PurityElec

Pure Energy, Smart Savings!

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Energy Efficiency

Power Quality

AHF

Flexible Alternative Current

Harmonic Mitigation

Inverter Based PQ

Active Harmonic Filter

Modular Solution

NONLINEAR LOADS

Different compensation model for different loads

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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.

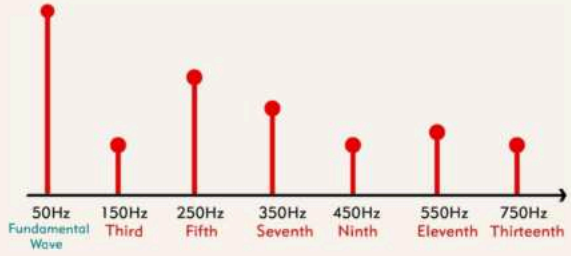
UNINTERRUPTIBLE POWER SUPPLIES (UPS)

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.



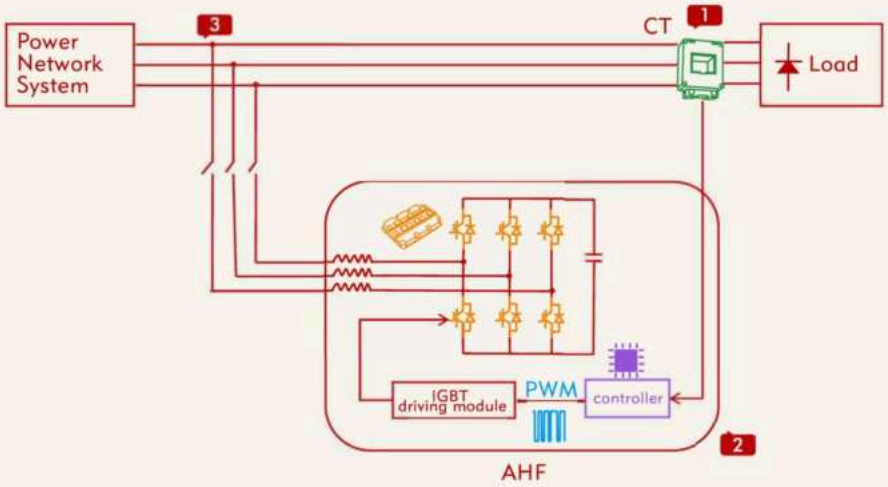
Electrical network with poor power quality results in financial loss and safety concerns. Good power quality not only improves the efficiency of the energy by decreasing the loss of electrical equipment, but also guarantees that the power system could support stable and healthy operation. It becomes 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 .

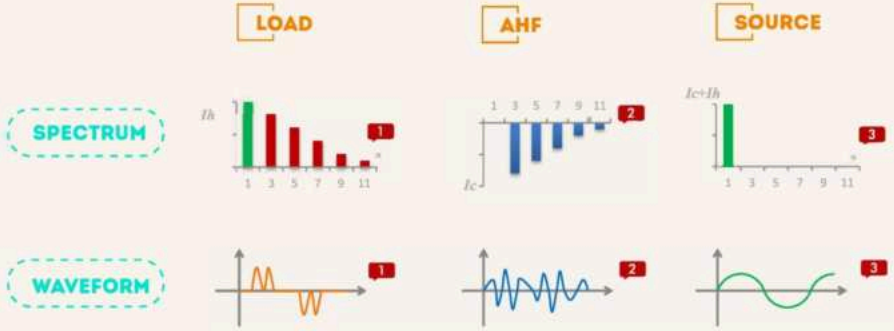
AHF WORKING PRINCIPLE

Optimize your harmonic compensation efficiency

Flexible Alternative Current
Harmonic Mitigation
Inverter Based PQ
Active Harmonic Filter

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.





External CT function as eye
detect the load current

DSP as CPU has advanced logic control arithmetic, could fast track the instruction current, automatically study the grid environment and system impedance by using the intelligent FFT, and calculates the harmonic content rapidly and accurately.

DSP function as brain
Analyze and calculate harmonic content of the load current

Send PWM signal to drive IGBT control IGBT on and off at 20kHz frequency

IGBT function as heart
Generate opposite phase harmonic compensation current by rectifier and inverter

Realize harmonic compensation

CT detects the output current and negative feedback goes to DSP. Then DSP proceeds the next logical control to achieve more accurate and stable system.

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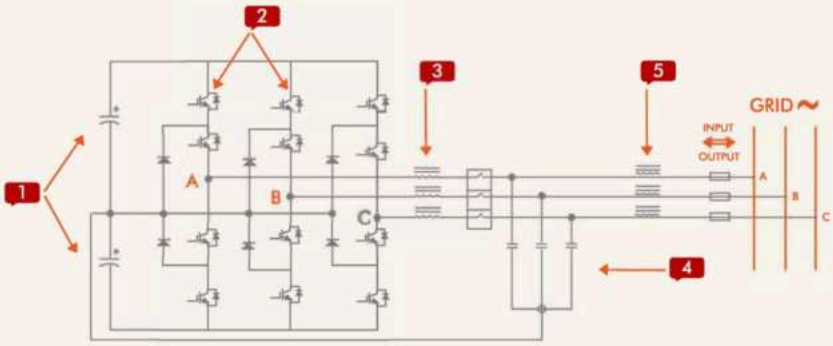
UNDERSTAND HOW AHF COMPENSATE HARMONIC

Optimize your harmonic compensation efficiency



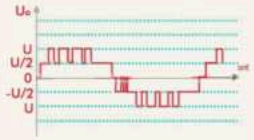
DC BUS CAPACITOR 1

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.

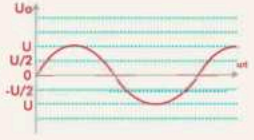
LCL FILTER CIRCUIT

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

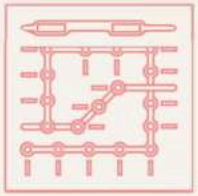
Module 4.3 inch HMI, cabinet 7 inch HMI central

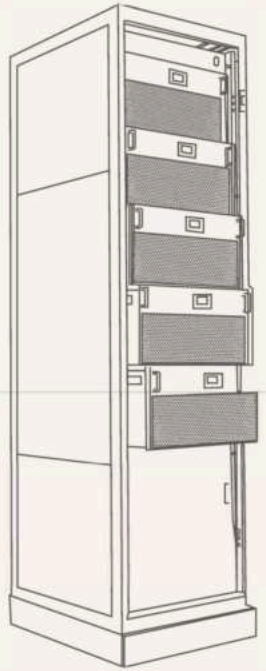
Display electrical system voltage, current, frequency, before and after THDi, Apparent/Active/Reactive power, etc

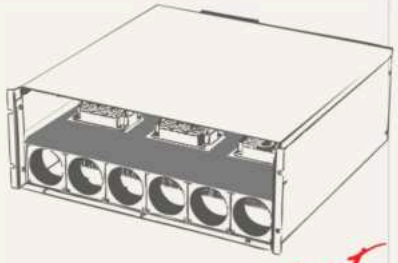
Display before and after waveform, spectrum in same page with clearly comparison

MAINTENANCE FREE DESIGN

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







AHF Cabinet

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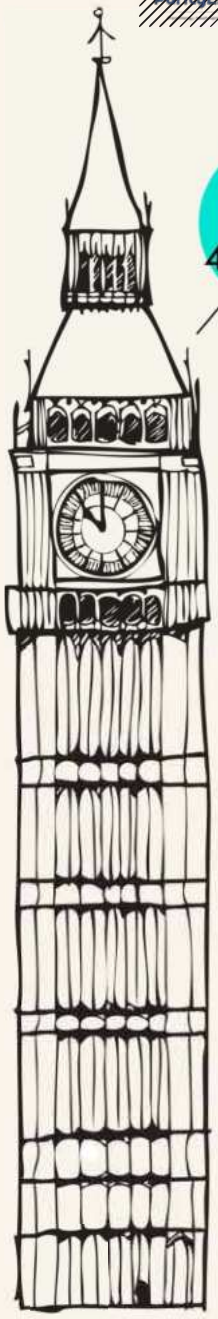
INVERTER



400V Grid Voltage

Specification

Item	
Nominal voltage	
Voltage range	
Nominal frequency	
Parallerquantities	
Efficiency	
Wiring configuration	
Current Transformer	
Topology	
Capacity	
Harmonic Comp.	
Reactive Power Comp.	
Unbalance Comp.	
Compensation Har. Order	
Harmonic compensation rate	
Fast response Time	
Overall response Time	
Target PF	
Overall response Time	
Switching frequency	
Cooling (Smart ventilation)	
Noise level	
Communication port	
Communication protocal	
Display interface	
Protecting	
Event recorded	
Installation	
Dimension (W * D * H, mm)	Rack mount, LED
	Rack mount, LCD
	Wall mount, LCD
Net weight	
Color	
Altitude	
Operation temperature	
Relative humidity	
Protectionclass	
Qualifications	

PurityElec's Active Harmonic Filter						
AHF 5/10/15	AHF 25/35	AHF 50/60	AHF 75	AHF100	AHF150	AHF 300
System Parameters						
400V						
228~456Vac						
50/60Hz (Range : 45Hz ~ 62.5Hz)						
Unlimited						
≥ 97%						
3 Phase 4 Wire/3 Phase 3 Wire						
0 ~ 30,000/5						
Three level						
Performance Indicators						
5/10/15A	25/35A	50A/60A	75A	100A	150A	300A
Default						
Default						
Default						
2~61 order	2~50order					
> 95%						
<20μs	< 50μs					
< 5ms						
-1 ~ 1 adjustment						
FFT, intelligent FFT, and instantaneous reactive power						
average 50kHz	average 20kHz					
44L/Sec	151L/Sec	115L/Sec	222L/Sec	336L/Sec	360L/Sec	500L/Sec
<68dB	<56dB				<65dB	<75dB
Monitoring						
RS485 , Ethernet(option)						
Modbus、TCP/IP(option)						
Wifi display 7-inch HMI(optional)	4.3-inch LCD touch panel ; LED indicator, central monitor(optional 7-inch touch screen)					
over-voltage protection, under-voltage protection, inverter bridge inverse protection, over-compensation protection, and etc						
Yes , max. up to 500 records						
Mechanical Characteristic						
Wall mounted / Rack mounted	Wall mounted / Rack mounted / Cabinet					
410*340*45	440*490*150	500*515*180	500*546*190	500*575*200	500*605*269	500*726*370
/	440*490*150	500*515*180	500*586*190	500*605*200	500*630*269	500*726*370
410*45*340	440*150*485	500*180*540	500*190*571	500*200*599	500*273*638	500*370*729
4.98kg	18kg	23kg	28kg	35kg	44kg	110kg
Black	Black					
Environment Requirment						
≤ 1500m 1500 ~ 4000m (according to GB/T3859.2 , increase every 100m derating capacity 1%)						
-10℃ ~ +40℃						
5% to 95%, non-condensing						
IP20 , others IP class could be customized						
CE						

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INVERIER

690V Grid voltage

Specification

Items	208V	480V	600V	690V
	PurityElec's AHF 25/35/50/60/75/	PurityElec's AHF 25/35/50/60/75/90/100	PurityElec's AHF 25/35/50/60/75/90/100	PurityElec's AHF 25/35/50/60/75/90/100
System Parameter				
Rated input	220V(176V~264V)	480V(384V-552V)	600V(420V-690V)	690V(483V-793V)
Power grid fequency	50/60Hz (range: 45Hz~62.5Hz)			
Parallel quantities	Unlimited			
Efficiency	>97%			
Power grid structure	3P3W/3P4W			
CT	150/5~30,000/5			
Circuit topology	3-Level			
Performance Indicator				
Rated capacity	25/35/50/60/75/90/100A			
Function	Harmonic compensation, Reactive power compensation, Unbalance compensation			
Control algorithm	FFT/ Intelligent FFT/ Instantaneous Reactive Power			
Filtering range	2nd to 50th orders			
Filtering performance	>95%			
Reaction time	<50μs			
Overall response time	<5ms			
Target power factor	Adjustable from -1 to +1			
Switching frequency	Average 20KHz			
Cooling air requirement	359L/Sec	For 25/35/50A 342L/Sec; For 60/75/90/100A 359L/Sec		
Noise level	<65dB			
Communication & Monitoring Capability				
Communication ports	RS485, Ethernet port (RJ45)			
Communications protocols	MODBUS (RTU, TCP/IP)			
Module display interface	7-inch LCD touched screen/LED(rack-mounted); 4.3-inch LCD touched screen(wall-mounted)			
Protection functions	Abnormal voltage/frequency protection; Inverter short-circuit protection; Abnormal output current protection; Inverter over-loaded protectio; Over-tempearture protection etc,.			
Monitoring alarm	Available			
Fault alarm	Available, 500 alarm records			
Machanical Properties				
Mounting type	Wall-mountedd/Rack-mounted/Cabinet			
Dimensions (WxDxH)mm	For 25A/35A/50A 500*540*180 (Rack-mounted) 500*184*627 (Wall-mounted) For 60/75/90/100A 500*675*250 (Rack-mounted) 500*250*723 (Wall-mounted)			
Net weight	70kg	40kg (25/35/50A); 70kg (60/75/90A/100A)		
Color	Black			
Environment Requirement				
Altitude	≤1500m; Between 1500m to 4000m, derating 1% every additional 100m			
Ambient temperature	-20℃-40℃ (may derate capacity if ambiet temperature exceeds 45℃)			
Relative humidity	5% to 95%, non-condensing			
Protection class	IP20			
Related Qualifications & Standards				
Qualifications	CE, cETLus, cULus, DNV/BV/RINA			
Standards compliance	IEEE 519, ER G5/4, IEEE 61000			

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INVERTER

A

400V

25A/35A wall 440*150*485mm³ 18kg
rack 440*490*150mm³ 18kg

400V

50A/60A	wall	500*180*540mm³	23kg	rack	500*515*180mm³ 23kg
75A	wall	500*190*571mm³	28kg	rack	500*546*190mm³ 28kg
100A	wall	500*200*599mm³	35kg	rack	500*575*200mm³ 35kg

INVERTER

A

400V

480V
600V
690V

300A wall 500*273*638mm³ 110kg
rack 500*370*729mm³ 110kg

150A wall 500*273*638mm³ 44kg
rack 500*605*269mm³ 44kg

50A wall 500*184*627mm³ rack 500*540*180mm³ 40kg
90A wall 500*253*590mm³ rack 500*590*250mm³ 62kg
100A wall 500*250*723mm³ rack 500*675*250mm³ 70kg

INVERTER

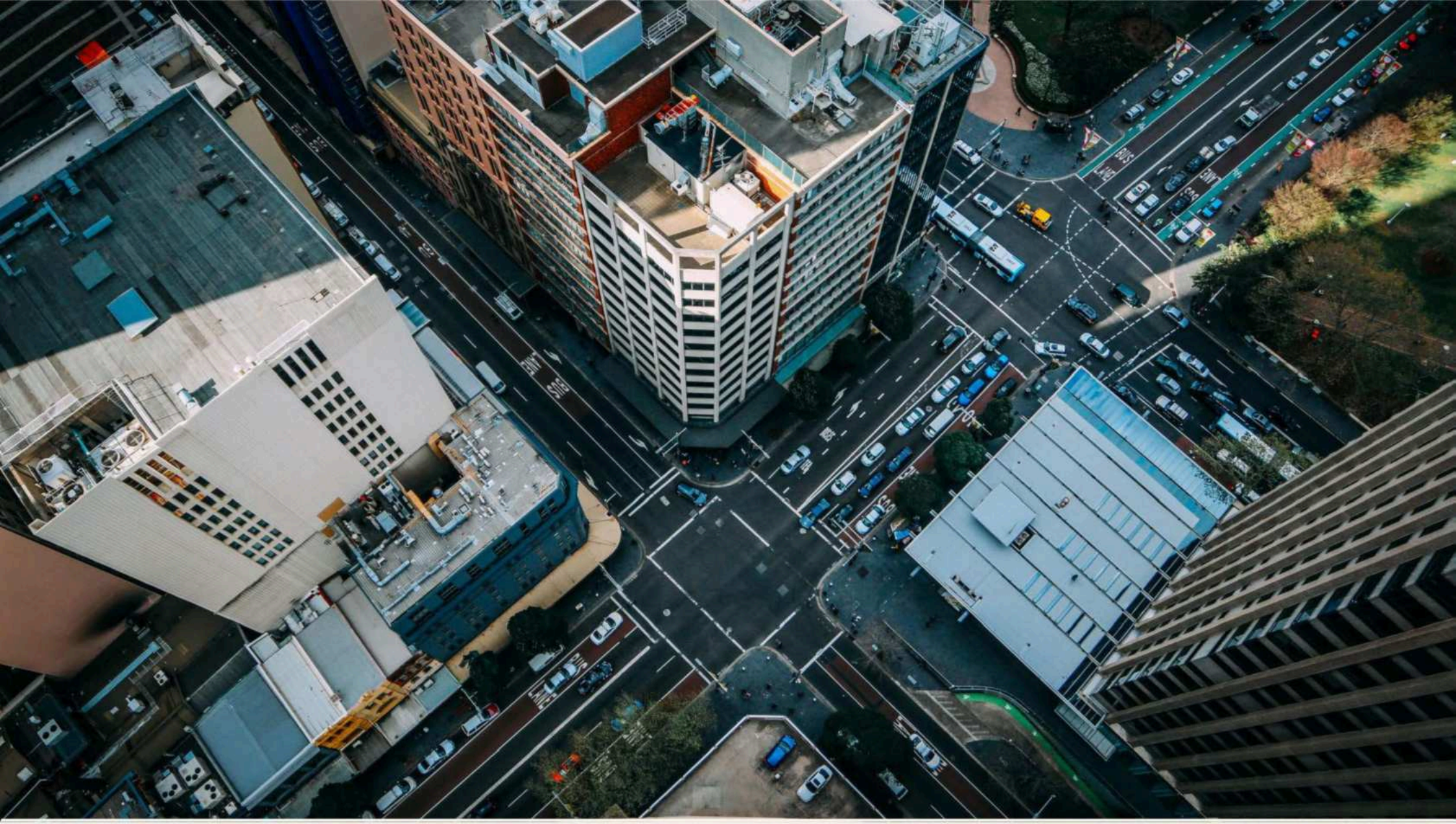
A 400V

5A/10A/15A wall/rack 410*340*45mm^3 4.98kg

400V

Flexible Engineering Cabinet

- Flexible dimension
  600*1000*2200mm^3,800*1000*2200mm^3,800*800*2200mm^3,1000*1000*2200mm^3 are available.
- Flexible Capacity
  AHF, 25A/35A/50A/60A/75A/100A/150A/300A adapt to cabinet
  RPG, 30kvar/50kvar/100kvar/200kvar adapt to cabinet
  AHF, RPG module adapt to cabinet
- Flexible incoming connection
  Top/ Bottom cable entrance
  Top/ Bottom MCCB position



Thank You!

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