OMAX Hydraulics Industrial

Shihlin Electric

AUTOMATION FOR
SMART MANUFACTURING

SHIHLIN AC MOTOR DRIVE
SA3/SE3/SC3/SS2/SFG

福源興有限公司（歐瑪斯油壓）

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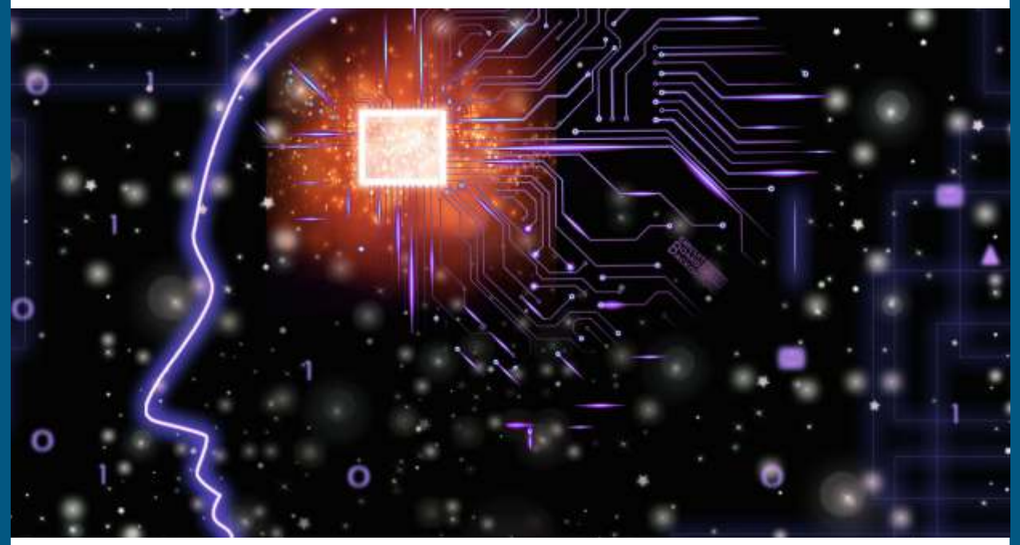
OHSAS 18001 ISO 14001 ISO 9001

About Shihlin Electric

Established in 1955, SHIHLIN ELECTRIC & ENGINEERING CORPORATION has expanded its operations from basic construction to public works, from the development of electrical power resources to assisting in industry upgrade. The company has been a leader in the domestic market with advanced technology in heavy electrical systems, electrical equipment, machinery and automation for a long time. In retrospect, the development of the company has been closely associated with the economic growth in Taiwan. With sustained growth in revenue from domestic and overseas sources, the company has engaged in joint ventures with famous international firms in ODM and OEM production. The company has been persistent in its firm belief of "improvement over time" in running the operation and in corporate development. As such, the company plays a pivotal role in the domestic electrical and automation industry.



Core Business Units

*Transmission & Distribution Electrical Products

*Power Control, Switches & Breakers

*Factory Automation Products

*Automotive Electrical Component Products

Table of Contents

SC3 Series

Compact Vector Control AC Motor Drive

Power Range

Model		KW (HP)	0.2 (0.25)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	5.5 (7.5)
SC3	021	1-phase 220V							
	023	3-phase 220V							
	043	3-phase 440V							

Main Features

* Compact design for space saving and DIN rail mounting
* Torque improvement in low-speed
* Low frequency noise reduction
* Built-in PID feedback control
* Built-in RFI switch for IT mains
* Advanced design for shock-resistant and vibration

Applications

Packing Machine

Conveyer Belt

Grinding Machine

Wood cutting

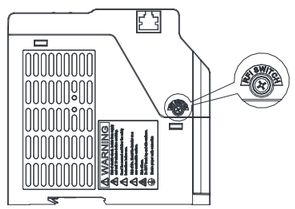
Polishing Machine

Drilling Machine

Product Features

Built-in RFI filer

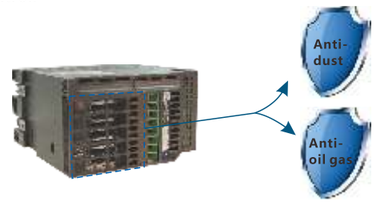
· Reduce electromagnetic interference.
· Switchable for different application needs



Note:For comforming to the CE regulations, please refer to service manual for wiring and installation.

Coating & Isolated Air Duct

· Circuit boards are painted with insulating material.
· Air circulation would be forced to go through heat sink area and prevent dust or oil gas goes into inverter main control.



Note: Please do not install the inverter in a heavily polluted environment without any protection.

Quick Connect to External Keypad

· Easy wiring for multi-machine communication.
· External keypad and RS485 communication cannot be applied at the same time.

Note: Pulling operator can not be used at the same time with RS485.

Easy Maintenance

· Minimize dustfall by changing the location of exhaust fan.
· Removable cooling fan for service and regular maintenance.

Optimized Operation JOG Dial

· Easy and quick setup experience for parameter adjustment.

Grouping Parameters - Easy Setup

Group	Sequency	Description	Setting Range	Factory Default
01-00	P.1	Upper limit frequency	0 ~ 120.00Hz	120.00Hz
01-01	P.2	Lower limit frequency	0 ~ 120.00Hz	0Hz
01-02	P.18	High speed upper limit frequency	120.00 ~ 650.00Hz	120.00Hz
01-03	P.3	Base frequency	50Hz System set : 0 ~ 650.00Hz	50Hz
			60Hz System set : 0 ~ 650.00Hz	60Hz
01-04	P.19	Base Voltage	0 ~ 1000.0V	99999
			99999 : Change with input voltage	

SC3 series: Similar functions are grouped into same sectors instead of sequence numbers.

Electrical Specifications

220V Series single-phase

Frame		A			B	
Model SC3-021-□□□K-□□		0.2	0.4	0.75	1.5	2.2
Output	Rated output capacity (kVA)	0.6	1	1.5	2.5	4.2
	Rated output current (A)	1.8	2.7	4.5	8	11
	Applicable motor capacity (HP)	0.25	0.5	1	2	3
	Applicable motor capacity (kW)	0.2	0.4	0.75	1.5	2.2
	Overload current rating	150% 60seconds 200% 1second (inverse time characteristics)				
	Carrier frequency (kHz)	1~15kHz				
	Maximum output voltage	Three-phase 200-240V				
Power supply	Rated power voltage	Single-phase 200-240V 50Hz / 60Hz				
	Power voltage permissible fluctuation	Single-phase 170-264V 50Hz / 60Hz				
	Power frequency permissible fluctuation	±5%				
	Power source capacity (kVA)	0.75	1.5	2.5	3.5	6.4
Cooling method		Self cooling	Forced air cooling			
Weight (kg)		0.66	0.68	0.73	1.38	1.4

220V Series three-phase

Frame		A				B	
Model SC3-023-□□□K- □□		0.2	0.4	0.75	1.5	2.2	3.7
Output	Rated output capacity (kVA)	0.6	1.2	2	3.2	4.2	6.7
	Rated output current (A)	1.8	3	5	8	11	17.5
	Applicable motor capacity (HP)	0.25	0.5	1	2	3	5
	Applicable motor capacity (kW)	0.2	0.4	0.75	1.5	2.2	3.7
	Overload current rating	150% 60seconds 200% 1second (inverse time characteristics)					
	Carrier frequency (kHz)	1~15kHz					
	Maximum output voltage	Three-phase 200-240V					
Power supply	Rated power voltage	Three-phase 200-240V 50Hz / 60Hz					
	Power voltage permissible fluctuation	Three-phase 170-264V 50Hz / 60Hz					
	Power frequency permissible fluctuation	±5%					
	Power source capacity (kVA)	0.75	1.5	2.5	4.5	6.4	10
Cooling method		Self cooling	Forced air cooling				
Weight (kg)		0.69	0.69	0.70	0.73	1.32	1.4

Electrical Specifications

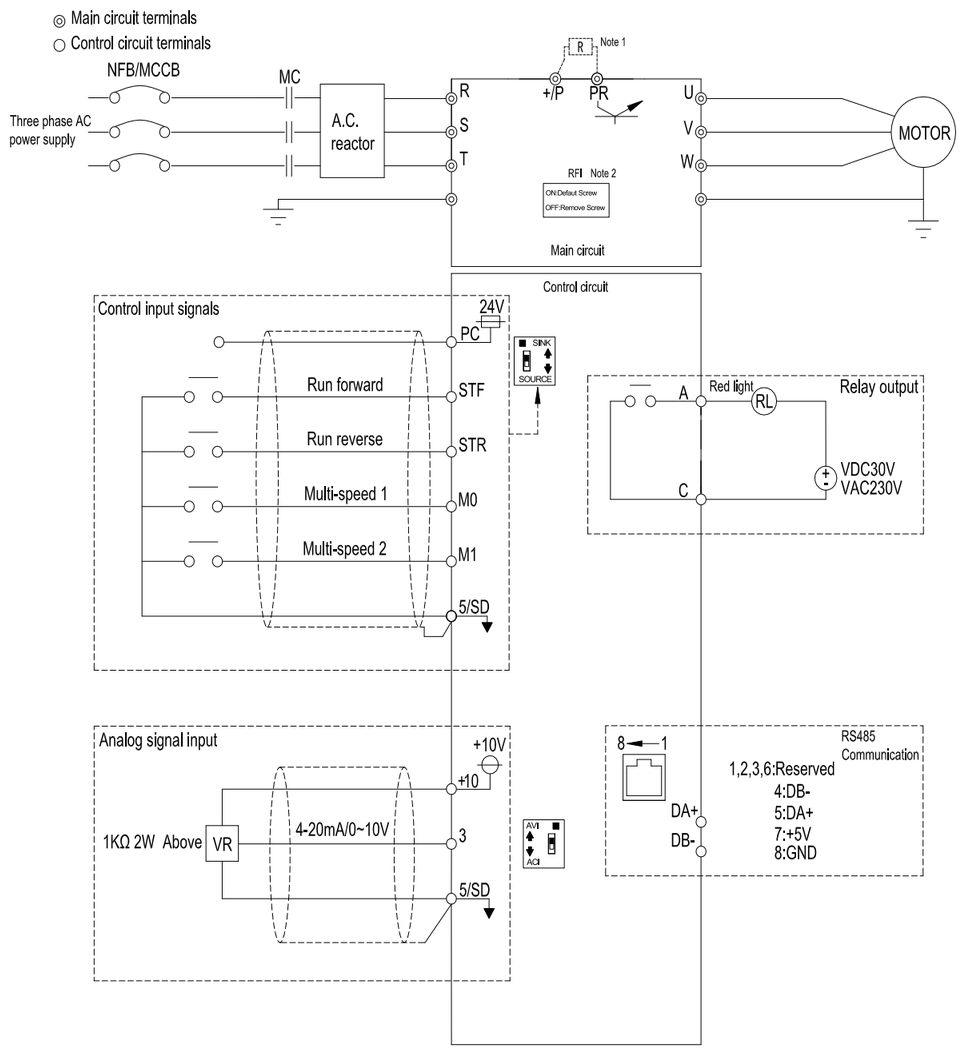
440V Series three-phase

Frame		A			B		
Model **SC3-043-□□□K- □□**		0.4	0.75	1.5	2.2	3.7	5.5
Output	Rated output capacity (kVA)	1	2	3	4.6	6.9	9.2
	Rated output current (A)	1.5	2.6	4.2	6	9	12
	Applicable motor capacity (HP)	0.5	1	2	3	5	7.5
	Applicable motor capacity (kW)	0.4	0.75	1.5	2.2	3.7	5.5
	Overload current rating	150% 60seconds 200% 1second (inverse time characteristics)					
	Carrier frequency (kHz)	1~15kHz					
	Maximum output voltage	Three-phase 380-480V					
Power supply	Rated power voltage	Three-phase 380-480V 50Hz / 60Hz					
	Power voltage permissible fluctuation	Three-phase 323-528V 50Hz / 60Hz					
	Power frequency permissible fluctuation	±5%					
	Power source capacity (kVA)	1.5	2.5	4.5	6.9	10.4	11.5
Cooling method		Self cooling	Forced air cooling				
Weight (kg)		0.74	0.74	0.81	1.37	1.37	1.42

Common Specifications

Control method		SVPWM control, V/F control, General magnetic vector control
Output frequency range		0~650.00Hz
Frequency setting resolution	Digital setting	The frequency is set within 100Hz, the resolution is 0.01Hz.
		The frequency is set more than 100Hz, the resolution is 0.1Hz.
	Analog setting	DC 0~5V or 4~20mA signal, 11 bit
		DC 0~10V signal, 12 bit
Output frequency accuracy	Digital setting	Maximum target frequency±0.01%.
	Analog setting	Maximum target frequency±0.1%.
Starting torque		180% 3Hz,200% 5Hz:Under the condition of general magnetic vector control
V/F characteristics		Constant torque curve, variable torque curve, five-point curve
Acceleration / deceleration curve characteristics		Linear acceleration /deceleration curve, S pattern acceleration /deceleration curve1 & 2 & 3
Drive motor		Induction motor(IM)
Stalling protection		The stalling protection level can be set to 0~250%(06-01(P.22)). The default value is 200%.
Target frequency setting		Operation panel setting, DC 0~5V/10V signal, DC 4~20 mA signal, multiple speed stage level setting, communication setting.
Operation panel	Operation monitoring	Output frequency, output current, output voltage, PN voltage, electronic thermal accumulation rate, temperature rising accumulation rate, output power, analog value input signal, output terminal status...; alarm history 12 groups at most, the last group of alarm message is recorded.
	LED indication lamp (6)	frequency monitoring indication lamp, voltage monitoring indication lamp, current monitoring indication lamp, motor operation lamp, mode switching lamp, PU control indication lamp.
Communication function		RS-485 communication can select Shihlin/Modbus communication protocol, communication speed115200bps or lower.
Protection mechanism / alarm function		Output short circuit protection, Over-current protection, over-voltage protection, under-voltage protection, motor over-heat protection (06-00(P.9)), IGBT module over-heat protection, communication abnormality protection...
Environment	Ambient temperature	-10 ~ +50℃ (non-freezing) When installation is in side by side way-10~ +40℃(non-freezing).
	Ambient humidity	Below 90%Rh (non-condensing).
	Storage temperature	-20 ~ +65℃.
	Surrounding environment	Indoor, no corrosive gas, no flammable gas, no flammable powder.
	Altitude	Altitude is below 2000 meters. When altitude is above 1,000 m,derate the rated current 2% per 100 m
	Vibration	Vibration below 5.9m/ s^2 (0.6G).
	Enclosure Rating	IP20
	Pollution level	II
	Class of protection	Class I
International certification		CE

Wiring Diagram

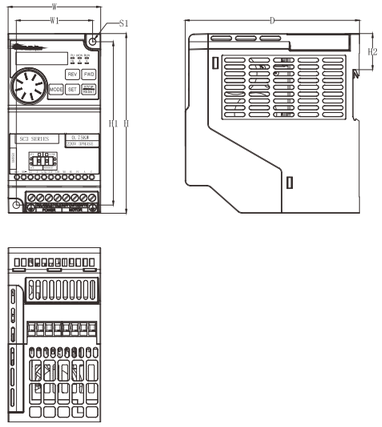


NOTE

1:SC3-043-0.4K~1.5K,SC3-023-0.2~1.5K,SC3-021-0.2~0.75K have not +/P and PR terminals.
2:Built-in RFI filer for reducing electromagnetic interference in all models, please refer to service manual for wiring and instalation for comforming to the CE regulations.

Dimensions

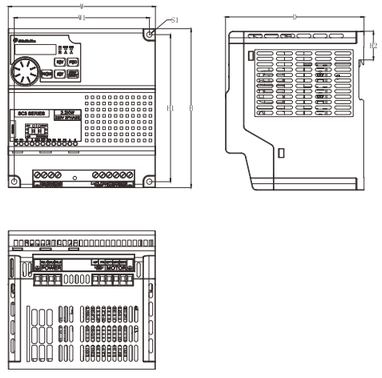
Frame A



Frame A

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	H2 (mm)	D (mm)	S1 (mm)
SC3-021-0.2K	68	56	132	120	26.5	128	5
SC3-021-0.4K							
SC3-021-0.75K							
SC3-023-0.2K							
SC3-023-0.4K							
SC3-023-0.75K							
SC3-023-1.5K							
SC3-043-0.4K							
SC3-043-0.75K							
SC3-043-1.5K							

Frame B



Frame A

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	H2 (mm)	D (mm)	S1 (mm)
SC3-021-1.5K	136	125	147	136	26.5	128	5
SC3-021-2.2K							
SC3-023-2.2K							
SC3-023-3.7K							
SC3-043-2.2K							
SC3-043-3.7K							
SC3-043-5.5K							

SE3 Series

High Performance Vector Control AC Motor Drive

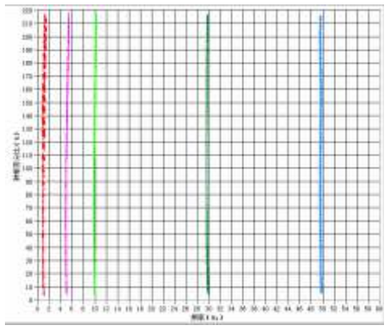
Product Range

Model		KW (HP)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)	22 (30)
SE3	021	1-Phase 220V											
	023	3-Phase 220V											
	043	3-Phase 440V											

Product Features

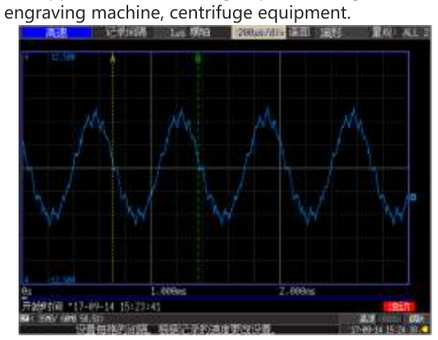
High Performance Vector Control Technology

· High starting torque: Sensorless vector control (SVC)200% 0.5Hz,and closed-loop vector control (FOC + PG) 180% 0Hz.



Up to 1500Hz High-Speed Frequency Output

· Support high speed spindle function, which can be applied to complicated and precise machining process. The application includes high-speed drilling machine, engraving machine, centrifuge equipment.



High Performance Synchronous Motor Control Technology

· Supports induction motor (IM) and synchronous motor (IPM and SPM) control.

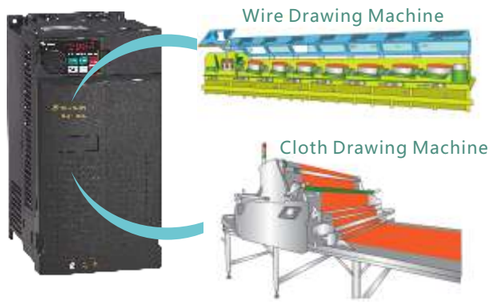
Support Multiple High-speed Bus Connections

· Equipped with high-speed communications:CANopen、Profibus、DeviceNet、EtherCAT、MODBUS TCP ;

Product Features

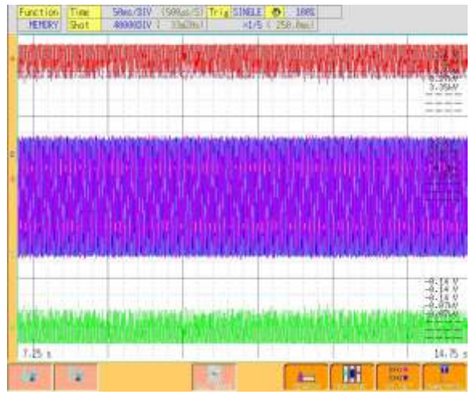
Multiple Control Modes for Various Applications

- Position / Speed / Torque / Tension control mode
- Combination mode (e.g. speed+torque) can be achieved via I/O switch.
- Advanced position control functions: Homing commands, zero speed, Pr/Pt mode (with optional PG cards)



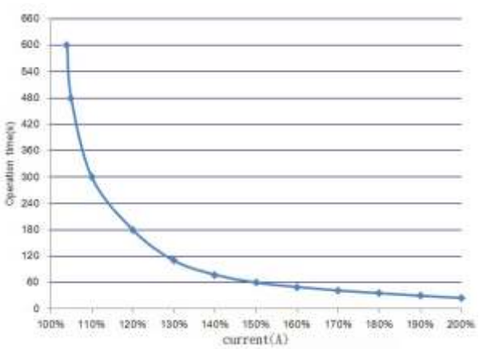
Low-noise Carrier Wave Control (Soft-PWM)

- Motor noise is controlled so that the metallic sound is transformed into a more pleasing buzz.
  Low noise operations to reduce the interference exerted upon external radio frequencies



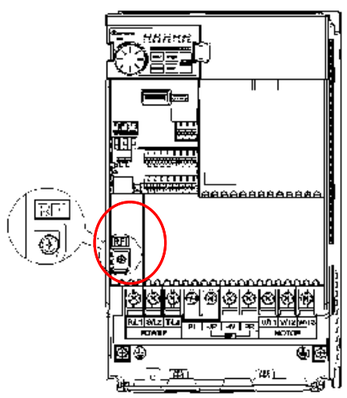
Excellent Overload Endurance

- With a current overload capability of 150% for 60 seconds and 200% for 3 seconds, the setting is suitable for handling large sudden load changes applications such as tooling machinery.



Built-in RFI filer

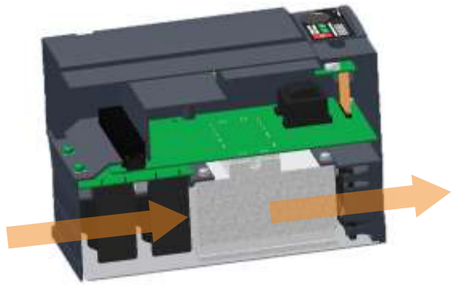
- Reduce electromagnetic interference



Product Features

Isolated Air Channel

- Fan wind channels are sealed and isolated from the heat dissipation system and electrical parts. Dust will not be able to infiltrate the interior of the machine through the fans.



Complete Protection Functions

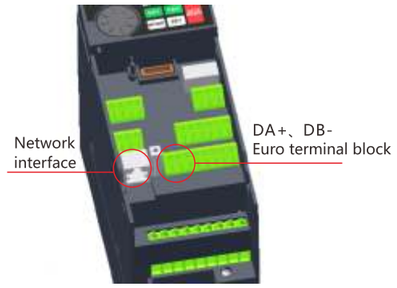
- Phase failure protection, overvoltage protection, overcurrent protection, undervoltage protection, output short-circuit protection, ground fault protection, motor overheat protection, IGBT module overheat protection, communication abnormality protection

LED Digital Keypad

1. 5-digit 7-segment display
2. Optimized operation JOG Dial

Quick Connect to External Keypad and Easy Wiring

- Standard RJ45 network and DA+ DB- terminals are equipped for multi-machine communication



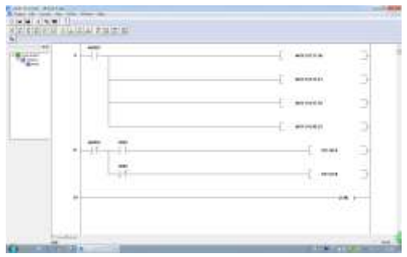
12 Sets of Alarm Records

- Complete alarm system for recording the output frequency, output current, output voltage, accumulated count of temperature increase, PN voltage, total AC drive operation time, AC drive operational status,alarm output time.A total of 12 alarm code, 12 groups of alarm code.

P.288	06-40	Alarm code query	0~12	0	176
P.289	06-41	Alarm code display	Read	Read	176
P.290	06-42	Alarm code query	0~10	0	176
P.291	06-43	Alarm code display	Read	Read	176

Built-in PLC Functions

- Provides PLC programming software, easy for editing.
- Applicable for programming small number of points, and support multiple functions.



Product Features

Grouping Parameters - Easy Setup

Group	Sequency	Description	Setting Range	Factory Default	User Defined
02-10	P.60	2-5filter time	0~2000ms	30ms	
02-11	P.139	The bias rate og 2-5 voltage signal	0~100.0%	0	
02-12	P.192	The minimum input positive voltage of 2-5	0~10.00V	0	
02-13	P.193	The maximum input positive voltage of 2-5	0~10.00V	10.00V	
02-14	P.194	The percentage corresponding to the The minimum input positive voltage of terminal 2-5	-100.0%~100.0%	0%	
02-15	P.195	The percentage corresponding to the The maximum input positive voltage of terminal 2-5	-100.0%~100.0%	100.0%	

SE3 series: Similar functions are grouped into same sectors instead of sequence numbers.

Easy Maintenance

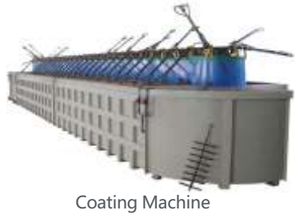
- Minimize dustfall by changing the location of exhaust fan.
- Removable cooling fan for service and regular maintenance.

Applicable Industries

Engraving machine

CNC tooling Machine

Wire drawing machine



Coating Machine

Wood cutting

Mechanical Press

Electrical Specifications

220V series one-phase/three-phase

Frame			A		B	
Model SE3-021-□- xy			0.4K	0.75K	1.5K	2.2K
Output	HD	Rated output capacity (kVA)	1	1.5	3.2	4.2
		Rated outputcurrent (A)	2.7	4.5	8	11
		Applicable motor capacity (HP)	0.5	1	2	3
		Applicable motor capacity (kW)	0.4	0.75	1.5	2.2
		Overload current rating	150% 60 seconds 200% 3seconds (inverse time characteristics)			
		Carrier frequency (kHz)	1~15KHz			
	ND	Rated outputcapacity (kVA)	1.2	2	3.4	4.8
		Rated outputcurrent (A)	3	5	8.5	12.5
		Applicable motor capacity (HP)	0.5	1	2	3
		Applicable motor capacity (kW)	0.4	0.75	1.5	2.2
		Overload current rating	120% 60seconds (inverse time characteristics)			
		Carrier frequency (kHz)	1~15KHz			
	Maximum output voltage		Three-phase 200-240V			
Power supply	Rated power voltage		One-phase 200-240V 50Hz / 60Hz			
	Power voltage permissiblefluctuation		One -phase 170-264V 50Hz / 60Hz			
	Power frequency permissible fluctuation		±5%			
	Power source capacity (kVA)		1.5	2.5	4.5	6.9
Cooling method			Self cooling	Forced air cooling		
Weight (kg)			1.0	1.0	1.5	1.5

Frame			A			B		C		D	
Model SE3-023-□- xy			0.4K	0.75K	1.5K	2.2K	3.7 K	5.5 K	7.5K	11K	15K
Output	HD	Rated output capacity (kVA)	1.2	2	3.2	4.2	6.7	9.5	12.5	18.3	24.7
		Rated outputcurrent (A)	3	5	8	11	17.5	25	33	49	65
		Applicable motor capacity (HP)	0.5	1	2	3	5	7.5	10	15	20
		Applicable motor capacity (kW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
		Overload current rating	150% 60 seconds 200% 3seconds (inverse time characteristics)								
		Carrier frequency (kHz)	1~15KHz								
	ND	Rated outputcapacity (kVA)	1.3	2.1	3.4	4.8	7.4	10.3	13.7	19.4	26.3
		Rated outputcurrent (A)	3.2	5.5	8.5	12.5	19.5	27	36	51	69
		Applicable motor capacity (HP)	0.5	1	2	3	5	7.5	10	15	20
		Applicable motor capacity (kW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
		Overload current rating	120% 60seconds 150% 3seconds (inverse time characteristics)								
		Carrier frequency (kHz)	1~15KHz								
	Maximum output voltage		Three-phase 200-240V								
Power supply	Rated power voltage		Three-phase 200-240V 50Hz / 60Hz								
	Power voltage permissiblefluctuation		Three-phase 170-264V 50Hz / 60Hz								
	Power frequency permissible fluctuation		±5%								
	Power source capacity (kVA)		1.5	2.5	4.5	6.4	10	12	17	20	28
Cooling method			Forced air cooling								
Weight (kg)			1.0	1.0	1.0	1.5	1.5	4.0	4.1	5.7	5.8

Note:The test conditions of rated output current,rated output capacity and inverter power consumption are:the carrier frequency (P.72) is at the set value;the inverter output voltage is at 440V;the output frequency is at 60Hz,and the ambient temperature is 40℃.

Electrical Specifications

440V series three-phase

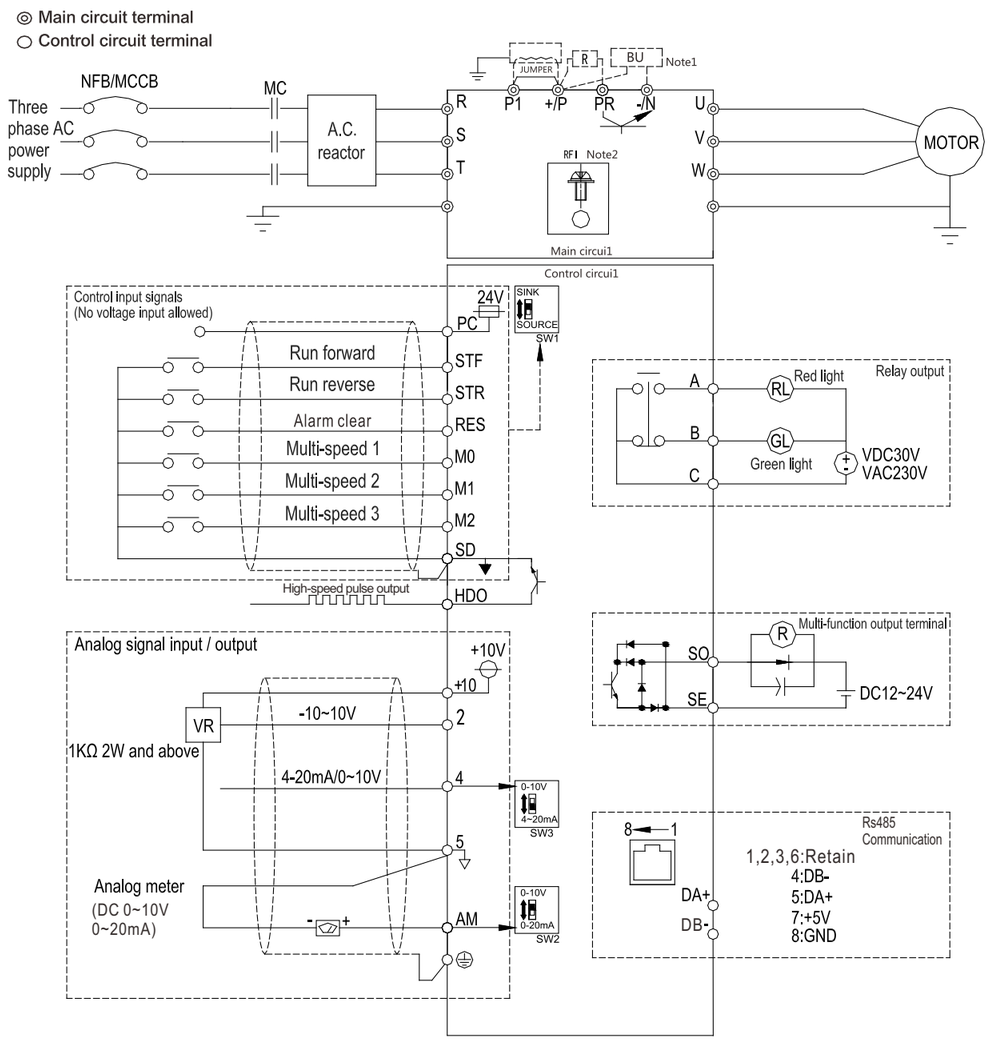
Frame			A			B		C			D		
Model SE3-043-□ - xy			0.4K	0.75K	1.5K	2.2K	3.7 K	5.5 K	7.5 K	11 K	15K	18.5K	22K
Output	HD	Rated output capacity (kVA)	1	2	3	4.6	6.9	10	14	18	25	29	34
		Rated outputcurrent (A)	1.5	2.7	4.2	6	9	12	17	24	32	38	45
		Applicable motor capacity (HP)	0.5	1	2	3	5	7.5	10	15	20	25	30
		Applicable motor capacity (kW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
		Overload current rating	150% 60 seconds 200% 3seconds (inverse time characteristics)										
		Carrier frequency (kHz)	1~15KHz										
	ND	Rated outputcapacity (kVA)	1.4	2.3	3.5	5	8	12	15.6	21.3	27.4	31.6	37.3
		Rated outputcurrent (A)	1.8	3	4.6	6.5	10.5	15.7	20.5	28	36	41.5	49
		Applicable motor capacity (HP)	0.5	1	2	3	5	7.5	10	15	20	25	30
		Applicable motor capacity (kW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
		Overload current rating	120% 60seconds (inverse time characteristics)										
		Carrier frequency (kHz)	1～15KHz										
	Maximum output voltage		Three-phase 380-480V										
Power supply	Rated power voltage		Three-phase 380-480V 50Hz / 60Hz										
	Power voltage permissiblefluctuation		Three-phase 323-528V 50Hz / 60Hz										
	Power frequency permissible fluctuation		±5%										
	Power source capacity (kVA)		1.5	2.5	4.5	6.9	10.4	11.5	16	20	27	32	41
Cooling method			Self cooling	Forced air cooling									
Weight (kg)			1.0	1.0	1.0	1.5	1.5	3.9	4.0	4.0	5.7	5.8	5.8

Note:The test conditions of rated output current,rated output capacity and inverter power consumption are:the carrier frequency (P.72) is at the set value;the inverter output voltage is at 440V;the output frequency is at 60Hz,and the ambient temperature is 40℃.

Common Specifications

Control method		SVPWM control, V/F control, close-loop V/F control (VF+PG), general flux vector control, sensorless vector control (SVC), close-loop vector control (FOC+PG), torque control (TQC+PG).
Output frequency range		0~1500.00Hz
Frequency setting resolution	Digital setting	The resolution is 0.01Hz.
	Analog setting	0.01Hz/60Hz(terminal 2: -10～+10V / 13bit) 0.15Hz/60Hz(terminal 2: 0～±10V / 12bit) 0.03Hz/60Hz(terminal 2: 0～5V / 11bit) 0.06Hz/60Hz(terminal 4: 0~10V, 4-20mA / 12bit) 0.12Hz/60Hz(terminal 4: 0～5V / 11bit)
Output frequency accuracy	Digital setting	Maximum target frequency±0.01%.
	Analog setting	Maximum target frequency±0.1%.
Speed control range		IM: WhenSVC, 1:200; when FOC+PG, 1:1000. PM: When SVC,1:20; when FOC+PG, 1:1000.
Starting torque		200% 0.5 Hz
V/F characteristics		Constant torque curve, variable torque curve, five-point curve, VF separation
Acceleration / deceleration curve characteristics		Linear acceleration /deceleration curve, S pattern acceleration /deceleration curve
Drive motor		Induction motor(IM), permanent magnet motor(SPM, IPM)
Stalling protection		The stalling protection level can be set to 0~250%
Target frequency setting		Parameter unit setting, DC 0~5V/10V signal, DC -10~+10V signal, DC 4~20 mA signal, multiple speed stage level setting, communication setting, HDI setting.
PID control		Please refer to parameter description
Built-in simple PLC		Supports 21 basic instructions and 14 application instructions, including PC editing software;
Parameter unit	Operation monitoring	Output frequency, output current, output voltage, PN voltage, output torque, electronic thermal accumulation rate, temperature rising accumulation rate, output power, Analog value input signal, digital input and output terminal status...; alarm signal and alarm history 12 groups at most
	LED indication lamp (7)	Forward rotation indication lamp, reverse rotation indication lamp, frequency monitoring indication lamp, mode switch lindication lamp ,PU contro lindication lamp, PLC indication lamp and work lindication lamp
Communication function		Built-in Shihlin/Modbus communication protocol, can select MODBUS TCP , CANopen、Profibus、DeviceNet、EtherCAT,high speed card
Protection mechanism / alarm function		Output short circuit protection, Over-current protection, over-voltage protection, under-voltage protection, motor over-heat protection, IGBT module over-heat protection, communication abnormality protection,
Environment	Ambient temperature	Heavy load : -10 ~ +50℃ (non-freezing) , Light load : -10 ~ +40℃ (non-freezing), please refer to 3.4.2 Class of protection and operation temperature for details.
	Ambient humidity	Below 90%Rh (non-condensing).
	Storage temperature	-20 ~ +65℃.
	Surrounding environment	Indoor, no corrosive gas, no flammable gas, no flammable powder.
	Altitude	Altitude below 2000 meters,when altitude is above 1,000 m,derate the rated current 2% per 100 m
	Vibration	Vibration below 5.9m/s2 (0.6G).
	Enclosure Rating	IP20
	Pollution level	Ⅱ
	Class of protection	Class I
International certification		CE

Wiring Diagram



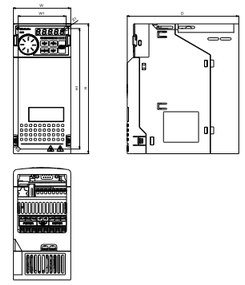
NOTE

1. Please refer to the Section 5.4.1 for the applications of external thermal overload relay.
2. Make sure that 10, SD, SE, 5 and PC are not shorted each other.
3. The DC reactor between +/P and P1 is optional. Please short +/P and P1 when DC reactor is not used.
4. For connecting the brake unit of Frame C and D to between +/P and -/N, please refer to the Section 3.7.1 for details.
5. When frame C and D adding DC reactors, please remove the short circuit piece between P1 and +/P. Please refer to the Section 3.6.4 for the reactor type.
6. Please refer to the Section 5.3.9 for wiring of HDO.

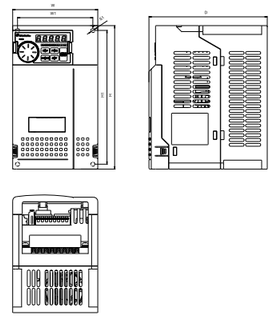
Dimensions

单位：mm

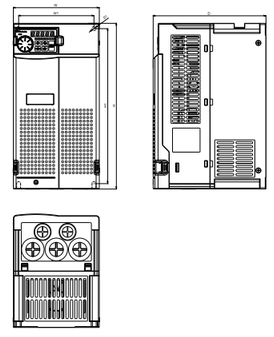
Frame A



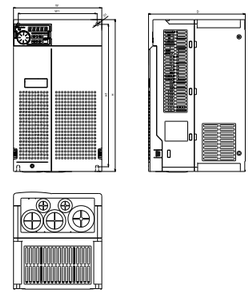
Frame B



Frame C



Frame D



Frame A

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	S1 (mm)
SE3-043-0.4~1.5K	74.0	62.0	167.0	155.0	144.0	5.2
SE3-023-0.4~1.5K						
SE3-021-0.4~0.75K						

Frame B

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	S1 (mm)
SE3-043-2.2~3.7K	105.0	93.0	178.0	166.0	146.0	5.2
SE3-023-2.2~3.7K						
SE3-021-1.5~2.2K						

Frame C

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	S1 (mm)
SE3-043-5.5~11K	141.0	123.6	270.0	252.6	185.0	6.5
SE3-023-5.5~7.5K						

Frame D

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	S1 (mm)
SE3-043-15~22K	175.0	156.4	300.0	281.4	191.8	6.2
SE3-023-11~15K						

SA3 Series

Heavy Duty AC Motor Drive with Dual Rating Vector Control

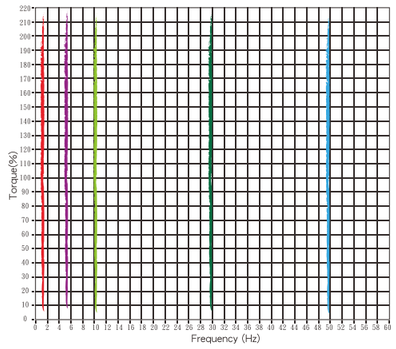
Product Range

Model		KW (HP)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)	55 (75)	75 (100)	90 (120)	110 (150)	132 (175)	160 (215)	185 (250)	220 (300)	250 (335)	280 (375)	315 (420)	355 (475)
SA3	023	3-Phase 220V																									
	043	3-Phase 440V																									

Product Features

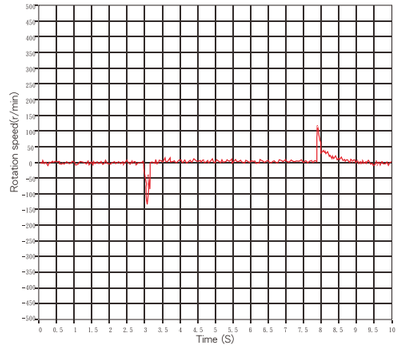
High Performance Vector Control Technology

- Vector control and Sensorless vector control (Maximum operating frequency 120 Hz).
- High starting torque: Sensorless vector control (SVC)150% 0.3Hz,and closed-loop vector control(FOC + PG) 180% 0Hz.



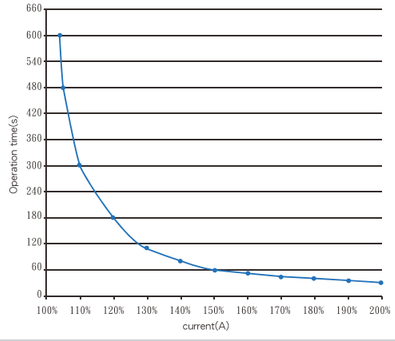
High Response Performance

- Speed accuracy: less than 1% with 0 to 100% load variation
- For applications with sudden load changes such as cranes and metal processing machinery.



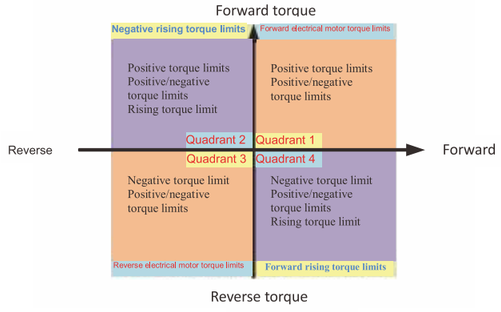
Excellent Overload Endurance

- With a current overload capability of 150% for 60 seconds and 200% for 3 seconds, the setting is suitable for handling large sudden load changes applications such as tooling machinery.



4-Quadrant Torque Control and Limits

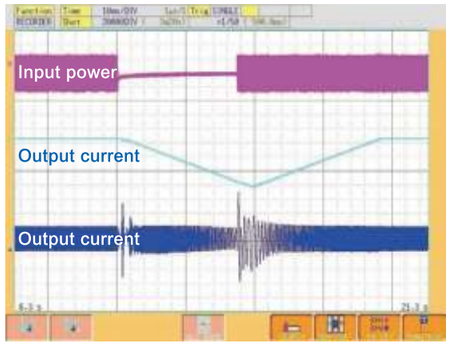
- Parameters or analog signals can be used to simply establish limits for 4 torque items.



Product Features

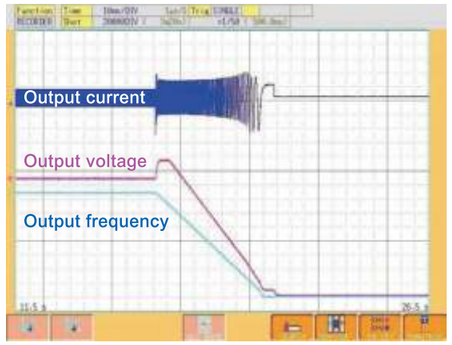
Temporary Compensation at Low Voltage

· When temporary shut-down occurs, output frequency will be controlled to maintain DC bus voltage of the inverter to decelerate the motor.
· When power resumes, inverter will control the motor to accelerate to its previous speed.
· Applicable for machines that are not able to commence free-run while decelerating.



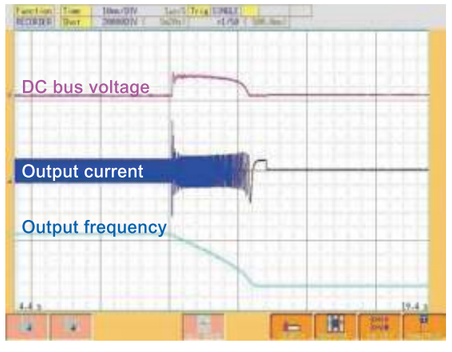
Magnetic Flux Brake

· When the motor is stopping, the magnetic flux will be transmitted to the motor coil to shorten deceleration time without relying on regenerative resistance.



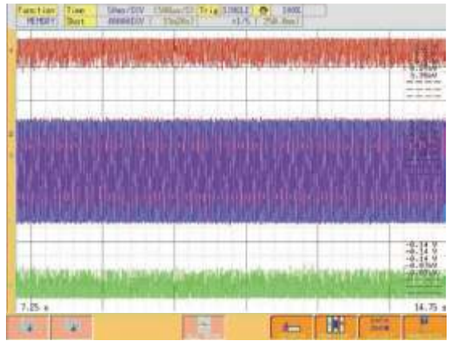
Regeneration Avoidance Functions

· By adjusting output frequency and voltage, DC bus voltage can be kept at a specified value and prevent overvoltage.



Low-noise Carrier Wave Control (Soft-PWM)

· Motor noise is controlled so that the metallic sound is transformed into a more pleasing buzz.
· Low noise operations to reduce the interference exerted upon external radio frequencies



Advanced Synchronous Motors Control Technology

· Support both induction and permanent magnet motors with open-loop control.

LCD Operation Interface

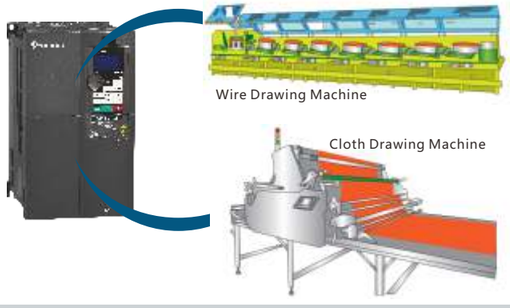
· Supports 2 display styles.
· Able to simultaneously display 6 sets of operational data.
· Calendar support.
· Offers both English and Chinese language interfaces.
· Capable of storing 3 sets of parameters.
· Supports shuttle settings.

Isolated Air Channel

· Fan wind channels are sealed and isolated from the heat dissipation system and electrical parts. Dust will not be able to infiltrate the interior of the machine through the fans.

Multiple Control Modes for Various Applications

· Position / Speed / Torque / Tension control mode
· Combination mode (e.g. speed+torque) can be achieved via I/O switch.
· Advanced position control functions: Homing commands, zero speed, Pr/Pt mode (with optional PG cards)
· Supports open-loop tension control, feeding disruption inspection and automatic spool replacement functions



SA3 Series

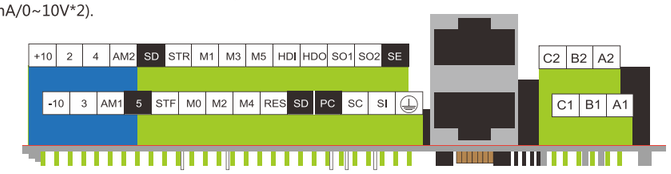
Heavy Duty AC Motor Drive with Dual Rating Vector Control

SA3

Product Features

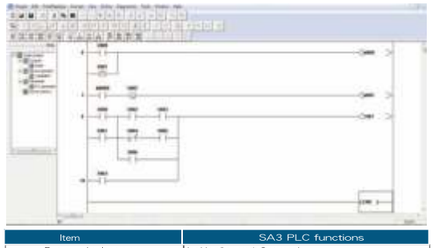
Multiple I/O Terminals

- Includes 10 sets of multi-functional combinational logic input terminals (with high-speed pulse inputs *1)
- Includes 5 sets of multi-functional combinational output terminals (including electric relay output *2, transistor output *2, and high-speed pulse output *1).
- Includes 3 sets of analog input signals (with -10~+10V*1 and 4~20mA/0~10V*2).
- Includes 2 sets of analog output signals (0~20mA/0~10V*2).
- 1 set of safety switch (S1~SC).



Built-in PLC Functions

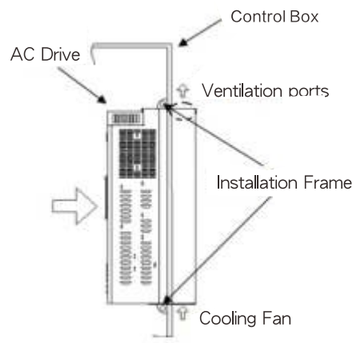
- Provides PLC programming software, easy for editing.
- Applicable for programming small number of points, and support multiple functions.



Item		SA3 PLC functions
Programming Language		Ladder diagram + Command
Basic commands		21
Applicable commands		14
Processing speed	Basic commands	1 μ s
	Applicable commands	10 μ s
Hidden program capacity		400 steps(0~399 steps)
I/O configuration	Input(X)	22 points(X0~X25, octal)
	Output(Y)	20 points (Y0~Y23, octal)
Supporting electric relay (M)	General	160 points, M0~M159
	Battery backed	80 points, M160~M239
	Special	64 points, M8000~M8063
Timer(T)	100ms	8 points, T0~T7, timer range: 0~65535,5 seconds
Counter(C)		8 points, C0~C7, counting range: 0~65535
Data register	General	32 points, D0~D31
	Battery backed	16 points, D32~D47
	Special	64 points, D8000~D8063

Through-the-wall Installation Support Provided for the Entire Series

- Improve heat dissipation, reduce heat generation within the cabinet, and improve protection for the cabinet contents.

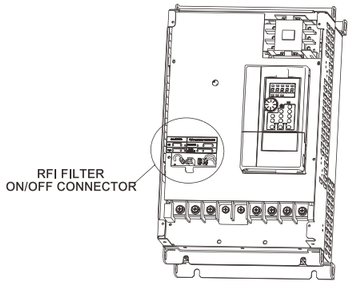


12 Sets of Alarm Records

- Complete alarm system for recording the output frequency, output current, output voltage, accumulated count of temperature increase, PN voltage, total AC drive operation time, AC drive operational status,alarm output time(only when used with PU301C)

Built-in RFI filer

- Reduce electromagnetic interference



Improved Protection

- Output phase failure protection, output short circuit protection, ground leakage protection, low voltage protection, motor overheating signal (PTC), and electrolytic capacitor life inspection.

Applicable Industries

Air Compressor

Injection molding machine

Cranes

Mechanical Press

Wire drawing machine

Coating Machine

Electrical Specifications

220 V Three-phase Series

Frame			A				B			C		D			E		F	G	
ModelSA3-023-□□□K□ -			0.75K 1.5KF	1.5K 2.2KF	2.2K 3.7KF	3.7K 5.5KF	5.5K 7.5KF	7.5K 11KF	11K 15KF	15K 18.5KF	18.5K 22KF	22K 30KF	30K 37KF	37K 45KF	45K 55KF	55K 75KF	75K 90KF	90K 110KF	110K 132KF
Output	HD	Rated output capacity (kVA)	2	3.2	4.2	6.7	9.5	12.5	18.3	24.7	28.6	34.3	45.7	55	65	82	110	132	165
		Rated output current (A)	5	8	11	17.5	25	33	49	65	75	90	120	145	170	215	288	346	432
		Applicable motor capacity (HP)	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	120	145
		Applicable motor capacity (kW)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
		Overload current rating	150% 60 seconds 200% 3seconds (inverse time characteristics)																
		Carrier frequency (kHz)	1~15kHz									1~9kHz							
	ND	Rated output capacity (kVA)	3.2	4.2	6.7	9.5	12.5	18.3	24.7	28.6	34.3	45.7	55	65	82	110	132	165	193
		Rated output current (A)	8	11	17.5	25	33	49	65	75	90	120	145	170	215	288	346	432	506
		Applicable motor capacity (HP)	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	120	145	175
		Applicable motor capacity (kW)	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132
		Overload current rating	120% 60seconds (inverse time characteristics)																
		Carrier frequency (kHz)	1~15kHz									1~9kHz							
	Maximum output voltage		Three-phase 200-240V																
Power supply	Rated power voltage		Three-phase 200-240V 50Hz / 60Hz																
	Power voltage permissible fluctuation		Three-phase 170-264V 50Hz / 60Hz																
	Power frequency permissible fluctuation		±5%																
	Power source capacity (kVA)		2.5	4.5	6.4	10	12	17	20	28	34	41	52	65	79	100	110	132	165
Cooling method			Self cooling	Forced air cooling															
Weight (kg)			3.15	3.15	3.15	3.15	6	6	6	10.6	10.6	33	33	33	42.7	42.7	56.5	89.2	90.2

Note: The test conditions of rated output current, rated output capacity and inverter power consumption are: the carrier frequency (P.72) is at the set value; the inverter output voltage is at 220V; the output frequency is at 60Hz, and the ambient temperature is 40°C.

Electrical Specifications

440 V Three-phase Series

Frame			A					B			C			D
Model SA3-043-□□□K □-			0.75K 1.5KF	1.5K 2.2KF	2.2K 3.7KF	3.7K 5.5KF	5.5K 7.5KF	7.5K 11KF	11K 15KF	15K 18.5KF	18.5K 22KF	22K 30KF	30K 37KF	37K 45KF
Output	HD	Rated output capacity (kVA)	2	3	4.6	6.9	10	14	18	25	29	34	46	56
		Rated output current (A)	3.0	4.2	6	9	12	17	24	32	38	45	60	73
		Applicable motor capacity (HP)	1	2	3	5	7.5	10	15	20	25	30	40	50
		Applicable motor capacity (kW)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
		Overload current rating	150% 60 seconds 200% 3seconds (inverse time characteristics)											
		Carrier frequency (kHz)	1 ~ 15kHz											1 ~ 9kHz
	ND	Rated output capacity (kVA)	3	4.6	6.9	10	14	18	25	29	34	46	56	69
		Rated output current (A)	4.2	6	9	12	17	24	32	38	45	60	73	91
		Applicable motor capacity (HP)	2	3	5	7.5	10	15	20	25	30	40	50	60
		Applicable motor capacity (kW)	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45
		Overload current rating	120% 60seconds (inverse time characteristics)											
		Carrier frequency (kHz)	1 ~ 15kHz											1 ~ 9kHz
	Maximum output voltage		Three-phase 380-480V											
Power supply	Rated power voltage		Three-phase 380-480V 50Hz / 60Hz											
	Power voltage permissible fluctuation		Three-phase 342-528V 50Hz / 60Hz											
	Power frequency permissible fluctuation		±5%											
	Power source capacity (kVA)		2.5	4.5	6.9	10.4	11.5	16	20	27	32	41	52	65
Cooling method			Self cooling	Forced air cooling										
Weight (kg)			3.15	3.15	3.15	3.15	3.15	6	6	6	9.8	9.8	9.8	33

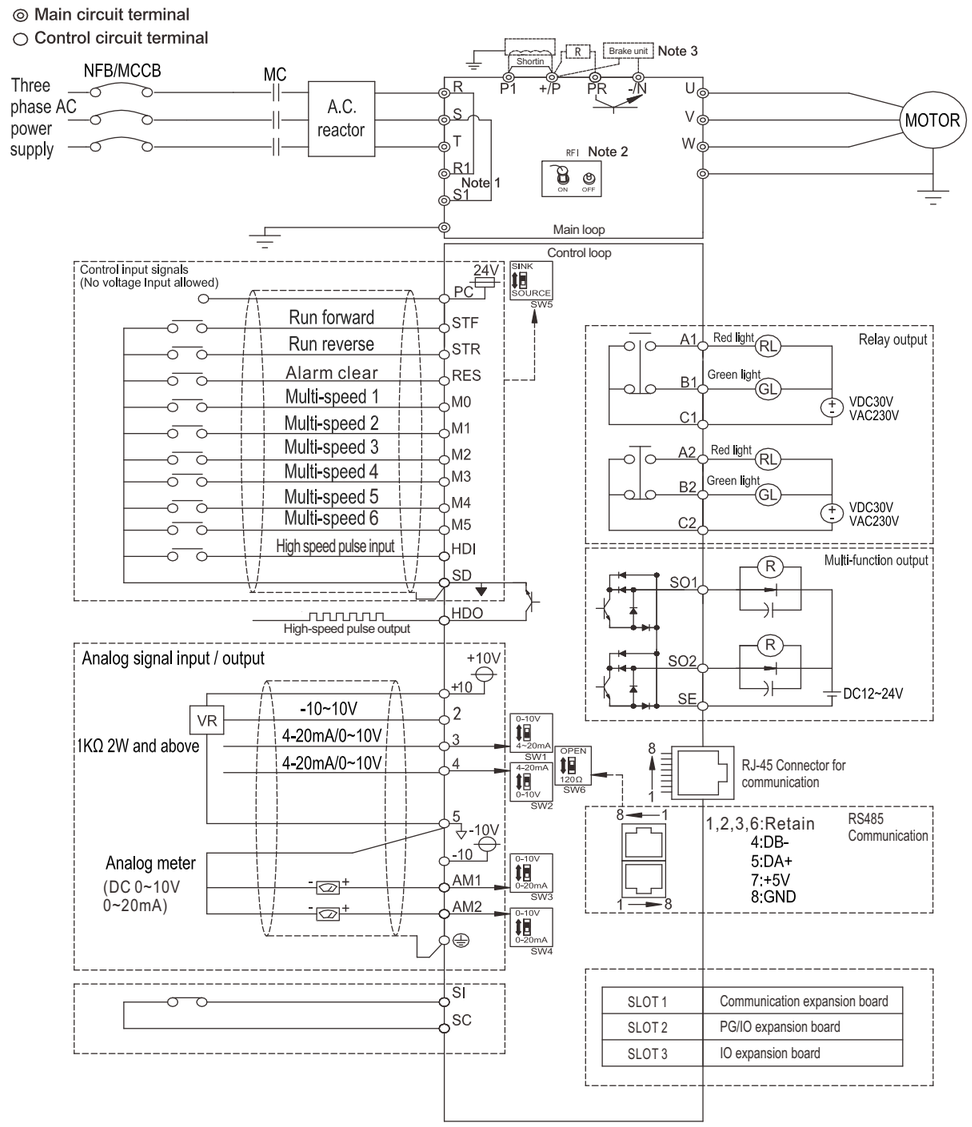
Frame			D			E		F	G				H	
Model SA3-043-□□□K □-			45K 55KF	55K 75KF	75K 90KF	90K 110KF	110K 132KF	132K 160KF	160K 185KF	185K 220KF	220K 250KF	250K 280KF	280K 315KF	315K 355KF
Output	HD	Rated output capacity (kVA)	69	84	114	137	168	198	236	295	367	402	438	491
		Rated output current (A)	91	110	150	180	220	260	310	340	425	480	530	620
		Applicable motor capacity (HP)	60	75	100	120	150	175	215	250	300	335	375	420
		Applicable motor capacity (kW)	45	55	75	90	110	132	160	185	220	250	280	315
		Overload current rating	150% 60 seconds 200% 3seconds (inverse time characteristics)											
		Carrier frequency (kHz)	1~9kHz										1~6kHz	
	ND	Rated output capacity (kVA)	84	114	137	168	198	236	295	367	402	438	491	544
		Rated output current (A)	110	150	180	220	260	310	340	425	480	530	620	683
		Applicable motor capacity (HP)	75	100	120	150	175	215	250	300	335	375	420	475
		Applicable motor capacity (kW)	55	75	90	110	132	160	185	220	250	280	315	355
		Overload current rating	120% 60seconds (inverse time characteristics)											
		Carrier frequency (kHz)	1~9kHz										1~6kHz	
	Maximum output voltage		Three-phase 380-480V											
Power supply	Rated power voltage		Three-phase 380-480V 50Hz / 60Hz											
	Power voltage permissible fluctuation		Three-phase 342-528V 50Hz / 60Hz											
	Power frequency permissible fluctuation		±5%											
	Power source capacity (kVA)		79	100	110	137	165	198	247	295	367	402	438	491
Cooling method				Forced air cooling										
Weight (kg)			33	33	33	42.7	42.7	56.5	84	84	84	84	123	123

Note:The test conditions of rated output current,rated output capacity and inverter power consumption are:the carrier frequency (P.72) is at the set value;the inverter output voltage is at 440V;the output frequency is at 60Hz,and the ambient temperature is 40℃.

Common Specifications

Control method		SVPWM control, V/F control, close-loop V/F control (VF+PG), general flux vector control, sensorless vector control (SVC), close-loop vector control (FOC+PG), torque control (TQC+PG).
Output frequency range		0~650.00Hz
Frequency setting resolution	Digit setting	The resolution is 0.01Hz.
	Analog setting	0.01Hz/60Hz (Terminal 2: -10~+10V/13bit) 0.015Hz/60Hz (Terminal 2: 0~±10V/12bit; Terminal 3: 0~10V, 4-20mA/12bit) 0.03Hz/60Hz (Terminals 2, 3; 0~5V/11bit) 0.06Hz/60Hz (Terminal 4: 0~10V, 4-20mA/10bit) 0.12Hz/60Hz (Terminal 4: 0~5V/9bit)
Output frequency accuracy	Digit setting	Maximum target frequency ±0.01%.
	Analog setting	Maximum target frequency ±0.1%.
Speed control range		IM: WhenSVC, 1:200; when FOC+PG, 1:1000. PM: When SVC,1:20; when FOC+PG, 1:1000.
Start torque		150% 0.3Hz (SVC), 180% 0Hz (FOC+PG).
V/F characteristics		Constant torque curve, variable torque curve, five-point curve, VF separation
Acceleration / deceleration curve characteristics		Linear acceleration /deceleration curve, S pattern acceleration /deceleration curve1 & 2 & 3
Driving motor		Induction motor (IM), permanent magnet motor (SPM and IPM)
Stall current protection		The stalling protection level can be set to 0~400% (06-01(P.22)). The default value is 150%.
Target frequency setting		Parameter unit setting, DC 0~5V/10V signal, DC -10~+10V signal, DC 4~20 mA signal, multiple speed stage level setting, communication setting, HDI setting.
PID control		Please refer to 08-00~08-01、08-04~08-14 / P.170~P.182 in chapter 4.
Built-in simple PLC		Supports 21 basic instructions and 14 application instructions, including PC editing software;
Operation panel	Operation monitoring	Output frequency, output current, output voltage, PN voltage, output torque, electronic thermal accumulation rate, temperature rising accumulation rate, output power, Analog value input signal, digital input and output terminal status...; alarm history 12 groups at most, the last group of alarm message is recorded.
	LED indication lamp (10)	Forward rotation indication lamp, reverse rotation indication lamp, frequency monitoring indication lamp, voltage monitoring indication lamp, current monitoring indication lamp, NET indication lamp, PU controlindication lamp, EXT indication lamp, PLC indication lamp and MON monitoring indication lamp.
Communication functions		RS-485 communication, can select Shihlin/Modbus communication protocol, communication speed38400bps or below, built-in CanOpenprotocol(SA3-CP301 expanded board can be optional), double RJ-45 connectors (the connector can also be connected to parameter unit)
Protection mechanism/ alarm function		Output short circuit protection, Over-current protection, over-voltage protection, under-voltage protection, motor over-heat protection (06-00(P.9)), IGBT module over-heat protection, communication abnormality protection, PTC temperature protection etc, electrolytic capacitor overheat, input and output phase failure, to-earth (ground) leakage currents protection, circuit error detection...
Environment	Ambient temperature	Over load : -10 ~ +50℃ (non-freezing) , Light load : -10 ~ +40℃ (non-freezing), please refer to 3.4.5 Class of protection and operation temperature for details.
	Ambient humidity	Below 90%Rh (non-condensing).
	Storage temperature	-20~ +65℃
	Surrounding environment	Indoors, no corrosive gases, no flammable gas, no flammable powder.
	Altitude	Altitude below 3000 meters,when altitude is above 1,000 m,derate the rated current 2% per 100 m Note 1: according to the safety of CE certification to meet specification EN61800-5-1, this series of frequency converter, using at an altitude of less than 3000 m, can be installed under the environment that could satisfy the requirement of the overvoltage level II, while using at an altitude of less than 2000 m, can be installed in conditions that could satisfy the requirement of overvoltage level III worse environment.
	Vibrations	Vibration below 5.9m/s^2 (0.6G).
	Enclosure Rating	Frame A, B, C , IP20 / NEMA TYPE 1, Frame D and above IP00 / UL OPEN TYPE(IP20 option can be selected).
	Pollution level	II
	Class of protection	Class I
International certification		CE

Wiring Diagram

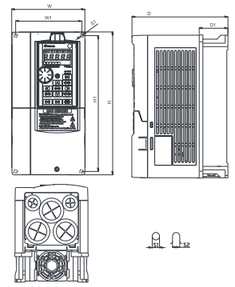


NOTE

1. R1, S1 terminal is only D ~ H framework, specific wiring please refer to the section 3.7.5.
2. RFI filter Settings, please refer to section 3.7.4.
3. The brake resistor connection approach between +/P and PR is for Frame A, B and C only. For connecting the brake unit of Frame D, E, F, G and H to between +/P and -/N, please refer to the Section 3.7.1 for details.
4. The DC resistor between +/P and P1 is optional. Please short +/P and P1 when AC resistor is not used.
5.When adding DC reactors, please remove the short circuit piece between P1 and +/P. Please refer to the Section 3.6.4 for the reactor type.
6. Please refer to the Section 5.3.9 for wiring of HDO.

Dimensions

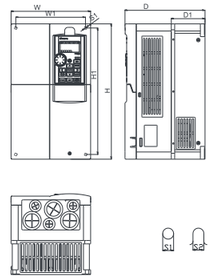
Frame A



Frame A

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)
SA3-043-0.75K/1.5KF	130.0	116.0	250.0	236.0	170.0	51.3	6.2	6.2
SA3-043-1.5K/2.2KF								
SA3-043-2.2K/3.7KF								
SA3-043-3.7K/5.5KF								
SA3-043-5.5K/7.5KF								
SA3-023-0.75K/1.5KF								
SA3-023-1.5K/2.2KF								
SA3-023-2.2K/3.7KF								
SA3-023-3.7K/5.5KF								

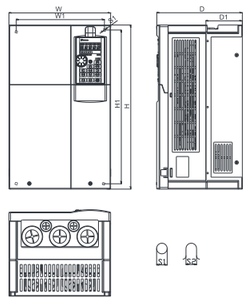
Frame B



Frame B

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)
SA3-043-7.5K/11KF	190.0	173.0	320.0	303.0	190.0	80.5	8.5	8.5
SA3-043-11K/15KF								
SA3-043-15K/18.5KF								
SA3-023-5.5K/7.5KF								
SA3-023-7.5K/11KF								
SA3-023-11K/15KF								

Frame C

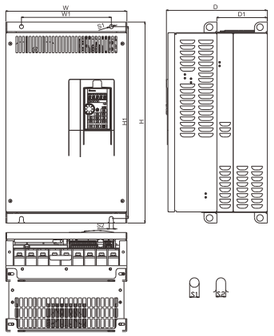


Frame C

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)
SA3-043-18.5K/22KF	250.0	231.0	400.0	381.0	210.0	89.5	8.5	8.5
SA3-043-22K/30KF								
SA3-043-30K/37KF								
SA3-023-15K/18.5KF								
SA3-023-18.5K/22KF								

Dimensions

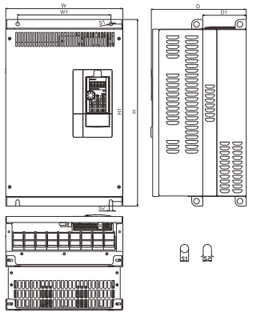
Frame D



Frame D

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)
SA3-043-37K/45KF	330.0	245.0	550.0	525.0	275.0	137.5	11.0	11.0
SA3-043-45K/55KF								
SA3-043-55K/75KF								
SA3-043-75K/90KF								
SA3-023-22K/30KF								
SA3-023-30K/37KF								
SA3-023-37K/45KF								

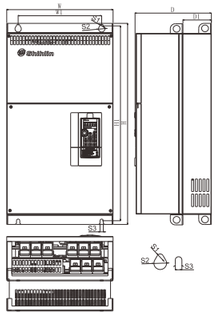
Frame E



Frame E

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)
SA3-043-90K/110KF	370.0	295.0	589.0	560.0	300.0	137.5	11.0	11.0
SA3-043-110K/132KF								
SA3-023-45K/55KF								
SA3-023-55K/75KF								

Frame F

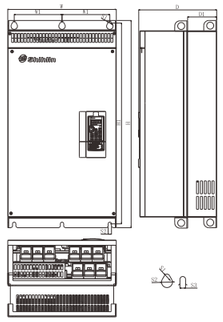


Frame F

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)	S3 (mm)
SA3-043-132K/160KF	420.0	340.0	800.0	770.0	300.0	145.5	13.0	25.0	13.0
SA3-023-75K/90KF									

Dimensions

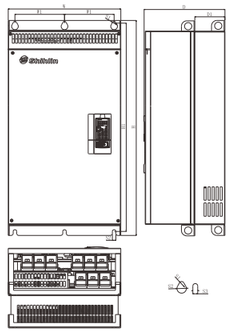
Frame G



Frame G

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)	S3 (mm)
SA3-043-160K/185KF	500.0	180.0	870.0	850.0	360.0	150.0	13.0	25.0	13.0
SA3-043-185K/220KF									
SA3-043-220K/250KF									
SA3-043-250K/280KF									
SA3-023-90K/110KF									
SA3-023-110K/132KF									

Frame H



Frame H

Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)	S3 (mm)
SA3-043-280K/315KF	600.0	230.0	1000.0	980.0	400.0	181.5	13.0	25.0	13.0
SA3-043-315K/355KF									

SS2 Series

Economy Vector Control AC Motor Drive

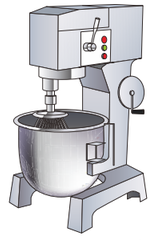
Product Range

Model		KW (HP)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	5.5 (7.5)
SS2	021	1-phase 220V						
	023	3-phase 220V						
	043	3-phase 440V						

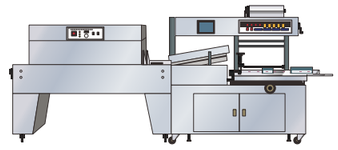
Main Features

* Built-in shuttle knop to adjust output frequency and set parameters easily
* Built-in RS-485 communication interface
* Support MODBUS and Shihlin communication protocol
* Built-in proportion linkage control function to support multi inverters connection
* Maximum 650Hz frequency output
* Support DIN rail mount
* The resolution of frequency setting: digital 0.01Hz ; analog 1/1000
* The accuracy of output frequency: 0.01%
* Multi-function input/output terminals
* Support 2 analog setting types: 0-10V and 4-20mA

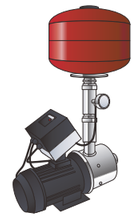
Application



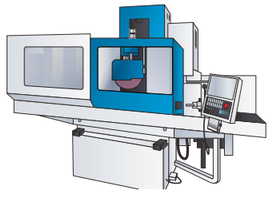
Mixer Machine



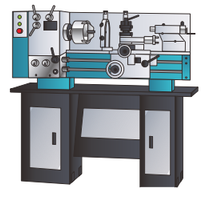
Packing Machine



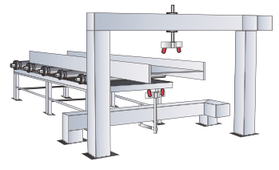
Constant pressure Water supply



Grinding Machine



Desktop type lathe

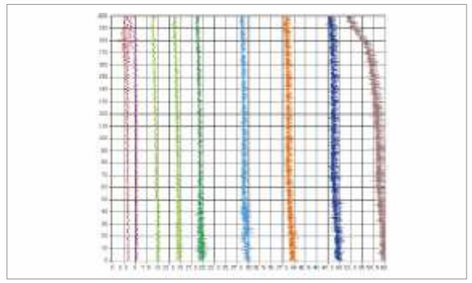


Printing press

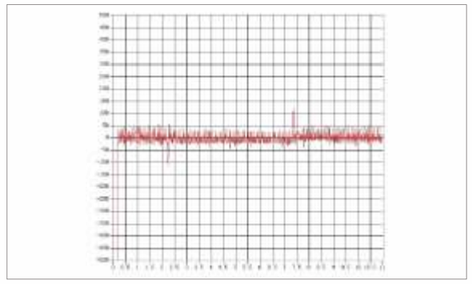
Product Features

General Flux Vector Control Technique

- General flux vector control technique
- A 32-bit RISC CPU for high-speed computation.
- Starting torque, 150%3Hz



- Speed accuracy is within 1% (0%~100% loading changes)

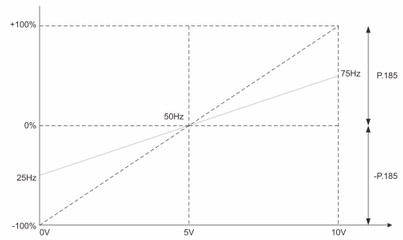


- Motor parameter auto-tuning function
- Stalling protection level reaches to 250%.

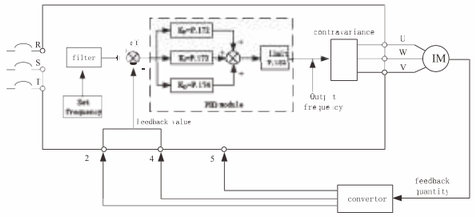
High Performance And Function

- The maximum output frequency up to 650Hz
- Soft-PWM functions for eliminating motor noises and preventing the temperature of AC drive module too high.
- Built-in energy-saving control function, the AC drive will control the output voltage automatically in order to reduce the output power losses when the AC drive is running.
- Cooling fan operation method is selectable.

Built-in Proportion Linkage Function

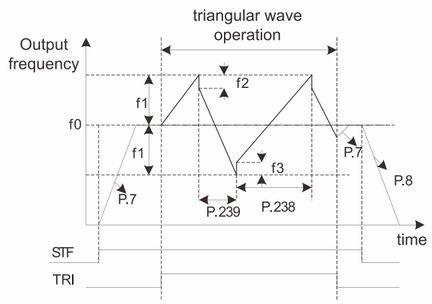


PID Feedback Control Function



Triangular Wave Function (traverse)

- This is suitable for operations that need traversing and winding movements such as textile operations.



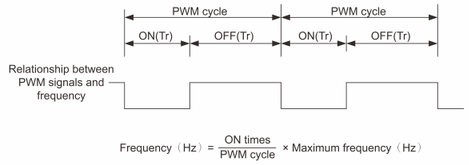
f0 : Setting value of frequency
f1 : Generated amplitude for setting frequency （f0×P.235）
f2 : Compensation from acceleration to deceleration （f1×P.236）
f3 : Compensation from deceleration to acceleration （f1×P.237）

Built-in Frequency And Parameter Setting Knob

Product Features

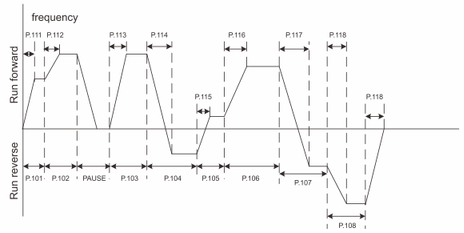
PWM Control Function

- The operating frequency can be controlled with the PWM signals output from PLC.
- The terminal M2 can be set as PWM signal input.



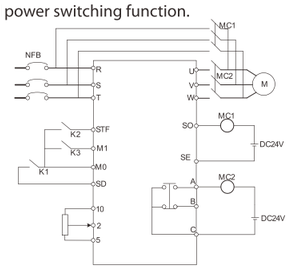
$$\text{Frequency（Hz）} = \frac{\text{ON times}}{\text{PWM cycle}} \times \text{Maximum frequency（Hz）}$$

Programmed Operation Mode With Manually Operated



Equipped With Grid Power Frequency Switching Mechanism

- It provides automatic switch between the grid power and frequency conversion.
- If the motor is running at rated frequency, using grid power frequency has a much better efficiency.
- In order to prevent the motor from stopping for a long time during the maintenance of AC drive, it is recommended AC drive to have grid power switching function.

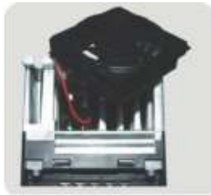


Easy To Install Design

- Din rail design-Multiple AC drives can be mounted side-by-side in the panel.

- Built-in standard RJ45 port for RS485 communication.
- Screwless terminal blocks designed

- The cooling fan is removable and easy to clean.



Electric Specifications

220V Series Single-Phase

Model SS2-021-□□□K		0.4K	0.75K	1.5K	2.2K
Applicable Motor Capacity	HP	0.5	1	2	3
	kW	0.4	0.75	1.5	2.2
Output	Rated output capacity kVA (Note)	0.95	1.5	2.5	4.2
	Rated output current A (Note)	2.7	4.5	8	11
	Overload current rating	150% 60 seconds; 200% 1 second (inverse time characteristics)			
	Maximum output voltage	3 Phase 200~240V AC			
Power Supply	Rated power voltage	Single phase 200~240V 50Hz / 60Hz			
	Power voltage permissible fluctuation	Single phase 170~264V 50Hz / 60Hz			
	Power frequency permissible fluctuation	±5%			
	Power source capacity kVA	1.5	2.5	3.5	6.4
Cooling Method		Self-cooling	Forced air cooling		
Inverter weight (kg)		1.1	1.2	1.6	1.7

220V Series Three-Phase

Model SS2-023-□□□K		0.4	0.75	1.5	2.2	3.7
Applicable Motor Capacity	HP	0.5	1	2	3	5
	kW	0.4	0.75	1.5	2.2	3.7
Output	Rated output capacity kVA (Note)	1.2	2	3.2	4.2	6.7
	Rated output current A (Note)	3	5	8	11	17.5
	Overload current rating	150% 60 seconds; 200% 1 second (inverse time characteristics)				
	Maximum output voltage	3 Phase 200~240V AC				
Power Supply	Rated power voltage	3 Phase 200~240V 50Hz / 60Hz				
	Power voltage permissible fluctuation	3 Phase 170~264V 50Hz / 60Hz				
	Power frequency permissible fluctuation	±5%				
	Power source capacity kVA	1.5	2.5	4.5	6.4	10
Cooling Method		Self-cooling	Forced air cooling			
Inverter weight (kg)		1.1	1.2	1.2	1.6	1.7

440V Series Three-Phase

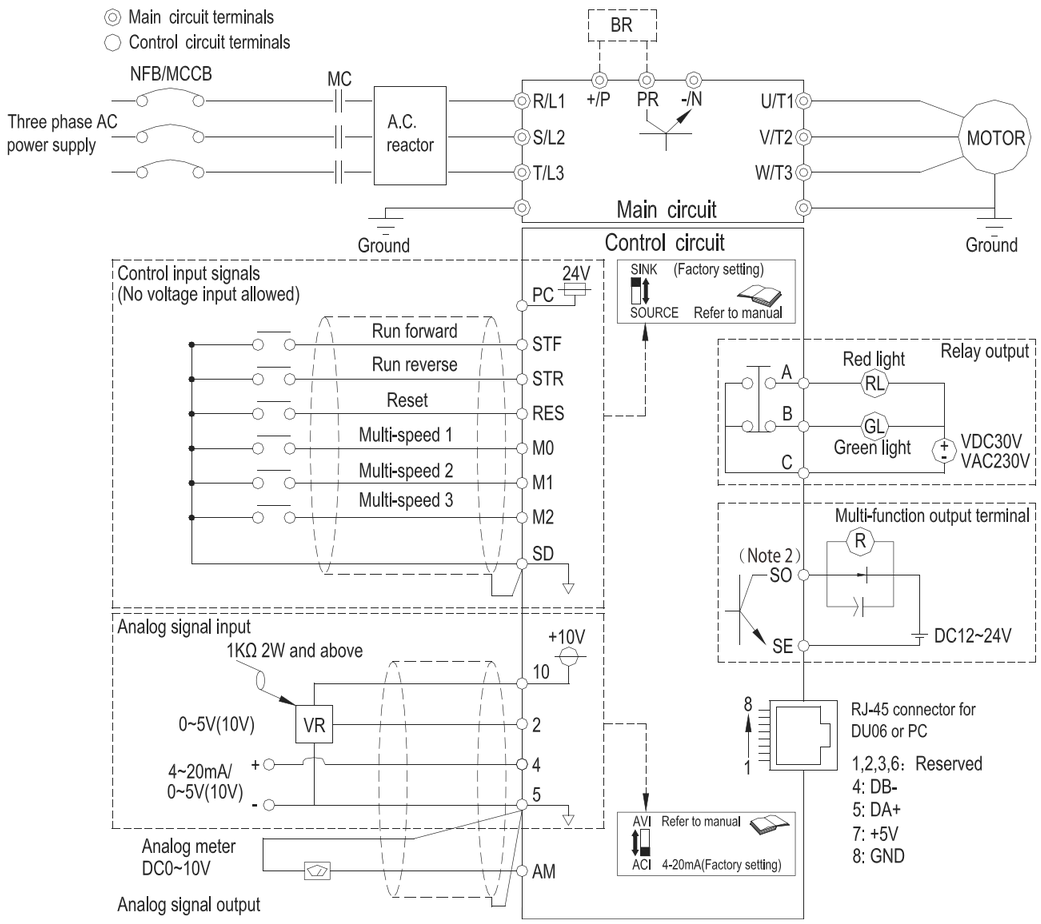
Model SS2-043-□□□K		0.4	0.75	1.5	2.2	3.7	5.5
Applicable Motor Capacity	HP	0.5	1	2	3	5	7.5
	kW	0.4	0.75	1.5	2.2	3.7	5.5
Output	Rated output capacity kVA (Note)	1	2	3	4.6	6.9	9.2
	Rated output current A (Note)	1.5	2.6	4.2	6	9	12
	Overload current rating	150% 60 Seconds; 200% 1 Second (inverse time characteristics)					
	(reverse time characteristics)	Three-phase 380~480V					
Power Supply	Rated power voltage	3 Phase 380~480V 50Hz / 60Hz					
	Power voltage permissible fluctuation	323~528V 50Hz / 60Hz					
	Power frequency permissible fluctuation	±5%					
	Power source capacity kVA	1.5	2.5	4.5	6.9	10.4	13.8
Cooling Method		Self-cooling	Self-cooling	Forced air cooling			
Inverter weight (kg)		1.1	1.1	1.2	1.6	1.7	1.7

Note: The test conditions of rated output current, rated output capacity and inverter power consumption are: the carrier frequency (P.72) is at factory setting value; the inverter output voltage is at 220V/440V; the output frequency is at 60Hz, and the ambient temperature is 50°C.

Common Specifications

Control Method		SVPWM control, V/F control, general flux vector control.
Output Frequency Range		0. 1~650Hz (The starting frequency setting range is betwee 0 and 60Hz).
Frequency Resolution	Digital setting	If the frequency value is set below 100Hz, the resolution will be 0.01Hz. If the frequency value is set above 100Hz, the resolution will be 0.1Hz.
	Analog setting	When setting the signal DC 0~5V, the resolution will be 1/500; When setting the signal DC 0~10V or 4~20mA, the resolution will be 1/1000.
Output Frequency Accuracy	Digital setting	Maximum target frequency±0.01%.
	Analog setting	Maximum target frequency±0.5%.
Voltage / Frequency output Characteristics		Base voltage (P.19), base frequency (P.3) can be arbitrarily set. Constant torque model and applicable load model can be selected (P.14).
Starting Torque		150% 3Hz, 200% 5Hz: when using the general flux vector control.
Torque Boost		The torque boost setting range between 0 and 30% (P.0), auto boost, slip compensation.
Acceleration / Deceleration Curve Characteristics		The resolution (0.01s/0.1s) of acceleration/deceleration time (P.7, P.8) is switched by P.21. The setting range has 0~360s or 0~3600s for selection. And different acceleration/deceleration curve model can be selected by P.29.
DC Braking		The DC braking action frequency range between 0 and 120Hz (P.10); the DC braking time is 0~60 Seconds (P.11); and the DC braking voltage is 0~30% (P.12). Linear braking and idling braking selection (P.71).
Stall current protection		The stalling protection level can be set between 0 and 250% (P.22).
Target Frequency Setting		Operation panel setting, DC 0~5V signal setting, DC 0~10V signal setting, DC 4~20mA signal setting, Multi-speed stage levels setting, communication setting,pulse frequency setting.
PID Control		Please refer to P.170~P.183 in Chapter 5.
Multifunction Control Terminals		Motor starting (STF, STR), the second function (RT), '16-speed operation' (RL, RM, RH, REX), external thermal relay (OH), reset (RES), etc. (can be set by the user (P.80~P.84, P.86))
Multiple Output Terminals	Multi-function output terminals	SO，SE — P.40 — Inverter running (RUN), output frequency detection (FU), Up to output frequency(SU), overload detection (OL), zero current detection (OMD), alarm (ALARM), Section detection (PO1), Periodical detection (PO2), and Pause detection (PO3), Inverter output (BP), Commercial power-supply output (GP).
	Multi-function output relay	A，B，C — P.85
	Analog output	AM，5 — Multi-function DC (0~10V) Output: output frequency, output current (P.54).
Operation Panel	Running status monitoring	Output frequency monitoring, output current monitoring, and output voltage monitoring,alarm record.
	HELP mode	Alarm history monitoring.
	LED indication lamp(6)	Run indication lamp, frequency monitoring indication lamp, voltage monitoring indication lamp, current monitoring indication lamp, mode switching indication lamp, and PU control indication lamp.
Communication Function	RS485	Build-in RS485 communication, RJ-45 connector.
Protection Mechanism / Alarm function		Output short circuit protection,Over-current protection, (+/P)-(-/N)over-voltage protection, under-voltage protection, motor over heat protection (P.9), IGBT module over-heat protection, communication abnormality protection, etc.
Environmental Condition	Ambient temperature	-10 ~ +50℃ (non-freezing), installation side by side -10~ +40℃.
	Ambient humidity	Below 90%Rh (non-condensing)
	Storage temperature	-20 ~ +65℃
	Surrounding environment	Indoor, no corrosive gas, no flammable gas, no flammable dust
	Altitude and vibration	Altitude:below 1000 meters, Vibration:below 5.9m/s² (0.6G).
	Enclosure Rating	IP20
	Pollution level	II
	Class of protection	Class I
Certification		CE

Wiring Diagram

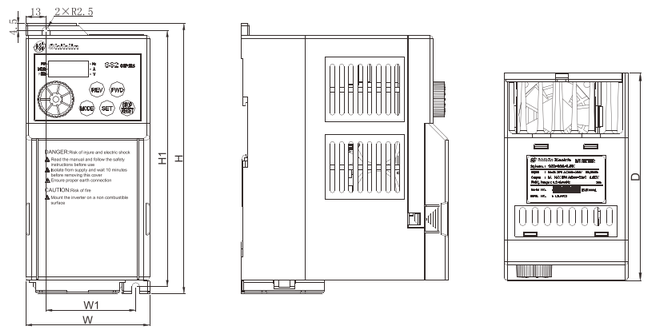


NOTE

1. For the usage of the external thermal relay, please refer to P.80~P.84, P.86 in Chapter 5 (OH)on the manual.
2. Make sure not to short circuit the PC and SD.
3. In the above figure, dotted line area, please refer to 3.5.7on the manual.
4. The SO terminal can select to FM or 10X function, please refer to P.64, P.74.
5. For single-phase series inverters, there is no T/L3 terminal, and the corresponding wiring(dotted line) doesn' t need to be connected.

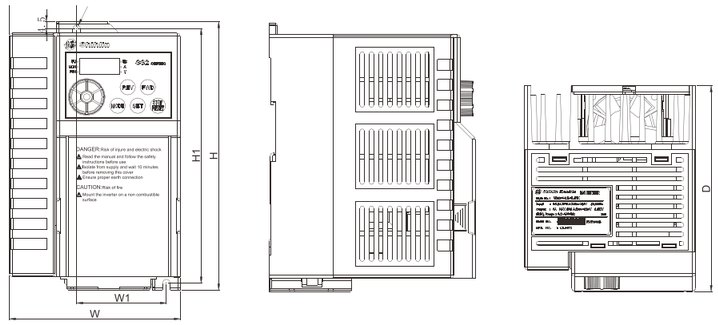
Dimensions

Frame A



Model	H(mm)	H1(mm)	W(mm)	W1(mm)	D(mm)
SS2-021-0.4K	174	165	80	58	134
SS2-021-0.75K					
SS2-023-0.4K					
SS2-023-0.75K					
SS2-023-1.5K					
SS2-043-0.4K					
SS2-043-0.75K					
SS2-043-1.5K					

Frame B



Model	H(mm)	H1(mm)	W(mm)	W1(mm)	D(mm)
SS2-021-1.5K	174	165	110.5	58	134
SS2-021-2.2K					
SS2-023-2.2K					
SS2-023-3.7K					
SS2-043-2.2K					
SS2-043-3.7K					
SS2-043-5.5K					

SF-G Series

Dual-load, High Performance Vector Control AC Drive

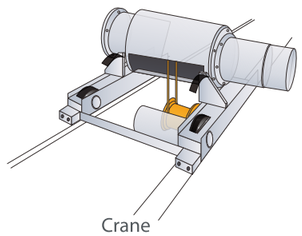
Product Range

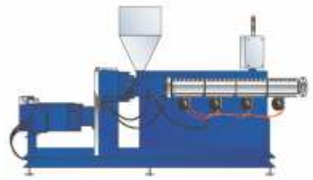
Model		KW (HP)	2.2 (3)	3.7 (5)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)	22 (30)	30 (40)	37 (50)	45 (60)	55 (75)	75 (100)	90 (120)	110 (150)	132 (175)	160 (215)	185 (250)	220 (300)	250 (335)	280 (375)	315 (420)	355 (475)
SF-G	020-G	3-phase 220V	120%, 60s →		●	●	●	●	●	●	●	●	●	●											
			150%, 60s →		●	●	●	●	●	●	●	●	●												
	040-G	3-phase 440V	120%, 60s →		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
			150%, 60s →		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

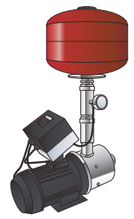
Main Features

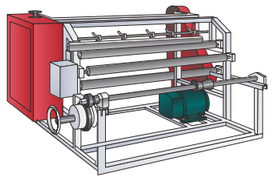
* Dual specifications with HD: 150% 60s / LD: 120% 60s
* V/F control, general purpose magnetic flux vector control, SVC sensor-less vector control, FOC+PG closed loop vector control, high torque output at low speed, and the best power saving control mode.
* Increased load capacity to 200% / s
* Embedded regeneration brake transistor(22kW or below)
* Strengthened PID function, Multi-channel control function for fan and pump
* RS-485 interface, selection between Shihlin protocol/standard Modbus protocol
* Strengthened speed tracking compensation capability
* Soft PWM function
* Multiple function pulse output
* Remote control panel through RJ45
* Support various expansion boards : injection molding machine specific expansion boards, Multi-channel control function for fan and pump

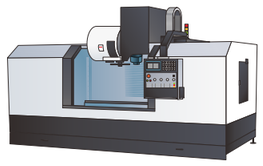
Application

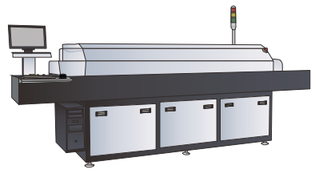

Crane


Extrusion Machine


Fan and Pump


Textile Equipment


CNC tooling Machine


Solder Equipment

SF-G Series

Dual-load, High Performance
Vector Control AC Drive

SF-G

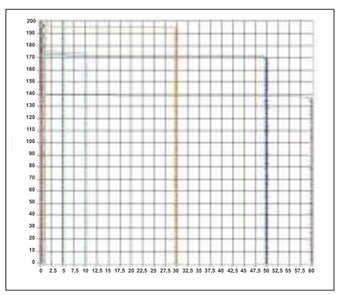
Product Features

Dual-load specifications

- Light load 120% 60s / heavy load (-G) 150% 60s.
- The default capacity is light load for air conditioners, pumps, air compreessors, conveyors and other machines using light loads.
- The parameters can be adjusted to heavy load by inner parameter setting for punches, cranes, trolleys,screw machinery, machine tools, and injection devices (by PM01 injector expansion card).

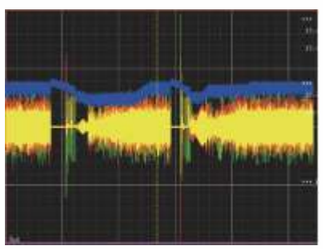
High-performance vector control technology

- A 32-bit RISC CPU for high-speed computation.
- SVC sensorless vector control with high starting torque of 1Hz150%, and FOC+PG closed loop vector control of 0Hz 150%.
- Speed accuracy: less than 1% with 0-100% load variation.
- An exclusive pioneer of high-precision motor parameter auto-tuning function.



Tracking compensation mechanism

- The enhanced tracking mechanism can detect the rotation speed and direction of motor in idle state, resulting a smooth machine start without jittering.



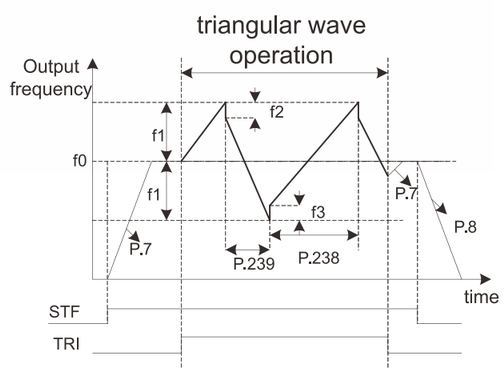
Built-in brake transistor (under 22kw)

- Built-in brake transistor (under 22kw).
- Its connection with the brake resistor to improve the braking torque capability .

Equipped with Soft-PWM mechanism

- Soft-PWM controls the motor noises, transforming the metal sound into a delightful complex tone.
- It provides low noise operation and reduces interference to external RF, ensuring stable operations of nearby PLC and encoder devices.

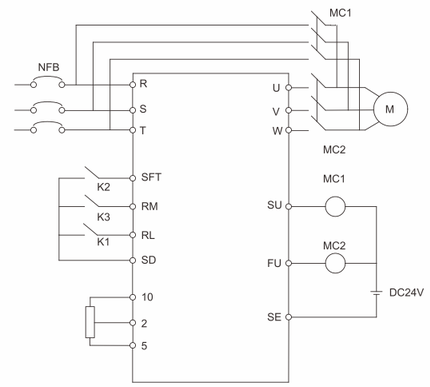
f0 : Setting value of frequency
f1 : Generated amplitude for setting frequency (f0 ×P.235)
f2 : Compensation from acceleration to deceleration (f1 ×P.236)
f3 : Compensation from deceleration to acceleration (f1 ×P.237)



Product Features

Equipped with grid power frequency switching mechanism

- It provides automatic switch between the grid power and frequency conversion.
- If the motor is running at rated frequency, using grid power frequency has a much better efficiency.
- In order to prevent the motor from stopping for a long time during the maintenance of AC drive, it is recommended AC drive to have bypass loop.



Operating time accumulation and parameters protection

- Time accumulation: the accumulated operating time of the AC drive can be displayed.
- Password protection: It provide 4-digital password to restrict the read and write of parameters, and prevent operative mistakes.

Built-in RS-485 interface

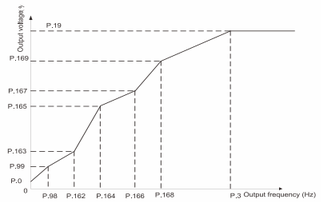
- Support for MODBUS and Shihlin protocol.
- Capable of simultaneous connections to HMI, PLC and other devices.

PC communication software

- This provides remote control of multiple frequency AC drive for parameters setup, copy and monitoring.

5-point V/F free setting

- It is more adaptable to various complicated load environment, such as multiple working frequencies.



Containing with 12 sets of abnormality alarm records

- The 12 sets of alarm records can be easily accessed .
- The system can record abnormal side power input(phase failure), short circuit of side output, over current,over voltage, module overheating, motor overheating, fan abnormalities, communication abnormalities, and so on.

Excellent performance with load capacity of 200% 1 s (-G)

- For impact load, safe to use (punch/trolley/injector/ screw machinery/machine tool, and so on) .

Electric Specifications

220V Series Three-phase

Model SF-020- □□□ / □□□ K-G		5.5	7.5/5.5	11/7.5	15/11	18.5/15
Applicable motor capacity	HP	7.5	10/7.5	15/10	20/15	25/20
	kw	5.5	7.5/5.5	11/7.5	15/11	18.5/15
Output	Rated output capacity kVA	9.5	12.5/9.5	18.3/12.5	24.7/18.3	28.6/24.7
	Rated output current A	25	33/25	49/33	65/49	75/65
	Overload current rating	120% 60 seconds /150% 60 seconds (inverse time characteristics)				
	Maximum output voltage	Three-phase 200 - 240V				
Power supply	Rated power voltage	Three-phase 200 - 240V 50Hz / 60Hz				
	Power voltage permissible fluctuation	Three-phase 180- 264V 50Hz / 60Hz				
	Power frequency permissible fluctuation	±5%				
	Power source capacity kVA	12	17/12	20/17	28/20	34/28
Cooling method		Forced air cooling				
Inverter weight (kg)		5.6	5.6	7.0	8.3	9.0

Model SF-020- □□□ / □□□ K-G		22/18.5	30/22	37/30	45/37	55/45
Applicable motor capacity	HP	30/25	40/30	50/40	60/50	75/60
	kw	22/18.5	30/22	37/30	45/37	55/45
Output	Rated output capacity kVA	34.3/28.6	45.7/34.3	55/45.7	65/55	81/65
	Rated output current A	90/75	120/90	145/120	170/145	212/170
	Overload current rating	120% 60 seconds 150% 60 seconds (inverse time characteristics)				
	Maximum output voltage	Three-phase 200 - 240V				
Power supply	Rated power voltage	Three-phase 200 - 240V 50Hz /60Hz				
	Power voltage permissible fluctuation	Three-phase 180- 264V 50Hz / 60Hz				
	Power frequency permissible fluctuation	±5%				
	Power source capacity kVA	41/34	52/41	65/52	79/65	99/79
Cooling method		Forced air cooling				
Inverter weight (kg)		20	21	37	37	67

440V Series Three-phase

Model SF-040- □□□ / □□□ K-G		5.5	7.5/5.5	11/7.5	15/11	18.5/15	22/18.5	30/22	37/30
Applicable motor capacity	HP	7.5	10/7.5	15/10	20/15	25/20	30/25	40/30	50/40
	kw	5.5	7.5/5.5	11/7.5	15/11	18.5/15	22/18.5	30/22	37/30
Output	Rated output capacity kVA	10	14/10	18/14	25/18	29/25	34/29	46/34	56/46
	Rated output current A	13	18/13	24/18	32/24	38/32	45/38	60/45	73/60
	Overload current rating	120% 60 seconds 150% 60 seconds (inverse time characteristics)							
	Maximum output voltage	Three-phase 380 - 480V							
Power supply	Rated power voltage	Three-phase380 - 480V 50Hz / 60Hz							
	Power voltage permissible fluctuation	Three-phase 342- 528V 50Hz / 60Hz							
	Power frequency permissible fluctuation	±5%							
	Power source capacity kVA	11.5	16/11.5	20/16	27/20	32/27	41/32	52/41	65/52
Cooling method		Forced air cooling							
Inverter weight (kg)		5.6	5.6	5.6	5.6	8.3	8.3	25	25

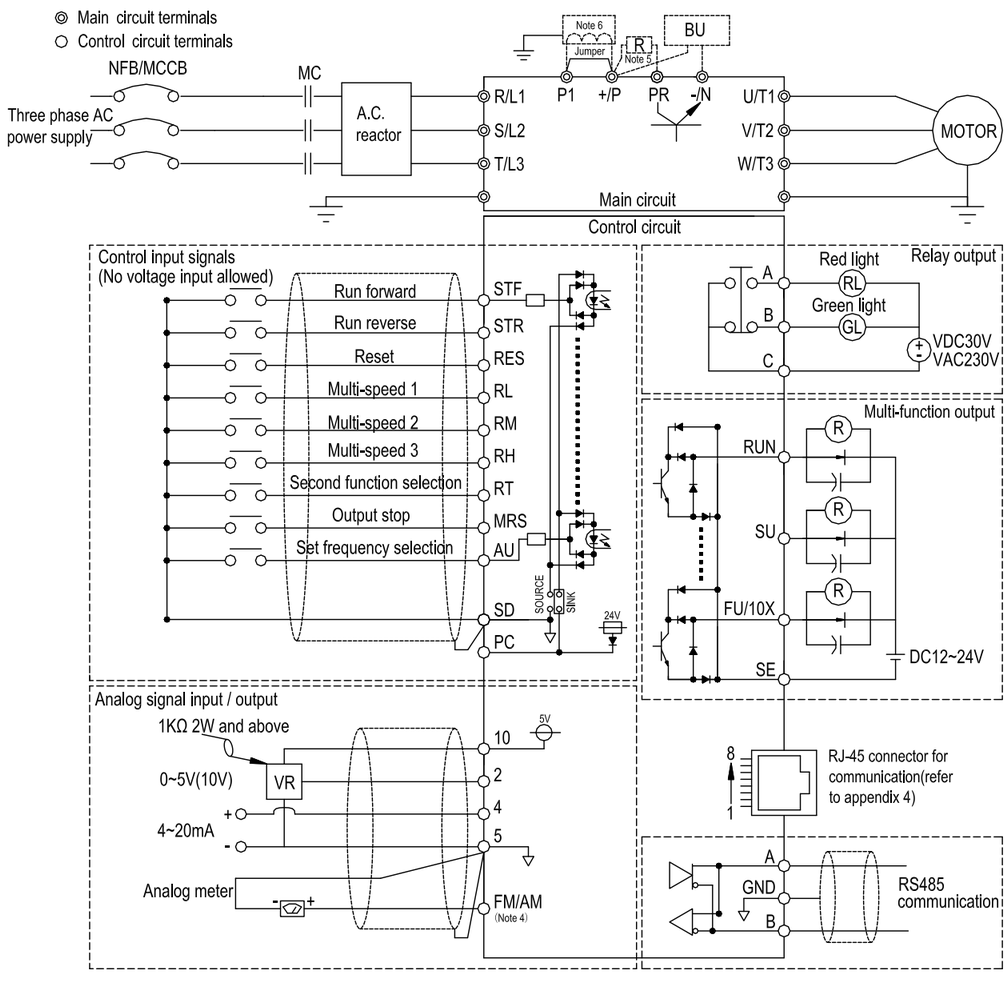
Model SF-040- □□□ / □□□ K-G		45/37	55/45	75/55	90/75	110/90	132/110	160/132
Applicable motor capacity	HP	60/50	75/60	100/75	120/100	150/120	175/150	215/175
	kw	45/37	55/45	75/55	90/75	110/90	132/110	160/132
Output	Rated output capacity kVA	69/56	84/69	114/84	137/114	168/137	198/168	236/198
	Rated output current A	91/73	110/91	150/110	180/150	220/180	260/220	310/260
	Overload current rating	120% 60 seconds 150% 60 seconds (inverse time characteristics)						
	Maximum output voltage	Three-phase 380 - 480V						
Power supply	Rated power voltage	Three-phase380 - 480V 50Hz / 60Hz						
	Power voltage permissible fluctuation	Three-phase 342- 528V 50Hz / 60Hz						
	Power frequency permissible fluctuation	±5%						
	Power source capacity kVA	79/65	100/79	110/100	137/110	165/137	198/165	247/198
Cooling method		Forced air cooling						
Inverter weight (kg)		25	37	37	37	67	67	67

Model SF-040- □□□ / □□□ K-G		185/160	220/185	250/220	280/250	315/280	355/315
Applicable motor capacity	HP	250/215	300/250	335/300	375/335	420/375	475/420
	kw	185/160	220/185	250/220	280/250	315/280	355/315
Output	Rated output capacity kVA	295/236	367/295	402/367	438/402	491/438	544/491
	Rated output current A	340/310	425/340	480/425	530/480	620/530	683/620
	Overload current rating	120% 60 seconds / 150% 60 seconds (inverse time characteristics)					
	Maximum output voltage	Three-phase 380 ~ 480 V					
Power supply	Rated power voltage	Three-phase 380 ~ 480V 50Hz / 60Hz					
	Power voltage permissible fluctuation	Three-phase 342 ~ 528V 50Hz / 60Hz					
	Power frequency permissible fluctuation	±5%					
	Power source capacity kVA	295/247	367/295	402/367	438/402	491/438	544/491
Cooling method		Forced air cooling					
Inverter weight (kg)		84	90	94	94	123	123

Common Specifications

Control method		SVPWM control , V/F control, close-loop V/F control (VF+PG), general flux vector control, sensorless vector control (SVC), close-loop vector control (FOC+PG)
Output frequency range		0.2-400Hz (The starting frequency setting range is 0-60Hz)
Resolution for setting frequency	Digital setting	If the frequency set value is below 100Hz, the resolution will be 0.01 Hz; If the frequency set value is above 100Hz, the resolution will be 0.1 Hz
	Analog setting	When setting DC 0-5V signals, the resolution will be 1/500 ; When setting DC 0-10V or 4-20mA signals, the resolution will be 1/1000
Output frequency accuracy	Digital setting	Maximum target frequency :±0.01 %
	Analog setting	Maximum target frequency :±0.5%
Voltage I frequency output characteristics		Base voltage (P.19), base frequency (P.3) can be arbitrarily set ; Constant torque model and applicable load model can be selected (P.14)
Start torque		150% 1H z : When the sensorless vector control is started
Torque boost		The torque boost setting range is 0-30% (P.0), auto boost, slip compensation
Acceleration / deceleration curve characteristics		The resolution (0.01s/0.1s) of acceleration/deceleration time (P.7, P.8) is switched by P.21. The setting range has 0~360s or 0~3600s for selection. And different acceleration/deceleration curve model can be selected by P.29.
DC braking		The DC braking action frequency is 0-120Hz (P.10); the DC braking time is 0- 60s (P.11) The DC braking voltage is 0-30% (P.12).Linear braking and idling braking selection (P.71)
Stall current protection		The stalling protection level can be set to 0-400% (P.22)
Target frequency setting		Operation panel setting; DC 0-5V signal, DC 0-10V signal, DC 4-20 mA signal, multiple speed stage level setting, communication setting
PID control		Please refer to manual P.170-P.182 in Chapter 5
Multi-function control terminals		Motor starting (STF, STR), the second function (RT), 16-speed operation (RH, RM, RL, REX), external thermal relay (OH), reset (RES),etc.(they can be set by the user with P.80~P.84, P.86 and P.126~P.128).
Output terminsl	Multi-function output terminals	SU, SE — P.40
		RUN, SE — P.129
		FU/10X , SE — P.130
	Multi-function output relay	A ,B ,C — P.85
		Inverter running (RUN), output frequency detection (FU), Up to output frequency (SU), overload alarm (OL), zero current detection (OMD), alarm (ALARM), section detection (PO1), periodical detection (PO2), and pause detection (PO3).
	Analog output	AM,5 — Multi-function DC (0-10V) output: output frequency, current (P.54)
	Pulse output	FM,SD — Output the pulse of 0-2300Hz
Operation Panel	Operation monitoring	Output frequency monitoring, output current monitoring, and output voltage monitoring, abnormality record (Maximum 12 sets)
	LED indication lamp(8)	Forward rotation indication lamp, reverse rotation indication lamp, frequency monitoring indication lamp, voltage monitoring indication lamp, current monitoring indication lamp, mode switching indication lamp, PU terminals control indi cation lamp, and external terminals control indication lamp
Communication function		RS-485 communication, can select Shihlin/Modbus protocol communication protocol
Protection mechanism / alarm function		Output short circuit protection, Over-current protection, (+/P)-(-/N) over-voltage protection under-voltage protection, motor over-heat protection (P.9), IGBT module over-heat protection, communication abnormality protection, etc
Environmental Condition	Ambient temperature	-10~+40℃ (non-freezing)
	Ambient humidity	Below 90%Rh (non-condensing)
	Storage temperature	-20 ~ +65℃
	Surrounding environmen	Indoor, no corrosive gas, no flammable gas, no flammable powder
	Altitude and vibration	Altitude: below 1000 meters, Vibration: below 5.9m/s^2 (0.6G).
	Grade of protection	IP20
	The degree of environmental pollution	2
	Class of protection	Class I
International certification		CE (Except the type of-GS)

Wiring Diagram

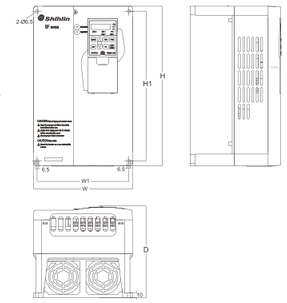


NOTE

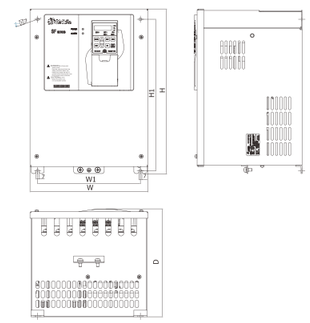
1. Please refer to chapter 5 of the service manual for external thermal overload relay installation.
2. Make sure not to short PC and SD.
3. The DC reactor between +/P and P1 is optional. Please short +/P and P1 when DC reactor is not used.
4. When selecting FM function for the FM/AM output terminal, the reference ground is SD. For more details, please refer to P.64.
5. The brake resistor connection approach between +/P and PR is for frames A and B only. For connecting the brake unit of frame C, D, E, F to between +/P and -/N, please refer to terminal arrangement in 3.4.5
6. Inverters corresponding to frame C、E、F have build-in DC reactors, you can also refer to DC reactor specification on the manual before adding DC reactors in addition.(When adding DC reactors,please remove the short circuit piece between P1 and +/P.)

Dimensions

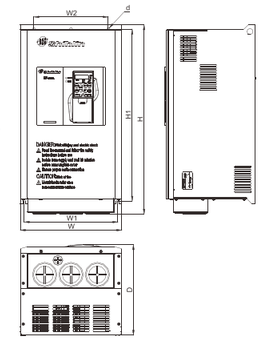
Frame A/B



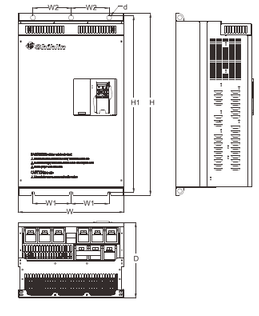
Frame C



Frame D/E/F



Frame G/H



Frame A/B

Model	Frame	H (mm)	H1 (mm)	W (mm)	W1 (mm)	D (mm)
SF-020-5.5K	A	323	303	200	186	186
SF-020-7.5K/5.5K-G						
SF-040-5.5K						
SF-040-7.5K/5.5K-G						
SF-040-11K/7.5K-G						
SF-040-15K/11K-G						
SF-020-11K/7.5K-G	B	350	330	230	214	195
SF-020-15K-11K-G						
SF-020-18.5K/15K-G						
SF-040-18.5K/15K-G						
SF-040-22K-18.5K-G						
SF-040-30K/22K-GS						

Frame C

Model	Frame	H (mm)	H1 (mm)	W (mm)	W1 (mm)	D (mm)
SF-020-22K-18.5K-G	C	379	348	271	236	248
SF-020-30K/22K-G						

Frame D/E/F

Model	Frame	H (mm)	H1 (mm)	W (mm)	W1 (mm)	W2 (mm)	D (mm)	d (mm)
SF-040-30K/22K-G	D	561	510	300	277	220	270	9
SF-040-37K/30K-G								
SF-040-45K-37K-G								
SF-020-37K/30K-G	E	595	566	370	336	336	286	13
SF-020-45K-37K-G								
SF-040-55K/45K-G								
SF-040-75K/55K-G								
SF-040-90K/75K-G								
SF-020-55K/45K-G	F	850	821	425	381	381	286	13
SF-040-110K/90K-G								
SF-040-132K/110K-G								
SF-040-160K/132K-G								

Frame G/H

Model	Frame	H (mm)	H1 (mm)	W (mm)	W1 (mm)	W2 (mm)	D (mm)	d (mm)
SF-040-185K/160K-G	G	870	850	500	180	180	360	13
SF-040-220K/185K-G								
SF-040-250K/220K-G								
SF-040-280K/250K-G								
SF-040-315K/280K-G	H	1000	980	600	230	230	400	13
SF-040-355K/315K-G								

SE3/SA3 Series

PD302
Profibus communication expansion board

DN301
DeviceNet communication expansion board

CP301
CANopen communication expansion board

EP301
Ethernet communication expansion board

EB362R
I/O expansion board

EB308R
I/O expansion board

EC301
EtherCAT communication expansion board

PG301C (SE3/SA3 Only)
Speed feedback board (supports open collector type output)

PG301L (SE3/SA3 Only)
Speed feedback board (supports differential type output)

PG302L (SE3/SA3 Only)
Speed feedback board (supports Resolver signal)

CMK301 (SE3 Only)
Cooperate with SE3 series to select expansion card

Braking Unit(BKU)

SF-G Series

PG01
PG01 expansion board

PM01
Injection modeling machine specific expansion board

WS01
Fan and water pump Multi-channel control board

Keypad

PU301 (SC3/SE3/SA3)

PU301C (SA3)

PU302 (SE3)

DU06 (SS2/SC3)

DU10 (SS2/SC3)

DU09S (SFG)