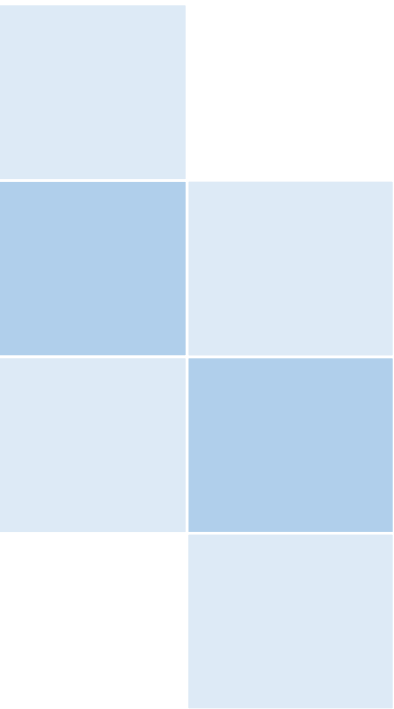


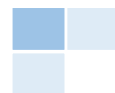


Reference Manual

BKC Series Servo Driver

v2017.3.1

WENLING YUHAI ELECTROMECHANICAL.,CO.,LTD.



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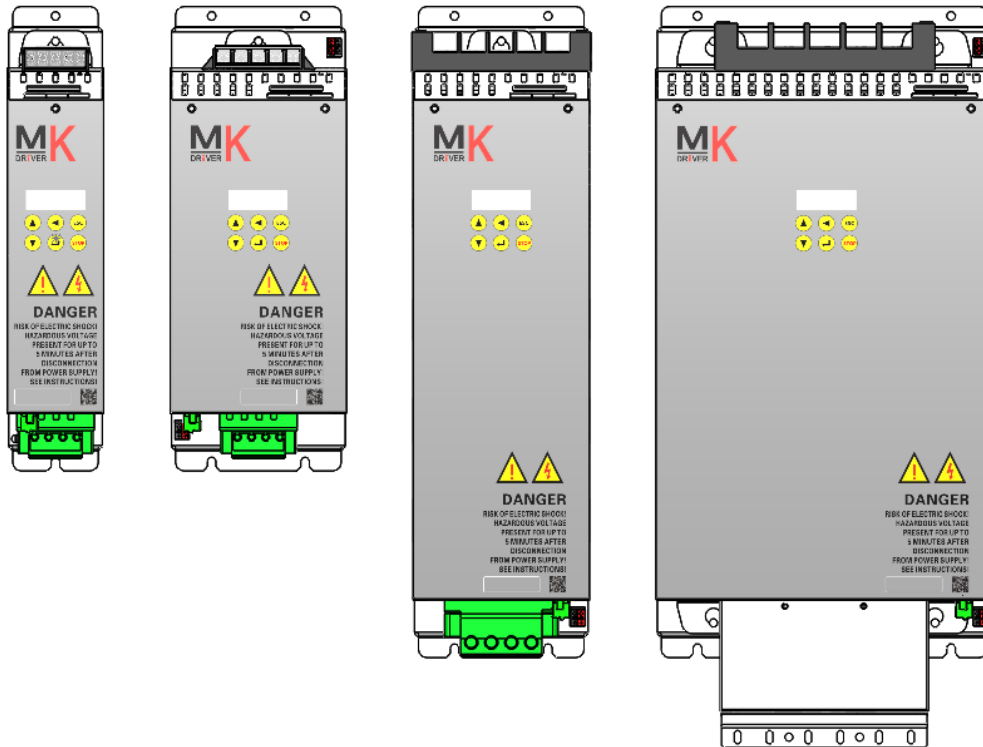
2 Model Specifications

2.1 Nomenclature Plate

$\frac{\text{BK}}{1} \frac{\text{C}}{2} - \frac{\text{CS}}{3} - \frac{4\text{T}}{4} \frac{018}{5} - \frac{\text{G}}{6} \frac{\text{P}}{7} \frac{3}{8} \frac{\text{R}}{9} - \frac{0000}{10} - \frac{1002}{11}$

No	Name	Options
1	Series	BK Book Series
2	Type	C : Integrated Motor Driver Unit S : Single Motor Driver Unit D : Double Motor Driver Unit P : AC Rectification / Braking Unit
3	Exterior	AS、CS、AH、CH、EH、FH、MX、VX
4	Voltage Class	2T : 220V 4T : 400V 6T : 600V
5	Rated Current	S1 Duty Rated Output AC Current Effective Value (A)
6	Encoder Interface Type	N : No Encoder Interface G : Incremental Quadrature Interface (RS422) X : Resolver Interface
7	Instruction Interface Type	X : No Interface Module , just mBUS P : GPIO Module E : ECAT Module
8	Platform Type	
9	mBUS Interface Type	K : mBUS Non-isolated (RS485) R : mBUS Isolated (RS422) C : mBUS Isolated (CAN 2.0B)
10	Hardware version code	0000
11	Software version code	-

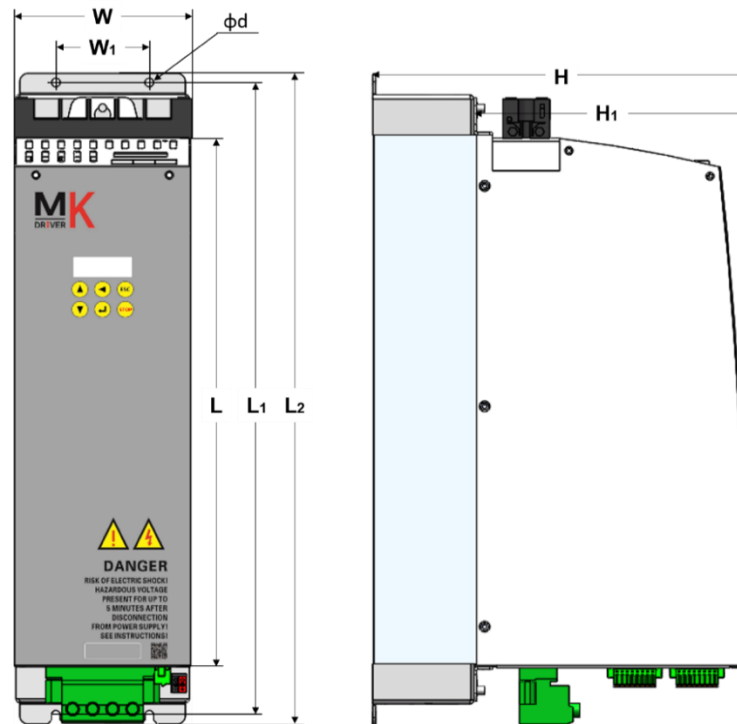
2.2 Specification Summarizing



Type	Shape Type	Power of Matched Motor (kW)	S ₁ Rated Output Current (A _{Acff})	Brake Resistor (Ω/W)
BKC-AS-4T008	AS	3.7	8.5	40/1000
BKC-AS-4T012		5.5	12	40/1000
BKC-AS-4T017		7.5	17	32/1000
BKC-CS-4T018	CS	7.5	18	32/1000
BKC-CS-4T024		11	24	26/1500
BKC-CS-4T030		13	30	20/2500
BKC-CS-4T035		15	35	20/2500
BKC-CH-4T037	CH	18.5	37	20/2500
BKC-CH-4T045		22	45	26/1500 x 2
BKC-CH-4T060		30	60	26/1500 x 2
BKC-EH-4T075	EH	37	75	20/2500 x 2
BKC-EH-4T090		45	90	20/2500 x 2

[Note]For the detailed technical parameters of the driver, please see *BK Series device manual*.

2.3 Installation

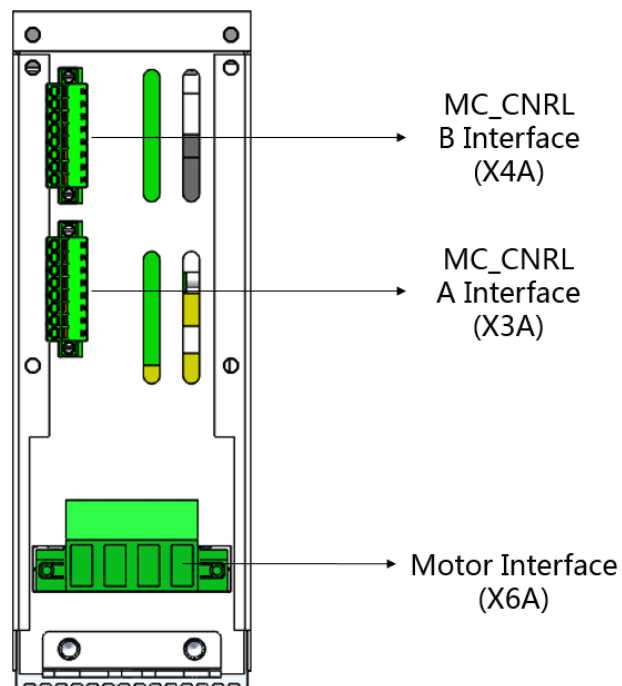
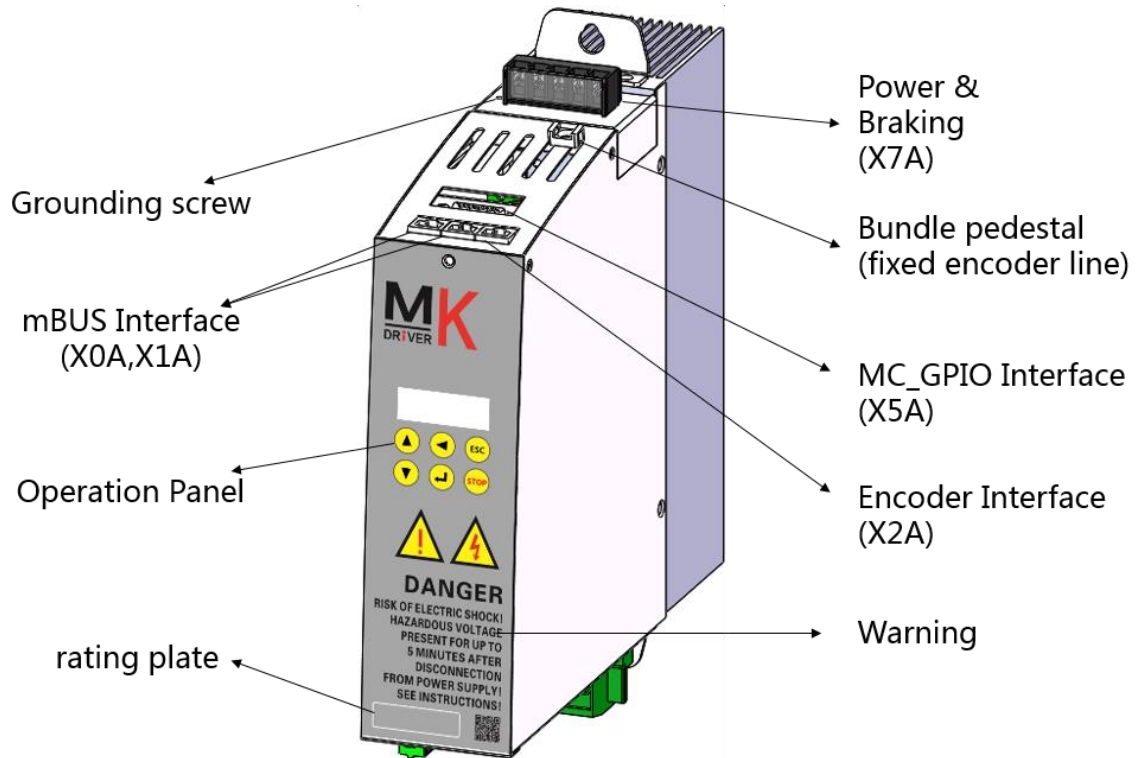


Type	Φd	L	L1	L2	W	W1	H	H1
BKC-AS-4T008	6.5	260	334	348	72	-	278	202
BKC-AS-4T012								
BKC-AS-4T017								
BKC-CS-4T018	6.5	260	334	348	132	70	278	202
BKC-CS-4T024								
BKC-CS-4T030								
BKC-CS-4T035								
BKC-CH-4T037								
BKC-CH-4T045	6.5	400	474	488	132	70	280	204
BKC-CH-4T060								
BKC-EH-4T075	6.5	400	474	556	252	190	280	204
BKC-EH-4T090								

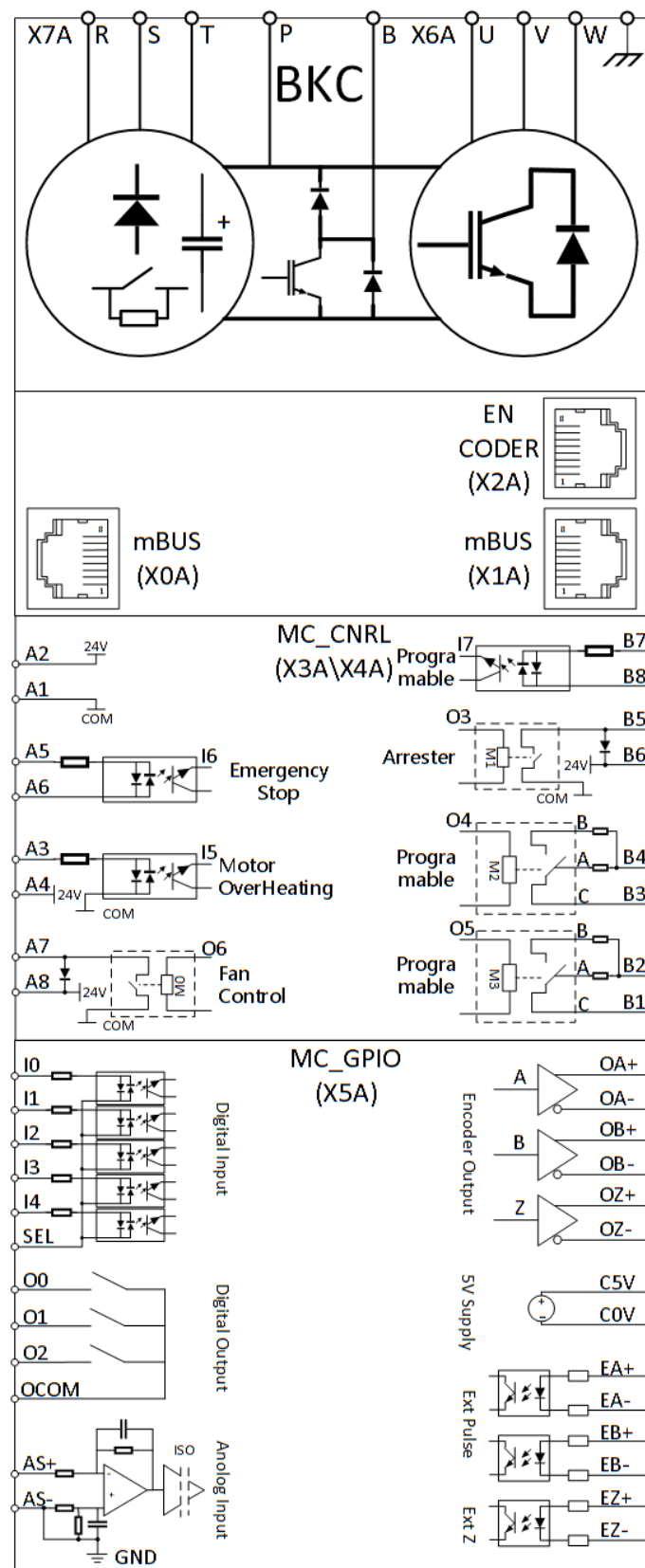
[Note] For the detailed installation information, please see *BK Series device manual*, unit mm.

3 Terminal

3.1 Interface Terminal



3.2 Electrical Schematic Diagram



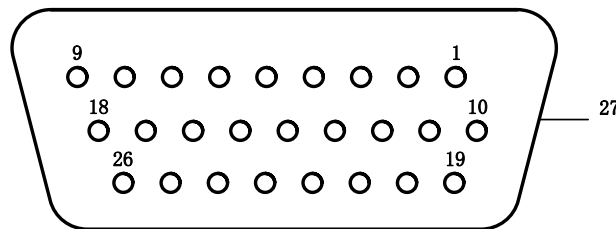
3.3 High Voltage Circuit

Terminal Name	R , S , T	P , B	U , V , W	
Position	X7A		X6A	
Function	AC Power Input	Brake Resistor	Motor	Earth

Note :

1. Primary loop connection cable should choose appropriate cable according to power of driver.
2. Grounding terminals must be reliable grounding, otherwise there is risk of electric shock.
3. Main circuit wiring should be separated from the control circuit wiring, otherwise control signal will be interfered.
4. It is forbidden to input the AC power to the output terminals U, V, W, otherwise it will damage the driver.

3.4 Control Signal Terminal X5



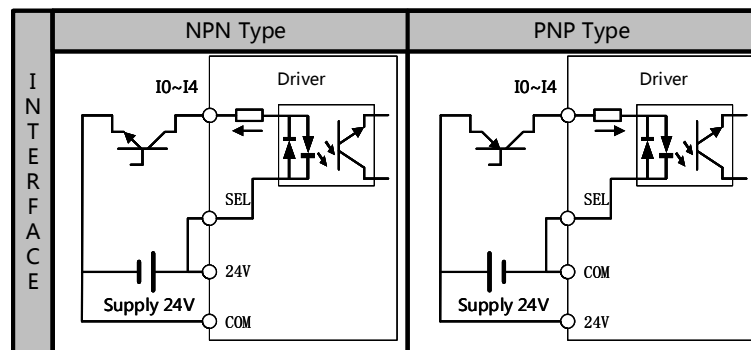
HDB-26-FEMALE

3.4.1 Terminal Definition

	Programmable Input		Programmable Output		Analog Input		Pulse Input		Motor Encoder Output	
	Terminal Name	Pin	Terminal Name	Pin	Terminal Name	Pin	Terminal Name	Pin	Terminal Name	Pin
Input Output	I0	10	O0	14	AS+	25	EA+/EP+/CW+	2	OA+	9
	I1	19	O1	5	AS-	26	EA-/EP-/CW-	11	OA-	18
	I2	1	O2	24			EB+/ED+/CCW+	4	OB+	17
	I3	20	OCOM	23			EB-/ED-/CCW-	13	OB-	8
	I4	21					EZ+	3	OZ+	7
	SEL	22					EZ-	12	OZ-	16
							C5V Power	6		
							CGND	15		
Descri ption	5 Point NPN、PNP According to SEL Pin		3 Point Normally Open Relay Output 24V/50mA		AS+ : Signal+ AS- : Signal- ±10V , 0 ~ +10V or 4 ~ 20mA		AB Pulse、PD Pulse or CW Pulse Max Frequency 500KHz		RS422	

3.4.2 Interface Type

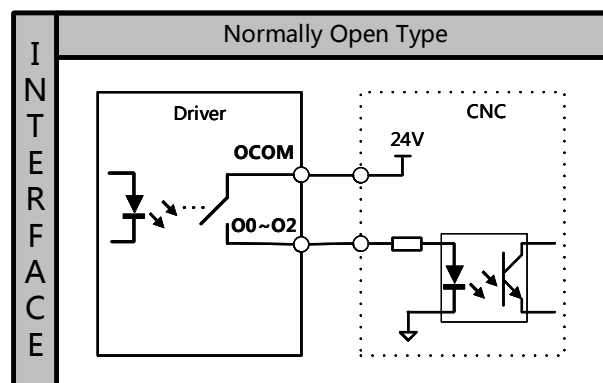
3.4.2.1 Digital Input



Note : Digital input type is chosen by SEL Pin :

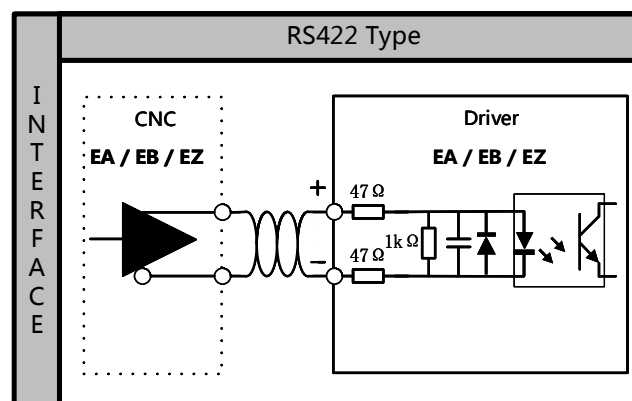
- a) SEL connect to 24V , input type is NPN;
- b) SEL connect to 0V , input type is PNP.

3.4.2.2 Digital Output

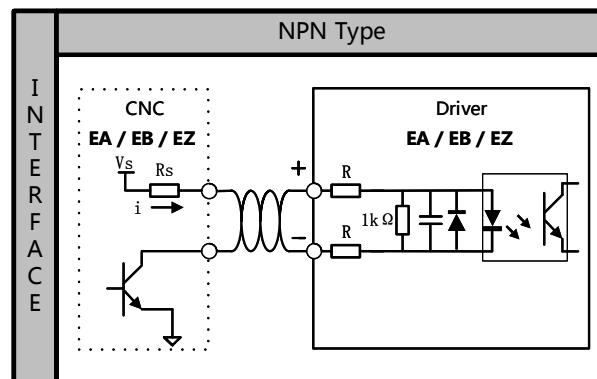


3.4.2.3 Pulse Input

- RS422 Differential Input

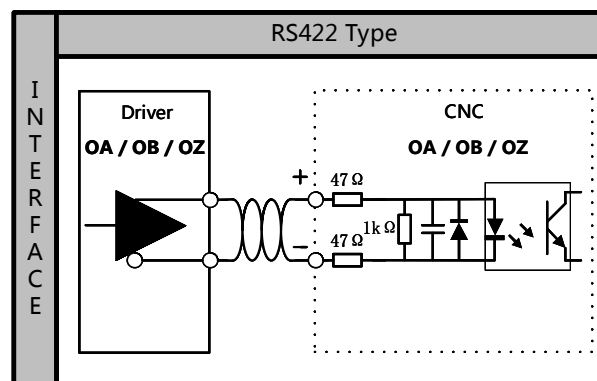


- Open Collection Input

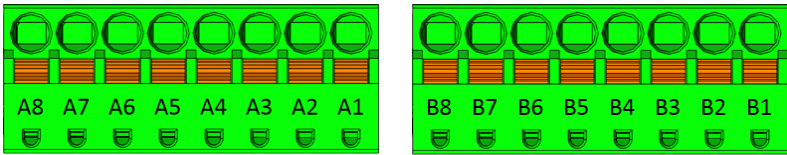


3.4.2.4 Motor Encoder Output

- RS422 Differential Output



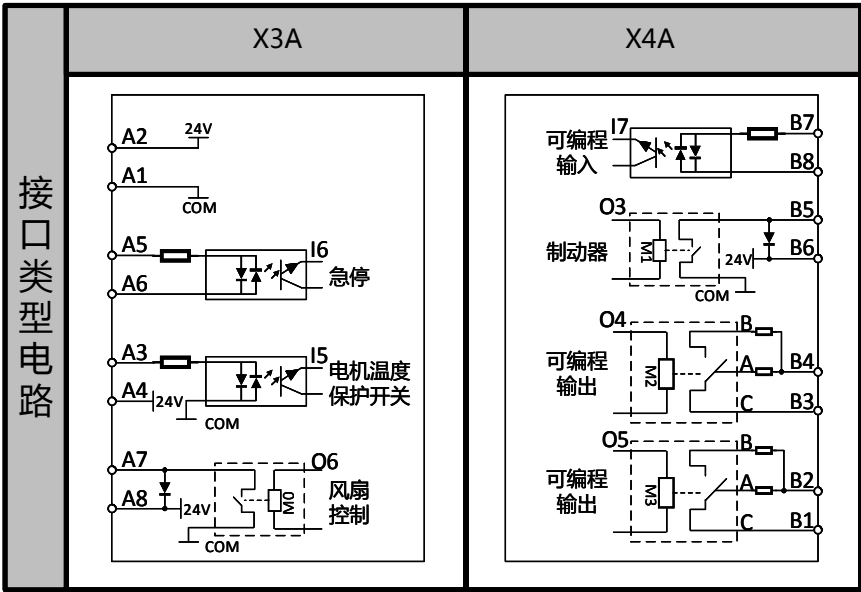
3.5 Motor Signal Interface X3/X4



3.5.1 Terminal Definition

X3A			X4A		
Pin	Name	Description	Pin	Name	Description
A1	COM	Supply 24V Negative	B1	M3C	Programable Relay 3 Common Terminal
A2	24V	Supply 24V Positive	B2	M3B	Programable Relay 3 NC Terminal
A3	MH1	Motor Overheated Protection Switch (NO or NC) Interface	B3	M2C	Programable Relay 2 Common Terminal
A4	MH2		B4	M2B	Programable Relay 2 NC Terminal
A5	ST1	Emergency Stop Switch Interface(24V)	B5	BRK_0V	Motor Brake Control Output Interface
A6	ST2		B6	BRK_24V	
A7	FAN_0V	Fan 0V Terminal	B7	I7A	Programable Input I7
A8	FAN_24V	Fan 24V Terminal	B8	I7B	

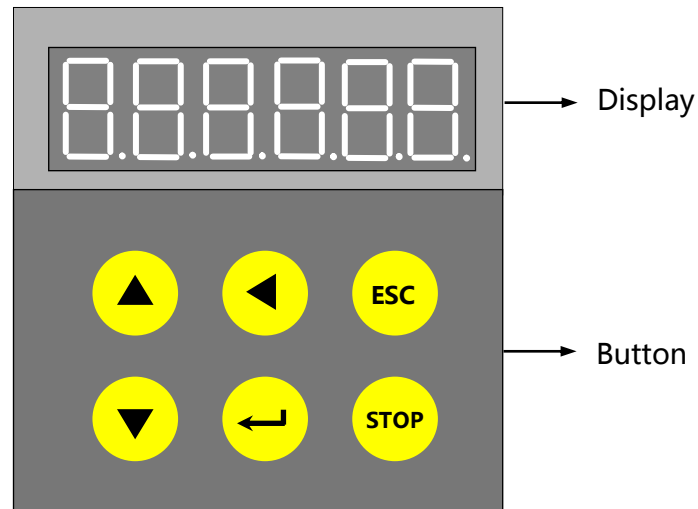
3.5.2 Interface Type



4 Panel Operation

4.1 Panel Appearance

Panel is composed of six buttons and six 8-SEG LED, which is used for the display and modification of performance parameter or real-time parameter of servo system. The operation is easy.



4.2 Button Function

Key	Name	General Function	Multiplex Function
	Increase	parameter number or parameter value increase	None
	Decrease	parameter number or parameter value decrease	None
	Left Shift	Make cursor moves left.	Switch between homologous series parameter set.
	Enter	Confirm the operation.	Run the program at stop state.
	Exit	Exit the operation.	Switching between different series of parameter set.
	Stop	Return to Run/Stop	At run state, press shortly will stop speed, press continuously will stop program.

[Note]

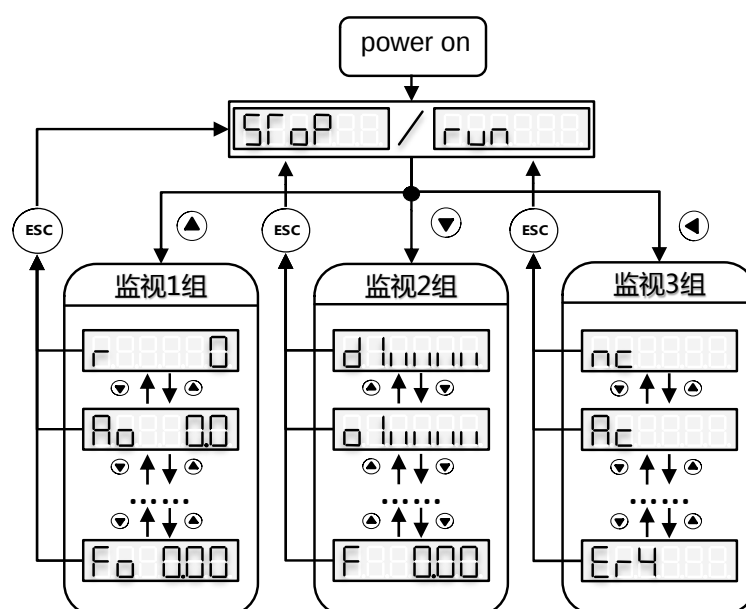
1. RUN on behalf of the servo system is in place, STOP on behalf of the servo system is not ready.

4.3 Parameter Display

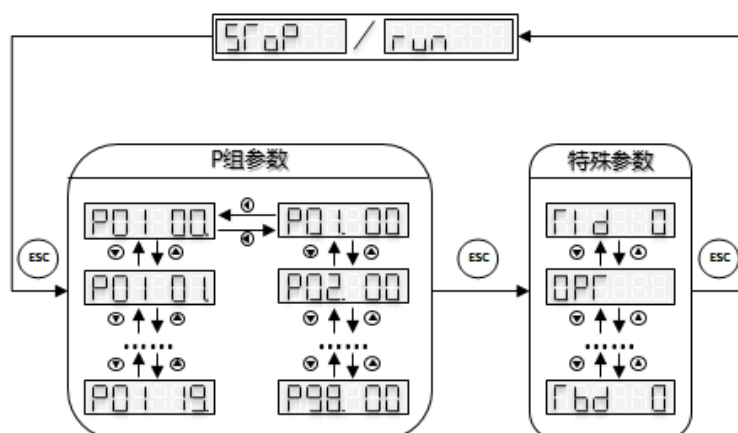
- **Real-time Parameter** : Parameter number is on the left, parameter value is on the right.
- **None Real-time Parameter** : Level 1 menu is for parameter number, displayed on the left; level 2 menu is for current parameter values, displayed on the right; level 3 menu is for target setting value.
- **Minus** : If decimal point before top digit is lighten, the number is negative.

4.4 Operation Procedure

- Switch of monitoring parameters and control panel menu :



- Parameters menu switch :



5 Trial Operation

5.1 Wiring

- No matter trial operation or daily operation, please check wiring.
 - 1) Power wire (TAG : R、 S、 T) , three-phase power input (3AC-380V) ;
 - 2) Motor wire (TAG : U、 V、 W) , three-phase output (U、 V、 W) ;
 - 3) Braking resistor wire (TAG : P、 B)
 - 4) Motor encoder wire (TAG : X2) connect to motor encoder terminal;
 - 5) Check drive grounding are in good condition.

5.2 Motor Phase Selfcheck

- 1) Check if the axis of motor can freely rotate;
- 2) Check parameter such as P01_01~P01_07 , P14_01;
- 3) When the panel display "run" , press "Left Shift" to "OP" , and input 2, motor phase start selfcheck;
- 4) Motor phase selfcheck will finish in 5 second, if warning occur, please see the warning list in chapter 8;
- 5) If an exception occurs in selfcheck (such as overcurrent) , then press "stop" continuously to stop the driver;

5.3 Drive Motor by Panel Operation

- Control motor through manually typing drive panel (such as speed, direction, acceleration, etc.) :
- When the control of CNC is abnormal, you can choose panel control to check if the wire between drive and motor is right, and if the parameter is right.
 - 1) When panel display "run", press "Left Shift" 2 times to "OP", enter 1;
 - 2) Press "Left Shift" to "nc", enter the desired speed;
 - 3) Press "Left Shift" to "ac", enter acceleration; Press "Left Shift" to "dc", enter deceleration;
 - 4) Press "Left Shift" to "FE", enter direction;
 - 5) Press "esc" to return to "run", press "Increase" one time to "r00000";
 - 6) Motor zero speed enable. Press "Enter" 1 time, zero speed motor can make; press "Enter" once again, motor will work according to setting speed.
 - 7) Press "Stop" 1 time, motor decelerates to zero and lock shaft; press "Stop" once again and motor disable.
 - 8) Press "stop" continuously, motor free sliding; at "STOP" state, press "enter" to return to "run" state.

6 Function Description

6.1 Motor Parameter

Para No	Address	Parameter Name	Range	Default	Unit
P14_00	0x2260	Motor Encoder Type	0~100	1	-
P14_01	0x2262	Motor Single Turn Encoder Line Number	1~100000000	1024	-
P14_06	0x226C	Motor Encoder Speed Filter Time	1~50	3	ms
P01_01	0x2102	Motor Poles	Please follow the Motor nameplate.		-
P01_02	0x2104	Motor Rated Frequency			Hz
P01_03	0x2106	Motor Maximum Frequency			Hz
P01_04	0x2108	Motor Rated Voltage			V
P01_05	0x210A	Motor Rated Current			A
P01_06	0x210C	Motor Rated Torque			Nm
P01_07	0x210E	Motor Rated Flux Current		= 0.3 x Motor Rated Current	
P01_08	0x2110	Motor Flux Current Coff	0.01~1.5	0.2	-
P01_09	0x2112	Motor Flux Weak Coff	0.01~1	0.1	-
P01_10	0x2114	Motor Moment Of Inertia	0~99.9999	0.1	kgm ²
P01_11	0x2116	Motor Zero Speed Torque Multiple	0.1~4	2	-
P01_12	0x2118	Motor Rated Torque Multiple	0.1~4	2	-
P01_13	0x211A	Motor Constant Power Max Speed	= 3~4 x Motor Rated Speed		
P01_14	0x211C	Motor Zero Slip Compensate Coff	0~10	1	-
P01_15	0x211E	Motor Rated Slip Compensate Coff	0~10	1	-
P01_16	0x2120	Motor Max Slip Compensate Coff	0~30	6	-
P01_17	0x2122	Motor Max Slip Compensate Coff Speed	= 3 x Motor Rated Speed		
P01_18	0x2124	Motor Pos Zero Slip Compensate Coff	0~10	1.5	-
P01_19	0x2126	Motor Pos Rated Slip Compensate Coff	0~10	2	-

6.2 IO Mapping

6.2.1 Monitored Parameter

Parameter No	mBUS Address	Parameter Name	Description
d1 ~ d8	0x2364	digital input	Digital input monitor, from right to left is I0, I1, I2...
o1 ~ o4	0x23B0	digital output	Digital output monitor, from right to left is O0, O1, O2...

6.2.2 DI Input Mapping Parameter

Driver has totally 8 digital input located in X3、X4、X5 terminal. Each digital input can be defined as various kinds of functional meaning.

Parameter No	mBUS Address	Parameter Name	Set Value
P23_10	0x236C	I0 Defination	0 : Speed Control ; 1 : Direction ; 2 : Homing 3 : Second Homing ; 4 : Position Control ; 5 : Emergency Stop ; 6 : Swing Control ; 7 : Reset ; 8 : Forward JOG ; 10 : Torque Control ; 11 : Third Homing ; 12 : Fourth Homing 13 : Motor Overheated ; 17~20 : 16 Speed (X1、 X2、 X3、 X4) ; 127 : Invalid
P23_11	0x236E	I1 Defination	
P23_12	0x2370	I2 Defination	
P23_13	0x2372	I3 Defination	
P23_14	0x2374	I4 Defination	
P23_15	0x2376	I5 Defination	
P23_16	0x2378	I6 Defination	
P23_17	0x237A	I7 Defination	

6.2.3 DO Output Mapping Parameter

Driver has totally 8 digital input located in X3、X4、X5 terminal. Each digital input can be defined as various kinds of functional meaning. Plus 128 to set value, the output is changed to normally closed output type. But when driver is not powered on, the output is open state.

Parameter No	mBUS Address	Parameter Name	Set Value
P24_10	0x23B8	O0 Definitions	0 : Warning ; 1 : Homing done ; 2 : Position Mode Ready 3 : Speed Reach ; 4 : Servo Ready ; 5 : Fan Output 6 : Double Speed Switch ; 7 : Motor Brake ; 9 : Zero Speed 127 : No Effect *Note: Plus 128 to the above figure, the output is changed to normally closed output type. when driver is not powered on, the output is open state.
P24_11	0x23BA	O1 Definitions	
P24_12	0x23BC	O2 Definitions	
P24_13	0x23BE	O3 Definitions	
P24_14	0x23C0	O4 Definitions	
P24_15	0x23C2	O5 Definitions	
P24_16	0x23C4	O6 Definitions	

6.3 Analog Voltage Correction

In the practical application, when analog Voltage is used to control signal, because of environment interference of industrial field, there is certain deviation between the actual collected analog voltage value of driver and theoretical analog voltage issued by numerical control system (or PC), which make the use inconvenience. However, the function of analog voltage correction is to correct the deviation of analog voltage to theoretical voltage.

6.3.1 Parameter

➤ **Monitored Parameter**

Parameter No	mBUS Address	Parameter Name	Description
A0	0x2316	Non-corrected Analog Input Value	Unit : V
A1	0x2318	Corrected Analog Input Value	Unit : V

➤ **0V~10V Correction Parameter**

Parameter No	mBUS Address	Parameter Name	Set Value
P21_10	0x231A	Actual sample voltage at positive 0V	A0 Value at Analog Voltage = 0V
P21_12	0x231E	Actual sample voltage at the first positive paragraph	A0 Value at Analog Voltage = +2V
P21_14	0x2322	Actual sample voltage at the second positive paragraph	A0 Value at Analog Voltage = +4V
P21_16	0x2326	Actual sample voltage at the third positive paragraph	A0 Value at Analog Voltage = +6V
P21_18	0x232A	Actual sample voltage at the fourth positive paragraph	A0 Value at Analog Voltage = +8V
P21_19	0x232C	Actual sample voltage at positive +10V	A0 Value at Analog Voltage = +10V

➤ **-10V~0V Correction Parameter**

Parameter No	mBUS Address	Parameter Name	Set Value
P21_20	0x232E	Actual sample voltage at negative 0V	A0 Value at Analog Voltage = 0V

Parameter No	mBUS Address	Parameter Name	Set Value
P21_22	0x2332	Actual sample voltage at the first negative paragraph	A0 Value at Analog Voltage = -2V
P21_24	0x2336	Actual sample voltage at the second negative paragraph	A0 Value at Analog Voltage = -4V
P21_26	0x233A	Actual sample voltage at the third negative paragraph	A0 Value at Analog Voltage = -6V
P21_28	0x233E	Actual sample voltage at the fourth negative paragraph	A0 Value at Analog Voltage = -8V
P21_29	0x2340	Actual sample voltage at negative -10V	A0 Value at Analog Voltage = -10V

➤ **Analog filter Parameter**

Parameter No	mBUS Address	Parameter Name	Set Value
P21_00	0x2310	Analog filter time constant	Analog filter time constant

6.3.2 Zero Correction

- 1) CNC Execute : M03S0 , monitored parameter A0
- 2) Put value that a little bigger than A0 into P21_10
- 3) Put value that a little smaller than A0 into P21_20

6.3.3 Analog Voltage Correction

Divide 0V~10V analog voltage to 5 segments to correct, segment points are P21_11,P21_13,P21_15,P21_17;

Divide -10V~0V analog voltage to 5 segments to correct, segment points are P21_21,P21_23,P21_25,P21_27;

For example:

- 1) In this case, - 10 v ~ 10 v corresponding motor speed range for - 6000 RPM to 6000 RPM;
- 2) First correct 0~10V analog voltage;
- 3) Set P55_05=6000,P21_11=2.000,P21_13=4.000,P21_15=6.000,P21_17=8.000
- 4) CNC execute : M03S1200 , put the value of A0 into P21_12 ;
- 5) CNC execute : M03S2400 , put the value of A0 into P21_14 ;
- 6) CNC execute : M03S3600 , put the value of A0 into P21_16 ;

- 7) CNC execute : M03S4800 , put the value of A0 into P21_18 ;
- 8) CNC execute : M03S6000 , put the value of A0 into P21_19 ;
- 9) Then correct -10V~0V analog voltage;
- 10) Set P21_21=-2.000; P21_23=-4.000; P21_25=-6.000;P21_27=-8.000 (the point in the front of value means negative)
- 11) CNC execute : M04S1200 , put the value of A0 into P21_22 ;
- 12) CNC execute : M04S2400 , put the value of A0 into P21_24 ;
- 13) CNC execute : M04S3600 , put the value of A0 into P21_26 ;
- 14) CNC execute : M04S4800 , put the value of A0 into P21_28 ;
- 15) CNC execute : M04S6000 , put the value of A0 into P21_29 ;
- 16) Now, check corrected analog input value A1.

6.4 Speed Control

Speed control is applied to precise speed control occasions, such as braiding machine, drilling machine, CNC machine, and position control can also be realized through CNC.

6.4.1 Command Sources

There are several different sources of speed instruction in speed control, which is set by parameter P55_02.

Parameter No	Description	Explanation
0	Analog Quantity Speed Command : 0~10V	Port AS+ and AS- input Analog Voltage
1	Analog Quantity Speed Command : $\pm 10V$	Port AS+ and AS-input Analog Voltage
2	Pulse Speed Command : External Pulse	Port EA+,EA-,EB+EB- Impulse Frequency
3	Bus Speed Command : mBUS	mbus set target speed

6.4.2 Monitored Parameter

Parameter No	mBUS Address	Parameter Name	Description
d	0x2364	Digital Input	Digital Input Monitor
A1	0x2318	Corrected Analog Input Value	Unit : V
F	0x2358	External Impulse Frequency	Impulse Frequency (Hz)
FI	0x2408	Motor Command Frequency	Unit : HZ
Fo	0x240A	Motor Output Frequency	Unit : HZ
Ao	0x2228	Motor Output Current	Unit : A
To	0x2238	Motor Output Torque	Unit : Rated Torque Multiple
r	0x2276	Motor Rotation Speed	Unit : rpm

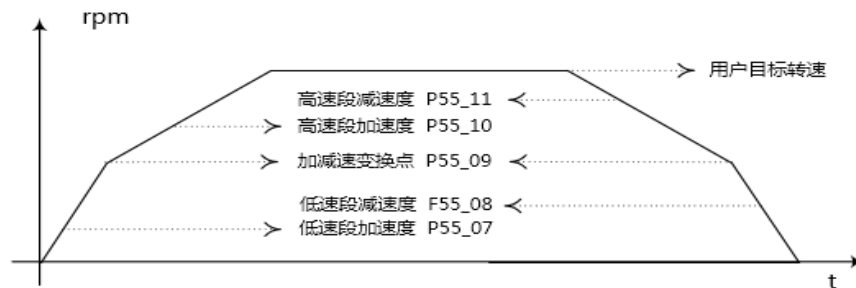
6.4.3 Performance Parameter

Parameter No	mBUS Address	Parameter Name	Set Value	Unit	Parameter No
ACR Parameter					
P33_00	0x2480	Foc ACR Im Kp Low	0~3	0.5	-
P33_01	0x2482	Foc ACR Im Kp High	0~3	1	-
P33_02	0x2484	Foc ACR It Kp Low	0~3	0.5	-
P33_03	0x2486	Foc ACR It Kp High	0~3	1	-
P33_06	0x248C	Foc ACR Im Ki	0~3	0.05	-
P33_08	0x2490	Foc ACR It Ki	0~3	0.05	-
ASR Parameter					
P34_00	0x2500	Foc ASR Kp	0~2	0.18	-
P34_03	0x2506	Foc ASR Ki Low Con	0~0.5	0.01	-
P34_04	0x2508	Foc ASR Ki High Con	0~0.5	0.004	-
Zero Lock Parameter					
P34_01	0x2502	Foc ASR Kp Zero	0~2	0.1	-
P35_00	0x2580	Foc APR Ki Follow Inertia Climb	0~0.5	0.1	-
P54_07	0x290E	Accurate Stop Stiff	0.0001~0.1	0.001	-

6.4.4 Acceleration and Deceleration

Parameter No	mBUS Address	Parameter Name	Set Value	Unit
P55_07	0x298E	Acceleration at Low Speed (Speed Control)	20	Hz/s
P55_08	0x2990	Deceleration at Low Speed (Speed Control)	20	Hz/s
P55_09	0x2992	acceleration transformation point	3000	rpm
P55_10	0x2994	Acceleration at High Speed (Speed Control)	20	Hz/s
P55_11	0x2996	Deceleration at High Speed (Speed Control)	20	Hz/s
P52_02	0x2844	Emergency Stop Deceleration	50	Hz/s

At speed control , motor will control speed according to the setting acceleration and deceleration. As shown in the figure below, P55_07 sets the acceleration curve of motor at low speed, P55_08 sets the deceleration curve of motor at low speed, P55_10 sets



the acceleration curve of motor at high speed , P55_11 sets the deceleration curve of motor at high speed, P55_09 sets the acceleration transformation point of motor.

- Formula of Acceleration and Deceleration Parameter (P55_07 , P55_08 ,

P55_10 , P55_11 , P52_02) and Time :

$$P_x = \frac{|r_1 - r_2|}{30 * t}$$

Note : r1 is current speed (rpm) , r2 is target speed (rpm) , t is acceleration time or deceleration time (s).

- Example : Time of motor speed from 0rpm to 3000rpm is 1s.
 - ✓ If P55_09>3000 (use acceleration at low speed) , P55_07= (3000-0)/30*1=100
 - ✓ If P55_09=1500 (acceleration is different at low and high speed) :
 Acceleration time at low speed is 0.4s , P55_07=(1500-0)/30*0.4=125 ;
 Acceleration time at high speed is 0.6s , P55_10=(3000-1500)/30*0.6=83.33;

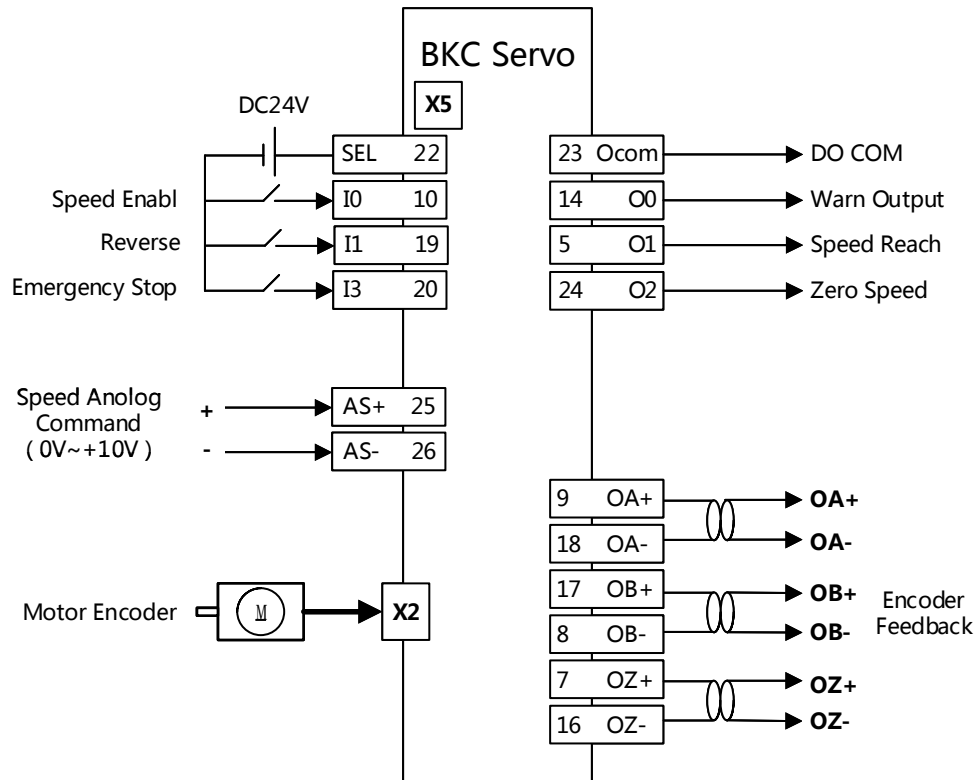
6.4.5 Speed Direction

No	P55_14	P55_15	Description
1	0	0	r=r
2	1	0	r = - r
3	X	1	If r < 0 , r = 0

6.4.6 Example

6.4.6.1 Instruction Type : 0~10V Analog Voltage

- Speed command is analog voltage input, below is the wiring diagram:



- Parameter of Example:

Parameter No	mBUS Address	Parameter Name	Set Value
P23_10	0x236C	I0 Defination	0
P23_11	0x236E	I1 Defination	1
P23_13	0x2372	I3 Defination	5
P24_10	0x23B8	O0 Output Definitions	0
P24_11	0x23BA	O1 Output Definitions	3
P24_12	0x23BC	O2 Output Definitions	9
P55_02	0x2984	Speed Command Type	0

- Associated parameter between speed command and analog voltage:

Parameter No	mBUS Address	Parameter Name	Set Value
P21_04	0x2318	Corrected Analog Input Value	
P55_18	0x29A4	Speed Instruction Resolution	1
P55_05	0x298A	Max Speed (Speed Control)	3000
P55_06	0x298C	Mini Speed (Speed Control)	0
P55_13	0x299A	Speed Command Gear Ratio Numerator	1

- Speed Command Formulas : ($P55_06 \leq |r| \leq P55_05$)

$$r = \frac{A1}{10.000} * P55_05 * P55_13$$

6.5 Positioning Control

Positioning control is applied to precision positioning systems, such as numerically-controlled machine tools, robots, etc. Positioning command source include pulse command, analog command, mBUS bus command.

6.5.1 Command Source

P53_02	Description	Explanation
0	Analog Voltage : 0~10V	10V Corresponding Max Speed
1	Analog Voltage : $\pm$ 10V	$\pm$ 10V Corresponding Max Speed
2	External Pulse	AB Pulse、PD Pulse、CCW Pulse
3	mBUS (Absolute)	Pulse Interpolation Count
4	mBUS (Incremental)	Unit Time Pulse Increasing Number

6.5.2 Monitored Parameter

Parameter No	mBUS Address	Parameter Name	Description
d	0x2364	Digital Input	Digital Input Monitor
P	0x2272	Motor Encoder Count	Unit : pulse
E	0x2356	External Pulse Count	Unit : pulse
C	0x240C	Position Command Pulse	Unit : pulse
Pc	0x2410	Synchro Error	Unit : pulse
Ao	0x2228	Motor Output Current	Unit : A
To	0x2238	Motor Output Torque	Unit : Rated Torque Multiple
r	0x2276	Motor Speed	Unit : rpm

6.5.3 Performance Parameter

Parameter No	mBUS Address	Parameter Name	Range	Default	Unit
P35_01	0x2582	Foc APR Ki Sync Inertia Climb	0~0.5	0.1	-
P53_04	0x2888	Position Max Speed	1~30000	1000	rpm
P53_05	0x288A	Position Min Speed	0.01~1	0.1	rpm
P53_06	0x288C	Position Max Inertia Speed	1~100	30	rpm
P53_15	0x289E	Position Ctrl Precision	1~100	2	Pulse
P53_07	0x288E	Position Stiff	0.00001~1	0.01	

6.6 Homing Control

6.6.1 Homing Mode

P54_00	Description	Explanation
0	Forward Homing	After find Z pulse, motor forward rotate homing.
1	Backward Homing	After find Z pulse, motor backward rotate homing.
2	Nearby Homing	Motor speed stop to 0, homing nearby.

6.6.2 Monitored Parameter

Parameter No	mBUS Address	Parameter Name	Description
d	0x2364	Digital Input	Digital Input Monitor
P	0x2272	Motor Encoder Count	Unit : pulse
H	0x2274	Motor Axis Absolute Position	Unit : pulse
Ao	0x2228	Motor Output Current	A
To	0x2238	Motor Output Torque	Unit : Rated Torque Multiple
r	0x2276	Motor Speed	Unit : rpm

6.6.3 Performance Parameter

Parameter No	mBUS Address	Parameter Name	Range	Default	Unit
P54_02	0x2904	Accurate Stop Dec	0~1000	50	Hz/s
P54_03	0x2906	Accurate Stop Search Z Speed	0~200	100	rpm
P54_04	0x2908	Accurate Stop Pos Max Speed	0~200	100	rpm
P54_05	0x290A	Accurate Stop Pos Min Speed	0.01~1	0.1	rpm
P54_06	0x290C	Accurate Stop Max Inertia Speed	1~100	30	rpm
P54_07	0x290E	Accurate Stop Stiff	0.0001~0.1	0.001	-
P54_10	0x2914	Accurate Stop Precision	0~100	2	Pulse

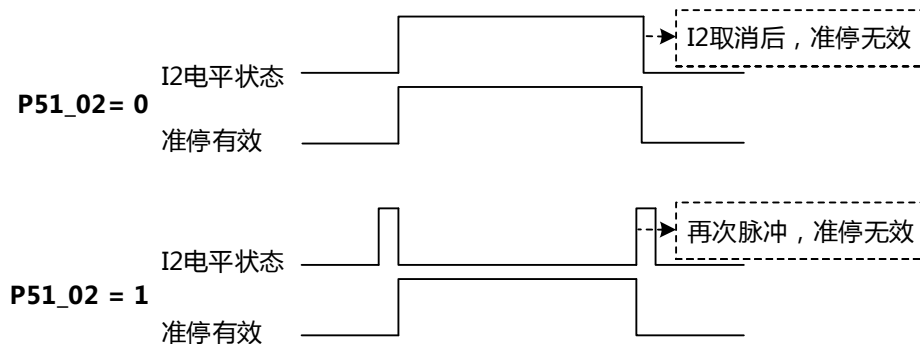
6.6.4 Origin Signal (Z Pulse) Parameter

Parameter No	mBUS Address	Parameter Name	Range	Default	Unit
P15_00	0x2280	Z Phase Input	0 : Motor Encoder Z; 1 : External Z		
P15_01	0x2282	Z Pulse Width	0~100	1	Pulse

6.6.5 Homing Trigger

Parameter No	mBUS Address	Parameter Name	Range	Default	Unit
P51_02	0x2824	Homing Trigger Type	0 : High Level Effective , 1 : Pulse Effective /Input Change Power off		

- There are two mode to trigger homing:



6.6.6 Homing Movement Parameter

Parameter No	mBUS Address	Parameter Name	Range	Default	Unit
P54_02	0x2904	Deceleration at Homing	0~1000	20	Hz/s
P54_07	0x290E	Locate Gain at Homing	0.0001~0.1	0.001	-
P54_03	0x2906	Speed at Searching Z Phase	1~200	60	rpm
P54_10	0x2914	Homing Monitoring Precision	0~100	2	Pulse
P54_12	0x2918	First Homing Position	0X80000000~0X7FFFFFFF	1000	Pulse
P54_13	0x291A	Second Homing Position	0X80000000~0X7FFFFFFF	1000	Pulse
P54_14	0x291C	Third Homing Position	0X80000000~0X7FFFFFFF	1000	Pulse
P54_15	0x291E	Fourth Homing Position	0X80000000~0X7FFFFFFF	1000	Pulse

- Driver provide 4 homing position which can be triggered by I2、I3、I11、I12.

6.7 Swing/JOG

➤ Parameter of example:

Parameter No	mBUS Address	Parameter Name	Set Value	Description
P23_10	0x236C	I0Defination	8	JOG
P23_11	0x236E	I1Defination	6	Swing
P23_13	0x2372	I3Defination	5	Emergency Stop
P24_10	0x23B8	O0 Output Definitions	0	Warning Output
P24_11	0x23BA	O1 Output Definitions	4	Servo Ready

[Note] : Motor forward JOG only when JOG IO is effective; motor swing only when swing IO is effective; Motor backward JOG only when both IO is effective.

➤ Parameter of Swing/JOG speed command:

Parameter No	mBUS Address	Parameter Name	Set Value	Description
P58_00	0x2A60	Swing Angle	180	°
P58_01	0x2A62	Swing Speed	60	rpm
P58_03	0x2A66	Swing Torque	1	Rated torque multiple
P57_00	0x2A40	JOG Speed	60	rpm
P57_01	0x2A42	JOG Acceleration	20	Hz/s
P57_04	0x2A48	JOG Torque Limit	1	Rated torque multiple

7 Parameter

7.1 Parameter Summary

Servo driver mainly contains two kinds of parameters : monitored parameter and system parameter (P series);

7.1.1 Monitored Parameter

Code	Address	Parameter Name	Range	Default	Unit
RUN	0x2404	Algorithm Running	-1 : Alarm , 0 : Stop , 1 : Run		
Ao	0x2228	Motor Output Current	RO	0	A
To	0x2238	Motor Output Torque	RO	0	Rated torque multiple
FI	0x2408	Motor Command Frequency	RO	0	Hz
Fo	0x240A	Motor Output Frequency	RO	0	Hz
Fr	0x2276	Motor Speed	RO	0	rpm
d1~d8	0x2364	Digital Input	RO	0	-
o1~o4	0x23B0	Digital Output	RO	0	-
A0	0x2316	Non-corrected Analog Input Value	RO	0	V
A1	0x2318	Corrected Analog Input Value	RO	0	V
P	0x2272	Motor Encoder Counter	RO	0	Pulse
H	0x2274	Motor Axis Absolute Position	RO	0	Pulse
E	0x2356	External Pulse Counting	RO	0	Pulse
F	0x2358	External Pulse Frequency	RO	0	Hz
C	0x240C	Position Instruction Pulse	RO	0	Pulse
L	0x240E	Position Instruction Frequency	RO	0	Pulse
U	0x2410	Position Following Error	RO	0	Pulse
nc	0x2804	Motor setting speed (OP Mode)	0~65535	0	rpm
Ac	0x2806	Motor Acceleration (OP Mode)	0~65535	0	Hz/s
dc	0x2808	Motor Deceleration (OP Mode)	0~65535	0	Hz/s
FE	0x280A	Motor Rotate Direction	0~1	0	-

Code	Address	Parameter Name	Range	Default	Unit
		(OP Mode)			
OP	0x2800	Control Mode	0 : Terminal Control ; 1 : OP Control ; 2 : Phase Selfcheck ;		
Er0	0x4102	Warning 0	RO	-	-
Er1	0x4120	Warning 1	RO	-	-
Er2	0x413E	Warning 2	RO	-	-
Er3	0x415C	Warning 3	RO	-	-
Er4	0x417A	Warning 4	RO	-	-
Er5	0x4198	Warning 5	RO	-	-

7.1.2 P Series Parameter

Code	Address	Parameter Name	Range	Default	Unit
P01_00	0x2100	Motor SN	0~999999	0	-
P01_01	0x2102	Motor Pole Number	0~64	4	-
P01_02	0x2104	Motor Rated Frequency	0~1000	50	Hz
P01_03	0x2106	Motor Max Frequency	0~1000	500	Hz
P01_04	0x2108	Motor Rated Voltage	1~3000	380	V
P01_05	0x210A	Motor Rated Current	0~1000	13	A
P01_06	0x210C	Motor Rated Torque	0~5000	35	N.m
P01_07	0x210E	Motor Rated Flux Current	0~1000	5	A
P01_08	0x2110	Motor Flux Current Coff	0.01~1.5	0.2	-
P01_09	0x2112	Motor Flux Weak Coff	0.01~1	0.1	-
P01_10	0x2114	Motor Moment Of Inertia	0~99.9999	0.1	kgm ²
P01_11	0x2116	Motor Zero Speed Torque Multiple	0.1~4	2	-
P01_12	0x2118	Motor Rated Torque Multiple	0.1~4	2	-
P01_13	0x211A	Motor Constant Power Max Speed	0~50000	4500	rpm
P01_14	0x211C	Motor Zero Slip Compensate Coff	0~10	1	-
P01_15	0x211E	Motor Rated Slip Compensate Coff	0~10	1	-
P01_16	0x2120	Motor Max Slip Compensate Coff	0~30	6	-
P01_17	0x2122	Motor Max Slip Compensate	0~50000	4500	rpm

Parameter

Code	Address	Parameter Name	Range	Default	Unit
		Coff Speed			
P01_18	0x2124	Motor Pos Zero Slip Compensate Coff	0~10	1.5	-
P01_19	0x2126	Motor Pos Rated Slip Compensate Coff	0~10	2	-
P02_00	0x2140	Hi Motor SN	0~0	0	-
P02_01	0x2142	Hi Motor Pole Number	0~64	0	-
P02_02	0x2144	Hi Motor Rated Frequency	0~1000	50	Hz
P02_03	0x2146	Hi Motor Max Frequency	0~1000	200	Hz
P02_04	0x2148	Hi Motor Rated Voltage	1~3000	380	V
P02_05	0x214A	Hi Motor Rated Current	0~1000	13	A
P02_06	0x214C	Hi Motor Rated Torque	0~5000	35	N.m
P02_07	0x214E	Hi Motor Rated Flux Current	0~1000	5	A
P02_08	0x2150	Hi Motor Flux Current Coff	0.01~1.5	0.2	-
P02_09	0x2152	Hi Motor Flux Weak Coff	0.01~1	0.1	-
P02_10	0x2154	Hi Motor Moment Of Inertia	0~100	0.1	kgm ²
P02_11	0x2156	Hi Motor Zero Speed Torque Multiple	0.1~4	2	-
P02_12	0x2158	Hi Motor Rated Torque Multiple	0.1~4	2	-
P02_13	0x215A	Hi Motor Constant Power Max Speed	0~50000	4500	rpm
P02_14	0x215C	Hi Motor Zero Slip Compensate Coff	0~10	1	-
P02_15	0x215E	Hi Motor Rated Slip Compensate Coff	0~10	1	-
P02_16	0x2160	Hi Motor Max Slip Compensate Coff	0~20	6	-
P02_17	0x2162	Hi Motor Max Slip Compensate Coff Speed	0~50000	4500	rpm
P02_18	0x2164	Hi Motor Pos Zero Slip Compensate Coff	0~10	1.5	-
P02_19	0x2166	Hi Motor Pos Rated Slip Compensate Coff	0~10	2	-
P03_00	0x2180	Double Switch State	0 : low gear , 1 : high gear		
P03_01	0x2182	Double Switch Type	0 : Switch according to the I , and switching		

Code	Address	Parameter Name	Range	Default	Unit
			is only allowed when the power is off 1 : Switch according to the I , switching when the power is on is allowed. 2 : Switch according to the I when the power is off. Switch according to the target speed. Switch when the power is on: not allowed when emergency stop, position control, accurate stop.		
P03_02	0x2184	IGB Toff Cur Attenuation Time	0~10000	20	Ms
P03_03	0x2186	Switch Relay Switch Time	0~10000	1000	Ms
P03_04	0x2188	Double Switch Relay Type			
P03_05	0x218A	Double Switch Speed	0~1000	50	Hz
P10_00	0x2200	Inverter SN	0~999999	0	-
P10_01	0x2202	Inverter Rated Voltage	1~3000	380	V
P10_02	0x2204	Inverter Rated Current	0~1000	24	A
P10_03	0x2206	Inverter Current OverLoad Multiple	0~2.5	2.5	-
P10_04	0x2208	Inverter Output Frequency Max	0~1000	500	Hz
P10_05	0x220A	Inverter Over Ambient Temp	35~85	55	°C
P10_06	0x220C	Inverter Ambient Temp	0~0	0	°C
P11_00	0x2220	Current Sensor	0~5000	100	A
P11_01	0x2222	Cur Zero Error Range Hi	2000~2150	2100	ADC sampling value
P11_02	0x2224	Cur Zero Error Range Low	1950~2100	2000	ADC sampling value
P11_03	0x2226	Cur Hard Protect Threshold	0.1~1.5	1.2	IGBT Rated multiples
P11_04	0x2228	Output Cur Rms	-	0	A
P11_05	0x222A	Output Cur Rms Filter Time	10~300	100	ms
P12_00	0x2230	Motor Over Load Protect Multiple	0.1~3	1.5	Rated torque multiple
P12_01	0x2232	Motor Over Load Counter Time Max	1~100000	1000	s

Code	Address	Parameter Name	Range	Default	Unit
P12_02	0x2234	Torque Limit Step	0.001~1	0.01	Rated torque multiple
P12_03	0x2236	Udc Up Torque Limit Threshold	0~800	650	V
P12_04	0x2238	Motor Output Torque Multiple	0~0	0	Rated torque multiple
P12_05	0x223A	Motor Output Torque	0~0	0	N.m
P12_06	0x223C	Motor Output Torque 16 Sector	0.01~5	0	Rated torque multiple
P12_07	0x223E	Motor Warn Load	0.001~3	2	Rated torque multiple
P12_08	0x2240	Motor Warn Load Time	1~100000	20	s
P12_09	0x2242	Motor Warn Load Power Down	0 : power on , 1 : power off		
P13_00	0x2250	Udc K	-0.66~-0.62	-0.64051241	-
P13_01	0x2252	Udc B	1380~1384	1382.22578	-
P13_02	0x2254	Udc Th Over	0~5000	800	V
P13_03	0x2256	Udc Th Under	0~5000	390	V
P13_04	0x2258	Udc Brake On	0~5000	700	V
P13_05	0x225A	Udc Brake Hysteresis	0~500	40	V
P13_06	0x225C	Udc Display	0~0	0	V
P14_00	0x2260	Motor Encoder Type	0 : No Encoder , 1 : Optical-electricity Encoder , 2 : Incremental rotary transformer , 3 : Incremental magnetoresistor encoder , 10 : Absolute type rotary transformer , 20 : BISS Bus encoder , 30 : Sin-Cos Encoder		
P14_01	0x2262	Motor Single Turn Encoder Line Number	1~100000000	1024	-
P14_02	0x2264	Motor Multi Turn Encoder Line Number	1~100000000	0	-
P14_03	0x2266	Motor Encoder Direction	0~1	0	-
P14_04	0x2268	Motor Encoder Low Speed Measure Switch Point	0~999	0	Pulse

Code	Address	Parameter Name	Range	Default	Unit
P14_05	0x226A	Motor Encoder Pos Filter Time	1~30	2	ms
P14_06	0x226C	Motor Encoder Speed Filter Time	1~50	3	ms
P14_07	0x226E	Motor Encoder Zero Speed Filter Time	1~10	1	ms
P14_08	0x2270	Motor Encoder Lost Line Time Threshold	0~10	2	s
P14_09	0x2272	Motor Encoder Counter	0~0	0	Pulse
P14_10	0x2274	Motor Encoder Abs Position	0~0	0	Pulse
P14_11	0x2276	Motor Encoder Speed Rpm Display	0~0	0	rpm
P15_00	0x2280	Zero Source	0 : encoder Z , 1 : external Z□, 2 : double Z		
P15_01	0x2282	Zero Source Width	0~100	1	Pulse
P15_02	0x2284	Zero Pulse Valid Counter	0~0	0	-
P15_03	0x2286	Encoder Output Source	0 : Motor Encoder , 1 : Second Encoder		
P15_04	0x2288	Encoder Output Line Number	1~100000000	1024	-
P16_00	0x22A0	Second Encoder Type	0 : No Encoder , 1 : Optical-electricity encoder		
P16_01	0x22A2	Second Single Turn Encoder Line Number	1~100000000	1024	-
P16_02	0x22A4	Second Multi Turn Encoder Line Number	1~100000000	0	-
P16_03	0x22A6	Second Encoder Direction	0~1	0	-
P16_04	0x22A8	Second Encoder Low Speed Measure Switch Point	0~999	0	Pulse
P16_05	0x22AA	Second Encoder Pos Filter Time	1~30	2	ms
P16_06	0x22AC	Second Encoder Speed Filter Time	1~50	3	ms
P16_07	0x22AE	Second Encoder Zero Speed Filter Time	1~10	1	ms
P16_08	0x22B0	Second Encoder Lost Line Time Threshold	0~10	2	s
P16_09	0x22B2	Second Encoder Counter	0~0	0	Pulse

Code	Address	Parameter Name	Range	Default	Unit
P16_10	0x22B4	Second Encoder Abs Position	0~0	0	Pulse
P16_11	0x22B6	Second Encoder Speed Rpm Display	0~0	0	rpm
P20_00	0x2300	ID	0~255	0x30	-
P20_01	0x2302	Uart Baud	-		
P20_02	0x2304	Can Baud	-		
P20_03	0x2306	Select Uart Led	0 : OPBK , 1 : LEDF		
P20_04	0x2308	Extern Interface	0 : None , 1 : GSIO , 2 : ECAT , 3 : Profibus		
P21_00	0x2310	Ext Analog Filter Time	1~100	20	ms
P21_01	0x2312	Ext Analog Adc K	0.009~0.011	0.0101	-
P21_02	0x2314	Ext Analog Adc B	-19~-20.5	-19.766	-
P21_03	0x2316	Pre Corrected Voltage	0~0	0	V
P21_04	0x2318	Corrected Voltage	0~0	0	V
P21_10	0x231A	Correct Sample Voltage_P0	-12~12	0.2	V
P21_11	0x231C	Correct Ins Voltage_P1	-12~12	2	V
P21_12	0x231E	Correct Sample Voltage_P1	-12~12	2	V
P21_13	0x2320	Correct Ins Voltage_P2	-12~12	4	V
P21_14	0x2322	Correct Sample Voltage_P2	-12~12	4	V
P21_15	0x2324	Correct Ins Voltage_P3	-12~12	6	V
P21_16	0x2326	Correct Sample Voltage_P3	-12~12	6	V
P21_17	0x2328	Correct Ins Voltage_P4	-12~12	8	V
P21_18	0x232A	Correct Sample Voltage_P4	-12~12	8	V
P21_19	0x232C	Correct Sample Voltage_P10	-12~12	10	V
P21_20	0x232E	Correct Sample Voltage_N0	-12~12	-0.2	V
P21_21	0x2330	Correct Ins Voltage_N1	-12~12	-2	V
P21_22	0x2332	Correct Sample Voltage_N1	-12~12	-2	V
P21_23	0x2334	Correct Ins Voltage_N2	-12~12	-4	V
P21_24	0x2336	Correct Sample Voltage_N2	-12~12	-4	V
P21_25	0x2338	Correct Ins Voltage_N3	-12~12	-6	V
P21_26	0x233A	Correct Sample Voltage_N3	-12~12	-6	V
P21_27	0x233C	Correct Ins Voltage_N4	-12~12	-8	V
P21_28	0x233E	Correct Sample Voltage_N4	-12~12	-8	V
P21_29	0x2340	Correct Sample Voltage_N10	-12~12	-10	V
P22_00	0x2350	Ext Pulse Filter Time	1~100	5	ms
P22_01	0x2352	Ext Pulse Type	0 : AB Type , 1 : PD Type , 2 : CW Type		

Code	Address	Parameter Name	Range	Default	Unit
P22_02	0x2354	Ext Pulse Dir	0 : Forward Direction 1 : Reverse Direction		
P22_03	0x2356	Ext Pulse Value	0~0	0	Pulse
P22_04	0x2358	Ext Pulse Frequency	0~0	0	Hz
P23_00	0x2360	Input Filter Time	1~100	10	ms
P23_01	0x2362	Input Filter Window	1~16	3	-
P23_02	0x2364	Di Ins 1	0~0	0	-
P23_03	0x2366	Di Ins 2	0~0	0	-
P23_04	0x2368	Di Ins 3	0~0	0	-
P23_05	0x236A	Di Ins 4	0~0	0	-
P23_10	0x236C	Input MapToDi 0	0 : Speed Forward ; 1 : Speed Backward ; 2 : Homing 0 ; 3 : Homing 1 ; 4 : Position Control ; 5 : Emergency Stop ; 6 : Swing ; 7 : Reset ; 8 : JOG ; 9 : JOG Backward ; 10 : Torque Control ; 11 : Homing 2 ; 12 : Homing 3 ; 13 : Motor Overheat ; 14 : Double Speed Switch (High Speed) ; 15 : Double Speed Switch (Low Speed) ; 16 : Double Speed Switch Relay Flag ; 17~20 : Gear Speed 0~3 ; 21~24 : Position Gear Ratio 0~3 ;		
P23_11	0x236E	Input MapToDi 1			
P23_12	0x2370	Input MapToDi 2			
P23_13	0x2372	Input MapToDi 3			
P23_14	0x2374	Input MapToDi 4			
P23_15	0x2376	Input MapToDi 5			
P23_16	0x2378	Input MapToDi 6			
P23_17	0x237A	Input MapToDi 7			
P23_18	0x237C	Input MapToDi 8			
P23_19	0x237E	Input MapToDi 9			
P23_20	0x2380	Input MapToDi 10			
P23_21	0x2382	Input MapToDi 11			
P23_22	0x2384	Input MapToDi 12			
P23_23	0x2386	Input MapToDi 13			
P23_24	0x2388	Input MapToDi 14			
P23_25	0x238A	Input MapToDi 15			
P23_30	0x238C	Mbus Input 1	0~0xFFFFFFFF	0	-
P23_31	0x238E	Mbus Input 2	0~0xFFFFFFFF	0	-
P23_32	0x2390	Mbus Input 3	0~0xFFFFFFFF	0	-
P23_33	0x2392	Mbus Input 4	0~0xFFFFFFFF	0	-
P24_00	0x23B0	Do Ins 1	0~0xFFFFFFFF	0	-
P24_01	0x23B2	Do Ins 2	0~0xFFFFFFFF	0	-
P24_02	0x23B4	Do Ins 3	0~0xFFFFFFFF	0	-
P24_03	0x23B6	Do Ins 4	0~0xFFFFFFFF	0	-
P24_10	0x23B8	Input MapToDo 0	0 : Warn Output ; 1 : Homing Reach ; 2 : Position Ready□; 3 : Speed Reach ;		
P24_11	0x23BA	Input MapToDo 1			

Code	Address	Parameter Name	Range	Default	Unit
P24_12	0x23BC	Input MapToDo 2	4 : Servo Ready ; 5 : Fan Output ; 6 : Double Speed Switch ; 7 : Motor Brake Control ; 9 : Zero speed reach ; 127 : Invalid *Note : The above number+128 is the normally closed type output.		
P24_13	0x23BE	Input MapToDo 3			
P24_14	0x23C0	Input MapToDo 4			
P24_15	0x23C2	Input MapToDo 5			
P24_16	0x23C4	Input MapToDo 6			
P24_17	0x23C6	Input MapToDo 7			
P24_18	0x23C8	Input MapToDo 8			
P24_19	0x23CA	Input MapToDo 9			
P24_20	0x23CC	Input MapToDo 10			
P24_21	0x23CE	Input MapToDo 11			
P24_22	0x23D0	Input MapToDo 12			
P24_23	0x23D2	Input MapToDo 13			
P24_24	0x23D4	Input MapToDo 14			
P24_25	0x23D6	Input MapToDo 15			
P24_30	0x23D8	Mbus Output 4	0~0xFFFFFFFF	0	-
P30_00	0x2400	Work Mode	-		
P30_01	0x2402	ASR Loop Time	1~1	1	ms
P30_02	0x2404	Ag Run	-1 : Warning , 0 : Stop , 1 : Run		
P30_03	0x2406	Work Status	0~0	0	-
P30_04	0x2408	Ag Target Speed Display	0~0	0	Hz
P30_05	0x240A	Ag Ramp Output Speed Display	0~0	0	Hz
P30_06	0x240C	Ag Target Position Display	0~0	0	Pulse
P30_07	0x240E	Ag Target Position Frq Display	0~0	0	Pulse
P30_08	0x2410	Ag Following Error Display	0~0	0	Pulse
P31_00	0x2420	Pwm Modulator Mode	-		
P31_01	0x2422	Carrier Adjust Mode	-		
P31_02	0x2424	Carrier Frequency	5000~10000	8000	Hz
P31_03	0x2426	Dead Zone Time	2.8~5.2	3.2	us
P32_00	0x2440	VVVF Output Voltage Max	0~380	380	V
P32_01	0x2442	Acc Current Limit Multiple	0~2	1	Rated current multiple
P32_02	0x2444	Dec Current Limit Multiple	0~2	1	Rated current multiple
P32_03	0x2446	Over Current Voltage Dec	0.1~50	10	V/s
P32_04	0x2448	Over Current Voltage Recover	0.1~50	5	V/s

Code	Address	Parameter Name	Range	Default	Unit
		Acc			
P32_05	0x244A	Torque Raise Voltage Multiple	0~0.1	0.05	Rated voltage multiple
P32_06	0x244C	Torque Raise Stop Frequency Multiple	0~0.5	0.1	Motor base frequency multiple
P33_00	0x2480	FocACR Im Kp Low	0~3	0.5	-
P33_01	0x2482	FocACR Im Kp Hig	0~3	1	-
P33_02	0x2484	FocACR It Kp Low	0~3	0.5	-
P33_03	0x2486	FocACR It Kp Hig	0~3	1	-
P33_04	0x2488	FocACR P Switch Low Speed	0~1000	50	Hz
P33_05	0x248A	FocACR P Switch High Speed	0~1000	100	Hz
P33_06	0x248C	FocACR Im Ki	0~3	0.05	-
P33_07	0x248E	FocACR Im Ki Coef	0~3	0.3	-
P33_08	0x2490	FocACR It Ki	0~3	0.05	-
P33_09	0x2492	FocACR It Ki Coef	0~3	0.3	-
P34_00	0x2500	FocASR Kp	0~2	0.18	-
P34_01	0x2502	FocASR Kp Zero Speed	0~2	0.1	-
P34_02	0x2504	FocASR Kip Alpha	0~2	0.32	-
P34_03	0x2506	FocASR Ki Low Con	0~0.5	0.01	-
P34_04	0x2508	FocASR Ki High Con	0~0.5	0.004	-
P34_05	0x250A	FocASR Ki Low Acc	0~0.5	0.005	-
P34_06	0x250C	FocASR Ki High Acc	0~0.5	0.002	-
P34_07	0x250E	FocASR Ki Low Dec	0~0.5	0.005	-
P34_08	0x2510	Foc ASR Ki High Dec	0~0.5	0.002	-
P34_09	0x2512	FocASR Pi Switch Low Speed	0~100	5	Hz
P34_10	0x2514	FocASR Pi Switch High Speed	0~1000	150	Hz
P35_00	0x2580	FocAPR Ki Follow Inertia Climb	0~0.5	0.1	-
P35_01	0x2582	FocAPR Ki Sync Inertia Climb	0~0.5	0.1	-
P35_02	0x2584	FocAPR Ki Low Con	0~0.5	0.01	-
P35_03	0x2586	FocAPR Ki Hig Con	0~0.5	0.005	-
P35_04	0x2588	FocAPR Ki Low Acc	0~0.5	0.01	-
P35_05	0x258A	FocAPR Ki High Acc	0~0.5	0.001	-
P35_06	0x258C	FocAPR Ki Low Dec	0~0.5	0.01	-
P35_07	0x258E	FocAPR Ki High Dec	0~0.5	0.001	-

Code	Address	Parameter Name	Range	Default	Unit
P35_08	0x2590	FocAPR PI Switch Low Speed	0~100	5	Hz
P35_09	0x2592	FocAPR PI Switch High Speed	0~1000	150	Hz
P50_00	0x2800	OP	0 : External ; 1 : Panel ; 2: Selfstudy		
P50_01	0x2802	OP Power On	-		
P50_02	0x2804	OP Speed Ins	-30000~30000	100	rpm
P50_03	0x2806	OP Acc	0~1000	10	Hz/s
P50_04	0x2808	OP Dec	0~1000	10	Hz/s
P50_05	0x280A	OP Speed Ins Dir	0 : Forward Direction 1 : Reverse Direction		
P51_00	0x2820	Position Or Accurate Stop	0 : Position Prefer ; 1 : Homing Prefer		
P51_01	0x2822	Speed Or Torque	0 : Speed Prefer ; 1 : Torque Prefer		
P51_02	0x2824	Accurate Stop Trigger Type	0 : High Effective , 1 : Pulse Effective /Power on when input change		
P52_00	0x2840	Emergency Type	0 : Brake Stop , 1 : Free Stop		
P52_01	0x2842	Lost DI Emergency Type	0 : Brake Stop , 1 : Free Stop		
P52_02	0x2844	Emergency Dec	1~1000	50	Hz/s
P52_03	0x2846	Emergency Dec Torque Limit	0.1~2.5	1.5	Rated torque multiple
P52_04	0x2848	None DI PowerOff Delay Time	0~900000	0	ms
P52_05	0x284A	Soft Forward Limit Shift	0~2147483648.9	0	Pulse
P52_06	0x284C	Soft Reverse Limit Shift	0~2147483648.9	0	Pulse
P53_00	0x2880	Position Ctrl Type	0 : Follow , 1 : Synchronize		
P53_01	0x2882	Position Feed Back Source	0 : Motor Encoder , 1 : Second Encoder		
P53_02	0x2884	Position Ins Type	0 : 0~10V , 1 : ±10V , 2 : external pulse 3 : mBUS absolute type , 4 : mBUSInterpolation type		
P53_03	0x2886	Position Ins Filter Time	0~100	2	ms
P53_04	0x2888	Pos Max Speed	1~30000	1000	rpm
P53_05	0x288A	Pos Min Speed	0.01~1	0.1	rpm
P53_06	0x288C	Pos Max Inertia Speed	1~100	30	rpm
P53_07	0x288E	Pos Stiff	0.00001~1	0.01	-
P53_08	0x2890	Pos Acc Stiff	0.00001~1	0	-
P53_09	0x2892	Pos Ins Gear Ratio	0~10000	1	-
P53_10	0x2894	Position Ins Dir	0 : Forward Direction		

Code	Address	Parameter Name	Range	Default	Unit
			1 : Reverse Direction		
P53_11	0x2896	Pos Acc Torque Limit	0.1~4	2	Rated torque multiple
P53_12	0x2898	Pos Dec Torque Limit	0.1~4	2	Rated torque multiple
P53_13	0x289A	Pos Inertia Zone	1~500	30	Pulse
P53_14	0x289C	Pos Climb Zone	1~50	10	Pulse
P53_15	0x289E	Pos Ctrl Precision	1~100	2	Pulse
P53_16	0x28A0	Mbus Target Position	0~0xFFFFFFFF	0	Pulse
P53_17	0x28A2	Pos 10V max Speed	0~30000	1000	rpm
P54_00	0x2900	Accurate Stop Ctrl Type	0 : Fund Z forward homing , 1 : Fund Z backward homing , 2 : Nearby homing		
P54_01	0x2902	Accurate Stop Feed Back Source	0 : Motor Encoder , 1 : Second Encoder		
P54_02	0x2904	AccurateStopDec	0~1000	50	Hz/s
P54_03	0x2906	Accurate Stop Search Z-Speed	0~200	100	rpm
P54_04	0x2908	Accurate Stop Pos Max Speed	0~200	100	rpm
P54_05	0x290A	Accurate Stop Pos Min Speed	0.01~1	0.1	rpm
P54_06	0x290C	Accurate Stop Max Inertia Speed	1~100	30	rpm
P54_07	0x290E	Accurate Stop Stiff	0.0001~0.1	0.001	-
P54_08	0x2910	Accurate Stop Inertia Zone	1~500	30	Pulse
P54_09	0x2912	Accurate Stop Climb Zone	1~50	10	Pulse
P54_10	0x2914	Accurate Stop Precision	0~100	2	Pulse
P54_11	0x2916	Accurate Stop Torque Limit	0.1~3	2	Rated torque multiple
P54_12	0x2918	Accurate Stop Position 1	0~999999	1000	Pulse
P54_13	0x291A	Accurate Stop Position 2	0~999999	2000	Pulse
P54_14	0x291C	Accurate Stop Position 3	0~999999	3000	Pulse
P54_15	0x291E	Accurate Stop Position 4	0~999999	4000	Pulse
P55_00	0x2980	Speed Algorithm Type	0 : VVVF Control , 1 : Asynchronous Motor Speed Sensor FOC Control		
P55_01	0x2982	Speed Feed Back Source	0 : Motor Encoder , 1 : Second Encoder		
P55_02	0x2984	Speed Ins Type	0 : 0~10V , 1 : ±10V ,		

Code	Address	Parameter Name	Range	Default	Unit
			2 : External Pulse , 3 : mBUS , 4 : 16 gear speed		
P55_03	0x2986	Speed Zero Lock Time Delay	0 : Speed closed loop , 1 : Position closed loop		
P55_04	0x2988	Speed Ctrl S-Curve Time	1~10000	1	ms
P55_05	0x298A	Speed Ctrl Max Speed	0~30000	3000	rpm
P55_06	0x298C	Speed Ctrl Min Speed	0~3000	0	rpm
P55_07	0x298E	Speed Ctrl Low Speed Acc	0~1000	50	Hz/s
P55_08	0x2990	Speed Ctrl Low Speed Dec	0~1000	50	Hz/s
P55_09	0x2992	Speed Ctrl Adj Speed Sw Point	1~30000	1500	rpm
P55_10	0x2994	Speed Ctrl Hi Speed Acc	0~1000	50	Hz/s
P55_11	0x2996	Speed Ctrl Hi Speed Dec	0~1000	50	Hz/s
P55_12	0x2998	Speed Ctrl Reach Field	1~500	10	rpm
P55_13	0x299A	Speed Ctrl Ins Gear Ratio	0~10000	1	-
P55_14	0x299C	Speed Ctrl Speed Ins Dir	0 : Forward Direction 1 : Reverse Direction		
P55_15	0x299E	Speed Ctrl Speed Inv Disable	0~1	0	-
P55_16	0x29A0	Speed Ctrl Acc Torque Limit	0.1~3	2	Rated torque multiple
P55_17	0x29A2	Speed Ctrl Dec Torque Limit	0.1~3	2	Rated torque multiple
P55_18	0x29A4	Speed Ctrl Speed Ins Resolution	1~1000	1	rpm
P55_19	0x29A6	Speed Ctrl Mbus Target Speed	-30000~30000	0	rpm
P55_20	0x29A8	Gear Speed 0	-30000~30000	0	rpm
P55_21	0x29AA	Gear Speed 1	-30000~30000	0	rpm
P55_22	0x29AC	Gear Speed 2	-30000~30000	0	rpm
P55_23	0x29AE	Gear Speed 3	-30000~30000	0	rpm
P55_24	0x29B0	Gear Speed 4	-30000~30000	0	rpm
P55_25	0x29B2	Gear Speed 5	-30000~30000	0	rpm
P55_26	0x29B4	Gear Speed 6	-30000~30000	0	rpm
P55_27	0x29B6	Gear Speed 7	-30000~30000	0	rpm
P55_28	0x29B8	Gear Speed 8	-30000~30000	0	rpm
P55_29	0x29BA	Gear Speed 9	-30000~30000	0	rpm
P55_30	0x29BC	Gear Speed 10	-30000~30000	0	rpm

Code	Address	Parameter Name	Range	Default	Unit
P55_31	0x29BE	Gear Speed 11	-30000~30000	0	rpm
P55_32	0x29C0	Gear Speed 12	-30000~30000	0	rpm
P55_33	0x29C2	Gear Speed 13	-30000~30000	0	rpm
P55_34	0x29C4	Gear Speed 14	-30000~30000	0	rpm
P55_35	0x29C6	Gear Speed 15	-30000~30000	0	rpm
P56_00	0x2A00	Torque Ins Type	0 : 0~10V , 1 : $\pm 10V$, 3 : mBUS , 4 : 16 gear		
P56_01	0x2A02	Max Torque	0~3	2	Rated torque multiple
P56_02	0x2A04	Torque Acc	0.01~10	1	Rated torque multiple
P56_03	0x2A06	Torque Dec	0.01~10	1	Rated torque multiple
P56_04	0x2A08	Torque Ins Dir	0 : Forward Direction 1 : Reverse Direction		
P56_05	0x2A0A	Torque Fwd Max Speed	0~30000	1500	rpm
P56_06	0x2A0C	Torque Rev Max Speed	0~30000	1500	rpm
P56_07	0x2A0E	Torque Ctl Fwd Attenuation	0~10	0.1	multiple of torque /Hz
P56_08	0x2A10	Torque Ctl Rev Attenuation	0~10	0.1	multiple of torque /Hz
P56_09	0x2A12	Torque Attenuation Step Speed	0~10	10	rpm
P56_10	0x2A14	Mbus Target Torque	-3~3	0	Rated torque multiple
P57_00	0x2A40	Jog Max Speed	0~1000	100	rpm
P57_01	0x2A42	Jog Acc	0~100	30	Hz/s
P57_02	0x2A44	Jog Dec	0~100	30	Hz/s
P57_03	0x2A46	Jogp Dir	0 : Forward Direction 1 : Reverse Direction		
P57_04	0x2A48	Jog Torque Limit	0.1~3	2	Rated torque multiple
P58_00	0x2A60	Swing Angle	0~360	20	degree
P58_01	0x2A62	Swing Speed	0~30	30	rpm
P58_02	0x2A64	Swing Acc	0~50	30	Hz/s
P58_03	0x2A66	Swing Torque Limit	0.1~3	2	Rated torque multiple

Parameter

Code	Address	Parameter Name	Range	Default	Unit
P59_00	0x2A80	Start Identify	-		
P59_01	0x2A82	Identify Max Speed	0~300	100	rpm
P59_02	0x2A84	Identify Torque Limit	0.1~3	1	Rated torque multiple
P90_00	0x4000	Error Status	0~0	0	-
P90_01	0x4002	Clear Warning	Clear after write 1 ,and auto return to 0.		
P90_02	0x4004	Under Voltage Mask	0 : Non-shield 1 : Shield		
P90_03	0x4006	Motor Over Temp Mask	0 : Non-shield 1 : Shield		
P91_00	0x4100	Warn 0 Number	Warning number when warning occur.		
P91_01	0x4102	Warn 0 WarnId0	Record the warning type in turn when warning, up to 8 types.		
P91_02	0x4104	Warn 0 WarnId1			
P91_03	0x4106	Warn 0 WarnId2			
P91_04	0x4108	Warn 0 WarnId3			
P91_05	0x410A	Warn 0 WarnId4			
P91_06	0x410C	Warn 0 WarnId5			
P91_07	0x410E	Warn 0 WarnId6			
P91_08	0x4110	Warn 0 WarnId7			
P91_09	0x4112	Warn 0 Current	Current When Warning		A
P91_10	0x4114	Warn 0 Udc	Udc Voltage When Warning		V
P91_11	0x4116	Warn 0 Torque	Torque When Warning		Nm
P91_12	0x4118	Warn 0 Speed	Speed When Warning		rpm
P91_13	0x411A	Warn 0 Status	Drive Status When Warning		
P91_14	0x411C	Warn 0 Work Mode	Work loop status When Warning		

8 Warning

8.1 Warning List

Code	Description	Cause	Troubleshooting
Err-00	Over Voltage	Deceleration Time too Short Braking Resistor Broken Braking Resistor not Fit	Extend Deceleration Time Check Braking Resistor
Err-01	Under Voltage	Power Interruption Input Voltage is too low. Voltage fluctuation of input power is too big.	Check Source Power
Err-02	Short Current	Motor Broken Source Power Under Voltage Overload , Acceleration Time too Short Driver Output Short Power of Driver too Small	Check Motor Check Source Power Extend Acceleration Time Check U、V、W Short Choose Matched-power Driver
Err-03	Over Current	Braking Resistor not Fit System Parameter not Right Overload , Deceleration Time too Short Driver Output Short Power of Driver too Small	Check Braking Resistor Extend Deceleration Time Check U、V、W Short Choose Matched-power Driver
Err-04	IGBT Overheated	Motor Broken Temperature of Driver Overheated Output Current of Driver overload	Check Motor Check Heat Sink Whether motor is in state of overload for a long time

Code	Description	Cause	Troubleshooting
Err-05	Encoder Malfunction	Motor Phase Uncorrect Motor Encoder Parameter not Right Motor Encoder Wire Broken	Check Motor Phase Check System Parameter E04 Check Monitored Parameter P
Err-06	Motor Overheated	Motor temperature exceed the default value.	Check Motor Check Heat Sink of Motor
Err-07	Current Sensor Abnormal	Current Sensor Circle Fault	Communicate with FAE
Err-08	Ambient Temperature Overheats	Ambient Temperature Overheats	Reset P10_05, change warning threshold.
Err-09	Over Load	Motor Phase not Right Motor Encoder Broken Torque Overload Protection Threshold unreasonable	Check Motor Phase Check Motor Encoder Check Load Modify System Parameter E20
Err-13	New Parameter Warning	Occur after update new program.	Disappear after power on again.
Err-17	Interface Board Fault	GSIO interface board is loose or interface board model error.	Check if the interface board is plugged in correctly. Check if P20_04 is correct
Err-18	Double Speed Relay Switch State Error	Double Speed Relay Switch State Missing	Check Double Speed Relay
Err-20	Encoder Z Error	Encoder Z Phase Lost	Change Encoder
Err-21	Encoder Parameter Setting	Encoder Parameter Setting Abnormal	Check E04

Code	Description	Cause	Troubleshooting
	Error		
Err-22	Parameter Recovery Error When Power on	EEPROM Parameter CRC Error When Power on	Communicate with FAE
Err-24	Homing Precision Error	Homing Position not Precise Enough	Amplification F34

8.2 Fault Information and Troubleshooting

➤ No display on driver after power up

- ✧ Description: After power up, there is no display on driver. Tear down all the wiring, only retain R/S/T three-phase inlet wires.
- ✧ Cause and Troubleshooting:
 - If the power supply is normal, the rectifier bridge or charging resistor is damaged. Return to factory to repair or have professional maintenance;
 - Charging indicator light is on: the rectifier bridge and the charging resistor is normal, then the switching power supply is damaged or the fuse is burnt down. Return to factory to repair.

➤ Leakage protector action

- ✧ Description: When servo spindle starts, leakage protector trips.
- ✧ Cause and Troubleshooting:
 - If ordinary leakage protector is used, the threshold value of electric leakage protection should be greater than 200 mA, or the leakage protector should be canceled;
 - Recommend use servo (frequency) dedicated leakage protector, electric leakage protection threshold should be greater than 30 mA;
 - Put isolation transformer Between servo driver and ordinary leakage protector;

➤ Error Result From Encoder

- ✧ Description:
 - Err-05 Encoder Warning;
 - Spindle rotation at low speed , not control by the speed command;
 - Spindle over speed;
 - Speed uneven during operation , have significant impact type mechanical vibration;
 - Monitor current I_o when no-load , large current is observed;
 - Monitor torque T_o when no-load , high torque or the full torque has been reached;
 - Frequently appears Err-02 , Err-03 , Err-09 warning.
- ✧ Troubleshooting:
 - Check if X2 terminal and motor encoder air plug connect to encoder wire;
 - If it has been properly connected, you can rotate motor manually, and check monitored parameter P. If motor encoder is 1024, then motor rotate a circle, parameter P should change 4096 pulse;
 - If parameter P have no change, please carefully check encoder wire or replace the encoder;

- If the connection is correct and power is good, then maybe encoder is damaged and need to be changed;

➤ **Err-01 Under-voltage Error**

✧ Cause:

- Power voltage instability, please use the multimeter to measure the R/S/T port of driver to determine whether the power fluctuation is too big ;
- Start of large scale equipment nearby can lead to instantaneous undervoltage, and this kind of situation can't use multimeter to check

➤ **Spindle Speed not Precise**

✧ Cause and Troubleshooting:

- Pulse Speed Control :
 - ✓ Check whether encoder line parameter in CNC system match P14_01 parameter;
 - ✓ Whether spindle has transmission ratio;
- Analog Quantity Speed Control :
 - ✓ Check whether the highest spindle speed in CNC system match F00 parameter;
 - ✓ Whether receive of analog voltage is accurate, you can monitor through A1;
 - ✓ First correct analog in accordance with method in section 6.2.

➤ **Spindle Homing Position not Precise**

✧ Cause and Troubleshooting:

- For the first time use or replacing the spindle assembly : readjust the parameter P54_12 to the right value ;
- Deviation appears after a period of time use, and deviation is stable: synchronous pulley or synchronous belt is loose;
- Deviation appears during homing, and deviation progressively increase: check whether the motor encoder is loose ;
- Deviation appears during homing, and deviation changes randomly: check if encoder wire is interfered , and if synchronous belt is loose;
- If the above countermeasures are invalid, please contact technical support;