DS2 series 380V servo drive

Fast manual

WUXI XINJE ELECTRIC CO., LTD.

Serial NO. SC2309 20150708 1.0

►► Safety caution

■ Confirmation when receive products

- ✓ DO NOT install any driver which is damaged, lack of accessories or not the same with the model ordered.

■ Installation

- ✓ Cut off external power supply before installation.

■ Wiring

- ✓ Cut off external power supply before wiring.
- ✓ Connect AC power supply to the corresponding terminals.
- ✓ Do not connect a three-phase power supply to the U, V, or W output terminals.
- ✓ Use $2mm^2$ wire to grounding the ground terminals.

■ Operation

- ✓ Do not remove the panel cover while the power is ON.
- ✓ Do not touch terminals for five minutes after the power has been turned OFF.
- ✓ Do not connect with any motor when trial operation.
- ✓ Before starting operation with a machine connected, change the settings to match the parameters of the machine.
- ✓ Do not attempt to change wiring while the power is ON.
- ✓ Do not touch the heat sinks during operation.

►► Checking Products upon Delivery

1**. When receive the products, please check below items:**

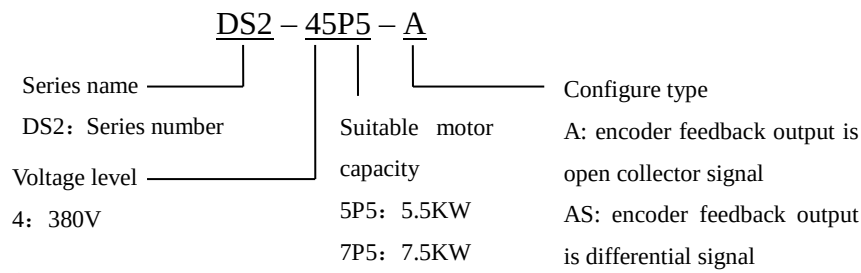
Items	Comments
Are the delivered products the ones that were ordered?	Check the model numbers marked on the nameplates of the servomotor and servo drive.
Does the servomotor shaft rotate smoothly?	The servomotor shaft is normal if it can be turned smoothly by hand. Servomotors with brakes,

	however, cannot be turned manually.
Is there any damage?	Check the overall appearance, and check for damage or scratches that may have occurred during shipping.
Are there any loose screws?	Check screws for looseness using a screwdriver.
Is the motor code the same with the code in driver?	Check the motor code marked on the nameplates of the servomotor and the parameter F0-00 on the servo drive.

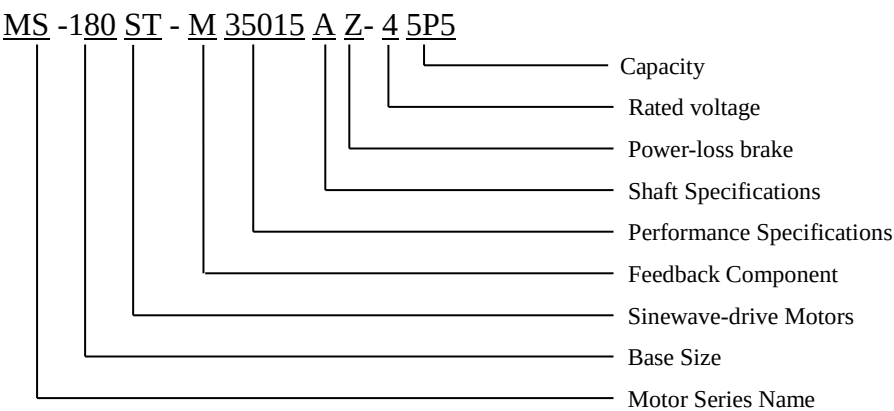
If any of the above is faulty or incorrect, contact XINJE or an authorized distributor.

2. **Model description**

1）Servo drive



2）Servo motor



Base size: 180;

Feedback component: M (Photoelectric pulse encoder)

Performance Specifications: First 3 numbers mean rated torque, last 2 numbers mean rated revolution;

For instance:35015: rated torque 35N ṁ,rated revolution 1500rpm;

48015: rated torque 48N ṁ, rated revolution 1500rpm;

Shaft Specifications: A－Without key; B－With key;

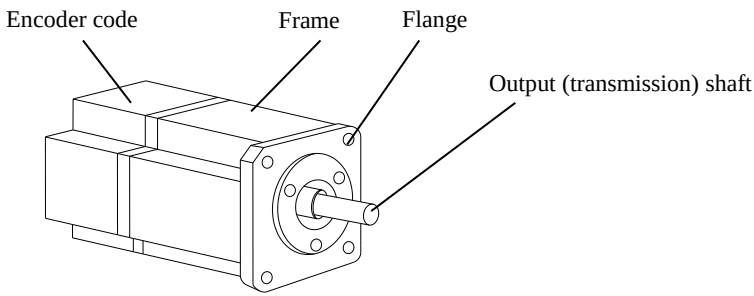
Power-loss brake: Null－Have it; Z－Not have it;

Voltage level: 4-380V;

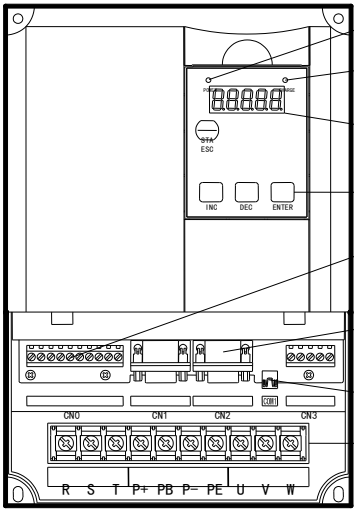
Capacity: 5.5KW, 7.5KW.

3. Sections description

1）Servo motor



2）Servo drive



POWER LED
Turn on when the drive power on

CHARGE LED
Turn on when main circuit power on.

Panel display
Show the servo state, alarm and parameters

Panel keys
To set the parameters

CN0/CN1/CN3
To connect the I/O signal and RS485 communication port

CN2
To connect the encoder on the servo motor

COM1
Connect to PC, HMI, PLC

Power supply and servo motor terminals
Power supply input, servo motor terminals

Voltage level	380V				
Motor type MS-	130ST-			180ST-	
	M21520	M27015		M35015	
	□□-44P5	□□-44P3		□□-45P5	
Motor code	0150	2151	0151	1152	0152
Rated power (KW)	4.5	4.3	4.3	5.5	5.5
Rated current (A)	9.5	8.0	10.0	8.5	12.0
Rated speed (rpm)	2000	1500	1500	1500	1500
Max speed（rpm）	3000	2000	2000	2000	2000
Rated torque（N m）	21.5	27	27	35	35
Peak torque（N m）	53	54	67	87.5	70

Back EMF constat（V/krpm）		140	210	172	250	181
Torque coefficient（N m/A）		2.26	3.37	2.70	4.1	2.92
Rotor inertia（Kg m^2）		4.7×10^{-3}	7.2×10^{-3}	6.1×10^{-3}	9.18×10^{-3}	8.6×10^{-3}
Winding resistor（Ω）		0.71	0.59	0.796	1.1	0.62
Winding inductance（mH）		4.00	14.4	4.83	15.1	4.00
Electrical time constant（ms）		5.63	24.4	6.07	13.7	6.45
Weight（Kg）		22.2	23.3	25.5	27.7	30.5
Encoder ppr（PPR）		2500				
Pole pairs		4				
Motor insulation level		Class B (130℃)				
Protection level		IP65				
Ambient	Temperature	－20℃~＋50℃				
	Humidity	Relative humidity<90% (no condensation)				

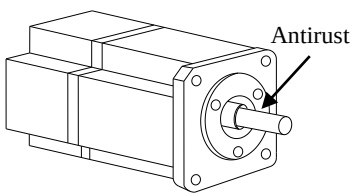
Voltage level	380V	
Motor type MS-	180ST-	220ST-
	M48015	M70015
	□□-47P5	□□-411P0
Motor code	0153	1157
Rated power (KW)	7.5	11.0
Rated current (A)	20.0	25
Rated speed (rpm)	1500	1500
Max speed（rpm）	2000	2000
Rated torque（N m）	48	70
Peak torque（N m）	96	105
Back EMF constat	156	170

（V/krpm）			
Torque coefficient（N m/A）		2.40	2.8
Rotor inertia（Kg m^2）		9.5×10^{-3}	23.5×10^{-3}
Winding resistor（Ω）		0.273	0.46
Winding inductance（mH）		2.14	5.54
Electrical time constant（ms）		7.84	12
Weight（Kg）		40.0	55
Encoder ppr（PPR）		2500	
Pole pairs		4	
Motor insulation level		Class B (130℃)	
Protection level		IP65	
Ambient	Temperature	－20℃～＋50℃	
	Humidity	Relative humidity<90% (no condensation)	

►► Installations

1. Servomotor

MS series servomotors can be installed either horizontally or vertically. The service life of the servomotor can be shortened or unexpected problems might occur if it is installed incorrectly or in an inappropriate location.



Caution：

1. The end of the motor shaft is coated with antirust. Before installing, carefully remove all of the paint using a cloth moistened with paint thinner.

2. Avoid getting thinner on other parts of the servomotor.

1） Storage Temperature

Store the servomotor within -20~+60 ℃ as long as it is stored with the power cable disconnected.

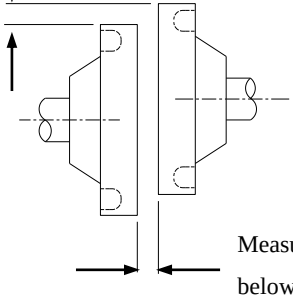
2） Installation Site

- Indoor，free of corrosive or explosive gases.
- Well-ventilated and free of dust and moisture.
- Ambient temperature of 0 °to 50 ℃.
- Relative humidity (r.h.) of 20 to 90% with no condensation.
- Accessible for inspection and cleaning.

3） Concentricity

Please use coupling when connecting to machine; keep the shaft center of servo motor and machine at the same line. It should be accord to the following diagram when installing the servo motor.

Measure it at 4 places of the circle, the difference should be below 0.03mm. (Rotate with the shaft coupler)



Measure it at 4 places of the circle, the difference should be below 0.03mm. (Rotate with the shaft coupler)

Caution：（1）If the concentricity is not enough, it will cause the vibration and bearing damage.

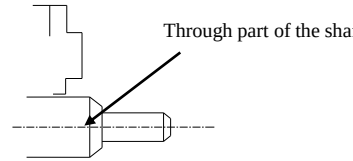
（2）When installing the coupler, prevent direct impact to the shaft. This can damage the encoder mounted on the shaft end at the opposite side of the load.

4） Orientation

MS series servomotors can be installed either horizontally or vertically.

5） Handling Oil and Water

Install a protective cover over the servomotor if it is used in a location that is subject to water or oil mist. Also use a servomotor with an oil seal when needed to seal the through-shaft section.



6） Cable Stress

Make sure that the power lines are free from bends and tension. Be especially careful to wire signal line cables so that they are not subject to stress because the core wires are very thin, measuring only 0.2 to 0.3mm^2.

2. Servo drive

The DS2 series servo drives are base-mounted servo drives. Incorrect installation will cause problems. Follow the installation instructions below.

1）Storage Conditions

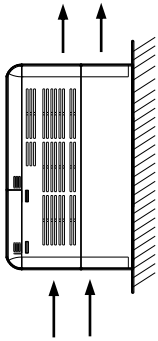
Store the servo drive within -20~+85℃, as long as it is stored with the power cable disconnected.

2）Installation Site

The following precautions apply to the installation site:

Situation	Installation Precaution
Installation in a Control Panel	Design the control panel size, unit layout, and cooling method so the temperature around the servo drives does not exceed 50 ℃.
Installation Near a Heating Unit	Minimize heat radiated from the heating unit as well as any temperature rise caused by natural convection so the temperature around the servo drives does not exceed 50 ℃.
Installation Near a Source of Vibration	Install a vibration isolator beneath the servo drive to avoid subjecting it to vibration.
Installation at a Site Exposed to Corrosive Gas	Corrosive gas does not have an immediate effect on the servo drives, but will eventually cause electronic components and terminals to malfunction. Take appropriate action to avoid corrosive gas.
Other Situations	Do not install the servo drive in hot and humid locations or locations subject to excessive dust or iron powder in the air.

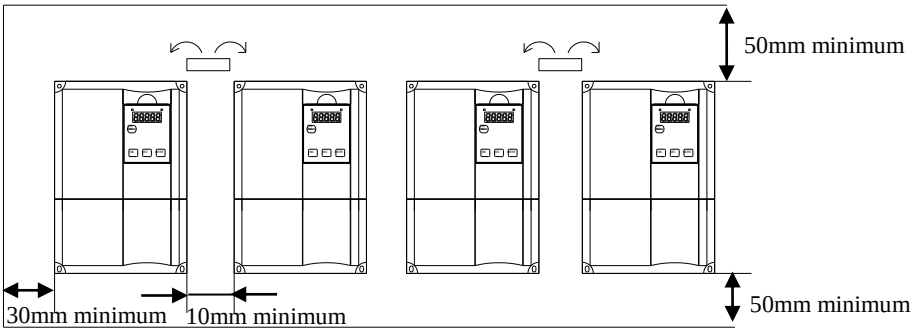
3）Orientation



Install the servo drive perpendicular to the wall as shown in the figure. The servo drive must be oriented this way because it is designed to be cooled by natural convection or by a cooling fan.

4) Installation

Follow the procedure below to install multiple servo drives side by side in a control panel.



■ **Servo drive Orientation**

Install the servo drive perpendicular to the wall so the front panel containing connectors faces outward.

■ **Cooling**

As shown in the figure above, allow sufficient space around each servo drive for cooling by cooling fans or natural convection.

■ **Side-by-side Installation**

When install servo drives side by side as shown in the figure above, make at least 10mm between and at least 50mm above and below each servo drive. Install cooling fans above the servo drives to avoid excessive temperature rise and to maintain even temperature inside the control panel.

■ **Environmental Conditions in the Control Panel**

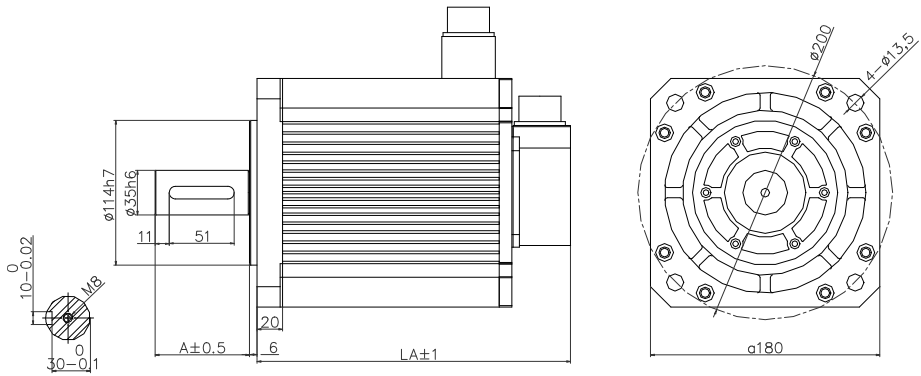
- ❖ Ambient Temperature: 0~50 ℃
- ❖ Humidity: 90%RH or less
- ❖ Vibration: 4.9m/s^2
- ❖ Condensation and Freezing: None
- ❖ Ambient Temperature for Long-term Reliability: 50 ℃ maximum

►► Dimensions

1. Servo motor

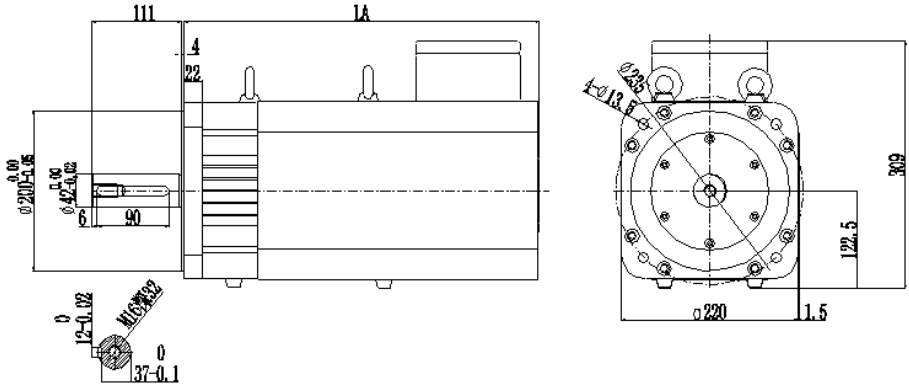
■ 180 Series（Units: mm）

Note: 180 series motor shaft length has 65mm and 80mm. please check the motor code, 0150, 0151, 0152, 0153 shaft length is 65mm, others are 80mm.



Model	Motor code	A	LA	
			Normal	With brake
MS-180ST-M19015□□-43P0	0156	59	221	289
	1052	74	221	303
MS-180ST-M21520□□-44P5	0150	59	243	300
MS-180ST-M27015□□-44P3	2151	74	247	329
	0151	59	262	319
MS-180ST-M35015□□-45P5	1152	74	277	359
	0152	59	292	349
MS-180ST-M48015□□-45P5	0153	59	346	403

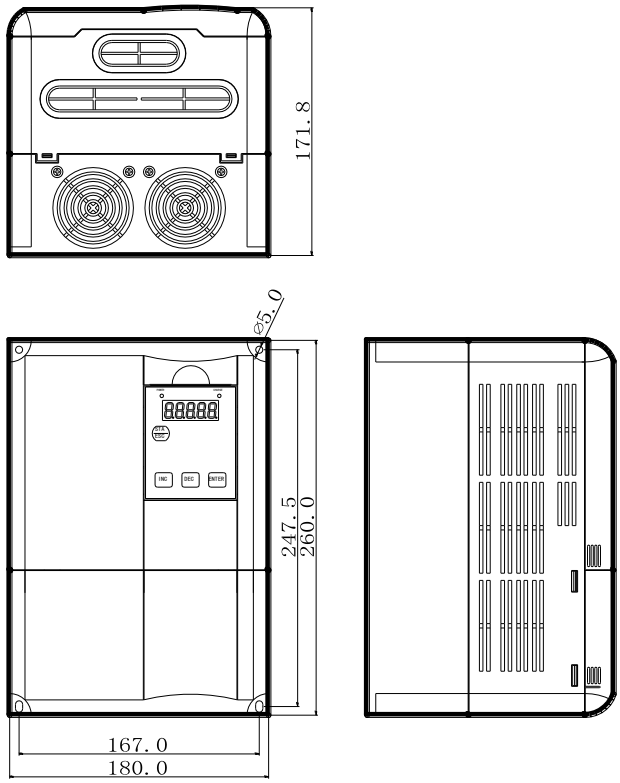
■ 220 Series（Units: mm）



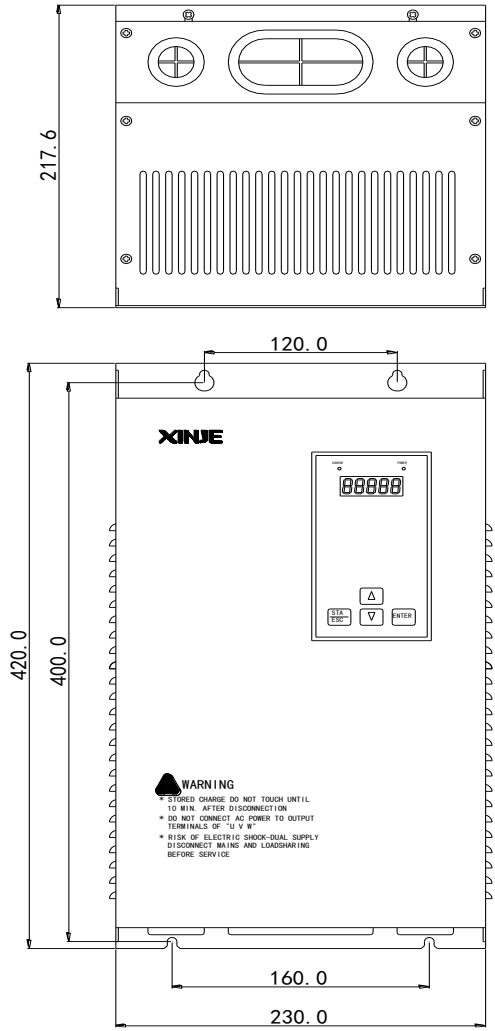
Model	Motor code	LA	
		Normal	With brake
MS-220ST-M70015□□-411P0	1157	444	

2. Servo drive（Units: mm）

DS2-45P5-A/AS



DS2-47P5-A, DS2-411P0-A



►► Servo drive general specification

Servo unit		DS2 series 380V servo drive
Encoder		Incremental encoder (2500 ppr)
Input power		DS2-4□P□-A/AS: 3-phase AC380V, 50/60Hz
Control mode		3-phase full-wave rectifier control IPM PWM sine-wave current drive
Using	Temperature	0～+50 ℃/-20～+85 ℃
	Humidity	Below 90% RH (no condensation)
	Vibration /impact resistance	4.9m/s^2 / 19.6m/s^2
Structure		Base installation

Performance specification

Servo drive type				DS2-45P5-A/AS, DS2-47P5-A, DS2-411P0-A
Speed torque control mode	Performance	Speed control range		1：2500 (the lower limit of speed control range, not stop at rated load torque)
		Speed change rate	Load change rate	0~100% load: below ±0.01% (rated speed)
			Voltage change rate	Rated voltage ±10% : 0% (rated speed)
			Temperature change rate	20±25℃: below ±0.1% (rated speed)
		Frequency feature		250Hz (JL≤JM)
		Soft start time		0～65535ms (set acceleration, deceleration individually)

	Input signal			RS485
Position control mode	Performance	Feedforward compensation		0～100% (resolution is 1%)
		Positioning finished width		0～250 command unit (resolution is 1 command unit)
	Input signal	Command pulse	Input pulse type	Sign+ pulse, CW, CCW mode
			Input pulse state	Collector (+24V) and differential signal input
			Input pulse frequency	Open collector input: 200kHZ Differential input: 500kHZ
		Control signal		Clear signal (/CLR)
I/O signal	Position output			open collector output
	Input signal	External input		5
		Changeable signal distribution		/S-ON、/P-CON、/P-OT、/N-OT、/ALM-RST、/PCL、/NCL、/SPD-D、/SPD-A、/SPD-B、/C-SEL、/ZCLAMP、/CLR、/G-SEL、/CHGSTP
	Output signal	External output		3
		Changeable signal distribution		/COIN、/V-CMP、/TGON、/S-RDY、/CLT、/VLT、/BK、/WARN、/NEAR、/ALM、/Z
Built-in function	Dynamic brake (DB)			No
	Regeneration			Built-in regeneration unit, external regenerative resistor
	Over range (OT) protection			For P-OT, N-OT action, deceleration stop or inertia stop
	Electronic gear			0.01≤ B/A≤100

			Protection	Program error, parameter error, overvoltage, undervoltage, regeneration error, overtemperature, overcurrent, overspeed, analog input error, position offset overflow, output shorting, current error, encoder cut, encoder error, overload, power off when running, write parameter error…
			LED display	Charge, power supply, 7-segment LED ×5 (built-in digital operate)
	communication	COM 1	Connector	RS232, connect to PC
			Serial parameter	Baud rate 19200; data bit 8; stop bit 1; communication protocol: ModubsRTU slave; Modbus station No.1
			Function	Debug online
		COM 2	Connector	RS485, connect to PLC, HMI, PC and other devices
			Serial parameter	Serial parameter can be set; communication protocol: ModbusRTU slave; Modbus station No. can be set
			Function	State display, user constant setting, monitor display, alarm display, alarm display, special control, online debug

►► Wiring

1. Names and Descriptions of Main Circuit Terminal

- 5.5KW driver: R S T P+ PB P- PE U V W
- 7.5~11KW driver: P+ P- R S T PE U V W PB

Terminal names	Function
R、S、T	3-phase AC 380V ±10% (50/60Hz)
P+、PB	Regenerative braking resistor connection
P+、P-	Power supply for main circuit
PE	Ground (Connect to the ground terminal of motor and power, to be grounded)
U、V、W	Motor connection

2. Winding Terminals on Servo motor

Symbol	180 Series
PE	1
U	2
V	3
W	4

3. Layout of CN0/CN1/CN3 terminals

The diagram shows the solder side:

■ Terminals description of CN0

NO.	Name	Description	NO.	Name	Description
1	P-	Pulse input P-	6	D+24V	+24V for open collector
2	P+5V	Differential input	7	SI1	Input terminal 1

		P+5V			
3	P+24V	+24V for open collector	8	SI2	Input terminal 2
4	D-	Direction input D-	9	SI3	Input terminal 3
5	D+5V	Differential input D+5V	10	+24V	+24V for input

■ Terminals description of CN1

(1) DS2-45P5/47P5-A, DS2-411P0-A

NO.	Name	Description	NO.	Name	Description
1	NC	Null	9	BO	Encoder output B
2	SI4	Input terminal 4	10	ZO	Encoder output Z
3	SI5	Input terminal 5	11	T-REF	Torque analog input
4	NC	Null	12	V-REF	Speed analog input
5	+24V	+24V for input	13	GND	GND for analog input
6	SO3	Output terminal 3	14	GND	GND for AO&BO output
7	COM	Ground of output terminal	15	GND	GND for ZO output
8	AO	Encoder output A			

(2) DS2-45P5-AS

NO.	Name	Description	NO.	Name	Description
1	Z+	Encoder output Z+	9	A-	Encoder output A-
2	SI4	Input terminal 4	10	A+	Encoder output A+

3	SI5	Input terminal 5	11	T-REF	Torque analog input
4	NC	Null	12	V-REF	Speed analog input
5	+24V	+24V for input	13	GND	GND for analog input
6	SO3	Output terminal 3	14	B-	Encoder output B-
7	COM	Ground of output terminal	15	B+	Encoder output B+
8	Z-	Encoder output Z-			

■ Terminals description of CN3

NO.	Name	Description	NO.	Name	Description
1	SO1	Output terminal 1	4	A	RS485+
2	SO2	Output terminal 2	5	B	RS485-
3	COM	Ground of output terminal			

4. I/O Signal Names and Functions

1）Input signals

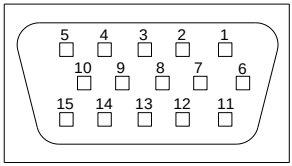
Item	Input terminal	Function
Digital input	SI1～SI5	Multi-functional input terminal
Pulse input	P-	P2-00=0:forward run pulse; P2-00=2:pulse
	D-	P2-00=0:reverse run pulse; P2-00=2: direction

2）Output signals

Class	Output terminal	Function
Optocoupler output	SO1～SO3	Multi-functions Output Terminals

5. CN2 Connector Terminal Layout

The following diagrams are the layout of CN2 connector (face the solder pin).

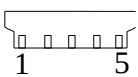


Drive side	Encoder Side On Motor 180 series	Name	Drive side	Encoder Side On Motor 180 series	Name
1	4	A+	2	5	B+
3	6	Z+	4	10	U+
5	12	W+	6	7	A-
7	8	B-	8	9	Z-
9	13	U-	10	15	W-
11	1	Shield	12	3	GND
13	2	5V	14	11	V+
15	14	V-			

6. Communication port

- Serial Port 1（COM1）

COM1 supports RS232, and is often used to connect with PC for debugging.



（5-pin port）

Pin	Name	Description
1	TXD	RS232 send
2	RXD	RS232 receive
3	GND	RS232 ground

Caution：1. Please use the cable provided by XINJE company.

2. The types in the table cannot use RS232 (COM1) and RS485 (COM2) at the same time.

The communication parameters of COM1 and COM2 will be changed at the same time.

- Serial Port（COM2） （Pin: A：CN3-4, B：CN3-5）

Communication parameters of COM2 can be set via P0-04.

Parameter Number	Name	Default Setting	Range
P0-04.0	Baud rate	6	0～9 0：300 1：600 2：1200 3：2400 4：4800 5：9600 6：19200 7：38400 8：57600 9：115200
P0-04.1	Data bits	0	0：8
P0-04.2	Stop bits	2	0：2 bits；2：1 bits
P0-04.3	Parity	2	0～2 0：No Parity；1：Odd Parity；2：Even Parity

Modbus station number can be set freely, depending on the following parameter.

Parameter	Name	Unit	Default setting	Range

Number				
P0-03	Modbus Station Number	—	1	1～255

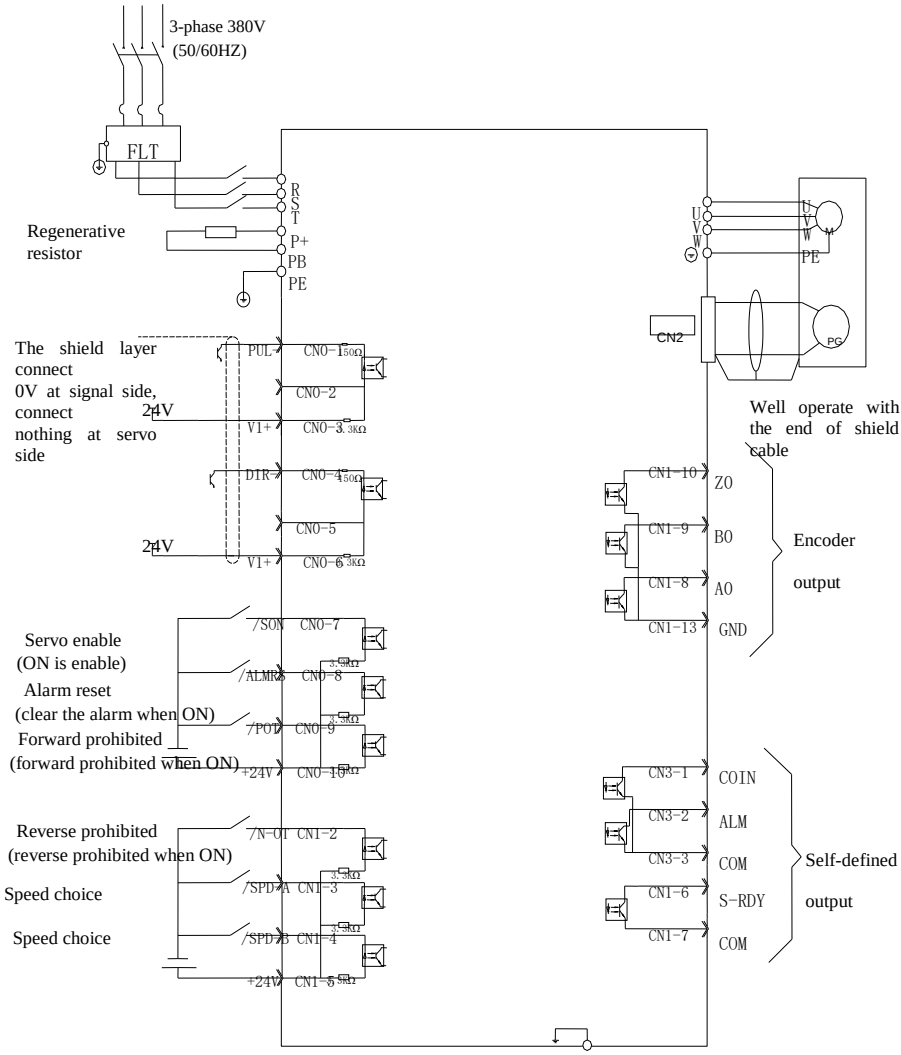
Note: Parameters above will take effect after repower on.

7. Regenerative resistor

Servo drive model	Built-in regenerative resistor	External regenerative resistor
DS2-45P5-A/AS	-	External regenerative resistor is 20Ω, 2000W and up. Connect it between P+ and PB. The resistor in the packing box has no positive and negative for wiring. For special condition, the alarm code is E-003, please change larger resistor 20Ω-75Ω, 3000W and up.
DS2-47P5-A		External regenerative resistor is 18Ω, 2000W and up. Connect it between P+ and PB. The resistor in the packing box has no positive and negative for wiring. For special condition, the alarm code is E-003, please change larger resistor 18Ω-50Ω, 3000W and up.

Note: when connecting external regenerative resistor, please pay attention to the resistor heat dissipation.

8. Standard connection example of DS2-45P5-A/AS, DS2-47P5-A, DS2-411P0-A

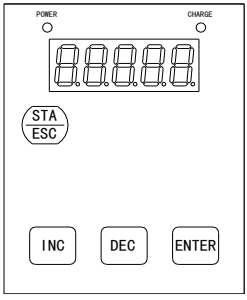


Note: This is the standard connection diagram when pulse signal is open collector input (+24V).

►► Using the operation panel

1. Basic operation

The operate panel can be used for parameter settings, operating references, and status displays. 5-bit LED displays parameter settings, status or alarm.

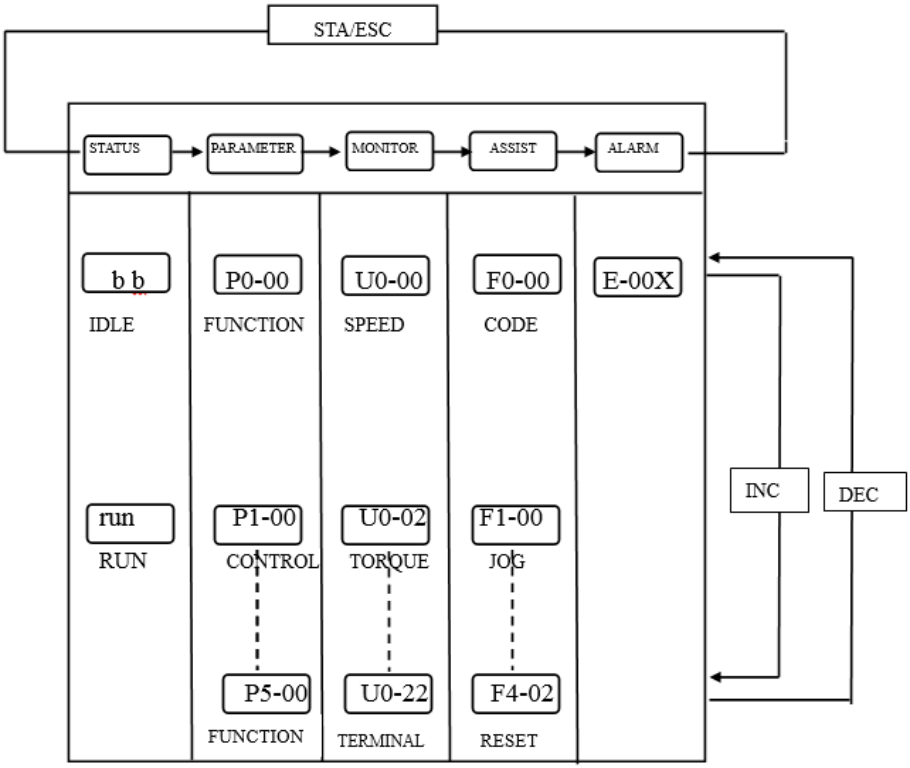


Button name	Function
STA/ESC	Press: Status switch, status return
INC	Press: Increase the value; Press and hold: Increase the value continuously
DEC	Press: Decrease the value; Press and hold: Decrease the value continuously
ENTER	Press: Shift the editing digit; Press and hold: Enter a status, check the data

(1) Key operation

The control panel can display the running status, set the parameters and command.

The basic status includes display status, parameter settings, monitor, auxiliary function, alarm status. Press STATUS/ESC to change the status.



Display mode:

Status: bb stand for the servo system is in idle status; run stand for the servo system is in run status

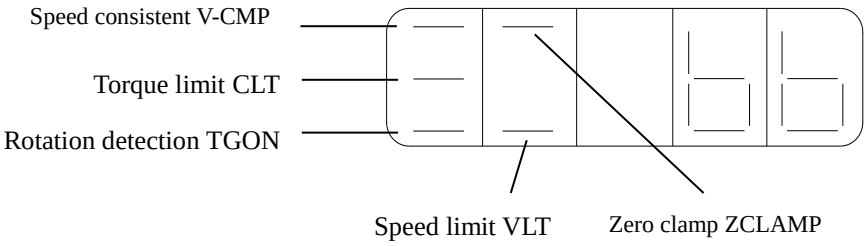
Parameter settings mode PX-XX: the first X is group code; the second X is parameter code in this group.

Auxiliary function mode: FX-XX: the first X is group code; the second X is parameter code in this group.

Alarm mode E-XXX: XXX is alarm code.

2. Running status

■ Speed, torque control mode

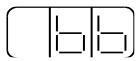
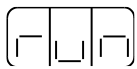
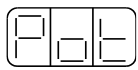
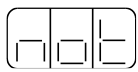


A. Bit display

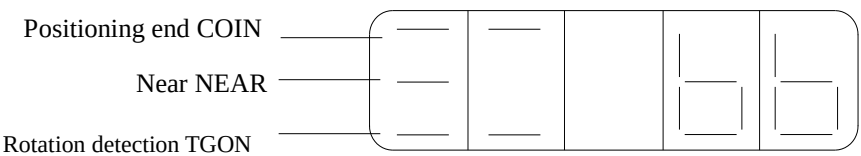
Bit data	contents
P5-29 Same speed detection (/V-CMP)	When motor's actual speed is the same as the order speed, the light on. Same speed signal detection width: P5-03 (Unit: rpm)
P5-32 Torque limit (/CLT)	When speed control, torque is more than the setting value, the light on. Positive torque limit: P4-02 Reverse torque limit: P4-03
P5-30 Rotation detection (/TGON)	When motor speed is higher than rotation detection speed, the light on. Rotation detection speed: P5-02 (Unit: rpm)
P5-21 Zero clamp (/ZCLAMP)	When zero clamp is effective, the light on
P5-33 Speed limit (/VLT)	When torque control，the speed is more than the setting value, the light on

	Torque control speed limit: P4-07

B. Code contents

Code	Contents
	Standby Servo is OFF (motor has no electricity)
	Run Servo enable (motor has electricity)
	Forward prohibit P-OT ON
	Reverse prohibit N-OT ON

- Position control

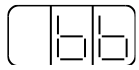
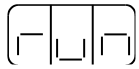
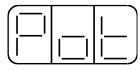
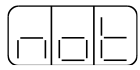


A. Bit display

Bit data	Contents
P5-28 Positioning end (/COIN)	For position control, when given position is the same to actual, the light on Positioning end signal width: P5-00 (Unit: command pulse)

P5-36 Near (/NEAR)	For position control, when given position is the same to actual, the light on Near signal width: P5-04
P5-30 Rotation detection (/TGON)	When motor speed is higher than the rotation detection speed, the light on Rotation defection speed: P5-02 (Unit: rpm)

B. Code display

Code	Contents
	Stand by status, Servo is OFF (motor is power off)
	Running Servo is running (motor is power on)
	positive rotation prohibition P-OT ON status
	reverse rotation prohibition N-OT ON status

■ U-XX monitor status

Code	Contents	Unit
U-00	Motor real speed	Rpm
U-01	Input speed command	Rpm
U-02	Servo motor torque	%
U-03	Rotate angle (physical angle)	0.1 °
U-04	Rotate angle (electricity angle)	0.1 °
U-05	Bus voltage	V
U-06	Module temperature	0.1℃

U-07	Input command pulse speed		Rpm
U-08	Offset command	（0000～9999）*1	Command
U-09	pulse value	（0000～9999）*10000	pulse
U-10	Rotate angle (encoder	（0000～9999）*1	Encoder
U-11	value)	（0000～9999）*10000	pulse
U-12	Input command	（0000～9999）*1	Command
U-13	pulses	（0000～9999）*10000	pulse
U-14	Feedback command	（0000～9999）*1	Command
U-15	pulses	（0000～9999）*10000	pulse
U-16	Current position	（0000～9999）*1	Encoder
U-17	(cumulative value)	（0000～9999）*10000	pulse
U-18	Real-time current, 1 decimal place		0.1A
U-19	Analog input V-REF		0.01V
U-20	Analog input T-REF		0.01V
U-21	I/O signal status		
U-22	I/O terminal status		

■ U-21 I/O signal status

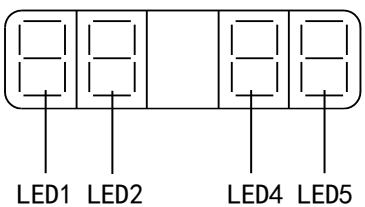


Fig 1

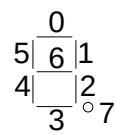


Fig 2

In fig 1, input status is shown in LED4 and LED5; output status is shown in LED1 and LED2. Fig 2 is the LED segment number.

- Input signal distribution

segment	instruction	segment	instruction
LED4_0	/SPD-A set internal speed	LED5_0	/S-ON servo signal
LED4_1	/SPD-B set internal speed	LED5_1	/P-CON ratio action command
LED4_2	/C-SEL control mode selection	LED5_2	/P-OT ban positive rotation
LED4_3	/ZCLAMP zero clamp	LED5_3	/N-OT ban reverse rotation
LED4_5	/G-SEL gaining switch	LED5_5	/P-CL external torque limit at forward rotation side
LED4_6	/CLR clean pulse	LED5_6	/N-CL external torque limit at reverse rotation side
LED4_7	/CHGSTP change step	LED5_7	/SPD-D set internal speed

- Output signal distribution

segment	instruction	segment	instruction
LED1_0	Near （/NEAR）	LED2_0	Positioning end（/COIN）
LED1_1	Alarm output（/ALM）	LED2_1	Same speed dection （/V-CMP）
LED1_2	Encoder Z phase output （/Z）	LED2_2	Rotation detection （/TGON）
		LED2_3	Get ready（/S-RDY）
		LED2_4	Torque limit（/CLT）
		LED2_5	Speed limit detection （/VLT）
		LED2_6	Brake interlock（/BK）
		LED2_7	Warning （/WARN）

■ U-22 I/O terminal status

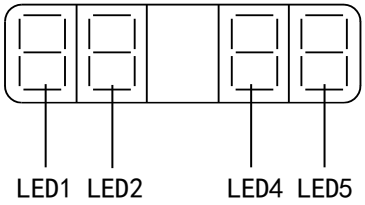


Fig 1

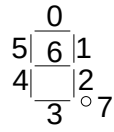


Fig 2

In fig1, input terminal status is shown in LED5; output terminal status is shown in LED2. Fig 2 is the LED segment number.

Input terminal		Output terminal	
Segment	Instruction	Segment	Instruction
LED5_0	SI1 input status	LED2_0	SO1 output status
LED5_1	SI2 input status	LED2_1	SO2 output status
LED5_2	SI3 input status	LED2_2	SO3 output status
LED5_3	SI4 input status		
LED5_4	SI5 input status		
LED5_5	SI6 input status		

4. Auxiliary function

Function code	Contents
F0-**	System information
F1-**	Auxiliary function, show auxiliary command and result
F2-**	Motor code
F3-**	Alarm information
F4-00	Reset to default settings
F5-00	External communication monitor

■ F0-XX

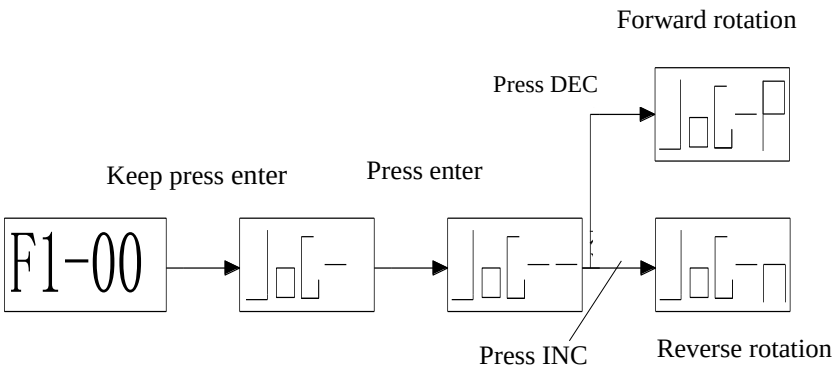
Code	Contents	Code	Contents
F0-00	Motor code	F0-01	Series
F0-02	Machine type	F0-03	Production: year
F0-04	Production date: month	F0-05	Production date: day
F0-06	Software version	F0-07	Hardware version

■ F1-XX

Note: make sure the motor code in F2-00 is same to the one on the motor label before using, otherwise servo cannot work fine if motor code is not matched.

（1）Jog（F1-00）

Make sure motor doesn't connect to the machine before jogging!



P3-04	JOG speed					
	Unit	Factory set	Range	Suitable mode	Modify	Effective
	1rpm	100	0~1000	JOG	Servo OFF	Immediately

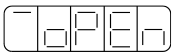
(2) test run（F1-01）

Make sure the motor doesn't connect to the machine before test running!

Please enter test run if servo connects to non-original encoder line and power line.

Set panel to F1-01, keep press ENTER to go to test run.

The display will show the following when test running.



If all the wires are connected correctly, the motor will run forward (direction is counterclockwise) in 5 seconds. The motor will shake if the wiring is not correct. Even worse, the drive will alarm. Please cut the power at this time and check the wiring.

Press STATUS/ESC to exit.

(3) current offset auto-tune (parameter F1-02)

Please use current offset auto-tune when servo finishes updating or motor is not running smoothly after long time.

Press STATUS/ESC to exit.

(4) speed analog value auto-tune (parameter F1-03)

Press STATUS/ESC to exit.

(5) torque analog value auto-tune (parameter F1-04)

Press STATUS/ESC to exit.

(6) forced enable (F1-05)

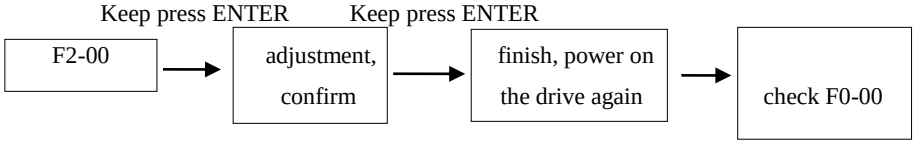
0: cancel enable, return to bb status

1: forced enable, servo is in RUN status

Power on again, forced enable will be ineffective

■ Change the motor code (parameter F2-00)

Note: Servo drive can match to different motors with similar power level. Please see the motor code on the product label. Make sure F0-00 is the same to the motor code on the label.



■ Check the alarm information（parameter F3-XX）

Function no.	Contents	Unit
F3-00	Current alarm code ※1	
F3-01	Current warn code ※2	
F3-02	Alarm/warn code 1 when alarming	
F3-03	U phase current when alarming	A
F3-04	V phase current when alarming	A
F3-05	DC bus voltage when alarming	V
F3-06	The module temperature of IGBT when alarming	℃
F3-07	The speed when alarming	rpm
F3-08	The internal torque command when alarming	%
F3-09	The V-REF value when alarming	V
F3-10	The T-REF value when alarming	V
F3-11	Alarm/warn code 2 when alarming	
F3-12	Alarm/warn code 3 when alarming	

F3-13	Alarm/warn code 4 when alarming	
F3-14	Alarm/warn code 5 when alarming	
F3-15	Alarm/warn code 6 when alarming	
F3-16	Alarm/warn code 7 when alarming	

※1: when F3-00=0, no alarm

※2: when F3-01=0, no warning

■ Set to default value (parameter F4-XX)

F4-00=1,all parameter will back to default value.

Note: When drive is on, the change cannot be done. The operations must be done when servo is OFF.

■ External monitor (parameter F5-XX)

In auxiliary function, choose F5-00, it will show C-OUT. COM1 is available, control panel is invalid. User can debug the servo through PC.

Press STATUS/ESC to exit.

5. Error alarm operation (parameter E-XX)

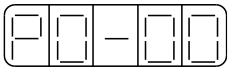
When error appears, the drive will enter alarm status and display the alarm no.; when there is no error, the alarm status cannot see. System error display "E-XXX". Under the alarm status ,short press ENTER can reset the error. If the power is off because of the servo alarm, we may not do the alarm clear.

Note: when error appears, First to delete the alarm reason, then do alarm clear.

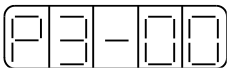
6. Parameter setting

The following steps show how to change the value of P3-09 from 2000 to 3000.

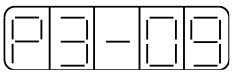
(1) Press STATUS/ESC, change to parameter setting status, press ENTER to confirm.



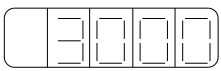
(2) The second LED will blink, press INC or DEC to change the value to 3, keep press ENTER to confirm.



(3) The last two LEDs will blink at this time, press INC or DEC to change the value to 09, keep press ENTER to confirm.



(4) It will show the value in P3-09. The lowest bit will blink; press ENTER to left shift the bit. Press INC, DEC or ENTER to change the value to 3000. Keep press ENTER to confirm.



Repeat step2 to step4 to change the value.

(5) Press STATUS/ESC to exit.

►► Parameter list

Effective time：○ means the parameter can be modified when the servo is OFF, and effective when servo is ON.

Parameter：PX－XX＝××　××

PX－XX. H↵　↳PX－XX.L

1. P0: function selection (Address：0000～00FF)

P0-	Function	Unit	Default	Range	Effective
00	Main mode	-	0	0	
01	Submode 1 0: idle	-	6	0～7	○

	1: torque (command) 2: torque (analog) 3: speed (command) 4: speed (analog) 5: position (internal) 6: position (pulse) 7: speed (pulse)				
02	Submode 2 0~7: same as submode 1	-	0	0～7	○
03	Modbus station of serial port 2	-	1	1 ～ 255	●
04	Parameter of serial port 2	-	n.2206	n.0000～n.2209	●
05	Rotation direction selection 0:From the side view of motor load, CCW is forward rotate 1:From the side view of motor load, CW is forward rotate	-	0	0、1	●
06	06.L: stop mode when servo OFF or alarm. DS2 series default is inertia stop. Keep the inertia motion after stop.	-	2	0～2	●
	06.H: over range (OT) stop mode 0~1: inertia stop. Keep inertia motion after stop. 2: deceleration stop. Change to zero clamp after stop. Torque: P4-06 urgent stop torque.	-	2	0～3	●

	3: deceleration stop. Change to inertia motion after stop. Torque: P4-06 urgent stop torque.				
07	T-REF distribution 0: undefined. 1: make T-REF as external torque limit input 2: undefined. 3: when P-CL, N-CL is ON, make T-REF as external torque limit input.	-	0	0～3	○
08	V-REF distribution 0: - 1: make V-REF as external speed limit input.	-	0	0、1	○
09	Forced output terminal 0: - 1: SO1 terminal output 2: SO2 terminal output 3: SO3 terminal output	-	0	0-3	√

2. P1: control parameters (Address：0100～01FF)

P1-	Name	Unit	Default	Range	Effective
00	The gain of speed loop	1Hz	100	1～5000	√
01	Speed loop integral time	0.1ms	400	1～50000	√
02	The gain of position loop	1/s	100	1～2000	√
03	Reserved				
04	The gain of second speed loop	1Hz	250	1～5000	√
05	Integral time of second speed loop	0.1ms	10000	1～50000	√
06	The gain of second position loop	1/s	250	1～2000	√

07	Reserved				
08	Reserved				
09	The gain of position loop feedforward	1%	0	0～100	√
10	Feedforward filter time	0.01ms	0	0~65535	√

3. P2: position control（0200～02FF）

P2-	Function	Unit	Default	Range	Effective
00	Command pulse state 0：Symbol+ Pulse train 1：AB phase pulse（90 phase, 4-time mode） 2：Pulse+ direction	-	2	0,1,2	●
01	Position command filter selection 0：First order inertia filtering 1：smoothing filtering	-	0	0,1	●
02	Electronic gear ratio (molecular)	-	1	1～65535	√
03	Electronic gear ratio (denominator)	-	1	1～65535	√
04	Position command filter time	1ms	0	0～100	●
05	Reserved				
06	Command pulse frequency at rated speed	100Hz	5000	1～10000	○
07	Speed command pulse filter time	0.1ms	20	0～1000	√
08	Reserved				
09	Reserved				
10	Internal position mode setting	-	n.0000		●
11	First segment pulse (low bit)	1	0	-9999～+9999	○
12	First segment pulse (high bit)	1	0	-9999～+9999	○
13	First segment speed	0.1rpm	0	0～50000	○

14	First segment adjustment time	1ms	0	0～65535	○
15	First segment command filter time	0.1ms	0	0～65535	○
P2-16~P2-90 are 2~16 segments parameter setting.					
94. xx□x	Find the original point 0: invalid 1: valid	-	0	0~1	●
94. xxx□	The signal quantity pass the Z phase signal at the direction of leaving the limit switch	A	2	1 ～ F（Hex）	●
95	The speed of closing the proximity switch	0.1rpm	600	0~50000	○
96	The speed of leaving the proximity switch	0.1rpm	100	0~50000	○
97	Set segment through communication	-	00	00-16	√

4. P3: speed control（0300～03FF）

P3-	Name	Unit	Default	Range	Effective
00	Analog value of rated speed	0.01V	1000	150～3000	○
01	Internal setting speed 1	rpm	100	-5000～+5000	√
02	Internal setting speed 2	rpm	200	-5000～+5000	√
03	Internal setting speed 3	rpm	300	-5000～+5000	√
04	JOG speed	rpm	100	0～1000	√
05	Soft start acceleration time	1ms	0	0～65535	○
06	Soft start deceleration time	1ms	0	0～65535	○
07	Speed command filter time	0.01ms	0	0～65535	○
08	Speed feedback filter time	0.01ms	20	0～65535	○
09	Max speed limit (MAX speed)	rpm	Different for each type	0～5000	○
10	Speed command input dead area voltage	0.01V	0	0～100	○

5. P4: torque control（0400～04FF）

P4-	Name	Unit	Default	Range	Effective
00	Analog value of rated torque	0.01V	1000	150～3000	○
01	Torque command filter time	0.01ms	0	0～65535	○
02	Forward torque limit	1%	300	0～300	√
03	Reverse torque limit	1%	300	0～300	√
04	Forward external torque limit	1%	100	0～300	√
05	Reverse external torque limit	1%	100	0～300	√
06	Urgent stop torque	1%	300	0～300	○
07	Internal speed limit when torque controlling	rpm	2000	1～5000	√
08	Reserved				
09	Internal torque command setting	1%	0	-300～300	√
10	Torque command input dead area voltage	0.01V	0	0～100	○
11	Forward torque	1%	300	0~300	√
12	Reverse torque	1%	300	0~300	√
13	Overlimit time	1ms	0	0~60000	√

6. P5: signal parameter setting（0500～05FF）

P5-	Name	Unit	Default	Range	Effective
00	Positioning finished width /COIN	Command pulse	7	0～250	○
01	Zero clamp speed /ZCLAMP	rpm	10	0～300	○
02	Rotation checking speed /TGON	rpm	20	1～1000	○
03	Coincide speed checking signal width /V-CMP	rpm	10	1～250	○
04	Near output signal width /NEAR	Command	50	0～10000	○

		pulse			
05	Offset pulse limit value	256* command pulse	1000	0～65535	○
06	Servo OFF delay time (brake command)	1ms	0	0～500	○
07	Brake command output speed	rpm	100	0～5000	○
08	Brake command wait time	1ms	500	10～1000	○
09	Input filter time	5ms	0	0~100	√
10	/S-ON servo signal 0000: signal is always ineffective 0001: input positive signal to SI1 0002: input positive signal to SI2 0003: input positive signal to SI3 0004: input positive signal to SI4 0005: input positive signal to SI5 0006: input positive signal to SI6 0010: signal is always effective 0011: input negative signal to SI1 0012: input negative signal to SI2 0013: input negative signal to SI3 0014: input negative signal to SI4 0015: input negative signal to SI5 0016: input negative signal to SI6	—	0001	0000-0016	●
11	/P-CON proportion action command ditto	—	0000	0000-0016	●
12	/P-OT forward drive prohibition ditto	—	0003	0000-0016	●

13	/N-OT reverse drive prohibition ditto	—	0004	0000-0016	●
14	/ALM-RST alarm reset ditto	—	0002	0000-0016	●
15	/P-CL forward external torque limit ditto	—	0000	0000-0016	●
16	/N-CL reverse external torque limit ditto	—	0000	0000-0016	●
17	/SPD-D internal speed selection ditto	—	0000	0000-0016	●
18	/SPD-A internal speed selection Same to above	—	0005	0000-0016	●
19	/SPD-B internal speed selection ditto	—	0006	0000-0016	●
20	/C-SEL control mode selection ditto	—	0000	0000-0016	●
21	/ZCLAMP zero clamp ditto	—	0000	0000-0016	●
22	/INHIBIT command pulse prohibition ditto		0000	0000-0016	●
23	/G-SEL gain switch ditto	—	0000	0000-0016	●
24	/CLR clear pulse offset ditto	—	0000	0000-0016	●
25	/CHGSTP step change signal	—	0000	0000-0016	●

	ditto				
26	Reserved				
27	Reserved				
28	/COIN positioning finished 0000: not output to the terminal 0001: output positive signal from SO1 0002: output positive signal from SO2 0003: output positive signal from SO3 0011: output negative signal from SO1 0012: output negative signal from SO2 0013: output negative signal from SO3	—	0001	0000-0013	●
29	/V-CMP speed coincide checking ditto	—	0000	0000-0013	●
30	/TGON rotation checking ditto	—	0000	0000-0013	●
31	/S-RDY ready ditto	—	0003	0000-0013	●
32	/CLT torque limit ditto	—	0000	0000-0013	●
33	/VLT speed limit checking ditto	—	0000	0000-0013	●
34	/BK brake lock	—	0000	0000-0013	●

	ditto				
35	/WARN warn ditto	—	0000	0000-0013	●
36	/NEAR near ditto	—	0000	0000-0013	●
37	/ALM alarm ditto	—	0002	0000-0013	●
38	/Z encoder Z signal ditto	—	0000	0000-0013	●

Note: P5-10~P5-25, P5-28~P5-38 SI/SO terminal cannot be repeated, otherwise, SI/SO function will lose efficacy.

►► Modbus address

■ Parameter address

Parameter	Modbus Address (hex)	Modbus Address (decimal)	Parameter	Modbus Address (hex)	Modbus Address (decimal)
P0-00	0x0000	0	P1-00	0x0100	256
P0-01	0x0001	1	P1-01	0x0101	257
P0-02	0x0002	2	P1-02	0x0102	258
P0-03	0x0003	3	P1-03	0x0103	259
P0-04	0x0004	4	P1-04	0x0104	260
P0-05	0x0005	5	P1-05	0x0105	261
P0-06	0x0006	6	P1-06	0x0106	262
P0-07	0x0007	7	P1-07	0x0107	263
P0-08	0x0008	8	P1-08	0x0108	264
P0-09	0x0009	9	P1-09	0x0109	265

P0-10	0x000A	10	P1-10	0x010A	266
Parameter	Modbus Address (hex)	Modbus Address (decimal)	Parameter	Modbus Address (hex)	Modbus Address (decimal)
P2-00	0x0200	512	P3-00	0x0300	768
P2-01	0x0201	513	P3-01	0x0301	769
P2-02	0x0202	514	P3-02	0x0302	770
P2-03	0x0203	515	P3-03	0x0303	771
P2-04	0x0204	516	P3-04	0x0304	772
P2-05	0x0205	517	P3-05	0x0305	773
P2-06	0x0206	518	P3-06	0x0306	774
P2-07	0x0207	519	P3-07	0x0307	775
P2-10	0x020A	522	P3-08	0x0308	776
P2-11~P2-90	0x020B-0x025A	523-602	P3-09	0x0309	777
P2-94	0x025E	606	P3-10	0x030A	778
P2-95	0x025F	607			
P2-96	0x0260	608			
P2-97	0x0261	609			
Parameter	Modbus Address (hex)	Modbus Address (decimal)	Parameter	Modbus Address (hex)	Modbus Address (decimal)
P4-00	0x0400	1024	P5-00	0x0500	1280
P4-01	0x0401	1025	P5-01	0x0501	1281
P4-02	0x0402	1026	P5-02	0x0502	1282
P4-03	0x0403	1027	P5-03	0x0503	1283
P4-04	0x0404	1028	P5-04	0x0504	1284

P4-05	0x0405	1029	P5-05	0x0505	1285
P4-06	0x0406	1030	P5-06	0x0506	1286
P4-07	0x0407	1031	P5-07	0x0507	1287
P4-08	0x0408	1032	P5-08	0x0508	1288
P4-09	0x0409	1033	P5-09	0x0509	1289
P4-10	0x040A	1034	P5-10	0x050A	1290
P4-11	0x040B	1035	P5-11	0x050B	1291
P4-12	0x040C	1036	P5-12	0x050C	1292
P4-13	0x040D	1037			
Parameter	Modbus Address (hex)	Modbus Address (decimal)	Parameter	Modbus Address (hex)	Modbus Address (decimal)
P5-13	0x050D	1293	P5-26	0x051A	1306
P5-14	0x050E	1294	P5-27	0x051B	1307
P5-15	0x050F	1295	P5-28	0x051C	1308
P5-16	0x0510	1296	P5-29	0x051D	1309
P5-17	0x0511	1297	P5-30	0x051E	1310
P5-18	0x0512	1298	P5-31	0x051F	1311
P5-19	0x0513	1299	P5-32	0x0520	1312
P5-20	0x0514	1300	P5-33	0x0521	1313
P5-21	0x0515	1301	P5-34	0x0522	1314
P5-22	0x0516	1302	P5-35	0x0523	1315
P5-23	0x0517	1303	P5-36	0x0524	1316
P5-24	0x0518	1304	P5-37	0x0525	1317
P5-25	0x0519	1305	P5-38	0x0526	1318

■ Monitor state address

Explanations	Modbus Address (hex)	Modbus Address (decimal)	Explanations	Modbus address (hex)	Modbus Address (decimal)
U-00 Motor speed	0x0700	1792	F3-00 current alarm code	0x0716	1814
U-01 Speed command	0x0701	1793	F3-01 Current warn code	0x0717	1815
U-02 Internal torque command	0x0702	1794	F3-02 Alarm/warn code 1	0x0718	1816
U-03 Rotation angle (physical angle)	0x0703	1795	F3-03 U phase current when alarming	0x0719	1817
U-04 Rotation angle (electricity angle)	0x0704	1796	F3-04 V phase current when alarming	0x071A	1818
U-05 Bus voltage	0x0705	1797	F3-05 DC bus voltage when alarming	0x071B	1819
U-06 Module temperature	0x0706	1798	F3-06 IGBT temperature when alarming	0x071C	1820
U-07 Input command pulse speed	0x0707	1799	F3-07 The speed when alarming	0x071D	1821
U-08 Offset pulse value (low	0x0708	1800	F3-08 Internal torque command	0x071E	1822

16 bits)			when alarming		
U-09 Offset pulse value (high 16 bits)	0x0709	1801	F3-09 V-REF value when alarming	0x071F	1823
U-10 Rotation angle (low 16 bits)	0x070A	1802	F3-10 T-REF value when alarming	0x0720	1824
U-11 Rotation angle (high 16 bits)	0x070B	1803	F3-11 Alarm/warn code 2	0x0728	1832
U-12 Input command pulse (low 16 bits)	0x070C	1804	F3-12 Alarm/warn code 3	0x0729	1833
U-13 Input command pulse (high 16 bits)	0x070D	1805	F3-13 Alarm/warn code 4	0x072A	1834
U-14 Feedback pulse (low 16 bits)	0x070E	1806	F3-14 Alarm/warn code 5	0x072B	1835
U-15 Feedback pulse (high 16 bits)	0x070F	1807	F3-15 Alarm/warn code 6	0x072C	1836
U-16 Current accumulated position (low 16 bits)	0x0710	1808	F3-16 Alarm/warn code 7	0x072D	1837
U-17 Current accumulated	0x0711	1809			

position (high 16 bits)					
U-18 Present current	0x0712	1810			
U-19 Analog input (speed)	0x0713	1811			
U-20 Analog input (torque)	0x0714	1812			

■ Input signal state (can read and write)

Explanation	Address (hex)	Address (decimal)	Explanation	Address (hex)	Address (decimal)
/S-ON servo signal	0x0800	2048	/SPD-A internal speed selection	0x0808	2056
/P-CON proportion action command	0x0801	2049	/SPD-B internal speed selection	0x0809	2057
/P-OT forward drive prohibition	0x0802	2050	/C-SEL control mode selection	0x080A	2058
/N-OT reverse drive prohibition	0x0803	2051	/ZCLAMP zero clamp	0x080B	2059
/ALM-RST reset alarm	0x0804	2052	/INHIBIT command pulse prohibition	0x080C	2060
/P-CL forward external torque limit	0x0805	2053	/G-SEL gain switch	0x080D	2061
/N-CL reverse external torque	0x0806	2054	/CLR pulse clear	0x080E	2062

limit					
/SPD-D internal speed selection	0x0807	2055	/CHGSTP change step	0x080F	2063

Note: for example, /S-ON signal address 0x0800=1, this function is effective; 0x0800=0, this function is ineffective.

■ Output state signal (can read, cannot write)

Explanation	Address (hex)	Address (decimal)	Explanation	Address (hex)	Address (decimal)
Positioning finished (/COIN)	0x0812	2066	Brake lock (/BK)	0x0818	2072
Coincidence speed checking (/V-CMP)	0x0813	2067	Warn (/WARN)	0x0819	2073
Rotation checking (/TGON)	0x0814	2068	Near (/NEAR)	0x081A	2074
Ready (/S-RDY)	0x0815	2069	Alarm output (/ALM)	0x081B	2075
Torque limit (/CLT)	0x0816	2070	Encoder Z signal (/Z)	0x081C	2076
Speed limit checking (/VLT)	0x0817	2071			

►► Alarm Information

Alarm Code	Description	Reason	Solution
E-001	Program damage	program self-test failed	Re-download the program or contact XINJE or an authorized distributor
E-002	Parameter damage	Parameter self-test failed	Restart the drive to reset the parameters. If it occurs for many times please contact XINJE or an authorized distributor
E-003	Bus over-voltage	Power grid is over voltage or need a regenerative resistor; the regenerative resistor damage or its value is too large	Check the power grid; connect and check the regenerative resistor
E-004	Bus under voltage	Power grid is under voltage	Check the power grid
E-005	Regenerative resistor error	Regenerative resistor is ineffective	Check the connection of regenerative resistor
E-006	Module over temperature	Run with large load for long time	Reduce the load, and enhance the cooling system, or check if the fan is revolving when motor is ON; cool down the ambient temperature
E-007	Over current	UVW of drive is short circuit or the motor is error	Replace the damaged motor; check the UVW wiring.

E-008	Over speed	Motor speed is too fast, motor UVW connection is error	Check if there is other device that make motor revolve too fast; check the UVW wiring.
E-009	Analog input error	Input voltage error when 2-channe analog zero calibrating	Input correct voltage when zero calibration for analog
E-010	Position offset too large	The difference between set position and actual position exceeds the limit value	Check if the motor stalled, decrease the set position speed, increase offset pulse limit value P5-05
E-011	Motor UVW is short circuit	External is short circuit when fist self-test	Check the UVW wiring of motor, or replace the damaged motor
E-012	Motor UVW current error	Current collection circuit error	Check the UVW wiring of motor, or replace the damaged drive
E-013	Encoder UVW wire break	Encoder wiring error, encoder broken, encoder is not connected	Check the wiring of encoder, and re-connect the encoder after power-off, or replace the damaged encoder
E-014	Encoder ABZ wire break	Encoder wiring error, encoder broken, encoder is not connected	Check the wiring of encoder, and re-connect the encoder after power-off, or replace the damaged encoder
E-015	Speed changes too fast (encoder feedback error)	The encoder wiring is error, or the encoder has interference	Check the wiring of encoder, or add shield layer for the encoder wire

E-016	Overload	Run overload for long time	Reduce the overload running time, change a motor with larger rated power
E-017	Power off when running	Bus voltage is too low when running	Re-power on after the bus voltage is normal
E-018	Erase parameter error	Voltage is too low when power on, cannot erase the parameter	Check the power supply and re-power on
E-031	Motor code error	Motor code cannot match to drive type	Set the motor code in F2-00 again
E-032	Initialization error	System chip is damaged	Contact XINJE or an authorized distributor

►►Debug steps

b) Please check the products before power on, make sure the devices are not significant damage.

c) Connect the cables correctly. Connect U, V, W one-to-one, don't cross them.

d) Power on, panel display: bb;

e) Enter F2-00，set the correct motor code.

f) After power on again，proceed to current Offset Auto-Adjustment，please refer to auxiliary run mode；

g) Set F1-01=1, check if the motor can work normally. If yes, enter F1-00. If not, check the cables.

h) Enter F1-00 and proceed to jog test-running, if work normally, connect to motor.

i) Before start the devices, set the parameters of servo according to actual application, and adjust in real-time.

►►Motor code

Motor Type	Capacity KW	Torque Nm	Rotate speed RPM	Current A	Over load	Motor code
MS-180ST-M21520	4.5	21.5	2000	9.5	2.5	0150
MS-180ST-M27015	4.3	27	1500	10	2.5	0151/2151
MS-180ST-M35015	5.5	35	1500	12	2	0152/1152
MS-180ST-M48015	7.5	48	1500	20	2	0153
MS-220ST-M70015B	11.0	70	1500	70	1.5	1157

►► Suitable motor code for each servo drive

Drive model	Support code
DS2-45P5-A/AS	0150
	0151/2151
	0152/1152
DS2-47P5-A	0153(default setting)
DS2-411P0-A	1157

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