YAKO

YAKO has been the main provider of Chinese motion control products and solutions for more than ten years, with our spirit of indepen-dent innovation.

We effectively improve the performance of key components of motion control and save design costs for customers:

•Established long-term partnership with 3,000+ automation equipment manufacturers and distributors.

•More than 3 million sets of products are stable running in all kinds of high-precision grasping,conveying, feeding and other automation equipment and production lines.

Based on precision-controlled stepping and servo motor drive technology, YAKO integrates the most advanced precision control algorithms, multi-axis cooperative communication technology, pulse signal optimization technology, reliability design method, testing and whole process quality control technology into products and services. We continuously developed a series of motion control solutions and products with various precision and multiple control processes.

滚滚长江东逝水

Contents

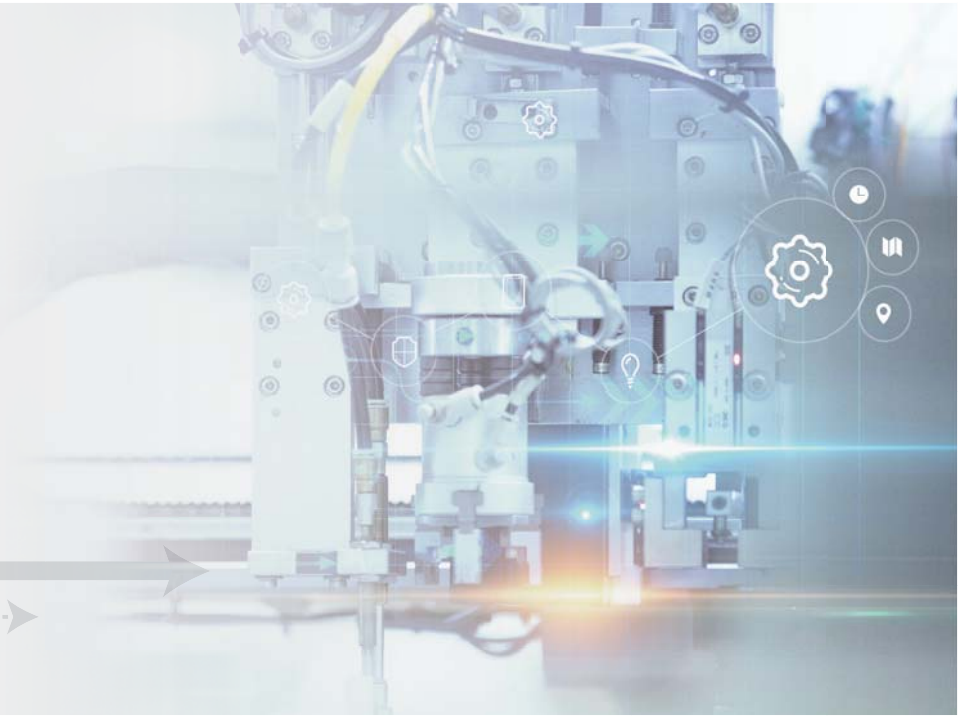
History of YAKO Servo

2011
PSDD Series
AC Servo System

2015
AS1 Series
AC Servo System

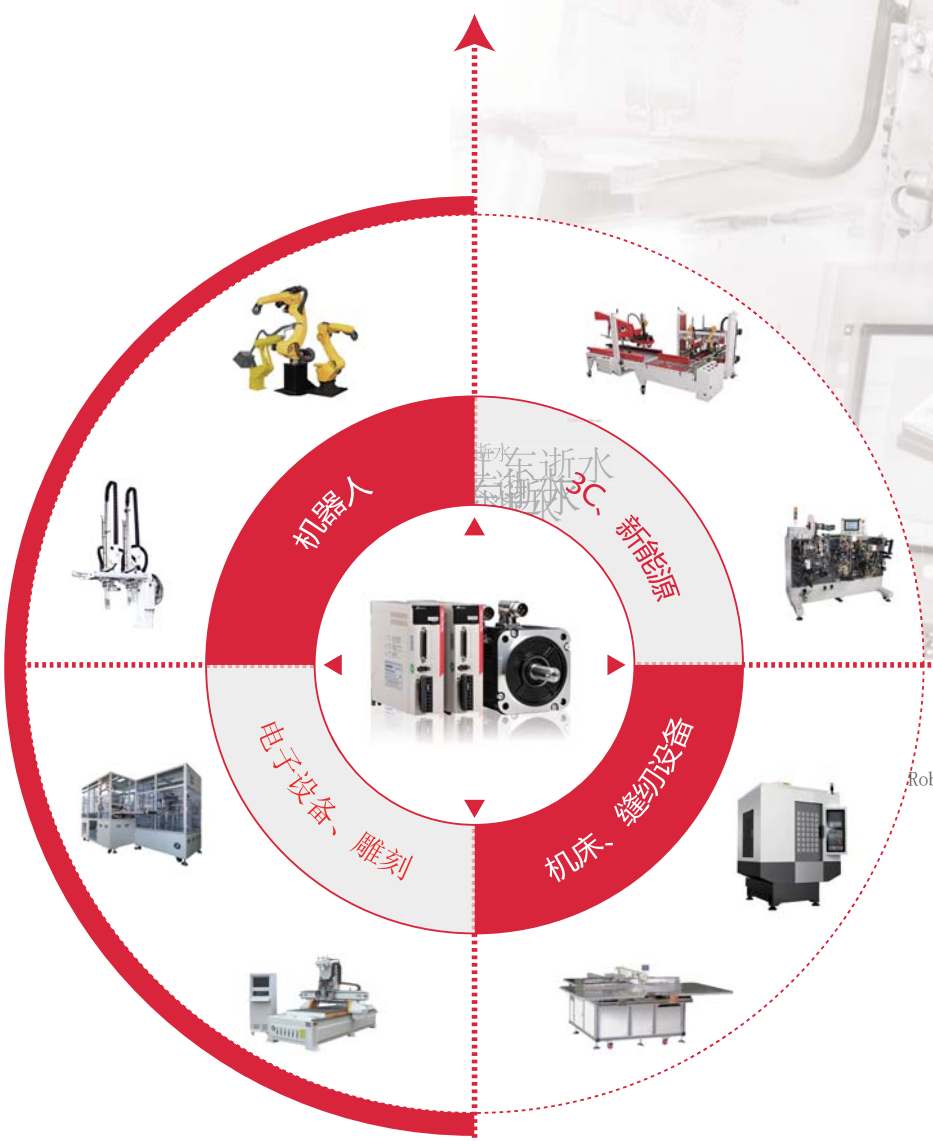
2018
AS2 Series
High Response Frequency
High Reliability
AC Servo System

2020
AS3 Series
Ultra-thin & Excellent Performance
New Generation
AC Servo System

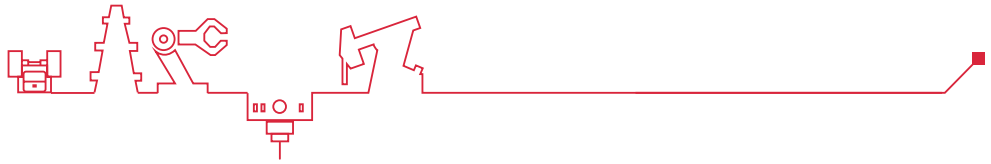


AS3

New Generation AC Servo System



Robots, new energy, 3C electronic equipment, advertising spray carving equipment, laser equipment, electronic processing, labeling machines, wire equipment,CNC machines, LED equipment, printing machinery, food production lines, etc.



Features

Ultra-thin, High Precision Positioning

ASM servo motor can be matched with high-precision 23-bit (8388608p/rev) encoder to improve positioning accuracy and low-speed operation stability.

•Record absolute position of 65535 rounds, support absolute position control and software position limit, save the cost of limit switch and home switch. Easy for wiring and reducing faults.

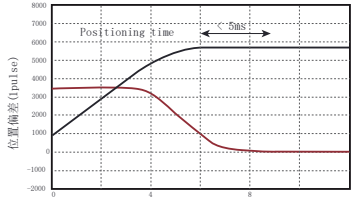
•The volume is 35% less than the AS2 series driver

Fast Response Performance

1.2K speed loop response bandwidth

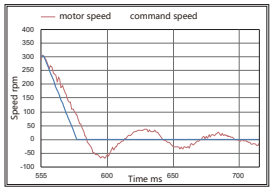
loop response bandwidth

0r/min to 3000r/min acceleration time within 7ms

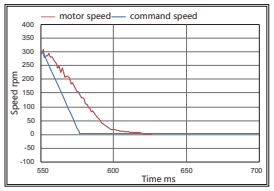


Excellent High and Low Frequency Vibration Suppression

Built-in type-A / type-B of low-frequency vibration suppression algorithms to suppress mechanical low-frequency resonance and peripheral vibration

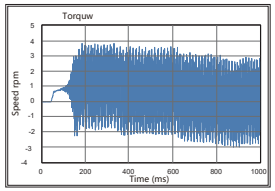


Before suppressing vibration

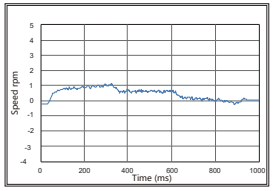


After suppression vibration

Built-in four sets of notch filters can effectively suppress mechanical high frequency resonance and reduce mechanical noise



Torque command before notch



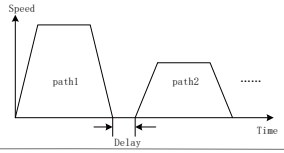
Torque command after notch

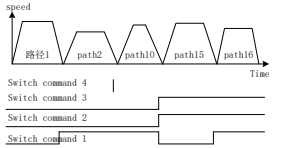
Features

Multi-segment Position Control

Up to 16 internal position control can be performed by function code internal setting or external DI terminal switching.

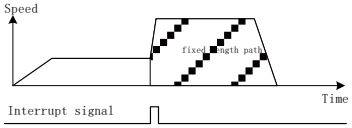
In the multi-segment position execution, each segment has a position arrival signal output, thus to realize multiple servo series motion.





Interrupted Position Fixed Length Control

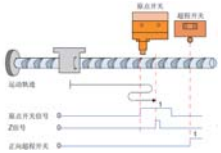
- Two high-speed DI interrupt fixed length function
- Interruption trigger servo continues to run a set length in previous speed direction. This function has the highest priority, the fastest execution and guaranteed minimum delay. It can make up for PLC processing and response delay. The interrupt execution does not respond to any other positional instructions, preventing other instructions from affecting it.

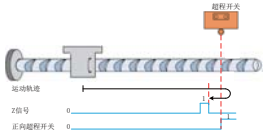


Multiple Internal Homing Mode

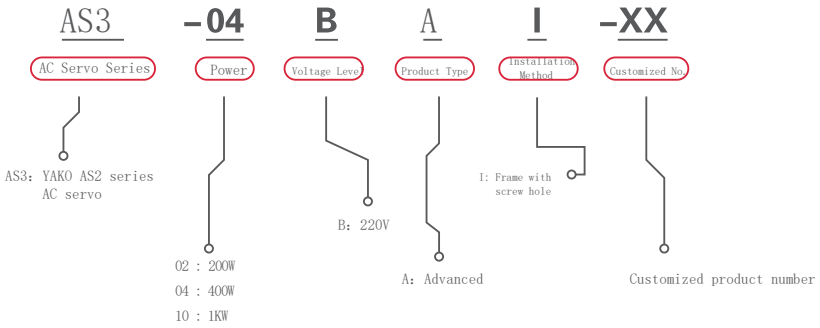
Simplify the design of host computer, servo can actively find the home point to complete the positioning function through the limit switch or home switch.

There are 16 kinds of homing modes for users to choose, and the repeating homing precision can reach ±1 pulse.

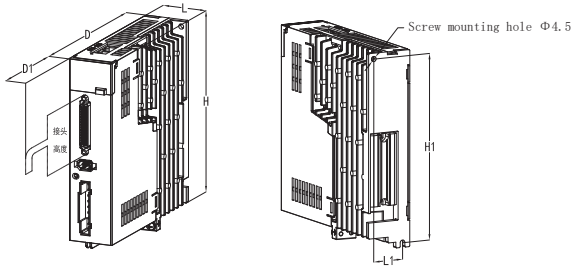




Servo Drive Naming Rules



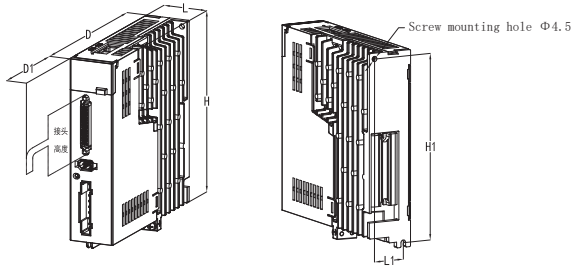
AS3 Series Drive Specs and Dimensions



Model	L(mm)	H(mm)	D(mm)	L1(mm)	H1(mm)	D1(mm)	Screw Hole
AS3 Frame B	40	170	153	28	161	75	2-M4
AS3 Frame C	50	170	173	37	161	75	2-M4

Structure Size	SIZE B		SIZE C
Drive Model	AS3-02BAI	AS3-04BAI	AS3-10BAI
Output Current Arms	1.6	2.8	6.0
Maximum Output Current Arms	5.8	10	17
Regenerative Loop Function	-	Built-in braking resistor	
Input Power	Single phase, AC200~240V, 50/60HZ		

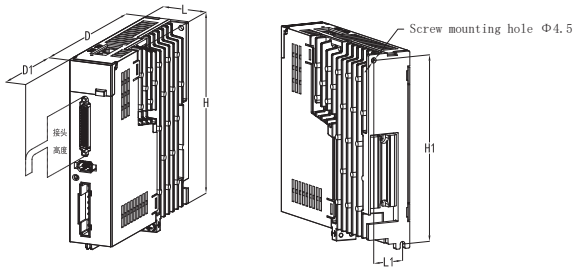
Servo Drive Basic Specifications



■ Basic Specifications

Working Environment	Temperature		Operating: 0℃～50℃
			Storage: -20℃～85℃
	Humidity		< 0～90% RH (No dew environment)
	Working Altitude		< 1000m above sea level
	Vibration/Shock		<1G
	IP Rating/Pollution degree		IP20/Pollution degree 2
Control Method			IGBT PWM space vector control
Encoder			17bit/23bit incremental /absolute
Input and output port	IO signal	Input	8 (General)
		Output	5 (General)
	Pulse Signal	Input	4 (Low speed pulse, high speed pulse)
		Output	4 (3 frequency divide outputs, 1 open collector output)
Communication Function	RS232		Connect with PC, to debug servo drive
	RS-485		Multiple groups in parallel, 485 communication with host computer
Panel Operator			LED display
Regenerative Loop Function			Built-in braking resistor for ≥800W models
Protect Function			Over current, overload, over voltage, low voltage, over speed, over temperature, encoder abnormality, communication abnormality, excessive position deviation, etc.
Control mode			Position control;speed contro;torque control

Servo Drive Function Specifications



■ Functions Specifications

Position Control Mode	Position Command Format		PULSE/DIR
			CW/CCW
			A, B phase orthogonal pulse
	Position Input Circuit		Line Driver; Open Collector
	Maximum Input Frequency		Line Driver low speed 500Kpps
			Line Driver high speed 3Mpps
			Open Collector 200Kpps
	Smoothing Filter		Smoothing the position command to make the motor run smoother and more stable
	Electronic Gear		Provide 2 sets of electronic gear ratio
	Vibration Suppression Filter		It can effectively suppress external signal interference and system resonance frequency, to ensure stable operation of equipment
Speed Control Mode	Command Form		Analog voltage command input(availably modified by 485), internal speed command (including DI switch)
	Speed Change Rate	Voltage Fluctuation	Rated voltage ±10%: 0.5% (Rated speed)
		Load Fluctuation	0-100% load: ≤ 0.5%(Rated speed)
		Temperature Fluctuation	25±25℃: ≤ 0.5%(Rated speed)
	Acceleration/Deceleration setting range		0-10S
Torque Control Mode	Command Form		Analog torque command (availably modified by 485), internal torque command (DI switch)
Common	Self-tuning Function		Inertia identification, rigidity tuning
	Encoder Feedback Electronic Gear		Setting freely
	Abnormal Information Record		9 groups of historical information records
	Dynamic braking		Built-in dynamic braking unit, to prevent running out of power

Servo Drive Connection to Peripheral Devices

▪ Main Circuit Terminal Definition

Name	Terminal Mark	Function Specification
Power Input Terminal	L1、L2	Single-phase AC220V power input
Regenerative Resistor Connection Terminal	P、C、D	1KW Model: Default P and D are shorted, Built-in resistor connected; When the braking capacity is insufficient, please connect an external braking resistor between P and C (The use of external resistors needs to remove the short wiring and keep P and D open 400W Model:P and C have been connected with an external braking resistor
Common DC Bus Terminal	P、N	Common bus connection when multiple units are connected in parallel
Power Cable Connection Terminal	U、V、W	Servo motor connection terminal, connected to U, V, W.
Ground Terminal	PE	Two grounding terminals are connected to the power grounding terminal and the motor grounding terminal. Be sure to ground the entire system.

Servo Drive Terminal Definition

▪ CN1 Control Terminal - Position Command Definition

Definition	Pin	Function	
PULS+	41	Low speed pulse command Pulse、Cw、A Phase	Differential drive input or open collector input
PULS-	43		
SIGN+	37	Low speed pulse command Dir、CCW、B phase	
SIGN-	39		
HPULS+	42	High speed pulse direction input, must be division input	
HPULS-	36		
HSIGN+	38	High speed pulse direction input, must be division input	
HSIGN-	40		
PULLHI	35	COM+, power input port, internal current limiting resistor connected	
GND	29	Differential signal ground	

▪ CN1 Control Terminal - General Input and Output Signal

Definition	Pin		Function
DI1	9	P-OT	Forward drive forbidden
DI2	10	N-OT	Backward drive forbidden
DI3	34	INHIBIT	Pulse forbidden
DI4	8	ALM-RST	Alarm reset (edge valid function)
DI5	33	S-ON	Servo enable
DI6	32	ZCLAMP	Zero fixed
DI7	31	GAIN-SEL	Gain select
DI8	30	Home Switch	Home switch
+24	17		Internal 24V power supply, voltage range+20~28V, Maximum output current 200mA
COM-	14		Internal 24V ground; open collector pulse input ground
COM+	11		Power input, 12~24V
DO1+	7	S-RDY+	Servo ready
DO1-	6	S-RDY-	
DO2+	5	COIN+	Position reached
DO2-	4	COIN-	
DO3+	3	ZERO+	Zero speed
DO3-	2	ZERO-	
DO4+	1	ALM+	Error output
DO4-	26	ALM-	
DO5+	28	BKOFF+	Brake output
DO5-	27	BKOFF-	

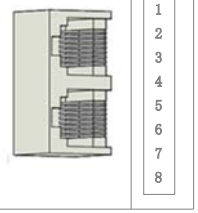
▪ CN1 Control Terminal - Encoder Output

Definition	Pin	Function
PAO+	21	Encoder pulse division output
PAO-	22	
PBO+	25	
PBO-	23	
PZO+	13	
PZO-	24	
PZ-OUT	44	Home point pulse open collector output
GND	29	Home point pulse collector open circuit output signal ground; differential signal ground
+5V	15	Internal 5V power supply, maximum output current 200mA
GND	16	
PE	Shell	

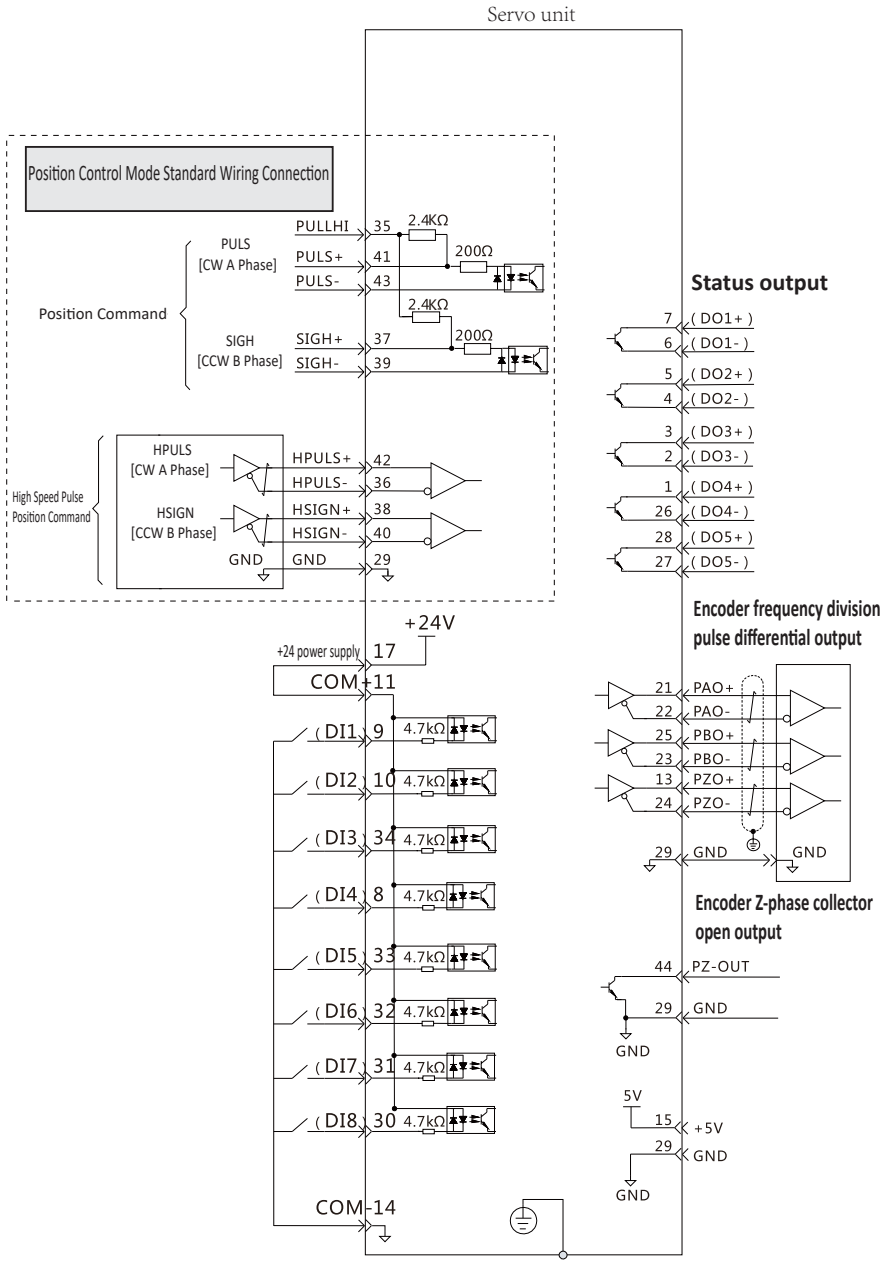
▪ CN2 Encoder Cable Servo Driver Side Terminal Pin Distribution

Pin	Encoder signal	Function
1	+5V	+5V power output
2	GND	Power GND output
5	SD+	Encoder signal
6	SD-	
Shell	PE	

▪ CN3 and CN4 - Industrial Bus and Host Computer Communication Port Uses

Pin	Definition	Function	Pin Distribution
1	--		 1 2 3 4 5 6 7 8
2	--		
3	GND(RS485)	RS485 communication port	
4	RS485+		
5	RS485-		
6	RS232-TXD	RS232 communication port	
7	RX232-RXD		
8	GND(RS232)		
Shell	PE	Shield	

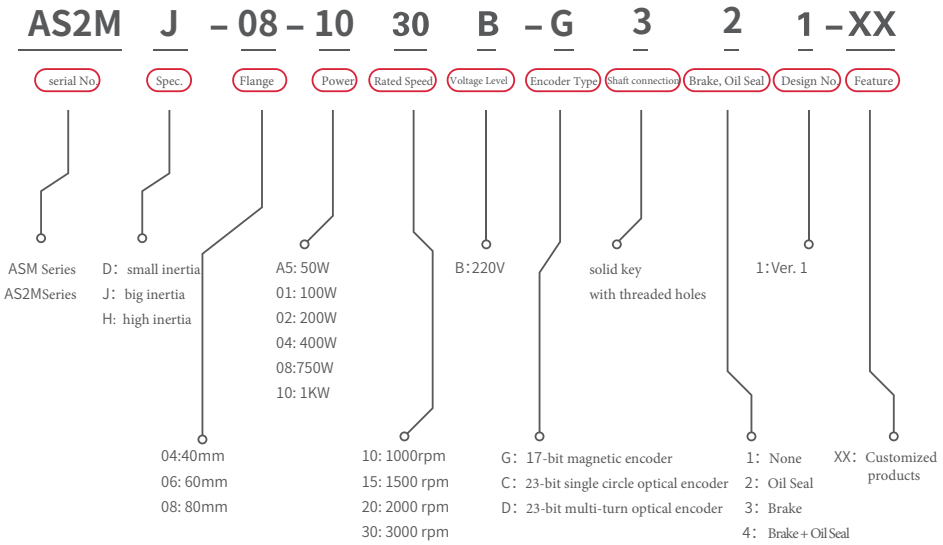
Position Control Mode Wiring



Servo Sysyem Configuration Table

Single phase 220V			
 Size B		 Size C	
AS3-02BAI	AS3-04BAI	AS3-08BAI	AS3-10BAI
			
ASMD-04-A530B AS2MD-04-0130B	AS2MJ-06-0230B AS2MJ-06-0430B	AS2MJ-08-0830B	AS2MJ-08-0830B AS2MJ-08-1030B

Motor Naming Rules

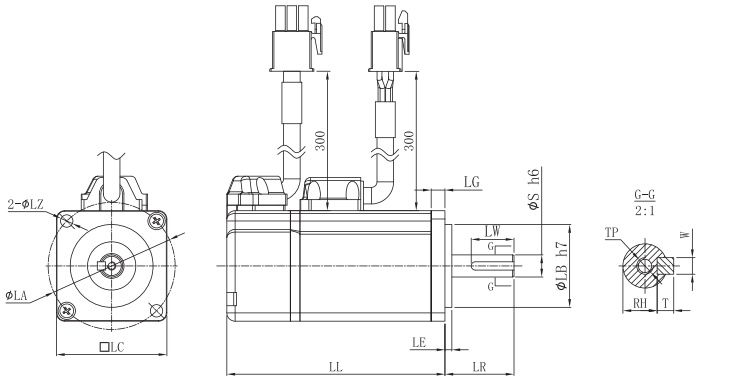


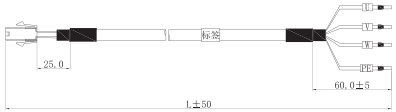
Servo Motor Parameters

Model \ Parameter	Rated Power (KW)	Rated Torque (Nm)	Instantaneous Maximum Torque (Nm)	Rated Curremt (Arms)	Instantaneous Maximum Current (Arms)	Rated Speed (rpm)	Maximum Speed (rpm)	Rotor Inertia (10^{-4}Kgm^2)	Weight (Kg)	Matching Drive Model
17-bit magnetic encoder motor parameters										
40 flange										
ASMD-04-0130B-G311-SA	0.1	0.318	0.954	1.1	3.3	3000	6000	0.046	0.47	AS3-02BAI
60 flange										
ASMJ-06-0230B-G321-SA	0.2	0.64	1.92	1.7	5.1	3000	6000	0.2	1.01	AS3-02BAI
ASMJ-06-0430B-G321-SA	0.4	1.27	3.81	2.8	8.4	3000	6000	0.436	1.42	AS3-04BAI
80 flange										
ASMJ-08-0830B-G321-SA	0.75	2.39	7.17	4.9	14.7	3000	5000	1.43	2.57	AS3-08BAI AS3-10BAI
ASMJ-08-1030B-G321-SA	1.0	3.18	9.52	5.7	17.1	3000	5000	1.63	2.83	AS3-10BAI
17-bit ultra-short magnetic encoder motor parameters										
40 flange										
ASMD-04-A530B-G311	0.05	0.159	0.477	0.67	2.01	3000	5000	0.025	0.4	AS3-02BAI
AS2MD-04-0130B-G321	0.1	0.318	0.954	1.26	3.78	3000	5000	0.043	0.45	AS3-02BAI
60 flange										
AS2MJ-06-0230B-G321	0.2	0.64	1.92	1.67	5.1	3000	5000	0.32	0.93	AS3-02BAI
AS2MJ-06-0430B-G321	0.4	1.27	3.81	2.5	7.5	3000	5000	0.57	1.26	AS3-04BAI
80 flange										
AS2MJ-08-0830B-G321	0.75	2.39	7.17	4.8	14.4	3000	5000	1.69	2.8	AS3-08BAI AS3-10BAI
AS2MJ-08-1030B-G321	1.0	3.18	9.52	6.3	18.9	3000	5000	2.1	2.9	AS3-10BAI
23-bit optical encoder motor parameters										
40 flange										
AS2MD-04-0130B-D321	0.1	0.318	0.954	1.26	3.78	3000	7000	0.043	0.45	AS3-02BAI
60 flange										
AS2MJ-06-0230B-D321	0.2	0.64	1.92	1.67	5.1	3000	7000	0.32	0.93	AS3-02BAI
AS2MJ-06-0430B-C321	0.4	1.27	3.81	2.5	7.5	3000	7000	0.57	1.26	AS3-04BAI
AS2MJ-06-0430B-D321	0.4	1.27	3.81	2.5	7.5	3000	7000	0.57	1.26	AS3-04BAI
80 flange										
AS2MJ-08-0830B-C321	0.75	2.39	7.17	4.8	14.4	3000	6500	1.69	2.8	AS3-08BAI AS3-10BAI
AS2MJ-08-0830B-D321	0.75	2.39	7.17	4.8	14.4	3000	6500	1.69	2.8	AS3-08BAI AS3-10BAI
AS2MJ-08-1030B-D321	1.0	3.18	9.52	6.3	18.9	3000	6500	2.1	2.9	AS3-10BAI

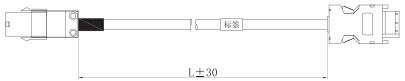
40mm Flange Servo Motor Technical Specifications

Model \ parameter	Encoder Accuracy	Servo Drive Model	Power Cable (Standard Length: 3m)	Encoder Cable (Standard Length: 3m)
ASMD-04-0130B-G311-SA	17 bit magnetic encoder	AS3-02BAI	P1-AS3-03P08M	E1-AS3-03AM
ASMD-04-A530B-G311		AS3-02BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MD-04-0130B-G321		AS3-02BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MD-04-0130B-D321	23-bit optical encoder	AS3-02BAI	P1-AS3-03P08M	E1-AS3-03AM

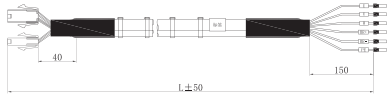




Model：P1-AS3-XXP08M



Model：E1-AS3-XXAM



Model：P1-AS3-XXP08M-S

Note: Cable length is optional. XX=1A5、03、05、08、10

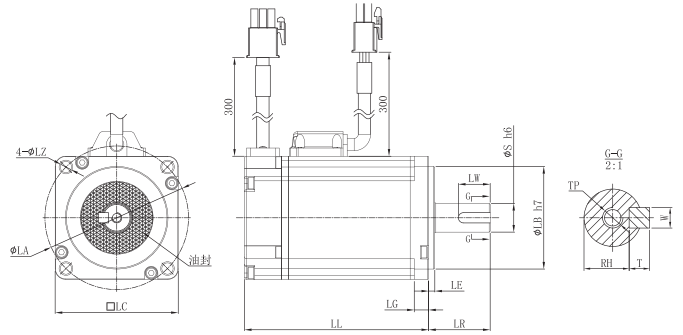
Model	LC	LZ	LA	S	LB	LL	LR	LE	LG	LW	RH	W	T	TP
ASMD-04-0130B-G311-SA	40	4.5	46	8	30	79(109)	25	2.5	5	15.5	6.2	3	3	M3*8
ASMD-04-A530B-G311	40	4.5	46	8	30	73.5(105.5)	25	2.5	5	15.5	6.2	3	3	M3*6
AS2MD-04-0130B-G3*1	40	4.5	46	8	30	79(111)	25	2.5	5	15.5	6.2	3	3	M3*6
AS2MD-04-0130B-D3*1	40	4.5	46	8	30	79(111)	25	2.5	5	15.5	6.2	3	3	M3*6

Note :

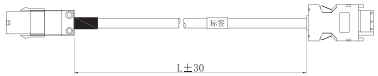
1. If * is 2, then it represents the oil seal. If * is 4, then it represents oil seal + brake. If selecting the servo motor with brake, then please use the power cable P1-AS3-XXP08M-S.
2. LL=(*) In parentheses are the dimensions of the motor with brake.

60mm Flange Servo Motor Technical Specifications

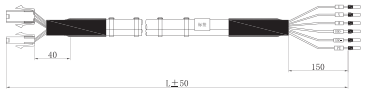
Model \ parameter	Encoder Accuracy	Servo Drive Model	Power Cable (Standard Length: 3m)	Encoder Cable (Standard Length: 3m)
ASMJ-06-0230B-G321-SA	17 bit magnetic encoder	AS3-02BAI	P1-AS3-03P08M	E1-AS3-03AM
ASMJ-06-0430B-G321-SA		AS3-04BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-06-0230B-G321		AS3-02BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-06-0430B-G321		AS3-04BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-06-0230B-D321	23-bit optical encoder	AS3-02BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-06-0430B-C321		AS3-04BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-06-0430B-D321		AS3-04BAI	P1-AS3-03P08M	E1-AS3-03AM



Model：P1-AS3-XXP08M



Model：E1-AS3-XXAM



Model：P1-AS3-XXP08M-S

Note: Cable length is optional. XX=1A5、03、05、08、10

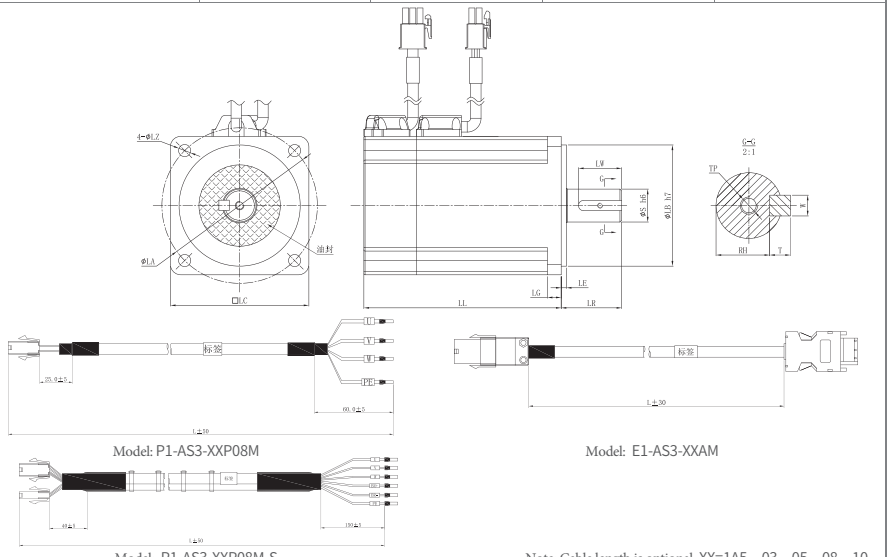
Model	LC	LZ	LA	S	LB	LL	LR	LE	LG	LW	RH	W	T	TP
ASMJ-06-0230B-G3*1-SA	60	5.5	70	14	50	78.5(105)	30	3	7	16.5	11	5	5	M5×8
ASMJ-06-0430B-G3*1-SA	60	5.5	70	14	50	105.5(136)	30	3	7	16.5	11	5	5	M5×8
AS2MJ-06-0230B-G3*1	60	5.5	70	14	50	71.8(99.8)	30	3	7	16.5	11	5	5	M5×8
AS2MJ-06-0430B-G3*1	60	5.5	70	14	50	89.8(117.8)	30	3	7	16.5	11	5	5	M5×8
AS2MJ-06-0230B-D3*1	60	5.5	70	14	50	71.8(99.8)	30	3	7	16.5	11	5	5	M5×8
AS2MJ-06-0430B-C3*1	60	5.5	70	14	50	89.8(117.8)	30	3	7	16.5	11	5	5	M5×8
AS2MJ-06-0430B-D3*1	60	5.5	70	14	50	89.8(117.8)	30	3	7	16.5	11	5	5	M5×8

Note :

1. If * is 2, then it represents the oil seal. If * is 4, then it represents oil seal + brake. If selecting the servo motor with brake, then please use the power cable P1-AS3-XXP08M-S.
2. LL=(*) In parentheses are the dimensions of the motor with brake.

80mm Flange Servo Motor Technical Specifications

parameter / Model	Encoder Accuracy	Servo Drive Model	Power Cable (Standard Length: 3m)	Encoder Cable (Standard Length: 3m)
ASMJ-08-0830B-G321-SA	17 bit magnetic encoder	AS3-08BAI AS3-10BAI	P1-AS3-03P08M	E1-AS3-03AM
ASMJ-08-1030B-G321-SA		AS3-10BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-08-0830B-G321		AS3-08BAI AS3-10BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-08-1030B-G321		AS3-10BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-08-0830B-C321	3-bit optical encoder	AS3-08BAI AS3-10BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-08-0830B-D321		AS3-08BAI AS3-10BAI	P1-AS3-03P08M	E1-AS3-03AM
AS2MJ-08-1030B-D321		AS3-10BAI	P1-AS3-03P08M	E1-AS3-03AM



Model: P1-AS3-XXP08M

Model: E1-AS3-XXAM

Model: P1-AS3-XXP08M-S

Note: Cable length is optional. XX=1A5、03、05、08、10

Model	LC	LZ	LA	S	LB	LL	LR	LE	LG	LW	RH	W	T	TP
ASMJ-08-0830B-G3*1-SA	80	7	90	19	70	114(143)	35	3	8	25	15.5	6	6	M5×8
ASMJ-08-1030B-G3*1-SA	80	7	90	19	70	126(155)	35	3	8	25	15.5	6	6	M5×8
AS2MJ-08-0830B-G3*1	80	6.5	90	19	70	98.5(133)	35	3	8	25	15.5	6	6	M6×10
AS2MJ-08-1030B-G3*1	80	6.5	90	19	70	111.5(146)	35	3	8	25	15.5	6	6	M6×10
AS2MJ-08-0830B-C3*1	80	6.5	90	19	70	98.5(133)	35	3	8	25	15.5	6	6	M6×10
AS2MJ-08-0830B-D3*1	80	6.5	90	19	70	98.5(133)	35	3	8	25	15.5	6	6	M6×10
AS2MJ-08-1030B-D3*1	80	6.5	90	19	70	111.5(146)	35	3	8	25	15.5	6	6	M6×10

Note :

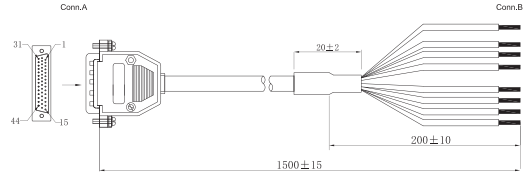
1. If is 2, then it represents the oil seal. If * is 4, then it represents oil seal + brake. If selecting the servo motor with brake, then please use the power cable P1-AS3-XXP08M-S.
2. LL=(*) In parentheses are the dimensions of the motor with brake.

Servo Accessory Kits

Kits Name	Included accessories	pcs	Kits picture	Kits Name	Corresponding cable model	Matched Motor Series
SA-C5	DB head plug plastic shell	1		Adapter between encoder cable and drive	E1-AS3-03AM	40、60、80
	DB head-6P	1				
	AMP-172161-1	1		9P connector plastic shell metal terminal 9P connector tail clip kit		
	AMP-170361-1	10				
	AMP-316454-1	2				
	AMP-172159-1	1		4P connector plastic shell metal terminal 2P connector plastic shell	P1-AS3-03P08M P1-AS3-03P08M-S	
	AMP-170362-1	8				
	AMP-172157-1	1				

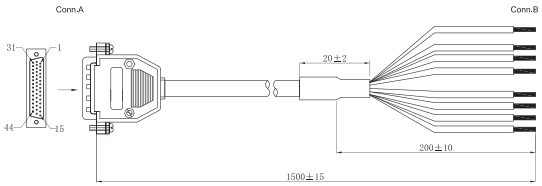
Optional accessory kits	Model	pcs	Kits picture	Kits Name
RJ45-TR	TR8120R45L_PIN4/5#_1/4W_120Ω	1		RS485 terminal resistor

Servo Signal Cable



Model：C2-AS-12P1A5

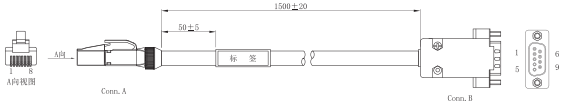
Pin	Color	Definition
1	black	DO4+
26	black/white	DO4-
28	orange/white	DO5+
27	orange	DO5-
8	brown	DI4
33	brown/white	DI5
11	red	DICOM+
35	red/white	PULLHI
37	yellow	SIGH+
39	yellow/white	SIGH-
41	green	PULS+
43	green/white	PULS-



Model：C2-AS-24P1A5

Pin	Color	Definition	Pin	Color	Definition
5	brown/white	DO2+	37	black	SIGH+
4	brown	DO2-	39	grey/black	SIGH-
1	black	DO4+	41	light green	PULS+
26	black/white	DO4-	43	green/black	PULS-
28	orange/black	DO5+	20	green/white	AI1
27	white	DO5-	19	green	analog GND
8	red	DI4	21	blue	PAO+
33	red/white	DI5	22	blue/white	PAO-
32	red/black	DI6	25	purple/white	PBO+
29	pink	differential ground	23	purple	PBO-
11	orange	DICOM+	13	yellow	PZO+
35	orange/white	PULLHI	24	yellow/black	PZO-

Servo PC Communication Cable

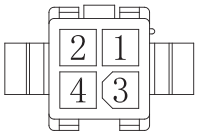
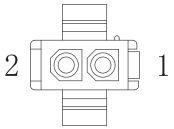


Model：T1-AS2-1A5

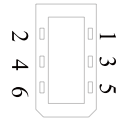
Conn.A	pin definition	Conn.B
6	TXD	2
7	RXD	3
8	GND	5

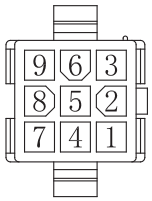
Matching Cable

▪ 伺服电机电源线及抱闸接口 servo power cable

端子引脚分布		适配伺服电机系列	连接器外形图
4 Pin接插件 4 pin connector		40、60、80	Connector Outline Drawing
针脚号 pin No.	信号名称 signal name		
1	U	shell 塑壳：AMP-172159-1 端子：AMP-170362-1 terminal	
2	V		
3	W		
4	PE		
2 Pin接插件 2 pin connector		40、60、80	
针脚号 pin No.	信号名称 signal name		
1	BK+	shell 塑壳：AMP-172157-1 端子：AMP-170362-1 terminal	
2	BK-		

▪ 伺服电机编码器线接口 servo encoder cable

引脚 pin	编码器信号 encoder signal	功能描述 Function description	图片 picture
1	+5V	+5V电源输出 +5V Power Output	
2	GND	电源GND输出 Power GND output	
5	SD+	编码器信号 encoder signal	
6	SD-		
外壳	PE		

端子引脚分布		适配电机系列	连接器外形图
9 Pin接插件 9 pin connector		40、60、80	
针脚号 pin No.	17Bit信号 17-bit signal		
2	SD+	shell 塑壳：AMP-172161-1 端子：AMP-170361-1 terminal	
5	SD-		
9	+5V		
8	GND		
7	PE		