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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检验标准，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！



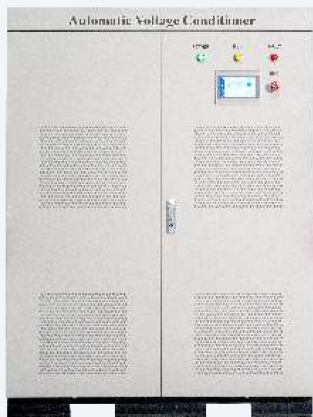
统一电能质量调节装置

Unified power quality control device

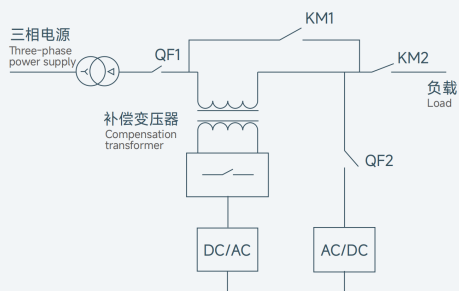
GY-AVC-PLUS

统一电能质量调节装置 (GY-AVC-PLUS) 主要由整流器、逆变器、补偿变压器、监控系统以及交流配电柜组成。具备电压暂降 (-40%) 治理、电压暂升 (+30%) 治理、无功补偿、谐波补偿以及三相不平衡补偿等功能的综合电能质量治理装置, 在改善电网电能质量的同时, 保证负载稳定供电, 为生产用户避免因电压波动造成的经济损失。

The unified power quality control device (GY-AVC-PLUS) mainly consists of a rectifier, inverter, compensating transformer, monitoring system, and AC/DC distribution. A comprehensive power quality control device with functions such as voltage sag (-40%) control, voltage sag (+30%) control, reactive power compensation, harmonic compensation, and three-phase imbalance compensation. It improves the power quality of the power grid while ensuring stable power supply to the load, avoiding economic losses caused by voltage fluctuations for production users.



工作原理 Working Principle



性能特点 Performance characteristics:

- 1) 采用新型电力电子技术, 电压无极调节, 调节精度高, 调节电压范围宽, 调节过程不闪烁。
- 2) 采用模块化设计, 占地空间小、维护方便。
- 3) 可按用户要求调节补偿电压, 调压速度可以设置, 且采用分相控制独立调节输出电压, 适应严重不平衡负载。
- 4) 可支持无功补偿、谐波补偿、三相不平衡补偿以及电压精确调节等多种功能可选。
- 5) 设备故障时无缝切换到电网供电, 保证负载供电不闪烁。
- 6) 具备过载保护、软/硬件过流保护、电网过/欠压保护、过温保护、缺相保护、频率异常保护、短路保护等, 提高供电的可靠性。
- 7) 可配备 RS485 (支持 4G/Wi-Fi) 等多种通信接口, 以方便用户将设备运行数据接入到监控系统。

外观与型号规格 Appearance and Model Specifications:

常用型号 Common models	补偿容量(kVA) Compensation capacity (kVA)	系统电压(V) System voltage (V)	冷却方式 Cooling method
GY-AVC-PLUS-0.22-30k	30	220	强制风冷 forced air cooling
GY-AVC-PLUS-0.4-30k	30	380	
GY-AVC-PLUS-0.4-60k	60	380	
GY-AVC-PLUS-0.4-80k	80	380	
GY-AVC-PLUS-0.4-100k	100	380	
GY-AVC-PLUS-0.4-150k	150	380	
GY-AVC-PLUS-0.4-300k	300	380	
GY-AVC-PLUS-0.4-400k	400	380	
GY-AVC-PLUS-0.4-500k	500	380	

- 1) Adopting new power electronics technology, voltage stepless regulation, high regulation accuracy, wide voltage regulation range, and no flicker during the regulation process.
- 2) Adopting modular design, it occupies a small space and is easy to maintain.
- 3) The compensation voltage can be adjusted according to user requirements, and the voltage adjustment speed can be set. The output voltage can be independently adjusted using phase separation control to adapt to severely unbalanced loads.
- 4) It can support various functions such as reactive power compensation, harmonic compensation, three-phase imbalance compensation, and precise voltage adjustment.
- 5) When the equipment fails, seamlessly switch to the power grid to ensure that the load power supply does not flash off.
- 6) Equipped with overload protection, software/hardware overcurrent protection, power grid overvoltage/undervoltage protection, over temperature protection, phase loss protection, frequency anomaly protection, short circuit protection, etc., to improve the reliability of power supply.
- 7) It can be equipped with various communication interfaces such as RS485 (supporting 4G/Wi-Fi) to facilitate users in accessing device operation data to the monitoring system.

技术参数 Technical parameters:

交流参数 Communication parameters		
额定功率 Rated Power	30kVA	30kVA-500kVA
额定电流 Rated Current	135A	45A-750A
额定电压 Rated Voltage	AC220V	AC380V
电压范围 Voltage Range	-40%~+30%	-40%~+30%
额定频率 Rated Frequency	50Hz/60Hz	50Hz/60Hz
电网结构 Grid Structure	L/N+PE	三相四线+PE Three-phase four-wire
交流过载能力 AC Overload Capability	1.1倍长时间 1.1 times the duration	1.1倍长时间 1.1 times the duration
输出电压精度 Output Voltage Accuracy	±1%	±1%
功能选择 Function Selection	电压补偿+(无功补偿、谐波补偿+无功补偿+谐波补偿)	电压补偿+(无功补偿、谐波补偿、三相不平衡补偿、无功补偿+谐波补偿、无功补偿+三相不平衡补偿、无功补偿+三相不平衡+谐波补偿)
补偿电压范围 Compensation Voltage Range	AC380±20%(-40%~+30%可定制) AC380 ± 20% (-40%~+30% customizable)	
变压器变比 Transformer Ratio	5:1 5:1	
谐波补偿率 Harmonic Compensation Rate	3-13次综合谐波补偿≥95% 3-13 times comprehensive harmonic compensation ≥ 95%	
无功补偿率 Reactive Power Compensation Rate	无功补偿≥99% Reactive power compensation ≥ 99%	
三相不平衡补偿率 Three-Phase Unbalance Compensation Rate	/	补偿后不平衡度≤5% Unbalance degree after compensation ≤ 5%
允许电网频率 Allowable Grid Frequency	45-63Hz	
输出电压谐波畸变率增量 Output Voltage THD Increment	≤1%	
补偿响应时间 Compensation Response Time	< 20ms	
变压器参数 Transformer parameters		
额定容量 Rated Capacity	6kVA	6kVA-100kVA
类型 Type	干式, 磁芯由叠层硅钢片制作而成, 架壳接地 Dry type, the magnetic core is made of stacked silicon steel sheets, and the frame is grounded	
过载 Overload Capability	1.1倍长时间运行 1.1 times longer running time	
绝缘 Insulation	绝缘等级H级 Insulation level H	
变比 Transformation Ratio	220: 44 220: 44	
设计温度 Design Temperature	温升≤90K Temperature rise ≤ 90K	
执行标准 Applicable Standard	IEC 726 IEC 726	
系统参数 System parameters		
海拔高度 Altitude	<2000m, 2000米以上按照GB/T3859.2降额使用 <2000m, Use in accordance with GB/T3859.2 for downgrading above 2000 meters	
环境温度 Ambient Temperature	-10~+50°C(40°C以上降容) -10~+50 °C (reduced capacity above 40 °C)	
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	
污秽等级 Pollution Degree	I级以下 Below Level I	
噪音 Noise Level	≤70dB ≤70dB	
防护等级 Degree of Protection	IP20(IP54可定制) IP20 (IP54 customizable)	

合作案例

COOPERATION STUDIES

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	0.917
	增收力调电费 Power factor penalty charge	免收力调电费 Exemption from power factor penalty charge



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

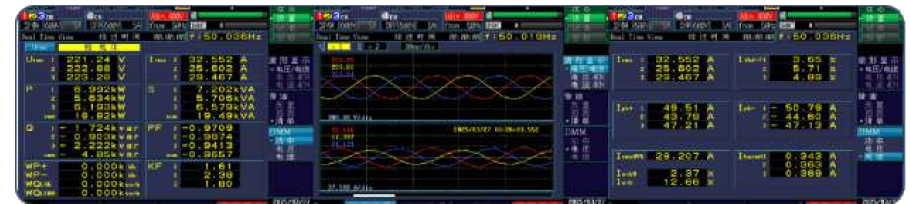
案例背景: 某数据机房末端精密空调变频压缩机产生的谐波, 给配电系统造成非必要损耗, 影响电气设备正常运行、降低配电系统使用效率以及增加用电成本。

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%



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: 某半导体生产车间接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%



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.

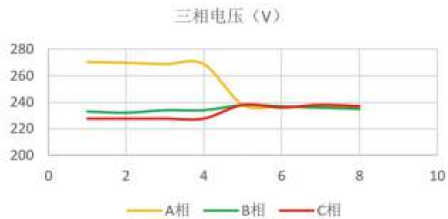
Solution: A TPQR was used to regulate the high voltage and three-phase voltage unbalance, adjusting the voltage to 230V and meeting the required compliance standards.

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。

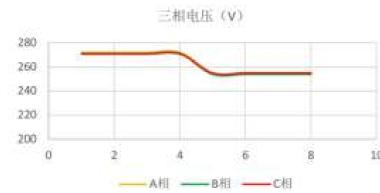
Industry Pain Points: Due to uneven distribution of single-phase loads, thin line diameters with long power supply radii, and seasonal load fluctuations, issues such as severe three-phase unbalance and voltage deviation (either too low or too high) are common. Coupled with harmonic pollution caused by 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

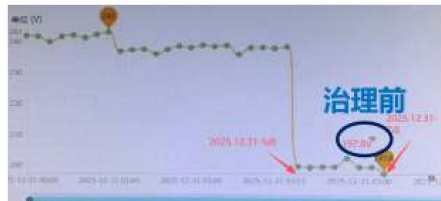
末端稳压
End-point voltage regulation

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%