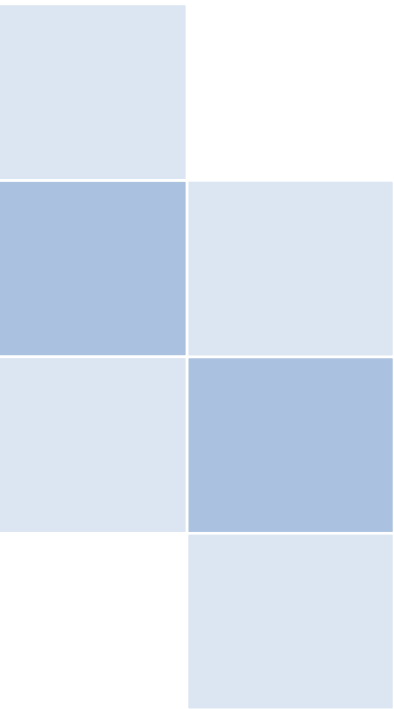


A decorative graphic on the left side of the page consisting of five squares in two shades of blue, arranged in a cross-like pattern.

MANUAL

S SERIES AC SERVO DRIVER



C o n t e n t s

Product features	1
Introduction	2
Wiring Description	3
Parameters Description	6
Instructions of Operation Panel	8
Outline Dimension	13
Fault Diagnosis	14
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High performance

Control function comprehensive: stable speed control, accurate position control, excellent torque control.

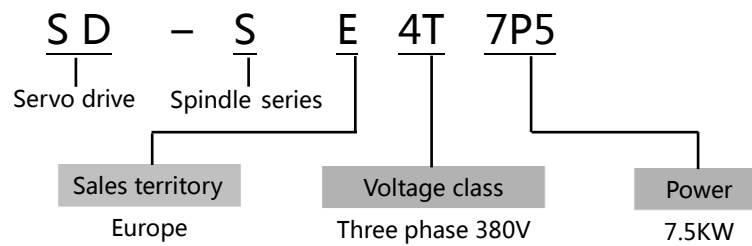
Safe & Reliable

Products comply with international standards, through the CE certification. Set up multiple protection circuit, the comprehensive protection of safety equipment.

Technical Specifications of Product

Input power	Rated voltage/frequency	Three-phase 380V/480V; 50Hz/60Hz
	Allowable voltage range	+10% , -15%
	allowable frequency fluctuation	±5%
Control features	Control mode	PWM Vector control
	Speed adjustment range	0.01 ~ 500Hz
	Speed stabilization precision	±0.1%
	Acceleration/deceleration time	0.05 ~ 3000Hz/s
	Torque control	200% Rated torque output ; Torque precision±5%
	position control precision	±1 Pulse
	Braking mode	Powered braking
	overload capacity	twice overload
I/O	Digital input	10 point , NPN or PNP
	Digital output	6 point , NPN
	Relay output	1 , DC30V/1A or AC250V/1A
	Analog input	2 , A0 : ±10V ; A1 : 0 ~ +10V or 4 ~ 20mA
	External pulse input	1 , AB、SIGN+PLUS or CW
	Motor encoder input	1 , Receive frequency range: 0~1MHz
	Motor encoder output	1 , Output frequency range :0~1MHz
Protection function	Over voltage protection, Low voltage protection, Over current protection Module protection ,Motor encoder failure, Motor over temperature, Motor overload protection	
Environment	Operating site	The product shall be mounted vertically in the electric control cabinet with good ventilation. The product shall be installed in the environment free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, steam and drip.
	Ambient temperature	-10℃ ~ +45℃
	Humidity	5 ~ 90% , no condensing
	Altitude	0 ~ 2000m, derated above 1000m, the rated output current shall be decreased by 1% for every rise of 100m
	Vibration	3.5mm,2~9Hz; 10 m/s ² ,9~200Hz; 15 m/s ² ,200~500Hz

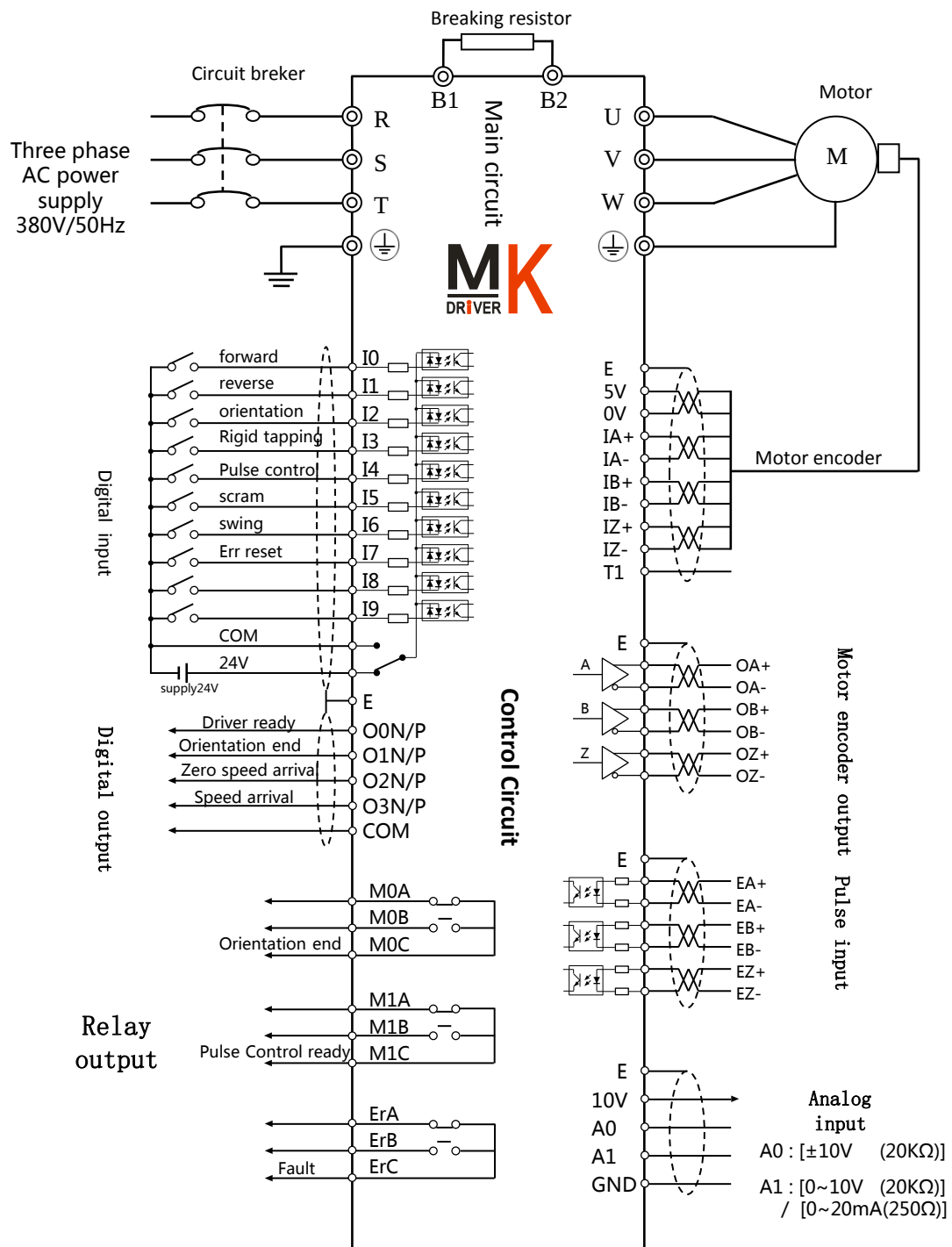
Product Model Description



Product Series

Product Model	Type	Motor power(kw)	Rated current(A)	KVA	Braking resistor	Wire specification (mm ²)	weight (Kg)
SD-S4T1P5	A	1.5	3.5	2.5	0.5kw / 75Ω	2.5	6
SD-S4T2P2		2.2	5	3.8	0.5kw / 75Ω	2.5	6
SD-S4T3P7		3.7	8	5.6	1kw / 40Ω	4	6
SD-S4T5P5L		5.5	13	8.6	1kw / 40Ω	4	6
SD-S4T5P5G	B	5.5	13	8.6	1.5kw / 32Ω	6	8
SD-S4T7P5		7.5	17	11	1.5kw / 26Ω	6	8
SD-S4T011		11	25	17	1.5kw / 26Ω	6	8
SD-S4T015L		15	32	20	1.5kw / 26Ω	6	8
SD-S4T015G	C	15	38	25	2kw / 40Ω * 2	10	16
SD-S4T018		18	39	26	2kw / 40Ω * 2	10	16
SD-S4T022		22	45	30	2kw / 40Ω * 2	16	16
SD-S4T030	D	30	60	40	2.5kw / 40Ω * 3	25	25
SD-S4T037		37	75	50	2.5kw / 40Ω * 3	25	25
SD-S4T045	E	45	90	60	2.5kw / 40Ω * 4	35	38
SD-S4T055		55	110	72	2.5kw / 40Ω * 4	50	38
SD-S4T075	F	75	150	99	2.5kw / 40Ω * 6	70	55
SD-S4T090		90	178	99	2.5kw / 40Ω * 8	70	55
SD-S4T110	G	110	210	145	2.5kw / 40Ω * 9	90	95
SD-S4T132		132	255	145	2.5kw / 40Ω * 10	90	95

Standard wiring diagram



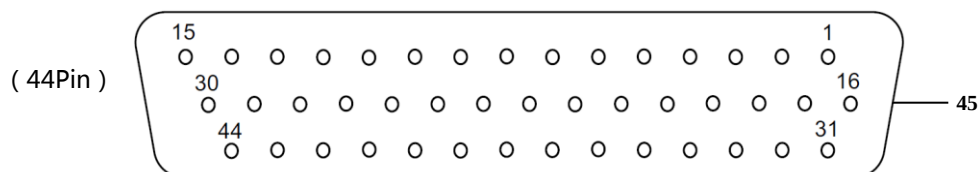
1. 24V-COM need to supply outside 24V, IO could to work, for internal power supply please ordering ;
2. The digital quantity input NPN and PNP can be set up by SEL pin, set way to see "digital quantity input type";
3. The digital output at the same time there is open collector output (0 v) when effective, open emitter output (output is valid 24 v);
4. The motor encoder interface default receiving 422 difference signal, photoelectric encoder for rotating transformer, please instructions at ordering

Functions of Main Circuit Terminal

Terminal symbol	R , S , T	B1 , B2	U , V , W
function description	Three-phase AC input terminal	Connecting terminal of braking resistor	Three-phase AC output terminal

Functions of Control Circuit Terminals

Definition of CN1

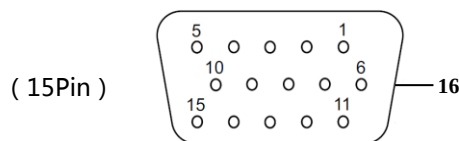


Function description of CN1

	Digital input		Digital output		Analog input		Relay output		Fault output	
	symbol	Stitch	symbol	Stitch	symbol	Stitch	symbol	Stitch	symbol	Stitch
CN1	I0	22	O0N	6	A0	14	M0A	32	EA	1
	I1	23	O0P	36	A1	15	M0B	33	EB	17
	I2	7	O1N	21	+10V	30	M0C	31	EC	16
	I3	8	O1P	35	GND	29	M1A	18		
	I4	9	O2N	5			M1B	3		
	I5	10	O2P	34			M1C	2		
	I6	11	O3N	20						
	I7	26	O3P	4						
	I8	24	SEL	12						
	I9	25								
	24V	39								
	COM	40								
	SEL	12								
Technical specification	0V input valid		0V output valid		A0 : $\pm 10V$ A1 : 0 ~ +10V or 4 ~ 20mA		Orientation end (in place) output		Driver fault output	

1. COM for the digital input and output of public side, GND for analog input fields, GND and COM isolation ;
2. 24V-COM need external power supply, 24 v for internal power supply please ordering ;
3. The digital quantity input type NPN (low level) effectively, PNP (effective) high level two, set way to see "digital quantity input type" ;
4. The main loop of the control loop cable please with separate cables and other power cable line, otherwise interfere with the control signal;
5. **SEL connection 24V, input type NPN, input low level**
6. **SEL connection 0V ,input type PNP , input high efficient**

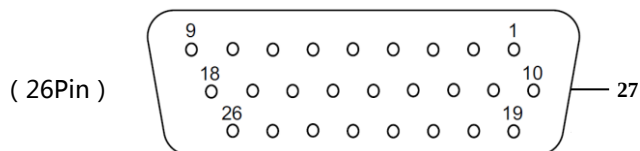
Definition of CN2 (Motor encoder input)



Function description of CN2

CN2	Motor Coder input			Rotating transformer	
	symbol	Stitch	function description	symbol	Stitch
	IA+	6	A phase input	EXC+	3
	IA-	1		EXC-	8
	IB+	7	B phase input	SIN+	2
	IB-	2		SIN-	7
	IZ+	8	Z phase input	COS+	6
	IZ-	3		COS-	1
	+5V	11	Encoder power		
	0V	12			
	E	16			
Technical specification	Max response frequency is 1MHz			Rotating transformer	

Definition of CN3 (External pulse input)



Function description of CN3

CN3	External Coder input			Motor Coder output	
	symbol	Stitch	function description	symbol	Stitch
	EA+ / EP+ / CW+	2	A phase input / PULSE input / CW Pulse input	OA+	9
	EA- / EP- / CW-	11		OA-	18
	EB+ / ED+ / CCW+	4	B phase input / SIGN input / CCW Pulse input	OB+	17
	EB- / ED- / CCW-	13		OB-	8
	EZ+	3	External Z phase input	OZ+	7
	EZ-	12		OZ-	16
	+5V	26	Hand wheel power supply		
	0V	25			
	E	27	Earth		
Technical specification	5V line drive difference signal input , Max response frequency is 1MHz			Max response frequency is 1MHz	

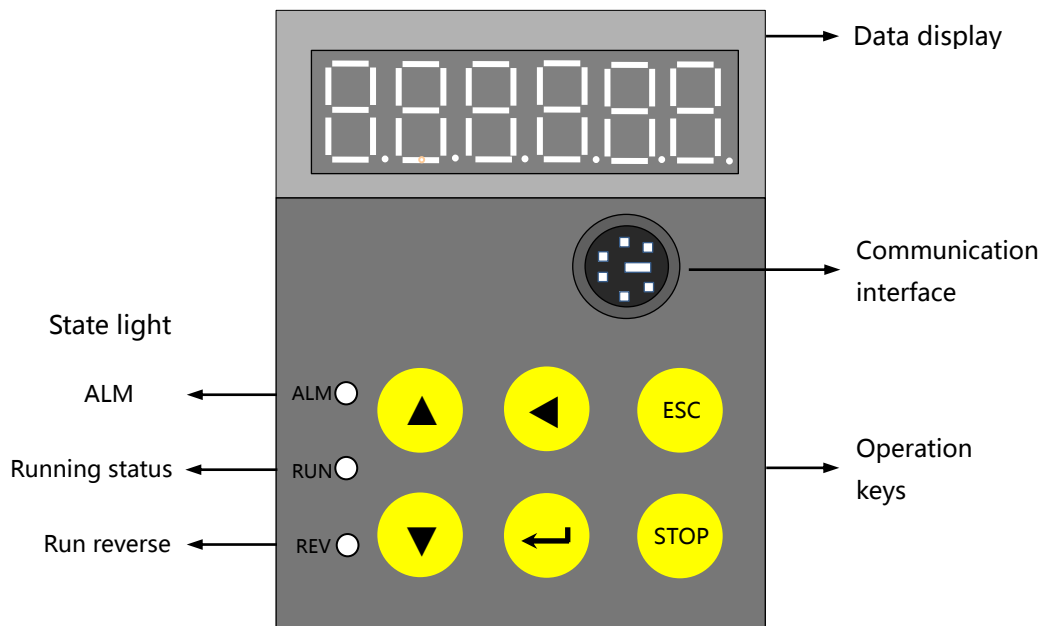
instru ction	Function code	parameter name	Set the range	Default setting	Units
Motor param eter	E00	Motor Rated frequency	0.00 ~ 500.00	50	Hz
	E01	Motor Rated current	0.0 ~ 500.0	17	A
	E02	Motor poles number	2 ~ 12	4	-
	E03	Motor slip	1 ~ 900	60	r/min
	E04	Coder lines number	1 ~ 60000	1024	-
	E05	Field current	1 ~ 100	50	%
	E06	Coder filter constant	1 ~ 200	30	0.1ms
	E07	Zero speed slip	1 ~ 100	80	%
	E08	Slip compensation	0 ~ 150	30	%
	E10	Speed control of slip base	1 ~ 900	60	r/min
	E11	Speed control of slip plus	1 ~ 100	0	-
	E12	Position control of slip base	1 ~ 900	30	r/min
Syste m param eter	E20	Torque amplitude limit of	0 ~ 200	100	-
	E21	Torque amplitude limit of	0 ~ 200	100	-
	E22	Current plus coefficient	0 ~ 550	450	-
	E23	Speed S curve time	1~20000	1000	-
	E24	Integral compensating factor	1 ~ 500.00	*	Hz
	E25	Integral offset value	1 ~ 500.00	*	Hz
	E30	Ratio plus P	0 ~ 100	80	%
	E31	Integral plus	0 ~ 150	100	%
	E32	Current plus offset	1 ~ 100	50	%
	E33	Current plus	1 ~ 150	60	1/10
	E34	Current plus conversion point	1 ~ 300.00	50.00	Hz
	E35	Speed control integral	1~1000	20	0.1ms
	E36	Steady speed integral	1~20000	200	0.1ms
	E37	Acceleration integral	1~20000	200	0.1ms
	E38	Deceleration integral	1~20000	1000	0.1ms
	E39	Position control integral	1~1000	20	0.1ms
Featur e selecti on	E40	Speed command input type	0 : 0 ~ 10V , 1 : $\pm 10V$, 2 : External pulse		
	E41	Choice Speed control direction	0 : the default direction 1 : the opposite direction		
	E42	Forbidden reverse	0 : None , 1 : forbidden reverse		
	E43	Control mode selection	0 : Normal mode , 1 : High speed mode		
	E44	Position control mode	0 : synchronous mode , 1 : follow mode		
	E45	Choice the direction of inching	0 : positive , 1 : Negative		
	E46	Protect of Low voltage	0 : protect , 1 : None protect		

Instru	Function	parameter name	Set the range
Control selection	E60	Motor encoder options	0 : Optical Encoder , 1 : Rotating transformer
	E61	External input pulse option	0 : AB Pulse , 1 : P+D pulse , 2 : CW pulse
	E62	Motor encoder options of Phase sequence	0 : A phase leading B phase 1 : B phase leading A phase
	E63	Motor overheating protection option	0 : None protect , 1 : open protect switch 2 : close protect switch
	E64	External input pulse direction of choice	0 : the default direction 1 : the opposite direction
	E65	External input pulse Z	0 : None , 1 : Yes

Instruct ion	Function code	parameter name	Set the range	Default setting	Units
Speed control	F00	The maximum speed	1 ~ 15000	6000	r/min
	F01	The minimum speed	0 ~ 100	0	r/min
	F02	Low speed acceleration	0 ~ 10000	1500	0.05Hz/s
	F03	Low speed deceleration	0 ~ 10000	1500	0.05Hz/s
	F04	Deceleration transformation point	0 ~ 15000	3000	r/min
	F05	High speed acceleration	0 ~ 10000	1500	0.05Hz/s
	F06	High speed deceleration	0 ~ 10000	1500	0.05Hz/s
	F07	Reach the range	0 ~ 300	45	r/min
	F08	The speed gear ratio of numerator	0 ~ 60000	1000	-
	F09	The speed gear ratio of denominator	0 ~ 60000	1000	-
Position control	F10	Maximum speed of Position control	1 ~ 15000	300	r/min
	F11	Minimum speed of Position control	0 ~ 60	1	r/min
	F12	Pulse sync acceleration	0 ~ 10000	200	0.05Hz/s
	F13	Pulse sync deceleration	0 ~ 10000	100	0.1Hz/s
	F14	External input pulse Filtering time	1 ~ 10000	20	0.1ms
	F15	Locate inertia modificaion point	0 ~ 60000	200	pulse
	F16	position control cushion point	0 ~ 60000	20	pulse
	F17	The position control accuracy	1 ~ 250	2	pulse
	F18	The Position control gear ratio of numerator	0 ~ 60000	1000	-
	F19	The Position control gear ratio of denominator	0 ~ 60000	1000	-
orientati on	F20	orientation deceleration	0 ~ 10000	1000	0.05Hz/s
	F21	Position plus at orientation	0 ~ 10000	200	0.1Hz/s
	F22	Positive orientation offset	0 ~ 60000	0	pulse
	F23	Orientation speed	0 ~ 1000	60	r/min
	F24	Time delay of Orientation arrive	0 ~ 10000	20	2.5ms
	F25	Orientation signal mode	0: orientation high level is valid 1: orientation pulse is valid		
	F26	Orientation mode selection	0 : Positive orientation , 1 : Negative orientation , 2 : Orientation the nearest		
	F27	The second Orientation offset	0 ~ 60000	2000	pulse
Emerge ncy stop	F30	Emergency stop deceleration	0 ~ 10000	1500	0.05Hz/s
	F31	The motor power off delay	0 ~ 10000	0	2.5ms
rigid tapping	F32	Maximum rotating speed at rigid	1 ~ 3000	1500	r/min
	F33	Spindle acceleration at rigid tapping	0 ~ 10000	3000	0.05Hz/s
	F34	rigid tapping order smallest unit	1 ~ 1000	1	-
Swing	F35	Swing Angle	0 ~ 3600°	180°	°
	F36	Swing speed	1 ~ 300	60	r/min
	F37	Swing torque	0 ~ 1000	500	%
Inching	F38	Inching speed	1 ~ 1500	60	r/min
	F39	Inching acceleration	0 ~ 10000	1500	0.05Hz/s
	F40	Speed order smallest unit	1 ~ 10000	10	r/min
	F41	Analog Filtering time	5 ~ 10000	200	0.1ms

Instruct	Function	parameter name	Set the	Default	Units
Analog modulati on	F42	Analog calibration parameters	0 ~ 4000	2000	-
	F43	Analog is segmented	0 ~ 15000	3000	r/min
	F44	the first period of bias	0 ~ 4000	2000	-
	F45	the second period of bias	0 ~ 4000	2000	-
	F46	±10V Negative piecewise point	0 ~ 15000	3000	r/min
	F47	±10V Negative for the first period of	0 ~ 4000	2000	-
	F48	±10V Negative for the second	0 ~ 4000	2000	-

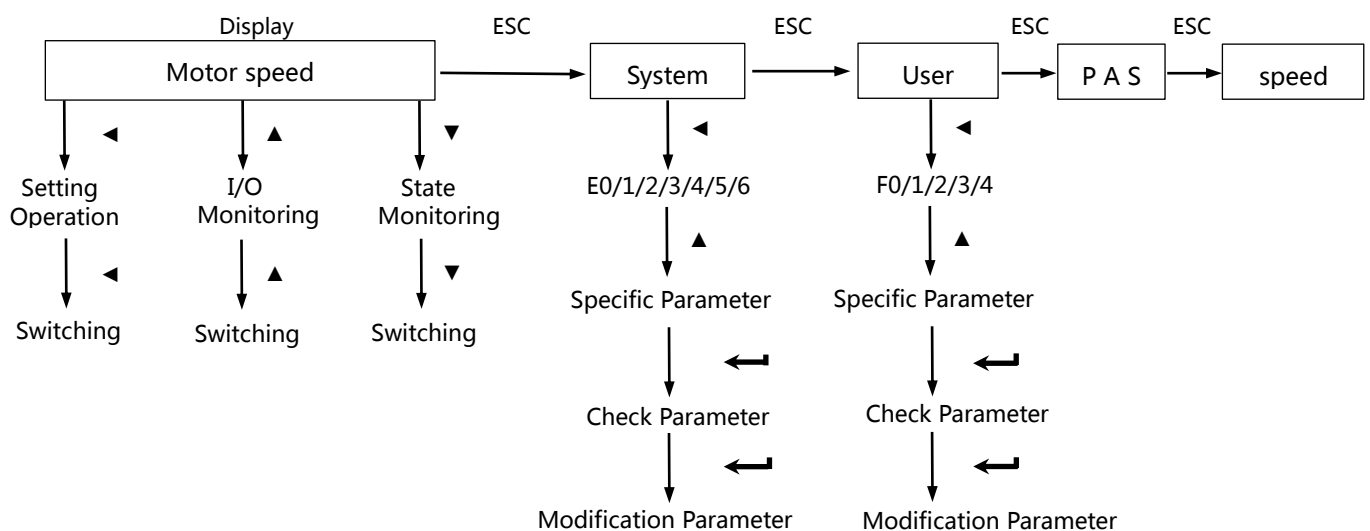
Instructions of Operation Panel



Description of Keys on Operation Panel

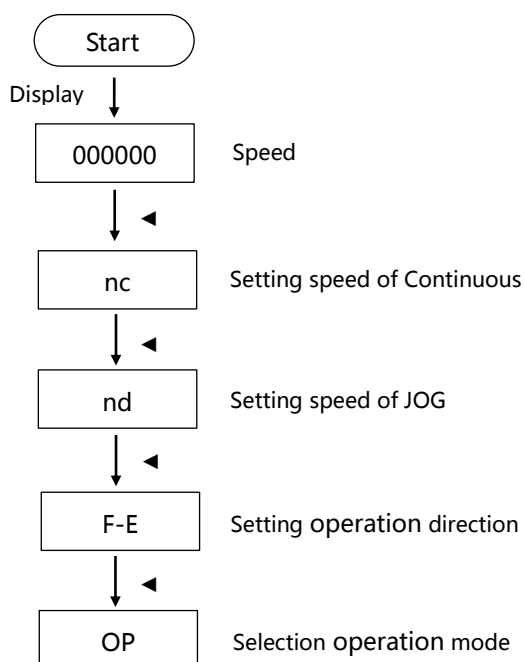
Symbol	Name	Function
▲	Increase Key	Increasing the parameters value
▼	Decrease Key	Decreasing the parameters value
◀	Shift Key	Switching the data bit of parameters number
↵	Enter Key	Finish the modification operation of parameters
ESC	Escape Key	Return to previous menu
STOP	Stop Key	Making motor stop. Replace the driver fault

Description of Parameter display

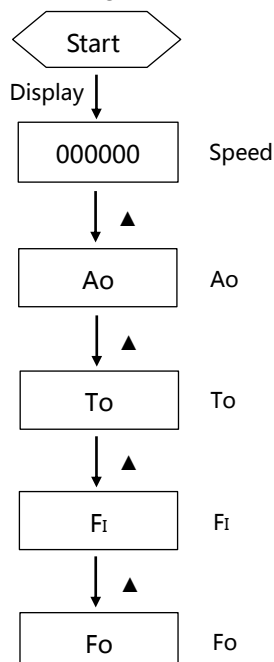


Operational Process

Operation Panel control



State Monitoring



Description of Operation Panel control and Monitoring Parameter

Parameter number	Operation Panel control	Parameter number	I/O Monitoring	Parameter number	State Monitoring
nc	Setting speed of Continuous	d	Digital input	Ao	Output current(A)
nd	Setting speed of JOG	o	Digital output		
F-E	Setting operation direction 0: forward , 1: reverse	A0	Analog input A0	To	Output torque (100%)
		A1	Analog input A1		
OP	operation mode 0: I/O control 1: Operation Panel control	P	Motor encoder input	Fi	Setting frequency (Hz)
		E	External pulse input		
ro	Run mode 0: Continuous 1: JOG	F	External pulse input frequency	Fo	Output frequency (Hz)

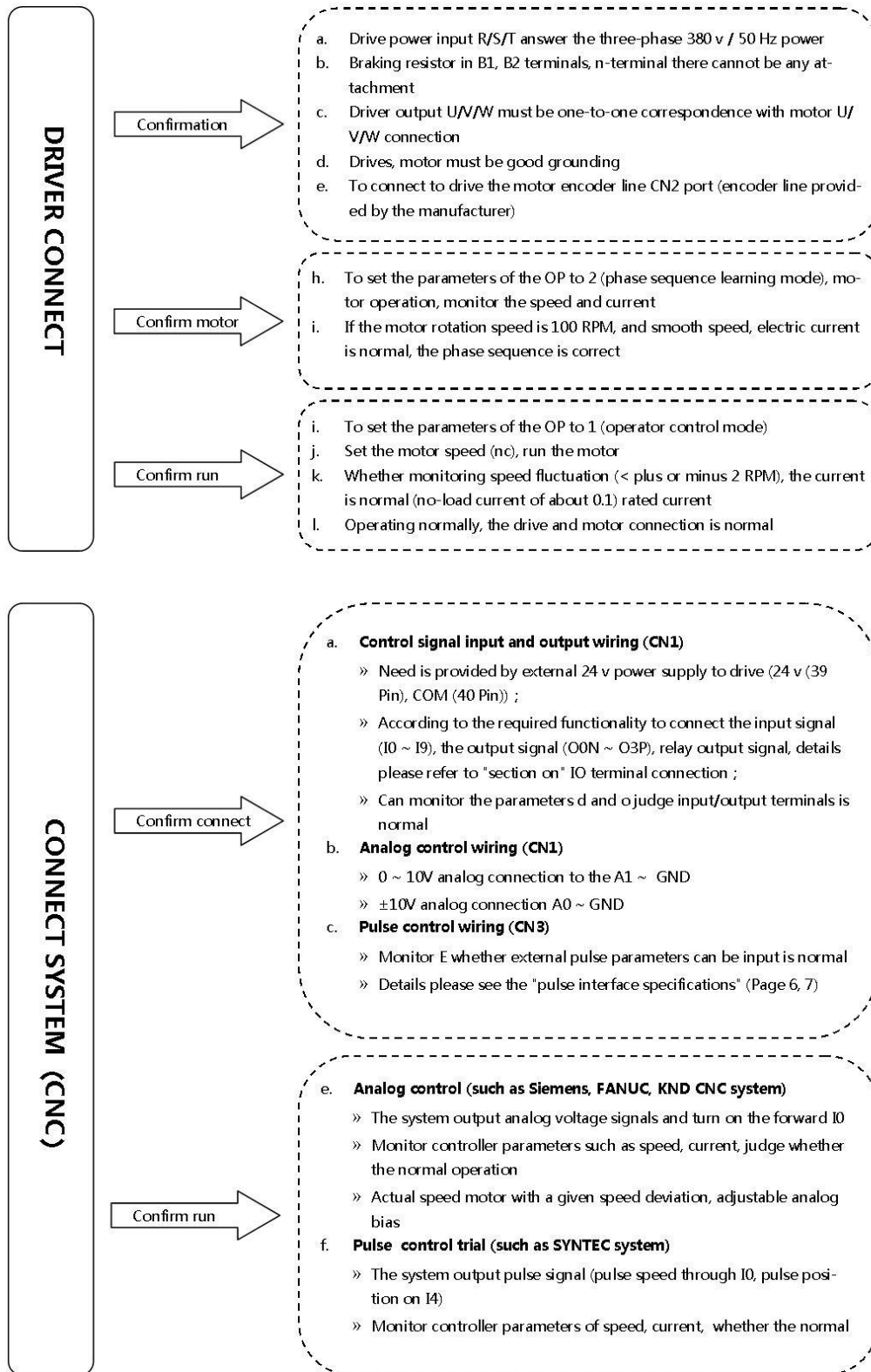
Description of Operation Panel control

After Setting Operation Panel control Parameter, Press  on the State Monitoring. The motor will run with set value. Press STOP Key will stop running.

Description of Password (P A S)

To prevent the irrelevant personnel modify manufacturer parameters, Need password into the manufacturer of parameter, if there is a need to amend manufacturer parameters, please contact with our company

Commissioning



Functional specifications of the Spindle

◆ Speed control mode: need to connect I0 or I1 terminal

➤ Speed instruction

Parameters	Definition	instructions
E40	Speed command input type selection	0 : 0 ~ 10V , 1 : ±10V , 2 : External pulse
E43	Control mode selection	0 : Normal mode , 1 : High speed mode
F00	The highest speed (speed control)	The maximum speed of control
F08	The speed gear ratio of numerator	Actual speed = Speed order $\times \frac{F08}{F09}$
F09	The speed gear ratio of denominator	
F40	Speed resolution	Speed order smallest unit
Analog instruction		
F41	Analog Filtering time	The more large the greater the effect input
F42-F48	Analog calibration parameters	Analog correction
Pulse instruction		
E61	External input pulse option	0 : AB Pulse , 1 : P+D pulse , 2 : CW pulse
E65	input pulse direction of choice	0 :the default direction ,1 :the opposite direction

- Control mode by the parameter E43 modification, common mode top speed of 7500 RPM, top speed of 15000 RPM high speed mode ;
- Speed control, there are three sources of speed instruction, by the parameter E40 choice ;
- Instruction type of 0 ~ 10V analog ±10V analog, 10 v corresponds to the highest speed set by parameter F00 ;
- Analog can F42 F48 parameter calibration, A0, A1 monitored by monitoring parameters ;
- Instruction type of pulse, pulse type can be chosen by E61 3 types of pulse, pulse direction can be changed by the E65 ;
- External sending pulse frequency f (Hz) corresponding to the motor speed n (RPM) relations as follows, which is suitable for motor encoder parameters E04 line number :

$$n = \frac{f * 15}{E04}$$

- After speed gear as used in the current actual speed, adjust the speed is not affected by the highest speed limit ;
- For example :
 - Using external pulse mode :
 - The E40 set to 2 ;
 - External pulse for AB type (90 ° orthogonal pulse), you will need to set the E61 to 0 ;
 - Motor encoder is 2500 lines, expect motor speed is 1500 RPM, the external pulse frequency need be sent 250 KHZ. If F00 set to 1000 RPM, the actual motor speed is 1000 RPM;
 - If the gear ratio is set to F08 = 2, F09 = 1, the motor speed is 2000 RPM (not for 3000 RPM).

- 2、 Use $\pm 10V$ mode :
 - A. The E40 set to 1 ;
 - B. If the highest speed F00 set as 10000, the control mode of E43 set to 1 (high speed)
 - C. Expect motor speed is 3020 RPM, the external input analog voltage should be 3.02 V.
 - D. If speed instruction resolution F40 set to 50, the actual motor speed is 3000 RPM;
 - E. If the gear ratio is set to F08 = 4, F09 = 1, motor speed should be 12080 RPM, not limited by F00 ;
 - F. Because the speed instruction resolution F40 is 50, so the actual motor speed is 12050 RPM.

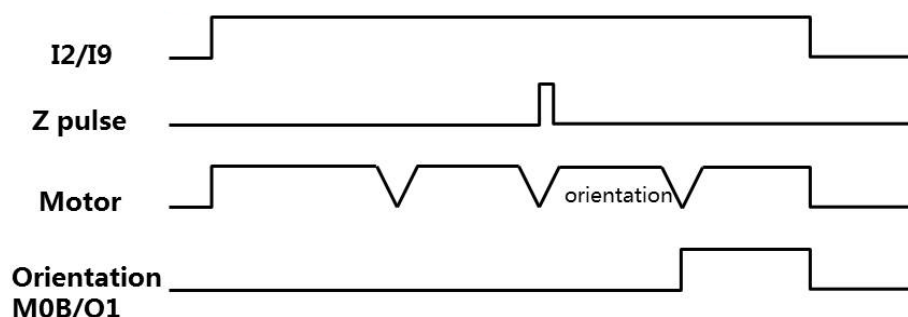
◆ **Orientation control : Need to connect I2 / I9 terminals !**

➤ **Parameters instruction**

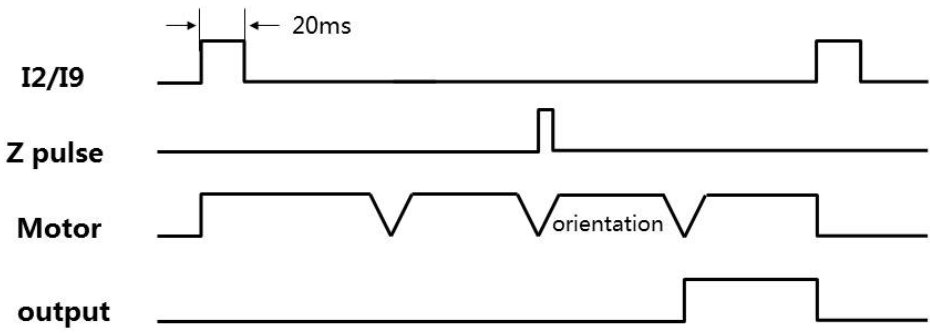
Parameters	definition	instruction
F20	orientation deceleration	
F21	Position plus at orientation	
F22	Positive orientation offset	
F23	Orientation speed	
F24	Time delay of Orientation arrive	orientation pulse is valid
F25	Orientation signal mode	0: orientation high level is valid 1: orientation pulse is valid
F26	Orientation mode selection	0 : Positive orientation , 1 : Negative orientation , 2 : Orientation the nearest
F27	The second Orientation offset	Through to the I9 according to this parameter specifies the location of Orientation
E65	External input pulse Z phase	0 : None , 1 : Yes
F30	Emergency stop deceleration	Motor with F30 deceleration slowed to zero speed

➤ **Orientation process diagram**

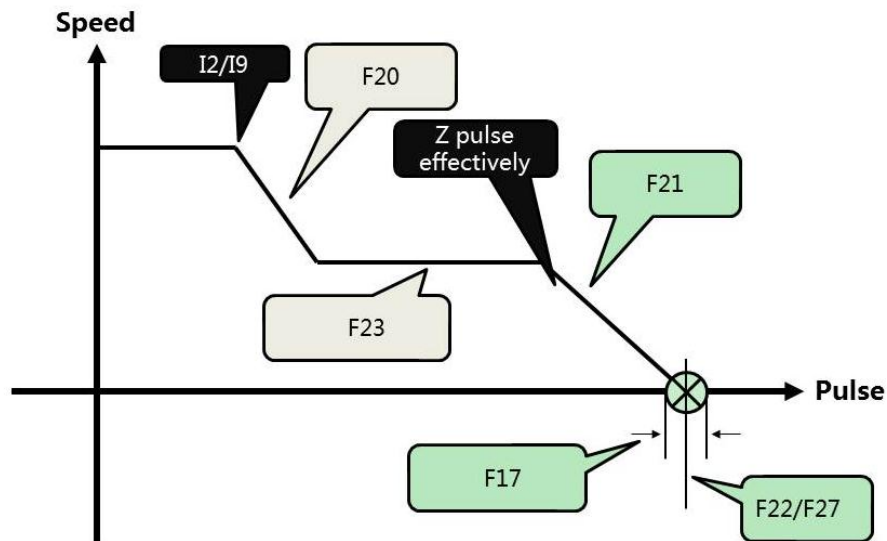
- ✧ There are two pulse source of origin (reference) :
 - **Motor coder location** : Motor coder location used in the situation of that transmission ratio is 1:1 or location by magnetic sensing zero position switching , when E65 set to 0 ;
 - **External coder location** : External coder location used in the spindle which transmission ratio isn' t 1:1 and the spindle location by installing spindle coder on spindle. when E65 set to 1
- ✧ Orientation high level valid (F25=0) :



✧ Orientation pulse is valid (F25=1) :



➤ Orientation process curve



➤ Setting of spindle orientation position

- Perform a spindle must first orientation, then remove the spindle orientation signal, make the motor in a free state; ;
- By manual rotation motor spindle to orientation location ;
- Check the monitoring parameter P, to fill in the P value orientation location parameter making F22/F27 ;
- Perform orientation, and if there is a slight deviation, eliminated by fine-tuning F22/F27.

◆ Analog rigid tapping : Need to connect I3 terminals !

Parameters	definition	Instruction
E40	Speed command input type selection	0 : 0~10V , 1 : ±10V , 2 : External pulse
F32	Maximum rotating speed at rigid	Set the maximum rotating speed at rigid
F33	Spindle acceleration at rigid tapping	Set the Spindle acceleration at rigid tapping
F34	rigid tapping order smallest unit	The value is generally set smaller, improve the accuracy of read analog
F30	Emergency stop deceleration	Motor with F30 deceleration slowed to zero speed

- a) when choosing 0 ~ 10V analog instruction ($E40 = 0$), when the tap exits, motor reversal, need through to I1, I3 terminal at the same time ;
- b) Choosing $\pm 10V$ analog instruction ($E40 = 1$), only need to connect I3 terminal ;
- c) Suggest using pulse rigidity tapping as far as possible.

◆ **Pulse control : Need to connect I4 terminals !**

The position control mode, the control instruction is only the external pulse !

Parameters	definition	instruction
E61	Pulse mode selection	0 : AB pulse , 1 : direction pulse , 2 : CW pulse
E64	External input pulse direction of choice	0, the default direction, 1: the opposite direction
E44	Position control mode selection	0 : synchronous mode , 1 : follow mode
F10	Maximum rotating speed	The position control to allow the motor maximum rotating speed
F11	Minimum rotating speed	The position control to allow the motor minimum rotating speed
F12	Pulse sync acceleration	Set the spindle acceleration/ deceleration at Pulse sync control.
F13	Pulse sync deceleration	
F16	position control cushion point	
F17	The position control accuracy	
F18	The Position control gear ratio of numerator	The actual pulse = Receive pulse number $\times \frac{F18}{F19}$
F19	The Position control gear ratio of denominator	
F30	Emergency stop deceleration	Motor with F30 deceleration slowed to zero speed

◆ **Swing control : Need to connect I6 terminals !**

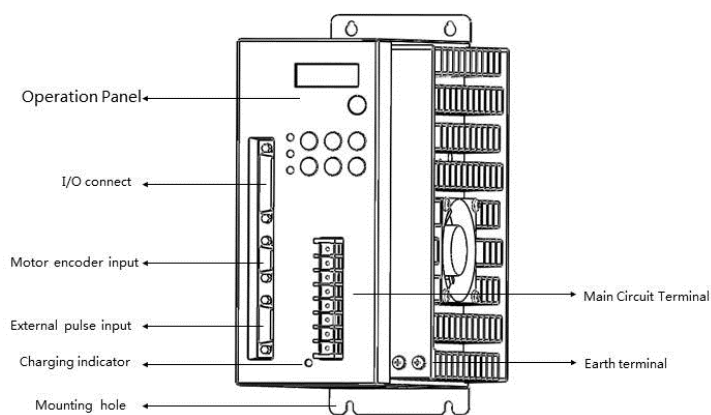
Parameters	definition	instruction
F35	Swing Angle	Set the swing angle
F36	Swing speed	Set the Swing speed
F37	Swing torque	Set the motor torque when swing
F30	Emergency stop deceleration	Motor with F30 deceleration slowed to zero speed

◆ **inching : Need to connect I8terminals !**

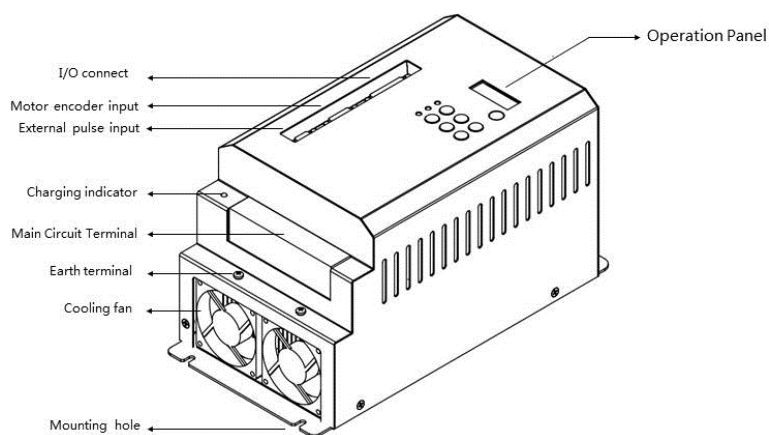
Parameters	definition	instruction
E45	Choice the direction of inching	0 : positive , 1 : Negative
F38	Inching speed	Motor speed of inching
F39	Inching acceleration	The acceleration of inching
F30	Emergency stop deceleration	Motor with F30 deceleration slowed to zero speed

Product appearance

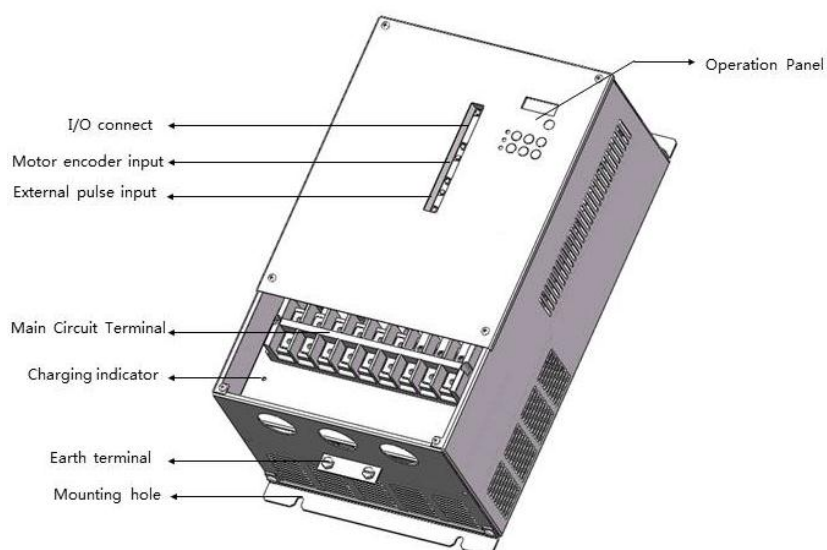
A size : 1.5kW ~ 5.5LkW



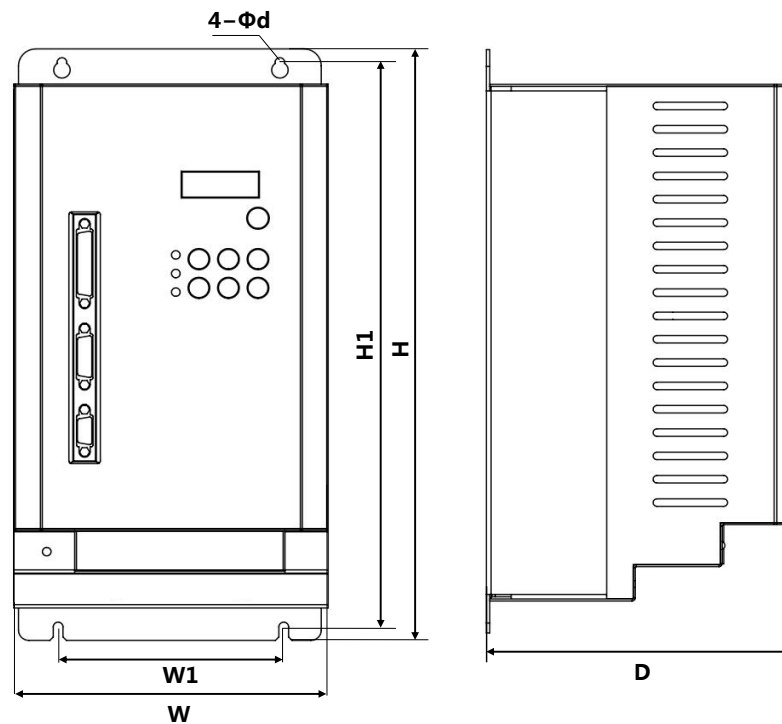
B size : 5.5GkW ~ 15LkW



C size ~G size : 15GkW ~ 132kW



Mounting Dimension



Product outline and mounting dimension

Drive Model	TYPE	Outline and mounting dimension (mm)						weight (kg)
		H	H1	W	W1	D	d	
SD-S4T1P5	A	268	255	130	70	212	5	6
SD-S4T2P2								
SD-S4T3P7								
SD-S4T5P5L								
SD-S4T5P5G	B	350	334	181	130	184	5	8
SD-S4T7P5								
SD-S4T011								
SD-S4T015L								
SD-S4T015G	C	450	430	280	180	225	7	16
SD-S4T018								
SD-S4T022								
SD-S4T030	D	580	555	320	220	225	10	25
SD-S4T037								
SD-S4T045	E	625	600	410	270	240	10	38
SD-S4T055								
SD-S4T075	F	840	800	600	520	380	12	65
SD-S4T090								
SD-S4T110	G	1100	1050	820	740	380	12	95
SD-S4T132								

Our Products is equipped with complete protection functions to provide efficient protection while utilizing its performance sufficiently. Some failure instructions may be displayed during operation. Compare the instructions with the following table and analyze, decide the causes and solve failures.

For damages on units or questions that can't be resolved, please contact with local distributors/agents, service centers or manufacturer for solutions.

Failure code	Failure description	Potential causes	Solutions
Er-0	Over voltage protection	Deceleration time is too short	Lengthen deceleration time
		Brake resistor is not reasonable	Choose appropriate energy braking components
Er-1	Low voltage protection	The power voltage is lower than the minimum operating voltage of equipment	Check input power supply
Er-2	Over current protection when acceleration operation	Low grid voltage	Check input power supply
		Power level of drive is small	Replace with drive with proper model
		Acceleration time is too Short	Lengthen acceleration time
		Improper setting of system parameters	Set system parameters properly
		output side of the motor was short circuited	Check whether the motor the output connection are short circuited
Er-3	Over current protection when deceleration operation	Low grid voltage	Check input power supply
		Brake resistor is not reasonable	Choose appropriate energy braking components
		Deceleration time is too short	Lengthen deceleration time
		Power level of drive is small	Replace with drive with proper model
		Improper setting of system parameters	Set system parameters properly
		output side of the motor was short circuited	Check whether the motor the output connection are short circuited
Er-4	Module protection	Ambient over-temperature	Lower the ambient temperature and strengthen ventilation and radiation
Er-5	Motor encoder failure	Encoder cable disconnection	Reconnect
		Encoder connection is incorrect	Change the encoder cable connection
		system parameters E04 is incorrect	Check system parameters E04
Er-6	Motor over temperature	The motor temperature signal reaches the alarm setting value	Strengthen ventilation and radiation
Er-7	Current detection fault	Current detection circuit failure	Seek for technical support
Er-8	Program error	Program error	Restore Factory Settings
Er-9	Motor overload protection	Motor phase sequence is incorrect	Exchange output terminals U and V
		Keep overloading for a long period of time	Shorten the overloading time
		Motor rotation is blocked or load mutation occurs	Prevent the motor rotation from blocking and reduce the load mutation

◆ Analysis on Frequent Malfunction

➤ No indication after the driver has been connected to the power.

- ✧ Cause: on indication on the manipulator after the driver has been connected to the power supply. Turn down all the attachment first, and only keep the R/S/T three-phase into line.
- ✧ Reasons and countermeasures :
 - Charging indicator light is not bright, measured with a multimeter R/S/T into the line voltage, normal power supply: $300\text{ V} < \text{power supply voltage} < 440\text{ V}$;
 - If the power supply is normal, the rectifier bridge or charging resistance is damaged, return to factory maintenance or professional maintenance ;
 - Charging indicator: rectifier bridge is normal, normal charging resistance, switch power supply damage or fuse burned down, return to factory maintenance ;

➤ Leakage protection switch trips.

- ✧ Cause : the leakage protection switch trips after the servo spindle start-up.
- ✧ Reasons and countermeasures :
 - A plain leakage protection switch with a leakage protection value of 200mA is recommended; otherwise candle the leakage protection switch. ;
 - Use the specified leakage protection switch dedicated to servo(or transducer) with a leakage protection value of 30mA. ;
 - Add an isolating transformer between the plain leakage protection switch and servo driver. ;

➤ Symptom for coder failure

- ✧ Cause :
 - Err - 05 encoder fault alarm
 - Spindle rotation at low speed, speed command control
 - Appear coasters phenomenon
 - Running speed uneven, there are obvious impact type mechanical vibration
 - no-load monitoring current A_0 , found that current significantly larger, rated worth when no-load current of about 15%
 - To monitor torque when there is no load torque big or the full torque has been reached
 - Often Err - 02, Err - 03, Err - 09 alarm
- ✧ Countermeasures :

- Check whether the CN2 terminal and motor encoder is connected encoder line; ;
- If already properly connected, can be manually rotating machine, and view the monitoring parameter P, if the motor encoder is 1024 line installation, is a revolution of the motor shaft, 4096 pulse parameter P should change; ;
- If no change parameter P, please carefully check the lines to the encoder or replace the encoder. Controller is measured with a multimeter CN2 port encoder on the power supply, if no voltage, drive internal power supply is damaged, need to change the drive;
- If attachment is correct, the power supply is normal, the encoder may damage, need to change the motor encoder; ;
- If parameter P change, but change pulse number for each lap 10000 pulses, the actual line number should be 2500 line motor encoder, please contrast encoder on the motor nameplate value, modify the E04 parameters.

➤ **Frequent Alarms of Er -01**

- ✧ Cause :
 - unstable or failed power supply, please use the multimeter to measure the controller of R/S/T port, to determine whether the power fluctuation is bigger ;
 - Large equipment start may cause instantaneous under voltage, this kind of situation can't use multimeter test ;
- ✧ Countermeasures :
 - Add a regulated power supply where the power supply is unstable. Adjust E46 settings.

➤ **Spindle can not be turned**

- ✧ Reasons and countermeasures :
 - The spindle speed is not controlled, may cause is the motor phase sequence errors.。
 - Perform OP = 2 (self-study) operation, after the success of the self learning, and change the OP to 0 (outside the terminal control);
 - Spindle don't work, need to check whether the controller receives the correct control instruction:
 - ✓ Example: CNC executes instructions M03 S500, requiring motor at 500 RPM is rotating.
 - ✓ Executes the instruction, the system should be connected to the controller IO input terminal, whether by monitoring parameter d the vertical bar on the right side of the pop-up, IO can be confirmed to be correct access:

- If no pop-up, explain the signal is not properly access, check whether the I0 CN1 port terminal is connected correctly, or whether the 24V power supply access, or SEL terminals are connected correctly.
- If other vertical bar pop-up, the 24V power supply and SEL terminal correct, I0 connection to other ports.
- ✓ Executes the instruction, the system may by pulse, 0 ~ 10V analog or $\pm 10V$ analog to represent the speed command, the following instructions:
 - If using pulse wave velocity, setting E40 = 2, set up the E61, depending on the type of pulse by monitoring parameter F (external pulse frequency), determine the correct pulse input;
 - If use 0 ~ 10 v analog, set E40 = 0, by monitoring parameters A1, determine whether or not the correct input;
 - If use $\pm 10V$ analog, set E40 = 1, A0 by monitoring parameters, determine whether or not the correct input.
- If above countermeasures are invalid, please contact technical support.

➤ The spindle speed is not correct

- ✧ Reasons and countermeasures :
 - Pulse speed control :
 - ✓ Confirm whether encoder line number parameters in CNC system with E04 parameters matching;
 - ✓ Whether the spindle drive ratio;
 - Analog speed control:
 - ✓ Confirm whether the highest spindle speed in CNC system with F00 parameters matching;
 - ✓ Analog voltage whether receive accurate, and can be through the parameter A0, A1 monitoring;
 - ✓ If analog into is proportional to the deviation, such as CNC setting of 1000 RPM, motor speed is 980 RPM, if CNC setting of 2000 RPM, motor speed is 1960 RPM, can be appropriately increase F00;
 - ✓ If analog deviation as a fixed value, such as CNC setting of 1000 RPM, motor speed is 980 RPM, setting of 2000 RPM, motor speed is 1980 RPM, can adjust the F4X group parameter modification;
 - If above countermeasures are invalid, please contact technical support.

➤ **Inaccurate positioning of spindle**

✧ Reasons and countermeasures :

- For the first use or replacement of spindle parts. Readjust the positioning angle. Adjust parameter: F22
- After used for a certain period .check for any loosen synchronous belt and that of spindle motor and for any loosen coder of spindle motor.
- Occasional inaccurate positioning during the operation. Please contact the manufacture if the followings are confirmed: Coder is connected firmly and the shield is grounded well. Logic of control sequence for positioning is in good order. It remains inaccurate positioning when handling it manually by means of MDI
- If above countermeasures are invalid, please contact technical support.

Description of safety marks:

Danger: The misuse may cause fire, severe injury, even death.

Note: The misuse may cause medium or minor injury and equipment damage.

◆ Installation

 Note
★ If the drive is found to be damaged or lack parts, the drive cannot be installed. Otherwise, accident may be caused. ★ The drive shall be mounted on the fire retardant surface, such as metal, and kept far away from the inflammables and heat source. ★ Keep the drilling scraps from falling into the inside of the drive during the installation; otherwise, drive failure may be caused. ★ When the drive is installed inside the cabinet, the electricity control cabinet shall be equipped with fan and ventilation port. And ducts for radiation shall be constructed in the cabinet.

◆ Wiring

 Danger
★ Before wiring, confirm that the power supply is disconnected. Otherwise, there exists the risk of electric shock or fire. ★ The wiring must be conducted by qualified electricians. Otherwise, there exists the risk of electric shock or drive damage. ★ The drive input and output cables with proper sectional area shall be selected according to the drive power. ★ Please confirm that the power supply phases, rated voltage are consistent with that of the nameplate, otherwise, the drive may be damaged. ★ Do not perform dielectric strength test on the drive, otherwise, the drive may be damaged. ★ The grounding terminal E must be reliably grounded, otherwise, the drive enclosure may become live. ★ The three-phase power supply cannot connect to output terminals U, V and W, otherwise, the drive will be damaged. ★ The wires of the main circuit terminals and the wires of the control circuit terminals shall be laid separately or in a square-crossing mode, otherwise, the control signal may be interfered.

◆ Operation

 Danger
★ In the power-on state, please do not touch the drive terminals; otherwise, there exists the risk of electric shock. ★ The failure and alarm signal can only be reset after the running command has been cut off. Otherwise, personal injury may be caused. ★ Do not start or shut down the drive by switching on or off the power supply, otherwise, the drive may be damaged. ★ When it is used on lifting equipment, mechanical contracting brake shall also be equipped.

- ★ Before operation, please confirm if the motor and equipment are in the allowable use range, otherwise, the equipment may be damaged.
- ★ The heatsink and the braking resistor have high temperature. Please do not touch such device; otherwise, you may be burnt.
- ★ Please do not change the drive parameter randomly. Most of the factory set parameters of the drive can meet the operating requirement, and the user only needs to set some necessary parameters. Any random change of the parameter may cause the damage of the mechanical equipment.

◆ Maintenance, Inspection



Danger

- ★ In the power-on state, please do not touch the drive terminals; otherwise, there exists the risk of electric shock.
- ★ If cover is to be removed, the power supply must be disconnected first.
- ★ Wait for at least 10 minutes after power off or confirm that the CHARGE LED is off before maintenance and inspection to prevent the harm caused by the residual voltage of the main circuit electrolytic capacitor to persons.
- ★ The components shall be maintained, inspected or replaced by qualified electricians.
- ★ The circuit boards have large scale CMOS IC. Please do not touch the board to avoid the circuit board damage caused by electro static.
- ★ It is forbidden to modify the drive unauthorizedly; otherwise, personal injury may be caused.

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