DS Series AC Servo Manual

CONTENTS

Safety Precautions

In order to use this product safely, the user should be familiar with and observes the following important items before proceeding with storage, installation, wiring, operation, inspection or maintenance for the product.

⚠ **DANGER** Indicates a mistake operation possibly can cause danger and physical injure or death.

⚠ **CAUTION** Indicates a mistake operation possibly can cause danger and physical injure, and may result in damage to the product.

⊘ **STOP** Indicates prohibited actions, otherwise can cause damage, malfunction to the products.

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1. Service Conditions

⚠ **Danger**
● Do not expose the product in moisture, caustic gas, and ignitable gas situation. Otherwise can cause an electric shock or fire. ● Do not use the product in direct-sunlight, dust, salinity and metal powder places. ● Do not use the product in the places that has water, oil and drugs drops.

2. Wiring

⚠ **Danger**
● Connect the earth terminal (PE) to earth reliably. ● Never connect the input power terminals (L1, L2, L3) to 380V power supply, otherwise can result in the equipment damage and an electric shock or fire. ● The output terminals (U, V,W) must be connected with the servo motor connections (U, V, W) correspondingly, otherwise can result in the servomotor flying speed that may cause equipment damage and the personnel casualty ● Referring to wire selection guide, please install all wires with an adequate cross-section. Otherwise may cause fire.

Chapter 1 Product Inspection And Installation

1.1 Product Inspection

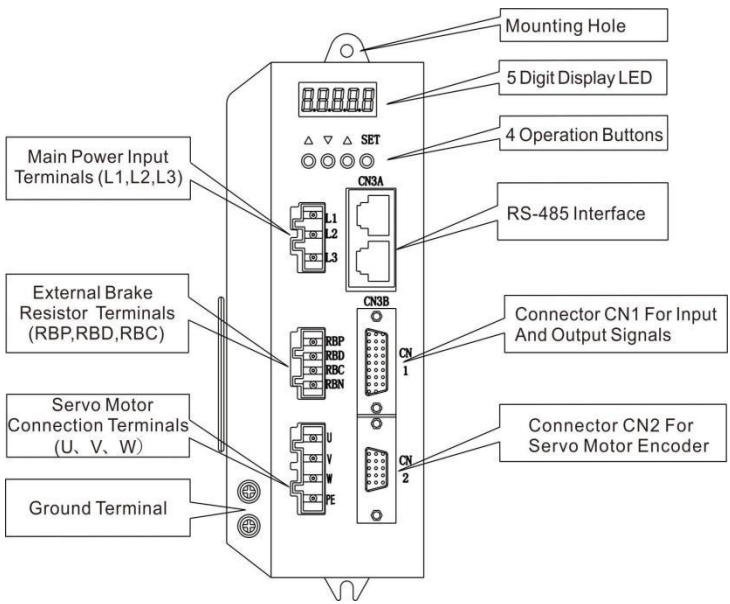
This product has made the complete function test before delivery, for prevented the product to be abnormal owing to shipping process, please make detail inspection as the following items after breaking the seal:

- Inspect the types of servo driver and servo motor and ensure that are the same types in the order form.
- Inspect the outward appearance of servo driver and servo motor to see any abrasion or damage; if so please do not wire to the power supply.
- Inspect the parts of servo driver and servo motor to see any loosen parts such as loosened or fallen off screw.
- Rotate the servo motor shaft by hand and should be smooth rotation.

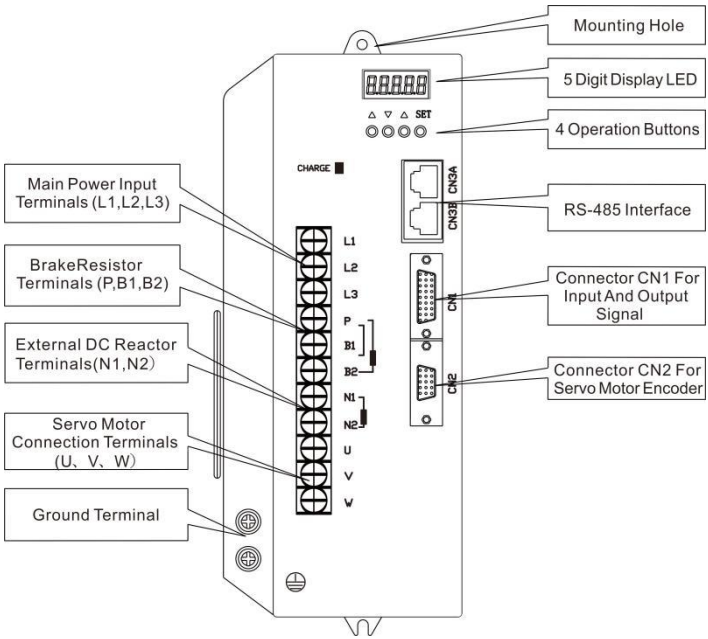
However, the servo motor with holding brake is unable to rotate directly. If there is any break down item or abnormal phenomenon mentioned above, please contact with the dealer immediately.

1.2 Product Front Panel

Applicable types：DS100S-40、DS100S-75、DS200S



Applicable types：DS300S、DS500S



1.3 Product Installation

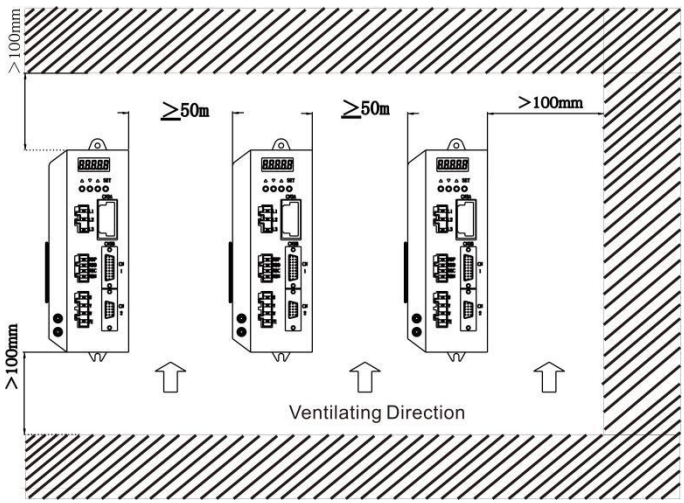
1.3.1 Environment Condition For Installation

Since the environment conditions for servo driver installation have the direct influence to the normal function and service life of the servo driver, therefore the environment conditions must be conformed to the following conditions:

- Ambient temperature: 0 to 40℃; Ambient humidity: less than 80% (no dew).
- Storage temperature: -40 to 50℃; Storage humidity: less than 93% (no dew).
- Vibration: less than 0.5G.
- Preventive measure shall be taken against raindrop or moist environment.
- Avoid direct sunlight.
- Preventive measure shall be taken against corrosion by oil mist and salinity.
- Keep away from radioactive and inflammable substances.
- Free from corrosive liquid and gas.

1.3.2 Servo Drive Installation

- In order to get good cooling, the servo drive should be normally mounted in vertical direction with the topside upward.
- For installing the servo driver, fasten the backboard of the servo driver with 2pcs of M4 screw bolt.
- Reserve enough space around the servo drivers as shown in the reference diagram. In order to guarantee the performance of the servo driver and the lifetime, please make the space as full as possible.
- To provide vertical wind to the heat sink of the servo driver should install ventilating fans in the control cubicle.
- Prevent the dust or the iron filings entering the servo driver when install the control cubicle.

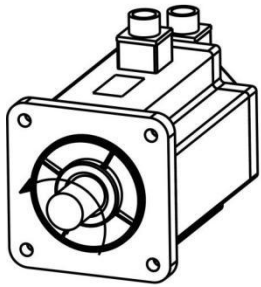


1.3.3 Servo Motor Installation

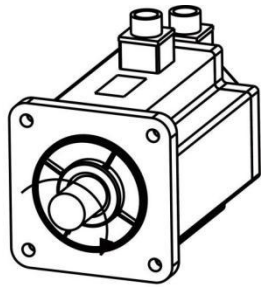
- For horizontal installation：In order to prevent water, oil, etc. from entering inside of the servo motor, please put the cable connector downward.
- For vertical installation: if the shaft of the servo motor is in upward direction with a speed reducer, some prevention measure shall be taken43 against entering inside of the servo motor by oil come from the speed reducer.
- In case of installation or removing the servomotor, please do not hit the servo motor with a hammer, otherwise the shaft and the encoder can be damaged.

1.3.4 Motor Rotation Direction Definition

The motor rotating direction description in this handbook is defined as facing the shaft of the servo motor, if the rotating shaft is in counterclockwise direction will be called as positive direction, or in clockwise as reversal direction.



Positive Rotation
(CCW)



Reversal Rotation
(CW)

Chapter 2 AC Servo Specifications

2.1 Servo Drive Specification

Soft Version: DS100S-40:15.0XX. DS100S-75:19.0XX. DS200S:21.0XX. DS300S:33.0XX. DS500S:31.0XX.

<table>
<tr><th>Model</th><th colspan="2">DS100S-40</th><th>DS100S-75</th><th>DS200S</th><th>DS300S</th><th>DS500S</th></tr>
<tr><td>Power</td><td colspan="2">0.05KW~0.4KW</td><td>0.75KW~1KW</td><td>1KW~2KW</td><td>2KW~3.5KW</td><td>3.5KW~7.5KW</td></tr>
<tr><td>Power Supply</td><td colspan="4">1 phase/3 phases AC220V-15%~10% 50/60Hz</td><td colspan="2">3 phases AC380V/AC220V</td></tr>
<tr><td>Control Method</td><td colspan="6">0：Position. 1：Speed. 2：Torque. 3：Position And Speed. 4：Position And Torque. 5：Speed And Torque</td></tr>
<tr><td>Protection Function</td><td colspan="6">Overspeed, Overvoltage, Undervolatge,Overload, Abnormal of main power, Abnormal encoder, Out of position error etc.</td></tr>
<tr><td>Monitor Function</td><td colspan="6">Speed, Current position, Command pulse accumulation,Position deviation, Motor torque, Motor current, Running state etc.</td></tr>
<tr><td>Control Input</td><td colspan="6">1：Servo on 2：Alarm clearance 3：CCW drive inhibition 4：CW drive inhibition
5：Deviation counter clearance 6：Command pulse inhibition 7：CCW torque limit
8：CW torque limit</td></tr>
<tr><td>Control Output</td><td colspan="6">Servo ready/Servo alarm/Positioning completion/Mechanical braking</td></tr>
<tr><td>Dynamic Braking</td><td colspan="6">Built-in/ Built-out</td></tr>
<tr><td>Load</td><td colspan="6">Less than 3 times of motor torque</td></tr>
<tr><td>Display</td><td colspan="6">5 LED digital display and 4 keys</td></tr>
<tr><td>Communication</td><td colspan="6">RS485</td></tr>
<tr><td rowspan="5">Position Control</td><td rowspan="4">Input Mode</td><td colspan="5">0：pulse+direction</td></tr>
<tr><td colspan="5">1：CCW/CW pulse</td></tr>
<tr><td colspan="5">2：A/B phase orthogonal pulse</td></tr>
<tr><td colspan="5">3：Internal position control</td></tr>
<tr><td colspan="4">Electronic gear ratio</td><td colspan="2">1-32767/1-32767</td></tr>
</table>

2.2 Servo Drive Naming Rule

DS | 100 | S - | 40 | - □□□

① ② ③ ④ ⑤

Serial No.	Definition
①	DS series ac servo drive
②	Power: 100:0.05KW~1KW; 200:1KW~2KW; 300:2KW~3.5KW;500:3.5KW~7.5KW
③	S: for 2500ppr incremental encoder; H: for 23-bit absolute encoder.
④	The dividing power range below 1KW: 40: 0.05KW~0.4KW; 75: 0.4KW~0.75KW.
⑤	Customization

2.3 Servo Motor Naming Rule

DN | 80 | - 024 | 30 | I2 | - MA | B

① ② ③ ④ ⑤ ⑥ ⑦

Serial No.	Definition
①	DN series ac servo motor
②	Flanger: 40(mm),60(mm),80(mm),90(mm),110(mm),130(mm),150(mm),180(mm).
③	Rated torque(×0.1N.m): 048=4.8N.m.
④	Rated speed(×100rpm): 30=3000rpm.
⑤	Encoder resolution: I2=2500ppr incremental, A4=23-bit absolute.
⑥	MA: AMP connector, MH: aviation connector, MHZ: aviation straight connector.
⑦	B: with a brake, Null: without a brake.

Note: 1. The code 02430 means the motor rated toque is 2.4N.m and rated speed is 3000rpm.

2. The rated power: P=0.1047×N×T=0.1047×2.4×3000=753.84W≈0.75KW. T=rated torque, N=rated speed.

2.4 Servo Motor And Matched Servo Drive

Flange	Model	Power	Speed	Matched Drive	Encoder
40mm	DN40-00130I2-MA(B)	50W	3000rpm	DS100S-40	2500ppr Incremental
	DN40-00330I2-MA(B)	100W	3000rpm		
60mm	DN60-00630I2-MA(B)	200W	3000rpm		
	DN60-01330I2-MA(B)	400W	3000rpm		
	DN60-01930I2-MA(B)	600W	3000rpm		
80mm	DN80-01330I2-MA(B)	400W	3000rpm	DS100S-75	
	DN80-02430I2-MA(B)	750W	3000rpm		
	DN80-03520I2-MA(B)	730W	2000rpm		
	DN80-04025I2-MA(B)	1000W	2500rpm		
110mm	DN110-02030I2-MH(B)	600W	3000rpm	DS200S	
	DN110-04020I2-MH(B)	800W	2000rpm		
	DN110-04030I2-MH(B)	1200W	3000rpm		
	DN110-05030I2-MH(B)	1500W	3000rpm		
	DN110-06020I2-MH(B)	1200W	2000rpm		
	DN110-06030I2-MH(B)	1800W	3000rpm		
130mm	DN130-04025I2-MH(B)	1000W	2500rpm		
	DN130-10010I2-MH(B)	1000W	1000rpm		
	DN130-05025I2-MH(B)	1300W	2500rpm		
	DN130-06025I2-MH(B)	1500W	2500rpm		
	DN130-10015I2-MH(B)	1500W	1500rpm		
	DN130-07725I2-MH(B)	2000W	2500rpm	DS200S/DS300S	
	DN130-15015I2-MH(B)	2300W	1500rpm		
	DN130-10025I2-MH(B)	2600W	2500rpm		
	DN130-15025I2-MH(B)	3800W	2500rpm	DS300S/DS500S	

Flange	Model	Power	Speed	Matched Drive	Encoder
150mm	DN150-15025I2-MH(B)	3800W	2500rpm	DS300S/DS500S	2500ppr Incremental
	DN150-15020I2-MH(B）	3000W	2000rpm		
	DN150-18020I2-MH(B)	3600W	2000rpm		
	DN150-23020I2-MH(B)	4600W	2000rpm	DS500S	
	DN150-27020I2-MH(B)	5500W	2000rpm		
180mm	DN180-17215I2-MH(B)	2700W	1500rpm	DS300S/DS500S	
	DN180-27010I2-MH(B)	2900W	1000rpm		
	DN180-19015I2-MH(B)	3000W	1500rpm		
	DN180-35010I2-MH(B)	3700W	1000rpm		
	DN180-27015I2-MH(B)	4300W	1500rpm	DS500S	
	DN180-21520I2-MH(B)	4500W	2000rpm		
	DN180-35015I2-MH(B)	5500W	1500rpm		
	DN180-48015I2-MH(B)	7500W	1500rpm		

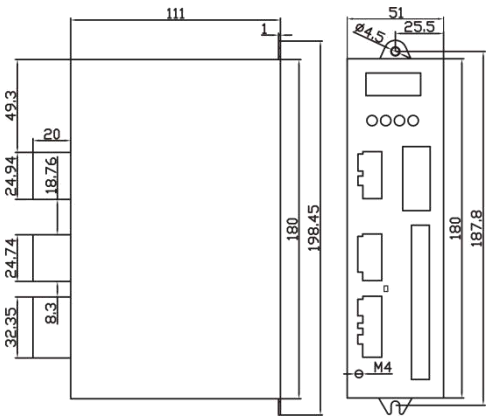
Chapter 3 Dimensions

3.1 Servo Drive Dimension

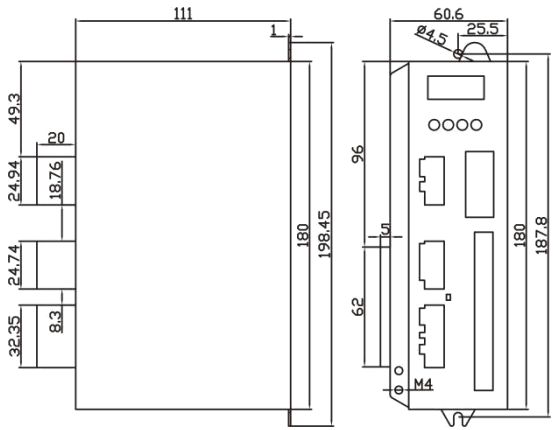
The user can install the servo drive with the bottom plate and the installed direction is perpendicular to the installation facing. Recommended to cool the servo drive with fan or natural cooling.

- Installation Dimension

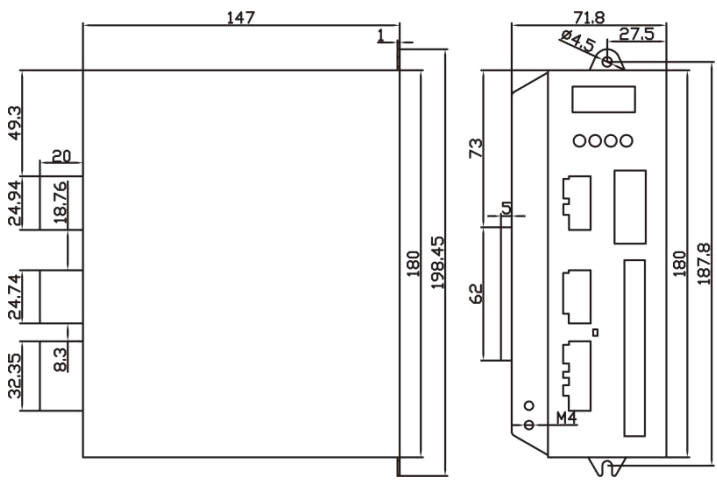
50W~400W



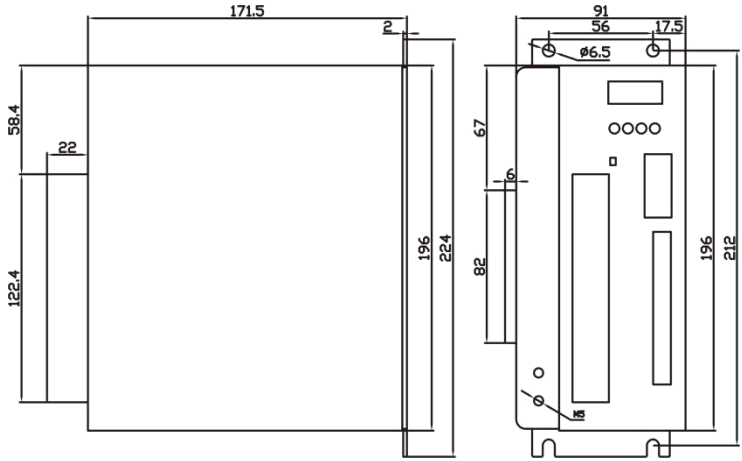
400W~750W



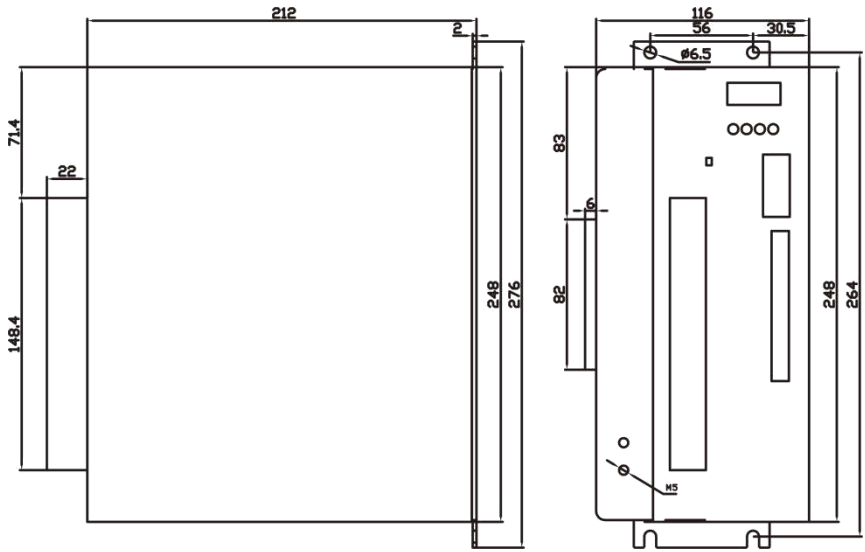
1000W~2000W



2000W~3500W



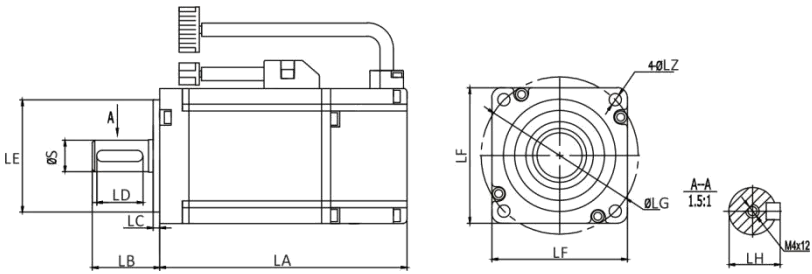
3500W~7500W



3.2 Servo Motor Dimension

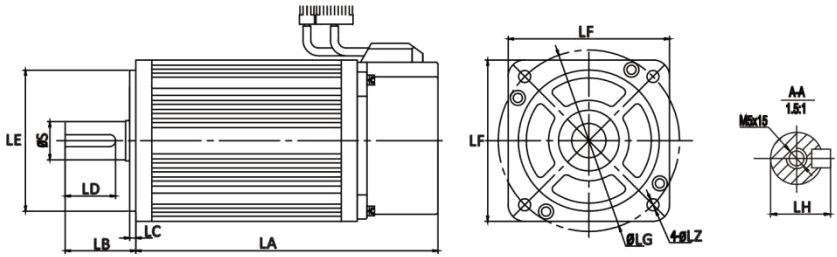
3.2.1 DN Series AC Servo Motor Dimension

- Flange 40mm、60mm



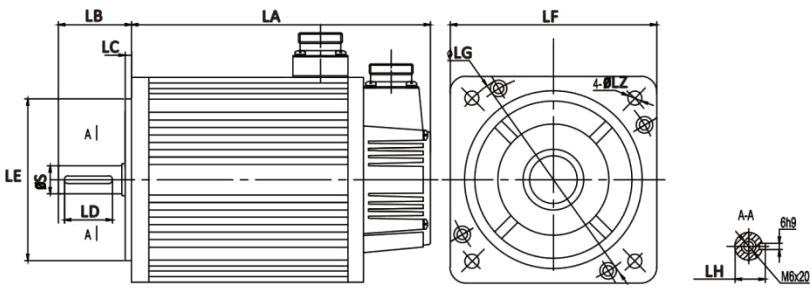
Model	LA	LB	LC	LD	LE	LF	LG	LH	LZ	S
DN40-00130I2-MA	75	25	3	\	30	40	46	\	3.5	8
DN40-00130I2-MA(B)	109	25	3	\	30	40	46	\	3.5	8
DN40-00330I2-MA	90	25	3	\	30	40	46	\	3.5	8
DN40-00330I2-MA(B)	124	25	3	\	30	40	46	\	3.5	8
DN60-00630I2-MA	116	30	3	20.5	50	60	70	16	5.5	14
DN60-00630I2-MA(B)	164	30	3	20.5	50	60	70	16	5.5	14
DN60-01330I2-MA	141	30	3	20.5	50	60	70	16	5.5	14
DN60-01330I2-MA(B)	189	30	3	20.5	50	60	70	16	5.5	14
DN60-01930I2-MA	169	30	3	20.5	50	60	70	16	5.5	14
DN60-01930I2-MA(B)	217	30	3	20.5	50	60	70	16	5.5	14

- Flange 80mm、90mm



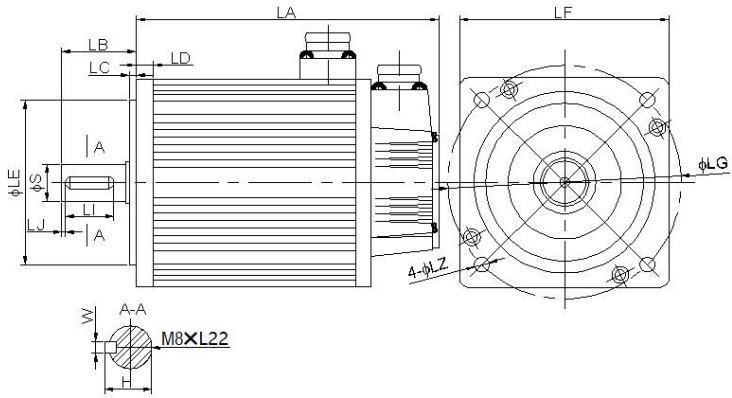
Model	LA	LB	LC	LD	LE	LF	LG	LH	LZ	S
DN80-01330I2-MA	124	35	3	25	70	80.4	90	21.5	6	19
DN80-01330I2-MA(B)	164	35	3	25	70	80.4	90	21.5	6	19
DN80-02430I2-MA	151	35	3	25	70	80.4	90	21.5	6	19
DN80-02430I2-MA(B)	191	35	3	25	70	80.4	90	21.5	6	19
DN80-03520I2-MA	179	35	3	25	70	80.4	90	21.5	6	19
DN80-03520I2-MA(B)	219	35	3	25	70	80.4	90	21.5	6	19
DN80-04025I2-MA	191	35	3	25	70	80.4	90	21.5	6	19
DN80-04025I2-MA(B)	231	35	3	25	70	80.4	90	21.5	6	19
DN90-02430I2-MA	150	35	3	25	70	80.4	100	18	6.5	16
DN90-02430I2-MA(B)	198	35	3	25	70	80.4	100	18	6.5	16
DN90-03520I2-MA	172	35	3	25	70	80.4	100	18	6.5	16
DN90-03520I2-MA(B)	220	35	3	25	70	80.4	100	18	6.5	16
DN90-04025I2-MA	182	35	3	25	70	80.4	100	18	6.5	16
DN90-04025I2-MA(B)	230	35	3	25	70	80.4	100	18	6.5	16

- Flange 110mm、130mm



Model	LA	LB	LC	LD	LE	LF	LG	LZ	LH	S
DN110-02030I2-MH	159	55	5	40	95	110	130	9	21.5	19
DN110-02030I2-MH(B)	233	55	5	40	95	110	130	9	21.5	19
DN110-04020I2-MH	189	55	5	40	95	110	130	9	21.5	19
DN110-04020I2-MH(B)	263	55	5	40	95	110	130	9	21.5	19
DN110-04030I2-MH	189	55	5	40	95	110	130	9	21.5	19
DN110-04030I2-MH(B)	263	55	5	40	95	110	130	9	21.5	19
DN110-05030I2-MH	204	55	5	40	95	110	130	9	21.5	19
DN110-05030I2-MH(B)	278	55	5	40	95	110	130	9	21.5	19
DN110-06020I2-MH	219	55	5	40	95	110	130	9	21.5	19
DN110-06020I2-MH(B)	293	55	5	40	95	110	130	9	21.5	19
DN110-06030I2-MH	219	55	5	40	95	110	130	9	21.5	19
DN110-06030I2-MH(B)	293	55	5	40	95	110	130	9	21.5	19
DN130-04025I2-MH	166	57	5	40	110	130	145	9	24.5	22
DN130-04025I2-MH(B)	223	57	5	40	110	130	145	9	24.5	22
DN130-05025I2-MH	171	57	5	40	110	130	145	9	24.5	22
DN130-05025I2-MH(B)	228	57	5	40	110	130	145	9	24.5	22
DN130-06025I2-MH	179	57	5	40	110	130	145	9	24.5	22
DN130-06025I2-MH(B)	236	57	5	40	110	130	145	9	24.5	22
DN130-07725I2-MH	192	57	5	40	110	130	145	9	24.5	22
DN130-07725I2-MH(B)	249	57	5	40	110	130	145	9	24.5	22
DN130-10010I2-MH	213	57	5	40	110	130	145	9	24.5	22
DN130-10010I2-MH(B)	294	57	5	40	110	130	145	9	24.5	22
DN130-10015I2-MH	213	57	5	40	110	130	145	9	24.5	22
DN130-10015I2-MH(B)	294	57	5	40	110	130	145	9	24.5	22
DN130-10025I2-MH	209	57	5	40	110	130	145	9	24.5	22
DN130-10025I2-MH(B)	290	57	5	40	110	130	145	9	24.5	22
DN130-15015I2-MH	241	57	5	40	110	130	145	9	24.5	22
DN130-15015I2-MH(B)	322	57	5	40	110	130	145	9	24.5	22
DN130-15025I2-MH	231	57	5	40	110	130	145	9	24.5	22
DN130-15025I2-MH(B)	312	57	5	40	110	130	145	9	24.5	22

- Flange 150mm、180mm



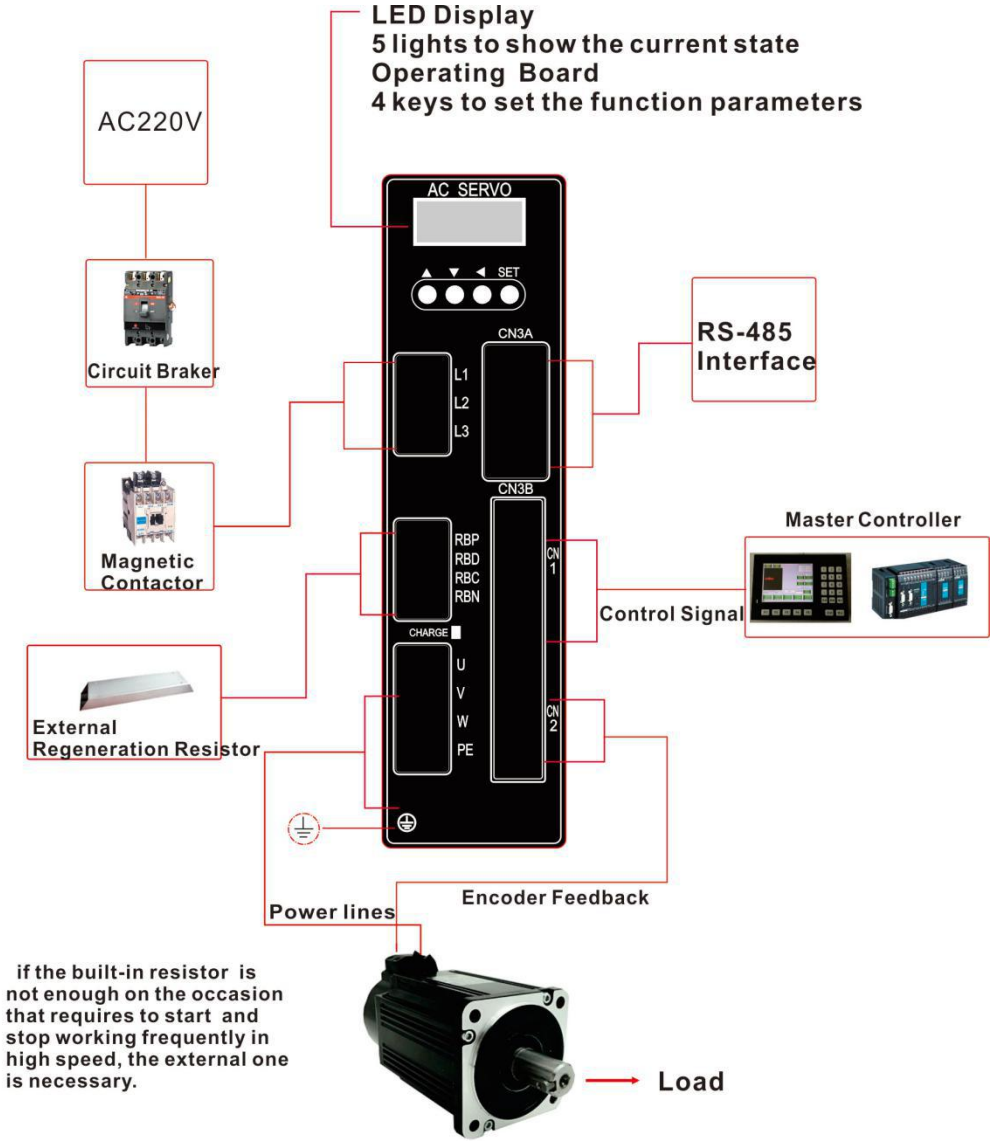
Model	LA	LB	LC	LD	LE	LF	LG	LZ	S	H	LI
DN150-15025I2-MH	230	58	5	14	130	150	165	11	28	31	45
DN150-15025I2-MH(B)	303	58	5	14	130	150	165	11	28	31	45
DN150-15020I2-MH	230	58	5	14	130	150	165	11	28	31	45
DN150-15020I2-MH(B)	303	58	5	14	130	150	165	11	28	31	45
DN150-18020I2-MH	248	58	5	14	130	150	165	11	28	31	45
DN150-18020I2-MH(B)	321	58	5	14	130	150	165	11	28	31	45
DN150-23020I2-MH	278	58	5	14	130	150	165	11	28	31	45
DN150-23020I2-MH(B)	351	58	5	14	130	150	165	11	28	31	45
DN150-27020I2-MH	302	58	5	14	130	150	165	11	28	31	45
DN150-27020I2-MH(B)	375	58	5	14	130	150	165	11	28	31	45
DN180-17215I2-MH	226	65	5	14	114	180	200	13.5	35	38	51
DN180-17215I2-MH(B)	298	65	5	14	114	180	200	13.5	35	38	51
DN180-19015I2-MH	232	65	5	14	114	180	200	13.5	35	38	51
DN180-19015I2-MH(B)	304	65	5	14	114	180	200	13.5	35	38	51
DN180-21520I2-MH	243	65	5	14	114	180	200	13.5	35	38	51
DN180-21520I2-MH(B)	315	65	5	14	114	180	200	13.5	35	38	51
DN180-27010I2-MH	262	65	5	14	114	180	200	13.5	35	38	51
DN180-27010I2-MH(B)	364	65	5	14	114	180	200	13.5	35	38	51
DN180-27015I2-MH	262	65	5	14	114	180	200	13.5	35	38	51
DN180-27015I2-MH(B)	334	65	5	14	114	180	200	13.5	35	38	51
DN180-35010I2-MH	292	65	5	14	114	180	200	13.5	35	38	51

DN180-35010I2-MH(B)	364	65	5	14	114	180	200	13.5	35	38	51
DN180-35015I2-MH	292	65	5	14	114	180	200	13.5	35	38	51
DN180-35015I2-MH(B)	364	65	5	14	114	180	200	13.5	35	38	51
DN180-48015I2-MH	346	65	5	14	114	180	200	13.5	35	38	51
DN180-48015I2-MH(B)	418	65	5	14	114	180	200	13.5	35	38	51

Chapter 4 Wiring

4.1 Servo System Wiring

4.1.1 Servo Drive Wiring



4.1.2 Wiring Introduction

Wiring Notes:

- The control cable length should be less than 3 meters and the encoder cable length 20 meters.
- Check that the power supply and wiring of L1,L2,L3 are correct.
- Please do not connect to 380V power supply.
- The output terminals(U,V,W) must be connected with the servo motor connections(U,V,W) correspondently, otherwise the servo motor will stop or over speed. However, by exchanging three-phase terminal cannot cause the motor to reverse; this point is different from asynchronous motor.
- Earthed wiring must be reliable with a single-point connection.
- Pay attention to the correct direction of freewheel diode which is connected with the delay at the output terminal, other can cause the output circuit breakdown.
- In order to protect the servo driver from noise interference that can cause malfunction, please use an insulation transformer and noise filter on the power lines.
- Wiring the power lines(power supply line, main circuit lines,etc) at a distance above 30cm from the control signal wires, do not lay them in one conduit.
- Install a non-fuse circuit breaker that can shut off the external power supply immediately for in case of the servo driver fault.

4.1.3 Electric Wire Specifications

Connect Terminal	Symbol	Wire Specification
Main Power Supply	L1、L2、L3	1.5~4mm^2
Servo Motor	U、V、W	1.5~4mm^2
Ground	⏚	1.5~4mm^2
Control Signals	CN1	≧0.14mm2(AWG26), Shielded.
Encoder Signals	CN2	≧0.14mm2(AWG26), Shielded.
Regenerative Resistors Terminals	RBP、RBD/RBP、RBC	1.5~4mm^2

Note:Must use a twisted pair wire cable for the encoder signal wiring. If the encoder signal cable is too long(＞20m), in which the encoder power supply can be insufficient, may use multi-wire or thick wire for the power supply wiring.

4.1.4 Main Circuit Terminal Explanation

Terminal Name	Symbol	Detailed Explanation
Main Power Supply	L1、L2	Connect to external AC power supply ,1 phase220VAC -15%~+10%，50/60Hz.
	L1、L2、L3	Connect to external AC power supply ,3 phase 220VAC -15%~+10%，50/60Hz.
Regenerative Resistor Terminals	RBP、RBD	When use the built-in resistor,Please connect RBP and RBD.
	RBP、RBC	When the external regenerative resistor is needed, please disconnect RBP and RBD and crossover it to terminal RBP and RBC. Leave RBN unconnected.
Servo Motor	U	U phase output to servo motor.
	V	V phase output to servo motor.
	W	W phase output to servo motor.
Ground	⏚	Ground terminal of servo motor.
	⏚	Ground terminal of servo drive.

Note: The built-in resistor has been set as default by factory.

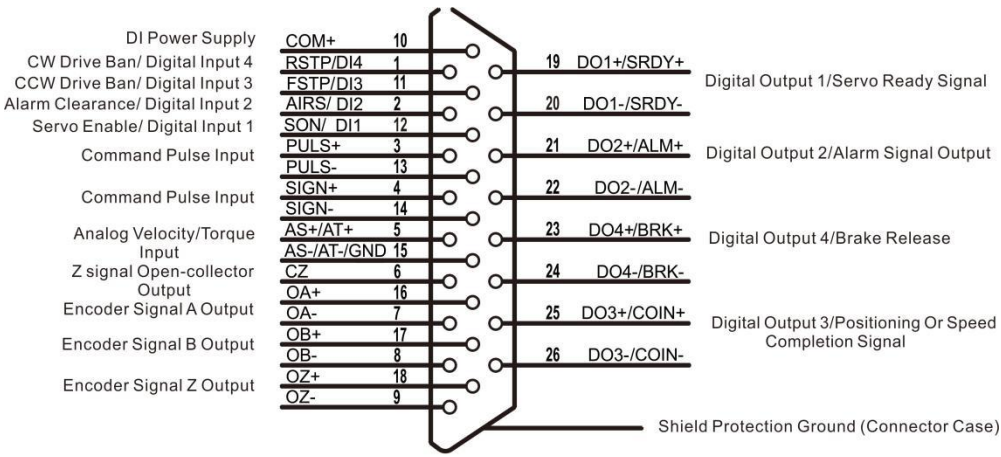
4.2 CN1 Control Signal Terminal

4.2.1 CN1 Terminal Introduction

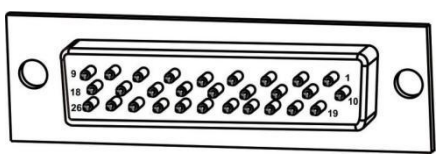
The CN1 connector DB26 plug provides the signals interfaced with the host-controller. The signal includes:

- 4 programmable input terminals
- 4 programmable output terminals
- Analog command inputs
- Pulse command inputs
- Encoder signal outputs

4.2.2 CN1 Terminal



CN1 Connector



Connector CN1 Soldering Lug Disposition

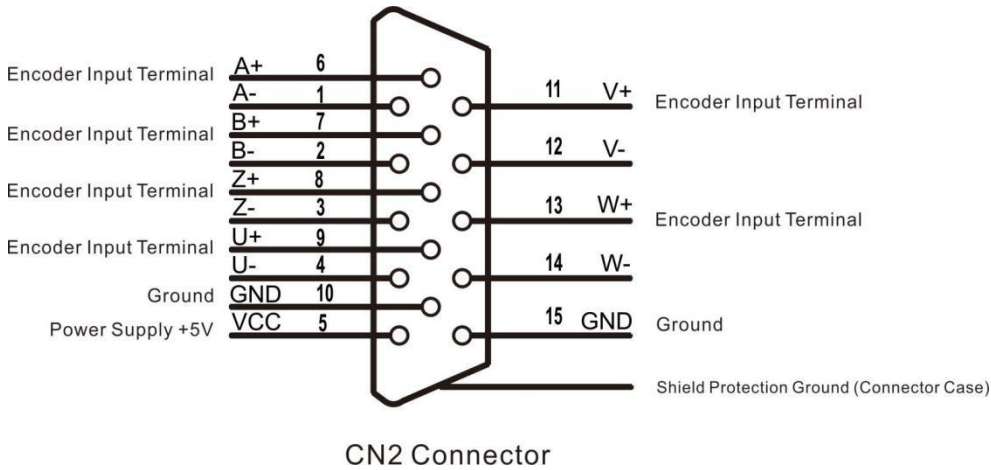
4.2.3 CN1 Terminal Signal Introduction

Name Of Signals		Pin No.	Functions
Digital Input	DI1	12	Optocoupler input And function is programmable. Defined by parameter P3 group(P3-0~P3-17) The input voltage of COM is both of common positive and negative terminal. And input signal voltage is 24V.
	DI2	2	
	DI3	11	
	DI4	1	
	COM	10	
Digital Output	DO1+	19	Photo isolation output.Function is programmable. Defined by parameter P3 series(P3-20~P3-23).
	DO1-	20	
	DO2+	21	
	DO2-	22	
	DO3+	25	
	DO3-	26	
	DO4+	23	
	DO4-	24	
Position Command Pulse	PULS+	3	High speed photo isolation input. Working mode is set by parameter PA14: ● Pulse+direction; ● CCW/CW pulse; ● A、B orthogonal pulse; ● Input of internal position control.
	PULS-	13	
	SIGN+	4	
	SIGN-	14	
Analog Command Input	AS+/AT+	5	Analog velocity/torque input, range: -10V~+10V.
	AS-/AT-	15	
Encoder Signal Output	OA+	16	Motor encoder signal output.
	OA-	7	
	OB+	17	
	OB-	8	
	OZ+	18	
	OZ-	9	
	CZ	6	
	GND	15	
Shielded Ground Protection	Metal case of connector		Shielded wire for connection with shielded cable

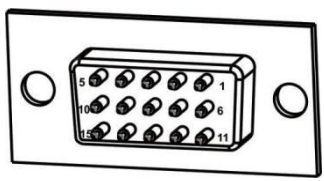
4.3 CN2 Encoder Signal Terminal

4.3.1 CN2 Terminal Introduction

The encoder signal connector CN2 connects with the servo motor encoder. A DB15 plug of three rows(the VGA plug) is used. The contour and pin disposition charts are:



CN2 Connector



Connector CN2 Soldering Lug Disposition

4.3.2 CN2 Terminal Signal Introduction

Signal Name Of Encoder		Pin No.	Functions
Encoder Power Supply	5V	5	Use 5V power supply (Provided by servo driver). If the cable is longer than 20m, in order to prevent encoder from voltage dropping down, it is better to use multi wires or thick wires for power line and ground line.
	0V	10	
		15	
A Phase Input	A+	6	Connect with A phase output of encoder.
	A-	1	
B Phase Input	B+	7	Connect with B phase output of encoder.
	B-	2	
Z Phase Input	Z+	8	Connect with Z phase output of encoder.
	Z-	3	
U Phase Input	U+	9	Connect with U phase output of encoder.
	U-	4	
V Phase Input	V+	11	Connect with V phase output of encoder.
	V-	12	
W Phase Input	W+	13	Connect with W phase output of encoder.
	W-	14	
Shield Ground	Metal Case		Connect with cable shield wire.

4.4 CN3 And CN4 Terminal Definition

RS485	Can be connected to the PC machine or controller through special serial cable, don't plug it with electric. Twisted pair shielded wires are suggested and less than 2 meters in length. Remark: Multi-machine series connected, CN3A connect with last CN3B, and CN3B connect with next CN3A.
CAN field bus	Alternative function

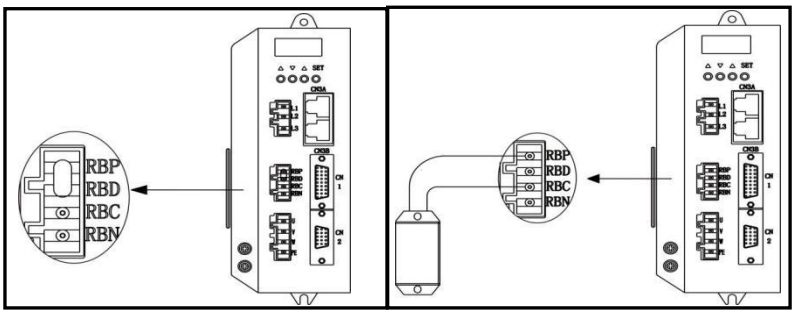
Terminal	CN3A	Name	CN3B	Name	Picture
1	VCC	positive power supply	NC	free end	
2	GND	ground	GND	ground	
3	CAN H	CAN terminal	CAN H	CAN terminal	
4	RS485-	RS485 communication signal	RS485-	RS485 communication signal	
5	RS485+		RS485+		
6	CAN L	CAN terminal	CAN L	CAN terminal	
7	GND	ground	GND	ground	
8	VCC	positive power supply	NC	free end	

4.5 The Connection Of Regeneration Resistor

For DS100S And DS200S

If use the built-in resistor, please connect RBP and RBD(a 4 pins connector for built-in resistor has been set by factory, so you can insert it to the terminal directly), as picture A showed.

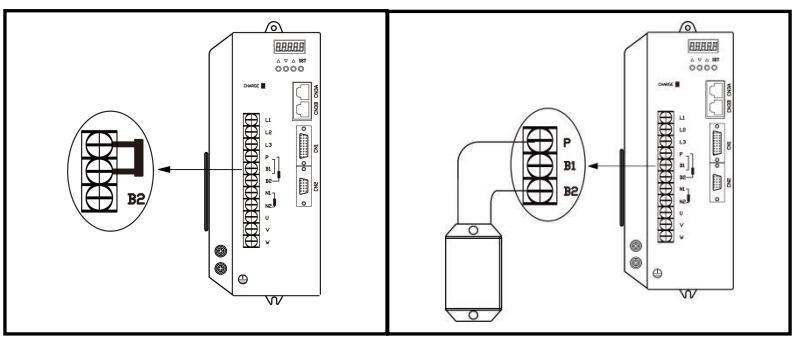
When an external regenerative resistor is connected to the servo driver, the short circuit between terminal RBP and RBD must be disconnected. Then the external regenerative resistor could be connected between RBP and RPC, as picture B showed.



Picture A Picture B

For DS300S And DS500S

If the internal brake resistance is used, the driver should connect P with B1 short, that is, it can be used normally according to the factory state, as shown in figure A. If the external brake resistance is necessary, the short joint between P and B1 must be removed, and then the external brake resistance line must be crossed over the P and B2 terminals, as shown in figure B:



Picture A Picture B

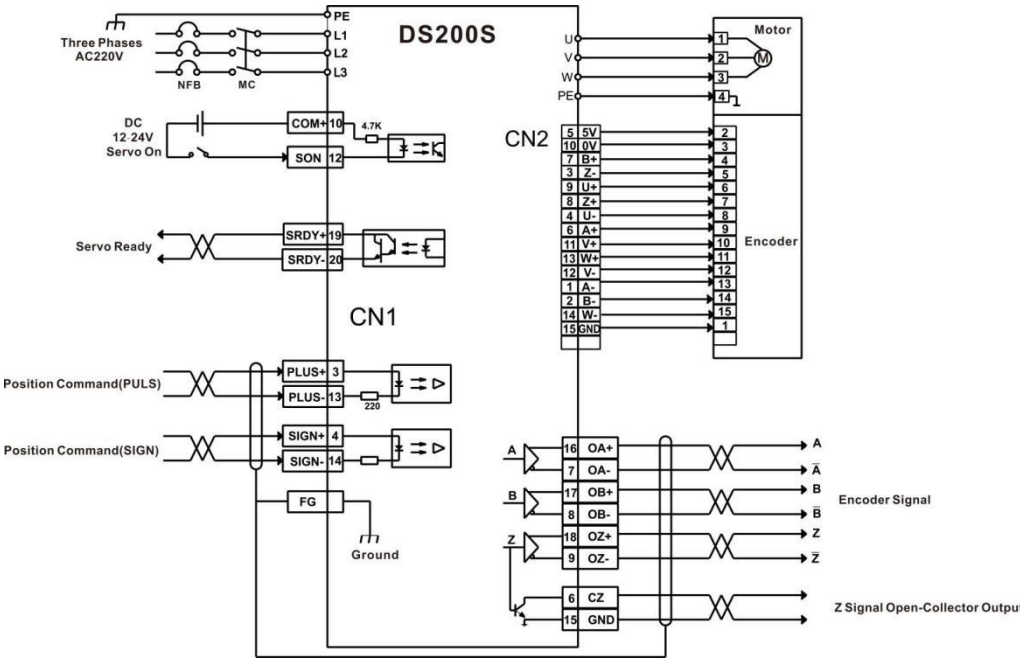
4.6 Control Signal Wiring Diagram And Parameter Settings

4.6.1 Position Control Wiring

1. For main circuit , if for 3 phases AC220V, please connect L1,L2,L3 terminals.

2. If for 1 phase AC220V, please connect L1,L2 terminals(only for DS100 and DS200).

3. The CN2 connector of encoder signal should be connected with the servo motor well, while the CN1 connector should be wired as below diagram showed.

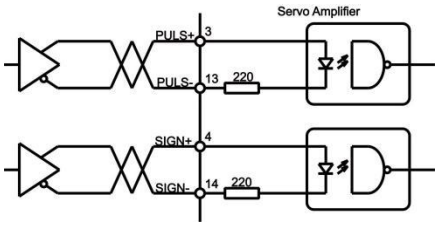
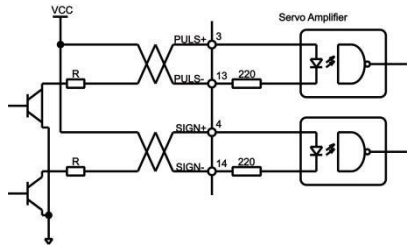


The wiring example (above) is for servo motors with flange size 60mm, 80mm and 90mm.When connected with servo motors with flange size110mm and 130mm,150mm and 180mm. Please connect as following:

Power	Signal	U				V				W			PE			
	Number	2				3				4			1			
Encoder	Signal	5V	0V	A+	B+	Z+	A-	B-	Z-	U+	V+	W+	U-	V-	W-	PE
	Number	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1

- **Position Command Pulse Interfaces**

There are both differential and single end connections. The differential connection is recommended and the twisted pair wire is used suitably. The drive current is in the range of 10~15mA. The operation mode is set by parameter PA14:Pulse+Direction, CCW/CW pulse, A phase+B phase(orthogonal pulse).

Differential Drive	Single Drive
	
● Maximum pulse frequency is 500KHz. ● This connection is recommended in order to avoid interference. ● In differential mode, it uses RS422 line ● drive of AM26LS31. VCC=5V is as default.	● Maximum pulse frequency is 200KHz. ● Resistance value of R is recommended. VCC=5V, R=0~0.1k; VCC=12V, R=0.75k~1.0k; VCC=24V, R=1.5k~2.0k.

- **Parameter Settings In Position Mode**

The following parameters need to be adjusted when in position mode:

Gain And Smooth Filter

Parameter	Introduction	Value	Default Value
PA4	Control mode	0	0
PA9	Position Proportional Gain	1-1000	40
PA19	Position Command Smooth Filter	0-30000×0.1ms	300

Digital Input(DI)

Parameter	Introduction	Value	Default Value
PA11	Command pulses if the motor runs one roll.	0-30000	10000
PA12	1st numerator of electronic gear for position command pulse	1-32767	0
PA13	Denominator of electronic gear for position command pulse	1-32767	10000

PA14	Input mode of position command pulse	0-2	0
PA15	Input direction of position command pulse	0-1	0
PA59	The effective edge of command pulse	0-1	0
PA77	2nd numerator of electronic gear for position pulse	1-32767	0
PA78	3rd numerator of electronic gear for position pulse	1-32767	0
PA79	4th numerator of electronic gear for position pulse	1-32767	0
PA80	Effective level of command direction signal	0-1	0
PA81	Command pulse(PULS)signal filter	0-15	4
PA82	Command pulse(SIGN)signal filter	0-15	4

Digital Output(DO)

Parameter	Introduction	Value	Default Value
PA16	Range of positioning completion	0-3000	10
PA17	Position deviation limit	0-30000×100	400
PA18	Position deviation error	0-1	0
PA83	CWL,CCWL direction prohibited mode	0-1	0
PA84	Hysteresis for position completion	0-32767	5
PA85	Range for approach positioning	0-32767	500
PA86	Hysteresis for approach positioning	0-32767	50

Input And Output Terminals

Parameter	Introduction	Value	Default Value
PA55	Effective level control word for input terminals	0000-1111	0000
PA57	Effective level control word for output terminals	0000-1111	0000
PA58	Time constant of removing jitter for IO input terminal	1-20×0.1ms	2
P3-0	Digital Input DI1 function	0-99	1
P3-1	Digital Input DI2 function	0-99	2
P3-2	Digital Input DI3 function	0-99	3
P3-3	Digital Input DI4 function	0-99	4
P3-15	Force digital input valid1	00000000-11111111	00000000
P3-16	Force digital input valid2	00000000-	00000000

		11111111	
P3-17	Force digital input valid3	00000000- 11111111	00000000
P3-20	Digital Output DO1 function	0-99	2
P3-21	Digital Output DO2 function	0-99	3
P3-22	Digital Output DO3 function	0-99	5
P3-23	Digital Output DO4 function	0-99	8

- **Position Command Introduction Of Internal Position Pr Mode**

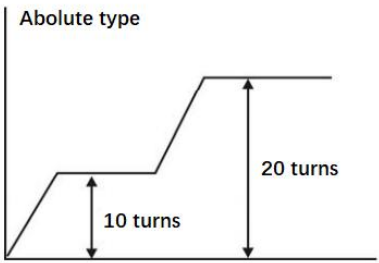
Pr position command source creates position command register using the 8 groups of parameters （P4-2， P4-3)-(P4-23， P4-24). Based on the parameter P4-0, you can choose: a. absolute type; b. incremental type, and then can choose one of 8 groups to be position command to match with 1/O(CN1、POS0-POS2 and CTRG). As below table shows:

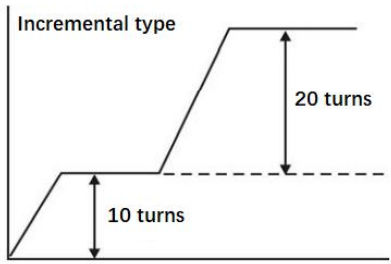
Command	POS2	POS1	POS0	CTRG	Parameter	Induction	Moving Speed Register
P1	0	0	0	↑	P4-2	circle(+/-30000)	P4-4
					P4-3	pulse(+/-max cnt)	（V1）
P2	0	0	1	↑	P4-5	circle(+/-30000)	P4-7
					P4- 6	pulse(+/-max cnt)	（V2）
P3	0	1	0	↑	P4-8	circle(+/-30000)	P4-10
					P4-9	pulse(+/-max cnt)	（V3）
P4	0	1	1	↑	P4-11	circle(+/-30000)	P4-13
					P4-12	pulse(+/-max cnt)	（V4）
P5	1	0	0	↑	P4-14	circle(+/-30000)	P4-16
					P4-15	pulse(+/-max cnt)	（V5）
P6	1	0	1	↑	P4-17	circle(+/-30000)	P4-19
					P4-18	pulse(+/-max cnt)	（V6）
P7	1	1	0	↑	P4-20	circle(+/-30000)	P4-22
					P4-21	pulse(+/-max cnt)	（V7）
P8	1	1	1	↑	P4-23	circle(+/-30000)	P4-25
					P4-24	pulse(+/-max cnt)	（V8）

Note: The states of POS0-2: 0 means contact break(open); 1 means contact close. CTRG↑means the moment from open(0) to close(1), while max means the command pulses of the motor in a turn.

The applications of position register of absolute type and incremental type are wide and they are general used as a simple program control. Users can easily complete periodicity actions as long as the above table is used. For example, the position command P1=10 turns and P2=20 turns. P1 should be ordered firstly and then P2 is later.

Differences between P1 and P2 as below:



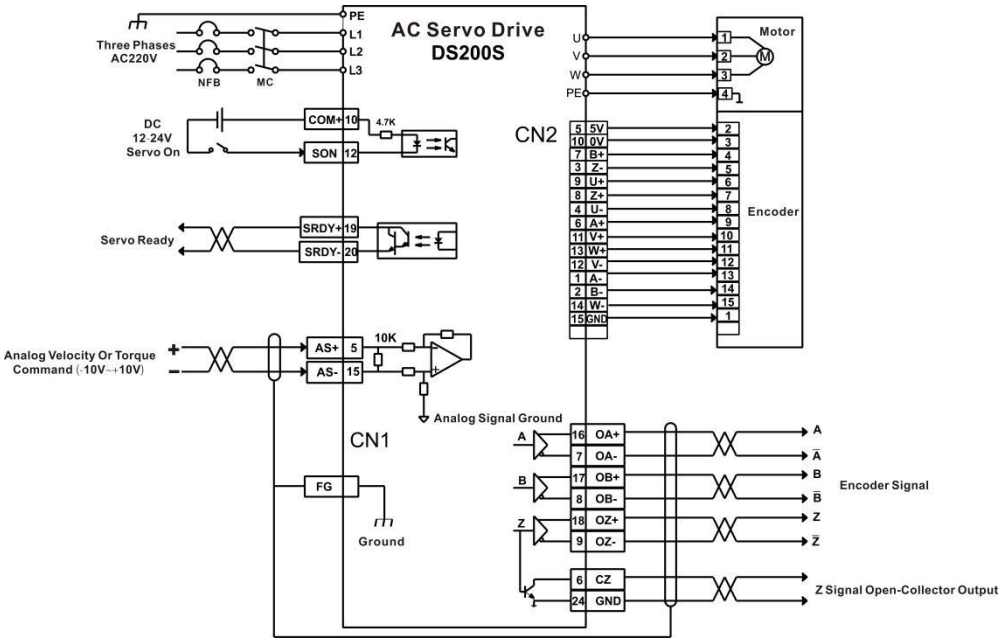


4.6.2 Speed Control Or Torque Control Wiring

1. For main circuit , if for 3 phases AC220V, please connect L1,L2,L3 terminals.

2. If for 1 phase AC220V, please connect L1,L2 terminals(only for DS100 and DS200).

3. The CN2 connector of encoder signal should be connected with the servo motor well, while the CN1 connector should be wired as below diagram showed.



The wiring example is for servo motors with flange 60mm,flange80mm and flange 90mm. When connected with servo motors with flange110mm,130mm,150mm and 180mm. please operate as below:

Power	Signal	U				V				W			PE			
	Number	2				3				4			1			
Encoder	Signal	5V	0V	A+	B+	Z+	A-	B-	Z-	U+	V+	W+	U-	V-	W-	PE
	Number	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1

- **Parameter Settings Of Speed Or Torque Control Mode**

Parameter Settings In Speed Control Mode

Parameter	Introduction	Value	Default Value
PA4	Control Mode	1	0
PA5	Gain Of Speed Loop	5-2000Hz	150
PA6	Integral Constant Of Speed	1-1000ms	75
PA22	The source Of Speed Command	0-5	0
PA24	Internal Speed 1	-6000-6000r/min	100
PA25	Internal Speed 2	-6000-6000r/min	500
PA26	Internal Speed 3	-6000-6000r/min	1000
PA27	Internal Speed4	-6000-6000r/min	2000
PA28	Arrival Speed	0-3000r/min	3000
PA40	Acceleration Time Constant Of Speed Command	1-10000ms	100
PA41	Deceleration Time Constant Of Speed Command	1-10000ms	100
PA43	Gain Of Analog Speed Command	10-3000r/min/v	10
PA44	Direction Of Analog Speed Command	0-1	0
PA45	Zero Offset Compensation Of Analog Speed Command	-5000-5000	0
PA46	Filter Of Analog Speed Command	1-1000Hz	100
PA75	Range For Zero Speed Detection	0-1000r/min	10
PA76	The Setting Value For Speed Consistent	0-1000r/min	10
PA87	Hysteresis Of Arrival Speed	0-5000r/min	30
PA88	Polarity Of Arrival Speed	0-1	0
PA92	Hysteresis For Zero Speed Detection	0-1000r/min	5

Parameter Settings In Torque Control Mode

Parameter	Introduction	Value	Default Value
PA4	Control Mode	2	0
PA29	Gain Of Analog Torque Command	Set by yourself	30
PA32	Selection For Internal And External Torque Command	0-2	0
PA33	Direction Of Analog Torque Command	0	0
PA39	Zero Offset Compensation Of Analog Torque Command	0	0
PA50	Speed Limit In Torque Control Mode	Set by yourself	Rated
PA64	Internal Torque 1	-3000-3000	0
PA65	Internal Torque 2	-3000-3000	0
PA66	Internal Torque 3	-3000-3000	0
PA67	Internal Torque 4	-3000-3000	0
PA83	Inhibition Method	0-1	0
PA89	Arrival Torque	-300%-300%	100
PA90	Hysteresis Of Arrival Torque	0%-300%	5
PA91	Polarity Of Arrival Torque	0-1	0

Communication Parameter Settings

Parameter	Introduction	Value	Default Value
PA71	MODBUS communication address	1-254	1
PA72	MODBUS communication baud rate	48-1152×100	96
PA73	MODBUS protocol selection	0-2	1
PA74	Communication error handing	0-1	0

4.7 Origin Regression Function And Relevant Parameters Introduction

4.7.1 Relevant Parameter Settings

Parameter	Introduction	Value	Default Value
P4-32	Origin detector type or search direction setting	0-5	0
P4-33	Set the model of short distance movement to the origin	0-2	0
P4-34	Origin trigger start mode	0-2	0
P4-35	Origin stop mode setting	0-1	0
P4-36	The first stage of high speed origin regression speed setting	1-2000r/min	1000
P4-37	The second stage of low speed origin regression speed setting	1-500r/min	50
P4-38	Cycles of origin regression offset	+/-30000	0
P4-39	Pulses of origin regression offset	+/-max cnt	0

4.7.2 Origin Regression Mode Introduction(Must be under internal position mode)

A. Origin trigger start mode(P4-34)

The origin trigger start mode is divide into two kinds of origin regression function. One is automatic performing and another is contacting trigger. Details as below:

P4-34=0: close origin regression function. When set P4-34=0, the origin regression function can not work not matter what its setting value is.

P4-34=1: when the power is on, it will execute origin regression automatically. The function is available one when the power supply and servo on,which means it is unnecessary to repeat the operation when the servo works. It can save one input contact used to perform the origin regression.

P4-34=2: It triggers origin regression function through the input contact SHOM.

One of registers which are input pin function planning register must be set to SHOM trigger input function. The SHOM contact can be triggered at any time during the servo working and the function of origin regression can be performed.

B. Origin trigger start mode(P4-32)

The origin detector can use either the left limit switch or the right limit switch as the reference point for the origin. Or it can use extra detectors such as near type or light-gate type switch) as the reference. The Z pulse can be also set as a reference point when the servo motor moves in only one revolution.

P4-32=0: CW direction finds the origin and use CCWL limit as a rough reference point. When

completing origin positioning, CCWL is limit input function. The subsequent retrigger will occur limit warning. When using limit input point as a rough reference point, recommended to set Z pulse(P4-33) as the precise mechanical origin.

P4-32=1: CCW direction finds the origin point and use CWL limit as a rough reference point. CWL is limit input function.The subsequent retrigger will occur limit warning. When using limit input point as a rough reference point, recommended to set Z pulse(P4-33) as the precise mechanical origin.

P4-32=2: CW direction finds the origin point and use ORGP(external detector input point) as the origin point reference. Then Z pulse of return search(P4-33=0) or do not return search(P4-33=1) can be set as the precise mechanical origin point. If do not use Z pulse as the mechanical origin point, the positive edge of ORGP can be also set as the mechanical origin point(P4-33=2).

P4-32=3: CCW direction finds the origin point and use ORGP(external detector input point) as the origin point reference. Then Z pulse of return search(P4-33=0) or do not return search(P4-33=1) can be set as the precise mechanical origin point. If do not use Z pulse as the mechanical origin point, the positive edge of ORGP can be also set as the mechanical origin point(P4-33=2).

P4-32=4: CW direction finds Z pulse origin point directly. This function is usually used for servo motor motion control in only one rotation range and now any detector switches are unnecessary connected.

P4-32=5: CCW direction finds Z pulse origin point directly. This function is usually used for servo motor motion control in only one rotation range and now any detector switches are unnecessary connected.

C. Movement mode setting of short distance to the origin (P4-33)

P4-33=0: after the origin point has been found, the servo motor returns at the second stage of speed to search the nearest Z pulse as the mechanical origin point.

P4-33=1: after the origin point has been found, the servo motor changes to the second stage of speed to keep searching the nearest Z pulse as the mechanical origin.

P4-33=2: the rising edge of ORGP which was found is set as the mechanical origin point and stops according to deceleration, which is applied to P4-32=2 or 3. Or when found Z pulse, it stops according to deceleration, which is applied to P4-32=4 or 5. And the value of P4-32 for detecting origin detection is only applicable to 2 or 3. Under Z pulse origin point detecting, P4-32 is only applicable to 4 or Z pulse.

D. The mode setting of origin point stops (P4-35)

P4-35=0: after the origin detection has been completed, the motor slows down and is pulled back to the origin point. The motor slows down and stops when it gets the signal of origin detection at the second stage of speed.Then it moves back to the mechanical original position.

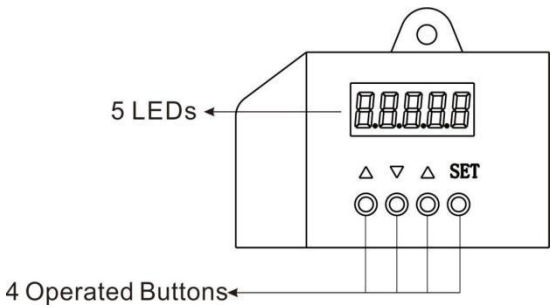
P4-35=1: after the origin detection has been completed, the motor decelerates and stops in the forward direction. The motor slows down and stops when it get the signal of origin detection at the second stage of speed. Then position overrun is no longer modified and the mechanical original position would not change even there are different position overruns.

Chapter 5 Operation And Display

5.1 Introduction Of Front Panel And Function

5.1.1 Front Panel

The panel consists of 5 digital LED and 4 buttons including ↑、↓、←、SET to display all system status and set parameters. The operation is hierarchical. ← button indicates “back” and SET button indicates “forward” while it also has the meaning of “Enter” and ← button also has the meaning of “Cancel” and “Exit”. ↑ button indicates “Increasing ” and ↓ button indicates “decreasing”. If you press the ↑ button or ↓ button and maintain it, you would get a duplicate result and stay longer, the repetition rate is higher.

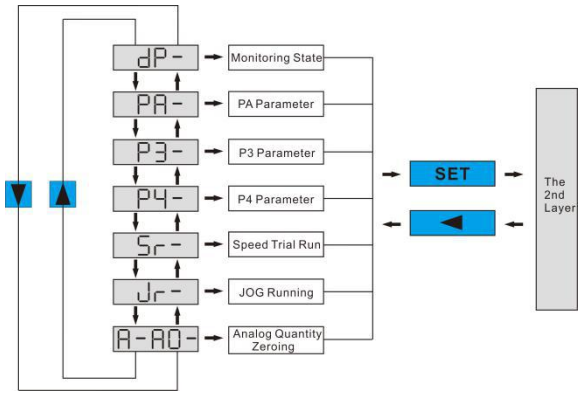


5.1.2 Front Panel Keys

Key	Name	Function
▲	Increasing	Increase sequence number or value;Press down and hold to repeat increasing.
▼	Reducing	Decrease sequence number or value;Press down and hold to repeat decreasing.
◀	Exit	Menu exit; Cancel the operation
SET	Confirm	Menu entered; Confirm the operation

5.2 Main Menu

The first layer is the main menu and has four operating modes. Press ↑or ↓button to change the operation mode. Then press SET button to enter into the second layer and executes a concrete operation. Press ← button returns to the main menu from the second layer.



5.3 Steps To Set Parameters

select “PA-” and press SET button to enter the status of parameter setting mode. And use ↑ or ↓ to choose parameters and then press SET button to display the parameter value. You can modify the value with ↑ or ↓ key. Press ↑ key or ↓ key once, the parameter value increases or decreases by 1. Pressing and holding ↑ or ↓ key can make the value increased or decreased continuously. After modifying the value of the parameter,please press SET button and when the LED flashes two times, it means the setting is completed . Finally please recharge, then the new parameter is effective.

5.4 Analog Quantity Zeroing Adjustment

Using this function,the servo drive can check analog zero offset automatically and then write the offset value into parameter PA39 or PA45. The operation has saved offset parameter to EEPROM, so it is unnecessary to write parameters again.

Firstly choose analog zero adjustment mode“A-A0” and press SET key to enter into the second layer. Select speed analog zeroing “A-SPd” or torque analog zeroing “A-Trq” and then keep pressing SET key for more than 3s. When it displays “donE”, it means the activation is completed.

5.5 Status Monitoring

In the first layer,select “DP--” and press SET button to enter into monitoring mode. There are 26 displays in total. Users select the desired display mode with ↑ or ↓ key, and then press SET button to enter into the specific states.

Status	Operation	Example	Definition
P-SPd		r 1000	Motor speed:1000r / min
P-PoS		P4580	The current position:124580
P-PoS.		P. 12	
P-CPo		C4581	Position command:124581
P-CPo.		C. 12	
P-EPo		E 4	Position deviation:4 pulses
P-EPo.		E. 0	
P-tr9		t 0.70	Motor torque 70%
P- I		I 2.3	Motor current 2.3A
P-Cnt		Cnt 0	Control mode 0：position control
P- CS		r. 500	In speed mode,analog input speed: 500 r/min
P- Ct		t 0.50	In torque mode,analog input torque:50%
P-APo		A3265	Absolute rotor position:3265
P-APo.	SET	A. 0	
P- In		n IIII	Input terminal
P-oUt		oUt.III	Output terminal
P-Cod		Coil.III	Encoder signal
P-UdC		UC336	Line voltage:336V
P-Err		Err 4	No.4 alarm
P- rL		rL-on	Relay open
		rL.-oF	Relay Uncharged
		rL-Er	Relay alarming
P- rn		rn - on	Main circuit working normally
		rn.-oF	Main circuit Uncharged
		rn-CH	Main circuit not enabled
		rn-Er	Main circuit alarming
P- US		U-on	Line voltage normally
		U-.LoU	Line voltage too low
		U-Err	Line voltage alarming

5.6 Resume The Parameter Default Values

In case of the following situation, please use the function of resuming the default parameter(manufacture parameter):

- The parameter is adjusted chaotically, the system is unable the normal work.
- The servo motor is replaced by a different newly model.
- For any other reason, it results to dismatch with motor model(PA01).

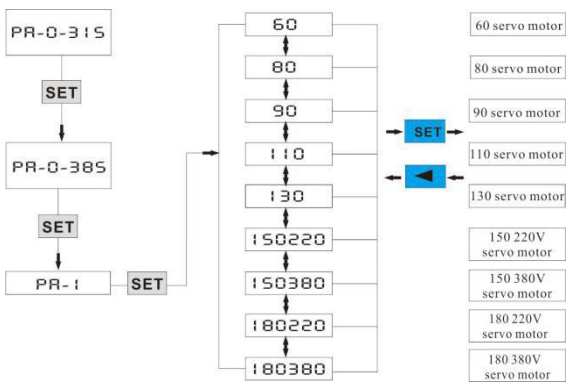
The procedures for resuming the default parameter values are as the following:

1. Inspect servo motor code(PA1) whether it is correct or not.
2. Modify the password(PA0) by 385.
3. Modify the servo motor code(PA1) with new servo motor code:

Resume all of the parameter default value means most of parameters that edited by customers would be recovered to the manufacture parameters. Step: Press ← key back to main menu, and choose"PA--" mode with ↑ or ↓ key. Press SET button entering into the second layer. Then press ↑ or ↓ key to set PA=0 and press SET button going into the third layer to set PA0=385, and press SET button to save it. Next, press ← button back to the "PA--"layer, and set PA1=dEF-. Press SET button for 5 seconds. When the LEDs in the screen flashes several times, it means the operation is successful. Finally turn off and on the power supply.

5.7 How To Set The Motor Model

The code parameter PA-01 of a motor must be configured with the exact motor that you use. The value of PA-01 should be set referring to the following table. If there is a mismatch,there will cause degradation or alarm. And needed attention that different motor codes have different default parameters. For example, DS100S-75 whose factory default model of ac servo motor is 80-02430. If there is necessary to modify the motor code or recover the factory default values, please modify PA-0 to 385 and then set PA-01 with pressing ↑ or ↓ key to select the motor code:



Chapter 6 Parameters

6.1 PA Group

No.	Name	Function	Rang	Default Value
0	Password	1.User password is 315 to set or change parameters. Motor type code is 385.	0-9999	315
1	Motor selection	1. Corresponding to different drives and motors with different power in the same series. 2. The different motor type code has different default parameters. If you want to use the function of recovering the default parameter, please make sure your current parameter is correct. 3.If want to edit the current parameter, please set the motor type code PA0 to 385 firstly.	40-180	Table 6-1
2	Software Version	The software version can be ready but can't be modified		

Table 6-1

Servo Drive	DS100S-40	DS100S-75	DS200S	DS300S	DS500S
Servo Motor	60-01330	80-02430	110-04030	150-15020	180-35015

No.	Name	Function	Rang	Default Value
3	Initial display status	0: Display motor speed 1:Display the current position is 5-bit low . 2：Display the current position is 5-bit high . 3：Display position command (command pulse accumulation) is 5-bit low. 4: Display position command (command pulse accumulation) is 5-bit high. 5:Display position deviation is 5-bit low. 6.Display position deviation is 5-bit high . 7.Display motor torque 8.Display motor current 9.Display control mode 10.Display temperature 11.Display speed command 12.Display torque command 13.Display absolute position of the rotor in a roll is 5-bit low . 14.Display absolute position of the rotor in a roll is 5-bit high . 15.Display input terminal state 16.Display output terminal state 17.Display encoder input signal 18.Display voltage value of main line of main circuit 19.Display alarming code 20.Display logic chip version number 21.Display the actuation state of the relay 22.Display external voltage state 23.Display external voltage state	0-23	0

No.	Name	Function	Rang	Default Value
4	Control mode	To set control method: 0: position control mode 1: speed control mode 2: torque control mode 3:position + speed control mode 4:position + torque control mode 5:speed + torque control mode	0-5	0
5	Proportional gain of speed loop	1.set the proportional gain of speed loop. 2.The value is bigger, the gain is higher and rigidity is stronger. The parameter value is set according to your exact servo driving system model and the load. Generally, the greater the load inertia, the bigger the value. 3.Please set a little high value if the system condition does not generate oscillation.	5-2000 Hz	150
6	Integral constant of speed	1.To set the integration time constant. 2.The value is smaller, the integral speed is faster and the ability of system in resisting deviation is stronger.But if it is too small, it will happen over controlling.	1-1000 ms	75
7	Torque filter	1.To set the characters of torque command filter. 2.To suppress resonance from torque. 3.The value is smaller, the cut-off frequency is lower and vibrations with noise generated by the motor is less. If the load inertia is great, reducing the setting value is recommended. If the value is too small, it would lead to low response, which would result in shaking. 4.The value is bigger, the cut-off frequency is higher and the response frequency is quicker. If you need higher torque response frequency, it is recommended to increase the setting value.	20-500%	100

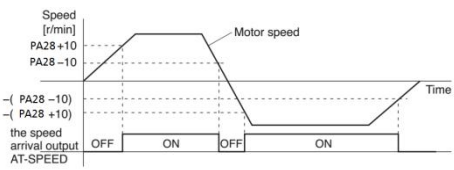
No.	Name	Function	Rang	Default Value
8	Speed detection filter	1. To set the characters of speed detection filter. 2. The value is smaller, the cut-off frequency is lower and noise from the motor is smaller. If the load inertia is great, reducing the setting value is recommended. If the value is too small, it would lead to low response, which would result in shaking. 3. The value is bigger, the cut-off frequency is higher and the response frequency is quicker. If you need higher torque response frequency, it is recommended to increase the setting value.	20-500%	100
9	Proportional gain of position loop	1.To set the proportional gain of position loop . 2.The value is bigger, the gain is higher and its rigidity is stronger. So the position lag is smaller under the same frequency command pulse condition. But if it is too big, it will happen oscillation. 3.The parameter value is set according to your exact servo driving system model and the load.	1-1000/s	40
11	Command pulses of motor in each rotation	1.To set the command pulses of each turn of the motor. 2.When it is set to 0, PA12(numerator of electronic gear for position command pulses), PA13(denominator of electronic gear for position command pulses) are valid.	1-30000	10000

<table>
<tr><th>No.</th><th>Name</th><th>Function</th><th>Rang</th><th>Default Value</th></tr>
<tr><td>12</td><td>1st numerator of electronic gear for position command pulse</td><td>1.Set the electric gear ratio for position command pulse.
2.In position control mode,it is convenient to match all kinds of pulse source through set the parameter PA12 and PA13, which helps to reach ideal control resolution(angle/pulse).
3. P×G=N×C×4
P: pulses of input command; G:electric gear ratio; N:numbers of motor rotation ; C:solutions of photoelectric encoder in per rotation, the default value is 2500.
4.For example, input command pulse P is 6000, servo motor rotate a roll:
G=(N×C×4)/P=(1×2500×4)/6000=5/3, So PA12 should be set to 5, PA13 should be set to 3.
5.The numerator of electronic gear for command pulse is decided by Gear1 and Gear2. The denominator is decided by PA13. The details as following:
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Denominator</th></tr>
<tr><th>Gear 2</th><th>Gear 1</th></tr>
<tr><td>0</td><td>0</td><td>1ST Numerator(PA12)</td></tr>
<tr><td>0</td><td>1</td><td>2nd Numerator(PA77)</td></tr>
<tr><td>1</td><td>0</td><td>3rd Numerator(PA78)</td></tr>
<tr><td>1</td><td>1</td><td>4th Numerator(PA79)</td></tr>
</table>
Note: 0=OFF, 1=ON.</td><td>0-32767</td><td>0</td></tr>
<tr><td>13</td><td>Denominator of position command pulse</td><td>Refers to parameter PA12</td><td>1-32767</td><td>10000</td></tr>
</table>

No.	Name	Function	Rang	Default Value
14	Input mode of position command pulse	1.Set the input mode of position command pulse. 2.To set one of 4 input modes: 0: Pulse+Direction 1: CCW pulse/CW pulse 2: phase A and phase B orthogonal input. 3: Internal position input Remark: CCW: observe from the motor axial direction. It defines CCW in counter clock wise and CW in clock wise.	0-3	0
15	Direction of command pulses	To set : 0:Normal 1:Reverse position command pulse	0-1	0
16	The rang of positioning completion	1.Setting the pulse range of positioning completion in position control mode. 2.The drive judges whether it has finished positioning completion based on this parameter. When the rest pulses in position deviation counter are less than or equal with the setting value, the COIN（positioning completion) of digital output(DO) is ON, or else OFF	0-30000 pulses	10
17	Detection of over-travel range	1.Set alarming range of detection of over travel.. 2.In position control mode, if the value in position deviation counter is over than the setting value, the drive will alarm.	0-30000× 100pulses	400
18	Invalid error of over travel	Set to: 0: The alarming detection of over travel is valid. 1: The alarming detection of over travel is invalid, and stops to detect its error .	0-1	0

No.	Name	Function	Rang	Default Value
19	Position command smooth filter	1.To filter the command pulse. Acceleration and deceleration are with exponential form. The value is time constant. 2.The filter does not lose input pulses, but would occur command delay . 3.The filter applies in (1. PC controller without acceleration and deceleration function. (2. The electronic gear frequency is a little big(>10). (3.The command frequency is a little low. 4.When the motor runs, there are step jumps and unsmooth. 5.When set to value"0", the filter does not work.	0-1000× 0.1ms	100
20	Invalid input of drive inhibition	To set: 0: CCW drive inhibition or CW drive inhibition is effective. If the switch of CCW drive inhibition is ON, CCW drive is permitted.If the switch of CCW drive inhibition is OFF, CCW torque keeps 0.The same as CW drive inhibition. If both CCW and CW drive inhibition are OFF, it will come to error alarms of drive inhibition input. 1: Cancel CCW or CW drive inhibition. No matter what state of the switch of CCW or CW drive inhibition is, CCW or CW drive is allowed.Meanwhile,if the switches of CCW and CW drive inhibition are OFF, it will still not alarm..	0-1	1
21	JOG speed	Set the running speed of JOG operating.	0-6000 r/min	100

<table>
<tr><th>No.</th><th>Name</th><th>Function</th><th>Rang</th><th>Default Value</th></tr>
<tr><td>22</td><td>The source of speed command</td><td>In speed control mode, it sets the source of speed command
Setting meaning:
0: Analog Terminal AS+,AS- input analog speed command.
1:Internal speed command is decided by SP1 and SP2 of digital input(DI):
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Speed Command</th></tr>
<tr><th>SP2</th><th>SP1</th></tr>
<tr><td>0</td><td>0</td><td>Internal Speed1(PA24)</td></tr>
<tr><td>0</td><td>1</td><td>Internal Speed2(PA25)</td></tr>
<tr><td>1</td><td>0</td><td>Internal Speed2(PA26)</td></tr>
<tr><td>1</td><td>1</td><td>Internal Speed2(PA27)</td></tr>
</table>
Note: 1=ON, 0=OFF
2: Analog speed command+internal speed command:
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Speed Command</th></tr>
<tr><th>SP2</th><th>SP1</th></tr>
<tr><td>0</td><td>0</td><td>Analog Speed Command</td></tr>
<tr><td>0</td><td>1</td><td>Internal Speed2(PA25)</td></tr>
<tr><td>1</td><td>0</td><td>Internal Speed2(PA26)</td></tr>
<tr><td>1</td><td>1</td><td>Internal Speed2(PA27)</td></tr>
</table>
3: JOG speed command, if carry out JOG operation,it is needed.
4: Keyboard speed command, if carry out Sr operation,it needs to set the parameter.
5:IO terminal controls JOG operation.</td><td>0-5</td><td>0</td></tr>
<tr><td>23</td><td>Highest speed limit</td><td>Set the highest speed of the ac motor.
1.It doesn’t matter with rotating direction.
2.If the setting value is beyond of rated speed, the real highest speed is set as the rated speed.</td><td>0-6000 r/min</td><td>5000</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Function</th><th>Rang</th><th>Default Value</th></tr>
<tr><td>24</td><td>Internal speed selection 1</td><td>1.Set the internal speed 1.
2.In speed control mode(PA22=0), when SC1 and SC2 are OFF, internal speed 1 is the speed command.</td><td>-6000-6000 r/min</td><td>100</td></tr>
<tr><td>25</td><td>Internal speed selection 2</td><td>1.Set the internal speed 2.
2.In speed control mode(PA22=0), when SC1 is ON,while SC2 is OFF, internal speed 2 is the speed command.</td><td>-6000-6000 r/min</td><td>500</td></tr>
<tr><td>26</td><td>Internal speed selection 3</td><td>1.Set the internal speed 3.
2.In speed control mode(PA22=0), when SC1 is OFF,while SC2 is ON, internal speed 3 is the speed command.</td><td>-6000-6000 r/min</td><td>1000</td></tr>
<tr><td>27</td><td>Internal speed selection 4</td><td>Set the internal speed 4.
In speed control mode(PA22=0), when SC1 and SC2 are ON, internal speed 4 is the speed command.</td><td>-6000-6000 r/min</td><td>2000</td></tr>
<tr><td>28</td><td>At speed (Speed arrival)</td><td>1.Set the detection timing of the speed arrival output. When the servomotor speed surpasses this parameter, the digital output (DO) ASP (arrival speed) is ON, otherwise is OFF.
2.The comparator has hysteresis function set by PA87. Detection is associated with 10 r/min hysteresis.
 

2.It also has the polarity setting function:
<table>
<tr><th>PA88</th><th>PA28</th><th>Comparator</th></tr>
<tr><td>0</td><td>＞0</td><td>No direction for speed</td></tr>
<tr><td rowspan="2">1</td><td>＞0</td><td>Only detect CCW speed</td></tr>
<tr><td>＞0</td><td>Only detect CW speed</td></tr>
</table></td><td>0-3000 r/min</td><td>3000</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Function</th><th>Rang</th><th>Default Value</th></tr>
<tr><td>29</td><td>Gain of analog torque command</td><td>1.Set the proportion for input voltage of analog torque and the actual motor running torque.
2. The setting value unit is 0.1v/100%.
3. The default value is 30, corresponding to 3v/100%, while it means if the input voltage is 3V, it would generate 100% rated torque.</td><td>10-100 (0.1v/ 100%)</td><td>30</td></tr>
<tr><td>30</td><td>The alarm value of torque overload</td><td>1. The value is the percentage of rated torque. The limit is independent to direction and CW or CCW direction is protected.
2. When PA31＞9, motor torque＞PA30 and duration ＞PA31, the drive alarms and the code is Err-29. The motor stops working. It must repower on after clearing errors.</td><td>1-300</td><td>300</td></tr>
<tr><td>31</td><td>The detection time for torque overload</td><td>1. The detection time for torque overload, unit:ms. Detection time=PA31×0.1；
2. When set to 0~9, the function of torque overload alarming is prohibited. In general,the value is set to 0.</td><td>0-32,767</td><td>0</td></tr>
<tr><td>32</td><td>The source of torque command</td><td>In torque control mode, it sets the source of torque command. It means:
0:Analog torque command, it inputs by analog terminal AS+ and AS-.
1:Internal torque command, it is decided by TRO1 and TRQ2 of digital input(DI):
<table>
<tr><th colspan="2">DI Signal</th><th rowspan="2">Torque Command</th></tr>
<tr><th>TRQ2</th><th>TRQ1</th></tr>
<tr><td>0</td><td>0</td><td>Internal Torque1(PA64)</td></tr>
<tr><td>0</td><td>1</td><td>Internal Torque2(PA65)</td></tr>
<tr><td>1</td><td>0</td><td>Internal Torque3(PA66)</td></tr>
<tr><td>1</td><td>1</td><td>Internal Torque4(PA67)</td></tr>
</table></td><td>0-1</td><td>0</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Note: 0=OFF, 1=ON
2:Analog torque command+internal torque command:<table><tr><th colspan="2">DI Signal</th><th rowspan="2">Torque Command</th></tr><tr><th>TRQ2</th><th>TRQ1</th></tr><tr><td>0</td><td>0</td><td>Analog Torque Command</td></tr><tr><td>0</td><td>1</td><td>Internal Torque2(PA65)</td></tr><tr><td>1</td><td>0</td><td>Internal Torque3(PA66)</td></tr><tr><td>1</td><td>1</td><td>Internal Torque4(PA67)</td></tr></table></td><td></td><td></td></tr>
<tr><td>33</td><td>The input direction of analog torque command</td><td>1. Reverse the input polarity of analog torque.
2.When set to 0 and the analog torque command is positive, torque direction is CCW. When set to 1 and the analog torque command is positive,torque direction is CW.</td><td>0-1</td><td>0</td></tr>
<tr><td>34</td><td>Internal CCW torque limit</td><td>1.Set internal torque limit of servo motor CCW direction.
2.The setting value is the percentage of rated torque, for example, it is set to 2 times of rated torque, the value is 200.
3. It is always valid no matter whenever it is.
4.If the setting value is over than the max overload capacity, the actual torque limit is treat as the max overload capacity that is permitted.</td><td>0-300%</td><td>300%</td></tr>
<tr><td>35</td><td>Internal CW torque limit</td><td>Set internal torque limit of servo motor CW direction.
1.The setting value is the percentage of rated torque, for example, it is set to 2 times of rated torque, the value is -200.
2.It is always valid no matter when it is.
3.If the setting value is over than the max overload capacity, the actual torque limit is treat as the max overload capacity that is permitted.</td><td>-300-0%</td><td>-300%</td></tr>
</table>

No.	Name	Function	Rang	Default Value
36	External CCW torque limit	1.The setting value is the percentage of rated torque, for example, it is set to 1 time of rated torque, the value is 100. 2.Only when the input terminal(FIL) of CCW torque limit is ON is it valid. 3.When the limit is valid, the actual torque limit is the Minimum value of max overload capacity ,internal CCW torque limit and external CCW torque limit.	0-300%	100%
37	External CW torque limit	Set external torque limit of the motor CW direction. 1.The setting value is the percentage of rated torque, for example, it is set to 1 time of rated torque, the value is -100. 2.Only when the input terminal(RIL) of CW torque limit is ON is it valid. 3.When the limit is valid, the actual torque limit is the Minimum value of max overload capacity ,internal CCW torque limit and external CCW torque limit.	-300-0%	-100%
39	Zero offset compensation of analog torque command	Make an offset adjustment for analog torque command with this parameter.	-2000-2000	0
40	Acceleration time constant	The value means the motor of acceleration time from 0r/min to 1000r/min. 1.Linear acceleration and deceleration characteristics. 2.It only applies in speed control mode and internal position control mode, while other modes are invalid. 3.This parameter should be set to 0, if the drive is used in combination with an external position loop.	1-10000 ms	100

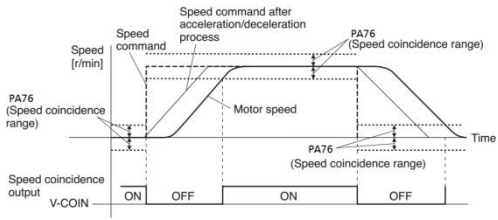
No.	Name	Function	Rang	Default Value
41	Deceleration time constant	The value means the deceleration time of the motor from 1000r/min to 0r/min. 1.Linear acceleration and deceleration characteristics. 2.It only applies in speed control mode and internal position control mode, while other modes are invalid. 3.This parameter should be set to 0 if the drive is used in combination with an external position loop.	1-10000 ms	100
42	S type acceleration and deceleration time constant	It makes the motor start and stop working stably and sets a part of time of S type acceleration and deceleration curve.	0-1000ms	0
43	Gain of analog speed command	Set the proportion for analog speed input voltage and actual motor running speed.	10-3000 r/min/v	10
44	Direction of analog speed command	Reverse the input polarity of analog speed. 1. Set to 0 and analog speed command is positive,the speed direction is CCW. 2. Set to 1 and analog speed command is positive,the speed direction is CW.	0-1	0
45	Zero offset compensation of analog speed command	Make an offset adjustment for analog speed command with this parameter.	-5000-5000	0
46	Filter of analog speed command	1.The input low pass filter of analog speed 2.The setting value is bigger, the response frequency is quicker to speed input analog quantity and the influence of signal noise is louder.	1-1000Hz	300

No.	Name	Function	Rang	Default Value
47	The setting of mechanical brake when the motor stops	1.It defines the delay time from BRK=ON and BRK=OFF to the motor current cutting off when the motor stops rotating. 2.To avoid a small displacement or working drop of the motor, the parameter should not be less than the delay time of mechanical braking.	0-200 x10ms	0
48	The setting of mechanical brake when the motor rotates	1.It defines the delay time from the motor current cutting off to BRK=ON and BRK=OFF when the motor rotates. 2.To avoid a damage to the brake, the parameter makes the motor slow down from the rotating state to the low speed and then makes the mechanical brake work.	0-200 ×10ms	50
49	The working speed of the mechanical brake when the motor rotates	1.It defines the speed value from the motor current cutting off to BRK=ON and BRK=OFF when the motor rotates. 2.The minimum time should be got between the parameter PA48 and the time that takes for the motor to slow down to PA49.	0-3000 r/min	100
50	Speed limit in torque control mode	1:In torque control mode, the motor running speed is limited in the range of this parameter. 2:It prevents over speed due to the light load.	0-5000 r/min	3000
53	Servo Force Enable	To set : 0: The enable signal is controlled by SON of digital input(DI). 1:Software force to servo on.	0-1	0
54	Servo enable delay closing time	After the servo signal was closed, it delays to cut the time of motor current.	0-30000× 0.1ms	0

<table>
<tr><th>No.</th><th>Name</th><th>Function</th><th>Rang</th><th>Default Value</th></tr>
<tr><td>55</td><td>Effective level control of input terminals</td><td>1.To reverse the input terminals. For unreversed terminals, it is valid when the switch is closed, while it is invalid when the switch is open. For reversed terminals, it is invalid when the switch is closed, while it is valid when the switch is open.
2.Represented by a binary digit of 4 bits. If it is 0, it means the input terminal dose not reverse. While it is 1, it means the terminal reverses.
The binary digit represents the input terminals as following:
<table><tr><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td></tr></table>0: high level is active;
1: low level is active.</td><td>0000-1111</td><td>0000</td></tr>
<tr><td>57</td><td>Effective level control of output terminals</td><td>1.To reverse the output terminals. For reversed terminals,the definitions of breaking over and cut-off is contrary to standard definitions
2.Represented by a binary digit of 4 bits. If it is 0, it means the input terminal dose not reverse. While it is 1, it means the terminal reverses.
The binary digit represents the input terminals as following:
<table><tr><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td></tr></table></td><td>0000-1111</td><td>0000</td></tr>
<tr><td>58</td><td>Removing jitter time constant of IO input terminal</td><td>1.Set the removing jitter filter time for input terminal.
2.The value is smaller, the terminal input response frequency is quicker.
3.The value is bigger, the anti-jamming performance of input terminal is better, but the response frequency becomes slow.</td><td>1-1000×0.1ms</td><td>2</td></tr>
</table>

No.	Name	Function	Rang	Default Value
59	Effective command pulse edge	Set to: 0: the rising edge is effective 1:the falling edge is effective	0~1	0
60	Soft reset	Set to: 0:Soft reset is invalid 1:Soft reset is effective and the system will be restart.	0-1	0
61	System alarm clear	Set to: 0: System alarm clear is invalid 1: System alarm clear is effective	0-1	0
62	Encoder selection	Set to: 0: IO incremental 2500-line encoder 1:IO save-wiring 2500-line encoder	0-1	0
63	Load inertia ratio	Set the load inertia ratio of this motor rotating inertia. The setting value=((load inertia+rotating inertia) / rotating inertia)×100.	1-500	100
64	Internal Torque 1	In torque control mode(PA4=2), when TRQ1=OFF, TRQ2=OFF, internal torque 1 is as the torque command.	-300-300	0
65	Internal Torque 2	In torque control mode(PA4=2), when TRQ1=ON, TRQ2=OFF, internal torque 2 is as the torque command.	-300-300	0
66	Internal Torque 3	In torque control mode(PA4=2), when TRQ1=OFF, TRQ2=ON, internal torque 3 is as the torque command.	-300-300	0
67	Internal Torque 4	In torque control mode(PA4=2), when TRQ1=ON, TRQ2=ON internal torque 4 is as the torque command.	-300-300	0
71	MODBUS ID NO.	MODBUS communication address	1-254	1

No.	Name	Function	Rang	Default Value
72	MODBUS communication baud rate	MODBUS communication baud rate	48-1152× 100	96
73	MODBUS protocol selection	0: 8, N, 2 (MODBUS, RTU) 1：8，E，1 （MODBUS, RTU) 2：8，O，1 （MODBUS, RTU) The parameter decide the communication protocol. Value8 represents the transmitted data is 8 bits; N,E,O indicate odd or even: N: do not use this bit. E: it represents 1 is even bit. O: it represents 1 is odd bit. Value 1 or 2 indicates communication of 1 bit or 2 bits.	0-2	1
74	Communication error handing	When communication is wrong, choose: 0: keep working 1: Alarm and stop working	0-1	0
75	Range for zero speed detection	1. If the motor running speed is less than the value of this parameter, the ZSP(zero speed) of digital output(DO) is ON, or else OFF. 2. If ZCLAMP of digital input(DI) is ON and speed command is less than the value of this parameter, the value of speed command is forced to be zero.	0-1000r/ min	10
76	Speed Coincidence Range	1. Set the speed coincidence(VCOIN) output detection timing. 2. Output the speed coincidence(VCOIN ON) when the difference between the speed command and the motor speed is equal to or smaller than the speed specified by this parameter PA76, otherwise is OFF. For example, PA76=10 and the command speed is 1000rpm, while the actual speed ranges from	0-1000 rpm	10

		990rpm~1010rpm, then the digital output VCOIN is ON.  * Because the speed coincidence detection is association with 10 r/min hysteresis, actual detection range is as shown below: Speed coincidence output OFF → ON timing(PA76-10)r/min Speed coincidence output ON → OFF timing(PA76+10)r/min		
77	2nd numerator of electronic gear for position command pulse	Refers to parameter PA12	0-32767	0
78	3rd numerator of electronic gear for position command pulse	Refers to parameter PA12	0-32767	0
79	4th numerator of electronic gear for position command pulse	Refers to parameter PA12	0-32767	0
80	Effective level of command direction signal	Set to: 0:High level is positive direction 1:Low level is positive direction	0-1	0

No.	Name	Function	Rang	Default Value
81	PULS signal filter of command pulse	1.To filtering the input PULS signal. 2.The default value is the max pulse input frequency: 500K. The value is bigger, the max input frequency is slower. 3.To filter the noise from the signal line in order to avoid incorrect counting happening. If it goes wrong due to the incorrect counting, you can increase the value of this parameter properly. 4. After edited this parameter, must save it and recharge. Then it is effective.	0-15	4
82	SIGN signal filter of command pulse	1.To filtering the input SIGN signal. 2.The default value is the max pulse input frequency: 500K. The value is bigger, the max input frequency is slower. 3.To filter the noise from the signal line in order to avoid incorrect counting happening. If it goes wrong due to the incorrect counting, you can increase the value of this parameter properly. 4. After edited this parameter, must save it and recharge. Then it is effective.	0-15	1
83	CWL/CCWL inhibit way	When the machine touches the mechanical limit switch and strike CW/CCW limit , you can choose the following methods to prohibit with this parameters. 0: To limit the torque of the current direction to be 0. 1: The input pulse of the current direction is prohibited.	0-1	0
84	Hysteresis for positioning completion	Refer to parameter PA16.	0-32,767 pulse	5

<table>
<tr><th>No.</th><th>Name</th><th>Function</th><th>Rang</th><th>Default Value</th></tr>
<tr><td>85</td><td>Range for approach positioning</td><td>1. To set the pulse range of approach positioning under the position control mode.
2. When the pulse number in position deviation counter is smaller than or equal to the setting value of this parameter, the digital output (DO) NEAR(approach positioning) is ON, otherwise is OFF.
3. The comparator has hysteresis function set by PA86.
4. Use this function in case that in near positioning, the host controller is accepting the NEAR signal to carry on the preparation to the next step. In general, this parameter value should be bigger than PA16.</td><td>0-32,767 pulse</td><td>500</td></tr>
<tr><td>86</td><td>Hysteresis for approach positioning</td><td>Refer to parameter PA85.</td><td>0-32,767 pulse</td><td>50</td></tr>
<tr><td>87</td><td>Hysteresis of arrival speed</td><td>Refer to parameter PA28.</td><td>0-5000 rpm</td><td>30</td></tr>
<tr><td>88</td><td>Polarity of arrival speed</td><td>Refers to parameter PA87</td><td>0-1</td><td>0</td></tr>
<tr><td>89</td><td>Arrival torque</td><td>1.The motor running torque is over than the value of this parameter, ATRQ(arrival torque) of digital output(DO)is ON, or else OFF.
2.The comparator has hysteresis function. It is set by PA90.
3.It also has polarity setting function:
<table>
<tr><th>PA91</th><th>PA89</th><th>Comparator</th></tr>
<tr><td>0</td><td>>0</td><td>Torque without direction</td></tr>
<tr><td rowspan="2">1</td><td>>0</td><td>Only detect CCW torque</td></tr>
<tr><td><0</td><td>Only detect CW torque</td></tr>
</table></td><td>-300%-300%</td><td>100%</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Function</th><th>Rang</th><th>Default Value</th></tr>
<tr><td>90</td><td>Hysteresis of arrival torque</td><td>1.If the motor torque is bigger than PA90, the ATRQ(torque arrival) of digital output(DO) is ON, otherwise it is OFF.
2.The comparator has hysteresis function and it is set by PA90.
3.It also has polarity setting function:<table><tr><th>PA91</th><th>PA89</th><th>Comparator</th></tr><tr><td>0</td><td>>0</td><td>Torque without direction</td></tr><tr><td rowspan="2">1</td><td>>0</td><td>Only detect CCW torque</td></tr><tr><td><0</td><td>Only detect CW torque</td></tr></table></td><td>0-300%</td><td>5%</td></tr>
<tr><td>91</td><td>Polarity of arrival torque</td><td>1.If the motor torque is bigger than PA91, the ATRQ(torque arrival) of digital output(DO) is ON, otherwise it is OFF.
2.The comparator has hysteresis function and it is set by PA90.
3.It also has polarity setting function:<table><tr><th>PA91</th><th>PA89</th><th>Comparator</th></tr><tr><td>0</td><td>>0</td><td>Torque without direction</td></tr><tr><td rowspan="2">1</td><td>>0</td><td>Only detect CCW torque</td></tr><tr><td><0</td><td>Only detect CW torque</td></tr></table></td><td>0-1</td><td>0</td></tr>
<tr><td>92</td><td>Hysteresis of zero speed detection</td><td>1. The motor speed is lower than the value of this parameter, ZSP(zero speed) of digital output is ON, or else OFF.
2. The comparator has hysteresis function.</td><td>0-1000r/ min</td><td>5</td></tr>
<tr><td>94</td><td>The delay time of brake on</td><td>This parameter defines the delay time from the servomotor energized until the action(the digital output(DO) BRK is ON .</td><td>0-200×10 ms</td><td>0</td></tr>
<tr><td>99</td><td>Max duty cycle when it is braking</td><td>The setting parameter of max duty cycle when it is braking</td><td>5-90</td><td>50</td></tr>
</table>

6.2 P3 Group Parameter

6.2.1 Parameter Table

DS100S/DS200S have 4 input terminals and 4 output terminals. The input definition values or output definition values can be set by P3 group parameters.(Low level is effective as default).

Parameter	Name	Range	Default Value
P3-0	Digital Input DI1 Function	0-99	1
P3-1	Digital Input DI2 Function	0-99	2
P3-2	Digital Input DI3 Function	0-99	3
P3-3	Digital Input DI4 Function	0-99	4
P3-15	Digital Input DI forced effective1	00000000-11111111	00000000
P3-16	Digital Input DI forced effective2	00000000-11111111	00000000
P3-17	Digital Input DI forced effective3	00000000-11111111	00000000
P3-18	Digital Input DI forced effective4	00000000-11111111	00000000
P3-19	Digital Input DI forced effective5	00000000-11111111	00000000
P3-20	Digital Output DO1 Function	0-99	2
P3-21	Digital Output DO2 Function	0-99	3
P3-22	Digital Output DO3 Function	0-99	5
P3-23	Digital Output DO4 Function	0-99	8
P3-30	Virtual Input Terminal Control	0-1	0
P3-31	The State Value Of Virtual Input Terminal	00000000-11111111	00000000
P3-32	Virtual Output Terminal Control	0-1	0
P3-33	The State Value Of Virtual Output Terminal	00000000-11111111	00000000
P3-38	Virtual I/O Input DI1 Function	0-99	5
P3-39	Virtual I/O Input DI2 Function	0-99	6
P3-40	Virtual I/O Input DI3 Function	0-99	7
P3-41	Virtual I/O Input DI4 Function	0-99	8

P3-42	Virtual I/O Input DI5 Function	0-99	9
P3-43	Virtual I/O Input DI6 Function	0-99	10
P3-44	Virtual I/O Input DI7 Function	0-99	11
P3-45	Virtual I/O Input DI8 Function	0-99	12

Remark:

1. P3-30=0, the number of IO input is 4 decided by DI1~DI4 and the corresponding parameter P3-0~P3-3;

2. P3-30=1, the number of IO input is 8 decided by P3-31 and the corresponding parameter P3-38~P3-45;

3. P3-30=2, the number of IO input is 12 decided by DI1~DI4 and P3-31 and the corresponding parameter P3-0~P3-3 and P3-38~P3-45.

6.2.2 DI Function Explanation

Input terminals(4 input terminals are corresponding to the definitions of P3-0,P3-1,P3-2,P3-3).

Value	Symbol	Function	Explanation
0	NULL	No	Input state dose not effect system.
1	SON	Servo Enable	Input terminal of servo enable. OFF: servo driver can not enable and servomotor does not excite. ON:servo driver has enabled and servomotor has excited.
2	ARST	Alarm Clear	Input terminal of alarm clearance. When an alarm occurs and the alarm has permission to clear, then the rising edge(from OFF becomes ON) of ARST will clear the alarm. Attention: only a part of alarm have the permission to clear.
3	CCWL	CCW Drive Inhibition	1.Input terminal of CCW drive inhibition: OFF：Inhibit CCW running. ON：Enable CCW running. 2.Use this function for protection of the mechanical traveling limit.The function is controlled by the parameter PA20. Pay attention to that the default value of PA20 neglects this function.Therefore needs to modify PA20 if need to use this function: (1)：When PA20=0，the function of input inhibition is effective. Whether to inhibit for CCW is decided by PA83. (2)：When PA20=1, the function of input inhibition is not effective. Whether to inhibit for CCW is not decided by PA83 3. Inhibition function is valid(PA20=0): (1) PA83=0, CCW torque limit is 0,but it does not limit CCW pulse input. (2) PA83=1, it does not inhibit CCW pulse input.

4	CWL	CW Drive Inhibition	1.The input terminal of CW drive inhibition OFF：Inhibit CCW running. ON：Enable CW running. 2.Use this function for protection of the mechanical traveling limit.The function is controlled by the parameter PA20. Pay attention to that the default value of PA20 neglects this function.Therefore needs to modify PA20 if need to use this function: (1)：When PA20=0，the function of input inhibition is effective. Whether to inhibit for CW is decided by PA83. (2)：When PA20=1, the function of input inhibition is not effective. Whether to inhibit for CW is not decided by PA83 3.Inhibition function is valid(PA20=0): (1)：PA83=0, CW torque limit is 0,but it does not limit CW pulse input. PA83=1, it does not inhibit CW pulse input.
5	TCCW	CCW Torque Limitation	OFF： Torque is not limited by parameter PA36 in CCW direction. ON ： Torque is limited by parameter PA36 in CCW direction. Attention: Whether the TCCW is effective or not, the torque is also limited by PA34 in CCW direction.
6	TCW	CW Torque Limitation	OFF：Torque is not limited by parameter PA37 in CW direction. ON ： Torque is limited by parameter PA37 in CW direction. Attention: Whether the TCW is effective or not, the torque is also limited by PA35 in CW direction.
7	ZCLAMP	Zero Speed Clamping	When it is satisfied with the followings, the function of zero speed clamping is open(speed is forced to zero): 1: speed control mode(PA4=1), and choose external

			speed(PA22=0); 2：ZCLAMP ON; 3：speed command is lower than the value of PA75 When any one of the above conditions is not satisfied, it will perform normal speed control.
8	CZERO	Zero Command	In speed or torque control mode, speed or torque command: OFF：Normal command ON:：Zero command
9	CINV	Instruction Reverse	In speed or torque control mode, speed or torque command: OFF：Normal command ON：Command reversed
10	SP1	Speed Choice 1	In speed control mode(PA4=1), and choose internal speed(PA22=1). SP1 and SP2 combinations are used to select different internal speeds: SP2 OFF SP1 OFF: internal speed 1PA-24) SP2 OFF SP1 ON: internal speed 2(PA-25) SP2 ON SP1 OFF:internal speed 3(PA-26) SP2 ON SP1 ON:internal speed 4(PA-27)
11	SP2	Speed Choice 2	
13	TRQ1	Torque Choice 1	In torque control mode(PA4=2), and choose internal torque(PA32=1). TRQ1 and TRQ2 combinations are used to select different internal torque: TRQ2 OFF TRQ1 OFF: internal torque1(PA-64) TRQ2 OFF TRQ1 ON: internal torque2(PA-65) TRQ2 ON TRQ1 OFF: internal torque3(PA-66) TRQ2 ON TRQ1 ON: internal torque4(PA-67)
14	TRQ2	Torque Choice 2	
16	CMODE	Mix Control Mode	When PA4 is set to 3, 4, 5, it is in mix control mode. It can change control mode with this input terminal: (1)PA4=3, CMODE OFF, it is position control mode; CMODE ON, it is speed control mode; (2)PA4=4, CMODE OFF, it is position control mode; CMODE ON, it is torque control mode;

			(3)PA4=5, CMODE OFF, it is speed control mode; CMODE ON, it is torque control mode.
18	GEAR1	Electronic Gear 1	When PA11=0, Gear1 and Gear2 combinations are used to select different numerator of gear ratio: GEAR2 OFF GEAR1 OFF: numerator 1(PA-12) GEAR2 OFF GEAR1 ON: numerator 2 (PA-77) GEAR2 ON GEAR1 OFF: numerator 3(PA-78) GEAR2 ON GEAR1 ON: numerator 4(PA-79)
19	GEAR2	Electronic Gear 2	
20	CLR	Position Deviation Clear	In position control mode, the position deviation counter clear input terminals.
21	INH	Pulse Input Inhibition	In position control mode, position command pulse inhibit terminals: OFF: permit to position command pulse to go through. ON: position command pulse is inhibited.
22	JOGP	CCW Inching	In speed control mode, PA22=5, connect to this signal, the motor in inching in CCW and speed is set by PA21. Attention: If the signal is connected to CW inching, inching function does not work.
23	JOGN	CW Inching	In speed control mode, PA22=5, connect to this signal, the motor in inching in CW and speed is set by PA21. Attention: If the signal is connected to CCW inching, inching function does not work.
27	HOLD	Internal Position Control Command Stops	In internal position register mode, the motor will stop rotating if the signal is active.
28	CTRG	Internal Position Command Triggers	In internal position register mode, the signal will be triggered once the internal position register control commands(POS0-2) are chosen, and then the motor will rotate according to the internal position register command. Only when the ZSPD=1(digital output), it would receive the next internal position command

<table>
<tr><td></td><td></td><td></td><td>trigger.</td></tr>
<tr><td>29</td><td>POS0</td><td>Internal Position Command Selection0</td><td rowspan="3">The corresponding relationship of internal position selection:
<table>
<tr><th>Position Command</th><th>POS2</th><th>POS1</th><th>POS0</th><th>CTRG</th><th>Parameter</th></tr>
<tr><td rowspan="2">P1</td><td rowspan="2">0</td><td rowspan="2">0</td><td rowspan="2">0</td><td rowspan="2">↑</td><td>P4-2</td></tr>
<tr><td>P4-3</td></tr>
<tr><td rowspan="2">P2</td><td rowspan="2">0</td><td rowspan="2">0</td><td rowspan="2">1</td><td rowspan="2">↑</td><td>P4-5</td></tr>
<tr><td>P4-6</td></tr>
<tr><td rowspan="2">P3</td><td rowspan="2">0</td><td rowspan="2">1</td><td rowspan="2">0</td><td rowspan="2">↑</td><td>P4-8</td></tr>
<tr><td>P4-9</td></tr>
<tr><td rowspan="2">P4</td><td rowspan="2">0</td><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">↑</td><td>P4-11</td></tr>
<tr><td>P4-12</td></tr>
<tr><td rowspan="2">P5</td><td rowspan="2">1</td><td rowspan="2">0</td><td rowspan="2">0</td><td rowspan="2">↑</td><td>P4-14</td></tr>
<tr><td>P4-15</td></tr>
<tr><td rowspan="2">P6</td><td rowspan="2">1</td><td rowspan="2">0</td><td rowspan="2">1</td><td rowspan="2">↑</td><td>P-17</td></tr>
<tr><td>P-18</td></tr>
<tr><td rowspan="2">P7</td><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">0</td><td rowspan="2">↑</td><td>P4-20</td></tr>
<tr><td>P4-21</td></tr>
<tr><td rowspan="2">P8</td><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">↑</td><td>P4-23</td></tr>
<tr><td>P4-24</td></tr>
</table></td></tr>
<tr><td>30</td><td>POS1</td><td>Internal Position Command Selection1</td></tr>
<tr><td>31</td><td>POS2</td><td>Internal Position Command Selection2</td></tr>
<tr><td>33</td><td>SHOM</td><td>Starting Origin Regression</td><td>In internal position register mode,it needs to search for origin. The searching function for origin is starting when the signal is active.</td></tr>
<tr><td>34</td><td>ORGP</td><td>Origin Of Regression</td><td>In internal position register mode, the servo treat the position of the point as the origin when searching for the origin and the signal is active.</td></tr>
</table>

6.2.3 DO Function Explanation

Output terminals(4 terminals are corresponding to the definitions of P3-20,P3-21,P3-22,P3-23).

Value	Symbol	Function	Explanation
1	ON	Always valid	Forced output ON.
2	RDY	Servo Ready	OFF ： servo main power supply is off, or alarm occurs; ON： servo main power supply is normal, no alarm occurs
3	ALM	Alarm	OFF ： alarm occurs； ON ： no alarm occurs。
4	ZSP	Zero Speed	In speed or torque control mode: OFF：motor speed is higher than the value of PA-75(no direction). ON：motor speed is higher than the value of PA-75(no direction).
5	COIN	Positioning Completion	In position control mode: OFF:position deviation is bigger than parameter PA-16； ON: position deviation is bigger than parameterPA-16.
6	ASP	Arrival Speed	In speed or torque control mode: OFF :motor speed is lower than parameter PA28; ON : motor speed is higher than parameterPA28. Can set polarity function, refers to the explanation of PA28.
7	ATRQ	Arrival Torque	OFF : motor torque is lower than parameter PA89; ON : motor torque is higher than parameter PA89. Can set polarity function, refers to the explanation PA89.
8	BRK	Electromagnetic Brake	OFF : electromagnetic brake applies the brake. ON : electromagnetic brake releases the brake.
9	RUN	Servo Running	OFF : servo motor does not excite. ON : servo motor has excited.
10	NEAR	Approach Position	In position control mode:

			OFF: position deviation is bigger than parameter PA-85. ON: position deviation is smaller than parameter PA-85.
11	TRQL	Torque Limitation	OFF : motor torque has not reached the limitation. ON : motor torque has reached the limitation. Torque limitation is set byPA34,PA35,PA36 and PA37.
12	SPL	Speed Limitation	In torque control mode: OFF : motor speed has not reached the limitation. ON : motor speed has reached the limitation. Speed limitation is set byPA-50.
13	VCOIN	Speed Consistency	OFF: The absolute value of the difference between the actual rotational speed and the instruction speed is bigger than PA76. ON: The absolute value of the difference between the actual rotational speed and the instruction speed is smaller than PA76.
15	HOME	Origin Regression Completion	OFF: No signal output when the origin regression doesn't complete. ON: The signal outputs when the origin regression completes.
16	CMDOK	Internal Position Command Completion	OFF: No signal output when internal position command doesn't complete or internal position command doesn't stop. ON: The signal outputs after the setting time of P4-1 when internal position command completes or internal position command stops.

6.2.4 DI Forced Valid

There are 3 parameters(P3-15, P3-16, P3-17) in group P3 and they can force DI valid.

(1) Corresponding functions for P3-15 is represented by 8-bit binary:

Number	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	CZERO	ZCLAMP	TCW	TCCW	CWL	CCWL	ARST	SON

(2) Corresponding functions for P3-16 is represented by 8-bit binary:

Number	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	CMODE	NULL	TRQ2	TRQ1	NULL	SP2	SP1	CINV

(3) Corresponding functions for P3-17 is represented by 8-bit binary:

Number	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	NULL	JOGN	JOGP	INH	CLR	GEAR2	GEAR1	NULL

(4) Corresponding functions for P3-18 is represented by 8-bit binary:

Number	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	NULL	POS2	POS1	POS0	CTRG	HOLD	NULL	NULL

(5) Corresponding functions for P3-19 is represented by 8-bit binary:

Number	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Function	NULL	NULL	NULL	NULL	NULL	NULL	ORGP	SHOM

Parameter Meaning:

Attention: Already Planned means functions of parameters has been chosen by P3-0~P3-3;

Unplanned means functions of parameters has not been chosen by P3-0~P3-3.

One of 3 parameters	Corresponding Function	Result
0	Unplanned	OFF（invalid）
	Already Planned	It is up to signals
1	Unplanned Or Already Planned	ON（forced valid）

6.3 Internal Position Command Of P4 Group Parameter

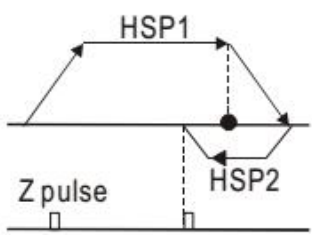
No.	Name	Function	Rang	Default Value
P4-0	Internal position instruction control mode	0: absolute position instruction. 1: incremental position instruction.	0-1	0
P4-1	The completion of digital output delay of internal position command	1. When the internal position command is completed or stops, the internal position command is outputted to complete this signal after the delay time set by P4-1. 2. Only when the delay time P4-1=0 and CMDOK=1 can it receive trigger internal position command. 3. Only when the delay time P4=1 is not 0 and CMDOK=1 can it receive the internal position command triggered by CTRG.	0-200ms	0
P4-2	The setting of position cycle numbers for internal position command 1	To set position cycles of the first internal position.	-30000-30000	0
P4-3	The setting of pulse number in position cycle for internal position command 1	1. To set position pulses of the first internal position. 2. Internal position command=the setting value of the first internal position cycles+the setting value of the first internal position pulses. (Max is the pulse number of the motor for one roll, please refer to the settings of PA11,PA12 and PA13)	+/-max.cnt /rev	0

No.	Name	Function	Rang	Default Value
P4-4	The move speed of Internal position instruction 1	To set the move speed of internal position instruction 1.	0-5000 r/min	1000
P4-5	The number of position cycles of internal position instruction 2	To set the number of position cycles of the second stage internal position.	-30000-30000	0
P4-6	The pulse number setting in position loop of internal position instruction 2	1. To set the position pulses of the second stage internal position. 2. Internal position instruction 2=the position cycles setting of the second internal position+the pulse number setting of the second internal position.	+/-max.cnt /rev	0
P4-7	The move speed of internal position instruction 2	To set the move speed of internal position instruction 2.	0-5000 r/min	1000
P4-8	The position cycles of internal position instruction 3	To set the position cycles of the third stage internal position instruction.	-30000-30000	0
P4-9	The pulse number setting in position loop of internal position instruction 3	1. To set the position pulses of the third stage internal position. 2. Internal position instruction 3=the position cycles setting of the third internal position+the pulse number setting of the third internal position.	+/-max.cnt /rev	0

No.	Name	Function	Rang	Default Value
P4-10	The move speed of internal position instruction 3	To set the move speed of internal position instruction 3.	0-5000 r/min	1000
P4-11	The number of position cycles of internal position instruction 4	To set the number of position cycles of the fourth stage internal position.	-30000-30000	0
P4-12	The pulse number setting in position loop of internal position instruction 4	1. To set the position pulses of the 4th stage internal position. 2. Internal position instruction 4=the position cycles setting of the 4th internal position+the pulse number setting of the 4th internal position.	+/-max.cnt /rev	0
P4-13	The move speed of internal position instruction 4	To set the move speed of internal position instruction 4.	0-5000 r/min	1000
P4-14	The position cycles of internal position instruction 5	To set the position cycles of the 5th stage internal position instruction.	-30000-30000	0
P4-15	The pulse number setting in position loop of internal position instruction 5	1. To set the position pulses of the 5th stage internal position. 2. Internal position instruction 3=the position cycles setting of the 5th internal position+the pulse number setting of the third internal position.	+/-max.cnt /rev	0

No.	Name	Function	Rang	Default Value
P4-16	The move speed of internal position instruction 5	To set the move speed of internal position instruction 5.	0-5000 r/min	1000
P4-17	The number of position cycles of internal position instruction 6	To set the number of position cycles of the sixth stage internal position.	-30000-30000	0
P4-18	The pulse number setting in position loop of internal position instruction 6	1. To set the position pulses of the 6th stage internal position. 2. Internal position instruction 6=the position cycles setting of the 6th internal position+the pulse number setting of the 6th internal position.	+/-max.cnt /rev	0
P4-19	The move speed of internal position instruction 6	To set the move speed of internal position instruction 6.	0-5000 r/min	1000
P4-20	The position cycles of internal position instruction 7	To set the position cycles of the 7th stage internal position instruction.	-30000-30000	0
P4-21	The pulse number setting in position loop of internal position instruction 7	1. To set the position pulses of the 7th stage internal position. 2. Internal position instruction 7=the position cycles setting of the 7th internal position+the pulse number setting of the 7th internal position.	+/-max.cnt /rev	0

No.	Name	Function	Rang	Default Value
P4-22	The move speed of internal position instruction 7	To set the move speed of internal position instruction 7.	0-5000 r/min	1000
P4-23	The number of position cycles of internal position instruction 8	To set the number of position cycles of the eighth stage internal position.	-30000-30000	0
P4-24	The pulse number setting in position loop of internal position instruction 8	1. To set the position pulses of the 8th stage internal position. 2. Internal position instruction 8=the position cycles setting of the 8th internal position+the pulse number setting of the 8th internal position.	+/-max.cnt /rev	0
P4-25	The move speed of internal position instruction 8	To set the move speed of internal position instruction 8.	0-5000 r/min	1000
P4-32	The type of origin detector and setting of finding direction	0: Forward direction origin regression and CCWL is as regression origin. 1: Reverse direction origin regression and CWL is as regression origin. 2: Forward direction origin regression and ORGP is as regression origin. 3: Reverse direction origin regression and ORGP is as regression origin. 4: Forward looking for Z pulse as the origin of regression. 5: Reverse looking for Z pulse as the origin of regression	0-5	0

No.	Name	Function	Rang	Default Value
P4-33	Set the mode of short distance movement to the origin	0: Find the reference origin and return to search for the Z phase pulse as the mechanical origin. 1: Find the reference origin and keep forward for the Z phase pulse as the mechanical origin. 2: Find the rising edge of the detector ORGP as the mechanical origin. (when it is 2, only the type of origin detector and the setting value of the search direction can be used as 2, 3,4 or 5.)	0-2	0
P4-34	Origin trigger start mode	0: Close origin regression function. 1: Automatically perform origin regression when it is powering on. 2: Trigger the origin regression function by the input contact of the origin search function.	0-2	0
P4-35	The setting of origin stop mode	0: The motor slows down and pulls back to the origin when the origin detection completed. 1: The motor slows forward and stops when the origin detection completed.	0-1	0
P4-36	The speed setting of origin regress in the first stage of high speed(HSPD1)	To set the speed of origin regression in the first stage of high speed. 	1-2000 r/min	1000

No.	Name	Function	Rang	Default Value
P4-37	The speed setting of origin regress in the first stage of high speed(HSPD2)	To set the speed of origin regression in the second stage of high speed.	1-500 r/min	50
P4-38	The cycle number of origin regression offset(HOF1)	To set the cycle number of origin regression offset.	-30000-30000	0
P4-39	The pulse number of origin regression offset(HOF2)	1: To set the pulse number of origin regression offset. 2: When the parameter function HOF1 and HOF2 are set to 0, the origin is defined as Z pulse or ORGP by the origin regression mode. If they are not 0, the origin will define the above Z pulse plus last pulse offset HOF1 × 10000+HOF2 as the new origin.	+/-max.cnt /rev	0

Chapter7 Alarm Code

No.	Fault Name	Introduction
--	Normal	
1	Over Speed	Motor speed over than the setting values.
2	Main Circuit Over Voltage	The voltage of main circuit is too high
3	Main Circuit Under Voltage	The voltage of main circuit is too low
4	Over travel	The value of position deviation counter is over than the setting value.
5	Drive Over Heat	The temperature of the drive is high
6	Speed Amplifier Saturation Fault	Speed adjustment for long time saturation
7	Drive inhibit Error	Speed adjustment in saturation for long time
8	Position deviation accumulation was out of range	Absolute value of position deviation accumulation is over than 230.
11	IPM module Error	IPM smart module error
13	Drive Overload	Servo drive and motor overload(overheat instantaneously)
14	Brake Fault	Brake circuit Error
15	Encoder Counter Error	Encoder counts wrongly
18	Relay Switch Fault	The real state of relay is different from control state
19	Delay to open the brake	PA94 was set too big
20	EEPROM Error	EEPROM error
21	FPGA Module Fault	FPGA function abnormal
23	Current Collecting Circuit Fault	Current collecting circuit fault
29	Alarm For Torque Overload	Torque Overload
30	Encoder Z Pulse Missing	Encoder Z pulse Error
31	Encoder UVW signal error	1. Encoder UVW signal corrupted. 2. Encoder Z signal corrupted. 3. Bad cables. 4. Bad shielding of cables. 5. The shielding ground is not connected well. 6. The circuit around the encoder interface occurs error.

32	Encoder UVW Signal Error	All UVW signal in high level or low level. Or the encoder is mismatching.
33	UVW Signal Fault	No high resistance in powering up time series
34	UVW Signal Unstable	UVW Signal Unstable
36	When connecting to 9-line encoder, illegal state states for long time	When connecting to 9-line encoder, illegal state states for long time
42	AC Input Under Voltage	AC input under voltage
44	Missing phase alarm of 3 phases power supply	Missing phase alarm of 3 phases power supply
47	Over voltage when main circuit in powering up	Over voltage when main circuit in powering up
55	CRC check occurs errors for 3 times in a row	The check for internal communication occurs error
56	MODBUS frame is too long.	Data Receiving from MODBUS frame is too long
57	MODBUS serial communication abnormal	Internal communication abnormal

High Performance, High Quality

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