

SA3 Series

Compact Design
Vector Control AC Drive



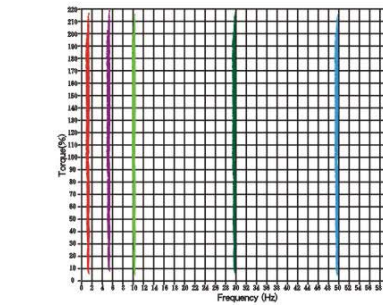
Product Range

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)	
SA3	SA3023	3-Phase 220V																								
	SA3043	3-Phase 440V																								

Product Features

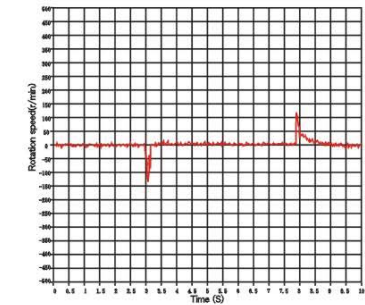
High Performance Vector Control Technology

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



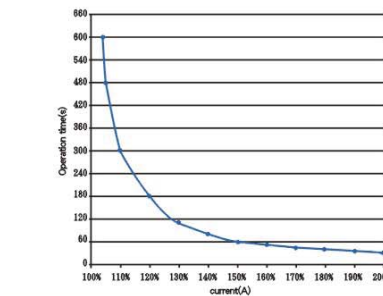
High Response Performance

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



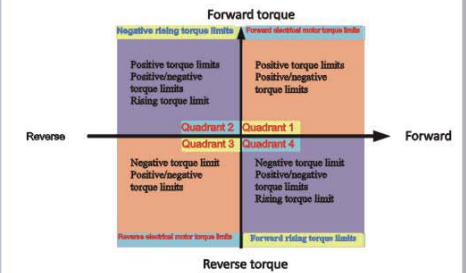
High Overload Capacity

- Greatly improved overload capacity to 150% for 60 seconds and 200% for 3 seconds, making it suitable for tooling machinery applications that requires the ability to handle sudden load changes.



4-Quadrant Torque Control and Limits

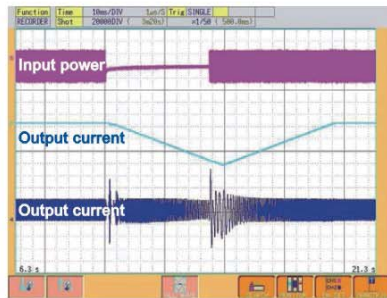
- Parameters or analog signals can be used to simply establish limits for 4 torque items.



Product Features

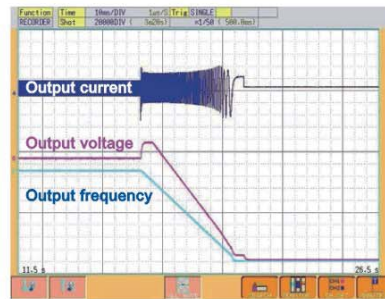
Temporary Compensation at Low Voltage

- During temporary power disruptions, output frequency can be controlled in order to maintain the DC bus voltage of the AC drive to control motor deceleration or stoppage.
- When power is restored, the AC drive will carry out re-acceleration to attain the frequency prior to power stoppage.
- May be applied to equipment that are not permitted to operate when idle.



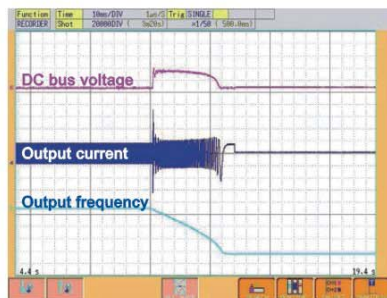
Magnetic Flux Brake

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



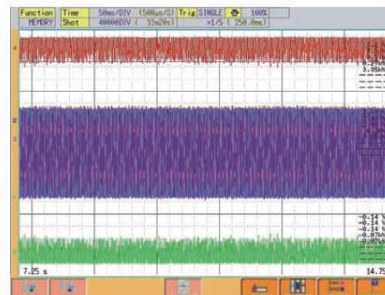
Regeneration Avoidance Functions

- By adjusting output frequency and voltage, AC drive 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.



High Performance synchronous Motor Control Technology

- Supports induction motor (IM) and synchronous motor (IPM and SPM) control.
- Supports open loop synchronous motor control.



LCD Operation Interface

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



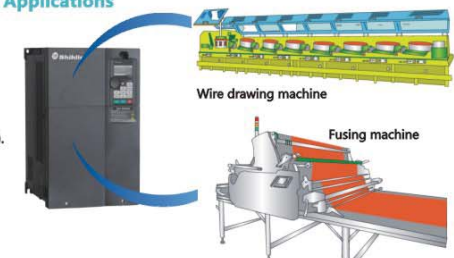
Isolated air Channel Designs

- 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.



Supports Multiple Control Modes for Different Applications

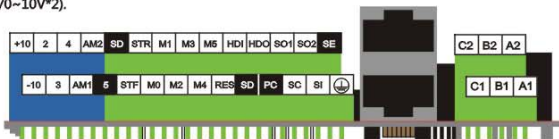
- Internal position control, torque control, speed control, and tension control functions.
- I/O switching can be used to initiate simple mixed controls over speed and torque as well as speed and location.
- Position control is capable of supporting home position return mode, zero-servo control, and single-axis position control mode (must be used with PG301C, PG301L, and PG302L).
- Supports open-loop tension control, feeding disruption inspection, and automatic spool replacement functions.



Product Features

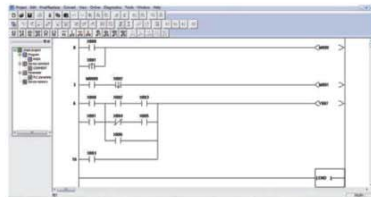
Multiple I/O Terminals

- 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 for easy editing program.
- Applicable for programming for small number of point and capable of supporting multiple functions.



Item	SA3 PLC functions
Programming Language	Ladder diagram + Command
Basic commands	21
Applicable commands	14
Processing speed	Basic commands 1 μs
	Applicable commands 10 μs
Hidden program capacity	400 steps(0-399 steps)
I/O configuration	Input/DO 22 points(X0~X25, out4)
	Output/YI 20 points(Y0~Y25, out4)
	General 180 points, MO-M159
Supporting electric relay	Battery backed 60 points, M160-M239
0/0	Special 54 points, M240-M293
Timer(T)	5 points, T0~T4, timer range 0-6553.5 seconds
Counter(C)	8 points, C0~C7, counting range 0-99999
	General 32 points, D0-D31
Data register	Battery backed 18 points, D32-D47
	Special 84 points, D48-D329

12 Sets of Alarm Records

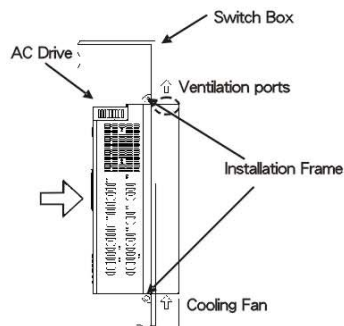
- For each alarm that occurs, the output frequency, output current, output voltage, accumulated count of temperature increase, PN voltage, total AC drive operation time, AC drive operational status, and the year, month, day, hour, minute, and second of the alarm will be recorded (only when used with PUC031C).

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.

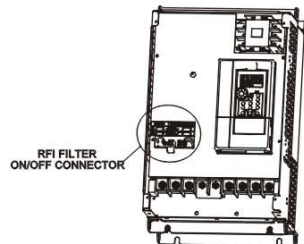
Through-the-wall Installation Support Provided for the Entire Series

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

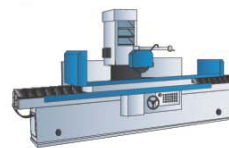


SA3 All-Series built-in RFI Filter

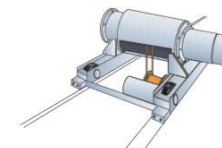
- RFI is capable of suppressing electromagnetic interference



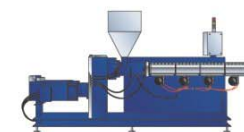
Applicable Industries



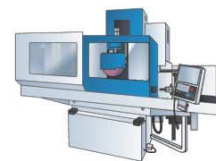
Grinding Machine



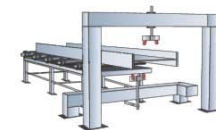
Cranes



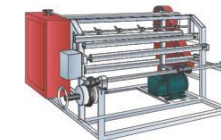
Extrusion Machine



Grinding Machine



Plating Machine



Slitting Machine

Electrical Specifications

220 V Three-phase Series

Frame	A	B	C	D	E	F										
Model SA3-023-□□□□-	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	
Output	Rated output capacity (kVA)															
	Rated output current (A)															
	Applicable motor capacity (HP)															
	Applicable motor capacity (kW)															
HD	Overload current rating															
	150% 60 seconds 200% 3seconds (inverse time characteristics)															
	Carrier frequency (kHz)															
	1~15kHz															
ND	Rated output capacity (kVA)															
	Rated output current (A)															
	Applicable motor capacity (HP)															
	Applicable motor capacity (kW)															
Power supply	Overload current rating															
	120% 60seconds (inverse time characteristics)															
	Carrier frequency (kHz)															
	1~15kHz															
Maximum output voltage																
Three-phase 200-240V																
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																
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																

Note: The test conditions of rated output current, rated output capacity and frequency converter AC Drive power consumption are: the carrier frequency (F72) is at the set value; the frequency converter/AC Drive output voltage is at 440V; 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-□□□□□-		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)											
	ND	Carrier frequency (kHz)	1 ~ 15kHz											
		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 ~ 9kHz													
Minimum 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-□□□□□-		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)											
	ND	Carrier frequency (kHz)	1~9kHz											
		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													
Minimum 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		Powered fan-cooling												
Weight (kg)		33	33	33	42.7	42.7	56.5	84	84	84	84	123	123	

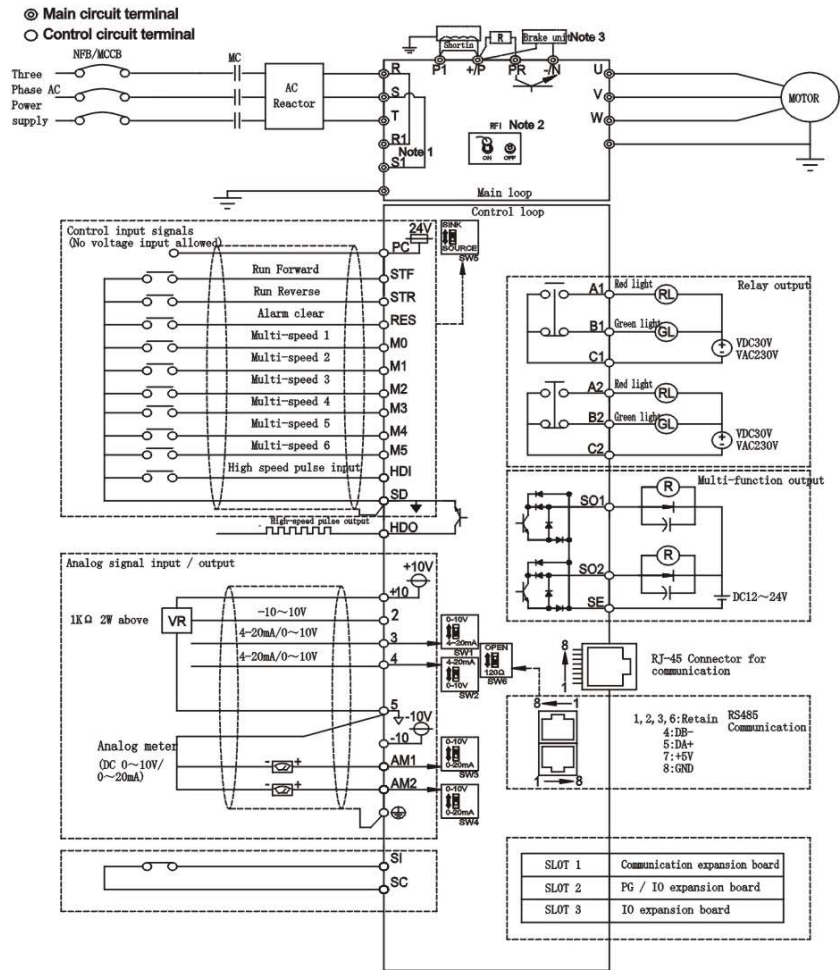
Note: The test conditions of rated output current, rated output capacity and frequency converter AC Drive power consumption are: the carrier frequency (P72) is at the set value; the frequency converter/AC Drive output voltage is at 440V; the output frequency is at 60Hz, and the ambient temperature is 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	0~650.00Hz	
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 ±0.1%.
	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	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 curve 1 & 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 / P170~P182 in chapter 4.	
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 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 control indication lamp, EXT indication lamp, PLC indication lamp and MON monitoring indication lamp.
Communication functions	RS-485 communication, can select Shihlin/Modbus communication protocol, communication speed 38400bps or below, built-in CanOpen protocol (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	-10 ~ +50°C (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°C
	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).
	Grade of protection	Frame A, B, CIP20 / NEMA TYPE 1, Frame D and above IP00 / UL OPEN TYPE (IP20 option can be selected).
	The degree of environmental pollution	2
Class of protection	Class I	
International certification	CE, C-TICK (in certifying)	

Blue text indicate AC drive parameters. For details, please refer to the SA3 instruction manual.

Wiring Diagram

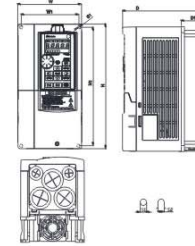


NOTE

1. Please refer to the Section 5.4.1 for the applications of external thermal overload relay.
2. Make sure that 10, -10, SD, SE, 5 and PC are not shorted each other.
3. The DC resistor between +P and P1 is optional. Please short +P and P1 when AC resistor is not used.
4. 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.
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

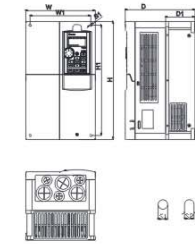
Frame A



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								

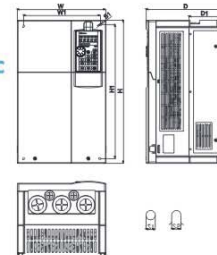
Frame B



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								

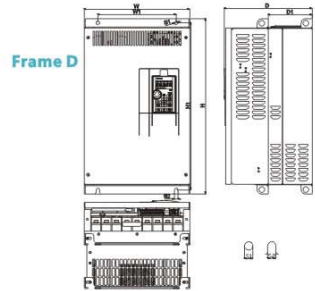
Frame C



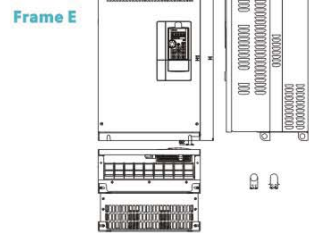
Frame C

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								

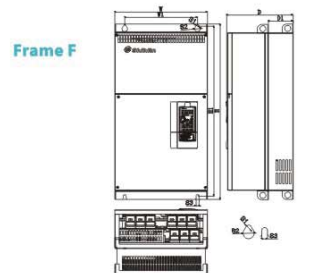
Dimensions



Frame D								
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								

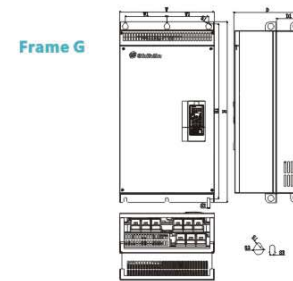


Frame E								
Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)
SA3-043-90K/110KF	370.0	295.0	589.0	560.0	300.0	137.5	11.0	11.0
SA3-043-110K/132KF								
SA3-023-45K/55KF								
SA3-023-55K/75KF								

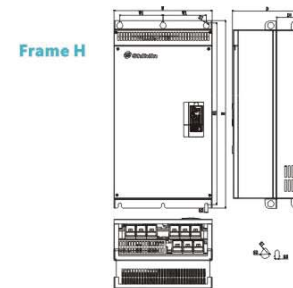


Frame F									
Model type	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	S1 (mm)	S2 (mm)	S3 (mm)
SA3-043-132K/160KF	420.0	340.0	800.0	770.0	300.0	145.5	13.0	25.0	13.0
SA3-023-75K/90KF									

Dimensions



Frame G									
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									



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									