displayed. Please refer to the troubleshooting table. After the failure occurs, the drive needs to be re-power on before the drive can run normally.

Please refer to the following table for abnormal motor operation. If you can not remove troubleshoot, please remember the fault code and contact our company for technical support.

Alarm Code

Alarm Code	Alarm Performance	Introduction
01（Red light always on）	Over-current alarm	The drive working current exceeds limit value.
02（Red light flashes 2 times alternately）	Over-voltage alarm	The power supply voltage is too high.
03（Red light flashes 3 times alternately）	Over-heat alarm	The drive temperature is too high.
04（Red light flashes 4 times alternately）	Position deviation alarm	Position deviation exceeds the setting value.
07（Red light flashes 7 times alternately）	Encoder communication abnormal alarm	Absolute encoder was not connected or communication wad interrupted.

Processing Methods

Alarm Code	Alarm Name	Alarm Reason	Treatment
01	Over-current alarm	1.IPM module problem. 2.Main control chip problem. 3.Circuit Board problem.	1.Check motor wiring. 2.Check if the motor is damaged. 3.Motor and driver mismatch. 4.Replacement drive.
02	Over-voltage alarm	1.Circuit Board problem. 2.High voltage 3.The power supply voltage waveform is abnormal.	1.Check power supply. 2.Motor overload. 3.Replacement drive.
03	Over-heat alarm	1.Circuit Board problem. 2.Driver temperature is too high.	1.Cooling driver temperature。 2.Replacement drive.
04	Position deviation alarm	1.Circuit Board problem. 2.Encoder problem. 3.The setting range of position deviation is too small. 4.Interference of control signals。	1.Check motor wiring. 2.Increase position overrange range。 3.Motor speed exceeds rated speed. 4. suppress interference.
07	Encoder communication abnormal alarm	Absolute Encoder Communication Abnormal	1.When it occurs in powering on the drive, please check the encoder cable wiring. 2.When it occurs in working,please check whether there is any interfere and it is recommended to use twisted-pair wires with shielding.

Charpter 8 External Key Board

Key Board Panel

Pic 8.1 Panel Introduction

The panel consists of 4 digital LED and 4 keys including ↑, ↓, ← and SET to display all system status and set parameters. The operation is hierarchical. The ← key indicates "back", The SET key indicates "forward" while it also has the meaning of "Enter". The ← key has the meaning of "Cancel" and "Exit". The ↑ key indicates "Increasing". The ↓ key indicates "decreasing". If you press the ↑ key or ↓ key and hold pressing, the result will be duplicated. The longer time pressing, the higher ratio getting.

■Keys

Symbol	Meaning
▲	Increase
▼	Decrease
◀	Exit/Cancel
SET	Confirm

Parameter Setting

Select "PA-" mode in the first layer and press SET key to enter the status of parameter setting mode. And use the ↑ or ↓ to choose parameters and then press SET key to display the value while it means enter into the second layer. In the second layer, you can modify the value with the ↑ or ↓. Press the ↑ or ↓ key once, the parameter increases or decreases by 1. Pressing and holding the ↑ or ↓ key is to make the value increased or decreased continuously. After modifying the value of the parameter, please press SET button and when the LED flashes twice, it means changes are completed and the parameter has been saved in EEPROM . The new parameter will become effective after the power recharging.

Operation Display

In the first layer, there are 3 operation mod`es. To change modes with the ↑ or ↓ key and press SET key to enter into the second layer. Back to the first layer, press the ← key.

Pic 8.2 Display Introduction

Monitoring Mode

There is a running LED indicator and 4 digital LEDs to display system status and it shows as above pic.8.1. To select modes with the ← key and motor running state with the ↑ or ↓ key. Then press SET key to enter into the detailed display status.

The display code meaning as following:

Monitoring	Operation	Range	Introduction
d--00		00-80	Running Current (A)
d--01		0-3000	Motor Speed (rpm)
d--02		C0-999	Pulse Command Value (High bit)
d--03		C0-999	Pulse Command Value (Low bit)
d--04		P0-999	Encoder Feedback Value (High bit)
d--05	SET	P0-999	Encoder Feedback Value (Low bit)
d--06	⟶	d0-999	Position Deviation Value
d--07	⟵	⁺ 000	Driver temperature value (℃)
d--08		ᵤ 000	The detected voltage value when power on
d--09		⊢ ⫼	Input logic level
d--10		0 ⫼	Output logic level

Remark: When the drive alarms, it will stop working and occurs the corresponding fault code. Users need to power off, and re-power, then the fault can be cleared.