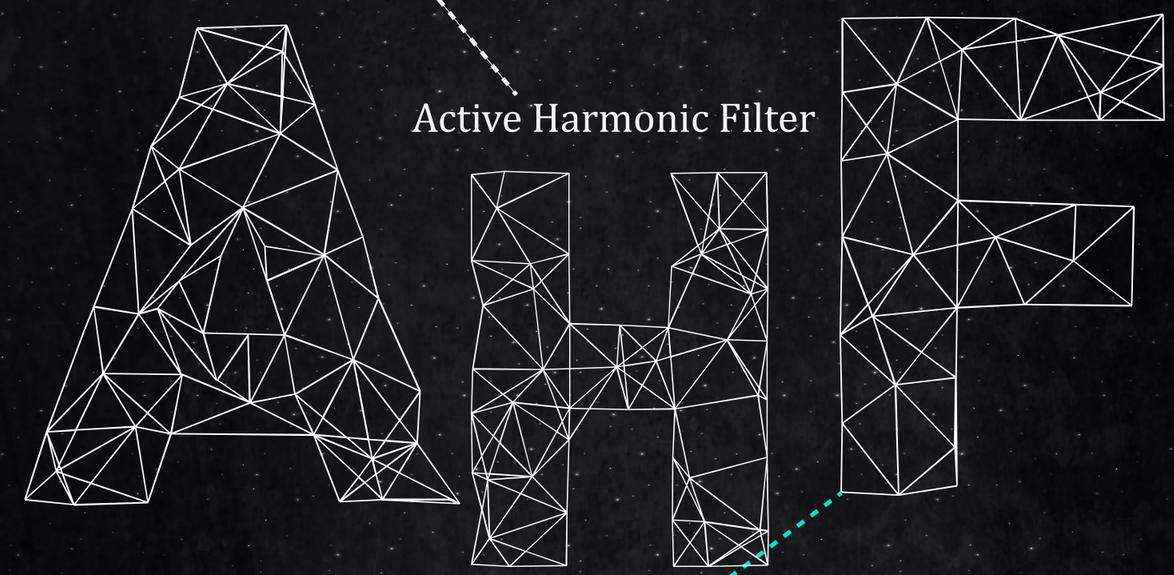
Sinexcel

Energy Efficiency

Power Quality

Active Harmonic Filter

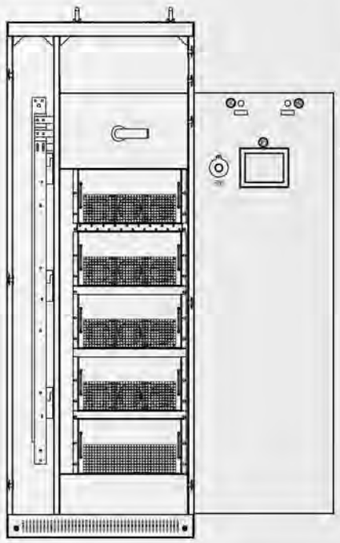


Harmonic Mitigation

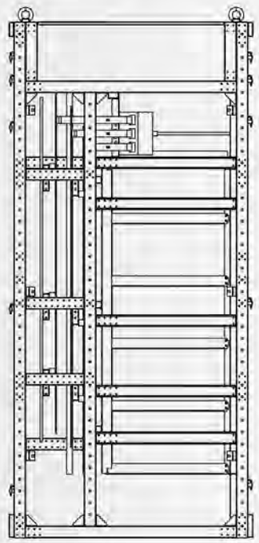
Modular Solution

MODULAR AHF DESIGN AND FLEXIBLE ENGINEERING CABINET

Front View



Left Side View



NONLINEAR LOADS

Different compensation model for different loads

NONLINEAR LOADS

INDUSTRIAL EQUIPMENT

Induction furnaces,
static converters,VFD,
welding machines

OFFICE EQUIPMENT

Computers, servers, printers

HOUSEHOLD APPLIANCES

Fluorescent lightings, TV light,
dimmers, microwave ovens.

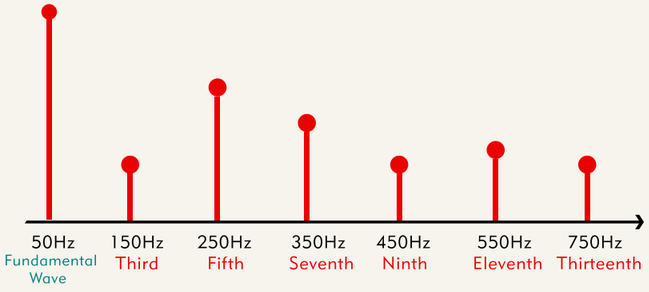
UNINTERRUPTIBLE POWER SUPPLIES (UPS)

WHY HARMONIC HURT YOUR SYSTEM?

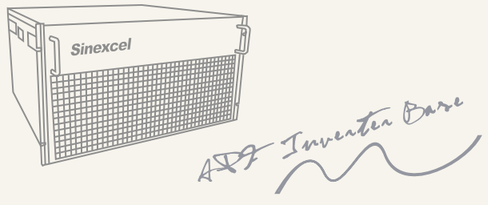
Higher harmonic current would lead to capacitors' inner swelling, oil spilling and fire risk, severe discharge, flashover and overheat, resulting in over-current and over-voltage, accelerating the aging of the capacitor dielectric, lower safety levels of installations , which cause the unnecessary financial losses .

Higher harmonic orders cause more serious distortion on the grid voltage and current, which will increase the transformer copper and iron losses or load imbalance.

Affect the equipment efficiency and occupy unnecessary grid capacity. Overheating of equipment and shortening the lifetime.



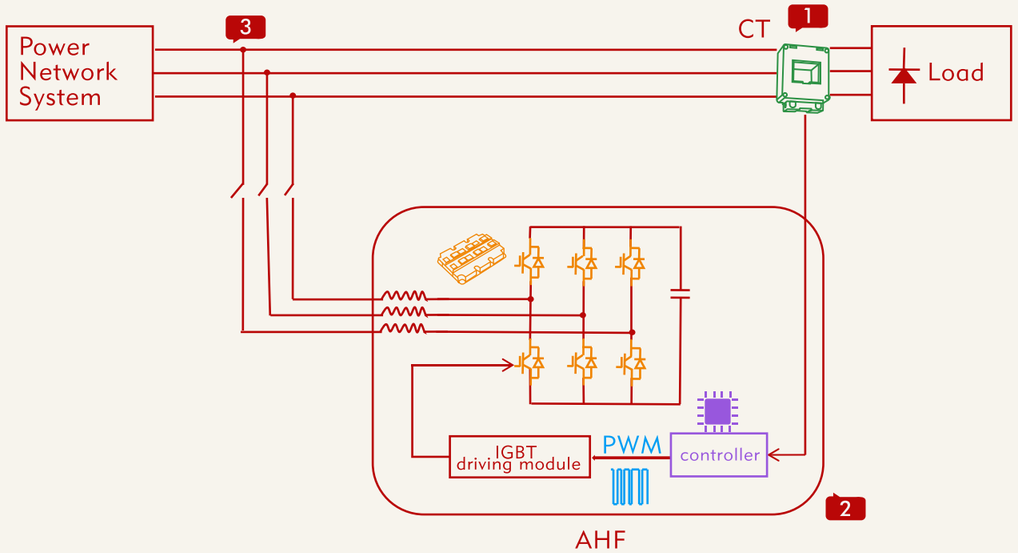
Electrical network with poor power quality results in financial loss and safety concerns. Good power quality not only improves the efficiency of the energy by decreasing the loss of electrical equipment, but also guarantees that the power system could support stable and healthy operation. It becomes more and more convenient for us both in daily life and industry because of fast developing technology, which is also accompanied with the development of non-linear loads .

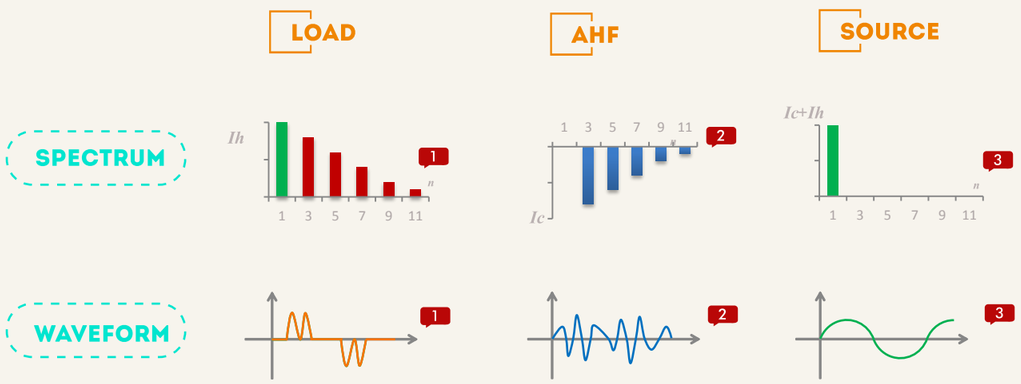


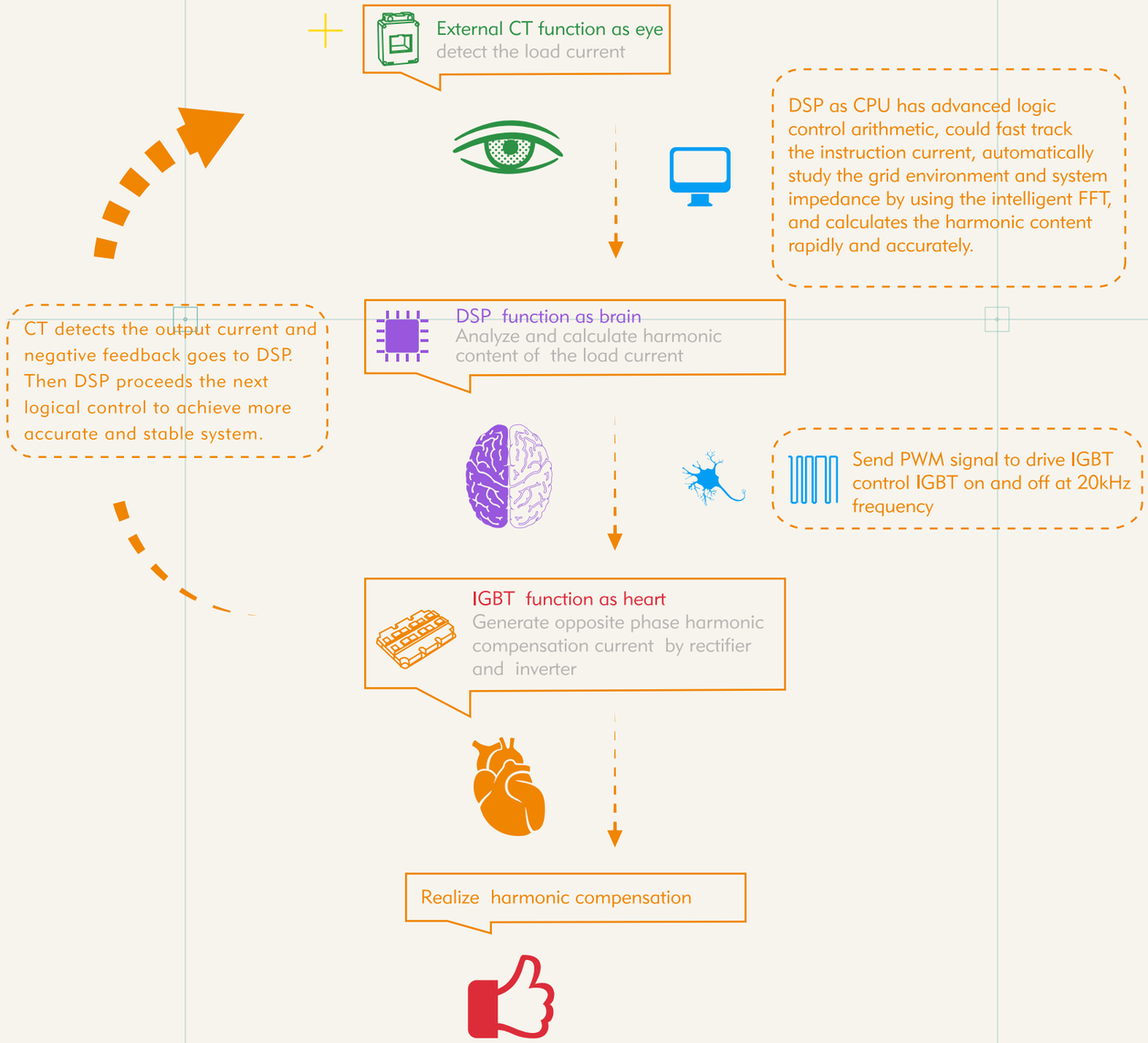
AHF WORKING PRINCIPLE

Optimize your harmonic compensation efficiency

External CT detect the load current, DSP as CPU has advanced logic control arithmetic, could fast track the instruction current, divides the load current into active power and reactive power by using the intelligent FFT, and calculates the harmonic content rapidly and accurately. Then sends PWM signal to internal IGBT's driver board to control IGBT on and off at 20KHZ frequency. Finally generates opposite phase compensation current on inverter induction, at the same time CT also detects the output current and negative feedback goes to DSP. Then DSP proceeds the next logical control to achieve more accurate and stable system.

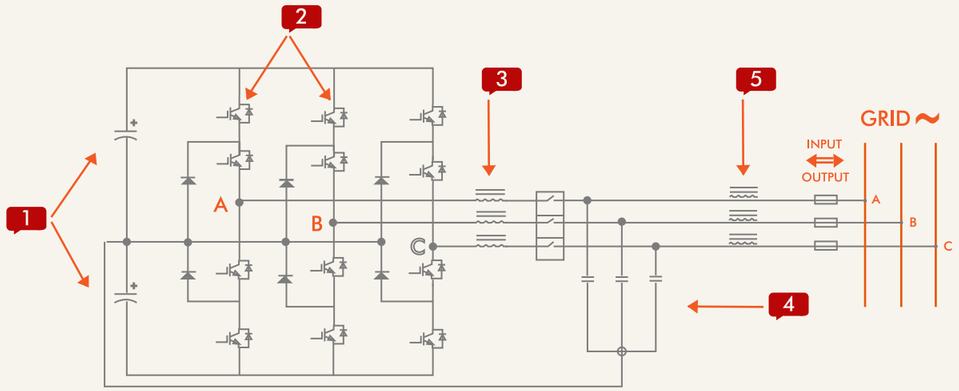






UNDERSTAND HOW AHF COMPENSATE HARMONIC

Optimize your harmonic compensation efficiency



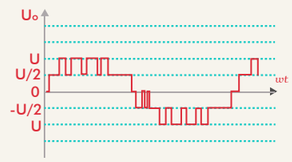
DC BUS CAPACITOR 1

AC to DC rectifier storage

IGBT 2

Controlled by DSP software algorithm, IGBT on-off timing selection and length could control inverter to generate a harmonic current.

IGBT generates square wave, it's outline is like sinusoid.



INVERTER INDUCTION 3

The square wave will convert into triangular wave, which is more like sinusoid after inverter inductor.

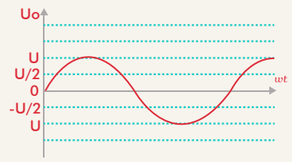
LCL FILTER CIRCUIT

LC FILTER CIRCUIT 4

LC filter circuit filter out impurities of the harmonic. High frequency inductor The rest of high frequency harmonic will be filtered by the high frequency inductor.

HIGH FREQUENCY INDUCTOR 5

Both for filtering. The combination of LC filter circuit and high frequency inductor are called LCL filter circuit



KEY FEATURES AND BENEFITS

Impressive compensation effect of AHF

MODULAR DESIGN

Ultra-compact design, wall and rack mount installation, easy to use in new or exiting switch room upgraded

Module structure with highest reliability of system

3P4W and 3P3W adapted by same modules, same harmonic mitigation capability

INTELLIGENT FFT

Unique intelligent FFT algorithm automatically study the electrical system impedance, to prevent system from resonance, high system reliability

Real time electrical system resonance monitor and management

GRAPHICAL USER INTERFACE

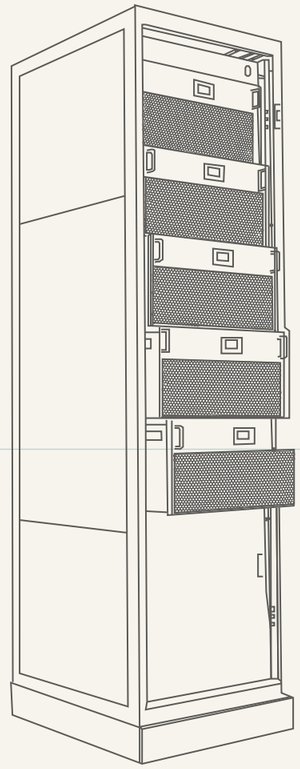
Module 4.3 inch HMI, cabinet 7 inch HMI central

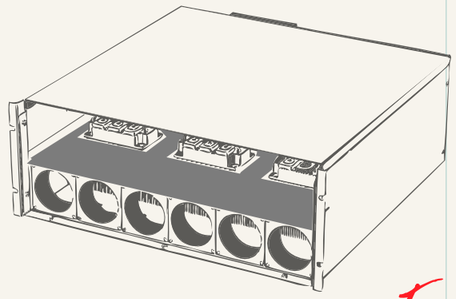
Display electrical system voltage, current, frequency, before and after THDi, Apparent/Active/Reactive power, etc

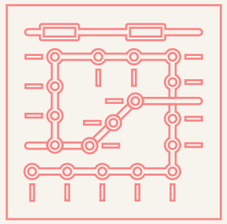
Display before and after waveform, spectrum in same page with clearly comparison

MAINTENANCE FREE DESIGN

Independent air flow, separate electronic components from air flow. Free of dust cleaning maintenance requirement, improve product reliability







AHF Cabinet

INVERTER A

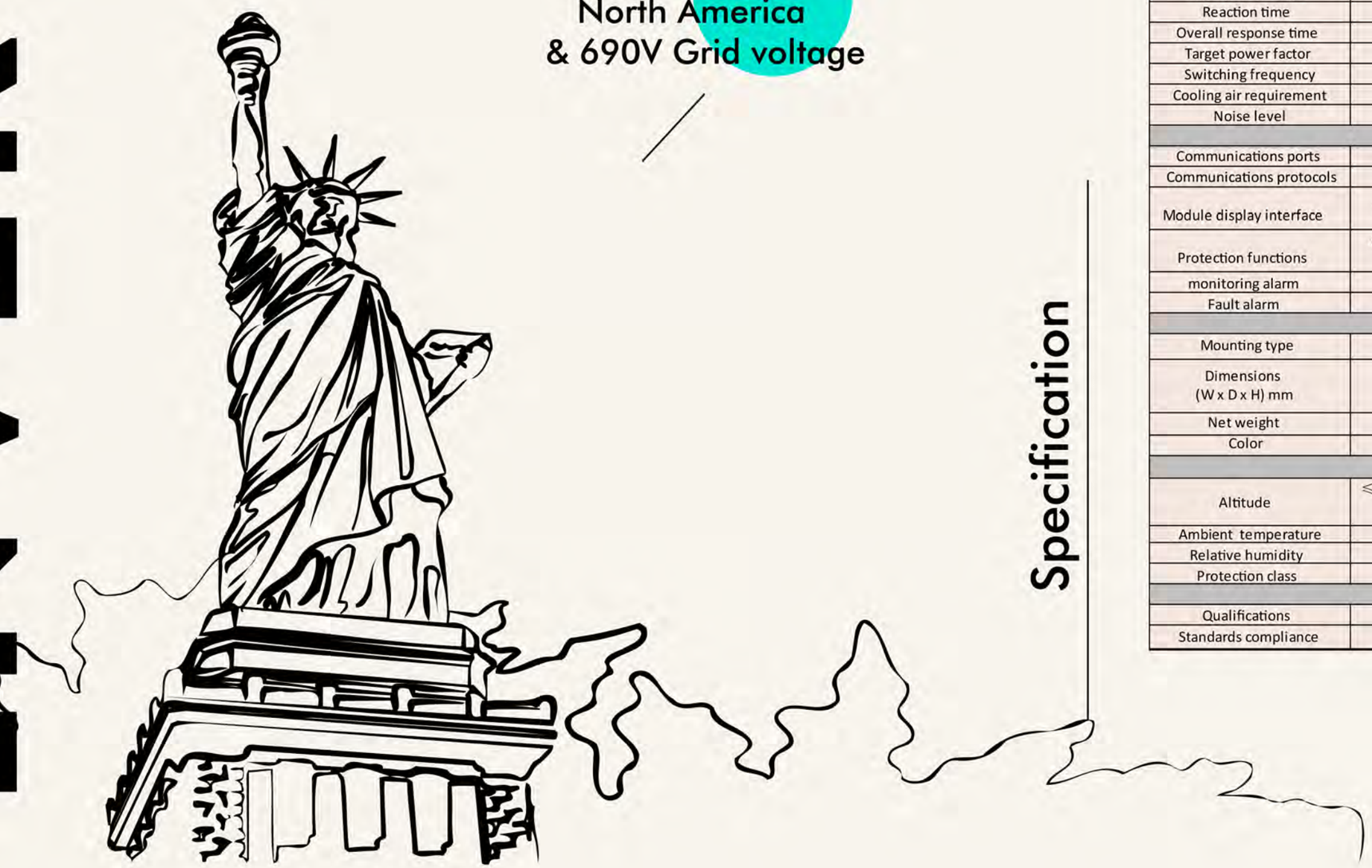
400V Grid Voltage

Specification

Items	400V				
	Sinexcel AHF 005/010/015	Sinexcel AHF 025/035	Sinexcel AHF 050/060	Sinexcel AHF075/ 100	Sinexcel AHF 150
System parameters					
Rated input	380V/415V(228V~456V)				
Power grid frequency	50/60Hz(range：45Hz～62.5Hz)	50/60Hz(range：45Hz~ 62Hz)			
Parallel quantities	unlimited				
Efficiency	⩾97%				
Power grid structure	3P3W, 3P4W				
CT	50/5~10000/5	150/5～10,000/5			
Circuit topology	3-level				
Performance indicators					
Rated capacity	5/10/15A	25A/35A	50A/60A	75A/100A	150A
Harmonic compensation	Available				
Reactive power compensation	Available				
Unbalance compensation	Available				
Control algorithm	FFT,Intelligent FFT, and instantaneous reactive power				
Operation mode	12 combination, set up priority				
Filtering range	2nd to 61th orders	2nd to 50th orders			
Filtering order	2nd to 61th orders	2nd to 50th orders			
Filtering degree	2nd to 61th orders	2nd to 50th orders			
Filter performance	>95%				
Reaction time	<15μs	<50μs			
Overall response time	5ms	<5ms			
Target power factor	Adjustable from -1 to +1				
Switching frequency	90KHz	average 20kHz,maximum 35kHz			
Cooling air requirement	44L/Sec	75L/Sec	151L/Sec	300L/Sec	405L/Sec
Noise level	<55dB	<56dB			
Communications and monitoring capabilities					
Communications ports	RS485	RS485，and Ethernet port			
Communications protocols	Modbus	Modbus (RTU)			
Module display interface	WIFI display	4.3-inch HMI (module), 7-inch HMI(central monitor), LED			
Protection functions	over-voltage protection, under-voltage protection, short-circuit protection, inverter bridge inverse protection, over-compensation protection, and so on				
monitoring alarm	Available				
Fault alarm		Available, at most 500 alarm records			
Mechanical properties					
Mounting type	Wall-mounted/Rack-mounted	Wall-mounted/Rack-mounted/Cabinet			
Dimensions (W x D x H)mm	400*325*44.5(Rack-mounted) 400*44.5*325(Wall-mounted)	440*490*150 (Rack- mounted) 440*150*470 (Wall- mounted)	440*590*190 (Rack-mounted) 440*190*610 (Wall-mounted)	500*600*190/440*600*230 (Rack-mounted) 500*190*584 /440*234*625 (Wall- mounted)	500*560*269 (Rack-mounted) 500*286*557 (Wall-mounted)
Net weight	4.98kg	18kg	35kg	36kg	48kg
Color	Black/gray/blue/orange/red (sand blast)	Black			
Environment requirements					
Altitude	⩽1500 m; Between 1500 m to 4000 m, according to GB/T3859.2, the power decreases by 1% for every additional 100 m.				
Ambient temperature	-10℃~40℃ (may derate capacity if ambient temperature exceeds 45℃)				
Relative humidity	5% to 95%, non-condensing				
Protection class	IP20				
Related qualifications and standards					
Qualifications	CE, IEEE 61000,				
Standards compliance	IEEE519、ER G5/4				

INVERTER

North America & 690V Grid voltage



Specification

Items	480V	600V	690V
	SinexcelAHF 25/35/50/60/75/90(USA)	SinexcelAHF 25/35/50/60/75/90(Canada)	SinexcelAHF 25/35/50/60/75/90
System parameters			
Rated input	480V(384V~552V)	600V(420V~690V)	690V(483V~793V)
Power grid frequency	50/60Hz(range：45Hz~62Hz)		
Parallel quantities	unlimited		
Efficiency	≥97%		
Power grid structure	3P3W, 3P4W		
CT	150/5 ~ 10,000/5		
Circuit topology	3-level		
Performance indicators			
Rated capacity	35/50/75/90A		
Harmonic compensation	Available		
Reactive power compensation	Available		
Unbalance compensation	Available		
control algorithm	Intelligent FFT,FFT, and instantaneous reactive power algorithm		
Filtering range	2nd to 50th orders		
Filtering order	2nd to 50th orders		
Filtering degree	2nd to 50th orders		
Filter performance	>95%		
Reaction time	<50μs		
Overall response time	< 5ms		
Target power factor	Adjustable from -1 to +1		
Switching frequency	20kHz		
Cooling air requirement	359L/Sec		
Noise level	<65dB		
Communications and monitoring capabilities			
Communications ports	RS485，and Ethernet port (RJ45)		
Communications protocols	Modbus (RTU)		
Module display interface	7-inch LCD touch screen(rack-mounted)；4.3-inch LCD touch screen(wall-mounted)		
Protection functions	over-voltage protection, under-voltage protection, short-circuit protection, inverter bridge inverse protection, over-compensation protection, and so on		
monitoring alarm	Available		
Fault alarm	Available, at most 500 alarm records		
Mechanical properties			
Mounting type	Wall-mounted/Rack-mounted		
Dimensions (W x D x H) mm	544*640*250(Rack-mounted) 504*253*640(Wall-mounted)		
Net weight	66kg		
Color	Black		
Environment requirements			
Altitude	≤1500 m; Between 1500 m to 4000 m, according to GB/T3859.2, the power decreases by 1% for every additional 100 m.		
Ambient temperature	-20℃~40℃ (may derate capacity if ambient temperature exceeds 45℃)		
Relative humidity	5% to 95%, non-condensing		
Protection class	IP20		
Related qualifications and standards			
Qualifications	CE, ETL(UL508), IEEE 61000		
Standards compliance	IEEE519，ER G5/4		

INVERTER A

400V

25A/35A wall/rack 440*150*47mm³ 18kg

400V

50A/60A wall/rack 440*190*540 mm³ 35kg
75A wall/rack 500*190*560 mm³ 36kg
100A wall/rack 440*230*600 mm³ 36kg

INVERTER A

400V

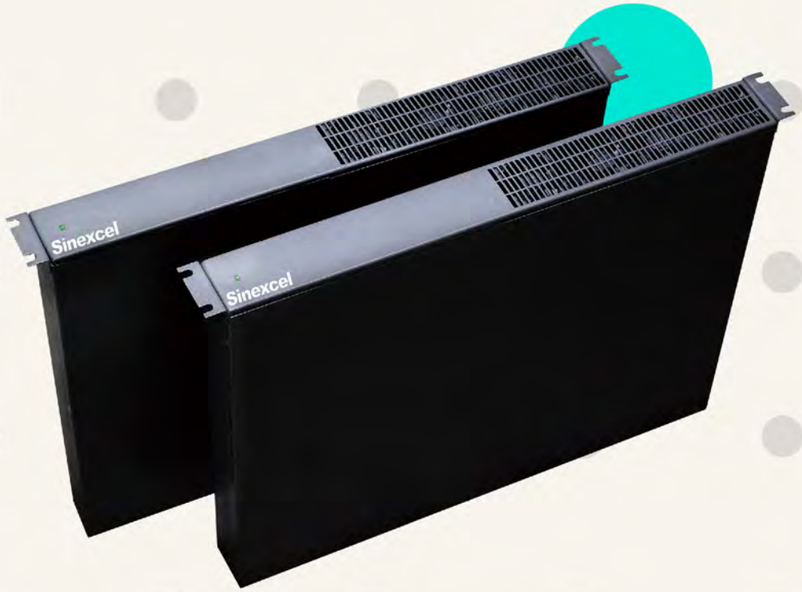
480V
600V
690V

150A wall/rack 500*470*270mm³ 48kg

90A wall/rack 500*590*250mm³ 62kg

INVERTER A

400V



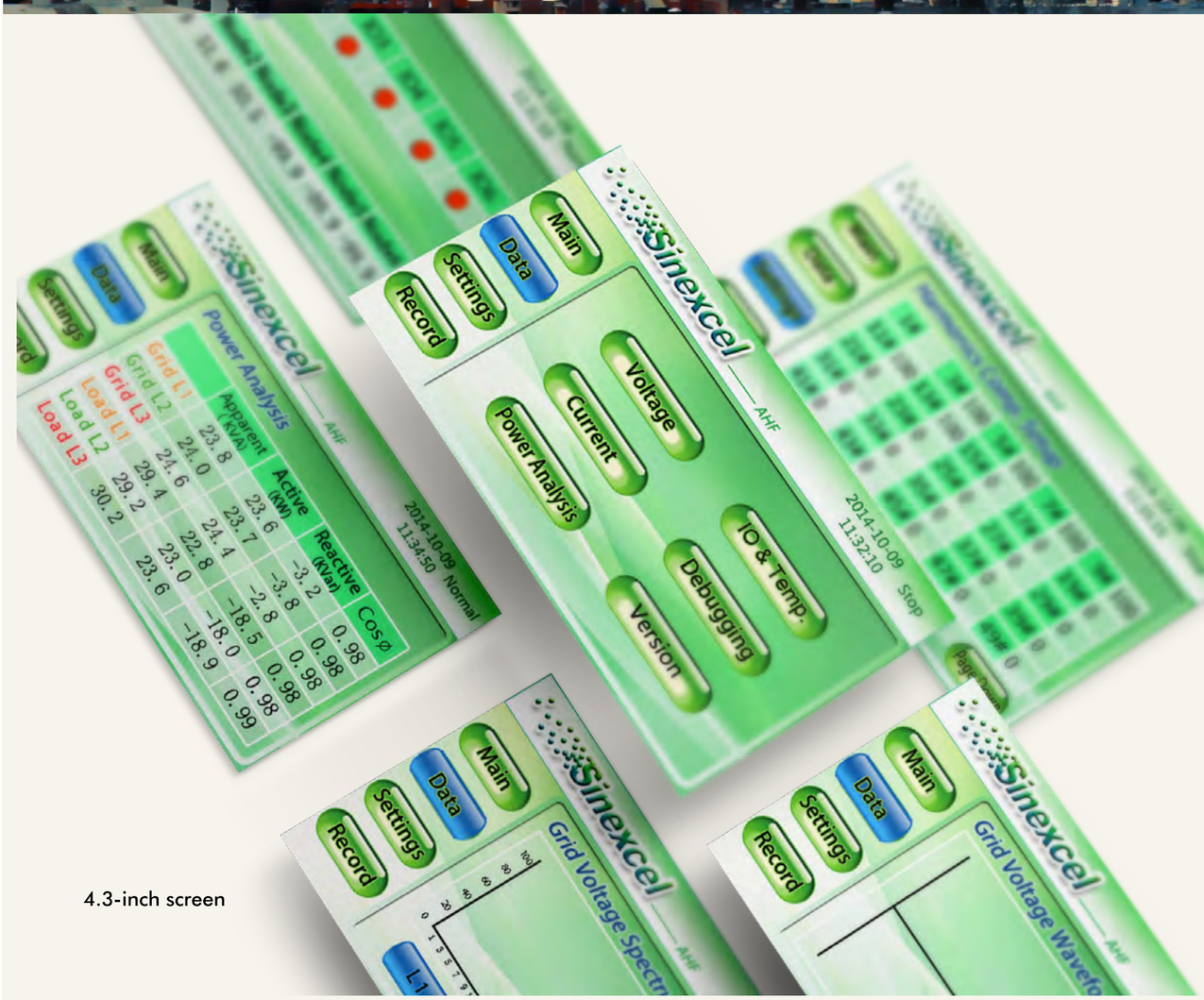
5A/10A/15A Rack 400*325*44.5 mm³ 4.98kg

400V

Flexible Engineering Cabinet

- Flexible dimension
  600*1000*2200mm³,800*1000*2200mm³,800*800*2200mm³ are available.
- Flexible Capacity
  AHF, 25A/35A/50A/60A/75A/100A/150A adapt to cabinet
  SVG, 30kvar/50kvar/100kvar adapt to cabinet
  AHF, SVG module adapt to cabinet
- Flexible incoming connection
  Top / Bottom cable entrance
  Top / Bottom MCCB position

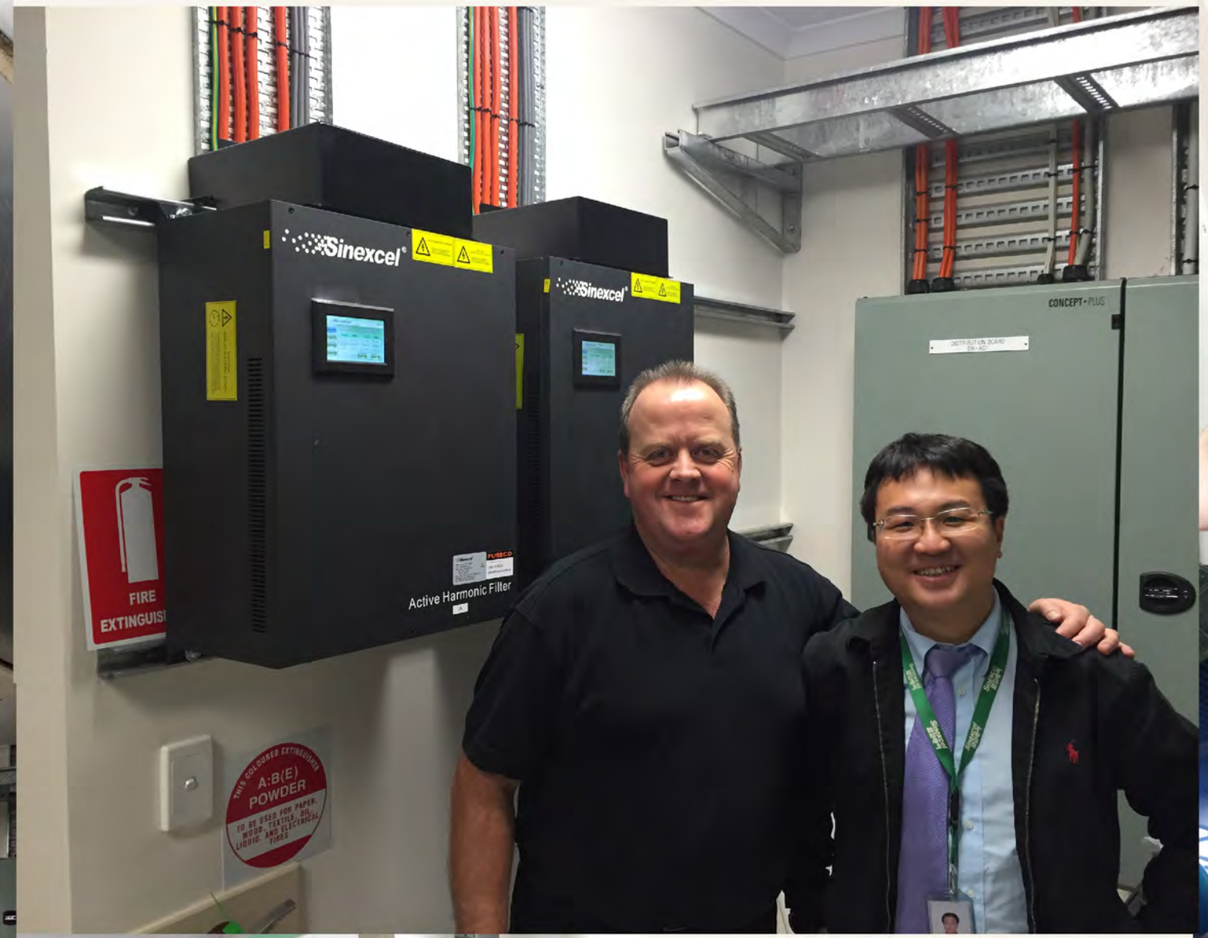
MONITORING

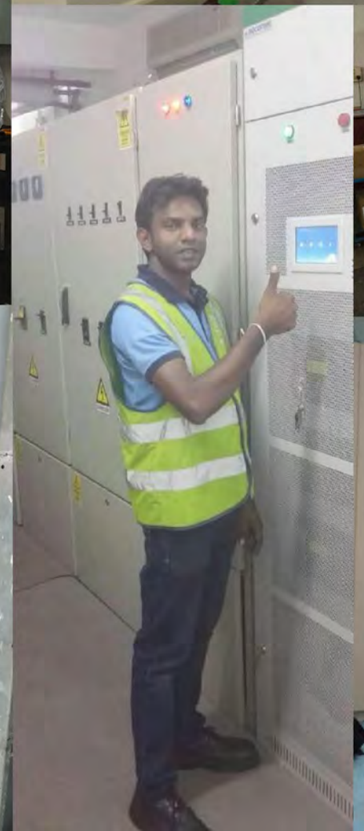


4.3-inch screen

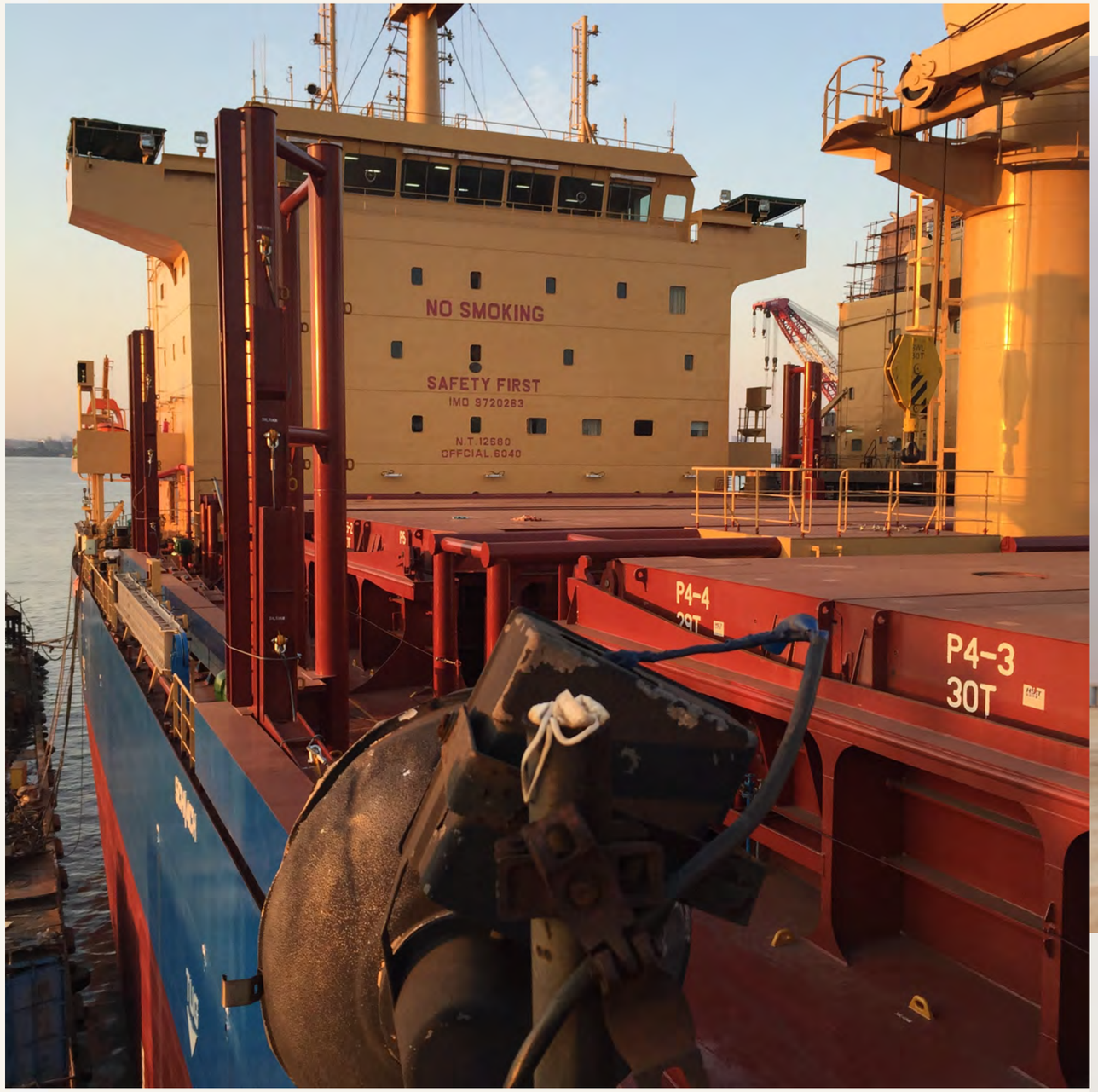
Centralized monitoring System

GLOBAL APPLICATION





GLOBAL APPLICATION

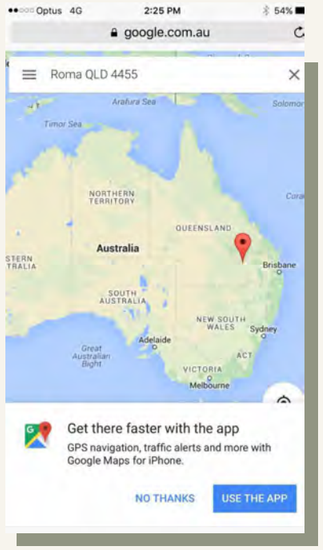


Germany, Transportation, AHF, Summit Bulk Carrier

Saudi Arabia, Oil&Gas, AHF, Well Head

Singapore, commercial, AHF, Marina Bay Financial Center

China, commercial, AHF, Han Show by Wanda Group and Franco Dragone Entertainment Group



Australia, industrial, AHF, BHP Billiton Group

United Kingdom, Commercial, AHF, Marks & Spencers

Chile, industrial, food product factory, AHF, Cecinas Llanquihue

New Zealand, Irrigation, AHF, Central Plains Water

GLOBAL APPLICATION

Sinexcel AHF application covers Asia, Oceania, Europe, Africa, North America, South America.