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GEYA®

GEYA®

电能质量
Power Quality Management

Product Manual

浙江格亚电气有限公司
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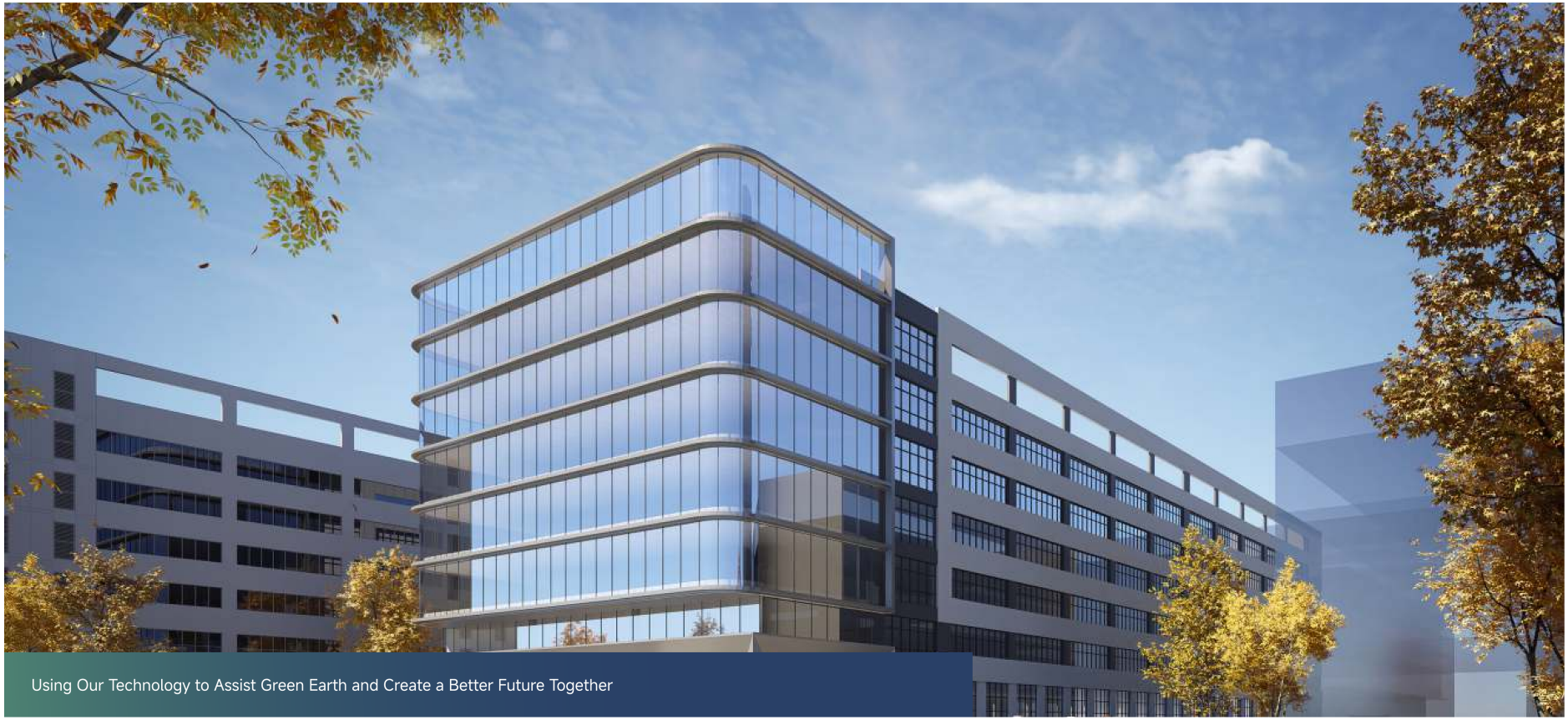
GEYA®



Using Our Technology to Assist Green Earth and Create a Better Future Together

ABOUT US

浙江格亚电气有限公司成立于2007年2月，地处浙江温州，是一家专业从事新能源电气与自动化控制产品自主研发、生产、销售及配套服务的高新技术企业。公司具备完整全产业链运营能力，依托规范经营管理与持续技术创新，综合实力稳步提升，年营业额已突破2亿元人民币，综合产能及行业综合实力位居区域行业前列。

公司主营低压电器元件、工业自动化控制元件全系列核心品类，可同步提供低压配电系统、自动化控制系统、新型智能电力系统定制化成套解决方案，可对接各类政企工程、工贸企业、跨境项目，交付一站式全流程配套服务。产品适配多类工业、基建、新能源全域应用场景，性能稳定、合规达标率高，收获海内外客户一致认可与长效好评。公司深耕全球化市场布局，销售网络覆盖全球六大洲，累计服务一万余家海外合作企业，渠道体系成熟完善。现面向全球开放区域代理、批量集采、专项项目共建等多元合作模式，携手共建电气产业共赢生态。

自成立以来，公司秉持"格物知致，亚行天下"企业理念，坚守品质为先、创新赋能核心发展原则，严控产品高标准、高性价比、高品质三道核心关口。目前已斩获多项国家实用发明专利，完成GEYA品牌多国全域合规布局。全系产品严格对标国际行业准入标准，顺利取得CCC、CE、SAA、SEMKO、TUV、EN等国内外权威全套资质认证，全面符合欧洲、中东等多国属地质量核验标准，跨境供货合规无壁垒。公司可正规承接全球客户OEM、ODM定制化代工研发服务，已与多家国际知名电气品牌达成长期稳定战略合作。专业实战型营销服务团队全域联动，稳步拓宽海内外品牌市场版图，持续强化品牌核心竞争力。

格亚电气诚邀海内外优质代理商、渠道商及工程合作伙伴携手拓市，共享行业发展红利。我们将以过硬原装全系产品、高效全天候专属配套服务、极具市场竞争力的合作扶持政策，全方位护航合作伙伴稳定创收、长效经营。

格亚电气匠心做品质、专心做科创、诚心做合作，期待与全球客商同心同行，共创电气行业高质量发展新未来！

统一电能质量调节装置

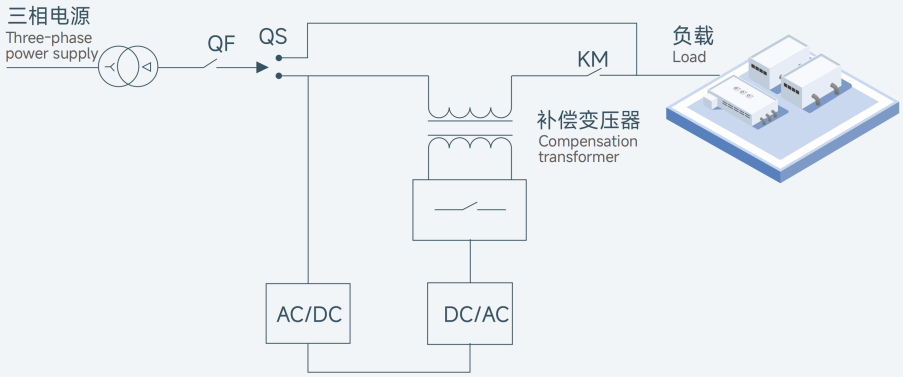
Unified power quality control device

GY-AVC

统一电能质量调节装置是由AC-DC-AC变换器、断路器QF、接触器KM以及补偿变压器组成。AC-DC-AC变换器采用全控型电力电子器件，可以实现能量双向流动;旁路开关是在检修时切到旁路状态;接触器KM是在补偿状态下，断开或者接通负载用。自动电压调节装置通过采样电网电压，实时监测电网电压是否偏离设定值，一旦偏离设定值，即控制AC-DC-AC变换器输出与电网电压极性相同或相反的电压，调节串联在主回路中补偿变压器的电压幅值和极性，保证负载端电压的稳定。

Unified power quality control device (AVC) device consists of an AC-DC-AC converter, a circuit breaker QF, a contactor KM, and a compensation transformer. The AC-DC-AC converter employs fully-controlled power electronic devices, enabling bidirectional power flow. The bypass switch is used to switch to the bypass state during maintenance. The contactor KM is used to disconnect or connect the load under the compensation state. The AVC device samples the grid voltage and monitors in real time whether the grid voltage deviates from the set value. Once a deviation is detected, it controls the AC-DC-AC converter to output a voltage with the same or opposite polarity as the grid voltage, thereby adjusting the magnitude and polarity of the voltage across the compensation transformer which is connected in series in the main circuit, so as to ensure the stability of the load-side voltage.

工作原理 Working Principle



产品型号及外观 Product model and appearance

GY - AVC - 0.4 - 30k / 4L - C

- C：安装方式　C:整柜式
- 4L：接线方式　4L:三相四线
- 30k：额定功率(kVA)　30kVA, 45kVA, 60kVA, 90kVA, 120kVA,150kVA, 200kVA, 300kVA, 400kVA
- 0.4：电压等级　0.22: 220V　0.4: 380V
- AVC：自动电压调节装置
- GY：浙江格亚电气有限公司

性能特点 Performance characteristics

(1)实时控制AC-DC-AC变换器输出电压，保证负载端电压稳定。
(2)电压无级调节，调节精度高，调节过程不间断。
(3)补偿电压幅值和速度可以控制，且分相控制输出电压，适应严重不平衡负载。
(4)变换器采用模块化设计，维护方便、扩展性好。(5)具备过载保护、软/硬件过流保护、电网过/欠压保护、过温保护、频率异常保护等，提高供电的可靠性。
(6)具有故障报警及记忆功能，可存储30个故障天的故障记录，在存储范围内，不限条数。

(1) Real time control of AC-DC-AC converter output voltage to ensure stable load terminal voltage.
(2) Voltage stepless regulation, high regulation accuracy, and uninterrupted regulation process.
(3) The amplitude and speed of the compensation voltage can be controlled, and the output voltage can be controlled by phase separation to adapt to severely unbalanced loads.
(4) The converter adopts modular design, which is easy to maintain and has good scalability.
(5) Equipped with overload protection, software/hardware overcurrent protection, power grid overvoltage/undervoltage protection, over temperature protection, frequency anomaly protection, etc., to improve the reliability of power supply.
(6) It has fault alarm and memory functions, and can store fault records for 30 fault days. There is no limit to the number of records within the storage range.

技术参数 Technical parameters

输入电压 Input voltage	220V(单相Single Phase)	380V+N(三相Three-Phase)
输入范围 Input Range	±20%(额定电压) ± 20% (rated voltage)	
输入频率 Input frequency	50Hz/60Hz±1.5Hz 50Hz/60Hz±1.5Hz	
电流谐波畸变率 Total harmonic distortion	增量≤1% Increment ≤ 1%	
电压谐波畸变率 Voltage harmonic distortion rate	增量≤1% Increment ≤ 1%	
输出电压 Output voltage	220V±1% 220V±1%	
输出电压设置范围 Output voltage setting range	输入电压的±20% ± 20% of input voltage	
调压方式 Voltage regulation method	无级、无触点 Stepless and contactless	
调节方式 Adjustment method	单相调节 Single-phase regulation	
谐波畸变 Harmonic distortion	无 nothing	
效率 Efficiency	≥99% ≥99%	
功率因数 Power factor	0.5滞后到0.7超前 0.5 lag to 0.7 lead	
7寸触摸屏 7-inch touch screen	提供参数设置，功率信息显示，故障记录，历史曲线等 Provide parameter settings, power information display, fault records, historical curves, etc	
保护功能 Protection function	输入过压/欠压保护、输出过压/欠压保护、输入过流保护、变压器过温保护、输出过载保护等 Input overvoltage/undervoltage protection, output overvoltage/undervoltage protection, input over current protection, transformer over temperature protection, output overload protection, etc	
相对湿度 Relative humidity	≤90%，月最低温度25°C表面无凝露 ≤ 90%, monthly minimum temperature 25 ° C, no condensation on the surface	
海波高度 Sea wave height	2000m以下 Below 2000m	
污秽等级 Pollution level	级以下 Below level	
噪音 Noise	≤65dB ≤65dB	
工作温度 Operating Temperature	-10°C~+50°C -10°C~+50°C	
储存温度 Storage temperature	-30°C~+70°C -30°C~+70°C	
散热方式 Cooling method	强制风冷 forced air cooling	
防护等级 Protection level	Ip20 Ip20	

智能制造业

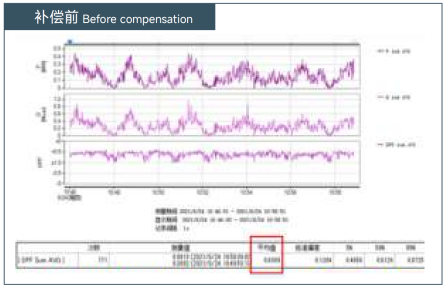
Intelligent manufacturing industry

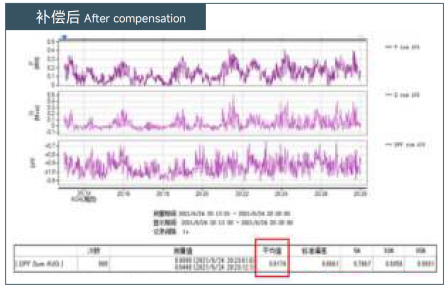
提升功率因数、抑制谐波、稳压
Improve power factor, suppress harmonics, stabilize voltage

案例背景：湖北某商用车制造公司车身装焊车间，冲击性负荷导致功率因数较低。
治理方案：投入总容量800kvar的静止无功发生装置（SVG），将功率因数由0.63提升至0.917，避免力调电费罚款。

Case Background: In the body welding workshop of a commercial vehicle manufacturing company in Hubei, impact loads resulted in a low power factor.
Solution: An 800kvar Static Var Generator (SVG) was installed, increasing the power factor from 0.63 to 0.917, thereby avoiding penalty charges for low power factor.

项　目 Project	补偿前 Before compensation	补偿后 After compensation
平均功率因数 Average power factor	0.63 增收力调电费 Power factor penalty charge	0.917 免收力调电费 Exemption from power factor penalty charge





半导体行业

Semiconductor industry

抑制谐波、提升供电质量
harmonic suppression and power quality improvement

案例背景：某半导体生产车间机台负载产生的电流谐波，导致UPS供电电源输出电压谐波畸变率严重增加，影响机台负载正常运行，甚至造成机台负载宕机。
治理方案：利用高性能APF，将THDu由17%降至3%，避免机台负载宕机。

Case Background: In a semiconductor manufacturing workshop, current harmonics generated by the equipment loads caused a severe increase in the output voltage harmonic distortion (THDu) of the UPS power supply, affecting the normal operation of the equipment and even leading to equipment shutdown.
Solution: A high-performance Active Power Filter (APF) was deployed, reducing THDu from 17% to 3%, thereby preventing equipment shutdown.

相 位 Phase	补偿前 Before compensation	补偿后 After compensation	改善幅度 Improvement margin
A 相	17.0	2.8	83.5%
B 相	16.7	3.3	80.2%
C 相	16.8	3.0	82.1%

数据中心

Data center

提升功率因数和供电质量、抑制谐波
Improve power factor and power quality, suppress harmonics

案例背景：某数据机房末端精密空调变频压缩机产生的谐波，给配电系统造成非必要损耗、影响电气设备正常运行、降低配电系统使用效率以及增加用电成本。
治理方案：利用高性能APF，将THDi由60%降至5%，用电效率显著提升。

Case Background: Harmonics generated by the variable-frequency compressor of precision air conditioners at the load end of a data center computer room caused unnecessary losses to the power distribution system, affected the normal operation of electrical equipment, reduced the efficiency of the power distribution system, and increased electricity costs.
Solution: A high-performance Active Power Filter (APF) was deployed, reducing THDi from 60% to 5%, significantly improving power efficiency.

项目 Project	补偿前 Before compensation	补偿后 After compensation
平均功率因数 Average power factor	0.84	0.96
电流谐波畸变率 Current harmonic distortion rate	60%	5%

新能源并网

New energy grid connection

避免力调电费罚款、抑制谐波
Avoid power factor penalty charges and suppress harmonics

案例背景：浙江湖州某309.69kWp光伏并网发电项目，计量点在400V低压侧与光伏接入点间，功率因数不达标，面临大额力调电费罚款。
治理方案：在计量点上端安装150ATPQC，通过高采低补方式，改善功率因数。

Case Background: A 309.69 kWp photovoltaic grid-connected power generation project in Huzhou, Zhejiang. The metering point is located between the 400V low-voltage side and the PV grid-connection point. The power factor was below the required standard, facing substantial penalty charges for low power factor.
Solution: A 150 A TPQC (Three-phase Power Quality Conditioner) was installed upstream of the metering point, using a high-side sampling / low-side compensation method to improve the power factor.

相 位 Phase	治理前 Before compensation	治理后 After compensation	改善幅度 Improvement margin
平均功率因数 Average power factor	0.67	0.95	41.8%
电路电流降低:1 - 0.67 / 0.95 = 29.47% Circuit current reduction			
电路损耗降低:1 -(0.67 / 0.95)^2 = 29.47% Circuit loss reduction			

行业痛点：新能源发电出力受自然条件影响呈间歇性、波动性，易引发电网电压与频率波动，且并网逆变器会产生谐波，污染电网电能质量；这类问题既冲击电网调度与稳定运行，还会损害变电设备寿命，降低新能源消纳能力。

Industry Pain Points: The output of renewable energy generation is intermittent and fluctuating due to natural conditions, which can easily cause grid voltage and frequency fluctuations. Additionally, grid-connected inverters generate harmonics, polluting the power quality of the grid. These issues not only impact grid dispatch and stable operation, but also shorten the lifespan of substation equipment and reduce the grid's capacity to absorb renewable energy.

合作案例
COOPERATION STUDIES

农网台区1
Rural Grid Distribution Area 1

高低电压治理、节能降耗
High/low voltage regulation, energy saving and consumption reduction

案例背景：浙江温州某台区，大规模光伏接入台区，高电压、三相电压不平衡问题接连产生，导致光伏脱网，甚至严重影响用户及企业用电情况。

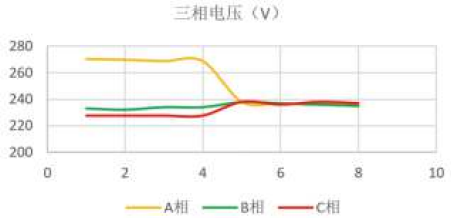
治理方案：利用TPQR治理高电压/三相电压不平衡，将电压调整至230V，满足考核要求。

Case Background:In a distribution area in Wenzhou, Zhejiang, large-scale photovoltaic integration led to successive issues of high voltage and three-phase voltage unbalance, causing PV disconnection and even seriously affecting power consumption for both residential and industrial users.
Solution: A TPQR was used to regulate the high voltage and three-phase voltage unbalance, adjusting the voltage to 230V and meeting the required compliance standards.

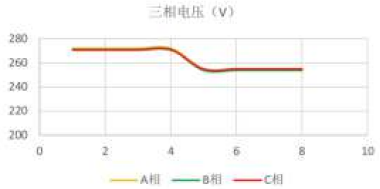
行业痛点：因单相负荷分布不均、线路径细且供电半径长、季节性负荷波动，普遍存在三相严重不平衡、电压偏低或偏高的问题；叠加非线性设备普及带来的谐波污染，加剧线路损耗与设备故障，影响乡村生产生活用电安全。

Industry Pain Points: Due to uneven distribution of single-phase loads, thin line diameters with long power supply radii, and seasonal load fluctuations, issues such as severe three-phase unbalance and voltage deviation (either too low or too high) are common. Coupled with harmonic pollution caused by the widespread use of nonlinear equipment, these problems aggravate line losses and equipment failures, affecting the safety of electricity consumption for rural production and daily life.

补偿前 Before compensation



补偿后 After compensation



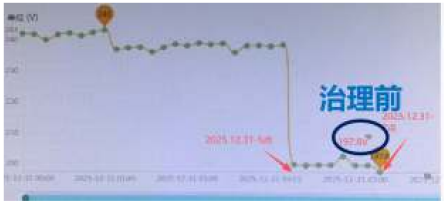
农网台区2
Rural Grid Distribution Area 2

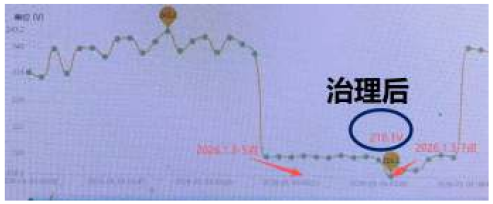
末端稳压
End-point voltage regulation

案例背景：安徽某台区，供电台区至线路末端线路长度约1km，供电线路过长，线路末端有4台单相7kw的充电桩，当充电桩运行时，导致末端低电压，有时电压会低至190V左右，严重影响末端用户的用电质量。

治理方案：利用TPQR治理高电压/三相电压不平衡，将电压调整至230V，满足考核要求。

Case Background:In a distribution area in Wenzhou, Zhejiang, large-scale photovoltaic integration led to successive issues of high voltage and three-phase voltage unbalance, causing PV disconnection and even seriously affecting power consumption for both residential and industrial users.
Solution: A TPQR was used to regulate the high voltage and three-phase voltage unbalance, adjusting the voltage to 230V and meeting the required compliance standards.





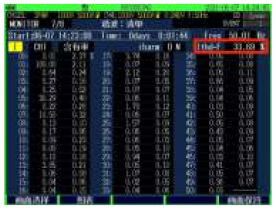
石油开采
Oil extraction

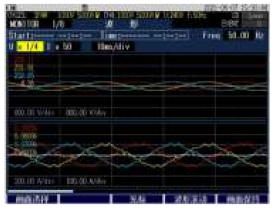
提升功率因数和供电质量、抑制谐波
Improve power factor and power quality, suppress harmonics

案例背景：石化某石油开采项目，设备作业期间产生大量谐波电流，给系统带来严重的谐波污染，导致抽油机误动作甚至停机。

治理方案：在低压配电室安装690V APF进行谐波治理，装完毕后此系统的电流畸变率降低至GB/T 14549标准要求，治理效果显著。抽油机运行状态良好，无误动作及停机事件发生。

Case Background:In a petrochemical oil extraction project, large amounts of harmonic current were generated during equipment operation, causing serious harmonic pollution to the power system, which led to malfunction or even shutdown of the pumping units.
Solution: A 690V Active Power Filter (APF) was installed in the low-voltage distribution room for harmonic mitigation. After installation, the current distortion rate of the system was reduced to meet the requirements of the GB/T 14549 standard, achieving significant improvement. The pumping units have been operating in good condition, with no malfunctions or shutdowns.





电流畸变率对比 Current distortion rate comparison	
治理前 Before treatment	33.69%
整理后 After treatment	11.92%