

项目 Item	功率 Power		
总功率 Total power	400KW	800KW	1000KW
测试电压 Test voltage	三相AC400V AC220 Three-phase AC400V AC200V	三相AC400V AC220 Three-phase AC400V AC200V	三相AC400V AC220 Three-phase AC400V AC200V
功率分段 Power step	1kw x1 2kw x1 4kw x1 8kw x1 12kw x2 24kw x6 48kw x5	1kw x1 2kw x1 4kw x1 12kw x1 24kw x2 48kw x4 60kw x10	1kw x1 2kw x1 4kw x1 12kw x1 24kw x2 48kw x5 60kw x13
频率 Frequency	50-60HZ	50-60HZ	50-60HZ
功率因素 Power factor	1.0	1.0	1.0
助电源 Auxiliary power	三相+N AC380V Three-phase AC380V	三相+N AC380V Three-phase AC380V	三相+N AC380V Three-phase AC380V
操作方式 Operation mode	手动 Manual	手动 Manual	手动 Manual
冷却方式 Cooling mode	强制风冷 Forced air cooling	强制风冷 Forced air cooling	强制风冷 Forced air cooling
外形尺寸 Overall dimension	L1100 x W1250 x H1600	L800 x W820 x H1300	L800 x W1250 x H1600
重量 Weight (KG)	500	1000	1300
选配 Selected fitting	电脑控制 Computer control	电脑控制 Computer control	电脑控制 Computer control

总功率 Total power	1000KW	2000KW	1000KW
测试电压 Test voltage	三相AC3300V AC6600 Three-phase AC3300V AC6600V	三相AC3300V AC6600 Three-phase AC3300V AC6600V	三相AC3300V AC6600 Three-phase AC3300V AC6600V
功率分段 Power step	0-6kw x1 6kw x5 55kw x3 110kw x8	0-6kw x1 6kw x5 55kw x4 110kw x5 220kw x6	0-12kw x1 6kw x5 60kw x5 120kw x4 240kw x1
频率 Frequency	50-60HZ	50-60HZ	50-60HZ
功率因素 Power factor	1.0	1.0	1.0
助电源 Auxiliary power	三相+N AC380V Three-phase AC380V	三相+N AC380V Three-phase AC380V	三相+N AC380V Three-phase AC380V
操作方式 Operation mode	电脑和手动 Computer&Manual	电脑和手动 Computer&Manual	电脑和手动 Computer&Manual
冷却方式 Cooling mode	强制风冷 Forced air cooling	强制风冷 Forced air cooling	强制风冷 Forced air cooling
外形尺寸 Overall dimension	L3600 x W1250 x H2000	L3600 x W2500 x H2000	L42600 x W 1710 x H2400
重量 Weight (KG)	2200	4500	3200

总功率 Total power	0.77KW	1.53KW	1.53KW	3KW
总电流 Total current	64A	128A	64A	128A
测试电压 Test voltage	DC 12V	DC 12V	DC 24V	DC 24V
功率分段 Power step	5段	5段	5段	5段
助电源 Auxiliary power	单相 AC220V Single phase AC220V	单相 AC220V Single phase AC220V	单相 AC220V Single phase AC220V	单相 AC220V Single phase AC220V
操作方式 Operation mode	"手动 Manual"	"手动 Manual"	"手动 Manual"	"手动 Manual"
冷却方式 Cooling mode	"强制风冷 Forced air cooling"	"强制风冷 Forced air cooling"	"强制风冷 Forced air cooling"	"强制风冷 Forced air cooling"
外形尺寸 Overall dimension	160 x 400 x 300	160x 400 x 300	160 x 400 x 300	160x 400 x 300
重量 Weight (KG)	30	30	30	30

成品识别码 (Product Identification Code)

TRA - 200A - L - Y
 TRA: 3 phase load bank 电流 Current
 DRA: Single phase load bank
 L: Inductive load
 R: Resistance load
 Y:星型 Star
 J:角型 Angle

有源电力滤波器 Active power filters

产品概述 (Product Introduction)

经过多年研发, 已成功应用于众多工业现场, 是当今用于电能优化技术中质量优良, 性能稳定的高科技产品。Active power filter is a high-tech product with excellent quality and stable performance power optimization technology after years of research and development, which has been successfully applied to many industrial sites.

有源滤波器拥有闭环控制系统和对每次谐波独立选择的两大功能。

The Active filter has two functions: a closed-loop control system and independent selection of each harmonic

●闭环控制系统可以检测到电流中每一次谐波的大小和无功功率, 通过与用户设定的目标对比从而实现自动修正。

The closed-loop control system detects the magnitude and reactive power of each harmonic in the current and automatically corrects it by comparing it with the target set by the user.

●对每次谐波进行独立选择的功能来自于先进的算法。滤波器所释放的补偿电流将完美地注入到所选定的目标谐波中, 这保证了用户锁定的目标谐波将会完美滤除。

The ability to independently select each harmonic comes from advanced algorithms. The compensation current released by the filter is perfectly injected into the selected target harmonic, which guarantees the user-locked target harmonic the waves will be filtered out perfectly.

有源电力滤波器闭环控制系统同样可帮助滤波器实现卓越的无功补偿功能和三相平衡功能。

The closed-loop control system of the active power filter also helps the filter achieve excellent reactive power compensation and three-phase balancing functions.

电能质量差带来的损失 Losses due to poor power quality

存在电能质量问题的电气系统将导致成本上升、环境污染和安全隐患在用户的供电系统中, 种类繁多的负载会带来以下三个明显的电能质量问题 Electrical systems with power quality problems will lead to rising costs, environmental pollution and safety hazards in the user's power supply system, a wide variety of loads will bring the following three obvious power quality problems

●谐波污染 Harmonic pollution

●负载不平衡而导致的电压不平衡和相对零电压 Voltage imbalance and relative zero voltage due to load imbalance

●无功功率 Reactive power

电能质量问题带来的不仅仅是金钱上的损失, 它还会带来更多其它问题:

Power quality issues bring more than just monetary losses. It raises many other problems:

●设备故障率上升 The equipment failure rate is rising

●设备寿命下降 Reduced equipment life

●产量下降 Production declined

●配电系统的安全性下降 The safety of the power distribution system is reduced

●增加碳排放 Increase carbon emissions

●无法满足供电局相关规范要求 Unable to meet the relevant specifications of the power supply bureau

此外, 谐波污染还会导致电网中诸如变压器、电缆和马达等设备的有功损耗上升, 这些损耗又将占用发电站的输出能量并导致更多的二氧化碳排放。排放量的大小将取决于整个生产过程和发电所用的燃料类型。

In addition, harmonic pollution can lead to higher active losses in equipment such as transformers, cables, and motors in the grid, which in turn will take up the output energy of the power station and lead to more CO₂ emissions. The magnitude of the emissions will depend on the entire production process and the type of fuel used to generate electricity.

负载平衡示例 Example of load balancing

不带滤波器 Without filter

线电流 Line current 1 49.1Arms
 线电流 Line current 2 5.3Arms
 线电流 Line current 3 5.1Arms

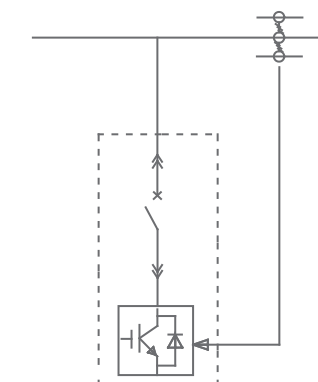
中性线电流
 Neutral current 44.1Arms

带滤波器 With filter

线电流 Line current 1 19.6Arms
 线电流 Line current 2 19.4Arms
 线电流 Line current 3 19.5Arms

中性线电流
 Neutral current 3.5Arms

在电气工程中的设计方法



解决方案 Solution

有源电力滤波器能解决谐波污染、三相不平衡和无功补偿等电能质量问题。

The active power filter solves power quality problems such as harmonic pollution, three-phase unbalance and reactive power compensation.

●可应用于不同类型的场合, 并同时适用于商业和工业环境。

It can be used in different types of applications and is suitable for both commercial and industrial environments.

●为客户提供谐波滤除、三相平衡和容性或感性无功补偿。

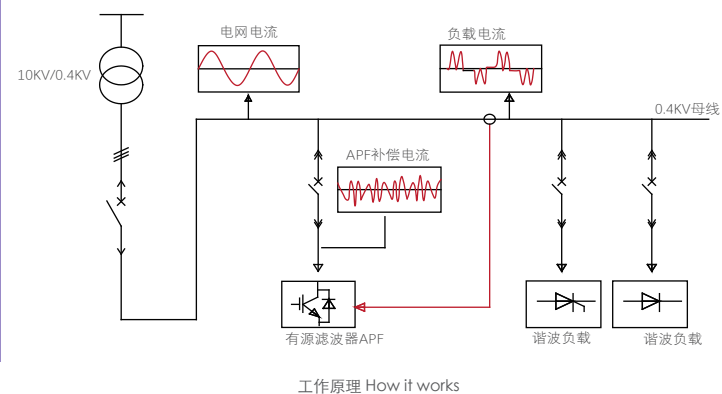
Provide customers with harmonic filtering, three-phase balancing and capacitive or inductive reactive power compensation.

●通过主从模块的并联扩展, 从几十安培到几千安培的丰富的滤波方案可以为每个系统提供最优化的解决方案。

Through the parallel expansion of the master-slave modules, the rich filtering scheme from tens of amperes to thousands of amperes can provide the most optimized solution for each system.

●有源动态滤波器可安装在低压电网中, 并可通过合适的升压变压器接入中压系统使用。

Active dynamic filters can be installed in low-voltage power grids and can be connected to medium-voltage systems via suitable step-up transformers.



有源电力滤波器为供电系统带来以下好处。
Active power filters bring the following benefits to power delivery systems.

- 减少停机时间
Reduce downtime
- 提高系统运行效率，减少二氧化碳排放
Improve the efficiency of system operation and reduce CO2 emissions
- 满足严格的供电局要求，避免罚款或断电
Meet stringent power bureau requirements and avoid fines or power outages
- 无需对电网的特殊分析，方案实施快而简单
No special analysis of the grid is required, and the implementation of the solution is quick and simple
- 不会过载，特别适用于负载变化快的低压系统
It will not be overloaded, and is especially suitable for low-voltage systems with fast load changes

应用范围 Scope of application

有源电力滤波器可提供不同结构、不同尺寸和不同电容量容量的产品，完全满足不同场合的不同要求。
Active power filters can provide products with different structures, different sizes and different current capacities, which can fully meet the different requirements of different occasions.

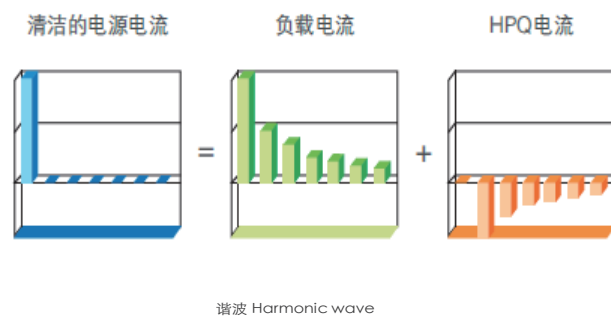
典型应用行业

- Typical application industries
- 石油和天然气行业（陆地和海上） Oil & Gas Industry (Onshore & Offshore)
 - 钢铁行业 Iron and steel industry
 - 水处理行业 Water treatment industry
 - 水泥行业 Cement industry
 - 汽车行业 Automotive industry
 - 过程控制行业 Process control industry
 - 造纸行业 Paper industry
 - 太阳能行业 Solar energy industry
 - 印刷行业…… Printing industry……

模块化产品为商业和民用以及轻工业场合开发的一款紧凑型产品，同时适用于三相三线和三相四线。墙上安装的模式使得产品适用于空间有限的场合。同样它也能安装在盘柜中。
The modular product is a compact product developed for commercial and residential as well as light industrial applications, and is suitable for both three-phase three-wire and three-phase four-wire. The wall-mounted mode makes the product suitable for applications where space is limited. It can also be installed in enclosures.

典型应用行业

- Typical application industries
- 办公室和商业大厦 Office and commercial buildings
 - 计算机和数据中心 Computers and Data Centers
 - 住宅 Residence
 - UPS系统，电梯和照明系统 UPS systems, elevators and lighting systems
 - 轻工业（例：远程泵站） Light industry (e.g. remote pumping stations)
 - 轨道交通…… Rail transit……



有源滤波控制器 Active filter controller

简单的调试工作在应用过程中尤为重要，同时用户需要实时监视整个网络的电能质量情况。HK-070HE 是应用于所有型号的一款标准化用户图形操作界面。它能直接为用户提供滤波器控制、编程和电网参数监视等功能，还具备通讯、故障和实时事件记录等功能。
Simple commissioning is especially important during the application process, where users need to monitor the power quality of the entire network in real time. The HK-070HE is a standardized graphical user interface for all models. It can be direct users are provided with functions such as filter control, programming, and grid parameter monitoring, as well as communication, faults, and real-time events recording and other functions.

全图图形显示 Full graphical display

HK-070HE通过 64×132 像素的液晶面板，清晰地为用户提供了各类滤波器信息。
The HK-070HE provides users with a wide range of filter information through a 64×132 pixel LCD panel.

主要功能如下：

启动、停止和重启滤波器测量、分析和记录各个参数对滤波器进行设定监视滤波器状态和故障记录满足不同场合的不同要求。
Start, stop, and restart filters measure, analyze, and record individual parameters, set the filter, and monitor the filter status and fault records meet the different requirements of different occasions.

操作键

Action keys
简单而又友好的操作键让整个操作简单而又直观。
Simple and user-friendly keys make the whole operation simple and intuitive.

通讯

Communication
HK-070HE 提供了 Modbus RTU 模式的通讯接口。通过 Modbus RS-485 转换器（可选），能够接入上位机。所有参数、设定和测量值均能够进行传输。
The HK-070HE provides a communication interface in Modbus RTU mode. Pass Modbus RS-485 converter (optional), can be connected to the host computer. All parameters, settings and measured values can be transmitted.

帮助键

Help key
帮助键能够让用户便捷地获得各个功能特性的详细描述。
The help button allows the user to easily obtain a detailed description of each function.

调试简单

Commissioning is simple
自动检测和对误接CT进行校正的功能使得调试工作更加简单。
Automatic detection and correction of misconnected CT images makes commissioning easier.

用户收益

User Benefits
保护功能降低了停机时间 Protection features reduce downtime
直接获取电网关键参数 Direct access to key grid parameters
适用于不同工况下 It is suitable for different working conditions

尺寸安装

Dimensional mounting
外观尺寸 Exterior dimensions: 203*145*38 mm
开孔尺寸 Cut-out size: 192*138 mm



技术参数 Technical parameters

电气参数

Electrical parameters	
联接方式 Connection mode	三相三线/三相四线 Three-phase three-wire / three-phase four-wire
电压等级 Voltage level	400V/690V (±20%)
电网频率 Grid frequency	50Hz/60Hz (±5%)
滤波电流能力 Filtering current capability	50A75A100A125A150A
零线谐波滤除能力 Neutral harmonic filtering capability	三倍于相线 Three times as much as the phase
模块数量 Number of modules	≤8 PCS
冗余功能 Redundancy	主主/主从 Master Master/Master Slave
设备损耗 Wear and tear of equipment	≤3%
内部保护装置 Internal protection	短路, 过流, 过压, 过热等 Short circuit, overcurrent, overvoltage, overheating, etc

滤波器参数

Filter parameters	
滤波范围 Filter range	2nd to 51st
谐波选择范围 Harmonic selection range	20次
滤波设定 Filter settings	可对每次谐波电流进行单独设定 Each harmonic current can be set individually
滤波能力 Filtering capabilities	≤5%THDi
整机效率 Overall machine efficiency	≥97.50%
谐波滤除率 Harmonic filtering rate	≥98%
涌入电流 Inrush current	少于额定电流值 Less than the rated current value
限流运转 Current-limited operation	限制在额定电流补偿 Limited to rated current compensation
瞬时响应时间 Instantaneous response time	≤0.1ms
全响应时间 Full response time	≤8ms
噪音（距离1米） Noise (distance of 1 meter)	≤60dB

无功补偿参数

Reactive power compensation parameters	
目标功率因数 Target power factor	可设定0.6 (感性)-0.6 (容性) Configurable 0.6 (sensitivity) - 0.6 (capacitance)

负载平衡参数

Load balancing parameters	
模式 Mode	相相间 Interphased :ON/OFF

编程 / 通讯

Programming / Communication	
数字输入输出 Digital inputs and outputs	2 digital inputs/6 digital outputs
报警点 Alarm point	1 NO point, 1 NC point

安装

Installation	
海拔 Elevation	≤1500m, indoor installation (1% reduction per 100 meters)
环境温度 Ambient temperature	-10° C 至 40° C
湿度 Humidity	95%, 无凝露 No condensation

订货资料 - 选型表 Ordering Information - Selection Table

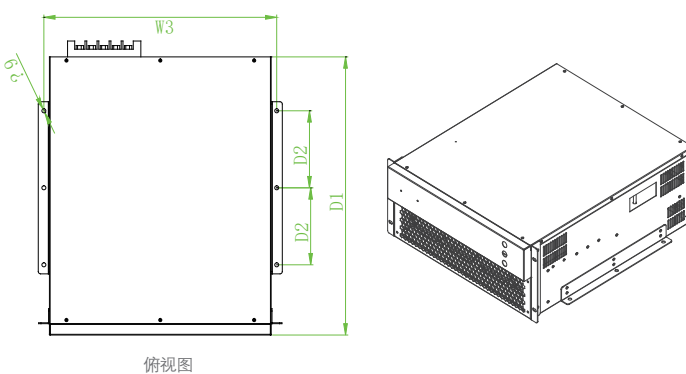
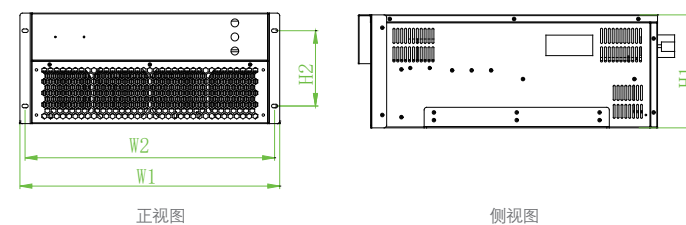
模块组合示例400V

Module combination example 400V	APF 模块组合
50A	APF-400V-50A-XL
75A	APF-400V-75A-XL
100A	APF-400V-100A-XL
125A	APF-400V-125A-XL
150A	APF-400V-150A-XL
200A	APF-400V-100A-XL*2
250A	APF-400V-125A-XL*2
300A	APF-400V-150A-XL*2
350A	APF-400V-100A-XL*2+HPQ-APF-400V-150A-XL
400A	APF-400V-100A-XL+HPQ-APF-400V-150A-XL*2
450A	APF-400V-150A-XL*3
500A	APF-400V-50A-XL+HPQ-APF-400V-150A-XL*3
550A	APF-400V-100A-XL+HPQ-APF-400V-150A-XL*3
600A	APF-400V-150A-XL*4

产品尺寸 Product dimensions

抽屉式 Drawer style

规格	外形尺寸(mm)						
	H1	H2	W1	W2	W3	D1	D2
50A	165	100	470	452	451	415	140
75A	165	100	470	452	451	415	140
100A	220	150	545	522	521	614	170
150A	220	150	545	522	521	614	170



壁挂式 Wall-mounted

规格	外形尺寸(mm)				
	H1	W1	W2	D1	D2
50A	190	430	451	460	140
75A	190	430	451	460	140
100A	250	496	521	589	170
150A	250	496	521	589	170

