ALPHA

Shenzhen ALPHA Electric Co.,Ltd

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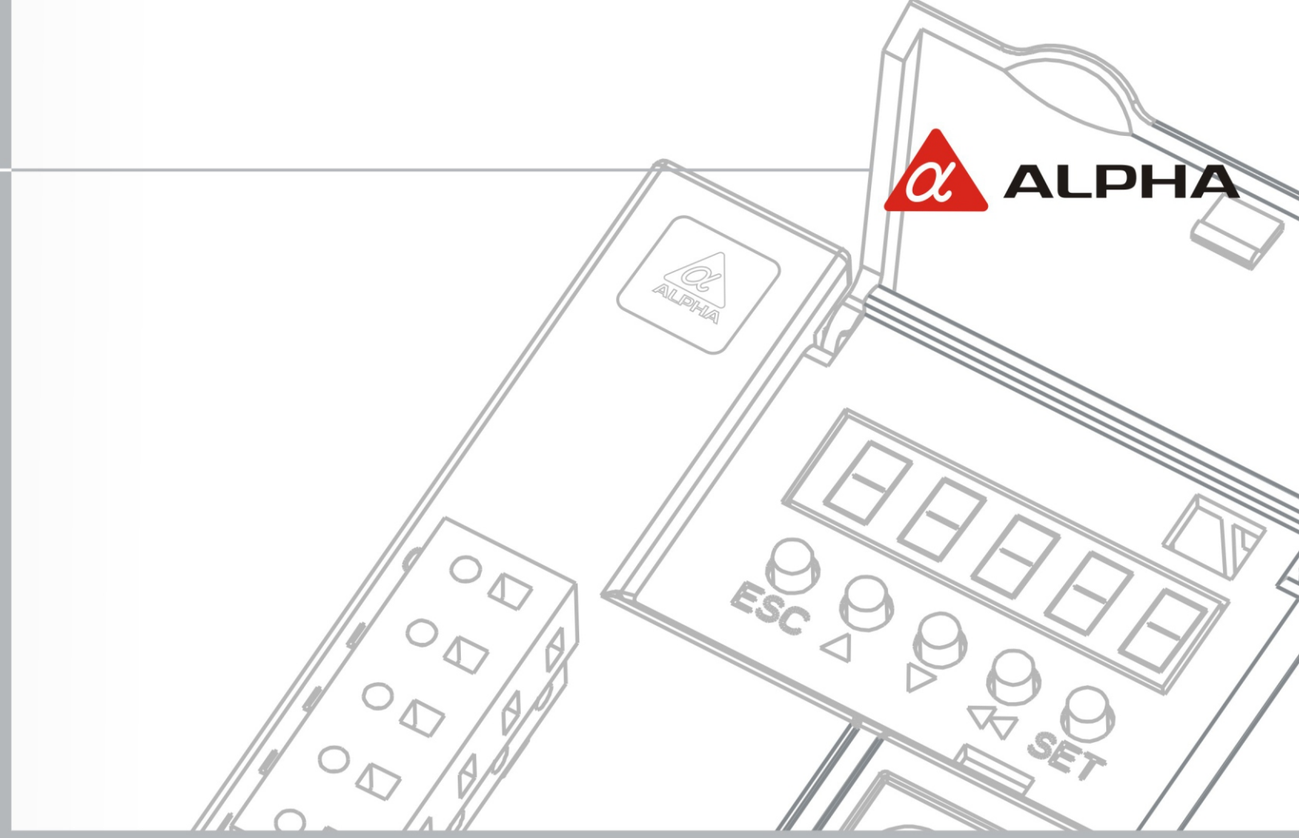
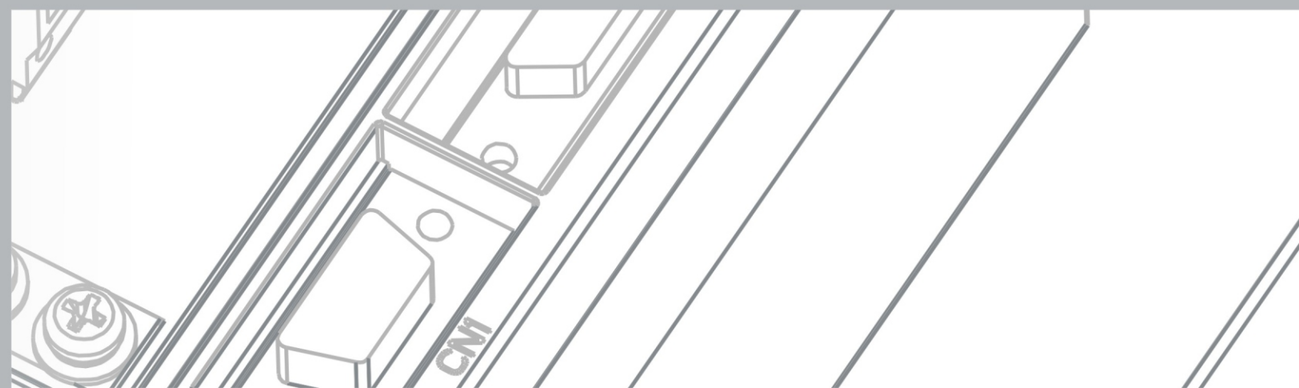


AS100N

AC Servo System



ALPHA

Company Profile

Shenzhen ALPHA Electric Co.,Ltd was established in 2000, and owns more than 30 subsidiaries and 50 after-sale service centers across China. Our headquarter is located in Longhua district of Shenzhen City and has another 2 manufacturing bases are located in Zhejiang Province and Jiangxi Province. The company employs more than 500 people, of which about 60 percent are technology staff.

Our main business is in the design, development, and sales of industrial automation, power assembly of new energy automobile, and intelligent elevator control system. Meanwhile, as a High-Tech enterprise, we put a lot of focus in R&D expenditures. We have several comprehensive laboratories, we have introduced the advanced technology from both domestic and abroad, we also allied with a number of scientific research institutions and universities.

Through years of efforts, our professional sales and after-sale service teams help Alpha not only gain the customers recognition by reliable products, but also gain the customers trust by premium services. In the future, we will continue to serve our partners with professional spirit and excellent services based on industrial automation, new energy vehicle, and elevator control fields, achieve win-win collaboration.

Product Introduction

AS100N Series AC Servo System consists of the AC drive and the permanent magnet synchronous servo motor.AS100N ac servo driver is equipped with 32-bit high performance digital signal processor (DSP)、complex programmable logic device(CPLD)and latest IPM,it has the characteristics of high integration, small volume, perfect protection and good reliability etc。The control software integrates advanced current control technology, optimal PID algorithm and optimized filtering algorithm to ensure high dynamic response and adaptability of the servo system, to meet the needs of a wider range of applications, and the comprehensive performance has reached the leading level of similar products in the country.

Features

- AS100N is equipped with high performance digital signal processor (DSP)、complex programmable logic device(CPLD),it has high integration, good reliability, small size and easy installation.
- Advanced dual-regulation current control algorithm,lager current loop bandwidth.
- Optimized PID control algorithm increases accuracy and dynamic performance of position and velocity control.
- Up-to -date IPM/SPM provides complete protections,strong over-load capacity and outstanding reliability.
- Wide speed range, minimum speed up to 0.1 rpm, speed range up to 1:10000.
- Fast dynamic response,low speed instability under sudden increased load.
- Full digital control, stable and reliable, real-time.
- Inbuilt multi-steps position function easily realizes multi-dots trajectory planning and fixed length control.
- Inbuilt multi-steps velocity function easily realizes programmable velocity control.
- Inbuilt brake unit in whole range.
- The pulse output can be arbitrarily divided, and the output pulse is stable and accurate.
- Complete monitoring functions for the convenience of debugging and diagnosis.

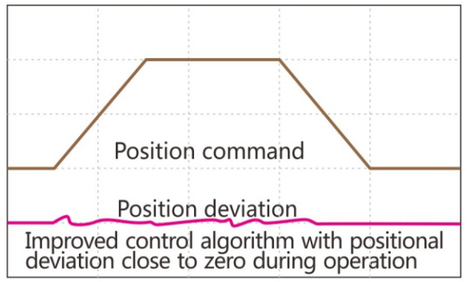
Application

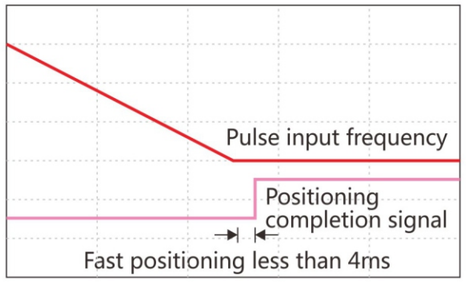
- **CNC:**Carving machine, Engraving machine, spring machine, electric spark, wire cutting,flying shear equipment, etc.
- **Textile machinery:** knitting machine, flat knitting machine, hosiery machine, garden side machine, embroidery machine, spinning machine, etc.
- **Packaging machinery:** filling machine, fixed length cutting machine, tissue machine, etc.
- **Electronic equipment:** winding machine, stripping machine, dispensing machine, etc.
- **Printing equipment:** screen printing machine, overprinting machine, pad printing machine, etc.
- **Laser machinery:** marking machine, cutting machine, etc.
- **Plastic machinery:** injection molding machine, blowing machine, extruder, etc.
- Equipment to improve driving performance: replace frequency inverter, stepper motor, replace cylinder, hydraulic device, etc

Special Characteristics

• Precise positioning

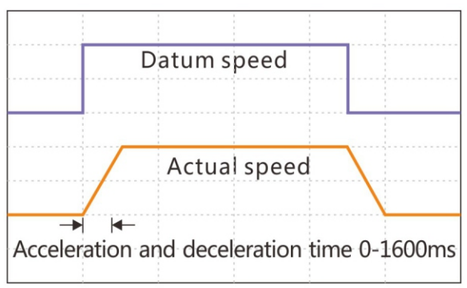
Feedforward control technology is used to greatly shorten the positioning time and the following error during motion.





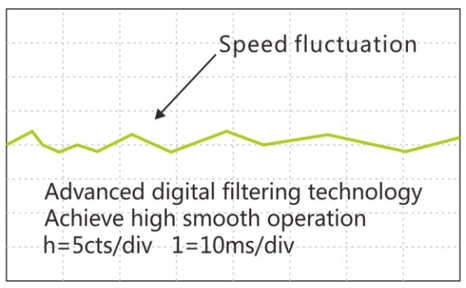
• Multi-functional

Built-in speed planning function to reduce the impact caused by acceleration and deceleration.



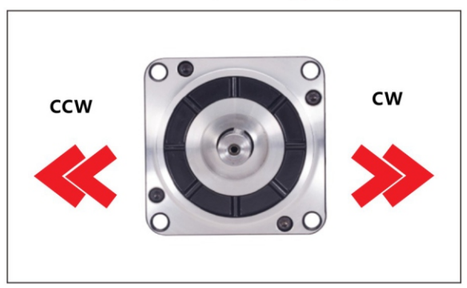
• Stable and reliable

Advanced control algorithms and digital filtering technology make the motor run more smoothly.



• Easy to use

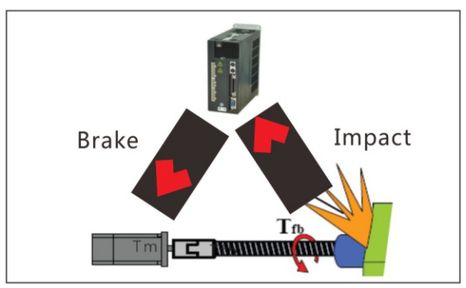
Test run function,
JOG function for easy debugging



Through the keyboard control motor inching or continuous movement

• Perfect protection

Safe protection mechanism, real-time motion status monitoring ensures safe operation of equipment



Naming rules of the servo drive are as below

AS100N	-	5R5	M2	U
Series CodeAlpha Servo 100Series		**Rated Output Current** 2R8: 2.8A 3R8: 3.8A 5R5: 5.5A 7R6: 7.6A 012: 12A 3R5: 3.5A 5R4: 5.4A 8R4: 8.4A	**Input Voltage** S2: Single-phase 220V T2: Three-phase 220V T3: Three-phase 380V M2: Single/three-phase 220V	**Encoder Type** U: 2500CPR standard inc. Enc. V: 2500CPR wire-saving inc. Enc.

Naming rules of the servo drive are as below

ASMG	-	R75	B	30	U	2	P
①		②	③	④	⑤	⑥	⑦

① Series Code:
ASMG=Medium Inertia AC Servo Motor of Alpha
ASMH=High Inertia AC Servo Motor of Alpha
ASMS=Low Inertia AC Servo Motor of Alpha

② Output Power:
Three figures or two figures plus R (decimal point) are employed to represent the rated output power of the motor, which is in KW.
e.g.: R75 refers to 0.75KW, 1R0 to 1.0KW, and 1R5 to 1.5KW.

③ Voltage Class:
One letter is used to represent the voltage class.
A=100V, B=220V, C=380V

④ Rated Speed:
Two figures are used to express rated speed.
To be specific, rated speed= the double digit × 100, in rpm.

⑤ Encoder Type:
Encoder type is represented by one letter.
U: 2500 CPR standard incremental encoder
V: 2500 CPR wire-saving incremental encoder

⑥ Design Sequence:
Design sequence is represented by a figure or a letter.
1=standard S-type design, 2=standard E-type design, others: non-standard designs

⑦ Option
Option is represented by a letter.

Option code	No oil seal No brake	No oil seal With brake	With oil seal No brake	With oil seal With brake
Circular shaft (withscrew holes)	A	B	C	D
Keyway	E	F	G	H
Keyway (with screwholes)	P	Q	R	S

Servo drive specifications

• 220V series servo drive specification

Drive model	AS100N-2R8M2U	AS100N-3R8M2U	AS100N-5R5M2U	AS100N-7R6T2U	AS100N-012T2U
Encoder specifications	2500 CPR standard incremental encoder				
Drive model	AS100N-2R8M2V	AS100N-3R8M2V	AS100N-5R5M2V	AS100N-7R6T2V	AS100N-012T2V
Encoder specifications	2500 CPR wire-saving incremental encoder				
Rated output current	2.8A	3.8A	5.5A	7.6A	12A
Maximum overload current	9.3A	11A	16.9A	17A	28A
Structure model	A	B			C
Main loop circuit	Single/three phase AC220V (-15~+15%),50 / 60Hz			Three phase AC220V (-15~+15%),50 / 60Hz	
Control loop circuit	Single phase AC220V(-15~+15%),50 / 60Hz				
Regenerative braking function	No built-in braking resistor,need external	Standard built-in braking resistor			

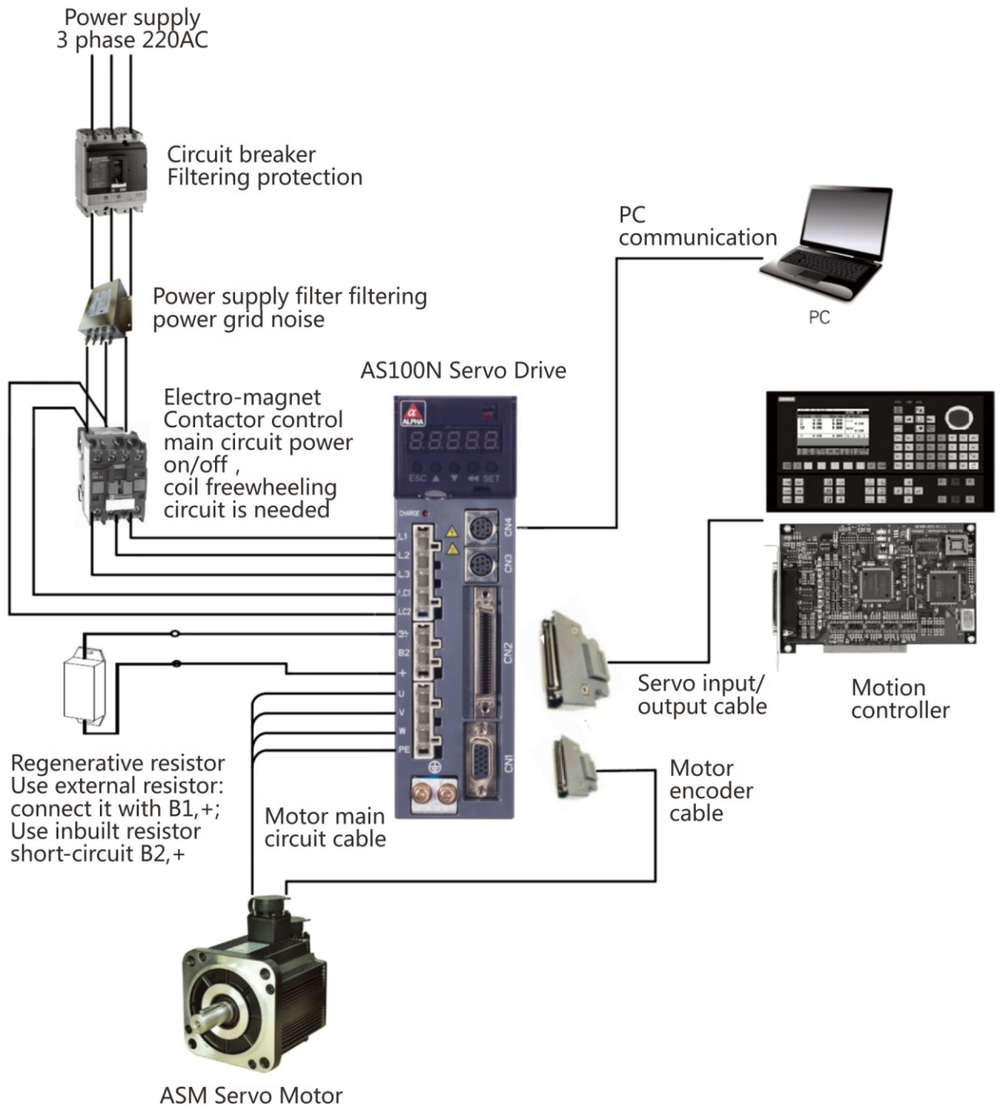
• 380V series servo drive specification

Drive model	AS100N-3R5T3U	AS100N-5R4T3U	AS100N-8R4T3U
Encoder specifications	2500 CPR standard incremental encoder		
Drive model	AS100N-3R5T3V	AS100N-5R4T3V	AS100N-8R4T3V
Encoder specifications	2500 CPR wire-saving incremental encoder		
Rated output current	3.5A	5.4A	8.4A
Maximum overload current	8.5A	14A	20A
Structure model	C		
Main loop circuit	Three phase AC380V (-15~+10%),50 / 60Hz		
Control loop circuit	Single phase AC380V (-15~+10%),50 / 60Hz		
Regenerative braking function	Standard built-in braking resistor		

• Servo drive general technical specification

Service environment	Temperature and humidity	Woking temperature:0~45℃ Storage temperature:-20~80℃ ; Humidity:less than 90%(Non condensation)
	Vibration	Less than 4.9m/S ² (0.5G) , 10~60HZ
Control Mode		SVPWM current vector control
Basic control mode		Position control,velocity control,torque control,internal multi-steps position control,internal multi-steps speed control
Control characteristics		Speed frequency response:600HZ (when load rotational inertia=motor rotational inertia)
		Speed fluctuation rate: < ±0.03% (load 0~100%); < ±0.02% (power supply -15%~+10%) (percentage relative to rated speed)
		Pulse input frequency:≤500KHz , Analog voltage input:+/-10V
Control Input		Servo enable S-ON;Alarm clear:ALM-RST; Positive travel limit:P-OT; Negative travel limit:N-OT;Deviation counter clear:CLR; Command pulse disabled:PINH; The second electro-gear ratio:GR2; Zero speed clamping under analog speed mode:ZCLAMP; Rotation reversing under internal speed mode; Forward startup under analog speed mode; Reversed startup under analog speed mode; Multi-steps selection CMD1~4;Origin search enable;Origin signalinput
Control output		Servo ready output; Servo alarm output; Positioning completion output/speedarrival output ; Origin search completed
Position control	Input command mode	1.Pulse+ Direction 2. CCW pulse/CW pulse 3.A/B two phases orthogonal pulse
	Electronic gear ration	1~32767/1~32767
	Internal multi-steps position	16 steps programmable position
	Feedback pulse	10000 pulse/rotation
Speed control		8 patterns internalspeed,programmable running
Acc./Dec fuction		Accelerating/decelerating ramp time:1~16000ms adjustable
Monitoring and display		Motor speed,current position,position command, position deviation,motor torque,motor current,current control mode, position command pulse frequency,speed command , torque command,absolute position of rotor,input terminal status, output terminal status,encoder UVW input signal, encoder zero correction pulse,fault code display,etc.
Protection fuction		Module fault,over/under-voltage,hardware/software over-current, no current in analog channel A/channel B, over speed tolerance, overposition tolerance,CPLD fault encoder fault, speed regulator saturation fault,current regulator saturation fault ,etc.
Display operation		5 digits LED display,5 buttons
Communication mode		RS485
Applicable load inertia		Less than 5 times of motor inertia

System Architecture



Model Selection

Supply voltage	Motor model	Flange	Power (kW)	Rotate speed (rpm)	Rated torque (Nm)	Encoder cable	Motor power cable	Servo drivers
1/3 phase 220V	ASMS-R40B30U3R	60	0.4	3000	1.3	CB100E-E-3000	CB100M-E-3000	AS100N-2R8M2U
	ASMS-R75B30U3R	80	0.75	3000	2.4			AS100N-3R8M2U
	ASMS-1R0B25U3R	80	1	2500	4			AS100N-5R5M2U
	ASMS-1R2B30U3R	110	1.2	3000	4	CB100E-F-3000	CB100M-F-3000	
	ASMH-1R0B25U3R	130	1	2500	4			
	ASMG-1R3B25U3R	130	1.3	2500	5			
3 phase 220V	ASMS-1R5B30U3R	110	1.5	3000	5			AS100N-7R6T2U
	ASMG-1R8B30U3R	110	1.8	3000	6			
	ASMH-1R5B15U3R	130	1.5	1500	10			
	ASMG-1R5B25U3R	130	1.5	2500	6			
	ASMG-2R0B25U3R	130	2	2500	7.7			
	ASMG-2R6B25U3R	130	2.6	2500	10			AS100N-012T2U
	ASMH-3R0B15U3R	180	3	1500	19		CB100M-G-3000	
3 phase 380V	ASMH-1R0C25U3R	130	1	2500	4		CB100M-F-3000	AS100N-3R5T3U
	ASMS-1R5C30U3R	110	1.5	3000	5			AS100N-5R4T3U
	ASMG-2R2C25U3R	130	2	2500	7.7			
	ASMG-3R8C25U3R	130	3.8	2500	15			AS100N-8R4T3U

Remarks:

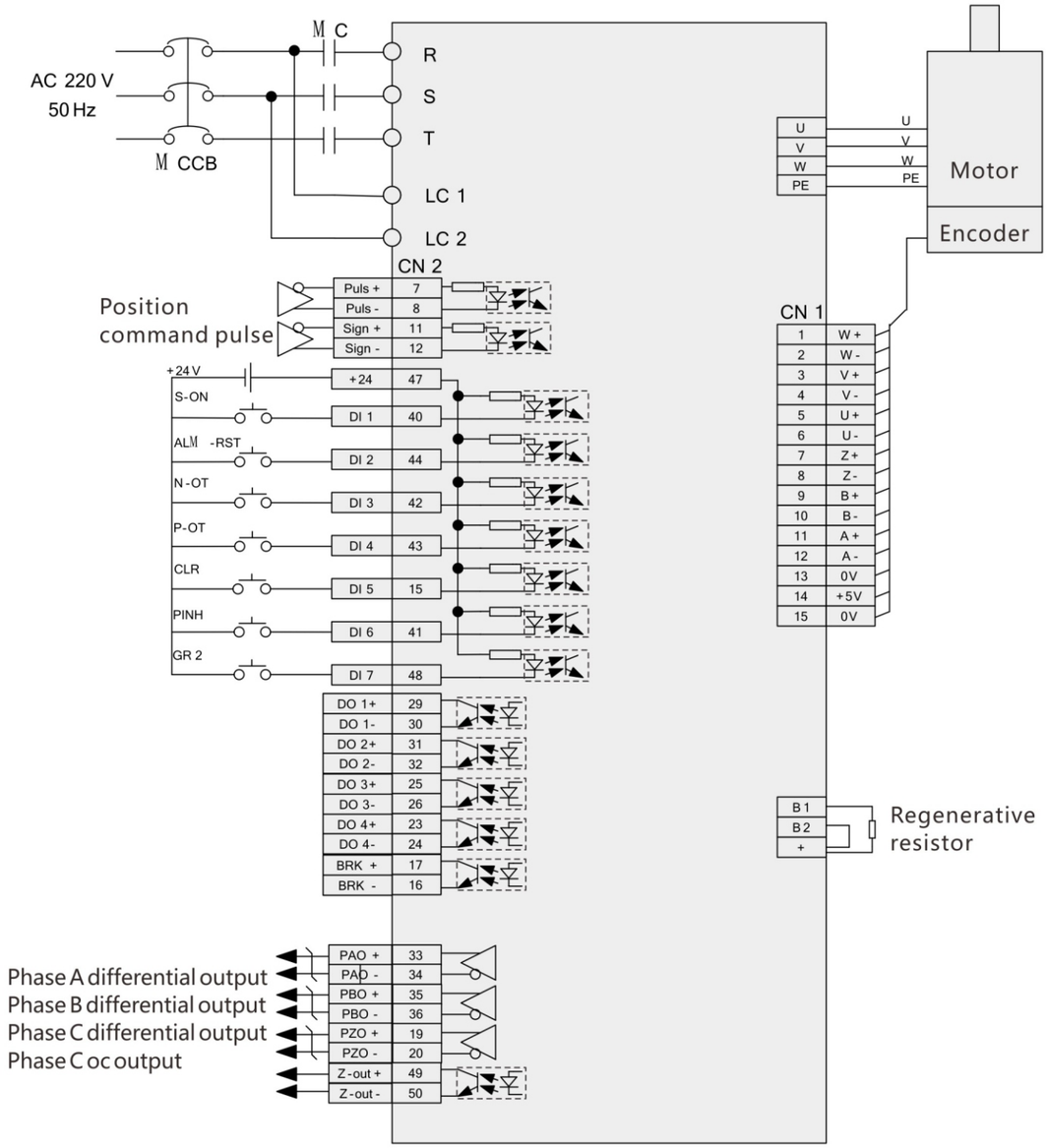
1) Servo motor performance parameters, installation dimensions, etc. Refer to the servo motor manual for details.

2) The last letter of the motor model is the motor option, which is listed in the table as the standard stock motor model.

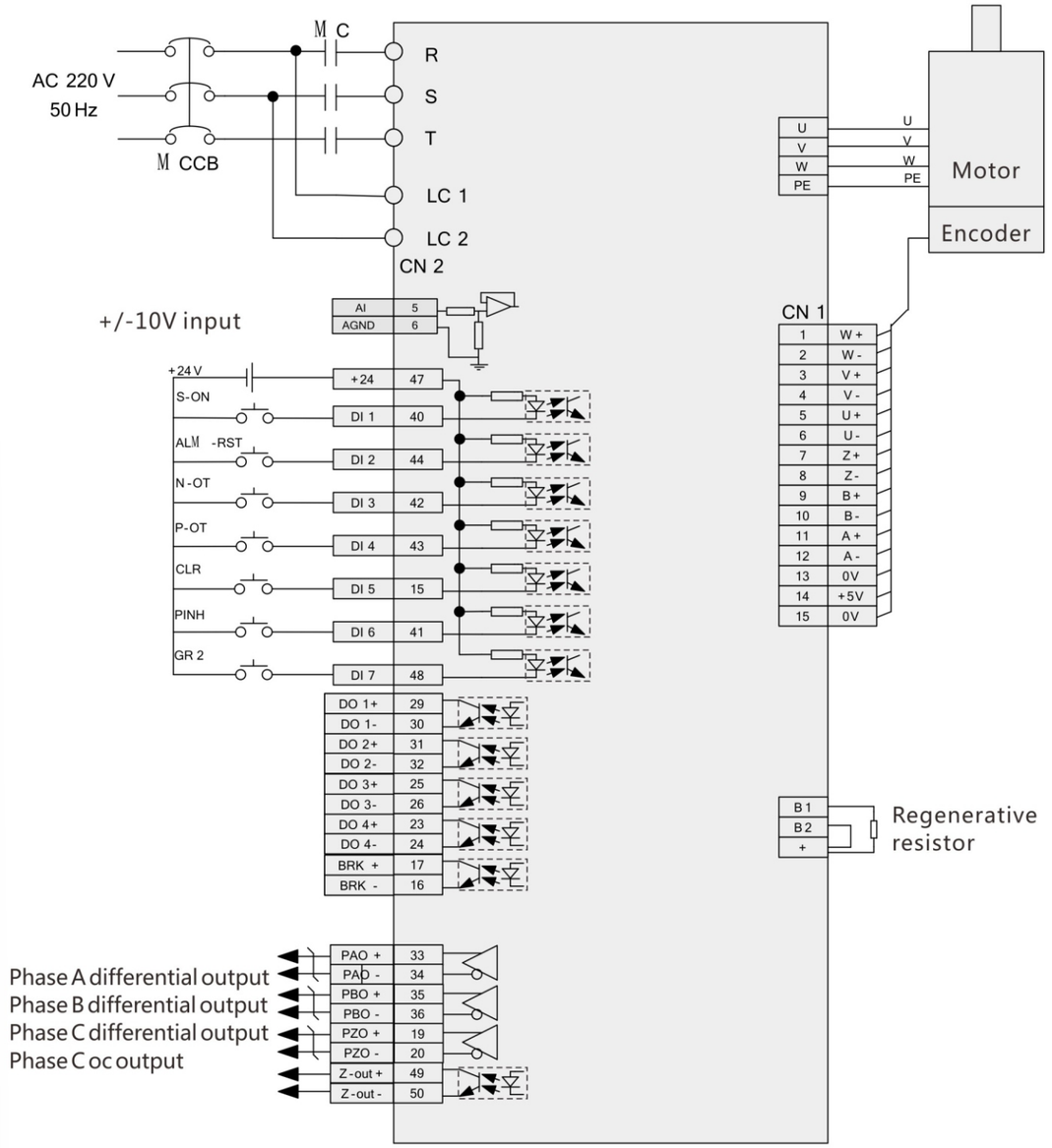
3) Motor option description:
P-no oil seal, no brake, with keyhole screw fixing hole;
Q-no oil seal, with brake, with keyway screw fixing hole;
R-with oil seal, no brake, with keyway screw fixing hole;
S- with oil seal, with brake, with keyway screw fixing hole.

Servo driver standard wiring

• Position mode



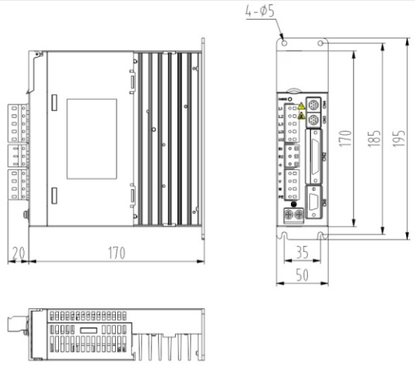
• Speed mode and torque mode



Appearance dimension and installation dimension of drive

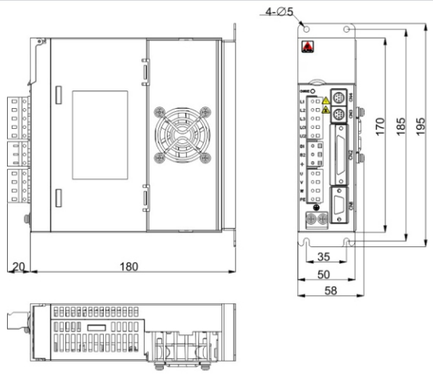
• Type -A Structure

Applicable to Single-phase 220V
grade: AS100A- 1R6M2U
AS100A-2R8M2U



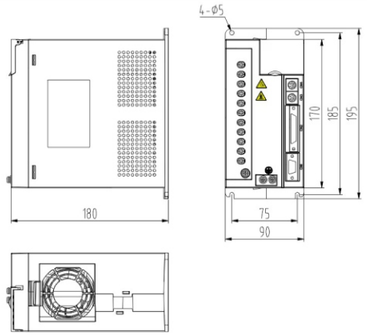
• Type -B Structure

Applicable to Three-phase 220V
grade: AS100A-3R8M2U,
AS100A-5R5M2U and
AS100A-7R6T2U



• Type -B Structure

Applicable to Three-phase 220V
grade: AS100A-012T2U
Three-phase 380V
grade: AS100A-3R5T3U
AS100A-5R4T3U
AS100A-8R4T3U

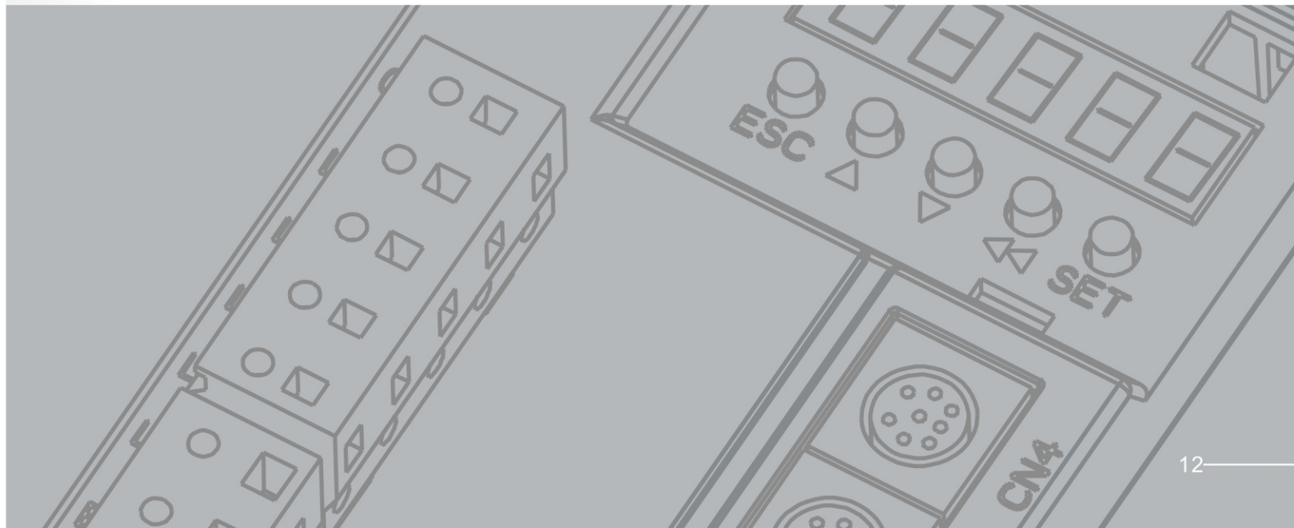


Servo motor parameter table

• 220V series motor parameter table

Motor type	Motor code	Power (kW)	Rated speed (rpm)	Rated torque (Nm)	峰值转矩 (Nm)	Rated current (A)	Moment of inertia (Kg.cm)	Number of motor poles	Motor length (mm)	Flange number
ASMS-R40B30U3	E2	0.4	3000	1.27	3.8	2.8	0.29	8	137	60
ASMS-R75B30U3	E3	0.75	3000	2.4	7.1	3	1.83	8	151	80
ASMS-1R0B25U3	E5	1.0	2500	4	12.0	4.4	2.97	8	191	80
ASMH-1R0B25U3	E7	1.0	2500	4	12.0	4	8.5	8	166	130
ASMS-1R2B30U3	E8	1.2	3000	4	12.0	5	5.4	8	189	110
ASMG-1R3B25U3	E10	1.3	2500	5	15.0	5	10.6	8	171	130
ASMS-1R5B30U3	E11	1.5	3000	5	15.0	6	6.3	8	204	110
ASMG-1R8B30U3	E11	1.8	3000	6	18.0	6	7.6	8	219	110
ASMG-1R5B25U3	E12	1.5	2500	6	18.0	6	12.6	8	179	130
ASMH-1R5B15U3	E13	1.5	1500	10	25.0	6	19.4	8	213	130
ASMG-2R0B25U3	E14	2.0	2500	7.7	22.0	7.5	15.3	8	192	130
ASMG-2R6B25U3	E15	2.6	1500	10	25.0	10	19.4	8	209	130
ASMH-3R0B15U3	E18	3.0	1500	19	47.0	12	38	8	232	180

Remarks:
1) The last of the motor model indicates the motor option, see the motor naming rules.
2) The length of the motor in the above table is the size without the brake. If the brake is used, the motor length is increased. See the rear motor size data for details.

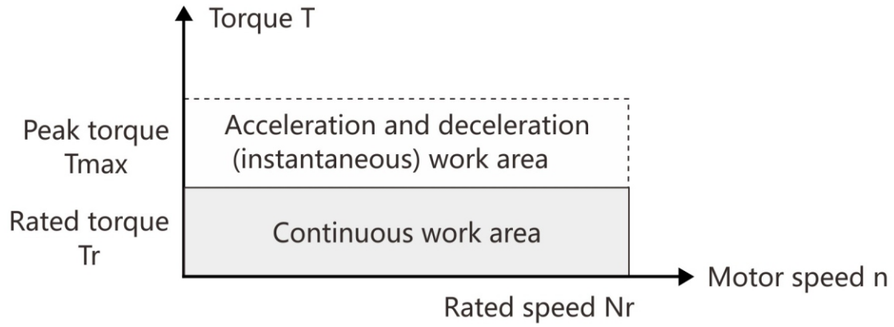


• 380V series motor parameter table

Motor type	Motor code	Power (kW)	Rated speed (rpm)	Rated torque (Nm)	峰值转矩 (Nm)	Rated current (A)	Moment of inertia (Kg.cm)	Number of motor poles	Motor length (mm)	Flange number
ASMS-1R5C30U3	E32	1.5	3000	5	15.0	4.5	6.3	8	204	110
ASMH-1R0C25U3	E34	1	2500	4	12.0	2.6	8.5	8	166	130
ASMG-2R0C25U3	E39	2	2500	7.7	22.0	4.7	15.3	8	192	130
ASMG-3R8C25U3	E43	3.8	2500	15	30.0	7.4	27.7	8	231	130

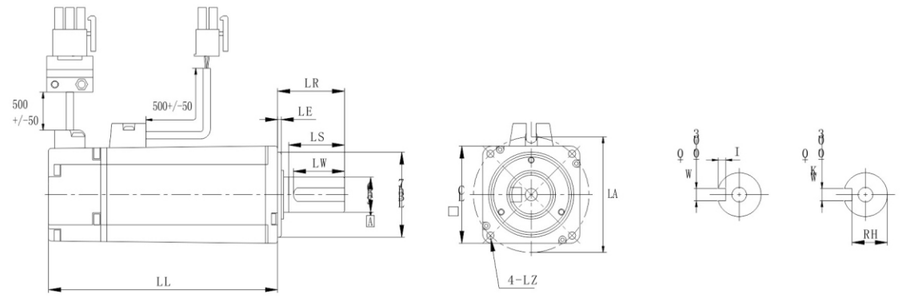
Remarks:
1) The last of the motor model indicates the motor option, see the motor naming rules.
2) The length of the motor in the above table is the size without the brake. If the brake is used, the motor length is increased. See the rear motor size data for details.

» Torque characteristic curve of servo motor

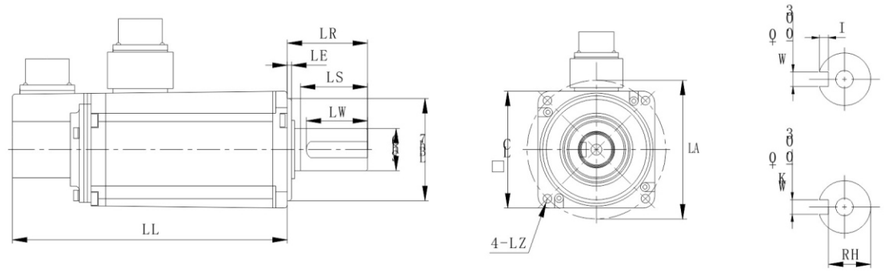


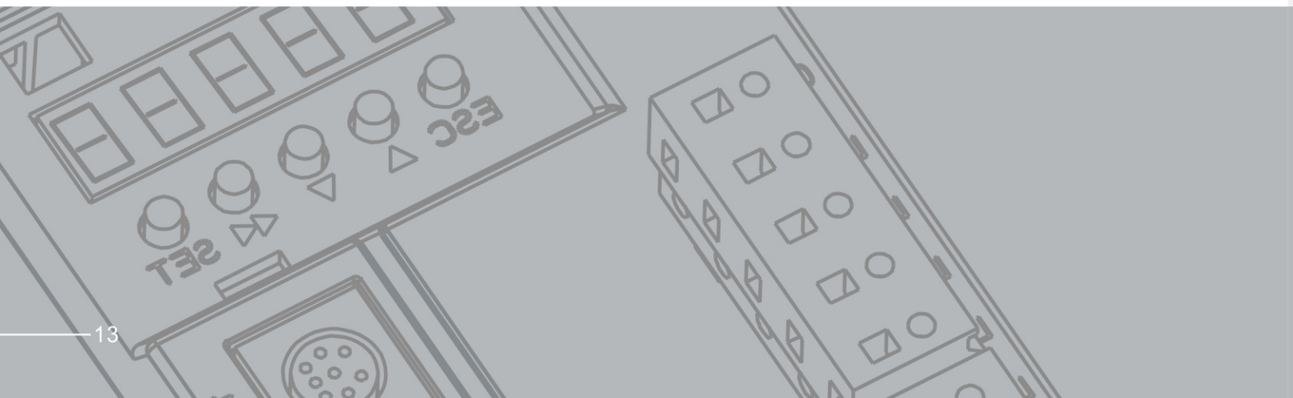
» Servo motor shape and installation size

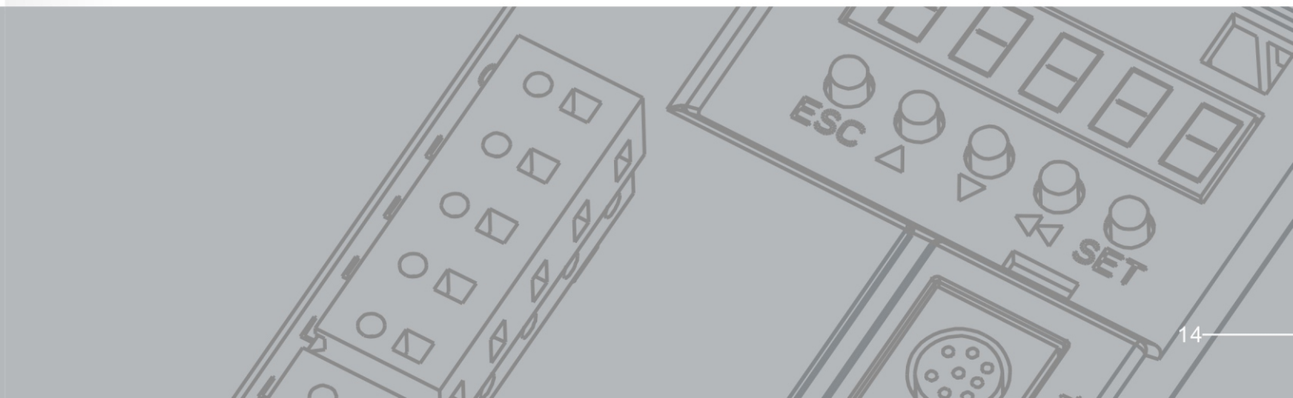
• 90 below flange motor outline drawing



• 110-180 flange motor outline drawing







• 220V series servo motor size (unit: mm)

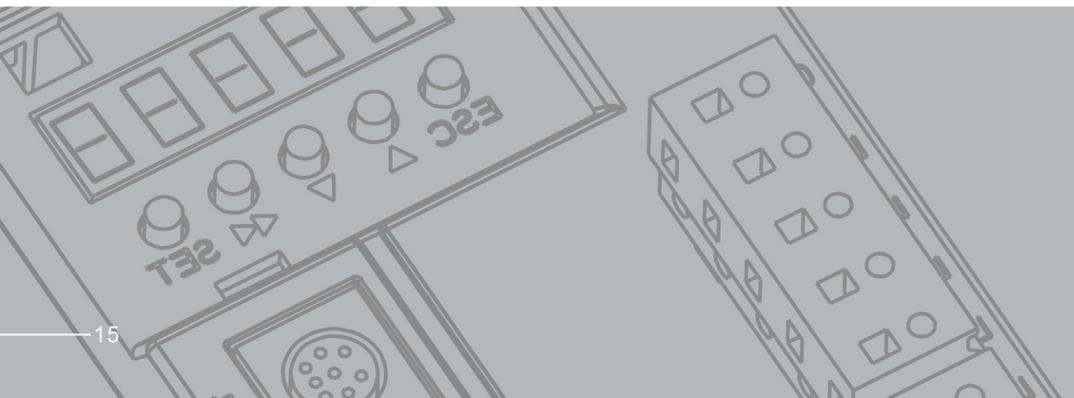
Motor type	LC	RH	LB	LA	LZ	S	LL	LS	LR	LE	W(K)	T
ASMS-R40B30U3	60	11	50	70	5.5	14	138	25	30	3	5	5
ASMS-R75B30U3	80	15.5	70	90	6	19	151	32	35	3	6	6
ASMS-1R0B25U3	80	15.5	70	90	6	19	191	32	35	3	6	6
ASMS-1R2B30U3	110	15.5	95	130	9	19	189	50	55	5	6	6
ASMS-1R5B30U3	110	15.5	95	130	9	19	204	50	55	5	6	6
ASMG-1R8B30U3	110	15.5	95	130	9	19	219	50	55	5	6	6
ASMH-1R0B25U3	130	18.5	110	145	9	22	166	52	57	5	6	6
ASMG-1R3B25U3	130	18.5	110	145	9	22	171	52	57	5	6	6
ASMG-1R5B25U3	130	18.5	110	145	9	22	179	52	57	5	6	6
ASMH-1R5B15U3	130	18.5	110	145	9	22	213	52	57	5	6	6
ASMG-2R0B25U3	130	18.5	110	145	9	22	192	52	57	5	6	6
ASMG-2R6B25U3	130	18.5	110	145	9	22	209	52	57	5	6	6
ASMH-3R0B20U3	150	24	130	165	11	28	230	53	58	5	8	7

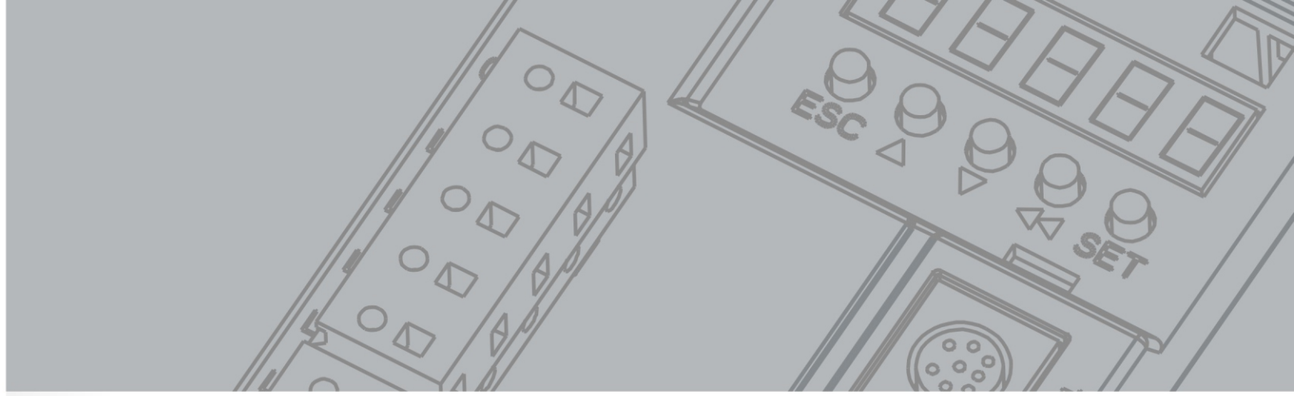
Remarks:

1)The last of the motor mode lindicates the motor option, see the motor naming rules.

2)The dimension LL in the above table is the length dimension without the brake.
If with brake, the motor length dimension is increased as follows.

Motor Spec. (Flange No/torque)	60	80	90	110	130/ 4~7.7Nm	130/ 10~15Nm	150	180
Increased length	48mm	54mm	57mm	74mm	57mm	81mm	73mm	72mm





» Servo motor shape and installation size

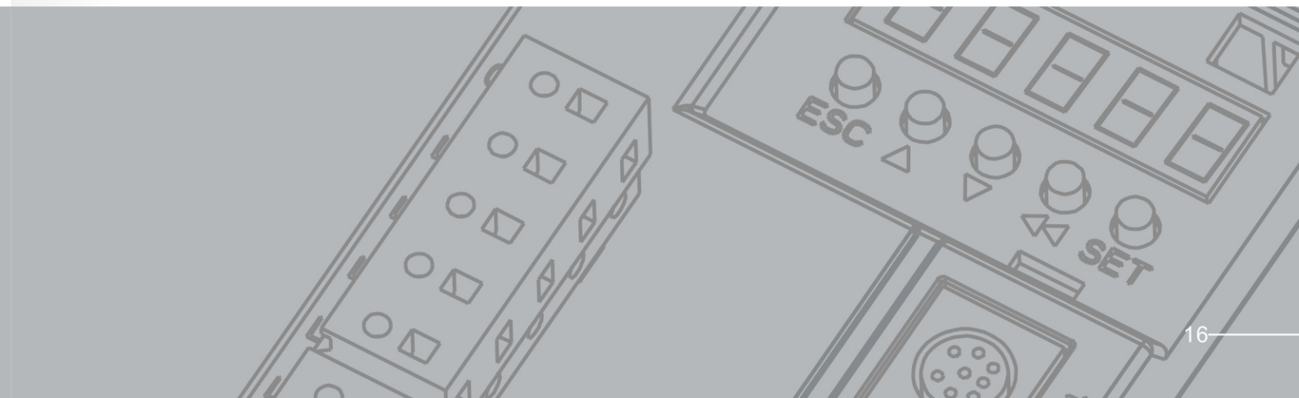
• 380V series servo motor size (unit: mm)

Motor type	LC	RH	LB	LA	LZ	S	LL	LS	LR	LE	W	T
ASMS-1R5C30U3	110	15.5	95	130	9	19	204	50	55	5	6	6
ASMH-1R0C25U3	130	18.5	110	145	9	22	166	52	57	5	6	6
ASMG-2R0C25U3	130	18.5	110	145	9	22	192	52	57	5	6	6
ASMG-3R8C25U3	130	18.5	110	145	9	22	231	52	57	5	6	6

Remarks:

1) The last of the motor model indicates the motor option, see the motor naming rules.
2) The dimension LL in the above table is the length dimension without the brake.
If with brake , the motor length dimension is increased as follows:

Motor Spec. (Flange No/torque)	110	130/ 4~7.7Nm	130/ 10~15Nm	150	180
Increased length	74mm	57mm	81mm	73mm	72mm



Servo driver link cable

• 90 flange motor cable

Cable Model	Name	Length	Profile
CB100E-E-3000	Encoder cable	3M	
CB100E-E-5000		5M	
CB100E-E-6000		6M	
CB100E-E-8000		8M	
CB100E-E-10000		10M	
CB100M-E-3000	Motor power cable	3M	
CB100M-E-5000		5M	
CB100M-E-6000		6M	
CB100M-E-8000		8M	
CB100M-E-10000		10M	

• 110-150 flange motor cable

Cable Model	Name	Length	Profile
CB100E-F-3000	Encoder cable	3M	
CB100E-F-5000		5M	
CB100E-F-6000		6M	
CB100E-F-8000		8M	
CB100E-F-10000		10M	
CB100M-F-3000	Motor power cable	3M	
CB100M-F-5000		5M	
CB100M-F-6000		6M	
CB100M-F-8000		8M	
CB100M-F-10000		10M	

• 180 flange motor cable

Cable Model	Name	Length	Profile
CB100E-F-3000	Encoder cable	3M	
CB100E-F-5000		5M	
CB100E-F-6000		6M	
CB100E-F-8000		8M	
CB100E-F-10000		10M	
CB100M-G-3000	Motor power cable	3M	
CB100M-G-5000		5M	
CB100M-G-6000		6M	
CB100M-G-8000		8M	
CB100M-G-10000		10M	

Remarks :
3m length cable is standard, 5m, 6m, 8m, 10m is the common length.
Other lengths are non-standard

Brake resistor specification

• 220V series servo drive braking resistor specification table

Drive model	Built-in braking resistor	Allowable minimum resistance	External braking resistor recommended specifications
AS100N-2R8M2U	None	50Ω	60Ω / 100W
AS100N-3R8M2U	40Ω / 60W	40Ω	40Ω / 200W
AS100N-5R5M2U			
AS100N-7R6T2U			
AS100N-012T2U	20Ω / 100W	20Ω	20Ω / 400W

• 380V series servo drive braking resistor specification table

Drive model	Built-in braking resistor	Allowable minimum resistance	External braking resistor recommended specifications
AS100N-3R5T3U	100Ω / 100W	80Ω	100Ω / 300W
AS100N-5R4T3U			100Ω / 400W
AS100N-8R4T3U		40Ω	50Ω / 600W

Remarks:
1) The resistance of the external braking resistor should not be less than the minimum allowable value, otherwise the drive will be damaged.
2) When using an external braking resistor, it must be ensured that the built-in braking resistor has been disconnected. For details, please refer to the servo driver manual.
3) The power of the external braking resistor should be determined according to the actual operating conditions of the servo system.