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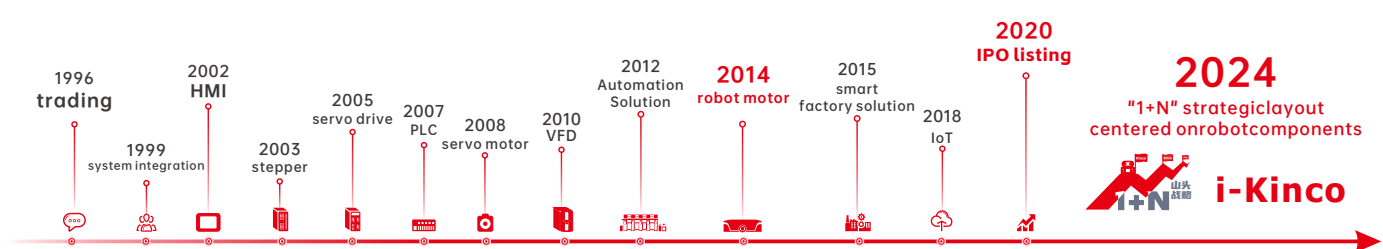
Kinco

Motion
Control
Servo System

➔ Servo System Catalog

- FD5P Series Servo Drive
- Servo Motor





Kinco was founded in 1996, and successfully listed on the Shanghai Stock Exchange in 2020 (abbreviated name: Kinco share, stock code 688160), which is a high-tech, specialized and sophisticated enterprise that attaches great importance to independent research and development and innovation, mainly engaged in the research and development, production, sales and related technical services of industrial automation and robot core components and digital factory hardware and software. It is a leading supplier of automation control, robot power and digital factory solutions in China.

After years of continuous research and development and innovation, Kinco has established a complete product line with independent intellectual property rights, covering a series of products from machine iot to human-machine interaction, control, drive and execution, which are widely used in robots, medical equipment, logistics equipment, packaging equipment, food equipment, clothing equipment, environmental protection equipment, etc. New energy equipment, rail transit equipment and other automation equipment industry.

Based on the comprehensive industrial automation and digital technology platform, the company has in-depth application scenarios in the robot industry, providing display, control, drive and other multi-dimensional solutions for industrial mobile robots, collaborative robots, industrial robots, pan-service robots, and bionic robots. Through the insight of the industry pain points, deep links with robot customers, combined with the advantages of product research and development, the company continues to innovate, and launches industry-leading low-voltage servo products for mobile robots, integrated servo wheel, frameless torque motor for collaborative robots, robot human-machine interfaces, robot controllers and other products. The company has formed a relatively complete robot core parts capability, and after nearly 10 years of hard work in the robot industry, it has become a leading enterprise in the field of mobile robot low-voltage servo, and has a high brand influence in the industry.

Kinco has four research and development centers in Shanghai, Shenzhen, Changzhou and Chengdu, and two manufacturing bases in Shenzhen and Changzhou, a total of 10+ domestic marketing centers, 100+ domestic service providers, 40+ global partners, and products are exported to 70+ countries overseas. In terms of after-sales service, Kinco has established after-sales service centers in Shanghai, Shenzhen and Changzhou.

Four R&D centers and two manufacturing bases



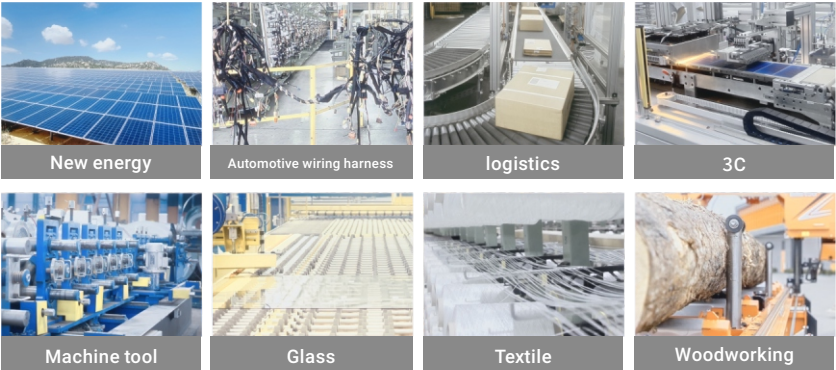
Kinco High voltage servo system

Kinco high voltage servo system

- FD5P series drive is a high-voltage servo product by Kinco that can easily face complex environment, facilitate maintenance, reduce cost and increase efficiency according to the pain points faced by equipment in various industries.
- FD5P support CANopen, EtherCAT, Modbus, Profinet and other communication protocols, which can match magnetoelectric, photoelectric and other different types of encoder motor. The product configuration is flexible



Industry application



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FD5P high performance AC servo

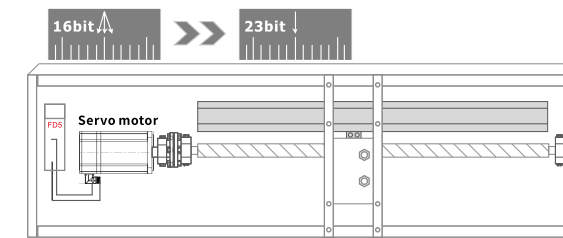
Driving intelligent equipments towards new trends

PK series



- ☑ Suitable for high protection scenarios, motor protection level up to IP65;
- ☑ Vibration suppression, smooth operation, safe and reliable;
- ☑ Reliable quality, automatic production;
- ☑ Power planning covers 50W-7.5KW;
- ☑ High responsiveness, speed loop sampling frequency up to 8KHz.

FD5P Feature



1. Equipped with a brand new platform

Equipped with a new platform, the main frequency of the new chip has increased by 2.4 times. The Current loop can reach 16KHz, the speed loop can reach 8KHz, the position loop can reach 4KHz, and the speed loop response bandwidth can reach 3.5KHz.

2. Accurate positioning

It can be paired with a 23 bit encoder to improve the positioning accuracy and response speed of the entire servo system, effectively improving production yield and efficiency. Among them, the highest positioning accuracy can reach $\leq \pm 5$.

3. Vibration suppression, stable operation

The driver reduces the speed oscillation generated by the motor during operation by using FFT multi-point notch filters (which can be used simultaneously with 4), effectively suppressing the large amplitude vibration generated by equipment operation. It is particularly suitable for high-speed movement, workpiece transportation, precise assembly, cantilever handling, and other occasions, helping the equipment operate quickly and smoothly.

4. Smooth operation, safe and reliable

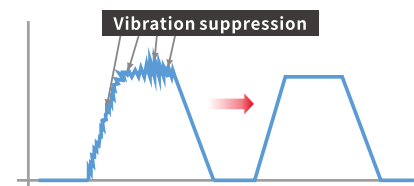
The drive supports one click activation of S-curve control function without command delay. It can be applied to the positioning control of equipment with large inertia or flexible equipment, ensuring smooth and safe operation of the equipment during sudden acceleration and deceleration, effectively overcoming mechanical vibration caused by sudden speed changes, and reducing impact force.

5. The coverage is larger and wider, supporting multiple bus communication.

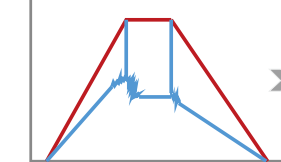
Based on Kinco's previous generation AC servo driver platform, a new upgrade has been carried out, with a power range of 50W-7.5KW, which is fully compatible and can be replaced. The drive supports CANopen, EtherCAT, and Modbus bus control.

6. EASY Tune optimization and upgrading+online Self-tuning

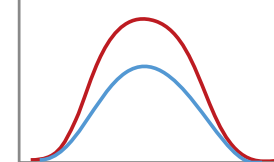
The servo system has a built-in online Self-tuning module. It only takes a few simple steps to set the mechanical stiffness, so that the load change under acceleration and deceleration can be automatically calculated during the operation of the equipment, and the PID parameters can be dynamically adjusted in real time according to the feedback load, the mechanical stiffness set and the application type, without any complicated parameter setting.



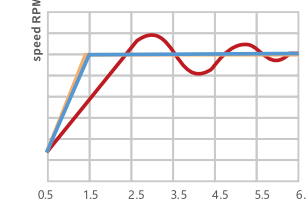
Ladder velocity curve



S-type velocity curve



Speed step curve



- Effective marking speed
- Feedback speed before setting
- Feedback speed after setting

SMK Feature



1. New electromagnetic design:

Adopting 12-slot and 10-pole design, with small slot torque and low torque pulsation, which is conducive to reducing the vibration during the operation of the motor and making the torque output more smooth.

2. New structure and short fuselage:

The redesign of the fuselage structure shortens the length of the fuselage, which can save more installation space and reduce the size of the equipment for customers' equipment.

3. Insulation class F:

The motor in the industry is at the highest insulation level, which can maintain high reliability and stability in high temperature extreme environment.

4. Energy efficiency class: 2

Drive and motor/cable naming rules

Dirve: FD425P-LA-000

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①-Series Name	FD:FD series		④-Drive version	5P: Fifth generation drive enhanced version	
②-Supply voltage	4:Input voltage AC220V 6:Input voltage AC380V		⑤-Control mode	LA:RS232, RS485,Pulse CA:RS232, CAN,Pulse EA:RS232, EtherCAT, Pulse PA: RS232,Profinet, Pulse	
③-Drive current :		AC220V		AC380V	Note: FD425P - □ F-000 comes with a fan
	1:	3.2A		5.4A	
	2:	4A/5A	12A		
	3:	7.6A	21A		
	4:	12.5A	26A		
			⑥-Software version	000: Software version number	

Motor: SMK60S-0020-30MAK-5LSA

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①-Series name	SMK: SMK series common body servo motor	⑦-Brake	A: Without brake B: With brake
②-Flange	40: 40x40(mm) 60: 60x60(mm) 80: 80x80(mm) 130: 130x130(mm)	⑧-Output shaft style	K: With key
③-Inertia type	S: Small inertia G: Large inertia	⑨-Number of polar pairs	5: 5-pole pair
④-Rated power	0005: 10x5(W) 0010: 10x10(W) 0020: 10x20(W) ... 0240: 10x240(W)	⑩- Supply voltage	L: AC220V H: AC380V
⑤-Rated speed	30: 30x100(rpm)	⑪- Motor version number	S: S version
⑥-Encoder type	M: Singleturn communication type magnetoelectric encoder Q: Multiturn communication type magnetoelectric absolute value encoder V: Singleturn communication type optical encoder Y: Multiturn communication type optical absolute value encoder	⑫- Motor Outlet Type	A: Special socket for common motor R: Military specification socket

Drive and motor/cable naming rules

Power cable: MOTF-005-LL-KA-B

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①-Cable function type	MOT: Motor power cable	④ -Cable length	03: 3 m 05: 5 m 10: 10 m 15: 15 m
②-Cable type	F: Flexible cable Empty: Common cable	⑤-Motor outlet type	KA: Pluggable motor connector
③-Rated current	005: Rated current 5A	⑥-Cable property	B: Power cable with brake, highly shielded cable NS: Power cable without brake, common cable Null: Power cable without brake, highly shielded cable
Note 1: MOTF-005-LL-KAB-S is the SMK40 series brake power cable Note 2: This naming rule applies to power cable matched with SMK40/60/80 series motor			

Power cable: M-A-12A-KR0-LL-F

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①-Cable function type	M: Motor power cable	⑤-Motor end connector	R0: 130 military specification plug
②-Drive end connector	A: Needle type cold press terminal	⑥-Cable length	3: 3m 5: 5m 10: 10m
③-Current	12A: Rated current 12A	⑦-Cable property	Null: Common cable F: High flexibility cable S: Shielded cable FS: High flexibility shielded cable B: Cable with brake BF: High flexibility cable with brake BS: Shielded cable with brake BFS: High flexibility shielded cable with brake
④-Motor platform	K: SMK	Note1: This naming rule applies to power cable matched with SMK130 series motor	

Encoder cable: ENC D G F-LL-G A-DC

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①-Cable function type	ENC:Motor encoder cable	⑤-Cable length	03:3m 05:5m 10:10m
②-Driver end encoder connector type	D:1394 connector	⑥-Core cable type	G:6-core cable
③-Drive connector definition	G:Communication type connector	⑦-Type of encoder connector to motor end	A:Pluggable encoder connector
④-Cable type	F:Flexible cable Empty:Common cable	⑧ Cable accessories	DC:With battery box outlet cable Empty:Without battery box outlet cable

Note: This naming rule applies to encoder cable matched with SMK40/60/80 series motor

Encoder cable: E - D - QY - K R - LL - F

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①-Cable function type	E:Motor encoder cable	⑤-Motor end connector	R:Military specification plug
②-Driver end encoder connector type	D:1394 6-core connector	⑥-Cable length	3:3m 5:5m 10:10m
③-Encoder type	QY:Multiturn communication encoder	⑦-Cable accessories	Null:Common cable F:High flexibility cable
④ -Motor platform	K:SMK		

Note: This naming rule applies to encoder cable matched with SMK130 series motor

Brake extension cable: BRA - LL - 2PIN

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①-Cable function type	BRA:Motor brake extension cable	②-Cable length	(5):0.5m 01:1m
③-Connector type	2PIN:2PIN connector		

Note: This naming rule applies to brake cable matched with SMK40/60/80 series motor

Brake extension cable: BRA - EXT - LL

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①-Cable function type	BRA:Motor brake extension cable	③-Cable length	0.5:0.5m 3:3m 5:5m
②-Drive end connector	EXT:Extension connector inside the cabinet		

Note: This naming rule applies to brake cable matched with SMK130 series motor

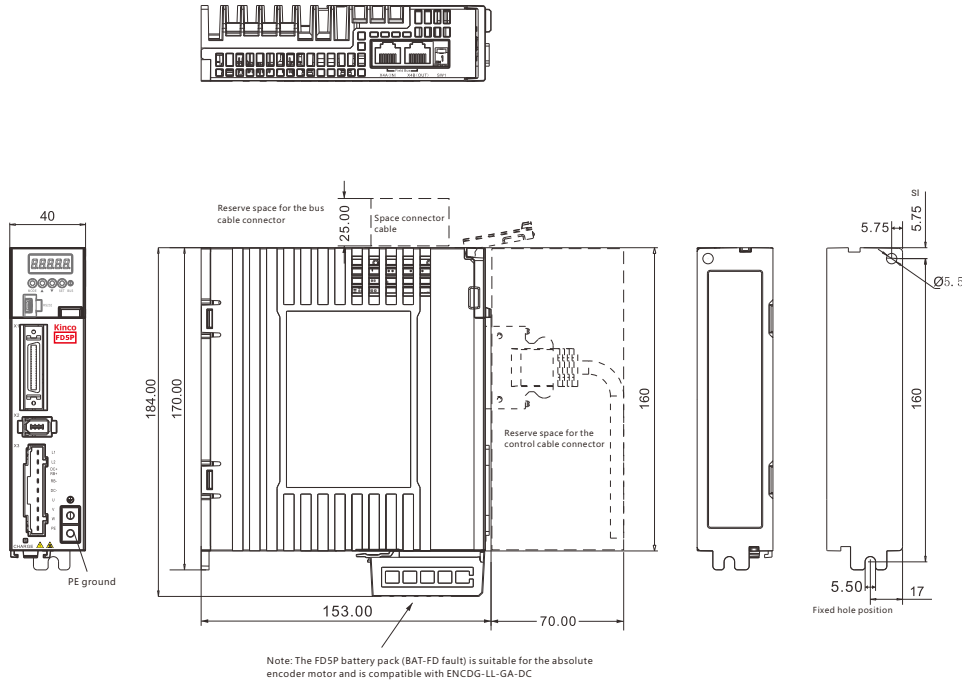
FD5P Servo drive technical parameters table

Model Parameters		FD5P Series								
		FD415P	FD425P	FD425P-F with fan	FD435P	FD445P	FD615P	FD625P	FD635P	FD645P
Power supply	Power Supply	1PH 200-240VAC±10% ;50/60Hz±3HZ			1PH/3PH,200-240VAC±10% ;50/60Hz±3HZ		3PH,380-415VAC±10%;50/60Hz±3HZ			
	Logic power supply	Null			1PH 200VAC-240VAC±10% 50/60Hz±3Hz		1PH 380VAC-415VAC±10% 50/60Hz±3Hz			
Current	Maximum continuous output current (rms)	3.2A	4A	5A	7.6A	12.5A	5.4A	12A	21A	26A
	Peak current (PEAK)	15Ap	18Ap	18Ap	32.5Ap	54Ap	23Ap	45.5Ap	75Ap	92Ap
Feedback Signal		Communication type encoder								
Energy consumption brake		No built-in brake resistance, limited power 20W			Built-in brake resistance 50Ω, limited power 60W	Built-in brake resistance 50Ω, limited power 80W	Built-in brake resistance 100Ω, limited power 60W	Built-in brake resistance 50Ω, limited power 80W	Built-in brake resistance 25Ω, limited power 100W	
Energy consumption braking voltage absorption point		DC380V±5V					DC680V±5V			
Overvoltage alarm voltage		DC400V±5V					DC710V±5V			
Undervoltage alarm voltage		DC200V±5V					DC400V±5V			
Cooling method		Natural cooling		Forced air cooling	Forced air cooling	Forced air cooling	Forced air cooling	Forced air cooling	Forced air cooling	
Weight (KG)		0.881	1.5	1.5	1.4	2.1	1.4	2.1	4	4
Location Control Mode	Command control mode	External pulse input control;Control of 8-segment position using DIN signal;Communication setting internal object parameter control								
	Command smoothing mode	Low-pass filtering (set by internal parameters), S-curve smoothing filtering (set by internal parameters in 1 mode)								
	Pulse command mode	Pulse+direction, CCW+CW, A-phase+B-phase								
	Maximum input pulse frequency	Differential transmission mode: up to 4MHz, open collector transmission mode: 500KHz								
	Electronic gear ratios	Setting range Gear factor:-32768~32767, Gear divider:1~32767, 1/50≤ Gear factor/Gear divider ≤50								
	Torque limit	Internal parameter setting								
	Feedforward gain	0~100.0% (Internal parameter setting)								
Speed Control Mode	Position loop sampling frequency	4KHz								
	Command control mode	8-segment speed control using DIN signals;Communication settings internal object parameter control								
	Command smoothing mode	Low-pass filtering (Internal parameter setting)								
	Speed limit	Internal parameter setting								
	Torque limit	Internal parameter setting								
Torque Control Mode	Speed loop sampling frequency	8KHz								
	Command control mode	Communication setting internal object parameter control								
	Command smoothing mode	Low-pass filtering (Internal parameter setting)								
	Speed limit	Internal parameter setting								
	Current loop sampling frequency	16KHz								
Digital Input	Input specification	7 digital inputs, through the connection of COM1 terminal, it can be valid at high level (12.5~30V) or valid at low level (0~5V).								
	Input function	The following functions can be defined according to your needs: drive enable, drive error reset, drive working mode control, speed loop proportional control, positive limit, negative limit, origin signal, command reverse, internal speed segment control, internal position segment control, emergency stop, pause, start to find the origin, command activation, wheel ratio switching, gain switching, position table function, clear pulse function, etc								
Digital Output	Output specification	5-channel digital output, maximum voltage DC30V, OUT1 and OUT2 differential output, maximum output current 100mA, OUT3~OUT5 single-ended output, maximum output current 20mA, control motor OUT2 brake output through relay.								
	Output function	The following functions can be defined according to your needs:drive ready, drive error, motor position arrives, motor zero speed, motor holding brake, motor speed arrives, index Z signal appears, speed reaches limit, torque reaches setting, motor lock Axis, motor limit, origin found, multi-segment position, etc.								
Encoder signal output function		Output 5V motor A, B, Z signals, frequency division output range 0 ~ 65536; used for multi-axis synchronization, maximum output frequency 5MHz								
Protection function		Over-voltage protection, under-voltage protection, motor overheating (I2T) protection, short-circuit protection, drive overheating protection, etc.								
RS232		RS232 (connection with PC: RS-232 serial port to Mini_USB)								
RS485		Maximum support 115.2KHz baud rate, can use Modbus RTU protocol to communicate with the controller								
CANopen		Maximum support 1MHz baud rate, can use CANopen protocol to communicate with the controller								
EtherCAT		Support CoE (CiA402 protocol) and CSP/CSV/PP/PV/PT/HM mode, communication rate 100M								
Operation Environment	Profinet	Support message 1, message 3, and message 111, process object, aperiodic data read and write								
	Operation temperature	0~40℃								
	Storage temperature	- 10℃~70℃								
	Humidity (no condensation)	5~95%								
	Protection level	IP20								
	Installation site	Dust-free, dry, lockable (e.g. electrical cabinets)								
	Installation method	Vertical installation								
Installation altitude	The rated working altitude is less than 1000 meters above sea level. When the working altitude is higher than 1000 meters, it is necessary to reduce the rated value by 1.5% for every 100 meters of elevation. The maximum working altitude is 2000 meters above sea level.									
Atmosphere pressure	86kpa~106kpa									
Note 1: FD415P, FD425P no PA series										
Note 2: The FD5P-PA series drives have only 3 digital output (OUT1,OUT2,OUT3)										

Mechanical dimension diagram of servo drive

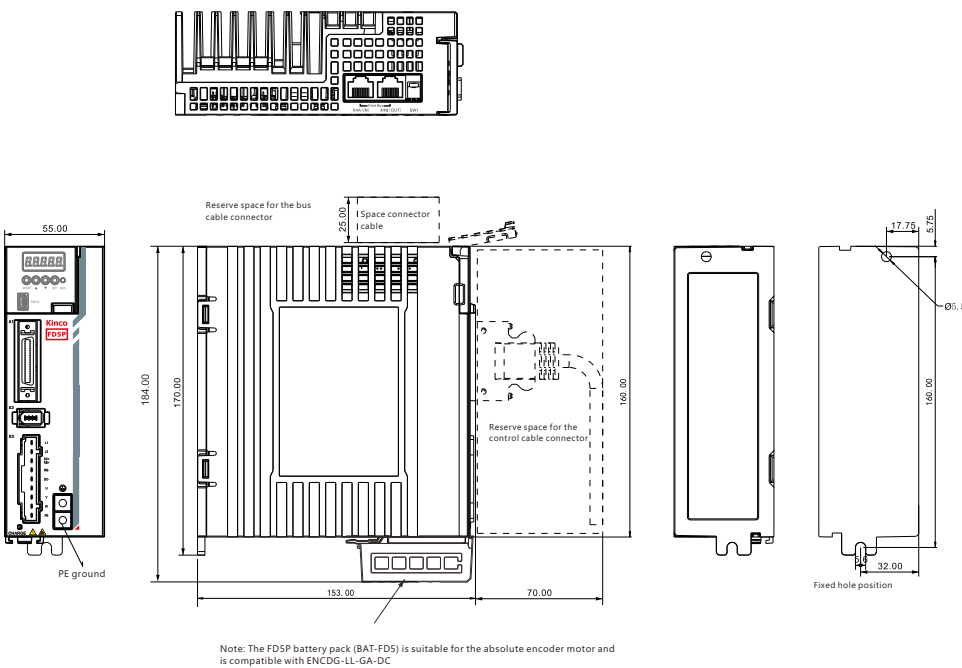
FD415P-□A-000 Dimensional Drawing (Unit:mm)

Note: Wiring space needs to be reserved around the driver, it is recommended to be greater than 70mm.



FD425P-□A-000 Dimensional Drawing (Unit:mm)

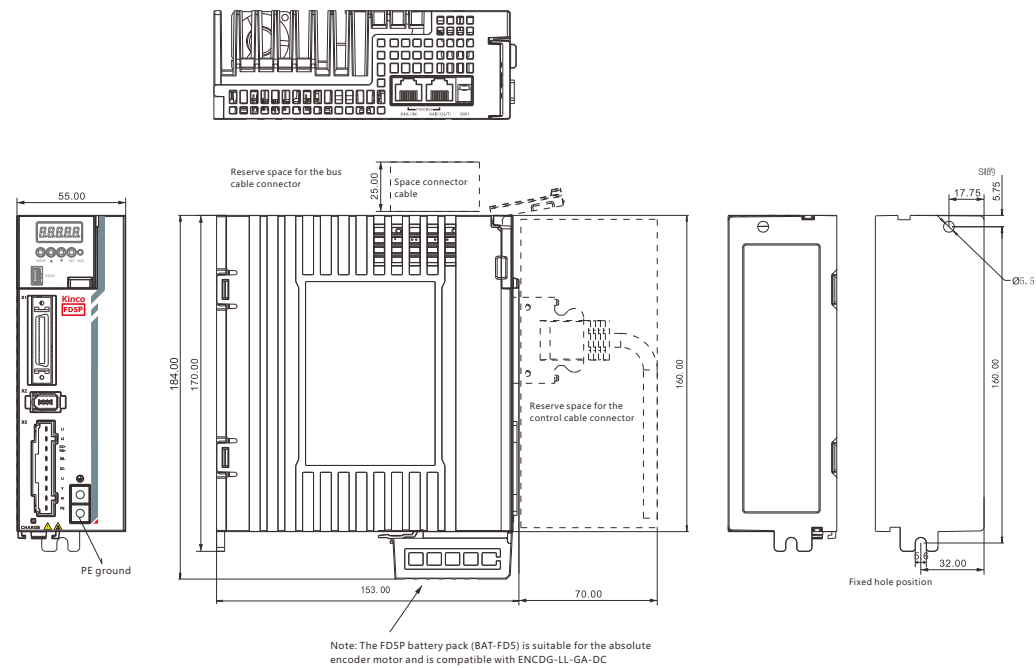
Note: Wiring space needs to be reserved around the driver, it is recommended to be greater than 70mm.



■ Mechanical dimension diagram of servo drive

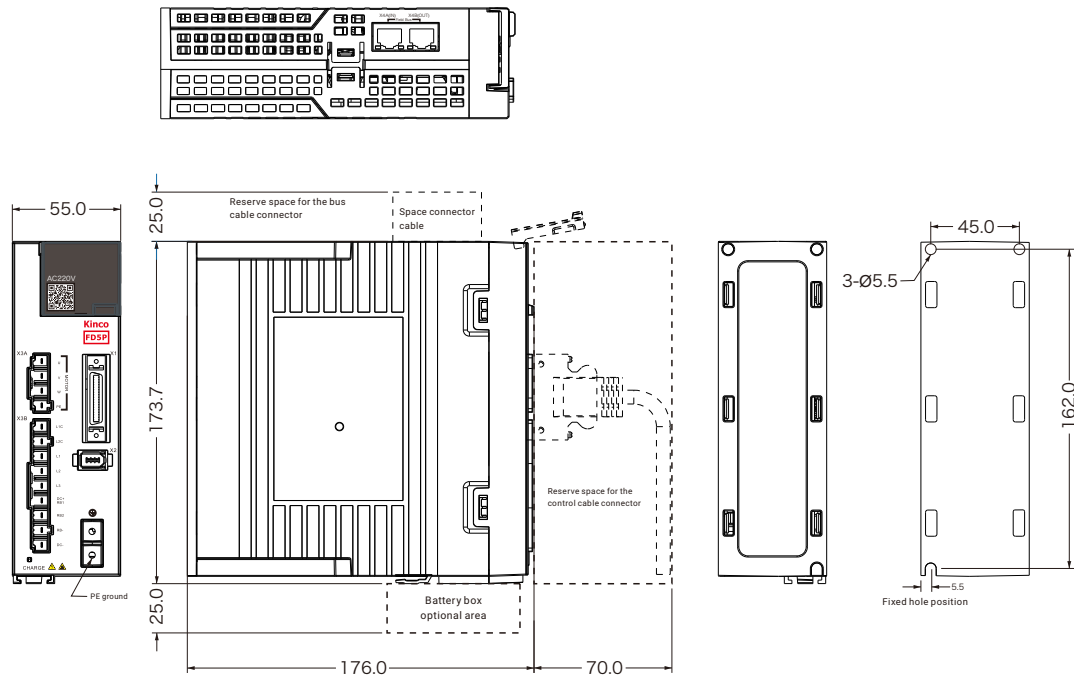
FD425P-□F-000 Dimensional Drawing (Unit:mm)

Note: Wiring space needs to be reserved around the driver, it is recommended to be greater than 70mm.



FD435P/FD615P-□A-000 Dimensional Drawing (Unit:mm)

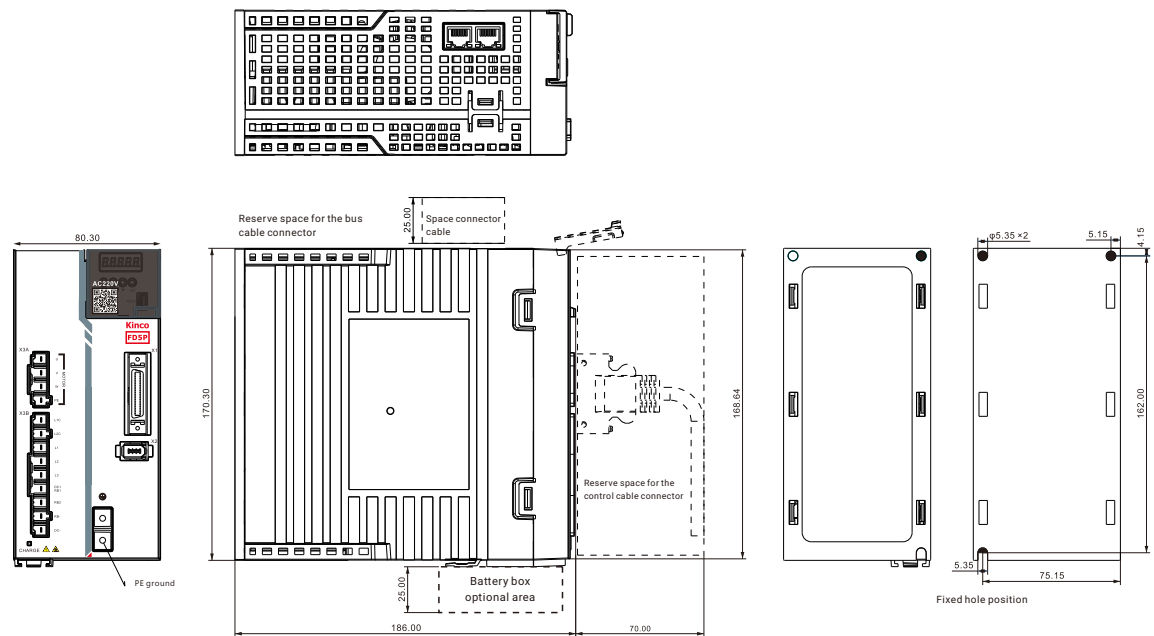
Note: Wiring space needs to be reserved around the driver, it is recommended to be greater than 70mm.



■ Mechanical dimension diagram of servo drive

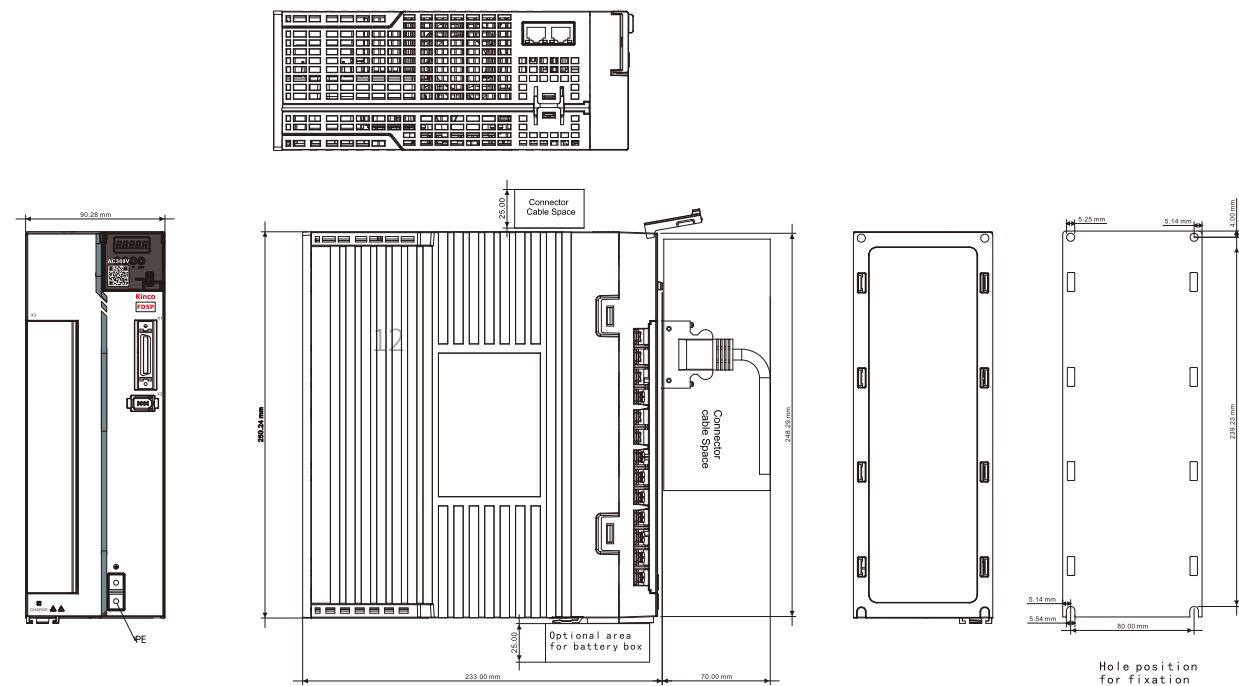
FD445P/FD625P-□A-000 Dimensional Drawing (Unit:mm)

Note: Wiring space needs to be reserved around the driver, it is recommended to be greater than 70mm.



FD635P/FD645P-□A-000 Dimensional Drawing (Unit:mm)

Note: Wiring space needs to be reserved around the driver, it is recommended to be greater than 70mm.



FD5P servo drive and motor configuration table

Servo motor		Servo drive					Power cable		Brake cable	Encoder cable		
Rated parameter	Motor model (Note 1)	Pulse + Modbus	CANopen	EtherCAT	Profinet		Power cable (Note 2)	Plug accessory kit	Extension cable inside the cabinet (Note 3)	Encoder cable(Note 4)	Battery accessory kit (Note 5)	Plug accessory kit
220V/50W/3000rpm/0.16Nm	SMK40S-0005-30□AK-5LSA	FD415P-LA-000	FD415P-CA-000	FD415P-EA-000	-		MOT-005-LL-KA	MOT/MOTF-005-KA	BRA-LL-2PIN	□=M/V: ENCDG-LL-GA =Q/Y: ENCDG-LL-GA-DC		□=M/V: ENCDG/ENCDGF-GA =Q/Y: ENCDG-GA-DC
	SMK40S-0005-30□BK-5LSA						MOTF-005-LL-KAB-S	MOT/MOTF-005-KA-B-S				
220V/100W/3000rpm/0.32Nm	SMK40S-0010-30□AK-5LSA						MOT-005-LL-KA	MOT/MOTF-005-KA				
	SMK40S-0010-30□BK-5LSA						MOTF-005-LL-KAB-S	MOT/MOTF-005-KA-B-S				
220V/200W/3000rpm/0.64Nm	SMK60S-0020-30□AK-5LSA						MOT-005-LL-KA	MOT/MOTF-005-KA				
	SMK60S-0020-30□BK-5LSA						MOT-005-LL-KA-B	MOT/MOTF-005-KA-B				
220V/400W/3000rpm/1.27Nm	SMK60S-0040-30□AK-5LSA						MOT-005-LL-KA	MOT/MOTF-005-KA				
	SMK60S-0040-30□BK-5LSA						MOT-005-LL-KA-B	MOT/MOTF-005-KA-B				
220V/750W/3000rpm/2.39Nm	SMK80S-0075-30□AK-5LSA	FD425P-LA-000	FD425P-CA-000	FD425P-EA-000	-		MOT-005-LL-KA	MOT/MOTF-005-KA				
	SMK80S-0075-30□BK-5LSA						MOT-005-LL-KA-B	MOT/MOTF-005-KA-B				
220V/1000W/3000rpm/3.18Nm	SMK80S-0100-30□AK-5LSA	FD435P-LA-000	FD435P-CA-000	FD435P-EA-000	FD435P-PA-000		MOT-005-LL-KA	MOT/MOTF-005-KA				
	SMK80S-0100-30□BK-5LSA						MOT-005-LL-KA-B	MOT/MOTF-005-KA-B				
220V/850W/1500rpm/5.39Nm	SMK130G-0085-15□AK-5LSR	FD435P-LA-000	FD435P-CA-000	FD435P-EA-000	FD435P-PA-000		M-A-12A-KR0-LL(-F/-S/-FS)	M-KR0	BRA-EXT-LL	E-D-QY-KR-LL E-D-QY-KR-LL-F		E-D E-KR
	SMK130G-0085-15□BK-5LSR						M-A-12A-KR0-LL-B(-BF/-BS/-BFS)					
220V/1300W/1500rpm/8.34Nm	SMK130G-0130-15□AK-5LSR	FD445P-LA-000	FD445P-CA-000	FD445P-EA-000	FD445P-PA-000		M-A-12A-KR0-LL(-F/-S/-FS)					
	SMK130G-0130-15□BK-5LSR						M-A-12A-KR0-LL-B(-BF/-BS/-BFS)					
380V/850W/1500rpm/5.39Nm	SMK130G-0085-15□AK-5HSR	FD615P-LA-000	FD615P-CA-000	FD615P-EA-000	FD615P-PA-000		M-A-12A-KR0-LL(-F/-S/-FS)					
	SMK130G-0085-15□BK-5HSR						M-A-12A-KR0-LL-B(-BF/-BS/-BFS)					
380V/1300W/1500rpm/8.34Nm	SMK130G-0130-15□AK-5HSR						M-A-12A-KR0-LL(-F/-S/-FS)					
	SMK130G-0130-15□BK-5HSR						M-A-12A-KR0-LL-B(-BF/-BS/-BFS)					
380V/1800W/1500rpm/11.5Nm	SMK130G-0180-15□AK-5HSR	FD625P-LA-000	FD625P-CA-000	FD625P-EA-000	FD625P-PA-000		M-A-12A-KR0-LL(-F/-S/-FS)					
	SMK130G-0180-15□BK-5HSR						M-A-12A-KR0-LL-B(-BF/-BS/-BFS)					
380V/2400W/1500rpm/15.2Nm	SMK130G-0240-15□AK-5HSR						M-A-12A-KR0-LL(-F/-S/-FS)					
	SMK130G-0240-15□BK-5HSR						M-A-12A-KR0-LL-B(-BF/-BS/-BFS)					

(Note1): □ indicates the optional encoder type:
M - Singleturn communication type magnetoelectric encoder
V - Singleturn communication type optical encoder
Q - Multiturn communication type magnetoelectric absolute value encoder
Y- Multiturn communication type optical absolute value encoder

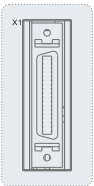
(Note2): The parentheses behind the power cable indicate the suffix of the other three cables

(Note3): The extension cable inside the cabinet is used to match the power cable with a brake

(Note4): SMK130 series motor only has Q/Y encoders

(Note5): Q/Y encoders are used when multi-turn function is required

Drive interface description



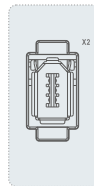
Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Specification description
X1	I/O Interface	SCSI-36P-F	1	OUT1+	Digital output port 1 positive	Open-collector output, maximum voltage DC30V, maximum current 100mA
			3	OUT1-	Digital output port 1 negative	
			5	OUT2+	Digital output port 2 positive	
			7	OUT2-	Digital output port 2 negative	
			9	OUT3	Digital output port 3	Maximum voltage DC30V, maximum current 20mA
			11	OUT4	Digital output port 4	
			20	OUT5	Digital output port 5	
			13	COMO	Digital output ports 3, 4, 5 common end	
			15	VDD	External output power supply positive	Internal 24V power output, voltage range +/-20%, maximum current DC200mA
			17	VEE	External output power supply negative	
			2	COMI	Digital input common end	Digital input common positive terminal, accepts power supplies from 18 ~ 30 VDC
			4	DIN1	Digital input port 1	The COMI-DINx signal is valid if the difference is greater than 12.5V, and is not valid if it is less than 5V. Receives relay output signals as well as NPN signals, maximum input frequency: 1 KHz
			6	DIN2	Digital input port 2	
			8	DIN3	Digital input port 3	
			10	DIN4	Digital input port 4	
			12	DIN5	Digital input port 5	
			14	DIN6	Digital input port 6	
			16	DIN7	Digital input port 7	
			19	MA/	Differential signal: MA_/MA,MB,/MB,MZ,/MZ, Support maximum frequency 4MHz, voltage range DC 3.3-5V	
			21	MB/		
			23	MZ/		
			25	NC		
			27	MA+ / MA	TTL signal: MA+,MA-,MB+,MB-,MZ+,MZ-, Support maximum frequency 500KHz, voltage range DC12-30V	Pulse signal input terminal, supports TTL/differential signal.Signal type optional: ①Pulse+Direction (PLS+DIR) ②Forward and reverse pulses (CW/CCW) ③A+B phase
			29	MA-		
			31	MB+ / MB		
			33	MB-		
			35	MZ+ / MZ		
			18	MZ-		
			22	+5V	Internal 5V power output	
			24	GND		
			26	ENCO_N	Encoder signal output	Output 5V motor A, B, Z signals, frequency division output range 0~65536; For multi-axis synchronization, the maximum output frequency is 5MHz
			28	ENCO_/N		
			30	ENCO_B		
			32	ENCO_/B		
			34	ENCO_A		
			36	ENCO_/A		

Note: FD5P-PA series does not have OUT4 OUT5



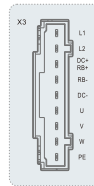
Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Specification description
RS232	RS232 communication interface	Mini_USB 5pin terminal	1	NC		It can be connected to the host computer software of the PC side to set parameters and monitor the status
			2	RX	Drive data reception	
			3	TX	Drive data send	
			4	NC		
			5	GND	Signal site	

Note: Customers can choose the Kinco servo debugging cable-MINIUSB, model PDC-USBM-1 (5)



Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Specification description
X2	Motor encoder interface	1394 port	1	+5V	5V power supply output positive	Encoder signal input
			2	GND	5V power supply output negative	
			3	CLOCK+	Clock signal positive	
			4	CLOCK-	Clock signal positive negative	
			5	SD+	Data signal	
			6	SD-	Data signal	

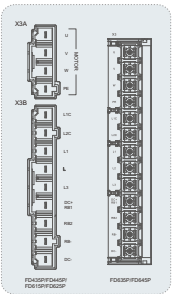
Note: The signal identification is suitable for magnetoelectric encoders, photoelectric encoders have no PIN3 and PIN4



Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Specification description
X3	Power terminal	9P/5mm Plug-in terminals	1	L1	Power supply input	1PH 200-240VAC 50/60Hz
			2	L2		
			3	DC+/RB+	DC bus,Braking resistance interface	1. The factory default does not connect the internal brake resistance. When braking exceeds the power drive, the brake resistance overpower alarm will be reported, and 0100 will be displayed 2. When the motor needs an external braking resistor, connect it between DC+/RB+ and RB- 3. DC+/RB+, DC- are the positive and negative terminals of the DC bus
			4	RB-		
			5	DC-		
			6	U	Motor cable interface	Connect to motor cable U, V, W, PE
			7	V		
			8	W		
			9	PE		

Note: This X3 interface is the FD415P/FD425P power port

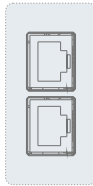
Drive interface description



Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Specification description		
X3A	Power terminal	7.5 spacing plug-in terminal (Figure 1)/Fence terminal(Figure2)	1	U	Motor cable interface	Connect motor cable U,V,W,PE		
			2	V				
			3	W	Motor ground terminal			
			4	PE				
X3B		7.5 spacing plug-in terminal (Figure 1)/Fence terminal(Figure2)	1	L1C	Logic power input	FD435P/FD445P:1PH 200V-240V AC±10% 50/60Hz±3Hz		
			2	L2C	Power supply input	FD615P/FD625P/FD635P/FD645P:1PH 380V-415V AC±10% 50/60Hz±3Hz		
			3	L1				
			4	L2				
			5	L3	DC Bus, Brake resistance interface		FD435P/FD445P:1PH/3PH 200V-240V AC±10% 50/60Hz±3Hz	
			6	DC+/RB1				FD615P/FD625P/FD635P/FD645P:3PH 380V-415V AC±10% 50/60Hz±3Hz
			7	RB2				
			8	RB-				
			9	DC-	DC Bus input negative end			

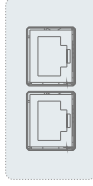
Note: This X3 interface is the FD435P/FD445P/FD615P/FD625P/FD635P/FD645P power port

RS485



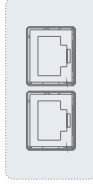
Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name
X4A	RS485 communication interface input	RJ45 Master Network Port	L1	NC		X4B	RS485 communication interface input	RJ45 Master network port	R1	NC	
			L2	NC					R2	NC	
			L3	NC					R3	NC	
			L4	485-	Data receiving negative end				R4	485-	Data receiving negative end
			L5	485+	Data receiving positive end				R5	485+	Data receiving positive end
			L6	NC					R6	NC	
			L7	NC					R7	NC	
			L8	NC					R8	NC	

CAN



Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name
X4A	CAN communication interface input	RJ45 Master Network Port	L1	CAN_H	Signal positive end	X4B	CAN communication interface input	RJ45 Master network port	R1	CAN_H	Signal positive end
			L2	CAN_L	Signal negative end				R2	CAN_L	Signal negative end
			L3	GNDB	Signal ground				R3	GNDB	Signal ground
			L4	NC					R4	NC	
			L5	NC					R5	NC	
			L6	NC					R6	NC	
			L7	NC					R7	NC	
			L8	NC					R8	NC	

EtherCAT/Profinet



Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name	Interface number	Interface name	Interface type	Pin number	Signal marking	Signal name
X4A	EtherCAT communication interface input	RJ45 Master network port	L1	TD+	Send signal positive end	X4B	EtherCAT/Profinet communication interface input	RJ45 Master network port	R1	TD+	Send signal positive end
			L2	TD-	Send signal negative end				R2	TD-	Send signal negative end
			L3	RD+	Data receiving positive end				R3	RD+	Data receiving positive end
			L4	NC					R4	NC	
			L5	NC					R5	NC	
			L6	RD-	Data receiving negative end				R6	RD-	Data receiving negative end
			L7	NC					R7	NC	
			L8	NC					R8	NC	

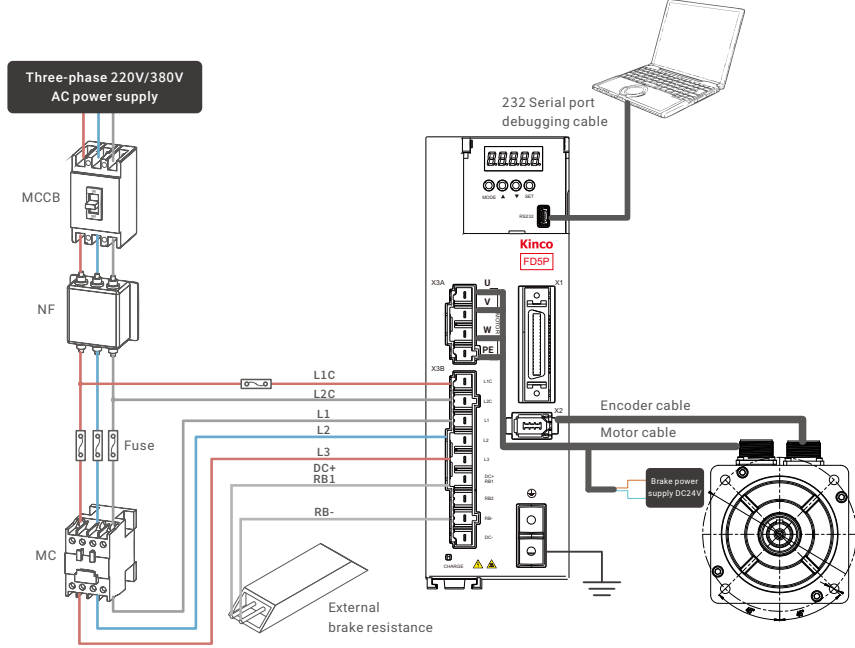
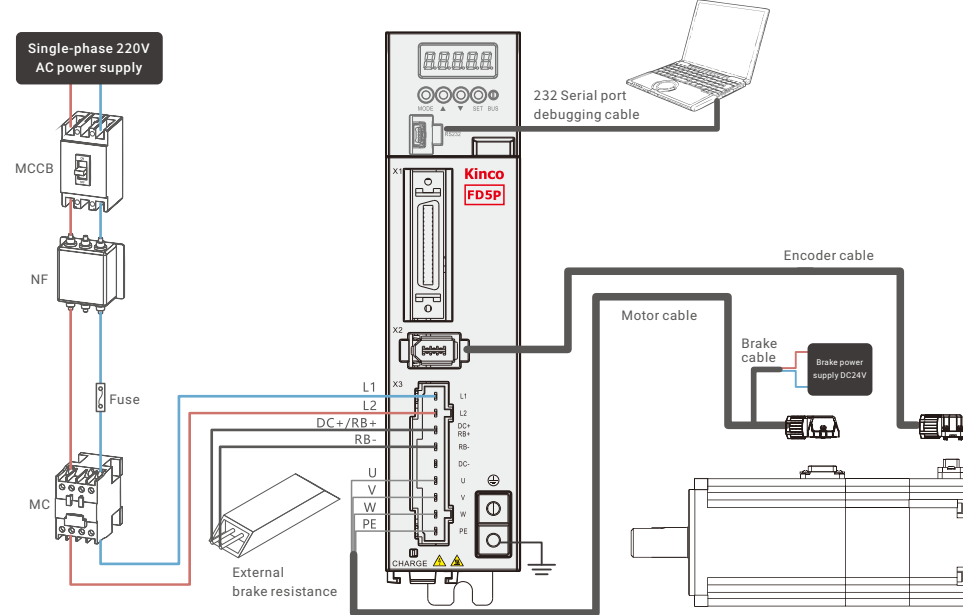
Drive external wiring diagram

Drive external wiring diagram

External wiring diagram

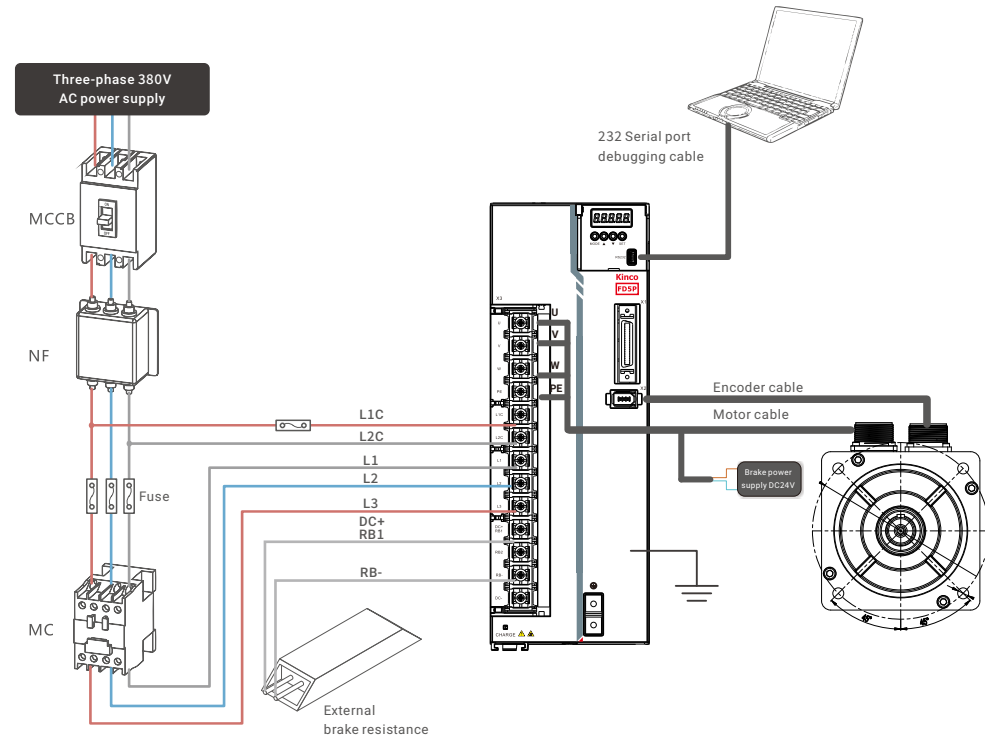
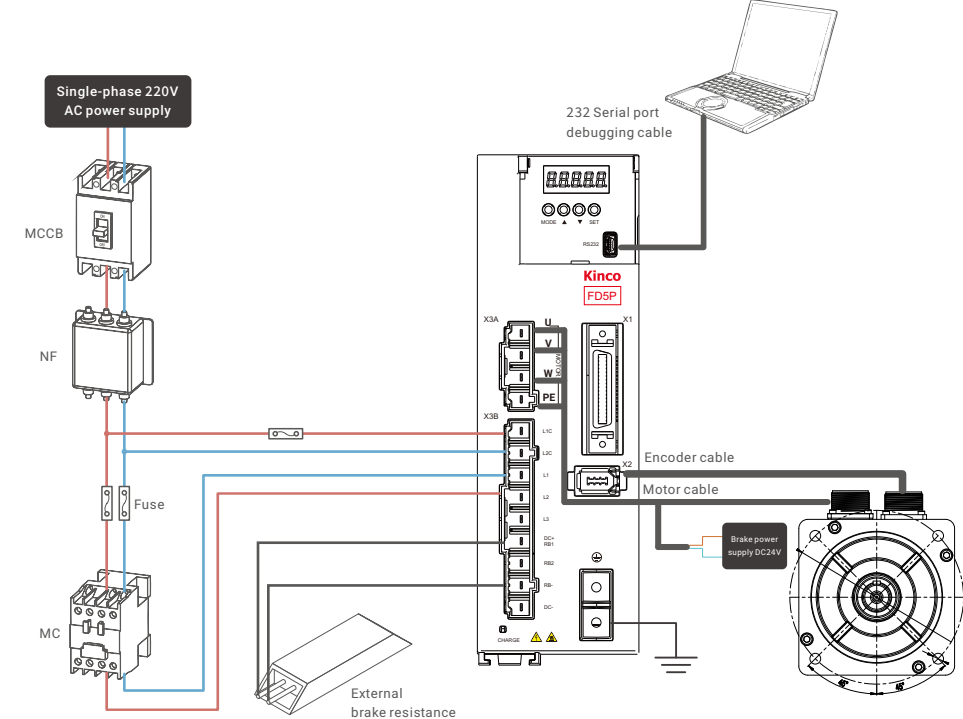
FD435P, FD445P(three-phase 220V)/FD615P,FD625P(three-phases380V) power supply

FD415/FD425P



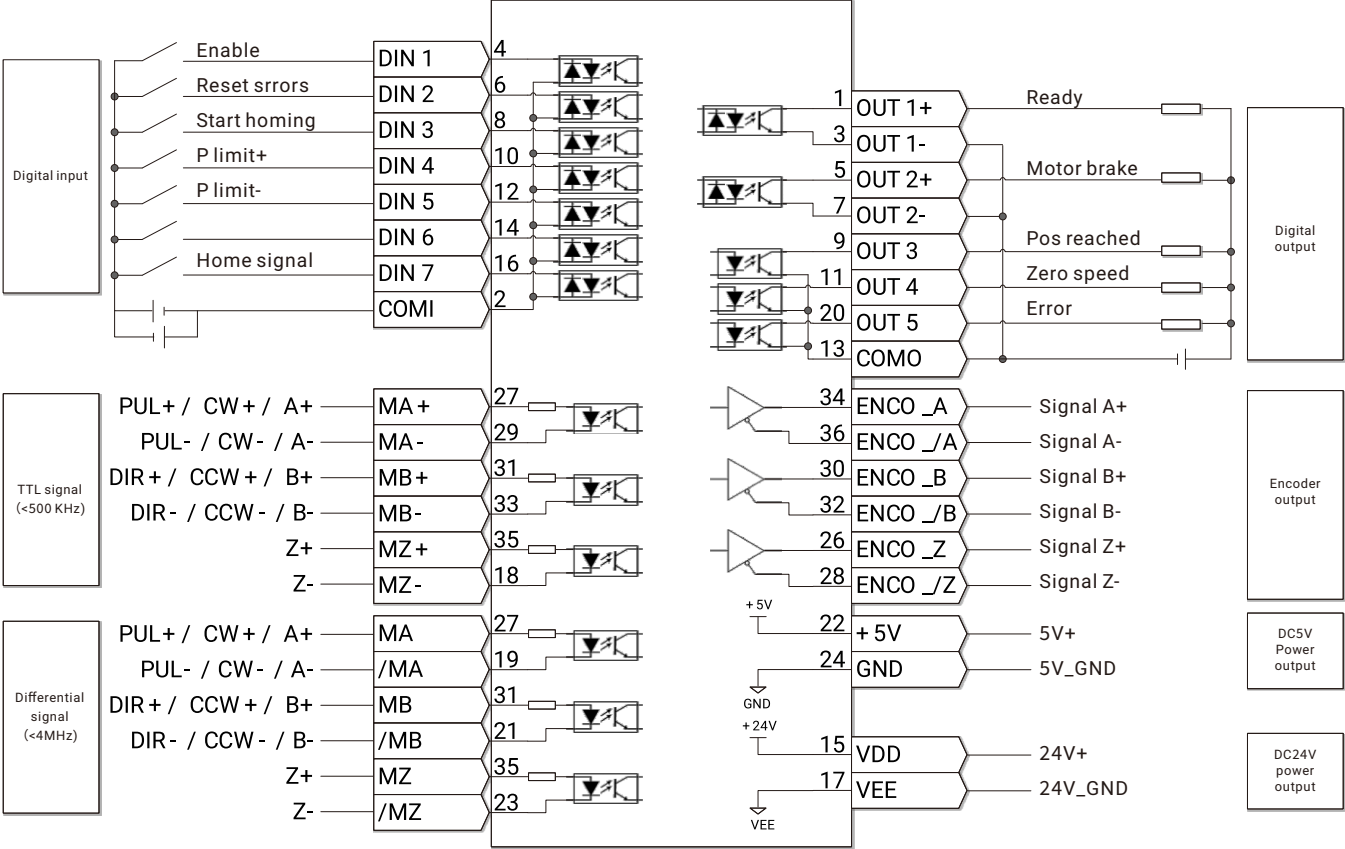
FD435P/FD445P single-phase 220V AC power supply

FD635P/FD645P three-phase 380V power supply



Note: When the FD435P/FD445P is connected in single-phase mode, the input phase loss detection is enabled by default upon power-on. To use it, you need to write 0 to Input_Lack_Check (269200) in the KS+ software

Drive electrical wiring diagram



SMK servo motor technical parameter

Model parameter		Small inertia, 40 flange	
Servo motor model		SMK40S-0005-30□□■K-5LSA	SMK40S-0010-30□□■K-5LSA
Adapted drives		FD415P-LA-000	
		FD415P-CA-000	
		FD415P-EA-000	
Rated voltage (VAC)		220	220
Rated power Pn(W)		50	100
Rated torque Tn(Nm)		0.16	0.32
Rated speed nN (rpm)		3000	3000
Rated current In(A)		0.88	1.2
Max torque Tm(Nm)		0.56	1.11
Max current Im (A)		3.3	4.4
Max speed (rpm)		6000	6000
Standstill torque Ts(Nm)		0.176	0.352
Standstill current Is(A)		0.98	1.32
Torque constant Kt (Nm/A)		0.2	0.3
Rotary inertia Jm (Kg·cm ²)		0.023	0.044
		0.025(with brake)	0.046(with brake)
Brake parameter	Brake holding torque T(Nm)	0.32	0.32
	Rated power (W)	6.1	6.1
	Rated voltage (VDC)	24	24
Insulation class		F	F
Max radial force Fr(N)		78	78
Max axial force Fa(N)		54	54
Weight G(Kg)		0.31	0.382
		0.5(with brake)	0.571(with brake)
Cooling method		Totally enclosed, self-cooling	
Protection level		IP67, IP54 at the shaft end (Note: add oil seal IP54 at the shaft end, no oil seal IP50)	
Operation environment	Temperature	- 20~40°C (no icing)	
	Humidity	Below 90% RH (no condensation)	
	Ambient environment	Keep away from corrosion, flammable gases, oil droplets, dust	
	Altitude	The rated working altitude is less than 1000 meters above sea level. When the working altitude is higher than 1000 meters, it is necessary to reduce the rated value by 1.5% for every 100 meters of elevation. The maximum working altitude is 2000 meters above sea level.	

Note: □ = M : Singleturn communication type magnetoelectric encoder
Q : Multiturn communication type magnetoelectric absolute encoder
V : Singleturn communication type optical encoder
Y : Multiturn communication type optical absolute value encoder
■ = A : Motor without brake
B : Motor with brake

SMK servo motor technical parameter

Model parameter		Small inertia, 60 flange		Small inertia, 80 flange	
Servo motor		SMK60S-0020	SMK60S-0040	SMK80S-0075	SMK80S-0100
model		-30□■K-5LSA	-30□■K-5LSA	-30□■K-5LSA	-30□■K-5LSA
Adapted drives		FD415P-LA-000		FD425P-LA-000	FD435P-LA-000
		FD415P-CA-000		FD425P-CA-000	FD435P-CA-000
		FD415P-EA-000		FD425P-EA-000	FD435P-EA-000
					FD435P-PA-000
Rated voltage (VAC)		220	220	220	220
Rated power Pn(W)		200	400	750	1000
Rated torque Tn(Nm)		0.64	1.27	2.39	3.18
Rated speed nN (rpm)		3000	3000	3000	3000
Rated current In(A)		1.55	2.93	3.9	5.3
Max torque Tm(Nm)		1.92	3.81	7.17	9.54
Max current Im (A)		5	9.4	12.4	16
Max speed (rpm)		6000	6000	6000	6000
Standstill torque Ts(Nm)		0.71	1.4	2.63	3.5
Standstill current Is(A)		1.7	3.2	4.3	5.83
Torque constant Kt (Nm/A)		0.5	0.51	0.7	0.66
Rotary inertia Jm (Kg・cm ²)		0.17	0.274	0.9	1.027
		0.174(with brake)	0.29(with brake)	0.95(with brake)	1.19(with brake)
Brake parameter	Brake holding torque T(Nm)	2	2	3.2	3.2
	Rated power (W)	7.6	7.6	11.5	11.5
	Rated voltage (VDC)	24	24	24	24
Insulation class		F	F	F	F
Max radial force Fr(N)		180	180	335	335
Max axial force Fa(N)		90	90	167.5	167.5
Weight G(Kg)		0.85	1.3	2	2.3
		1.2(with brake)	1.65(with brake)	2.6(with brake)	2.9(with brake)
Cooling method		Totally enclosed, self-cooling			
Protection level		IP67, IP54 at the shaft end (Note: add oil seal IP54 at the shaft end, no oil seal IP50)			
Operation environment	Temperature	- 20~40℃ (no icing)			
	Humidity	Below 90% RH (no condensation)			
	Ambient environment	Keep away from corrosion, flammable gases, oil droplets, dust			
	Altitude	The rated working altitude is less than 1000 meters above sea level. When the working altitude is higher than 1000 meters, it is necessary to reduce the rated value by 1.5% for every 100 meters of elevation. The maximum working altitude is 2000 meters above sea level.			

Note: □ = M : Singleturn communication type magnetoelectric encoder
Q : Multiturn communication type magnetoelectric absolute encoder
V : Singleturn communication type optical encoder
Y : Multiturn communication type optical absolute value encoder
■ = A : Motor without brake
B :Motor with brake

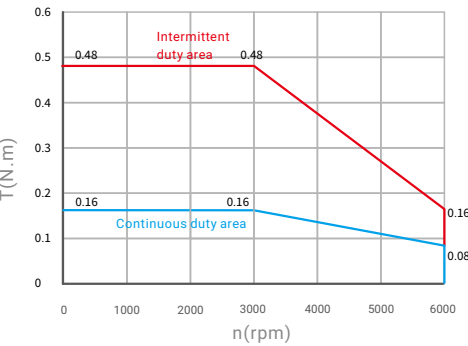
SMK servo motor technical parameter

Model parameter		Large inertia 130 flange				
Servo motor model		SMK130G-0085 -15□■K-5LSR	SMK130G-0130 -15□■K-5LSR	SMK130G-0085- 15□■K-5HSR	SMK130G-0130- 15□■K-5HSR	SMK130G-0180- 15□■K-5HSR
Adapted drives		FD435P-LA-000	FD445P-LA-000	FD615P-LA-000	FD625P-LA-000	
		FD435P-CA-000	FD445P-CA-000	FD615P-CA-000	FD625P-CA-000	
		FD435P-EA-000	FD445P-EA-000	FD615P-EA-000	FD625P-EA-000	
		FD435P-PA-000	FD445P-PA-000	FD615P-PA-000	FD625P-PA-000	
Rated voltage (VAC)		220	220	380	380	380
Rated power Pn(W)		850	1300	850	1300	1800
Rated torque Tn(Nm)		5.39	8.34	5.39	8.34	11.5
Rated speed nN (rpm)		1500	1500	1500	1500	1500
Rated current In(A)		6.6	10.5	3.5	5	6.9
Max torque Tm(Nm)		16.17	25.02	16.17	25.02	34.5
Max current Im (A)		21.45	34.125	11.375	16	22.425
Max speed (rpm)		4500	4500	4500	4500	4500
Standstill torque Ts(Nm)		5.929	9.174	5.929	9.174	12.65
Standstill current Is(A)		7.26	11.55	3.85	5.5	7.59
Torque constant Kt (Nm/A)		0.93	0.89	1.85	1.85	1.85
Rotary inertia Jm (Kg・cm ²)		11.56	17.17	11.56	17.17	22.85
		12.86(with brake)	18.47(with brake)	12.86(with brake)	18.47(with brake)	24.15(with brake)
Brake parameter	Brake holding torque T(Nm)	20	20	20	20	20
	Rated power (W)	23	23	23	23	23
	Rated voltage (VDC)	24	24	24	24	24
Insulation class		F	F	F	F	F
Max radial force Fr(N)		686	686	686	686	686
Max axial force Fa(N)		196	196	196	196	196
Weight G(Kg)		6.03	7.35	6.03	7.35	8.7
		7.38(with brake)	8.6(with brake)	7.38(with brake)	8.6(with brake)	9.95(with brake)
Cooling method		Totally enclosed, self-cooling				
Protection level		IP65, IP54 at the shaft end (Note: add oil seal IP54 at the shaft end, no oil seal IP50)				
Operation environment	Temperature	- 20~40℃ (no icing)				
	Humidity	Below 90% RH (no condensation)				
	Ambient environment	Keep away from corrosion, flammable gases, oil droplets, dust				
	Altitude	The rated working altitude is less than 1000 meters above sea level. When the working altitude is higher than 1000 meters, it is necessary to reduce the rated value by 1.5% for every 100 meters of elevation. The maximum working altitude is 2000 meters above sea level.				

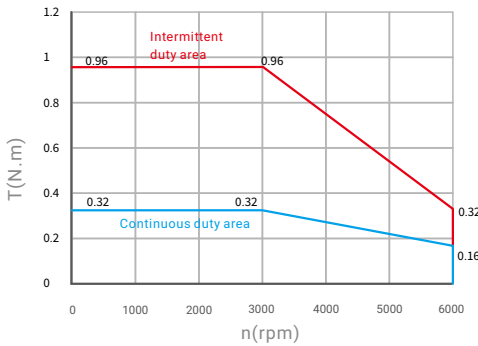
Note: □ = M : Singleturn communication type magnetoelectric encoder
Q : Multiturn communication type magnetoelectric absolute encoder
V : Singleturn communication type optical encoder
Y : Multiturn communication type optical absolute value encoder
■ = A : Motor without brake
B :Motor with brake

SMK series motor TN curve

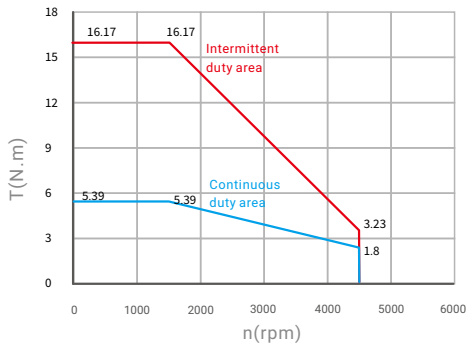
SMK40S-0005-30 K-5LSA 50W



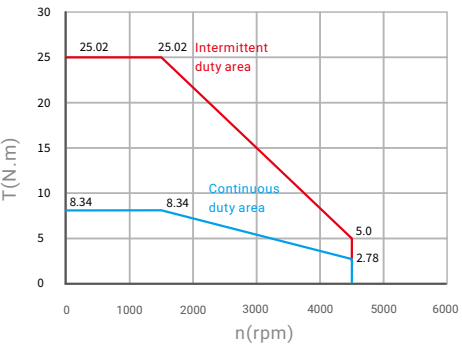
SMK40S-0010-30 K-5LSA 100W



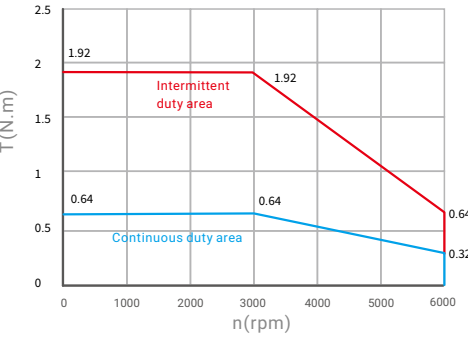
SMK130G-0085-15 K-5LSR/5HSR 850W



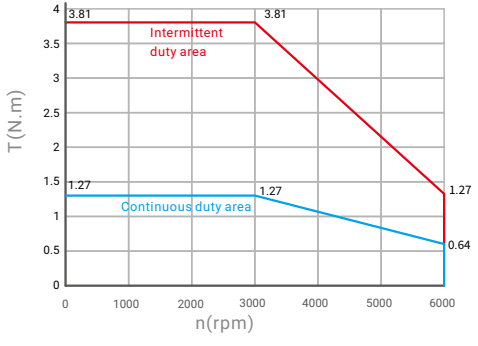
SMK130G-0130-15 K-5LSR/5HSR 1300W



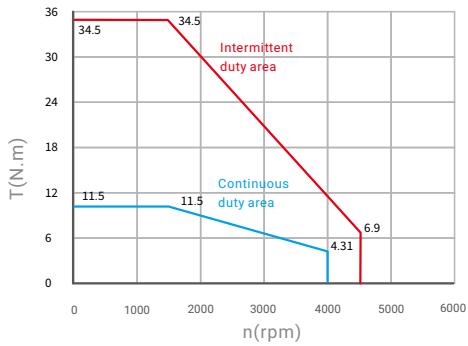
SMK60S-0020-30 K-5LSA 200W



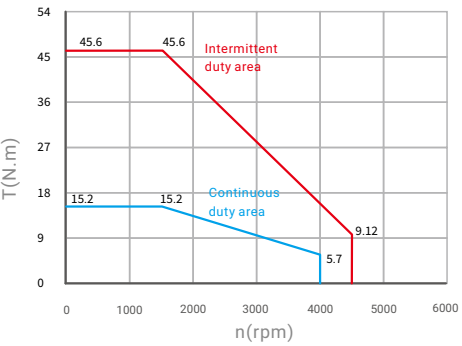
SMK60S-0040-30 K-5LSA 400W



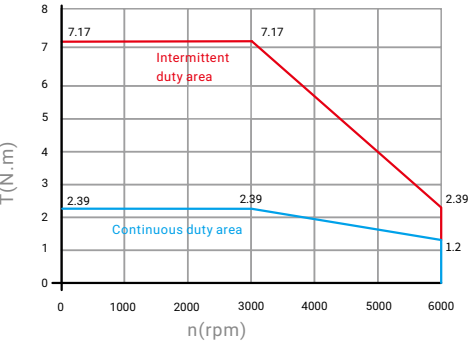
SMK130G-0180-15 K-5HSR 1800W



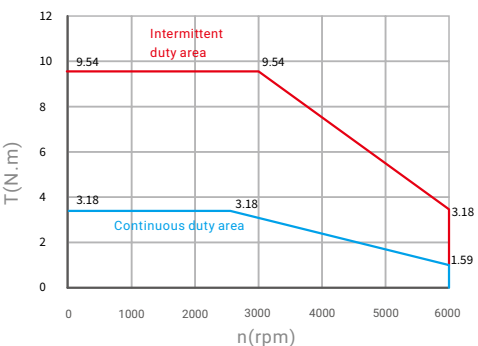
SMK130G-0240-15 K-5HSR 2400W



SMK80S-0075-30 K-5LSA 750W

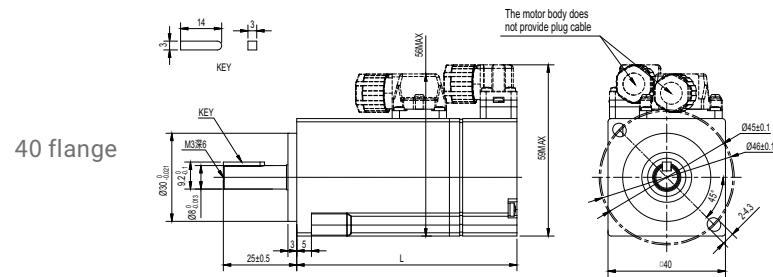


SMK80S-0100-30 K-5LSA 1000W



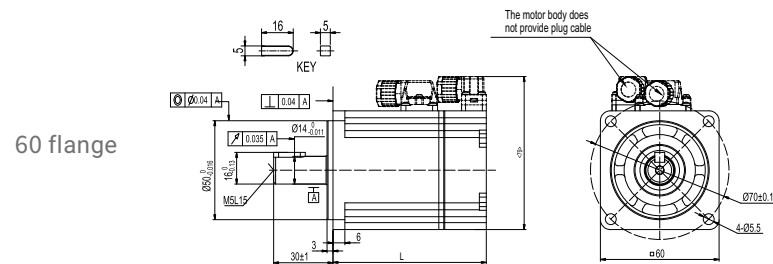
SMK servo motor dimension

SMK40 series servo motor dimension



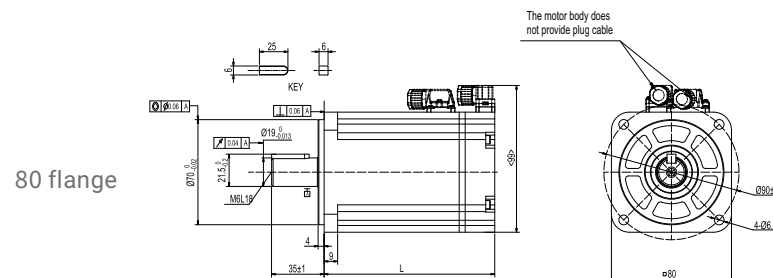
SMK40 series model	Weight (KG)	Motor body size L (mm)
SMK40S-0005-30□■K-5LSA	0.31	62.5±1
	0.5(With brake)	92.5±1(With brake)
SMK40S-0010-30□■K-5LSA	0.382	75±1
	0.571(With brake)	105±1(With brake)

SMK60 series servo motor dimension



SMK60 series model	Weight (KG)	Motor body size L (mm)
SMK60S-0020-30□■K-5LSA	0.85	77±1.5
	1.2(With brake)	109.1±1.5(With brake)
SMK60S-0040-30□■K-5LSA	1.3	95±1.5
	1.65(With brake)	127.1±1.5(With brake)

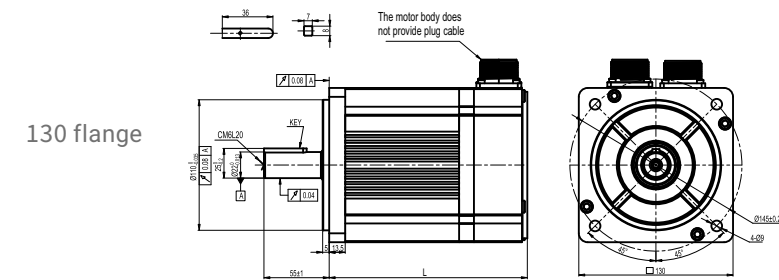
SMK80 series servo motor dimension



SMK80 series model	Weight (KG)	Motor body size L (mm)
SMK80S-0075-30□■K-5LSA	2	103.7±1.5
	2.6(With brake)	133.2±1.5(With brake)
SMK80S-0100-30□■K-5LSA	2.3	113.7±1.5
	2.9(With brake)	143.2±1.5(With brake)

SMK servo motor dimension

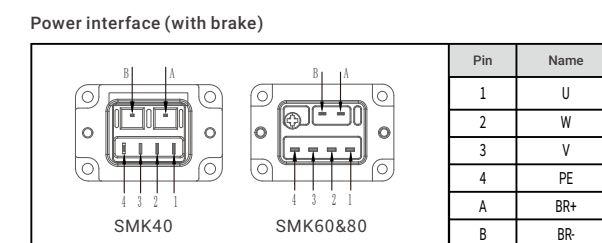
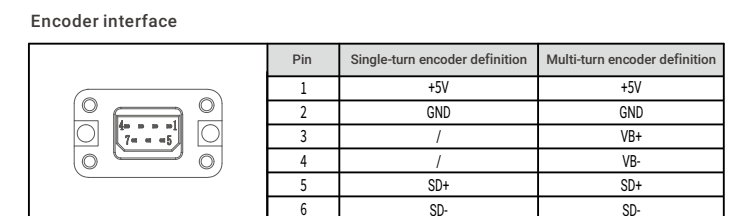
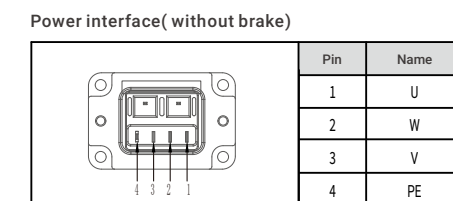
SMK130 series servo motor dimension



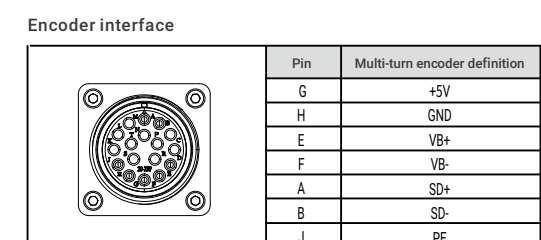
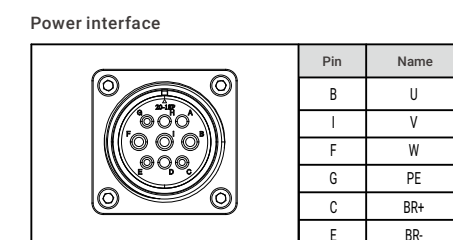
SMK130 series model	Weight (KG)	Motor body size L (mm)
SMK130G-0085-15□■K-5LSR/5HSR	6.03	139±1.5
	7.38(With brake)	155±1.5(With brake)
SMK130G-0130-15□■K-5LSR/5HSR	7.35	154±1.5
	8.6(With brake)	170±1.5(With brake)
SMK130G-0180-15□■K-5HSR	8.7	169±1.5
	9.95(With brake)	185±1.5(With brake)
SMK130G-0240-15□■K-5HSR	10.6	189±1.5
	11.85(With brake)	205±1.5(With brake)

Motor connector pin definition

■ SMK40&60&80 motor connector



■ SMK130 motor connector



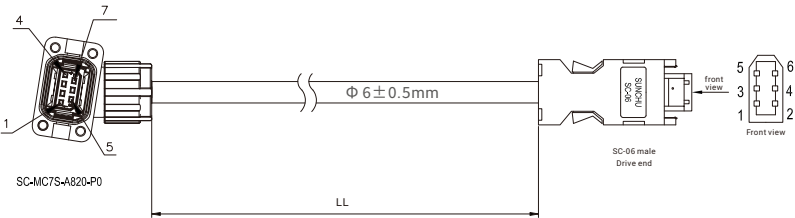
Note: Pin C and Pin E are suitable for SMK130 motor with brake

Cable description

Encoder cable

ENCDG-LL-GA

Cable specification:
1P x 22AWG+2P x 26AWG standard cable

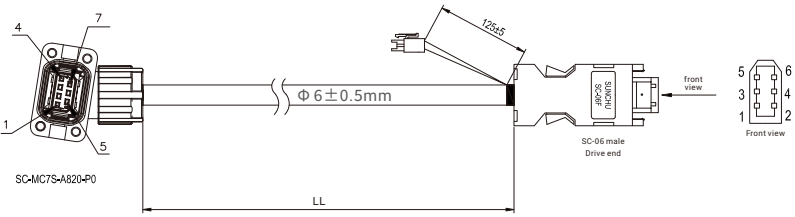


Signal name	Motor end	Color	Drive end
	SC-MC7S-A820-P0		SC-06 male
+5V	PIN1	Red	PIN1
GND	PIN2	Orange	PIN2
/	PIN3	/	PIN3
/	PIN4	/	PIN4
SD+	PIN5	Blue	PIN5
SD-	PIN6	Purple	PIN6
Shield	PIN7	Shield	Metal button

Note:
Corresponding flexible cable :ENCDGF-LL-GA
Cable specification:1P×22AWG+2P×26AWG flexible drag chain cable
Cable diameter:6±0.5mm
ENCDG/ENCDGF-LL-GA accessory package: ENCDG/ENCDGF-GA

ENCDG-LL-GA-DC

Cable specification:
1P x 22AWG+2P x 26AWG standard cable

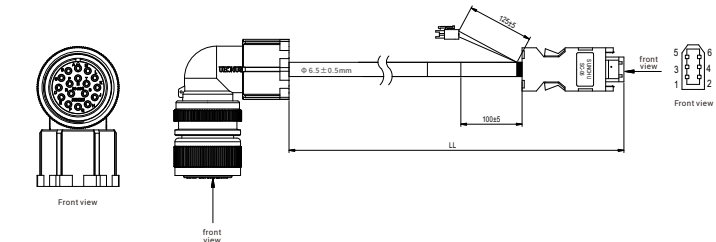


Signal name	Motor end	Color	Drive end	
	SC-MC7S-A820-00		Battery	SC-06 male
+5V	PIN1	Red	/	PIN1
GND	PIN2	Orange	/	PIN2
VB+	PIN3	Brown	PIN1	/
VB-	PIN4	Black	PIN2	/
SD+	PIN5	Blue	/	PIN5
SD-	PIN6	Purple	/	PIN6
Shield	PIN7	Shield	/	Metal button

Note:
Corresponding flexible cable:ENCDGF-LL-GA-DC
Cable specification:1P×22AWG+2P×26AWG flexible drag chain cable
Cable diameter:6±0.5mm
ENCDG/ENCDGF-LL-GA-DC accessory package:ENCDG-GA-DC

E-D-QY-KR-LL

Cable specification:
3P×26AWG standard cable with shielding (0-14m)
1P×22AWG+2P×26AWG standard cable with shielding (15-39m)



Signal name	Motor end	Color	Drive end	
	SUNCHU CMS3108A20-29SI		Battery	SC-06 male
+5V	PIN G	Red	/	PIN1
GND	PIN H	Orange	/	PIN2
VB+	PIN E	Brown	PIN1	/
VB-	PIN F	Black	PIN2	/
SD+	PIN A	Blue	/	PIN5
SD-	PIN B	Purple	/	PIN6
Shield	PIN J	Shield	/	Metal button

Note:
Corresponding flexible cable:E-D-QY-KR-LL-F
Cable specification:
3P×26AWG flexible drag chain cable with shielding (0-14m)
1P×22AWG+2P×26AWG flexible drag chain cable with shielding (15-39m)
Cable diameter:6.5±0.5mm
E-D-QY-KR-LL/E-D-QY-KR-LL-F accessory package:E-D 和 E-KR

Battery

BAT-FD5

Note:BAT-FD5 battery is suitable for absolute encoder and is compatible with ENCDG/ENCDGF-LL-GA-DC,E-D-QY-KR-LL/ (-F)



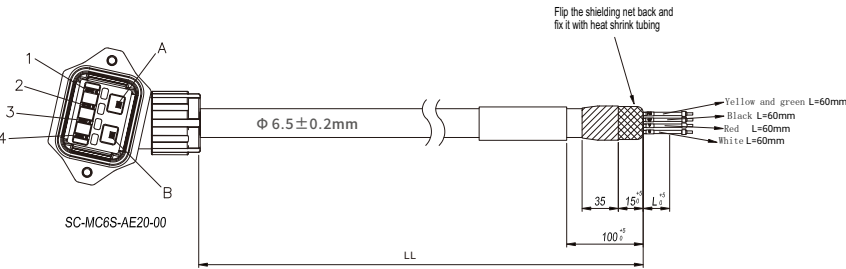
FD5P Battery optional pack

Cable description

Power cable

MOT-005-LL-KA

Cable specification:4C×20AWG 300V standard cable

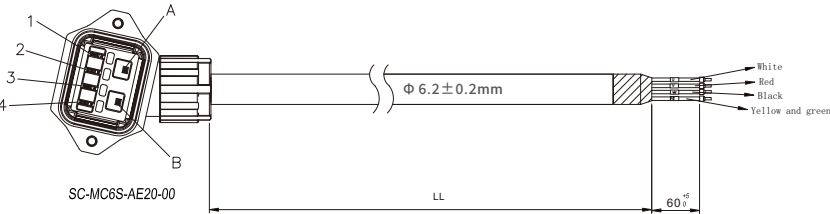


Signal name	Motor end	Color
U	PIN1	White
W	PIN2	Black
V	PIN3	Red
PE	PIN4	Yellow and green+shielding

Note:
Corresponding flexible cable:MOTF-005-LL-KA
Cable specification:4C×20AWG 300V flexible drag chain cable
Cable diameter:6.5±0.2mm
MOT/MOTF-005-LL-KA accessory package MOT/MOTF-005-KA

MOT-005-LL-KA-NS

Cable specification:4C×20AWG 300V standard cable, without shielding

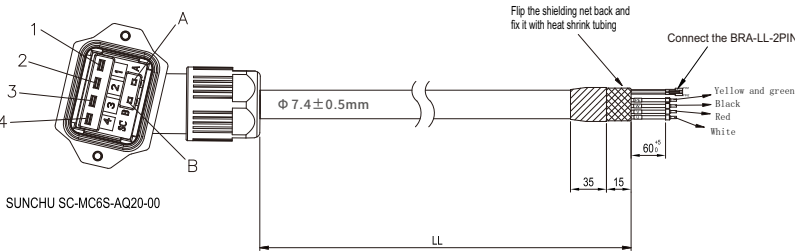


Signal name	Motor end	Color
U	PIN1	White
W	PIN2	Black
V	PIN3	Red
PE	PIN4	Yellow and green+shielding

Note:
Corresponding flexible cable:MOTF-005-LL-KA-NS
Cable specification:4C*20AWG flexible drag chain cable, without shielding
Cable diameter:6.2±0.2mm
MOT/MOTF-005-LL-KA-NS accessory package MOT/MOTF-005-KA

MOT-005-LL-KA-B

Cable specification:4C×18AWG+1P×24AWG standard cable with shielding

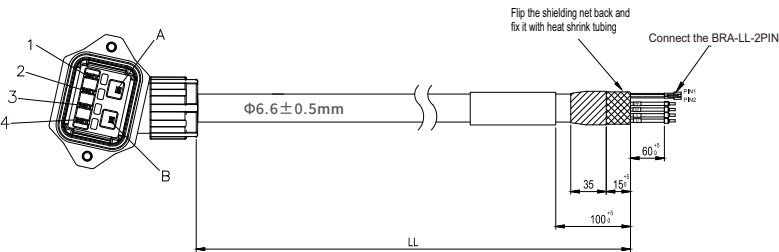


Signal name	Motor end	Color	Drive end
	SC-MC6S-AQ20-00		C2505HM-02P
U	PIN1	White	
W	PIN2	Black	
V	PIN3	Red	
PE	PIN4	Yellow and green+shielding	
BR+	PINA	Blown	PIN1
BR-	PINB	Blue	PIN2

Note:
Corresponding flexible cable:MOTF-005-LL-KA-B
Cable specification:4C×18AWG+1P×24AWG flexible drag chain cable,with shielding
Cable diameter:7.4±0.5mm
MOT/MOTF-005-LL-KA-B accessory package :MOT/MOTF-005-KA-B

MOTF-005-LL-KAB-S

Cable specification:4C×20AWG+1P×24AWG flexible drag chain with shielding



Signal name	Motor end	Color	Drive end
	SC-MC6S-AE20-00		C2505HM-02P
U	PIN1	White	
W	PIN2	Black	
V	PIN3	Red	
PE	PIN4	Yellow and green+shielding	
BR+	PINA	Blown	PIN1
BR-	PINB	Blue	PIN2

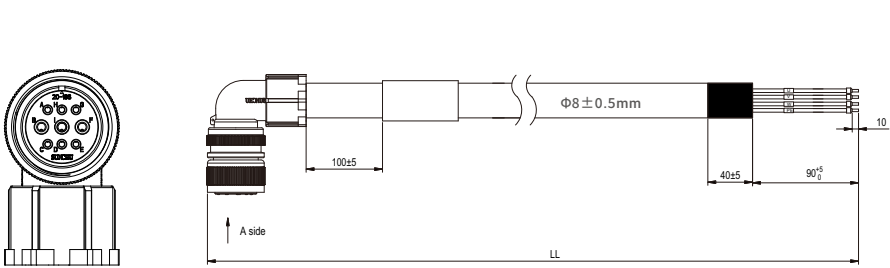
Note:
M-A-6A-GA0-LL accessory package:M-GA0

Cable description

Power cable

M-A-12A-KR0-LL

Cable specification:4×16AWG standard cable, without shielding

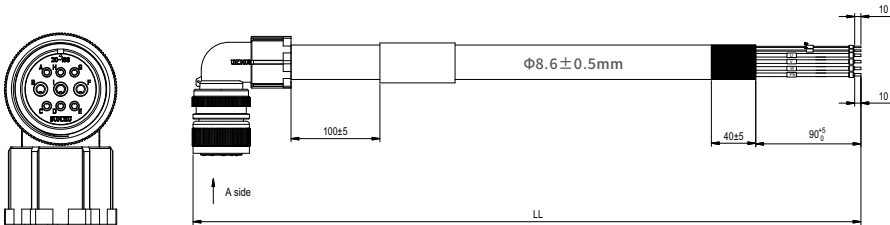


Signal name	Motor end	Color
	CMS3108A20-18SI	
U	PINB	White
V	PINI	Red
W	PINF	Black
PE	PING	Yellow and green

Note:
Corresponding cable:
M-A-12A-KR0-LL-F (Flexible drag chain cable without shielding)
M-A-12A-KR0-LL-S (Standard cable with shielding)
M-A-12A-KR0-LL-FS (Flexible drag chain cable with shielding)
Cable specification:4×16AWG
Cable diameter:8±0.5mm
M-A-12A-KR0-LL(-F/-S/-FS)accessory package:M-KR0

M-A-12A-KR0-LL-B

Cable specification:4×16AWG+2×20AWG standard cable, without shielding



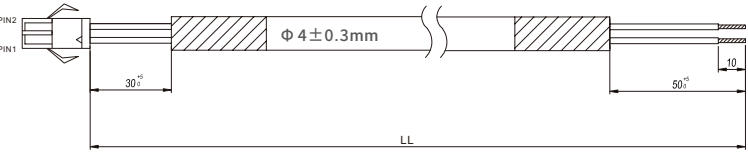
Signal name	Motor end	Color
	CMS3108A20-18SI	
U	PINB	White
V	PINI	Red
W	PINF	Black
PE	PING	Yellow and green
BR+	PINC	Brown
BR-	PINE	Blue

Note:
Corresponding cable:
M-A-12A-KR0-LL-BF (Flexible drag chain cable without shielding)
M-A-12A-KR0-LL-BS (Standard cable with shielding)
M-A-12A-KR0-LL-BFS (Flexible drag chain cable with shielding)
Cable specification:4×16AWG+2×20AWG
Cable diameter:8.6±0.5mm
M-A-12A-KR0-LL-B /(-BF/-BS/-BFS)accessory package:M-KR0

Brake extension cable

BRA-LL-2PIN

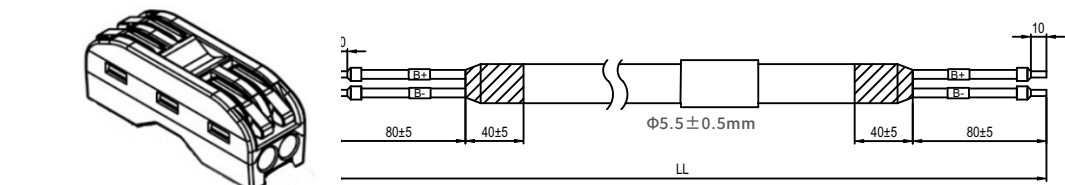
Cable specification:1P*24AWG standard cable with shielding



Signal name	Motor end	Color
	C2505HF-02P	
BR+	PIN1	Brown
BR-	PIN2	Blue

BRA-EXT-LL

Cable specification:2×20AWG without shielding



Quick-connect terminal

Signal name	Color
BR+	Brown
BR-	Blue