SAVCH S3100 A/E Series Inverter General Vector Control Owner's Manual

Contents

SAVCH® TAIWAN SAVCH ELECTRIC

SAVCH S3100 A/E Series Inverter General Vector Control

Company Profile

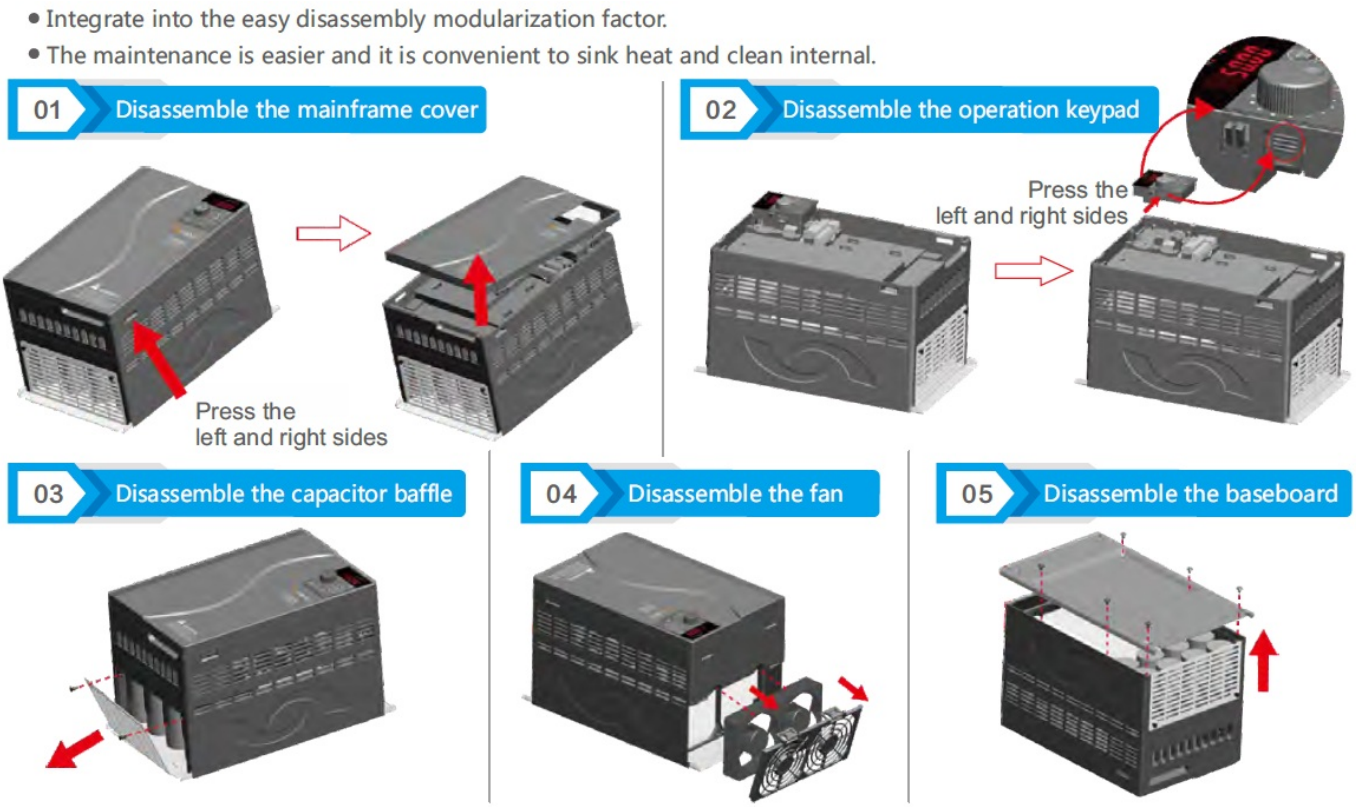
Taiwan Savch Electric Co., Ltd was set up in Quanzhou, Fujian province in 2001 and established a research and development center in Shanghai. It is one of the first few companies to develop and produce motor drives in China. In 2005, it became China's top ten inverter brands. The company relies on a strong R & D team and world-class power electronics production and quality control system (OEM for top international brand) to provide customers with high-performance servo drives, inverters, computer controllers and other industrial control products.
The company focuses on the frontier technology fields of "industrial intelligence, energy saving, green energy", and adheres to the core goal of "creating value for customers", and establishes a technical R&D team that highly conforms to customer industry characteristics and highly integrated mechatronics and provide more efficient and resource-efficient system solutions for various industries customers. For the pass years, the company has established a global equal and close cooperation agent system, and customer service system with user satisfaction as an indicator, widely used in ceramics, packaging, textile, dyeing and finishing, engineering upgrading, lifting, road, CNC machine tools, glass, mining, petroleum, shipbuilding, military and even farming and animal husbandry and other equipment fields.

S3100A/E series of products is an upgraded version of our S3100 series inverter. Under the premise of ensuring the original high configuration of the hardware remains unchanged, the operation mode is adjusted according to the usage habits of domestic customers, and the driver performance and functions of the bottom and application layers of the software are respectively improved:

- Support asynchronous motor and permanent magnet synchronous motor control.
- The maximum starting torque is 0.5Hz, 200%, and the speed accuracy is 0.1%.
- The latest vector algorithm of permanent magnet synchronization, start without reversal. Support 3200Hz high frequency output.
- Simple PLC, built-in swing frequency function.
- Can realize the main and auxiliary frequency superposition control.

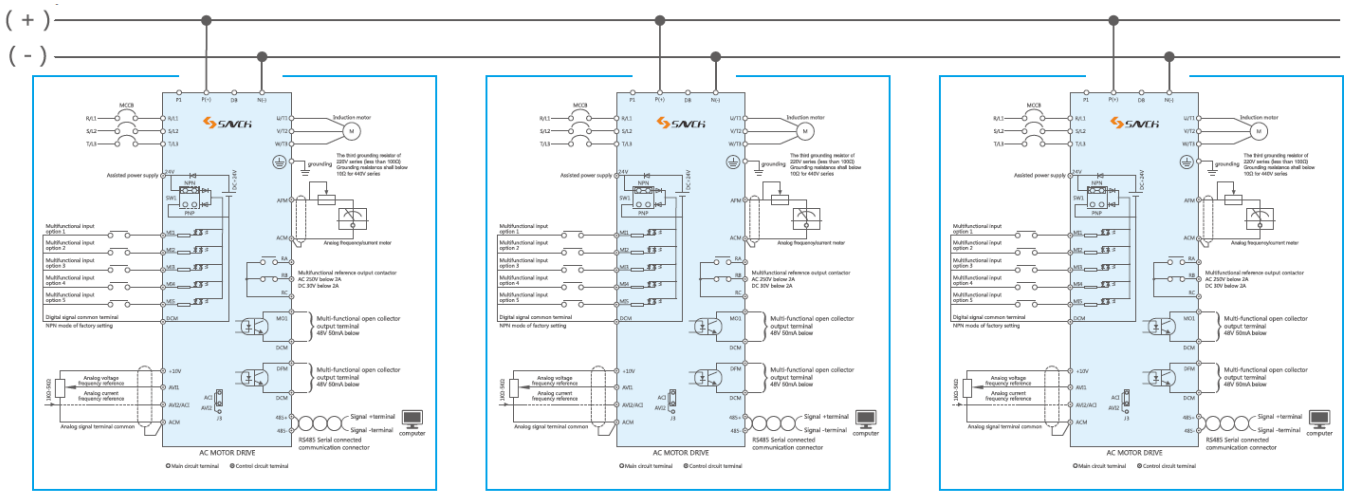
For More Convenient Maintenance

- Integrate into the easy disassembly modularization factor.
- The maintenance is easier and it is convenient to sink heat and clean internal.



Common DC Bus

All the power range support the common DC bus application, to share with the energe, and reduce the braking resistor power or cancel the brake resistor.



More Comprehensive Protection

- More optimized module temperature management. If the temperature of environment is high or over loading, it can protect more ti-mely and considerately.
- More optimized short-circuit protection.
- 2T series 4.0kW, 4T series 5.5kW and below, equipped with built-in charging resistor overheating protection

unit.

More Flexible Operation
External input terminal can select the two working modes, NPN, PNP to connect with external PLC and touch screen neatly.

Characteristics

- The overload capacity is 150%-60 seconds for the G type and 120%-60 seconds for the P type.
- The maximum starting torque (SVC) is 200%-0.5Hz, and the speed accuracy is 0.1%.
- The latest vector algorithm for permanent magnet synchronization does not reverse when starting.
- 3-point V/f curve setting, 6 sets of V/f curve setting, V/f separation control.
- Instant stop function, speed tracking function, effective brake suppression function.
- Instantaneous stop non-stop function, speed tracking function, effective brake suppression function.
- Built-in PID function, simple PLC function, swing frequency function.
- Multi-channel multi-function terminal, include optional function 1 high-speed pulse input, 1 high-speed pulse output.
- The external terminals can be selected from NPN and PNP modes, which are more flexible with external PLC and touch screen. Built-in brake transistor for power models up to 22kW.
- Switch to high frequency (3200Hz) output.
- With double limit specification: G type heavy load / P type light load specification can be set by parameters.
- Provide a variety of fault protection functions: inverter short circuit protection, over voltage, over current, overload, over temperature and other protection functions.

Various Application

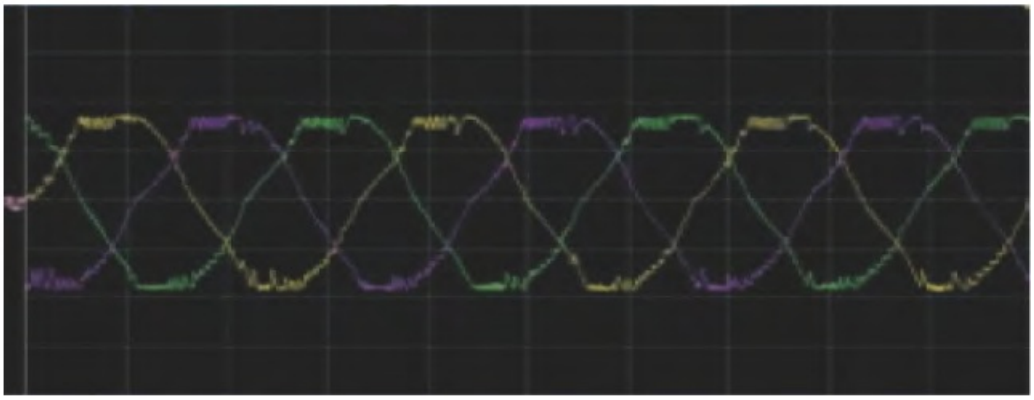
- S3100A/E series is an enhanced current vector control general-purpose inverter, supporting asynchronous motor and pe-rmanent magnet synchronous motor control, DSP control system main chip upgrade, a new high-performance current v-ector control method (SVC), V/f control, V /f separation control, torque control.
- The application is more flexible and the performance is more stable. It can be widely used in applications with high requi-rements for speed control accuracy, torque response speed and low frequency output characteristics.

Function Description

Multi terminal ports:

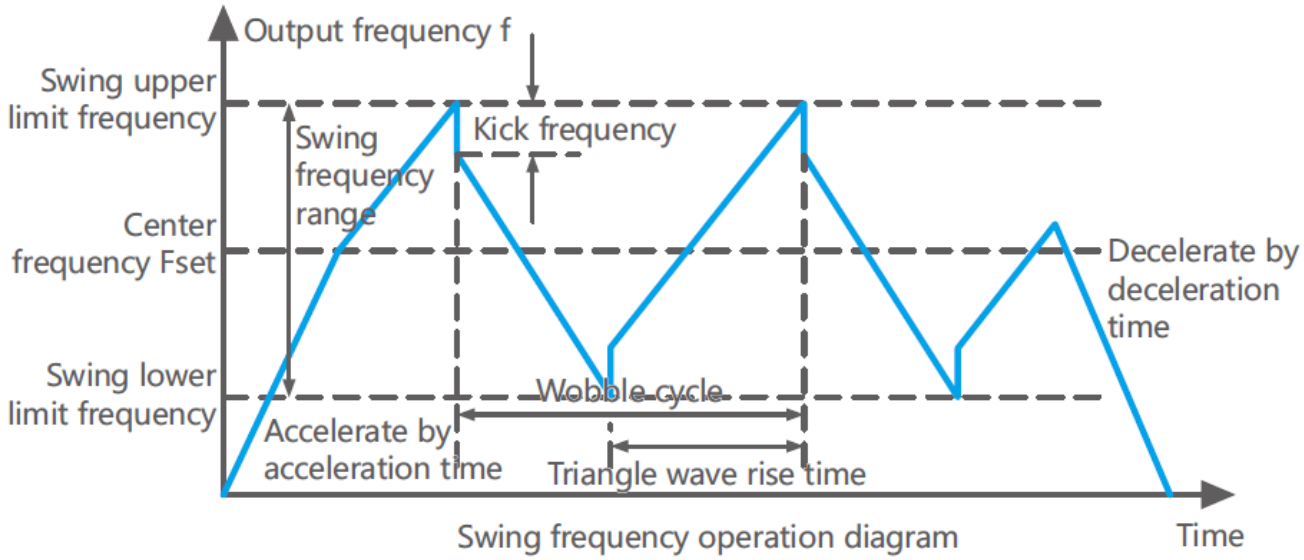
AVI	DC0~+10V input
AVI2/ACI	DC0~+10V/DC4~20mA
MI5	Pulse input

Fast current limiting: The fast current limiting function can avoid the over current alarms in the inverter freque-ntly. When the current exceeds the current protection p-oint, the fast current limit function can limit the current within the current protection point quickly to protect the safety of the device and avoid over current alarms cau-sed by sudden load or interference.

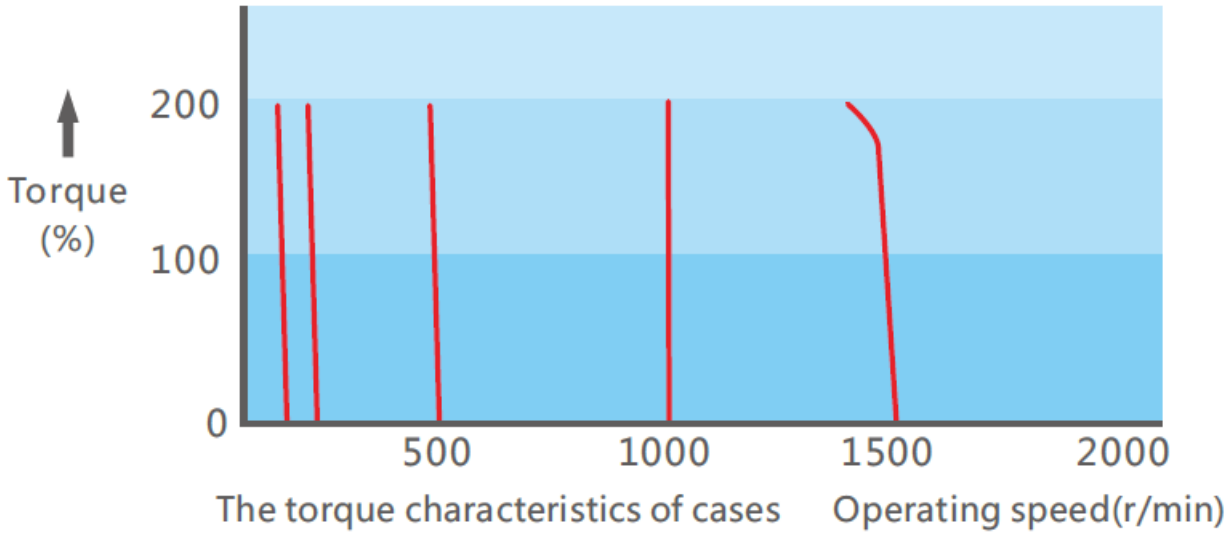


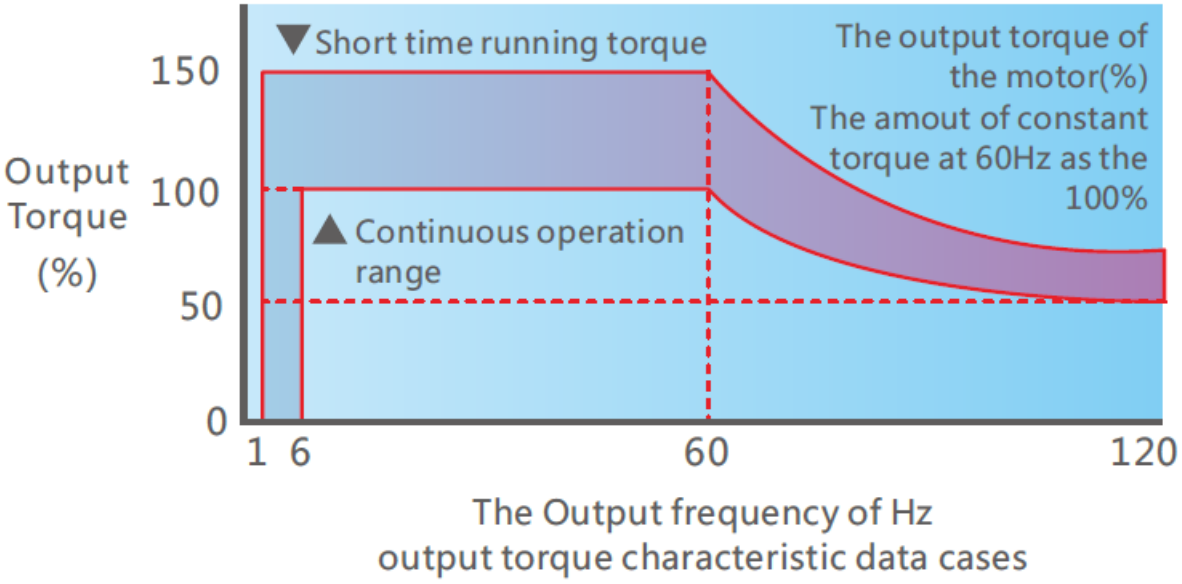
AFM	Analog output
DFM	Pulse output

Chemical fiber and other industries needing for traverse, winding frequency swing function: make the forming spindle flat, no drum.

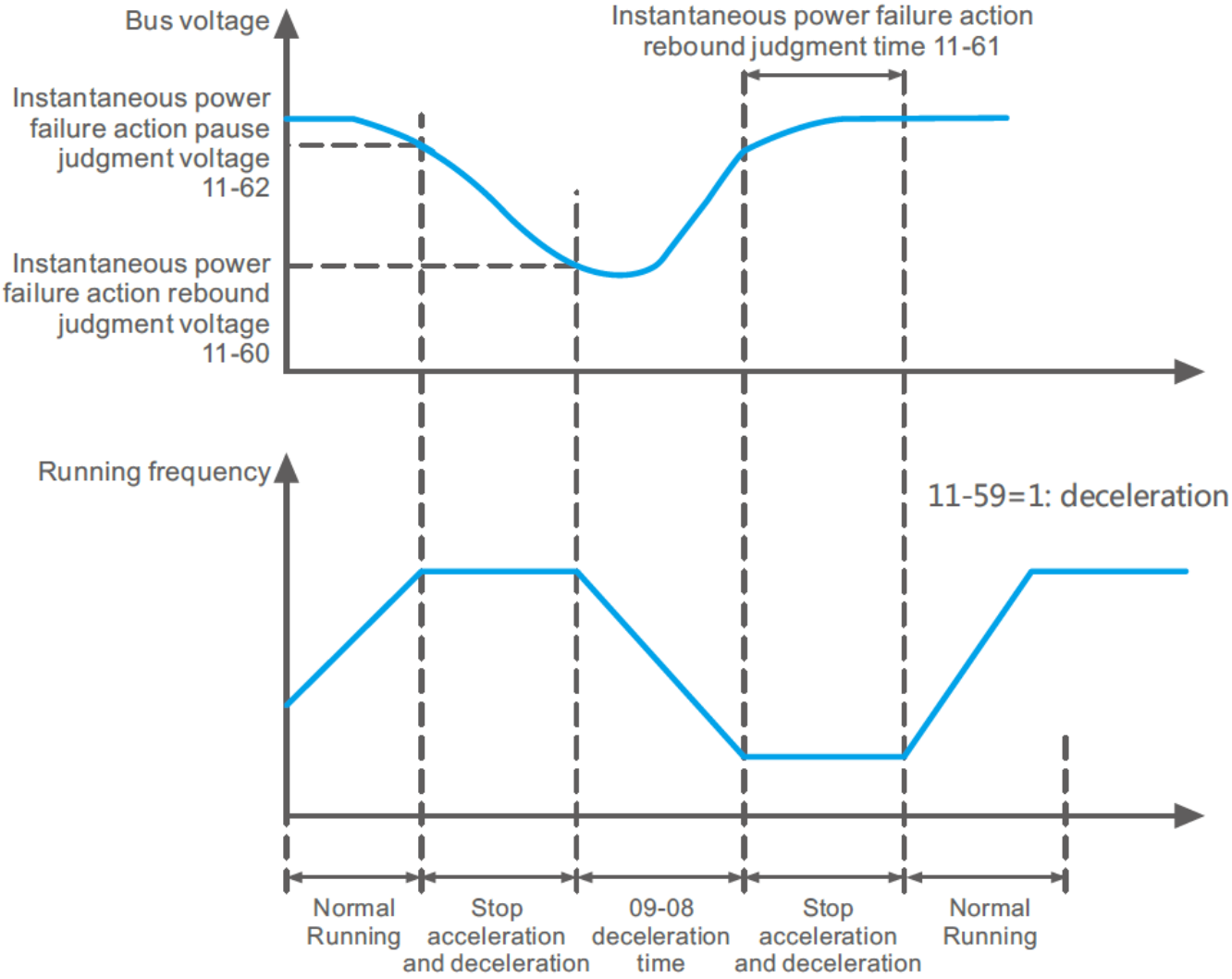


Powerful current vector control and high starting torque: No speed sensor vector control support to run under condition of block running. Under 0.5Hz, the rated out-put torque is 200%; Sensor-less vector control reduces sensitivity to motor parameters and improves field ada-ptability.



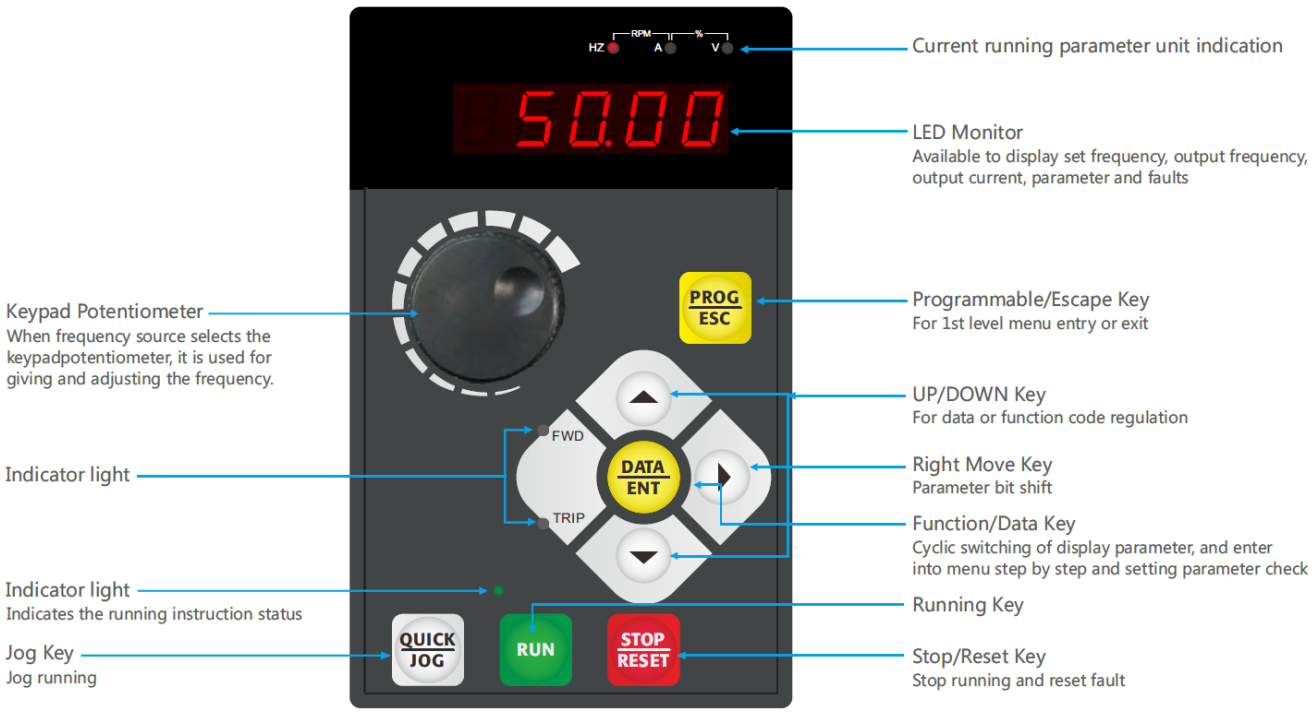


Instantaneous power failure without stopping: It means that the inverter will not stop when there is an instantaneous power failure. In the case of instantaneous po-wer failure or sudden voltage drop, the inverter reduces the output speed, and the load is fed back to the energy to compensate for the voltage drop to keep the inverter running for a short time.



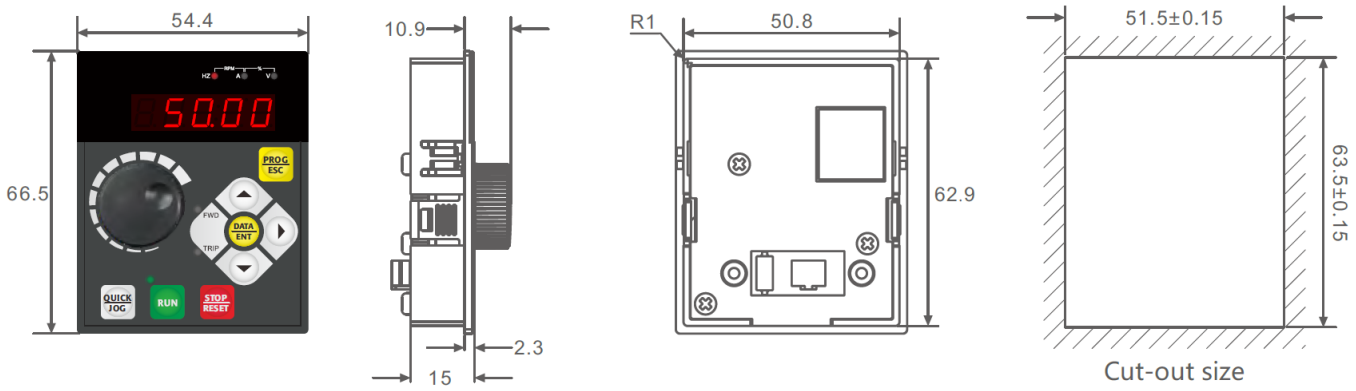
Operation Keypad

Function Description

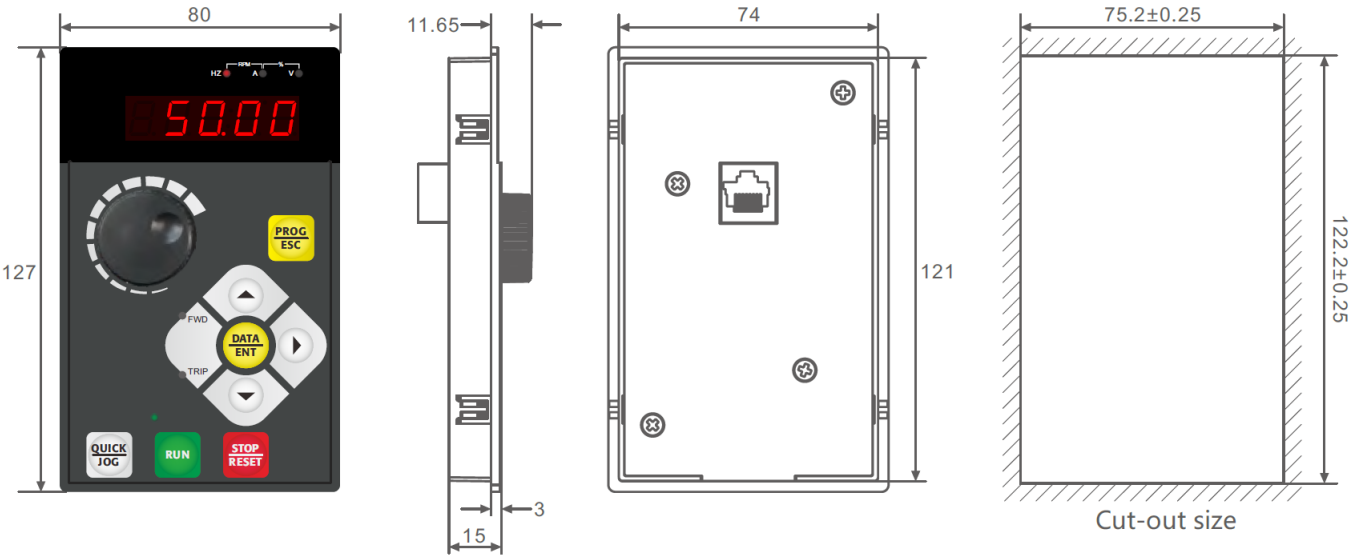


Dimension (unit: mm)

Below 18.5kW (include 18.5kW)



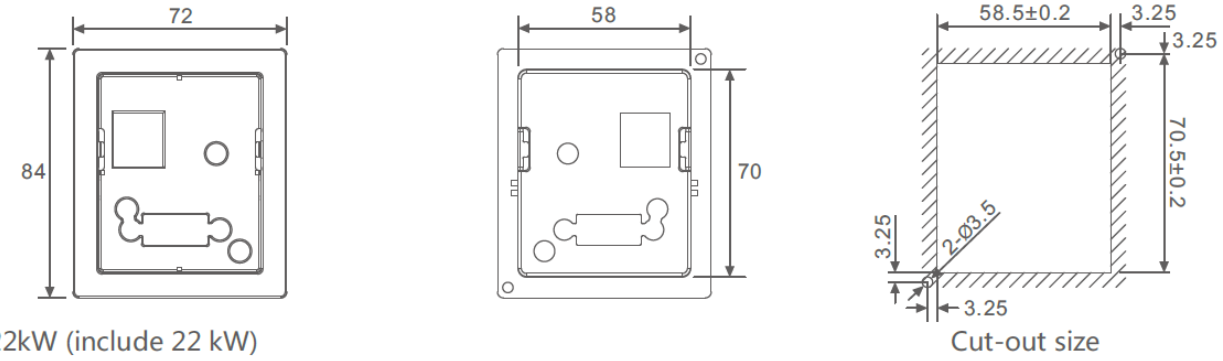
Above 22kW (include 22 kW)



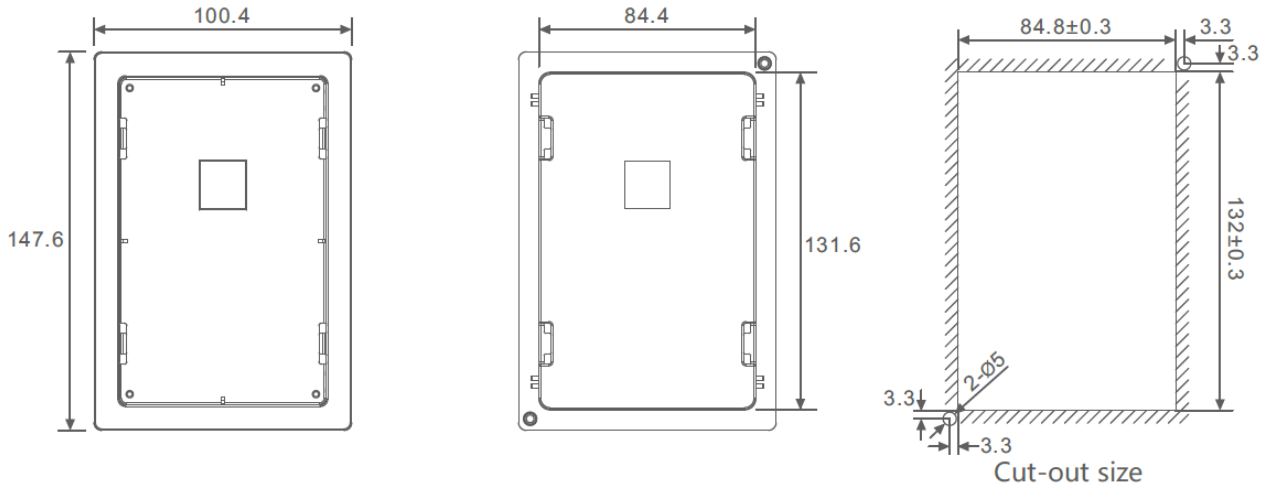
Note: the operation can extend by common cable (8 cores)

Epitaxial receptacle dimension description (unit: mm)

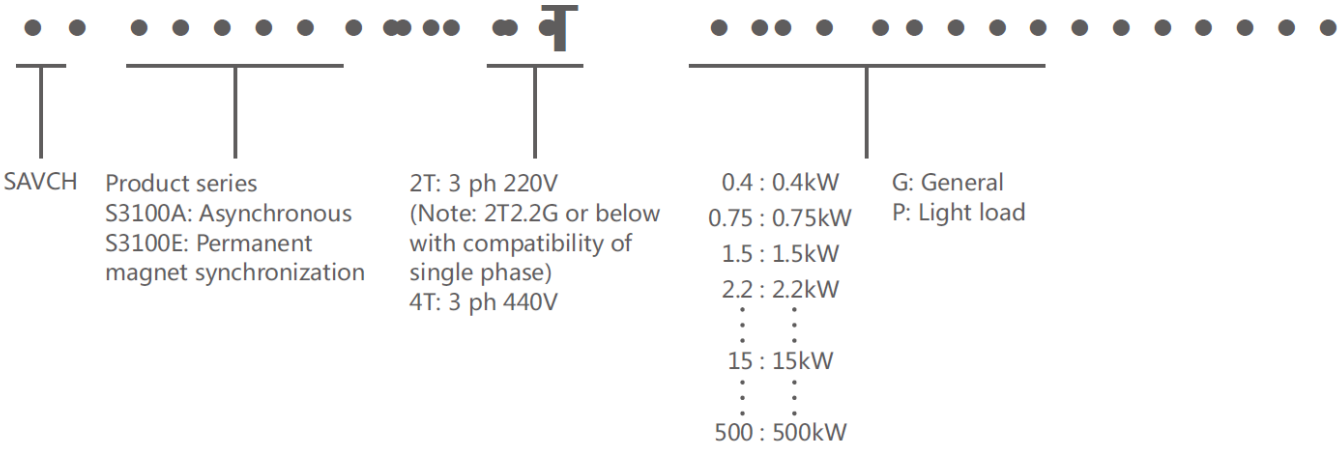
■ Below 18.5kW (include 18.5kW)



■ Above 22kW (include 22 kW)



Model Description



Product Specification

Common specification

Item		Explanation
	Control mode	V/f control, open loop vector control, torque control
	Range of output frequency	0~500.00Hz (V/f highest 3200.0Hz)
	Frequency setting resolution	0.01 Hz

Control characteristic	Output Frequency setting resolution		0.01 Hz
	PWM carrier frequency		Adjust from 0.5kHz to 16kHz
	Torque boost		Open loop vector control (SVC): G type: 0.5Hz/150% P type: 0.5Hz/120%
	V/f curve		Three types: line, multi-point. Nth power V/f curve (1.2th power, 1.4th power, 1.6th power, 1.8th power, 2th power)
	V/f separation		Two types: full separation, semi-separation
	Jump frequency		Adjust from 0.1Hz to 500.00Hz
	Acceleration/ deceleration time		0.00 to 65000 seconds (4-stage acceleration/deceleration time is set independently), linear or S-curve acceleration/deceleration mode.
	Over current stall prevention level		Can be set according to the motor load characteristics with 100~200% of the rated current of the driver
	DC brake		When stopping, it can be operated from 0.00 to the maximum operating frequency, and the braking current is 0 to 100% of the rated current. Start time 0-100.0 seconds, stop time 0-100.0 seconds.
	Brake torque		20% (external optional brake resistor can reach 125%) (1-50HP brake transistor built-in, 60HP and above can be connected to the external brake unit module)
	Speed ratio		open loop vector control 1:100
Operation characreristic	Frequency setting signal	bit operation board	set by
		external terminal	DC0-10V DC4-20mA Serial communication (RS485)
	Operation signal	bit operation board	Available to be operated by RUN, STOP, JOG keys
		external terminal	2-wire/3-wire operation, jog operation, serial communication (RS485)

	Input terminal of multi-function	Forward and reverse running, three-line running control, Forward and reverse jog running, free stop, reset fault, running pause, external fault input, increment/decrement frequency terminal setting, 16-segment preset speed switching, acceleration/deceleration time switching , frequency source switching, running command switching, PID control, PLC status reset, pause swing frequency, reset swing frequency, prohibit acceleration and deceleration, disable torque control, calculator function, length count, frequency increase and decrease setting clear, high speed pulse frequency , stop DC braking, frequency modification enable, speed control and torque control switching, clear running time of this time.

Item		Explanation
Operation characteristic	Output terminal of multi-function	Inverter operation, fault output, frequency level detection FDT output, frequency arrival, zero speed oper- ation, overload pre-alarm, count value arrival, length arrival, PLC cycle completion, cumulative running time arrival, frequency limitation, torque limit Ready to run, AVI1>AVI2, upper limit frequency arrival, lower limit frequency arrival (operation related), undervoltage status output, communication setting, cumulative power- on time arrival, frequency arrival output, timing arrival output, offload, reverse In operation, the zero current state, the module temperature reaches, the output current exceeds the limit, the lower limit frequency arrives (the stop is also output), the alarm output (continues to run), and the running time arrives.
	Analog signal output	Corresponding to the actual output frequency, output current, output voltage, etc.
	Fault signal contact	Contact “ON” (relay or two open collector outputs when the AC drive fails)
Inner function		Output frequency upper and lower limit setting, instantaneous power failure restart, abnormal fault restart, speed tracking, Simple PLC, multi-speed operation, PID control, timing control,Automatic regulated output regulation, Abnormal record, parameter lock, parameter factory reset, Reverse rotation prohibited, overcur- rent stall prevention, overvoltage stall prevention, electronic thermal relay
Protection function		Short circuit protection, acceleration over current, deceleration over current, constant speed over current, acceleration over voltage, deceleration over voltage, constant speed over voltage, bus undervoltage fault, motor overload, inverter overload, over torque protection, loss phase on the output (7.5G/11P and above), loss phase on the output , module overheating, external fault, communication fault, current detection fault, motor self-learning fault, parameter read and write abnormality, inverter hardware abnormality, motor short circuit to ground, running time arrival, the power-on time arrives, the load dropped, the PID feedback disconnected, and the fast current limit timeout.
Number of part on keypad		Contains 8 function keys, 5-digit 8-segment LED display, 6 status indicator LED lights, Can set the frequency, display the actual output frequency, output current, user-defined unit Parameter browsing and modification settings and parameter locking, abnormal fault display Executable operation, stop, reset, forward/reverse, jogging
	Operation temperature	-10℃ to +40℃

Environment	Temperature of stock	-20℃ to +60℃
	Humidity of operation environment	Below 90%RH, No condensation
	Height of installation	No more than 1000m in height, no corrosive gas, liquid, dust
	Vibration	Below 20Hz 9.80665m/s² (1G) 20~50Hz 5.88m/s² (0.6G)
	Enclosure	IP20 (Depending on the end customer's installation environment)

Standard Specification
220V single phase/three phase series

Item			Specifications						
S3100A/E-2T***G			0.4	0.75	1.5	2.2	4.0	5.5	7.5
Output	Maximum applicable motor output power(kW)		0.4	0.75	1.5	2.2	4.0	5.5	7.5
	Maximum applicable motor output power(HP)		0.5	1	2	3	5.4	7.4	1
	Output rated capacity(kVA)		1.1	1.5	2.7	3.7	6.5	9.5	12.2
	Output rated current(A)		2.3	4.0	7.0	9.6	17.0	25	32
	Output frequency range		0 500Hz						
	Overload capacity		150%-60s						
	Max output voltage		same to input voltage						
Input	Phase,voltage,Frequency		Single phase/three phase 200~240V 50/60Hz						
	Voltage frequency variations		Voltage:±15% Frequency:±5%						
	Input current(A)	single phase	5.4	8.2	14.2	23	no single phase input		
		three phase	3.1	5.0	7.7	11.1	22.2	31.5	42.7
Cooling method			Fan cooling						

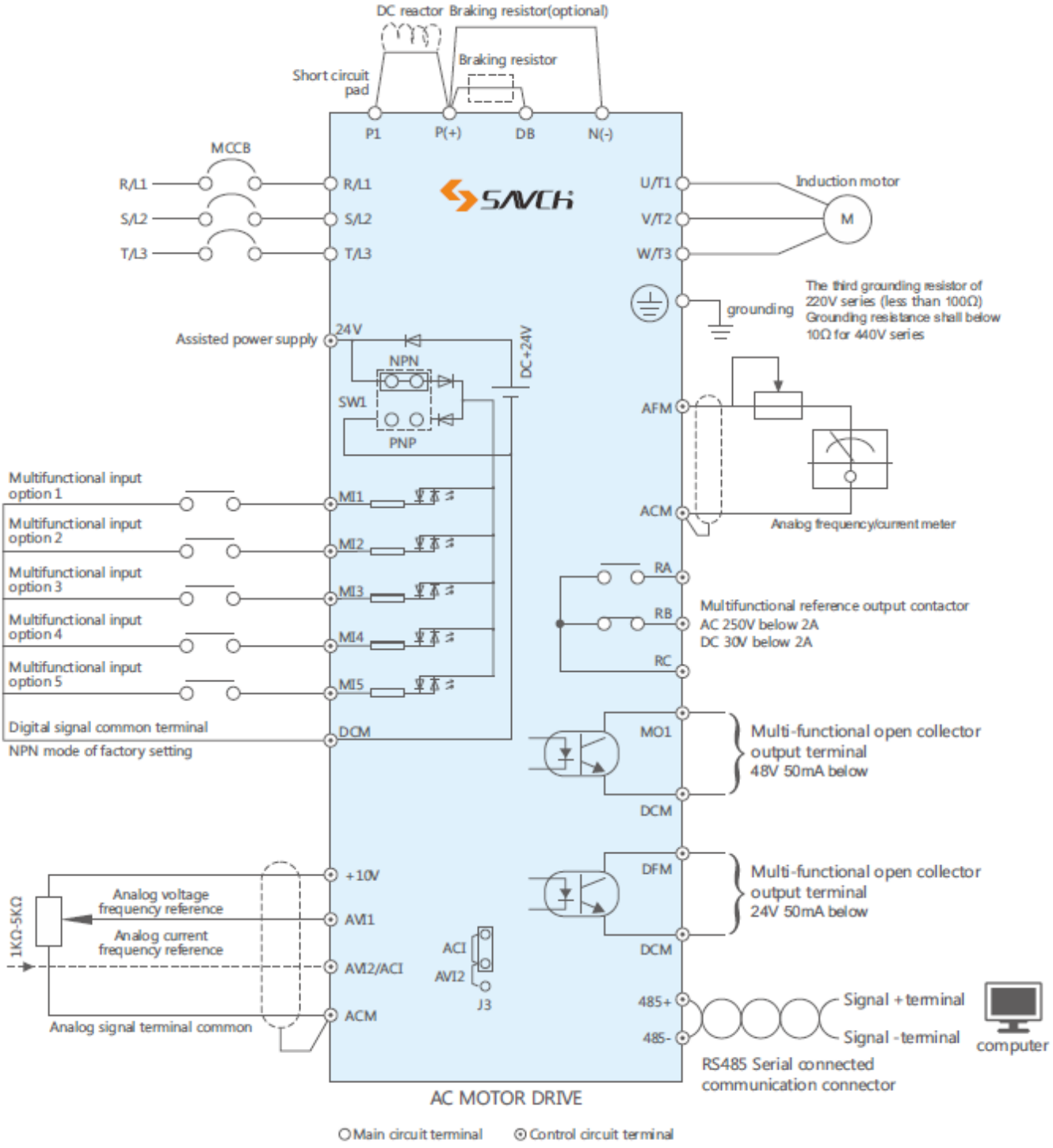
440V three phase series

Item		Specifications													
S3100A/E-4T***G/P		0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
Output	Maximum applicable motor output power(kW)	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
	Maximum applicable motor output power(HP)	1	2	3	5.4	7.4	10	14.7	20	24.7	29.4	40	50	60	74
	Output rated capacity(kVA)	1.9	2.9	3.9	6.9	9.9	13	19.1	24.4	28.2	34.3	45.7	57.1	68.6	83.8
	Output rated current (A)	2.5 (3.2)	3.8 (4.7)	5.1 (6.5)	9 (11.8)	13 (15)	17 (21.7)	25 (28.5)	32 (35.4)	37 (42)	45 (60)	60 (75)	75 (85)	90 (110)	110 (152)
	Output frequency range	0 500Hz													
	Overload capacity	G type: 150%-60seconds P type: 120%-60seconds													
	Max output voltage	same to input voltage													
Input	Phase,voltage,Frequency	Three phase 380-460V 50/60Hz													
	Voltage frequency variations	Voltage: ±15% Frequency: ±5%													
	Input current(A)	3.4	5.0	5.8	10.5	15	20.5	26	35	38	46	62	76	92	113
Cooling method		Fan cooling													

Item		Specifications														
S3100A/E-4T***G/P		75	90	110	132	160	185	200	220	250	280	315	355	400	450	500
Output	Maximum applicable motor output power(kW)	75	90	110	132	160	185	200	220	250	280	315	355	400	450	500
	Maximum applicable motor output power(HP)	100	120	147	176	214	247	267	294	334	374	420	470	530	600	660
	Output rated capacity(kVA)	114.3	134	160	191	229	259	290	316	358	396	445	500	565	630	700
	Output rated current(A)	152 (176)	176 (210)	210 (253)	253 (304)	304 (340)	340 (377)	377 (426)	426 (465)	465 (520)	520 (585)	585 (650)	650 (725)	725 (820)	820 (860)	860
	Output frequency range	0 500Hz														
	Overload capacity	G type: 150%-60seconds P type: 120%-60seconds														
	Max output voltage	same to input voltage														
Input	Phase,voltage,Frequency	Three phase 380-460V 50/60Hz														
	Voltage frequency variations	Voltage: ±15% Frequency: ±5%														
	Input current(A)	157	180	214	256	308	345	382	430	470	525	590	655	730	825	865
Cooling method		Fan cooling														

Basic Wiring Diagram

The following diagram is the standard wiring diagram of S3100A/E series AC motor driver. If only digital control panel (HCA-OP-A2/HCA-OP-B2) was used, only main circuit terminal wiring applicable.

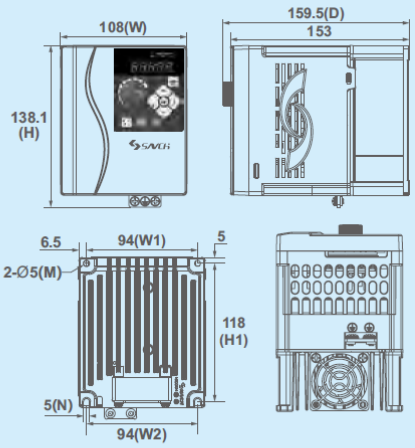


Remarks:

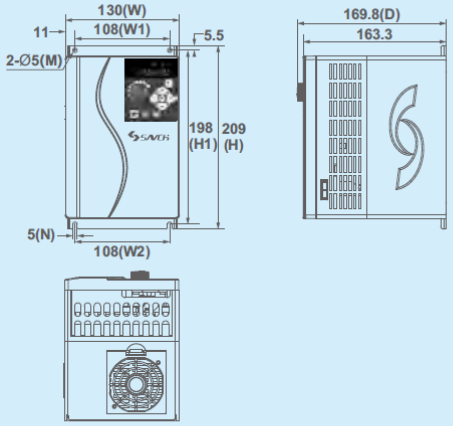
1. The external terminal has two AVI inputs (AVI1, AVI2), one of which is shared with ACI and can be switched to each other.
2. Analog current frequency command ACI: It can switch 4~20mA or 0~+10V as input signal according to J3.
3. There are 5 multi-function input terminals (MI1~MI5) in the external terminal, and the configuration input can be selected.
4. The external terminals have 2 open collector outputs (MO1, DFM).
5. The external terminal has one relay output (RA-RB-RC).
6. The power of 22kW and above can be equipped with I/O expansion card: HCA-EIO-AO/MC1, the whole machine realizes 2 analog (voltage/current optional) signals + 2 relay outputs.

External Dimensions

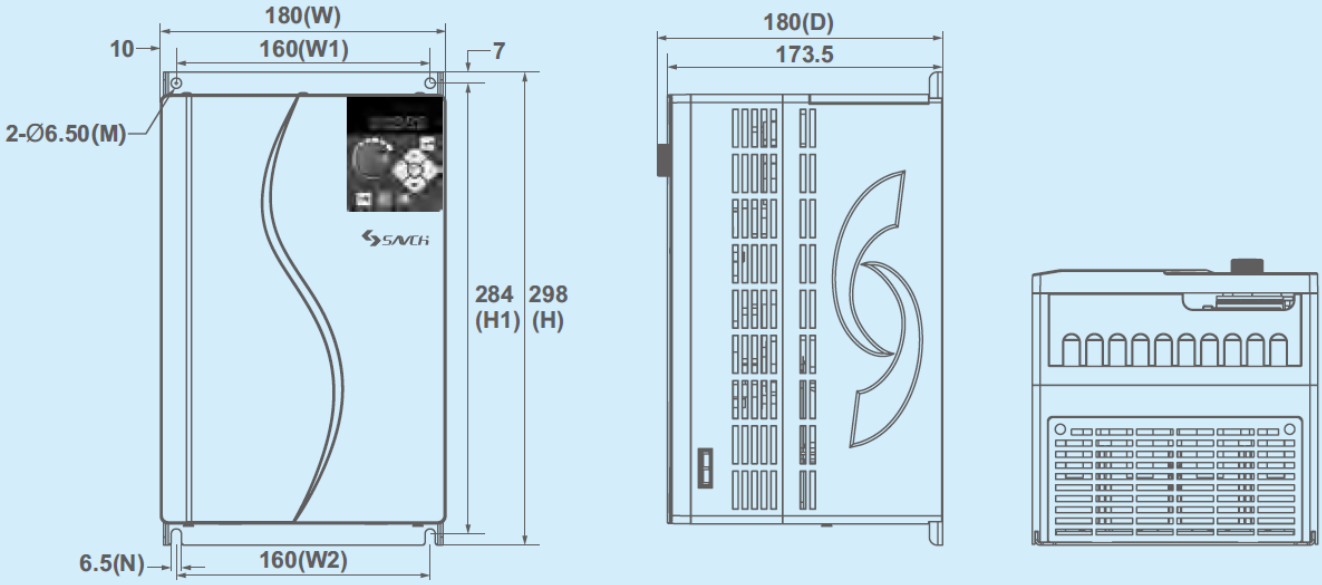
External Dimensions of inverter (Unit: mm)



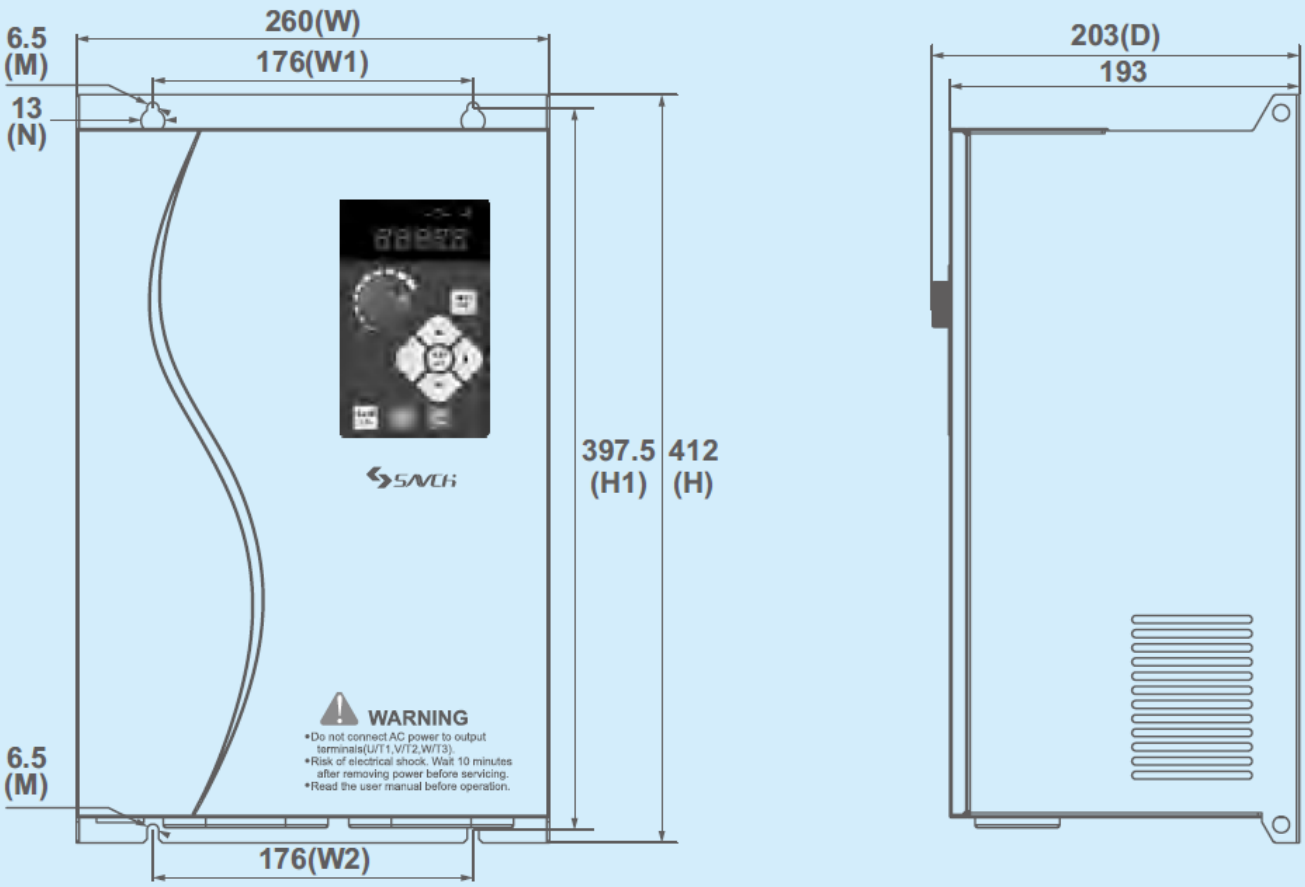
Size 1	2T	0.4G~1.5G
	4T	0.75G/1.5P~2.2G/4.0P



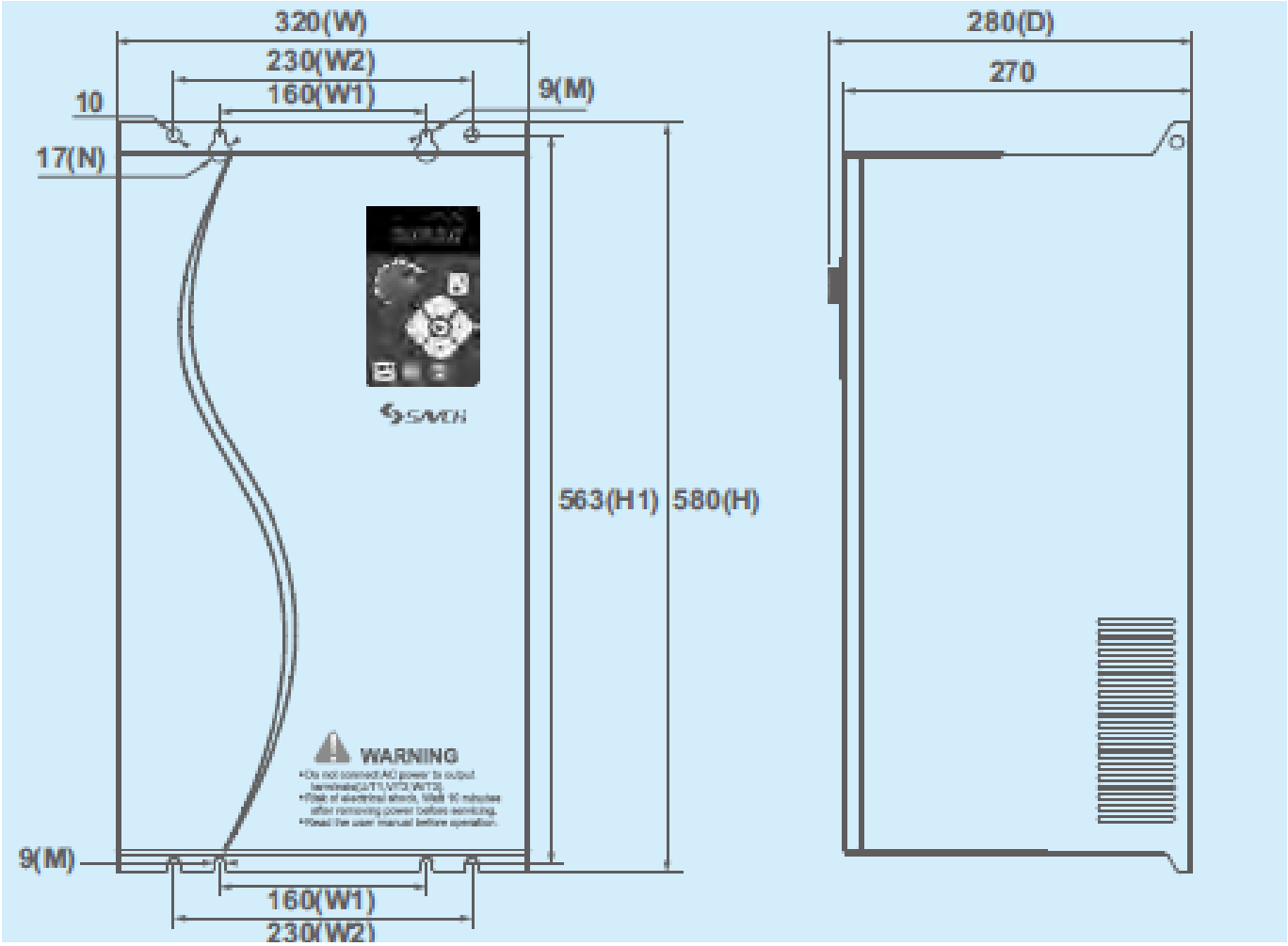
Size 2	2T	2.2G~4.0G
	4T	4.0G/5.5P~7.5G



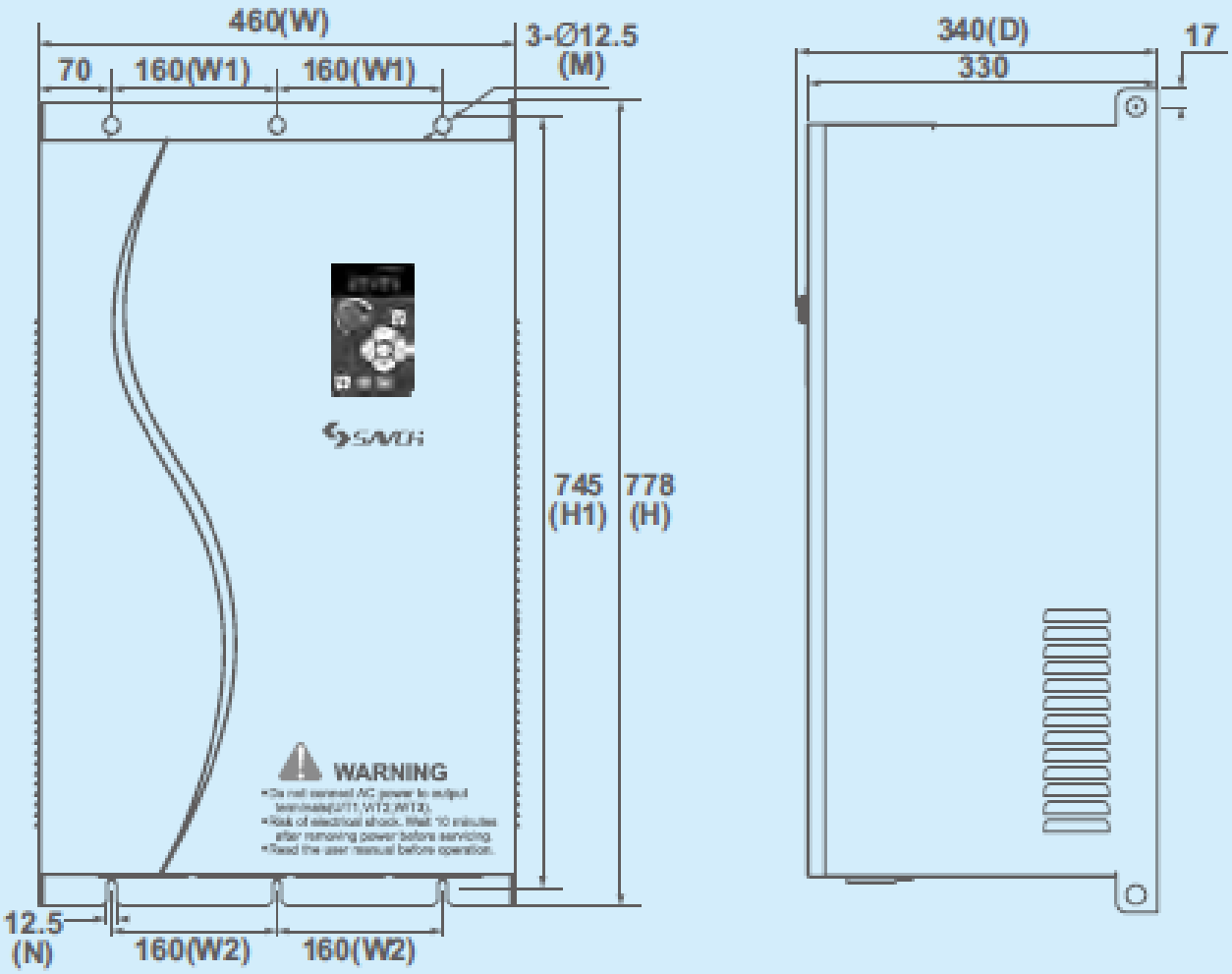
Size 3	2T	5.5G~7.5G
	4T	7.5G/11P~22G



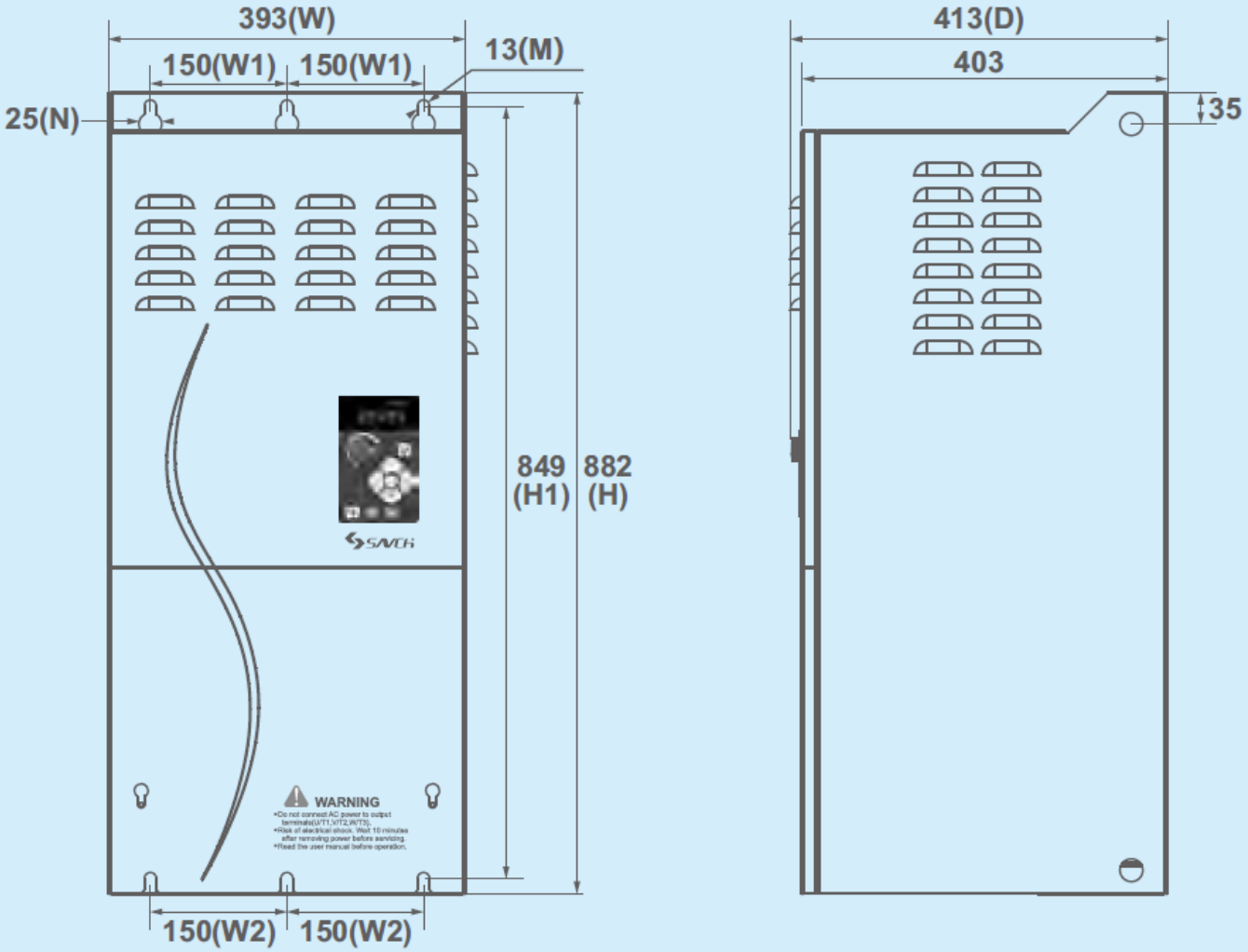
Size 4	4T	22G/30P~37G/45P



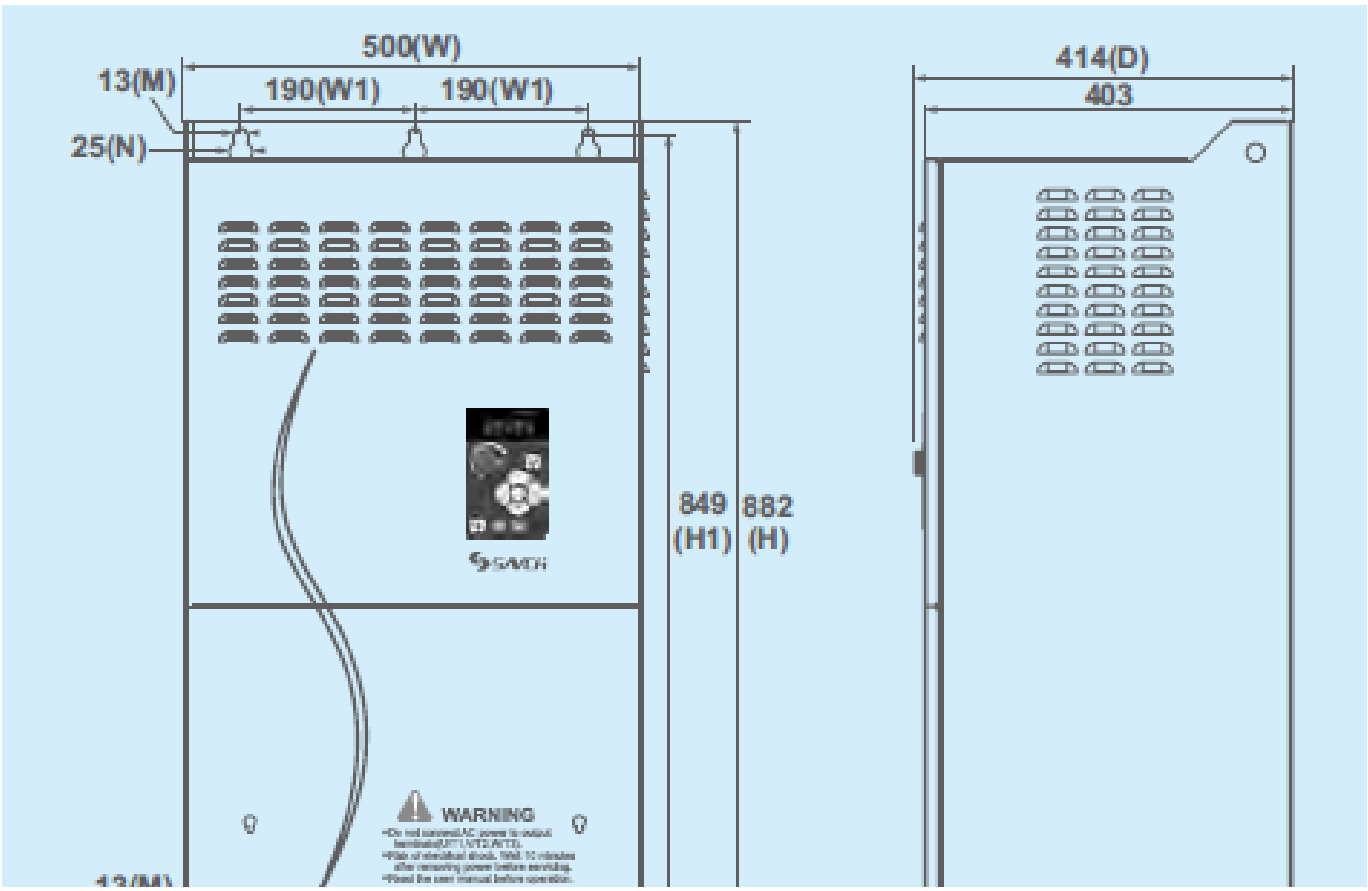
Size 5	4T	45G/55P~110G

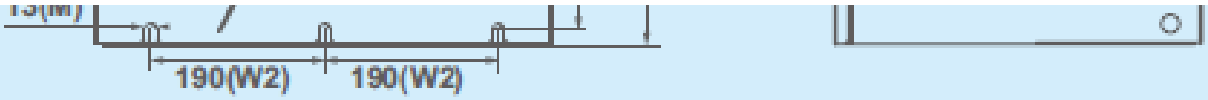


Size 6	4T	110G/132P~160G

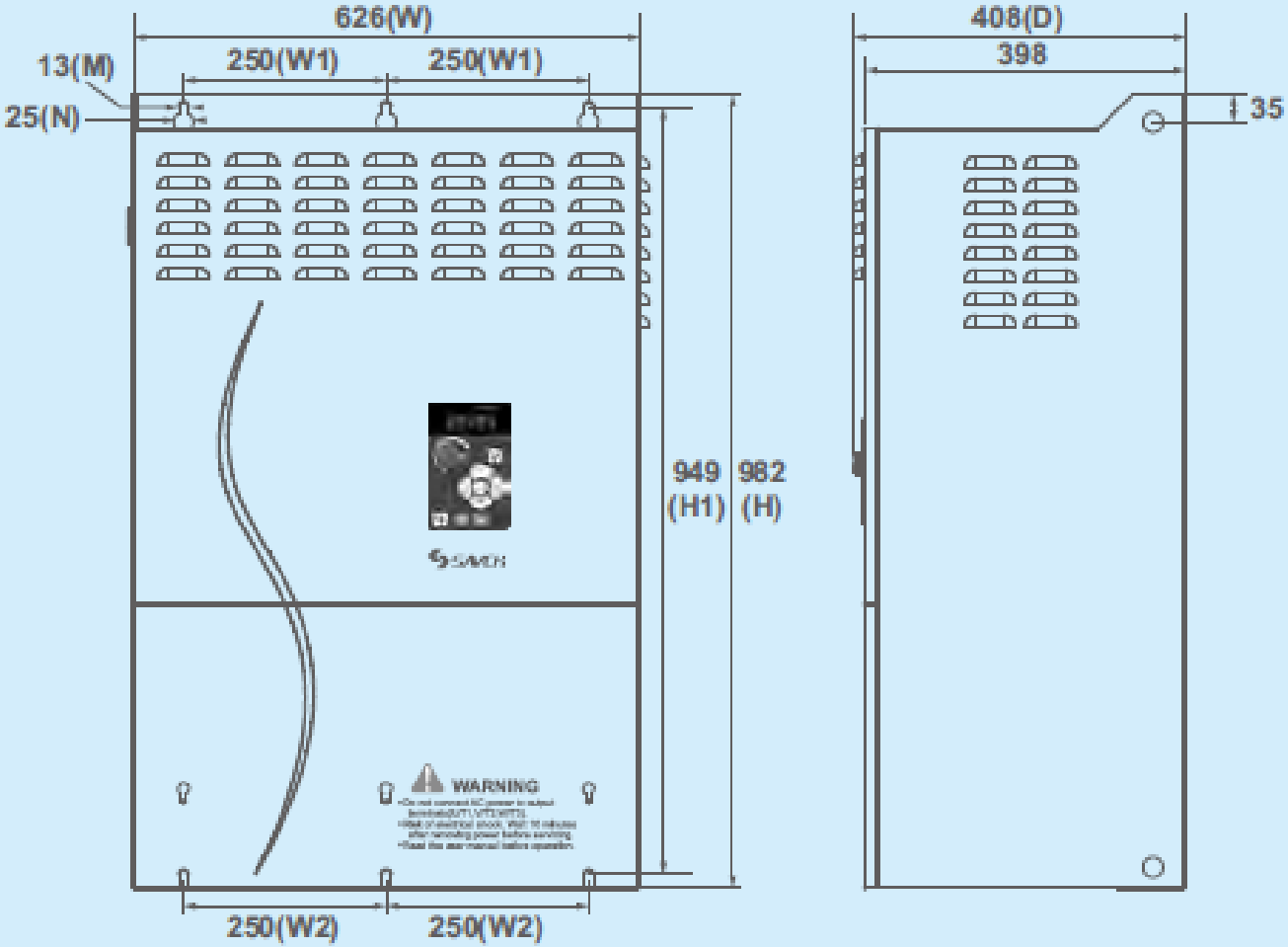


Size 7	4T	185G/200P~220G

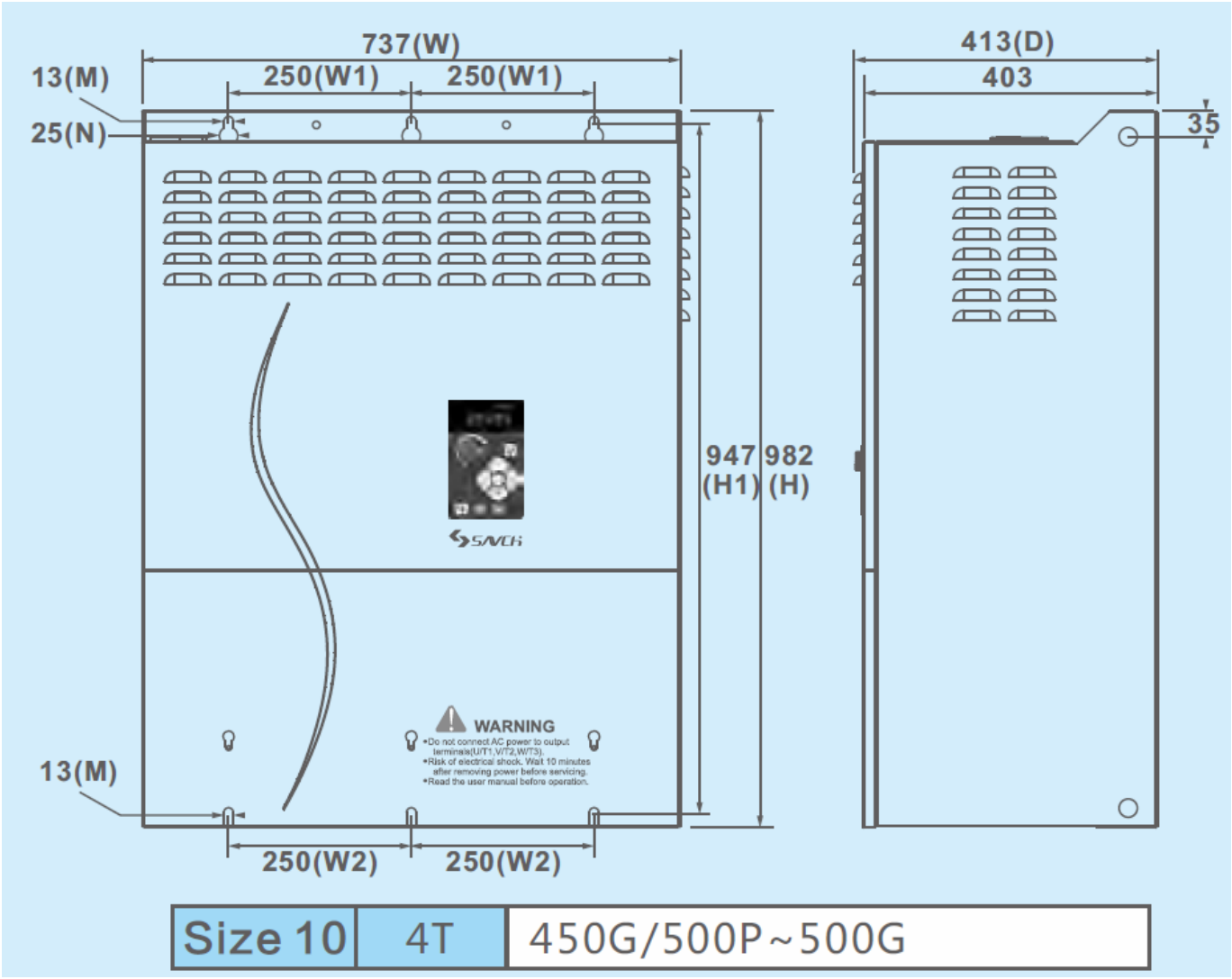




Size 8	4T	220G/250P~315G



Size 9	4T	315G/355P~400G/450P



Inverter Size (Unit: mm)

Inverter Type	W	W1	W2	H	H1	D	M	N	Fig.
S3100A/E-2T0.4G	108	94	94	138.1	118	159.5	5	5	Size 1
S3100A/E-2T0.75G									
S3100A/E-2T1.5G									
S3100A/E-4T0.75G/1.5P									
S3100A/E-4T1.5G/2.2P									
S3100A/E-4T2.2G/4.0P									
S3100A/E-2T2.2G	130	108	108	209	198	169.8	5	5	Size 2
S3100A/E-2T4.0G									
S3100A/E-4T4.0G/5.5P									
S3100A/E-4T5.5G/7.5P									
S3100A/E-4T7.5G									
S3100A/E-2T5.5G									
S3100A/E-2T7.5G									

S3100A/E-4T7.5G/11P	180	160	160	298	284	180	6.5	6.5	Size 3
S3100A/E-4T11G/15P									
S3100A/E-4T15G/18.5P									
S3100A/E-4T18.5G/22P									
S3100A/E-4T22G									
S3100A/E-4T22G/30P	260	176	176	412	397.5	203	6.5	13	Size 4
S3100A/E-4T30G/37P									
S3100A/E-4T37G/45P									
S3100A/E-4T45G/55P	320	160	230	580	563	280	9	17	Size 5
S3100A/E-4T55G/75P									
S3100A/E-4T75G/90P									
S3100A/E-4T90G/110P									
S3100A/E-4T110G									
S3100A/E-4T110G/132P	460	160	160	778	745	340	12.5	12.5	Size 6
S3100A/E-4T132G/160P									
S3100A/E-4T160G									
S3100A/E-4T185G/200P	393	150	150	882	849	413	13	25	Size 7
S3100A/E-4T200G/220P									
S3100A/E-4T220G									
S3100A/E-4T220G/250P	500	190	190	882	849	414	13	25	Size 8
S3100A/E-4T250G/280P									
S3100A/E-4T280G/315P									
S3100A/E-4T315G									
S3100A/E-4T315G/355P	626	250	250	982	949	408	13	25	Size 9
S3100A/E-4T355G/400P									
S3100A/E-4T400G/450P									
S3100A/E-4T450G/500P	737	250	250	982	947	413	13	25	Size 10
S3100A/E-4T500G									

Service Network
Website: w ww.savch.net

Documents / Resources

	**SAVCH S3100 A/E Series Inverter General Vector Control** [pdf] Owner's Manual S3100 A E Series, Inverter General Vector Control, S3100 A E Series Inverter General Vector Control, General Vector Control

References

- System controller-SANCH