STEP®

SATISFY CUSTOMERS · CREATE THE FUTURE

杭州之山智控技术有限公司
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ZSMC Offcial Account

STEP®

之山智控
STEP-ZSMC
ZHISHAN

ZSMC SERVO PRODUCT MANUAL 2021V1.0

High Efficiency Comes From Reliability Concentration Drives the Future

STEP®

ABOUT STEP

Shanghai STEP Electric Corporation was founded in 1995 with the registered trademark of STEP®, and has been awarded with titles of National High-tech Enterprise, National Innovative Enterprise, National Enterprise Technology Center.

In December of 2010, STEP has been listed in Shenzhen Stock Exchange with stock name STEP and stock code No. 002527.

STEP has set R&D centers in China, Germany and Japan etc., possesses postdoctoral research stations and technical laboratories certificated by China CNAS and American UL. STEP is also a member of National Robotic Standardization General Working Group and National Technical Committee 196 on Elevators of Standardization Administration, vice chairmans of China Robot Industry Alliance, Shanghai Robot Industry Association and Shanghai Intelligent Manufacturing Industry Association.

STEP is committed to be a well-known domestic brand of intelligent control drive, a leading enterprise in intelligent manufacturing integrated solutions and a strong promoter of "Made in China 2025" strategy.

STEP BY STEP, DREAMS COME TRUE

之山智控 STEP-ZSMC

ZHISHAN

ABOUT ZSMC

"Zhishan" was founded on 2010, and has always believed the mission of "enhance the value of customers and employees, promote intelligent equipment industry development", has pursued the professional application technology all the time, now has been a well-known domestic brand in motion control, intelligent equipment industry.

Hangzhou Zhishan Motion Control Co., Ltd., a national high tech enterprise, has always kept the operation principle of "satisfy customers, create the future" and adhere to the pursuit of quality and creation. The servo systems and integrated servos developed and made by ZSMC have been widely applied in textile, machine tools, electronics, logistics equipment, industrial robots and other industries.

On 2017, ZSMC joined STEP Group and has devoted itself to providing motion control products and solutions with high quality and efficiency all the time through Industry collaboration and segmentation.

Mission: constantly enhance the value of customers and employees, promote intelligent equipment industry development
Vision: the leading provider of motion control product and solution in China
Value: collaboration, responsibility, achievement, excellence
Operation Principle: satisfy customers, create the future

High Efficiency Lies in Reliability Concentration Drives the Future

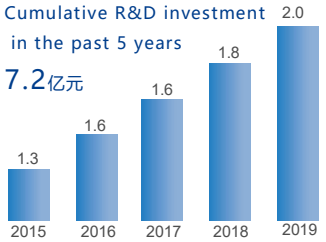
Technological Innovation

Research Teams

· set research centers in Shanghai, Shenzhen, Beijing and Hangzhou city, Germany and Japan country.
· 893 scientific researchers, 36% of the total number of employees
· 239 Ph.D./M.S.
· 1 special allowance of the State Council Government

Research Strength

· National Enterprise Technology Center
· National innovative enterprise
· Post-doctoral research workstation
· Laboratory with national CNAS accreditation



Research Results

· Undertake 3 projects of National Science and Technology Support Program.
· Authorized 556 patents, including 197 invention patents; 251 software copyrights
· Presided over/participated in the development of 34 national/industry technical standards
· The first batch of national CR certification for robot products
· National intelligent manufacturing system solution provider specification condition enterprise

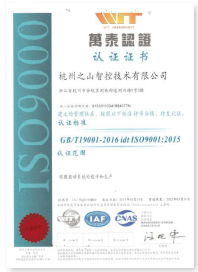
Honors and Qualifications

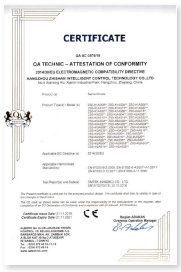
Company Honors

· National High-tech Enterprise
· Zhejiang Innovative Enterprise
· CMCD2017 Most Competitive Brand in the Field of Motion Control
· CMCD2018, 2019, 2020 Annual User Satisfaction Brand in the field of motion control

Qualifications

· ISO9000 Quality System Certification
· Work Safety Standardization Level 3 Enterprise
· QA Technic-Attestation of Conformity
· Attestation Certificate of Electromagnetic





High Efficiency Lies in Reliability

Concentration Drives the Future

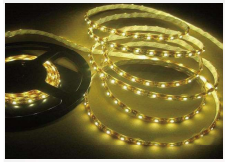
- **Fast response**
  The advanced control algorithm greatly improves the system response, with a current loop frequency response of 2.5 kHz and a velocity loop frequency response of 1.6 kHz.
- **Higher Accuracy**
  Support a variety of encoders, the maximum accuracy of 24 bit, high resolution encoder to meet the equipment high-precision positioning control and smooth operation. requirements. E Series are equipped with a dual encoder interface for full closed loop support.
- **More Control Modes**
  Pulse, Analog Voltage, RS485, CANopen, MECHATROLINK-Ⅱ, MECHATROLINK-Ⅲ, EtherCAT
- **Complete Power Band**
  Pulse 220V：50W~5.5kW；Pulse 380V：1kW~7.5W；Bus 220V：50W~5.5kW，Bus 380V：1kW~22kW
- **Safe and Reliable**
  Comply with STO/SBC/SS1/SS2 international safety standards, reliable and stable.

ZSMC Servo Applications


CNC


Packaging

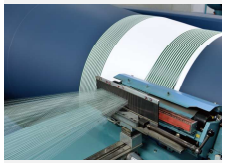

Dispenser

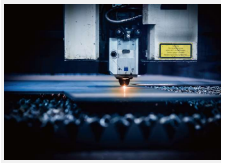

LED


Glass Panel


Robot


Photovoltaic


Textile


Laser Cutting

CONTENTS

Servo Drive Series

K1 | K1AD | G3 | iK3 | iK2

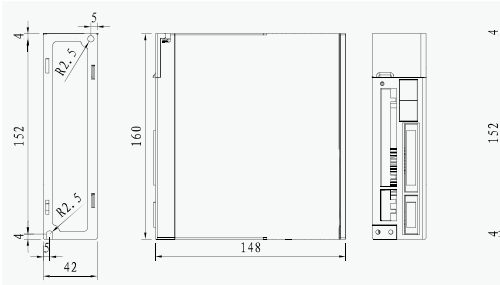
Servo Drive Naming Conventions

ZSD — G3 A S 15 A B

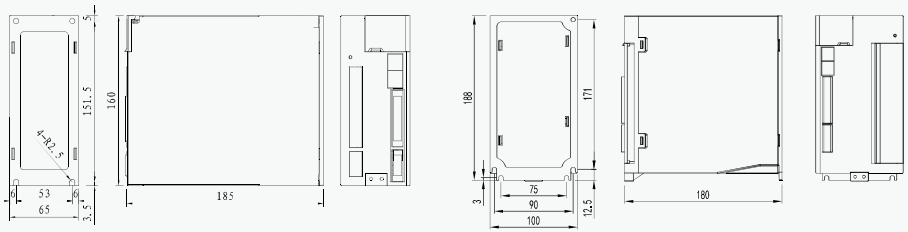
ZSD	Enterprise code: ZSD means Zhishan servo drive
G3	Series: G3 means G3 series
A	Power voltage: A means three-phase 220V, B means three-phase 380V
S	Output: S means single axis, D means double axes
15	Power level: 02 means 0.2kW, 04 means 0.4kW, 08 means 0.75kW, 15 means 1.5kW, 22 means 2.2kW, 30 means 3kW, 50 means 5kW
A	Input signal: E means EtherCAT, C means CANopen
B	Encoder: A means ABZ incremental encoder, B means absolute encoder

Servo Drive External Dimensions

K1、G3、iK3、iK2



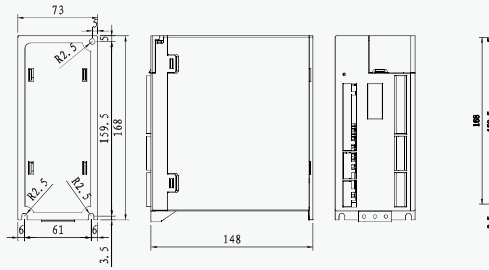
0.2kW / 0.4kW　　0.75kW



1.5kW / 2.2kW (220V)
1.8kW / 3kW (380V)

3kW / 5kW (220V)
3.8kW / 5.5kW / 7.5kW (380V)

K1AD



750W　　1.5kW

K1 Series Servo Drives

Modbus CAN 自定义

Product Features

■ Intelligent

· Powerful internal position mode allows for continuous multi-path planning for rich motion control; supports up to 32 data sets for planning, each set of data can be set to the number of pulses or angle required, and internal position mode can be set for speed, acceleration, deceleration and emergency deceleration

· Automatic determination of load inertial mechanical properties, setting optimal gain and shortening system commissioning time

■ Stable

· Mechanical resonance frequency analysis, configured with two sets of trap filters, adjustable frequency (50 ~ 5000Hz) and trap depth, effectively overcome low frequency resonance and mechanical end vibration, vibration frequency (1 ~ 100Hz) and vibration damping can be set

· Frictional torque compensation reduces the effect of static friction during mechanical commutation and improves command following performance at low speeds

■ Easy to Operate

· Support for debugging software, mechanical characteristics analysis, parameter setting, monitoring and other functions, intuitive and simple operation

Recommended Pairings

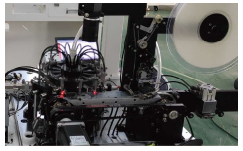
■ M4 Series Servo Motors (Details are at P19)

Specificatioons

Modes	
	K1AS02□□ 0.2kW; K1AS04□□ 0.4kW; K1AS08□□ 0.75kW; K1AS15□□ 1.5kW; K1AS22□□ 2.2kW; K1AS30□□ 3kW; K1AS50□□ 5kW
	K1BS15□□ 1.8kW; K1BS25□□ 3kW; K1BS35□□ 3.8kW; K1BS55□□ 5.5kW; K1BS75□□ 7.5kW
Input power	
Control mode	Three-phase PWM converter sine wave drive
Main power	220V: Single-phase / three-phase 220V AC (-15~+10%, 50~60Hz) 380V: Three-phase 380V AC (-15~+10%, 50~60Hz)
Control power	220V: Single-phase 220V AC (-15~+10%, 50~60Hz)
Rated current	220V: 0.2kW/2A,0.4kW/2.8A,0.75kW/5.5A,1.5kW/, 10A,2.2kW/12A,3kW/16A,5kW/25A 380V: 1.8kW/5A,3kW/8A,3.8kW/12A,5.5kW/16A, 7.5kW/20A
Encoder feedback	ABZ incremental encoder/absolute encoder
Environment	
Working temperature	0 ~ 45°C
Storage temperature	-20 ~ 65°C
Working humidity	20 ~ 85%RH or less (non condensing)
Storage humidity	20 ~ 85%RH or less (non condensing)
Working and storage air	Indoor (no direct sunlight), non-corrosive gases, flammable gases, oil mist, dust
Altitude	Below 1000m
Vibration	5.8m/s^2 (0.6G) below 10 ~ 60Hz (Cannot be used continuously at resonant frequency)
Insulation and pressure resistance	Primary- between F and G, 1 minute under AC1500V
Functions	
IO input	4-channel (DC24V optocoupler isolation) Input function can be selected according to parameters below: Servo on, P action, positive rotation inhibit, negtive rotation inhibit, alarm reset,positive torque limit, negtive torque limit, error clear
IO output	3-channel optocoupler isolated output; the following output function can be selected according to parameters: Alarm output, position proximity, velocity consistent detection output, motor rotation detection, servo ready, torque limit, brake release
Pulse input	Differential input: 500K; open collector: 200K Pulse + direction, AB orthogonal pulse, CW+CCW pulse
Pulse output	Phase A, phase B: differential output. Phase Z: differential output or open collector output
Internal speed command	Three-speed distribution via input terminals
Overload Capacity	Max. 3 times torque
Analog input	2-channel differential input ±10V, 1-channel single-ended 0-10V; switch according to control mode
Communication	Modbus; Customized CAN
Control modes	12 control modes: position control, speed control, torque control, inner spped, position/speed control, position/torque control, speed/torque control, inner speed/position, inner speed/speed, inner speed/torque, speed/zero clamp, position control/command inhibit
Regenerative resistance	400W: without external regenerative resistance; over 750W: with

Applications

LED banding machine, CNC polishing machine, tongue and groove machine, computerized quilting machine and other CNC, woodworking and textile industry equipment

K1AD Biaxial Servo Drives

Product Features

■ High Efficiency

· Built-in gantry control synchronization algorithm
· Automatic determination of load inertial mechanical properties, setting optimal gain and shortening system commissioning time
· Powerful internal location control mode, 32 sets of location data path planning. This feature not only saves the user PLC costs, but also allows for more efficient control

■ High Accuracy

· Bus synchronization accuracy <0.1us: multi-axis synchronization algorithm at current loop level

■ Stable

· Mechanical resonance frequency analysis, configured with two sets of trap filters, adjustable frequency (50 ~ 5000Hz) and trap depth, effectively overcome low frequency resonance and mechanical end vibration, vibration frequency (1 ~ 100Hz) and vibration damping can be set
· Frictional torque compensation reduces the effect of static friction during mechanical commutation and improves command following performance at low speeds

■ Easy to Operate

· Support for debugging software, mechanical characteristics analysis, parameter setting, monitoring and other functions, intuitive and simple operation

Recommended Pairings

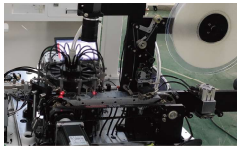
■ M4 Series Servo Motors (Details are at P19)
■ S5 Series Servo Motors (Details are at P26)

Specificatioons

Models		
	K1AD08□□ 0.75kW	K1AD15□□ 1.5kW
Input power		
Control mode	Three-phase PWM converter sine wave drive	
Main power	Single-phase / three-phase 220V AC (-15~+10%, 50~60Hz)	
Control power	Single-phase 220V AC (-15~+10%, 50~60Hz)	
Rated current	220V: 0.75kW/5.5A, 1.5kW/10A	
Encoder feedback	ABZ incremental encoder/absolute encoder	
Environment		
Working temperature	0~45°C	
Storage temperature	-20~65°C	
Working humidity	20~85% RH or less (no condensation)	
Storage humidity	20~85% RH or less (no condensation)	
Working and storage air	Indoor (no direct sunlight), non-corrosive gases, flammable gases, oil mist, dust	
Altitude	Below 1000m	
Vibration	5.8m/s² (0.6G) below 10~60Hz (Cannot be used continuously at resonant frequency)	
Insulation and pressure resistance	Primary- between F and G, 1 minute under AC1500V	
Functions		
IO input	6-channel (DC24V optocoupler isolation) Input function can be selected according to parameters below: Servo on, P action, positive rotation inhibit, negtive rotation inhibit, alarm reset,positive torque limit, negtive torque limit, error clear	
IO output	4-channel optocoupler isolated output; the following output function can be selected according to parameters: Alarm output, position proximity, velocity consistent detection output, motor rotation detection, servo ready, torque limit, brake release	
Pulse input	Differential input: 500K; open collector: 200K Pulse + direction, AB orthogonal pulse, CW+CCW pulse	
Pulse output	Phase A, phase B: differential output. Phase Z: differential output or open collector output	
Internal speed command	Three-speed distribution via input terminals	
Overload Capacity	Max. 3 times torque	
Analog input	2-channel differential input ±10V, 1-channel single-ended 0-10V; switch according to control mode	
Communication	Modbus; Customized CAN	
Control modes	12 control modes: position control, speed control, torque control, inner spped, position/speed control, position/torque control, speed/torque control, inner speed/position, inner speed/speed, inner speed/torque, speed/zero clamp, position control/command inhibit	
Regenerative resistance	400W: without external regenerative resistance; over 750W: with	

Applications

LED banding machine, CNC polishing machine, tongue and groove machine, computerized quilting machine and other CNC, woodworking and textile industry equipment

G3 Series Servo Drives

Product Features

■ Fast and Accurate

· Faster computation speed with 150MHz main frequency processor. Current loop frequency response is 2.5kHz, speed loop frequency response is 1.6kHz.

· Up to 23 bit bus encoder for positioning accuracy

· Improved velocity and accuracy with Kalman observer

■ Stable operation

· Configured with two notch filters, adjustable frequency and depth of notch, effectively overcome the low frequency resonance and vibration of the machine end

■ Multi-functional

· 12 control modes to choose from to easily meet the needs of any application

· Built-in position/velocity/acceleration observer for improved response bandwidth, real-time monitoring of operating status, and collision detection

· Pulse command filter function, can set the pulse filter width, filter out high frequency interference signal, improve the servo anti-interference ability

■ Easy to debug

· 6-channel software oscilloscope, easy to debug

· Support load inertia recognition function, shorten the debugging process and save man-hours

Recommended Pairings

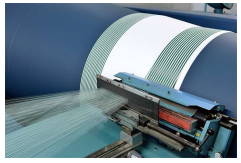
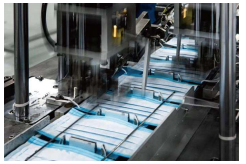
■ S5 Series Servo Motors (Details are at P26)

Specificatioons

Models	G3AS04AB 0.4kW	G3AS08AB 0.75 kW	G3AS15AB 1.5 kW	G3AS22AB 2.2 kW	G3AS30AB 3.0 kW	G3AS50AB 5.0 kW
Input power						
Control mode	Three-phase PWM converter sine wave drive					
Main power	Single-phase / three-phase 220V AC (-15~+10%, 50~60Hz)					
Control power	Single-phase 220V AC (-15~+10%, 50~60Hz)					
Rated current	0.4kW/2.8A,0.75kW/5.5A,1.5kW/10A,2.2kW/12A,3kW/16A,5kW/25A					
Encoder feedback	Serial encoder, support for the Tamagawa protocol					
Environment						
Working temperature	0~45°C					
Storage temperature	-20~65°C					
Working humidity	20~85%RH or less (non condensing)					
Storage humidity	20~85%RH or less (non condensing)					
Working and storage air	Indoor (no direct sunlight), non-corrosive gases, flammable gases, oil mist, dust					
Altitude	Below 1000m					
Vibration	5.8m/s² (0.6G) below 10~60Hz (Cannot be used continuously at resonant frequency)					
Insulation and pressure resistance	Primary- between F and G, 1 minute under AC1500V					
Functions						
IO input	8-channel (DC24V optocoupler isolation) Input function can be selected according to parameters below: Servo on, P action, positive rotation inhibit, negtive rotation inhibit, alarm reset,positive torque limit, negtive torque limit, error clear					
IO output	4-channel optocoupler isolated output; the following output function can be selected according to parameters: Alarm output, position proximity, velocity consistent detection output, motor rotation detection, servo ready, torque limit, brake release					
Pulse input	Differential input: 500K; open collector: 200K Pulse + direction, AB orthogonal pulse, CW+CCW pulse					
Pulse output	Phase A, phase B: differential output. Phase Z: differential output or open collector output					
Internal speed command	Three-speed distribution via input terminals					
Overload Capacity	Max. 3 times torque					
Analog input	1-channel differential input ±10V, 1-channel single-ended 0-10V; switch according to control mode					
Communication	Modbus; Customized CAN					
Control modes	12 control modes: position control, speed control, torque control, inner spped, position/speed control, position/torque control, speed/torque control, inner speed/position, inner speed/speed, inner speed/torque, speed/zero clamp, position control/command inhibit					
Regenerative resistance	400W: without external regenerative resistance; over 750W: with					

Applications

UV printer, packaging machine, paper cutting machine, glove machine, warp knitting machine, winding machine, cell phone inner screen dispensing machine, mask machine and other non-standard automation industry equipments

iK3 Series Servo Drives

Product Features

■ **High Response**

· Current loop frequency response > 2.5 kHz: 16-bit current sampling accuracy; dual sampling and dual update algorithms

· Speed loop frequency response > 1.6 kHz: 23-bit absolute encoder; Kalman observation algorithm

■ **High Accuracy**

· Bus synchronization accuracy < 0.1us: Multi-axis synchronization algorithm at current ring level

■ **High Speed Running Motor**

· Weak magnetic observation and control function for the servo motor to reach the maximum speed in an instant

■ **Great Adaptability**

· Standard EtherCAT communication protocol, which can be adapted to any EtherCAT bus controller

· With detailed functions such as active resonance suppression, end jitter suppression, friction compensation, groove torque compensation, etc., the servo performance can be perfected under various mechanical structures

· Thickened three-proof paint process for better environmental (moisture, corrosion, etc.) adaptation

Recommended Pairings

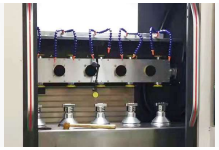
■ S Series Servo Motors (Details are at P24)

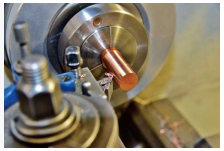
Specificatioons

Models	iK3AS04□□ 0.4kW	iK3AS08□□ 0.75kW	iK3AS15□□ 1.5kW	iK3AS22□□ 2.2kW	iK3AS30□□ 3kW	iK3AS50□□ 5kW	iK3BS15□□ 1.8kW	iK3BS25□□ 3kW	iK3BS35□□ 3.8kW	iK3BS55□□ 5.5kW	iK3BS75□□ 7.5kW
Input power											
Control mode	Three-phase PWM converter sine wave drive										
Main power	220V: Single-phase/three phase 220V AC (-15~+10%, 50~60Hz) 380V: Three-phase 380V AC (-15~+10%, 50~60Hz)										
Control power	220V: Single-phase 220V AC (-15~+10%, 50~60Hz)										
Rated current	220V: 0.4kW/2.8A,0.75kW/5.5A,1.5kW/10A, 2.2kW/12A,3kW/16A,5kW/25A 380V: 1.8kW/5A,3kW/8A,3.8kW/12A,5.5kW/16A, 7.5kW/20A										
Encoder feedback	ABZ incremen encoder / absolute encoder										
Environment											
Working temperature	0 ~ 45°C										
Storage temperature	-20 ~ 65°C										
Working humidity	20 ~ 85%RH or less (non condensing)										
Storage humidity	20 ~ 85%RH or less (non condensing)										
Working and storage air	Indoor (no direct sunlight), non-corrosive gases, flammable gases, oil mist, dust										
Altitude	Below 1000m										
Vibration	5.8m/s² (0.6G) below 10 ~ 60Hz (Cannot be used continuously at resonant frequency)										
Insulation and pressure resistance	Primary- between F and G, 1 minute under AC1500V										
Control signals											
Input	6-channel inputs (DC24V optocoupler isolation) Input function can be selected according to parameters										
Output	4-channel optocoupler isolated output; output function can be selected according to parameters										
Communications	EtherCAT, CANopen										
Regenerative esistance	400W: without; over 750W: with										
Position control modes											
Control input	Servo on, positive rotation prohibited, negtive rotation prohibited, forward current limit, reverse current limit, forward limit switch, negative limit switch, zero return proximity switch, bus IO input, probe 1, probe 2, fault reset										
Control Output	Servo return to zero completion, servo operation preparation completion, servo fault, position tracking over limit, target position arrival, STO enable flag, bus IO output, brake output										
Pulse output											
Output pulse patterns	Phase A, phase B, phase Z: differential output										
Frequency dividing ratio	Arbitrary frequency division										

Applications

Precision engraving machine, terminal machine, printing machine, CNC grinding machine and other CNC, electrical and advertising industry equipment



iK2 Series Servo Drives

MECHATROLINK

Product Features

■ **Specialized for CNC**

- Standard Mechatrolink Ⅱ and Mechatrolink Ⅲ buses, perfectly adapted to LNC, Syntec, HUST and other CNC systems
- Kalman observer algorithm for faster servo response
- Load perturbation compensation algorithm for smoother processing
- Quadrant bump suppression algorithm for finer processing
- Turret control function

■ **Smart**

- Powerful internal position mode allows for continuous multi-path planning for rich motion control; supports up to 32 data sets for planning, each set of data can be set to the number of pulses or angle required, and internal position mode can be set for speed, acceleration, deceleration and emergency deceleration
- Automatic determination of load inertial mechanical properties, setting optimal gain and shortening system commissioning time

■ **Stable**

- Mechanical resonance frequency analysis, configuration of two sets of trap filters, adjustable frequency (50~5000Hz) and trap depth, effectively overcome low frequency resonance and mechanical end vibration,can set the vibration frequency (1~100Hz) and vibration damping
- Frictional torque compensation reduces the effect of static friction during mechanical commutation and improves command following performance at low speeds

Recommended Pairings

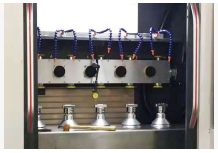
■ B Series Servo Motors (Details are at P17)

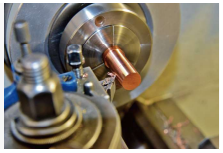
Specificatioons

Modes										
iK2AS08□□ 0.75kW	iK2AS15□□ 1.5kW	iK2AS22□□ 2.2kW	iK2AS30□□ 3kW	iK2AS50□□ 5kW		iK2BS15□□ 1.8kW	iK2BS25□□ 3kW	iK2BS35□□ 3.8kW	iK2BS55□□ 5.5kW	iK2BS75□□ 7.5kW
Input power										
Control Mode	Three-phase PWM converter sine wave drive									
Main power	220V: Single-phase / three-phase 220V AC (-15~+10%, 50~60Hz) 380V: Three-phase 380V AC (-15~+10%, 50~60Hz)									
Control power	220V: Single-phase 220V AC (-15~+10%, 50~60Hz)									
Rated current	220V: 0.75kW/5.5A,1.5kW/10A, 2.2kW/12A,3kW/16A,5kW/25A 380V: 1.8kW/5A,3kW/8A,3.8kW/12A,5.5kW/16A,7.5kW/20A									
Encoder feedback	Absolute encoder									
Environment										
Working temperature	0~45°C									
Storage temperature	-20~65°C									
Working humidity	20~85%RH or less (non condensing)									
Storage humidity	20~85%RH or less (non condensing)									
Working and storage air	Indoor (no direct sunlight), non-corrosive gases, flammable gases, oil mist, dust									
Altitude	Below 1000m									
Vibration	5.8m/s² (0.6G) below 10~60Hz (Cannot be used continuously at resonant frequency)									
Insulation and pressure resistance	Primary- between F and G, 1 minute under AC1500V									
Control signals										
Input	6-channel (DC24V optocoupler isolation) Input function can be selected according to parameters									
Output	4-channel optocoupler isolated output; output function can be selected according to parameters									
Communications	MECHATROLINK-II MECHATROLINK-III									
Control modes	3 control modes: position control, speed control, torque mode									
Regenerative resistance	400W: without; over 750W: with									
Position control modes										
Control input	Home Recursive Deceleration Switch Signal (/DEC), external latch signal (/EXT 1 to 2), positive rotation prohibited (P-OT), negtive rotation prohibited (N-OT), positive rotation side torque limit (/P-CL), negtive rotation side torque limit (/N-CL)									
Control output	Servo alarm (ALM), position completion (/COIN), velocity consistent detection, brake (/BK), servo motor rotation detection (/TGON), servo ready (/S-RDY), torque limit detection (/CLT), encoder zero output									
Pulse output										
Output pulse patterns	Phase A, phase B, phase Z: differential output									
Frequency dividing ratio	Arbitrary frequency division									
Communications										
Communication protocols	MECHATROLINK-Ⅱ、MECHATROLINK-Ⅲ									
Transmission speed	M2: 10 Mbps; M3: 100 Mbps									
Trsnamission period	M2: 250 μsec ~ 8 msec; M3: 31.25 μsec ~ 64 msec									
Frame length	M2: 17bytes/32bytes; M3: 32bytes/48bytes									
Connectable slave station NO.	M2: up to 30; M3: up to 62									
Command methods										
Command pecifications	Via position control, speed control and torque control of MECGATROLINK									
Command input	MECHATROLINK command (such as compliance control, motion, data setting/referencing, monitoring, adjustment and other commands									

Applications

CNC carving and milling machines, CNC lathes, CNC polishing machines and other CNC industry equipments



Y Series Integrated Servos

Modbus CAN

Product Features

■ Comparison with ordinary AC servos

· Safer, with a DC power supply below 36V
· Power as low as 70W, suitable for all kinds of micro-motor needs
· Drive is integrated into the motor for easy installation and simple wiring
· Cost savings for users

■ Comparison with stepper motors

· Control with closed-loop servo, absolutely no step loss
· High resolution 32768 encoder for more precise position control
· Rated torque output is guaranteed at any speed up to 3000 rpm
· Steady speed and lower operating noise

■ Control Advantages

· Pulse control, CAN bus control, MODBUS bus control

Naming Conventions

Integrated Servo (SE) Naming Convention

SE	A	07	C	A	R1	—	42	—	V00

SE: Product names
A: Drive modes
07: Rated power
C: Communications
A: Input voltage
R1: Special markings
42: Motor base no.
V00: Product version

Integrated Servo (SS) Naming Convention

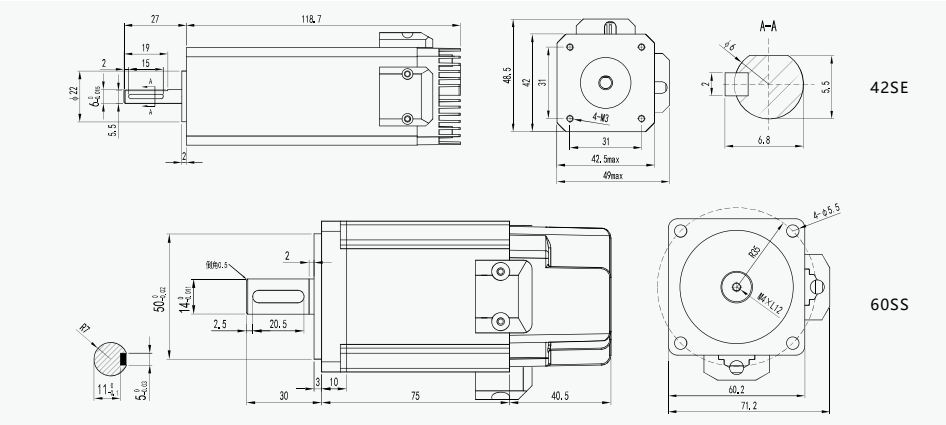
SS	B	40	R	B	R	—	60	—	V00

SS: Product names
B: Drive modes
40: Rated power
R: Communications
B: Input voltage
R: Special markings
60: Motor base no.
V00: Product version

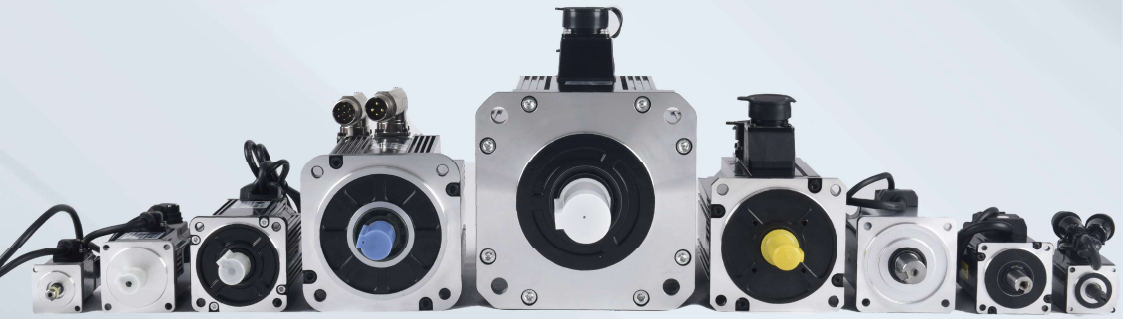
Specificatioons

Models	SEA07	SSB40
	70W	400W
Input power		
Control mode	Three-phase PWM converter sine wave drive	Three-phase PWM converter sine wave drive
Main power	DC24~36V	DC24~70V
Motor parameters		
Torque	0.2N·m	1N·m
Speed	3000rpm	3000rpm
Environment		
Working temperature	0 ~ 40°C	0 ~ 40°C
Storage temperature	-20 ~ 65°C	-20 ~ 65°C
Working humidity	85% RH or less (no condensation)	85% RH or less (no condensation)
Storage humidity	85% RH or less (no condensation)	85% RH or less (no condensation)
Working / storage air	Indoor (no direct sunlight), non-corrosive gases, flammable gases, oil mist, dust	Indoor (no direct sunlight), non-corrosive gases, flammable gases, oil mist, dust
Altitude	Below 1000m	Below 1000m
Vibration	5.8m/s² (0.6G) below 10 ~ 60Hz (Cannot be used continuously at resonant frequency)	5.8m/s² (0.6G) below 10 ~ 60Hz (Cannot be used continuously at resonant frequency)
Insulation and pressure resistance	DC power cord-between F and G, 1 minute under AC150V	DC power cord-between F and G, 1 minute under AC150V
Input and output		
Input channel	1-channel optocoupler isolated input, input function can be selected according to parameters	1-channel optocoupler isolated, input function can be selected according to parameters
Output channel	1-channel optocoupler isolated output, output function can be selected according to parameters	1-channel optocoupler isolated output, output function can be selected according to parameters
Analog input		1-channel differential input; ±10V; switch according to control mode
Communications	RS485/CAN	RS485/CAN
Control modes	Position control, speed control, position/speed con -trol, position/torque control, speed/torque control	Position control, speed control, position/speed con -trol, position/torque control, speed/torque control,
Position control		
Input pulse signal methods	Pulse + direction Right angle phase difference (A phase + B phase)	Pulse + direction Right angle phase difference (A phase + B phase)
Input pulse signal patterns	Differential input; open collector	Differential input; open collector
Max. command pulse frequency	Differential input: 500K; open collector: 200K	Differential input: 500K; open collector: 200K
Speed control		
Speed command input	RS485/CAN communication command input	Analog input voltage -10V~+10V
Torque limit function	Max. 2 times torque limit	Max. 3 times torque limit
Torque control		
Torque command input	RS485/CAN communication command input	Analog input voltage -10V~+10V

External Dimensions



B | M4 | S | S5 Series Servo Motors



B Series

60/80/130/180 Flange

· Power: 400W~7.5kW
· Current: 2.9A~23A
· Torque: 1.27N·m~48N·m
· Speed: 1500rpm, 3000rpm

P17

M4 Series

60/80/110/130/150/180 Flange

· Power: 200W~7.5kW
· Current: 1.2A~32A
· Torque: 0.637N·m~48N·m
· Speed: 1500rpm~3000rpm

P19

S Series

60/80/130 Flange

· Power: 200W~3kW
· Current: 2.1A~13.8A
· Torque: 0.64N·m~14.3N·m
· Speed: 2000rpm, 3000rpm

P24

S5 Series

40/60/80 Flange

· Power: 100W~750W
· Current: 1.1A~5.1A
· Torque: 0.32N·m~2.39N·m
· Speed: 3000rpm

P26

Servo Motor Naming Conventions

80	S	S	—	A	751	30	45	K1	B
X1	X2	X3		X4	X5	X6	X7	X8	X9

X1 Flange sizes

Codes	Meanings
40	40mm flange
60	60mm flange
80	80mm flange
90	90mm flange
100	100mm flange
110	110mm flange
130	130mm flange
150	150mm flange
180	180mm flange
...	... ...

X2 Motor series

Codes	Meanings
M4	M4 Series
S	S Series
B	B Series
S5	S5 Series

X3 Inertia

Codes	Meanings
S	Small inertia
D	Middle inertia
H	High inertia

X4 Input voltage

Codes	Meanings
A	220V
B	380V
...	... ...

X5 Power

Codes	Meanings
201	200W
751	750W
102	1.0kW
152	1.5kW
202	2.0kW
....	... ...

X6 Rated speed

Codes	Meanings
10	1000r / min
15	1500r / min
20	2000r / min
...	... ...

X7 Max. speed (not M4 series motor)

Codes	Meanings
10	1000r / min
15	1500r / min
20	2000r / min

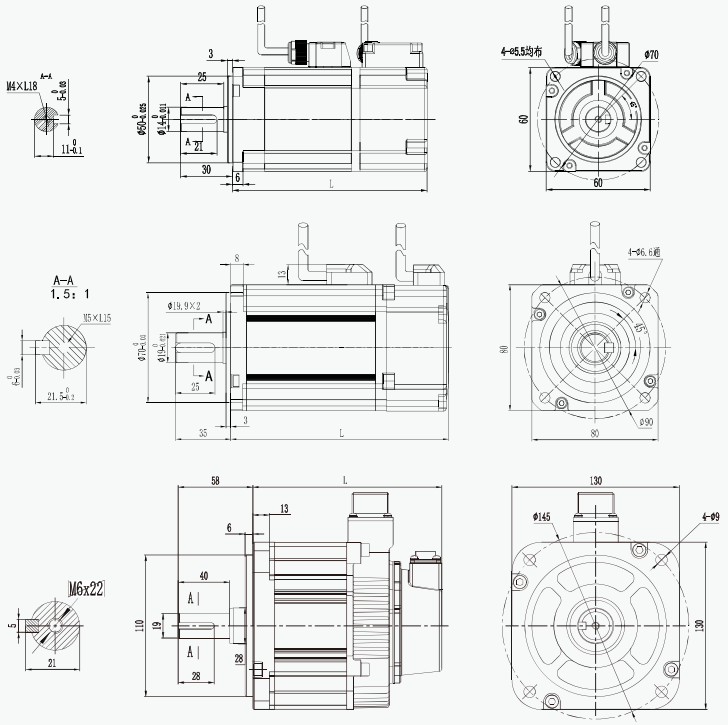
X8 Encoder

Codes	Meanings
D1	Standard 2500 wires (15 pole)
D2	Wire-saving 2500 wires (9 pole)
D4	Photoelectric multiturn absolute 17 bit
D7	Optical incremental 10000 wires (serial)
D10	Photoelectric multiturn absolute 23 bit
R1	Magnetic single turn 17 bit

X9 Special markings

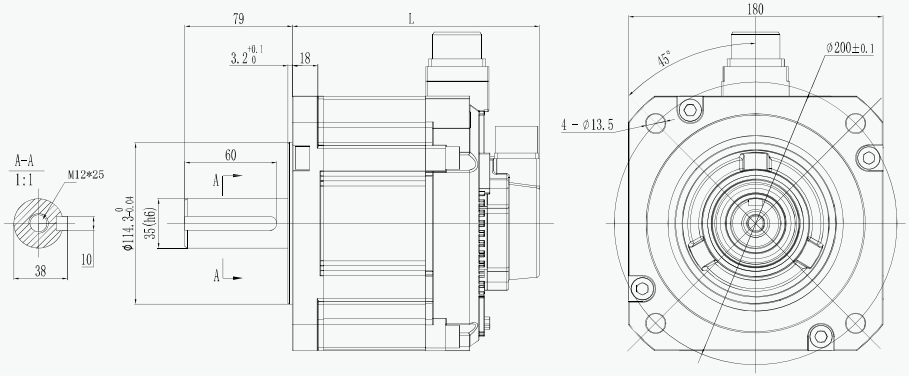
Codes	Meanings
Blank	General motor
B	Magnet brake
T	Special customization
F	Anti-water

B Series 60/80/130 Flange Servo Motors



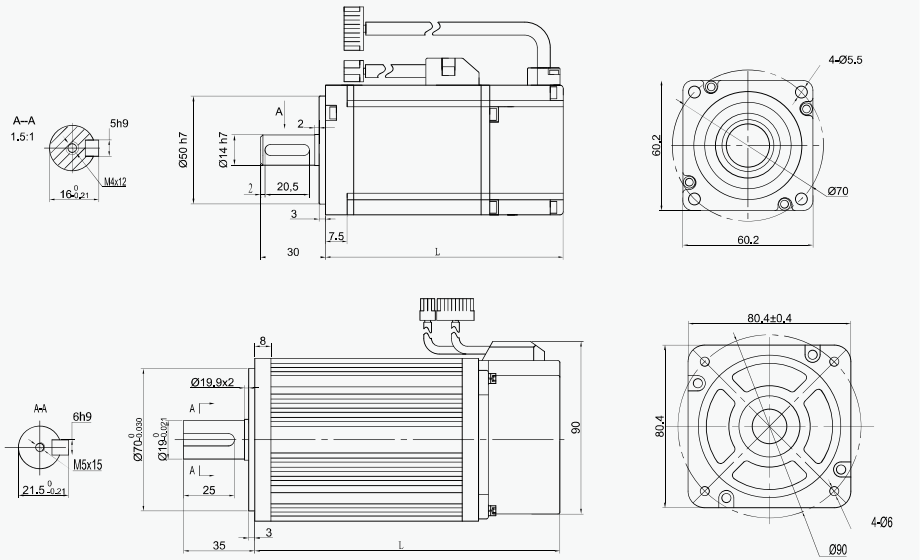
Mode	60BST-M01330	80BST-M02430	130BST-AM05415	130BST-AM08315	130BST-AM11515	130BST-AM14615
Rated power (kW)	0.4	0.75	0.85	1.3	1.8	2.3
Pole pairs	5	5	5	5	5	5
Rated torque (N·m)	1.27	2.39	5.39	8.34	11.5	14.6
Max. torque (N·m)	3.81	7.1	14.2	23.3	28.7	43.8
Rated speed (rpm)	3000	3000	1500	1500	1500	1500
Max speed (rpm)	6000	5000	3000	3000	3000	2000
Rated current (A)	2.9	5	6.9	10.7	15	12.5
Max. current (A)	8.7	15	17	28	42	37.5
Torque constant (N·m/A)	0.438	0.48	0.78	0.78	0.76	0.91
Voltage constant (V/krpm)	30.2	33.3	50.2	52	52.2	76.5
Rotor inertia ($kg·m^2$) no brake	0.487×10^{-4}	1.41×10^{-4}	13.9×10^{-4}	19.9×10^{-4}	26×10^{-4}	40.7×10^{-4}
Rotor inertia ($kg·m^2$) with brake	0.5×10^{-4}	1.51×10^{-4}	16×10^{-4}	22×10^{-4}	28.1×10^{-4}	42.3×10^{-4}
Line resistance (Ω)	3.28	1.58	0.98	0.54	0.4	0.69
Line inductance (mH)	7	6.8	12.32	8.5	6.2	10.25
L without brake (mm)	112	138.5	145	160	178	205
L with brake (mm)	152.5	174	178	193	211	237

B Series 180 Flange Servo Motors



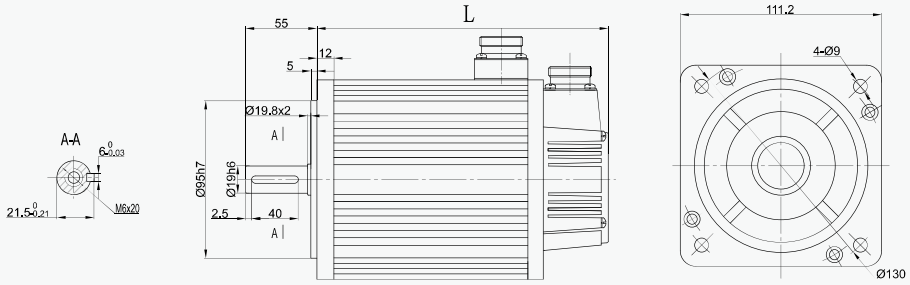
Mode	180HBST-AM18615	180HBST-AM28415	180HBST-AM35015	180HBST-AM48015
Rated power (kW)	2.9	4.4	5.5	7.5
Pole pairs	5	5	5	5
Rated torque (N·m)	18.6	28.4	35	48
Max. torque (N·m)	54	71	87.5	96
Rated speed (rpm)	1500	1500	1500	1500
Max speed (rpm)	2500	2000	2000	2000
Rated current (A)	10	12.8	14	23
Max. current (A)	29	32	35	46
Torque constant (N·m/A)	1.86	1.95	1.98	2.09
Voltage constant (V/krpm)	137.5	153	172	170
Rotor inertia ($kg·m^2$) no brake	44×10^{-4}	66×10^{-4}	102×10^{-4}	146×10^{-4}
Rotor inertia ($kg·m^2$) with brake	59×10^{-4}	80×10^{-4}	110×10^{-4}	156×10^{-4}
Line resistance (Ω)	1.1	0.9	0.62	0.42
Line inductance (mH)	15.2	13.9	10.9	6.7
L without brake (mm)	176	200	237	283
L with brake (mm)	224	248	285	331

M4 Series 60/80 Flange Servo Motors



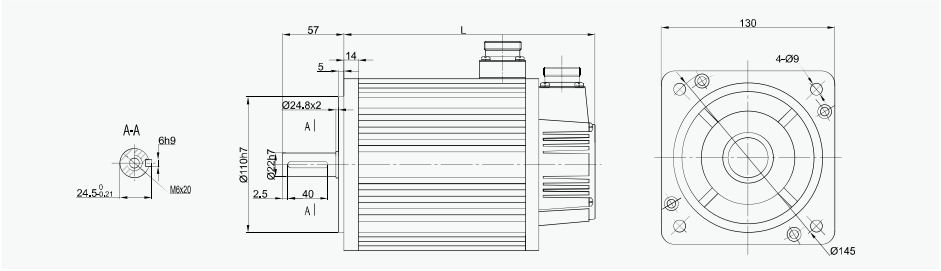
Modes	60M4S-A20130□	60M4S-A40130□	60M4S-A60130□	80M4S-A40130□	80M4S-A75130□	80M4S-A10225□
Rated power (kW)	0.20	0.40	0.60	0.40	0.75	1.00
Pole pairs	4	4	4	4	4	4
Rate torque (N·m)	0.637	1.27	1.91	1.27	2.39	4
Max torque (N·m)	1.91	3.9	5.73	3.8	7.1	12
Rated speed (rpm)	3000	3000	3000	3000	3000	2500
Rated current (A)	1.2	2.8	3.5	2	3	4.4
Max. current (A)	3.6	8.4	10.5	6	9	13.2
Torque constant (N·m/A)	0.53	0.45	0.55	0.64	0.8	0.9
Voltage constant (V/krpm)	30.9	29.6	34	40	48	56
Rotor inertia (kgm²) no brake	0.175×10^{-4}	0.29×10^{-4}	0.39×10^{-4}	1.05×10^{-4}	1.82×10^{-4}	2.97×10^{-4}
Rotor inertia (kgm²) with brake	0.23×10^{-4}	0.35×10^{-4}	0.45×10^{-4}	1.08×10^{-4}	1.85×10^{-4}	3×10^{-4}
Line resistance (Ω)	6.18	2.35	1.93	4.44	2.88	1.83
Line inductance (mH)	29.3	14.5	10.7	7.93	6.4	4.72
L no brake (mm)	116	141	169	124	151	191
L with brake (mm)	164	189	217	164	191	231

M4 Series 110 Flange Servo Motors



Modes	110M4D-A12230□	110M4D-A15230□	110M4D-A18230□
Rated power (kW)	1.20	1.50	1.80
Pole pairs	4	4	4
Rate torque (N·m)	4	5	6
Max torque (N·m)	12	15	18
Rated speed (rpm)	3000	3000	3000
Rated current (A)	5.0	6.0	6.0
Max. current (A)	15	18	18
Torque constant (N·m/A)	0.8	0.83	1.0
Voltage constant (V/krpm)	54	62	60
Rotor inertia (kgm²) no brake	0.54×10^{-3}	0.63×10^{-3}	0.76×10^{-3}
Rotor inertia (kgm²) with brake	0.56×10^{-3}	0.65×10^{-3}	0.78×10^{-3}
Line resistance (Ω)	1.09	1.03	0.81
Line inductance (mH)	3.3	3.43	2.59
L no brake (mm)	189	204	219
L with brake (mm)	263	278	293

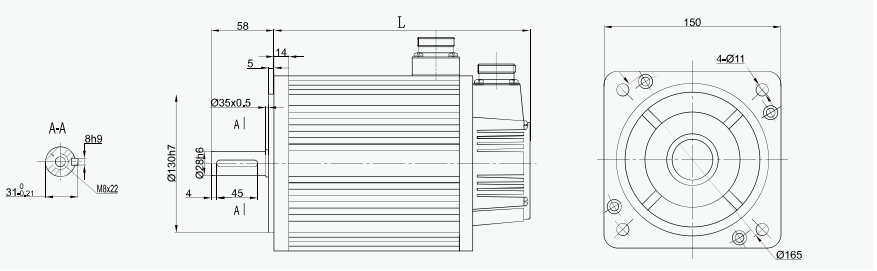
M4 Series 130 Flange Servo Motors



Modes	130M4D-A10225□	130M4D-A13225□	130M4D-A15225□	130M4D-A20225□
Rated power (kW)	1.00	1.30	1.50	2.00
Pole pairs	4	4	4	4
Rate torque (N·m)	4	5	6	7.7
Max torque (N·m)	12	15	18	22
Rated speed (rpm)	2500	2500	2500	2500
Rated current (A)	4.0	5.0	6.0	7.5
Max. current (A)	12	15	18	22.5
Torque constant (N·m/A)	1.0	1.0	1.0	1.03
Voltage constant (V/krpm)	72	68	65	68
Rotor inertia (kg·m²) no brake	0.85×10^{-3}	1.06×10^{-3}	1.26×10^{-3}	1.53×10^{-3}
Rotor inertia (kg·m²) brake	0.87×10^{-3}	1.08×10^{-3}	1.28×10^{-3}	1.55×10^{-3}
Line resistance (Ω)	2.76	1.84	1.21	1.01
Line inductance (mH)	6.42	4.9	3.87	2.94
L no brake (mm)	166	171	179	192
L with brake (mm)	223	228	236	249

Modes	130M4D- A15215□	130M4D-A26225□	130M4D-A23215□	130M4D-A38225□
Rated power (kW)	1.50	2.60	2.30	3.80
Pole pairs	4	4	4	4
Rate torque (N·m)	10	10	15	15
Max torque (N·m)	25	25	30	30
Rated speed (rpm)	1500	2500	1500	2500
Rated current (A)	6.0	10	9.5	13.5
Max. current (A)	18	30	28.5	40.5
Torque constant (N·m/A)	1.67	1.0	1.58	1.11
Voltage constant (V/krpm)	103	70	114	67
Rotor inertia (kg·m²) no brake	1.94×10^{-3}	1.94×10^{-3}	2.77×10^{-3}	2.77×10^{-3}
Rotor inertia (kg·m²) brake	2.01×10^{-3}	2.01×10^{-3}	2.84×10^{-3}	2.84×10^{-3}
Line resistance (Ω)	1.5	0.73	1.1	0.49
Line inductance (mH)	4.37	2.45	4.45	1.68
L no brake (mm)	213	209	241	231
L with brake (mm)	294	290	322	312

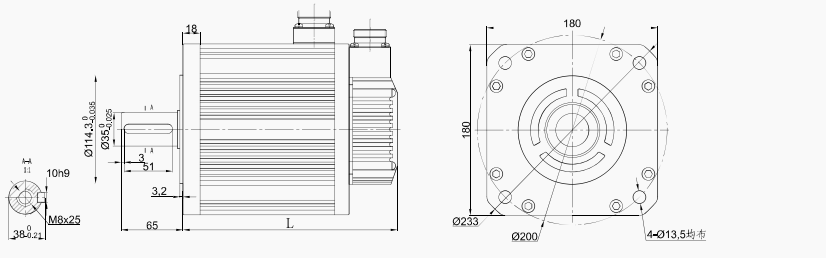
M4 Series 150 Flange Servo Motors



Modes	150M4D-A30220□	150M4D-B30220□	150M4D-A38225□	150M4D-B38225□	150M4D-A36220□	150M4D-B36220□
Rated power (kW)	3.00	3.00	3.80	3.80	3.60	3.60
Pole pairs	4	4	4	4	4	4
Rate torque (N.m)	15	15	15	15	18	18
Max torque (N.m)	30	30	30	30	36	36
Rated speed (rpm)	2000	2000	2500	2500	2000	2000
Rated current (A)	14	6.8	17	9.5	17	8.5
Max. current (A)	42	20.4	51	28.5	51	25.5
Torque constant (N.m/A)	1.07	2.2	0.88	1.58	1.05	2.12
Voltage constant (V/krpm)	70	141	59	106	71	141
Rotor inertia (kg.m²) no brake	3.88×10^{-3}	3.88×10^{-3}	3.88×10^{-3}	3.88×10^{-3}	4.6×10^{-3}	4.6×10^{-3}
Rotor inertia (kg.m²) brake	3.95×10^{-3}	3.95×10^{-3}	3.95×10^{-3}	3.95×10^{-3}	4.67×10^{-3}	4.67×10^{-3}
Line resistance (Ω)	0.34	1.38	0.23	0.8	0.255	1.024
Line inductance (mH)	1.55	6.32	1.08	3.55	1.3	5.19
L no brake (mm)	230	230	230	230	248	248
L with brake (mm)	303	303	303	303	321	321

Modes	150M4D-A47220□	150M4D-B47220□	150M4D-A55220□	150M4D-B55220□
Rated power (kW)	4.70	4.70	5.50	5.50
Pole pairs	4	4	4	4
Rate torque (N.m)	23	23	27	27
Max torque (N.m)	46	46	54	54
Rated speed (rpm)	2000	2000	2000	2000
Rated current (A)	21	12	27	14.5
Max. current (A)	63	36	81	43.5
Torque constant (N.m/A)	1.09	1.91	1	1.86
Voltage constant (V/krpm)	72	126	64	127
Rotor inertia (kg.m²) no brake	5.8×10^{-3}	5.8×10^{-3}	6.8×10^{-3}	6.8×10^{-3}
Rotor inertia (kg.m²) brake	5.87×10^{-3}	5.87×10^{-3}	6.87×10^{-3}	6.87×10^{-3}
Line resistance (Ω)	0.2	0.63	0.125	0.5
Line inductance (mH)	1.06	3.25	0.7	2.8
L no brake (mm)	278	278	302	302
L with brake (mm)	351	351	375	375

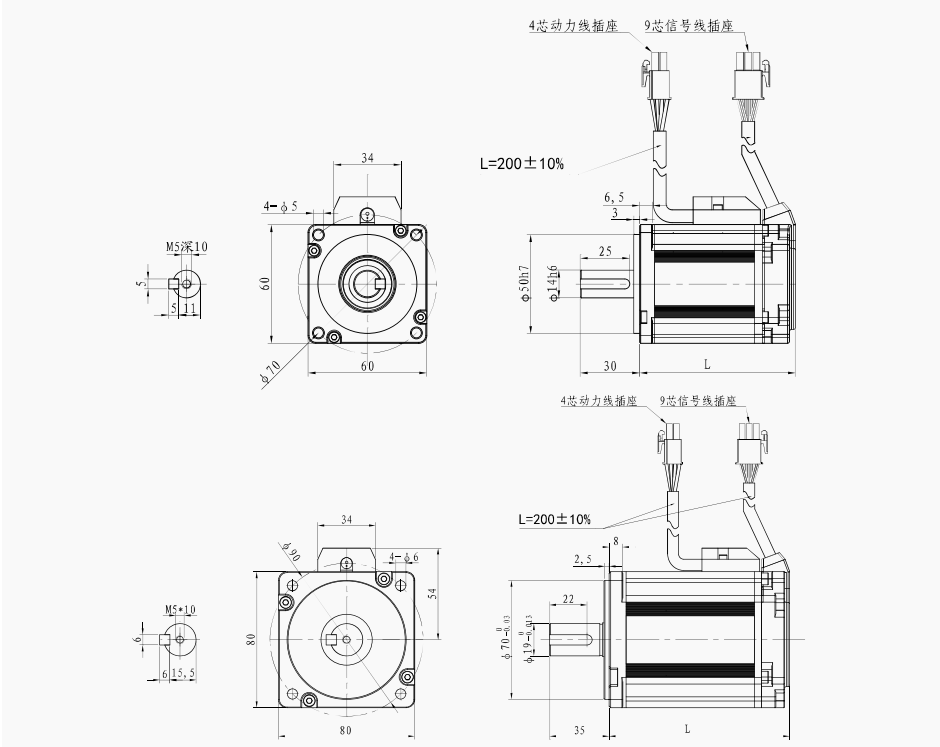
M4 Series 180 Flange Servo Motors



Modes	180M4D-A27215□	180M4D-B27215□	180M4D-A30215□	180M4D-B30215□	180M4D-A45220□	180M4D-B45220□
Rated power (kW)	2.70	2.70	3.00	3.00	4.50	4.50
Pole pairs	4	4	4	4	4	4
Rate torque (N.m)	17.2	17.2	19	19	21.5	21.5
Max torque (N.m)	43	43	47	47	53	53
Rated speed (rpm)	1500	1500	1500	1500	2000	2000
Rated current (A)	10.5	6.5	12	7.5	16	9.5
Max. current (A)	31.5	19.5	36	22.5	48	28.5
Torque constant (N.m/A)	1.64	2.65	1.58	2.5	1.34	2.26
Voltage constant (V/krpm)	112	167	97	170	84	140
Rotor inertia (kg.m²) no brake	6.5×10^{-3}	6.5×10^{-3}	7.0×10^{-3}	7.0×10^{-3}	7.96×10^{-3}	7.96×10^{-3}
Rotor inertia (kg.m²) brake	6.57×10^{-3}	6.57×10^{-3}	7.07×10^{-3}	7.07×10^{-3}	8.03×10^{-3}	8.03×10^{-3}
Line resistance (Ω)	0.7	1.47	0.4	1.23	0.24	0.71
Line inductance (mH)	3.5	7.8	2.42	7.3	1.45	4
L no brake (mm)	226	226	232	232	243	243
L with brake (mm)	298	298	304	304	315	315

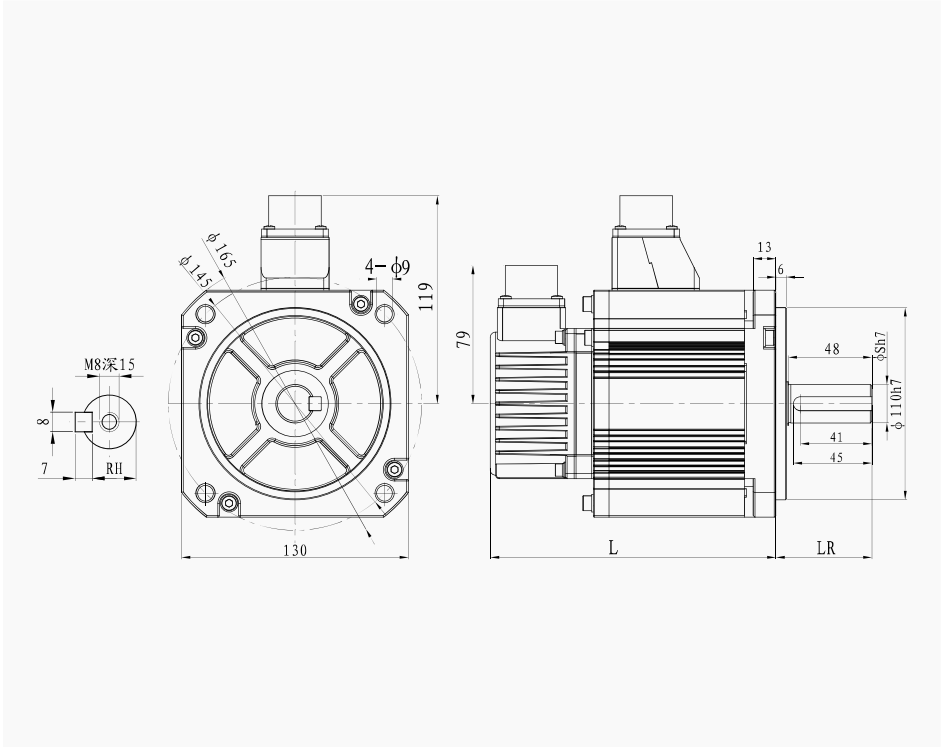
Modes	180M4D-A43215□	180M4D-B43215□	180M4D-A55215□	180M4D-B55215□	180M4D-A75215□	180M4D-B75215□
Rated power (kW)	4.30	4.30	5.50	5.50	7.50	7.50
Pole pairs	4	4	4	4	4	4
Rate torque (N.m)	27	27	35	35	48	48
Max torque (N.m)	67	67	70	70	96	96
Rated speed (rpm)	1500	1500	1500	1500	1500	1500
Rated current (A)	16	10	24	12	32	20
Max. current (A)	48	30	72	36	96	60
Torque constant (N.m/A)	1.69	2.7	1.45	2.9	1.5	2.4
Voltage constant (V/krpm)	103	172	90	181	94	156
Rotor inertia (kg.m²) no brake	9.64×10^{-3}	9.64×10^{-3}	12.25×10^{-3}	12.25×10^{-3}	16.72×10^{-3}	16.72×10^{-3}
Rotor inertia (kg.m²) brake	9.71×10^{-3}	9.71×10^{-3}	12.32×10^{-3}	12.32×10^{-3}	16.79×10^{-3}	16.79×10^{-3}
Line resistance (Ω)	0.28	0.8	0.14	0.62	0.104	0.273
Line inductance (mH)	1.74	4.83	1	4	0.77	2.14
L no brake (mm)	262	262	292	292	346	346
L with brake (mm)	334	334	364	364	418	418

S Series 60/80 Flange Servo Motors



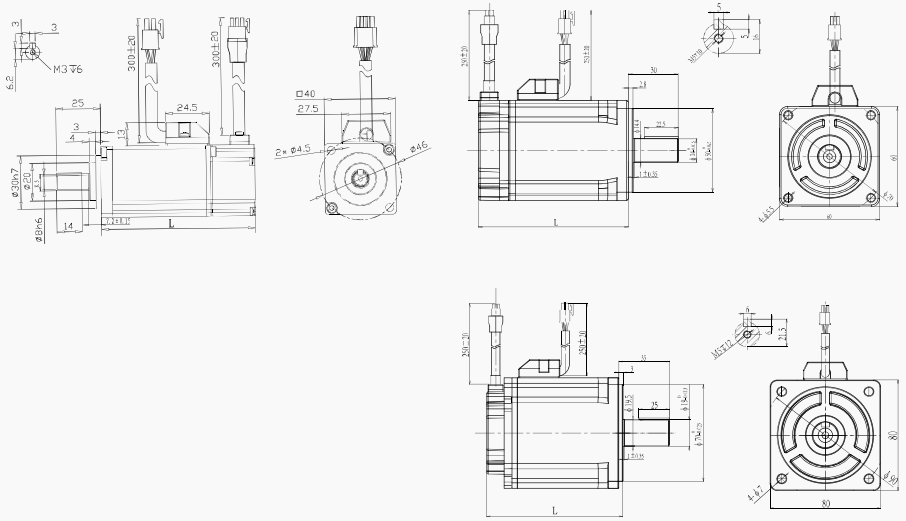
Modes	60SES-A2013060□	60SES-A4013060□	80SES-A7513060□	60SS-A2013050□	60SS-A4013050□	80SS-A7513050□
Rated power (kW)	0.2	0.4	0.75	0.2	0.4	0.75
Pole pairs	5	5	5	5	5	5
Rate torque (N.m)	0.64	1.27	2.39	0.64	1.27	2.39
Max torque (N.m)	1.92	3.8	7.2	1.92	3.8	7.2
Rated speed (rpm)	3000	3000	3000	3000	3000	3000
Max. speed (rpm)	6000	6000	6000	5000	5000	5000
Rated current (A)	2.1	3.2	4.8	1.9	2.8	4
Max. current (A)	6.3	9.6	13.4	5.7	8.4	12
Torque constant (N.m/A)	0.304	0.396	0.498	0.336	0.453	0.597
Voltage constant (V/krpm)	22.0	27.0	35.0	22.9	29.3	39.8
Rotor inertia (kg.m²) no brake	0.15×10^{-4}	0.27×10^{-4}	0.9×10^{-4}	0.16×10^{-4}	0.28×10^{-4}	1.0×10^{-4}
Rotor inertia (kg.m²) brake	0.16×10^{-4}	0.28×10^{-4}	1.0×10^{-4}	0.18×10^{-4}	0.3×10^{-4}	1.1×10^{-4}
Line resistance (Ω)	4.03	2.36	0.93	4.5	3.3	1.4
Line inductance (mH)	9.35	5.80	4.2	12.5	9.61	7.25
L no brake (mm)	78.7	98.7	106.2	108	133	144.5
L with brake (mm)	116.7	136.7	147.2	146	171	185.5

S Series 130 Flange Servo Motors



Modes	130SD-A1022030□	130SD-A1522030□	130SD-A2022030□	130SD-A3022030□
Rated power (kW)	1.0	1.5	2.0	3.0
Pole pairs	5	5	5	5
Rated torque (N·m)	4.77	7.16	9.55	14.3
Max. torque (N·m)	14.3	21.5	28.65	42.9
Rated speed (rpm)	2000	2000	2000	2000
Max. speed (rpm)	3000	3000	3000	3000
Rate current (A)	6	8.2	10	13.8
Max. current (A)	18	24.6	31.5	41.4
Torque constant (N·m/A)	0.795	0.873	0.905	1.04
Voltage constant (V/krpm)	51.2	55	61	65
Rotor inertia (kgm²) no brake	4.6×10^{-4}	6.7×10^{-4}	8.7×10^{-4}	15.1×10^{-4}
Rotor inertia (kgm²) brake	6.6×10^{-4}	8.7×10^{-4}	10.7×10^{-4}	17.1×10^{-4}
Line resistance (Ω)	0.955	0.7	0.54	0.3
Line inductance (mH)	7.96	6.1	5.91	3.43
L without brake (mm)	163.5	181	198.5	251.5
L with brake (mm)	197.5	215	232.5	285.5

S5 Series 40/60/80 Flange Servo Motors



Modes	40S5S-A1013060□	60S5S-A2013065□	60S5D-A4013050□	60S5D-A4013065□	80S5D-A7513065□
Rated power (kW)	0.1	0.2	0.4	0.4	0.75
Pole pairs	5	5	5	5	5
Rated torque (N·m)	0.32	0.64	1.27	1.27	2.39
Max. torque (N·m)	0.96	2.23	4.46	4.46	8.36
Rated speed (rpm)	3000	3000	3000	3000	3000
Max. speed (rpm)	6000	6500	5000	6500	6500
Rate current (A)	1.1	1.9	2.1	3.2	5.1
Max. current (A)	3.3	6.6	7.5	11.2	17.8
Torque constant (N·m/A)	0.306	0.33	0.635	0.4	0.465
Voltage constant (V/krpm)	14.8	21.8	38.4	22.6	28.8
Rotor inertia (kgm²) no brake	0.048×10-4	0.29×10-4	0.56×10-4	0.56×10-4	1.56×10-4
Rotor inertia (kgm²) brake	0.051×10-4	0.31×10-4	0.58×10-4	0.58×10-4	1.66×10-4
Line resistance (Ω)	12.4	6.3	6.1	2.64	1
Line inductance (mH)	12.25	12.2	13.8	7.9	5.8
L without brake (mm)	80.7	73.1	89.7	89.7	95.7
L with brake (mm)	114.8	103.6	120.2	120.2	130.7