锐特技术
RTELLIGENT

Rtelligent RS series Servo System

Quick start guide

Shenzhen Rtelligent
Mechanical Electrical Technology Co.,Ltd

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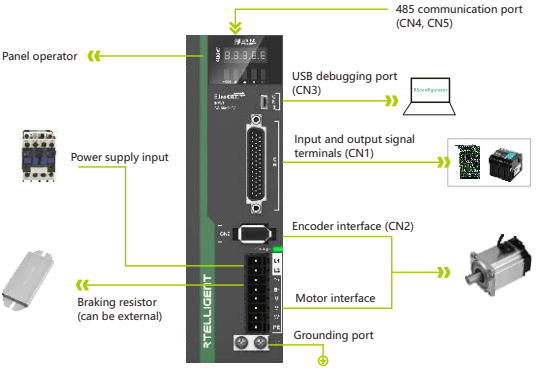
Cautions

Thank you for using the Rtelligent RS series AC servo system! This operating manual provides information about the RS series drivers and RSM series motors. Before use, please read the manual carefully to ensure proper use!

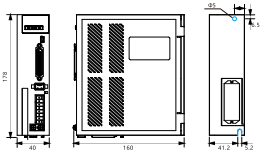
- Please disconnect the power supply for more than 5 minutes before removing or disassembling the driver, otherwise it may cause electric shock due to residual voltage.
- Please never touch the inside of the servo driver, otherwise it may cause electric shock
- Please insulate the connection part of the power supply terminal, otherwise it may cause electric shock.
- Please do not damage or pull on the cable, subject the cable to excessive force, put it under heavy objects or clamp it. Doing so may result in electric shock, which may cause the product to stop or burn out.
- Unless designated personnel, please do not set up, disassemble or repair, otherwise it may cause electric shock or injury.
- Please do not remove the cover, cables, connectors and optional accessories while the power is on, otherwise it may cause electric shock and damage the drive.
- Please follow the steps required by this manual for trial operation.
- If an operation error occurs while the servo motor is connected to the machine, it will not onlycause damage to the machine, but also sometimes cause personal accidents.
- Please do not change the maximum speed value, except for special purposes. Inadvertent change may damage the machine or cause injury.
- When the power is turned on and for a period of time after the power is cut of, the heat sink of the servo driver, the external braking resistor, and the servo motor may become hot. Please do not touch it, otherwise it may cause burns.To prevent accidental contact with hands or parts (cables, etc.), please take safety precautions such as installing an enclosure.
- Please do not touch the rotating part of the servo motor while it is running, as this may result in injury.
- If the servo motor is installed on the supporting machine and starts to run, make sure that the servo motor can be stopped at any time, otherwise you may get injured.
- Please install a stop device on the machine side to ensure safety.
- The brake of the servo motor with brake is not a stopping device to ensure safety. If a stop device is not provided, it may cause injury.
- If power is restored after a momentary power failure occurs during operation, the machine may restart suddenly, so please do not approach the machine.
- Please take measures to ensure that personal safety will not be endangered when restarting, otherwise it may cause injury.
- Please do not modify the product in any way, otherwise it may cause injury or mechanical damage.
- Please install the servo driver, servo motor, and external braking resistor on non-combustible materials, otherwise it may cause a fire.
- Between the power supply and the main circuit power supply of the servo driver (L1, L2 for single-phase, L1, L2, L3 for three-phase), please connect an electromagnetic contactor and a non-fuse circuit breaker. Otherwise, when the servo driver fails, the large current cannot be cut off, which may cause a fire.

Model combination list

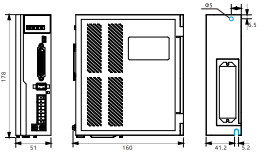


Servo driver dimension drawing

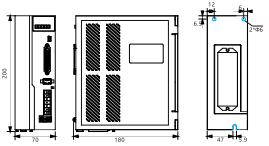
SizeA Below 400W



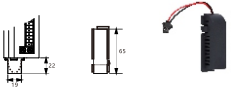
SizeB Below 1500W



SizeC Below 3000W



Absolute battery box dimensions



List of standard model combinations

Motor base	Model	Rated power	Matching driver	Encoder cable	Power cable
40	RSM-M04J0130A	50W	RS100(E)	SES4-030	SMS-030
	RSM-M04J0330A	100W	RS100(E)	SES4-030	SMS-030
60	RSMA-M06J0630A	200W	RS200(E)	SES4-030	SMS-030
	RSMA-M06J1330A	400W	RS400(E)	SES4-030	SMS-030
80	RSMA-M08J2430A	750W	RS750(E)	SES4-030	SMS-030
	RSMA-M08J3230A	1KW	RS1000(E)	SES4-030	SMS-030
110	RSM-M11W4030A	1.2KW	RS2000(E)	SEH4-030	SMH-030
	RSM-M11W5030A	1.5KW	RS2000(E)	SEH4-030	SMH-030
	RSM-M11W6020A	1.2KW	RS2000(E)	SEH4-030	SMH-030
	RSM-M11W6030A	1.8KW	RS2000(E)	SEH4-030	SMH-030
130	RSM-M13W5025A	1.3KW	RS2000(E)	SEH4-030	SMH-030
	RSM-M13W6025A	1.5KW	RS2000(E)	SEH4-030	SMH-030
	RSM-M13W7725A	2.0KW	RS2000(E)	SEH4-030	SMH-030
	RSM-M13W10025A	2.5KW	RS3000(E)	SEH4-030	SMH-030
	RSM-M13W15015A	2.3KW	RS3000(E)	SEH4-030	SMH-030
	RSM-M13W15025A	3.8KW	RS3000(E)	SEH4-030	SMH-030

* Driver with E is EtherCAT function

** Wiring is 3 meters as standard, other specifications please specify when ordering

Servo cable list

Naming of AC servo supporting cables

S E S 4 -030

1 2 3 4 5

1. Cable series
   S:220V AC servo
   H:380V high-voltage servo
   D:Low-voltage brushless servo
2. Cable category
   E:Encoder extension cable
   M:Motor power cable
3. Plug category
   S:Plastic Amp Head
   H:Aviation plugs
4. Number of cable cores
   Power cable 4 cores can be omitted
5. Cable length
   030: 3 meters

Cable of 80mm and below

Motor cable SMS-030
Color definition:

U	V	W	PE
Red	White	Black	Yellow-green

110mm / 130mm Cable

Motor cable SMH-030
Color definition:

U	V	W	PE
Brown	Blue	Black	Yellow-green

Motor model description

RSMA M 06 J 13 30 A - Z

1 RSM Series Servo Motor
A: 5 pole pairs,Ultra thin
none: 4 pole pairs

2 Motor inertia code
S: Small inertia M: Medium inertia
H: Large inertia

3 Motor flange size
06:60mm 13:130mm

4 Encoder resolution
J: 17bit magnetic encoder
H: 23bit optical encoder
G: 17bit magnetic Multi-turn absolute encoder
L: 23bit optical Multi-turn absolute encoder
W: 10000 lines optical encoder

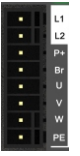
5 Motor rated torque
13:1.3 Nm 150: 15 Nm

6 Motor rated speed
30: 3000 rpm 15: 1500 rpm

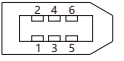
7 Oil seal or not
A: with oil seal
none: without

8 Brake or not
Z: With brake

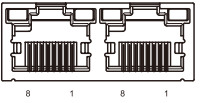
Main circuit wiring definition

Functions	Terminal symbol	Description	Diagram
Input power supply	L1	Single-phase 220 VAC	
	L2		
Braking resistance	P+	When using an external braking resistor, just replace the P+ and Br wiring	
	Br		
Motor wiring	U	Connect the motor extension cable	
	V		
	W		
	PE		

CN2 Encoder terminal wiring definition

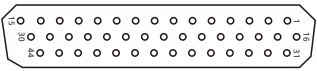
Pin numbers	Terminal symbol	Description	Diagram
1	Vcc	The encoder power supply is provided by the driver	
2	Gnd		
5	PS+	Encoder communication terminal	
6	PS-		
3	Reserved		
4	Reserved		

CN4,CN5 Communication 485 interface

Pin num	Description	Color	Diagram
1	RS485-A	orange&white	
2	RS485-B	orange	
3	——	green&white	
4	——	blue	
5	——	blue&white	
6	——	green	
7	GND	brown&white	
8	——	brown	

Dual RS-485 interface

CN1-DB44 control signal interface definition

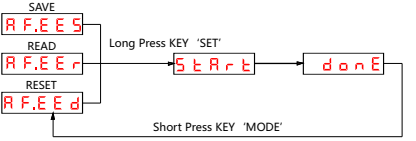


Functions	Signal	Pin number	Signal definition	Default function	Description
External pulse interface	PUL+	3	Differential pulse positive		Differential input, 5V
	PUL-	4	Differential pulse negative		
	DIR+	5	Differential direction positive		
	DIR-	6	Differential direction negative		
	24VPUL+	16	24V pulse positive		24V positive
	24VDIR+	17	24V direction positive		
Universal input interface	IN1(SV-ON)	2	Input 1	Servo enable	Common anode or common cathode is supported under 24V, and NPN or PNP mixed use is not supported
	IN2(POT)	7	Input 2	Positive limit	
	IN3(NOT)	8	Input 3	Negative limit	
	IN4(ALMRST)	9	Input 4	Alarm clear	
	IN5(PULStop)	10	Input 5	Pulse prohibited	
	IN6(Home)	11	Input 6	Origin input	
	IN7(ZERStart)	12	Input 7	Start homing	
	IN8(EMEStop)	13	Input 8	Emergency Stop	
	INCOM	1	Input common terminal		
Common cathode universal output interface	OUT1(SV-RDY)	32	Output 1	The servo is ready	The common cathode output current below 24V does not exceed 50mA
	OUT2(INP)	33	Output 2	Positioning completed	
	OUT3(ALM)	34	Output 3	Alarm Output	
	OUT4(ZERDO)	35	Output 4	Homing complete	
	OUTCOM-	31	Output common ground	Output ground	
Differential output interface	DFOUT5+(BRK+)	18	Output 5 positive	Brake positive	The differential output current below 24V does not exceed 200mA
	DFOUT5-(BRK-)	19	Output 5 negative	Brake negative	
	DFOUT6+	20	Output 6 positive	Reserved	
	DFOUT6-	21	Output 6 negative		
Encoder output interface	DFEA+	23	Encoder A+		5V differential output
	DFEA-	24	Encoder A-		
	DFEB+	25	Encoder B+		
	DFEB-	26	Encoder B-		
	DFEZ+	27	Encoder Z+		
	DFEZ-	28	Encoder Z-		
	EZ	29	Single-ended EZ+	Single-ended Z signal	24V single-ended output
	ECGND	30	Single-ended EZ ground	Single-ended Z ground	
Analog input interface	AN 1+	39	Analog1+		-10V~+10V analog input
	AN 1-	40	Analog1-		
	AN 2+	43	Analog2+		
	AN 2-	44	Analog2+		
	ANGND	41	Analog ground		

Display and panel operation

Functions	Symbol	Description	Diagram
Mode/Return	MODE	Mode switch	
Shift key	◀	Shift left	
Increase	▲	Switch up selection or increase value	
Decrease	▼	Switch down selection or decrease the value	
Confirm	SET	Confirm operation	

Operation progress of parameters



Panel operation menu

Jog Test Operation

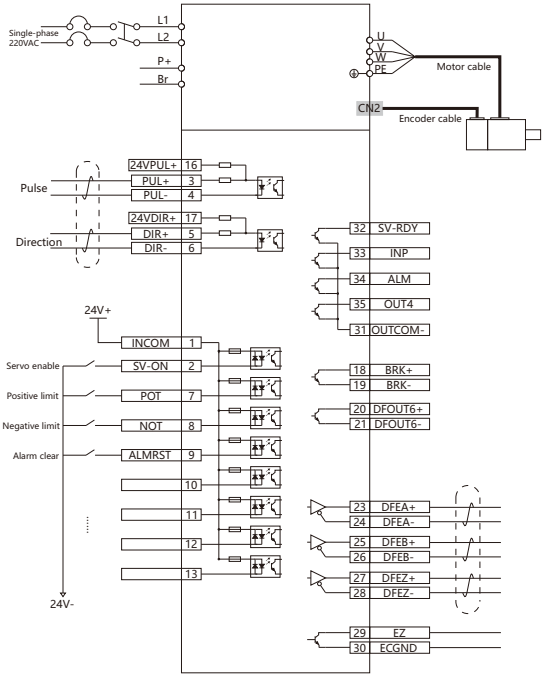
Monitor State Content

NO.	Unit	Content
d00.rS	——	Run statement
d01.SF	rpm	speed of motor
d02.SC	rpm	speed command
d03.tF	%	motor torque
d04.tC	%	torque command
d05.CU	%	Run current
d07.PC	Command unit(pulse)	Position command counter
d11.PF	Encoder unit(pulse)	Position feedback counter
d15.PE	Encoder unit	Position error
d17.FS	rpm	Pulse command speed
d18.Fr	KHz	Pulse command frequency
d19.1S	——	Input signal state
d20.oS	——	Output signal state
d21.nA	Encoder unit (pulse)	Motor mechanical position
d22.EA	°	Motor electrical angle
d23.Ub	V	Bus voltage
d24.ES	——	Encoder statement
d25.Eo	Encoder unit (pulse)	encoder current value
d26.En	cycles	encoder cycles value
d36.Er	——	alarm code

Common alarm & handling

NO.	Fault content	Handling
AL.100	Parameter read error	Modify the P00.00 and reset
AL.105	Encoder mismatch	Confirm encoder style
AL.110	IPM module overload	Grounding correctly
AL.112	Command overload	
AL.113	Motor thermal protection	Adjust command setting，change motor
AL.115	Internal voltage error	Internal circuit error，change new driver
AL.120	Encoder interference	Check encoder shield
AL.121	Encoder data error	Check encoder wiring
AL.125	Encoder counter error	
AL.126	Encoder disconnection	
AL.200	Mode error	Confirm control mode setting
AL.210	High Bus Voltage	
AL.211	Low Bus Voltage	
AL.220	Low encoder supply power1	Change encoder battery
AL.221	Low encoder supply power2	Reset encoder alarm
AL.230	Motor overspeed	Decrease motor speed
AL.240	Position feedback error	Adjust load and speed
AL.250	Brake inoperative	Check brake circuit
AL.252	Limit fault	Check limit switch

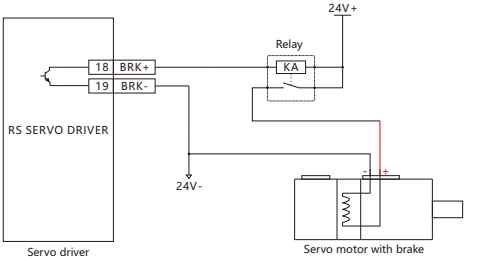
Operation guide for position control mode



Remarks:

1. The general input signal is a two-way optocoupler circuit, which can be connected to a single common anode or a single common cathode (pin 1 is the common terminal), and the common anode and common cathode cannot be mixed.
2. The general output signal is a common cathode connection, and pin 31 is a common ground. The maximum current of the output loop is 50mA. The maximum current of the differential output signal output loop is 200mA, which can be used to drive the relay switch.
3. Encoder output signal Z signal has single-ended output (pin29 and 30)
4. The input pulse frequency is up to 500KHz

Wiring diagram of holding brake



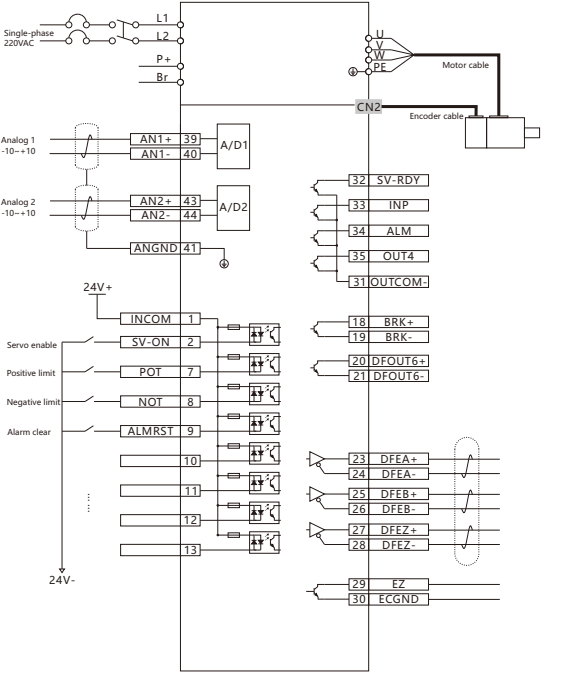
Remarks: 1. The output signal of brake control can only be specified as OUT5 or OUT6 port, OUT5 is shown as default.

2. Motor brake cable has polarity, please pay attention to distinguish

Basic parameters of position control mode

NO.	Parameter name	Sample value
P01.00	Control mode	0,position control mode
P01.01	Rotation direction	0 or 1
P01.02	Servo forced enable	0, external IO control enable; 1, internal enable
P02.00	IN1 function selection	Default 1 ,IN1 as servo enable
P02.01	IN1 polarity selection	0, valid at low level; 1, valid at high level
.....	IN2-8 function and polarity	.....
P02.32	OUT1 function selection	Default 4 ,OUT1 as servo ready
P02.33	OUT1 polarity selection	0, valid at low level; 1, valid at high level
.....	OUT2-6 function and polarity	.....
P03.00	Position command source	0,External pulse input
P03.02	Pulse command type	0,External pulse input
P03.03	Pulse command filter constant	Input pulse frequency limit
P03.04	Command smoothing time	Default is 1 invalid
P03.06	pulses required for one revolution	Default 10000
P06.00	First speed gain	Rough adjustment of rigidity
P06.01	The first speed integral time	Rough adjustment of rigidity
P06.02	First position gain	Rough adjustment of rigidity

Operation guide for torque control mode



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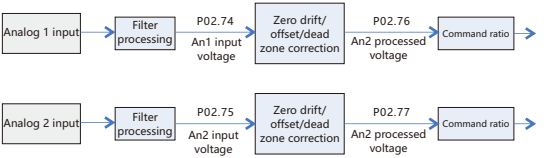
The maximum current of the differential output signal output loop is 200mA, which can be used to drive the relay switch.

3. The output port identification is defined as the factory setting in the default position mode of the driver, please reconfirm and assign the output port function when using.

4. Analog input specification is -10~+10V.

Analog input processing procedure



Basic parameters of torque control mode

NO.	Parameter name	Sample value
P01.00	Control mode	2,Torque control mode
P01.01	Rotation direction	0 or 1
P01.02	Servo forced enable	O,External IO control enable;1， Internal enable
P02.00	IN1 function selection	Default 1 ,IN1 as servo enable
P02.01	IN1 polarity selection	0,Valid at low level ; 1,Valid at high level
.....	IN2-IN8 function and polarity	.....
P02.32	OUT1 function selection	Default 4 ,OUT1 as servo ready
P02.33	OUT1 selection	0,Valid at low level ; 1,Valid at high level
.....	OUT2-OUT6 function and polarity	.....
P05.00	Channel A Torque command source	1, channel A derived from analog channel 1 input
P05.02	Torque command input source	0, derived from channel A
P05.12	Torque mode speed limit source	0: internal given / 1: external analog channel input
P05.14	Torque mode forward speed limit value	
P05.15	Torque mode reverse speed limit value	
P05.13	Speed limit external analog channel selection	P05.12=1, set P05.13=2 (channel 2).
P02.65	Analog 1 input filtering setting	P02.69 set channel 2 filtering
P02.67	Analog 1 zero drift correction value setting	P02.71 set channel 2 zero drift
P02.64	The offset correction value of analog 1 setting	P02.68 set channel 2 offset
P02.66	The dead zone range of analog 1 setting	P02.70 Set channel 2 zero drift
P02.78	The analog voltage - torque ratio setting	Set the maximum output torque corresponding to 10V
P02.79	The analog voltage - speed ratio setting	Set the maximum speed limit value corresponding to 10V
P05.16	The torque to reach the reference value setting	
P05.17	The torque to reach the effective offset value setting	
P05.18	The torque to reach the invalid offset value setting	
P05.19	The torque to reach the detection time setting	