Shihlin Electric

AUTOMATION FOR
SMART MANUFACTURING

SHIHLIN INVERTER
SC3/SE3/SA3/SF3/SS2

OHSAS 18001 ISO 14001 ISO 9001

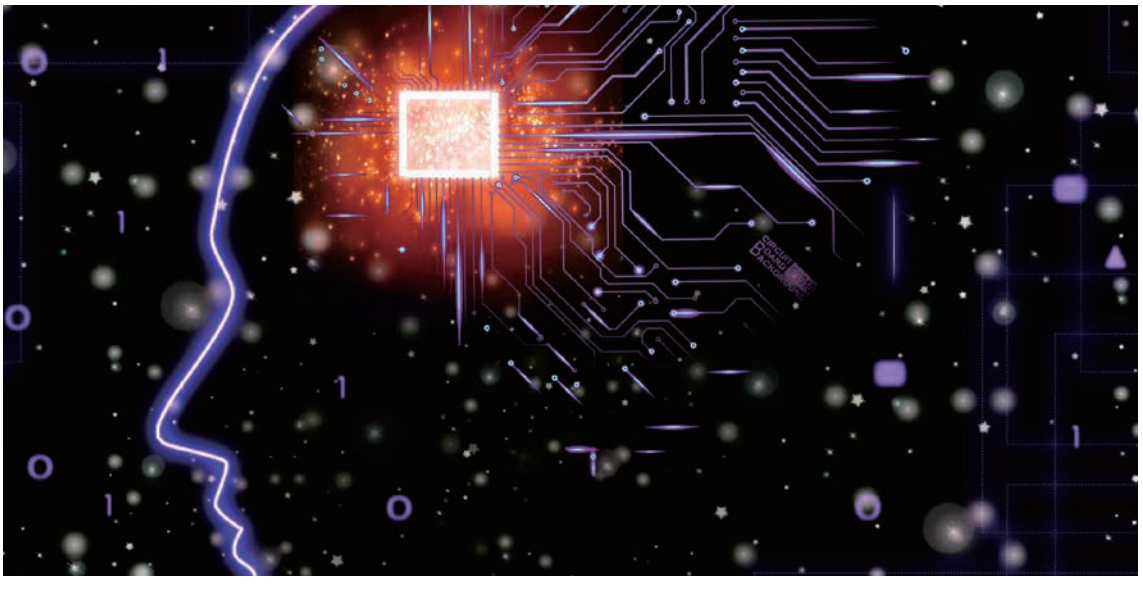
automation.seec.com.tw

About Shihlin Electric

Shihlin Electric & Engineering Corp. established in 1955, devoted to research and develop power related products, which cover from Automobile Equipment System, Breaker Switchgear & System, Heavy Electric System, and Factory Automation. Our persistent in the belief of "improvement over time" in running the operation and in corporate development has not only made us a leader in the domestic market, but also performed splendidly in the overseas market. To make our brand awareness highly recognized, we cautious deployment and work hard on overseas marketing and sales.

The setup of overseas branches and factories had compliance with the rapid growth of product demand and to cater to the service of customer worldwide. Shihlin Electric, even with over 60 years of experiences, is still improving itself to better keep up with the globalization. Now, we spare no effort in searching for suitable business partner and expand our brand into local market. We provide not just the qualified product but also excellent service and professional knowledge.

Now, with to the advance of science and technology, the market demand for electrical product would only grow exponentially. We hold great vision for the coming future. As we are in search of excellence, we do will take part in global competition.



Core Business Units

*Transmission & Distribution Electrical Products

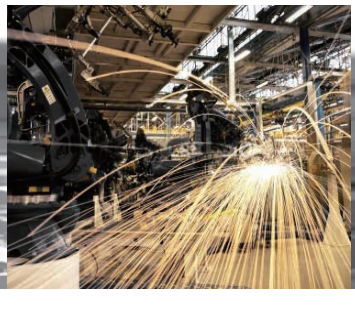
*Power Control, Switches & Breakers

*Factory Automation Products

*Automotive Electrical Component Products

SE3 series

High Speed Closed Loop/ Communication Inverter



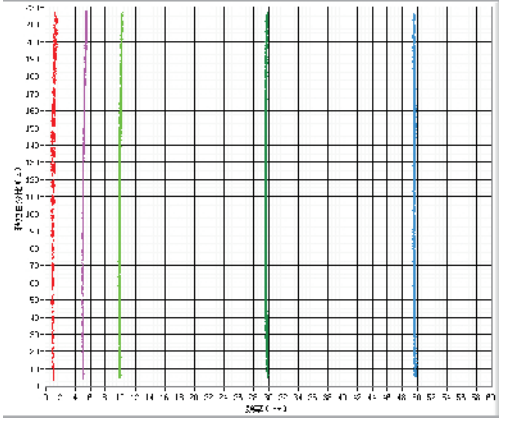
Power Range

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

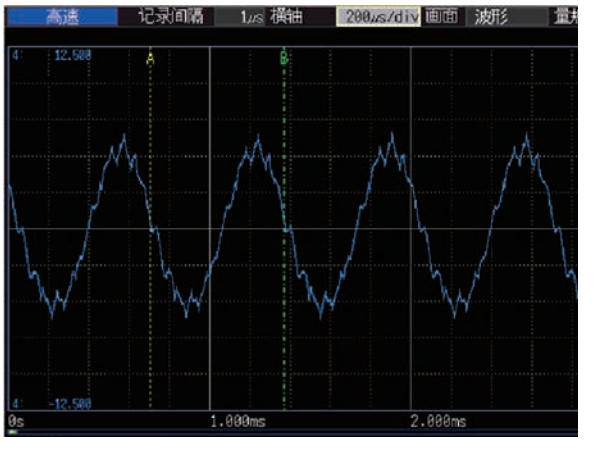
High Performance Vector Control Technology

- 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.

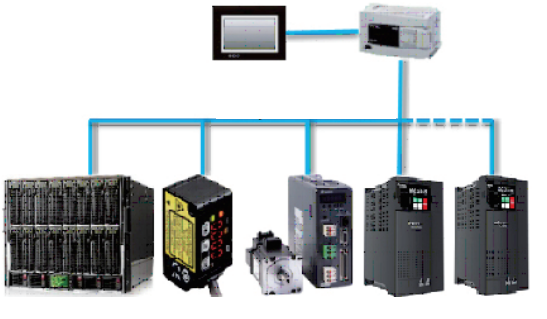


High Performance Synchronous Motor Control Technology

- Support induction motor (IM) and synchronous motor (IPM and SPM) control.

Support Multiple High-speed Bus Connections

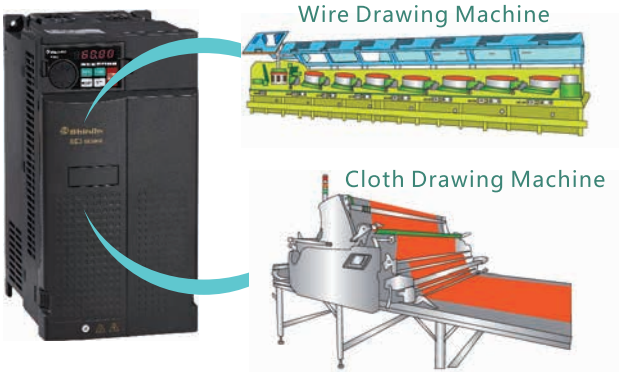
- Equipped with high-speed communications: CANopen, Profibus, DeviceNet, EtherCAT, MODBUS TCP.



Product Features

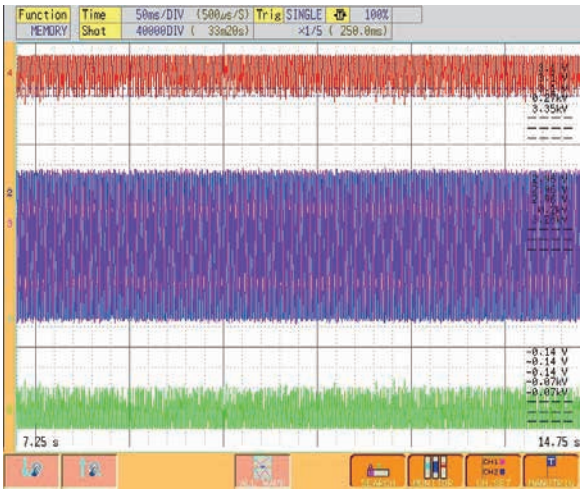
Multiple Control Modes for Various Applications

- 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).



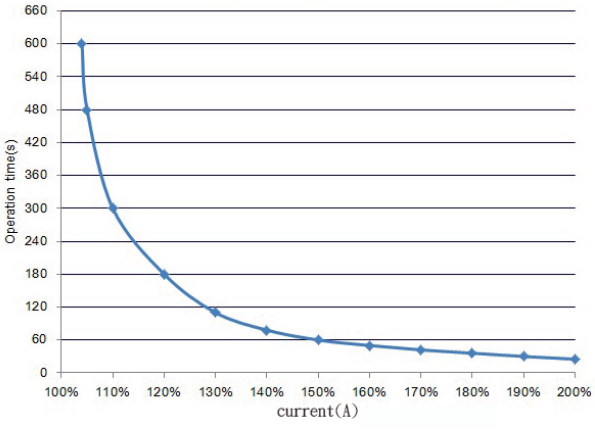
Low-noise Carrier Wave Control (Soft-PWM)

- 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.



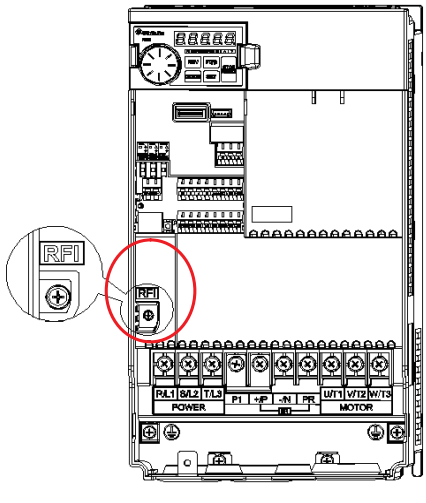
Excellent Overload Endurance

- 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

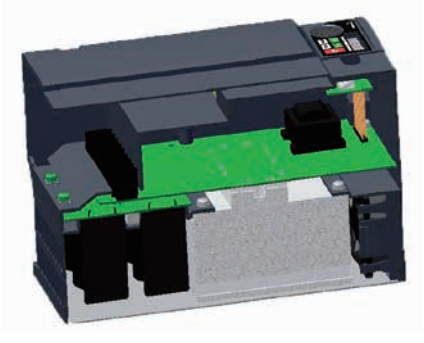
- Reduce electromagnetic interference.



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

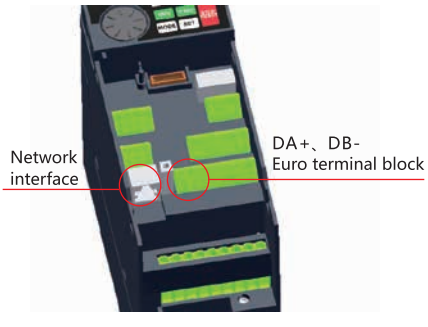
• Phase failure protection, overvoltage protection, overcurrent protection, undervoltage protection, output short-circuit protection, ground fault protection, motor overheat protection, IGBT module overheat protection, communication abnormality protection.

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.



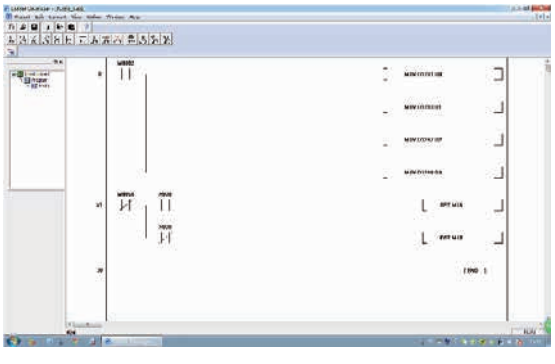
12 Sets of Alarm Records

• Complete alarm system for recording the output frequency, output current, output voltage, accumulated count of temperature increase, PN voltage, total operation time, 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

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



Product Features

Grouping Parameters - Easy Setup

Group	Parameter Number	Name	Setting Range	Default
02-10	P.60	Terminal 2-5 filter time	0 ～ 2000ms	30ms
02-11	P.139	Terminal 2-5 voltage signal bias rate	-100.0%~100.0%	0.0%
02-12	P.192	Terminal 2-5 minimum input positive voltage	0 ～ 10.00V	0.00V
02-13	P.193	Terminal 2-5 maximum input positive voltage	0 ～ 10.00V	10.00V
02-14	P.194	Percentage corresponds to terminal 2-5 minimum positive voltage	-100.0% ～ 100.0% -400.0% ～ 400.0%(02-00(P.500)=2/14/15/16/17)	0.0%

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.

Model Identification

SE3 **043** **0.75K** **XY**

Series	Voltage level	Capacity	Version
SE3 series	043：three phase 440V 023：three phase 220V 021：single phase 220V	0.75kW	None：General model -xy：Customized or specialized or region difference

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 output current (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% 3 seconds (inverse time characteristics)			
		Carrier frequency (kHz)	1~15kHz			
	ND	Rated output capacity (kVA)	1.2	2	3.4	4.8
		Rated output current (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% 60 seconds (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 permissible fluctuation		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	3.7K	5.5K	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 output current (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 output capacity (kVA)	1.3	2.1	3.4	4.8	7.4	10.3	13.7	19.4	26.3
		Rated output current (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% 60 seconds 150% 3 seconds (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)		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 220V; the output frequency is at 60Hz, and the ambient temperature is 40℃ .

Electrical Specifications

440V series three-phase

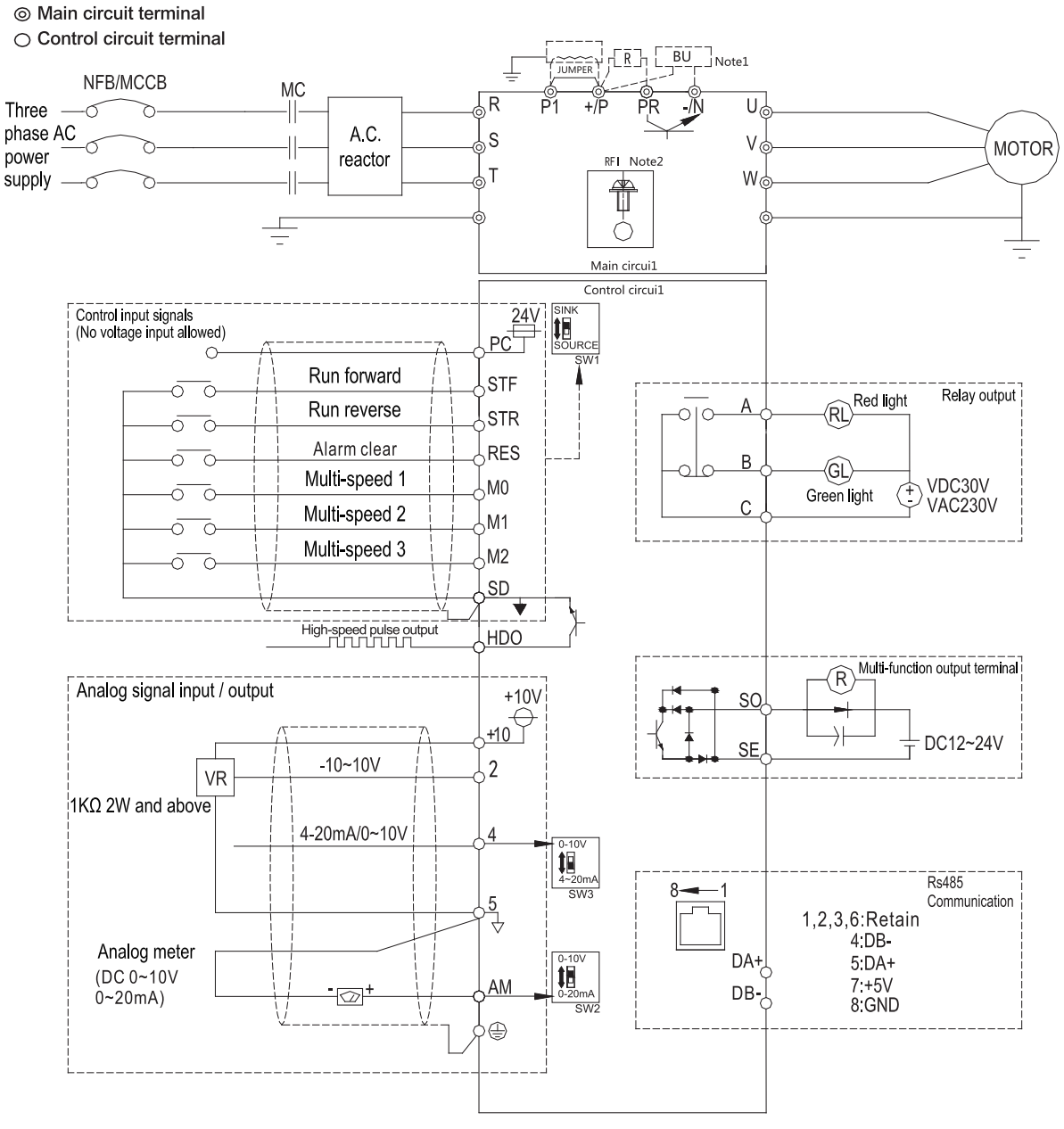
Frame			A			B		C			D		
Model SE3-043- □ -xy			0.4K	0.75K	1.5K	2.2K	3.7K	5.5K	7.5K	11K	15K	18.5K	22K
Output	HD	Rated output capacity (kVA)	1	2	3	4.6	6.9	10	14	18	25	29	34
		Rated output current (A)	1.5	2.7	4.2	6	9	12	17	24	32	38	45
		Applicable motor capacity (HP)	0.5	1	2	3	5	7.5	10	15	20	25	30
		Applicable 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% 3 seconds (inverse time characteristics)										
		Carrier frequency (kHz)	1~15kHz										
	ND	Rated output capacity (kVA)	1.4	2.3	3.5	5	8	12	15.6	21.3	27.4	31.6	37.3
		Rated output current (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% 60 seconds (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	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°C .

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		0~1500Hz
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: When SVC, 1:200; when FOC+PG, 1:1000. PM: When SVC, 1:20; when FOC+PG, 1:1000.
Start 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 shape 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		Keypad 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 indicator (7)	Forward rotation indicator, reverse rotation indicator, frequency monitoring indicator, mode switch indicator ,PU control indicator, PLC indicator and run indicator
Communication function		Built-in Shihlin / Modbus communication protocol, can select MODBUS TCP, CANopen, Profibus, DeviceNet, EtherCAT 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°C (non-freezing)，Light load：-10 ~ +40°C (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°C.
	Surrounding environment	Indoor, no corrosive gas, no flammable gas, no flammable powder.
	Altitude	Altitude below 2000 m, when altitude is above 1000 m, derate the rated current 2% per 100 m
	Vibration	Vibration below 5.9m/s2 (0.6G).
	Grade of protection	IP20
	The degree of environmental pollution	2
	Class of protection	Class I
International certification		CE

Wiring Diagram



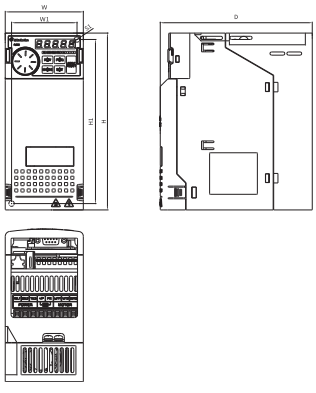
NOTE

1. Make sure 10, SD, SE, 5 and PC are not shorted to each other.
2. The DC reactor between +/P and P1 is optional, please short +/P and P1 when DC reactor is not used.

Dimensions

Unit : mm

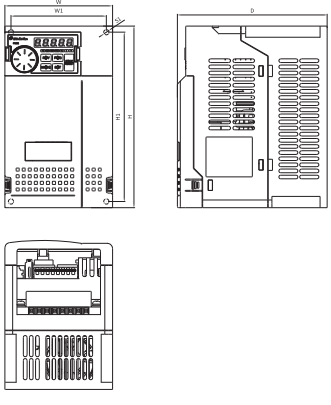
Frame A



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						

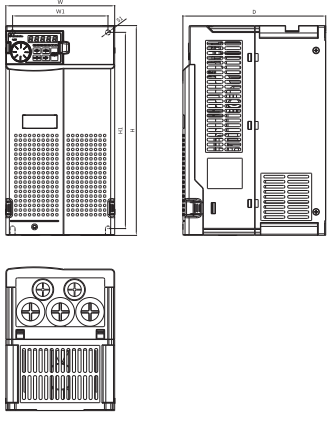
Frame B



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						

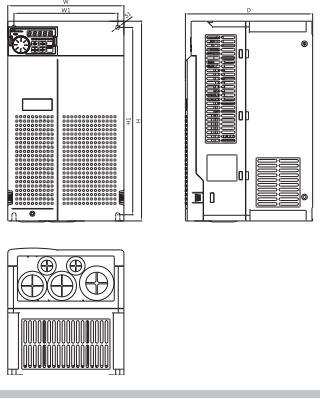
Frame C



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



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						

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