

HG Group HPM 系列模块 UPS

全球安装与操作手册



HG Group HPM Series Modular UPS
Global Installation & Operation Manual

前言 Preface

中文：本手册适用于 HG Group HPM 系列 100kVA 高频模块化 UPS 系统，整机机柜容量覆盖 300kVA–1200kVA，是面向全球商用及工业场景的标准化技术文档。内容涵盖设备开箱验收、场地勘测安装、电气接线规范、开机调试、日常运行操作、模块热插拔维护、故障诊断排查及全套安全操作规程。本手册适配全球各区域电网工况，严格遵循 IEC62040、CE、RoHS、ISO9001/ISO14001 国际标准。所有安装、调试、运维工作，必须由持证电气工程师或厂家官方授权技术人员执行。设备整机提供 3 年标准质保，大型重点工程项目可申请 5 年延保服务。

English: This manual applies to HG Group HPM series 100kVA high-frequency modular UPS systems with cabinet capacities ranging from 300kVA to 1200kVA, serving as a standardized technical document for global commercial and industrial scenarios. It covers equipment unpacking and inspection, site survey and installation, electrical wiring specifications, power-on commissioning, daily operation, hot-swap module maintenance, fault diagnosis and troubleshooting, as well as complete safety operation procedures. Adapted to global power grid conditions, this manual complies with IEC62040, CE, RoHS, ISO9001 and ISO14001 international standards. All installation, commissioning and maintenance work must be performed by certified electrical engineers or officially authorized technicians. The product comes with a 3-year standard system warranty, and a 5-year extended warranty is available for large key projects upon application.

1. 安全须知 Safety Precautions

1.1 通用安全规范 General Safety Rules

中文：UPS 设备内部集成高压交直流电气回路，设备断电后内部电容仍存有残余高压电，具备触电风险。严禁非专业人员私自拆机、插拔功能模块、更改电气线路及设备结构。本设备仅适用于室内干燥密闭环境，禁止露天安装、淋雨、积水浸泡及潮湿腐蚀环境使用。所有安装、接线、检修、维护作业前，必须完全切断市电输入、旁路输入及电池直流输入，严格遵守当地电气安全法规及施工规范。设备必须做可靠接地，接地电阻 $\leq 1\Omega$ ，严禁无接地、虚接地状态下开机运行。

English: The UPS integrates high-voltage AC and DC circuits. Internal capacitors retain residual high voltage after power off, posing electric shock risks. Unauthorized disassembly, module plugging, electrical wiring modification and structural adjustment by non-professionals are strictly prohibited. The device is designed for indoor dry and enclosed environments only; outdoor installation, rain exposure, water immersion and humid corrosive environment application are forbidden. Before all installation, wiring, inspection and maintenance operations, cut off mains input, bypass input and battery DC input completely, and strictly comply with local electrical

safety regulations and construction standards. Reliable equipment grounding is mandatory with grounding resistance $\leq 1\Omega$. Operation without effective grounding is strictly forbidden.

1.2 操作禁忌 Operation Prohibitions

中文：禁止带电插拔功率模块、控制模块及所有接线端子；禁止设备长期超额定负载运行；禁止封堵机身散热风口、遮挡散热通道；禁止在设备周边堆放易燃易爆、腐蚀性、导电性杂物；禁止私自改装设备硬件结构、电气参数及程序配置。

English: Hot swapping of power modules, control modules and all wiring terminals is prohibited. Long-term overloaded operation, heat dissipation vent blocking, stacking flammable, corrosive and conductive materials around the device, and unauthorized modification of hardware structure, electrical parameters and program configuration are strictly forbidden.

2. 产品简介 Product Introduction

中文：HPM 系列模块化 UPS 采用高频在线双变换纯正弦波架构，单功率模块额定容量 100kVA，整机机柜支持多模块并联，系统容量覆盖 300kVA–1200kVA。全系支持功率模块、旁路模块、控制模块在线热插拔，支持 N+1、N+X 冗余容错架构，最大支持 6 台整机并联组网。设备具备 138–485Vac 超宽输入电压范围、40–70Hz 宽频适配能力，常态工作效率 $\geq 97\%$ ，ECO 节能模式峰值效率可达 99%，可完美适配各类柴油发电机组联动运行。产品广泛应用于大中型数据中心、智算机房、金融机构、油气能源、轨道交通、工业制造等关键负载供电场景，供电稳定性与节能性满足全球高端基础设施建设标准。

English: Adopting high-frequency online double-conversion pure sine wave architecture, the HPM series modular UPS is equipped with 100kVA single power modules. Multi-module parallel connection supports system capacities from 300kVA to 1200kVA. All models support online hot-swap of power modules, bypass modules and control modules, N+1 and N+X fault-tolerant redundant architecture, and a maximum of 6 units parallel networking. With an ultra-wide 138–485Vac input voltage range and 40–70Hz wide frequency adaptation, the UPS achieves $\geq 97\%$ rated operating efficiency and a peak efficiency of 99% in ECO mode, and supports linkage operation with various diesel generators. Widely applied in medium and large data centers, computing rooms, financial institutions, oil and energy industries, rail transit and industrial manufacturing for critical load power supply, it meets global high-end infrastructure construction standards for power stability and energy efficiency.

3. 开箱与验收 Unpacking & Inspection

3.1 外观检查 Appearance Inspection

中文：设备开箱后，首先检查机柜整体外观，确认无运输变形、掉漆、磕碰、破损；检查触控屏幕、操作按键、通讯及接线接口完好无损；模块插槽洁净无异物、卡扣紧固无松动；逐一核对随机资料与配件，确保产品手册、合格证、保修卡、认证报告齐全。若发现设备破损、部件缺失、资料不全等问题，需立即停止安装作业，第一时间联系承运商及厂家售后报备处理。

English: After unpacking, inspect the overall cabinet appearance for no transportation deformation, paint peeling, collision or damage. Verify that the touch screen, operation buttons, communication and wiring interfaces are intact, module slots are clean without foreign matters and fasteners are tight. Check all random documents and accessories to ensure complete product manuals, qualification certificates, warranty cards and certification reports. Stop installation immediately and contact the carrier and factory after-sales team for handling if equipment damage, missing parts or incomplete documents are found.

3.2 配件清单 Accessories List

中文：UPS 整机机柜、100kVA 功率模块、专用通讯线材、机柜固定地脚、膨胀螺栓、接地铜线、中英双语产品手册、产品合格证、保修卡、国际认证报告。

English: UPS main cabinet, 100kVA power modules, dedicated communication cables, cabinet fixing feet, expansion bolts, grounding copper wires, Chinese and English product manuals, qualification certificate, warranty card and international certification reports.

4. 安装环境与场地要求 Installation Environment & Site Requirements

4.1 环境参数 Environmental Parameters

中文：设备正常工作温度：0℃ ~ 40℃，定制高温增强版可适配 45℃ 高温环境；储运温度（不含电池）：-25℃ ~ 55℃；相对湿度：0% ~ 95%RH，无凝露；满功率运行海拔 ≤ 1500m，海拔超过 1500m 设备自动线性降额；整机防护等级 IP20。安装场地需远离粉尘、腐蚀性气体、强电磁干扰、高温热源及水源，保持环境洁净干燥。

English: Normal operating temperature: 0℃ ~ 40℃; customized high-temperature enhanced version supports 45℃ operation. Storage and transportation temperature (without batteries): -25℃ ~ 55℃. Relative humidity: 0% ~ 95%RH, non-condensing. Full-power operating altitude ≤ 1500m; linear power derating occurs above 1500m. Ingress protection grade: IP20. The installation site shall be kept clean and dry, away

from dust, corrosive gas, strong electromagnetic interference, high-temperature heat sources and water sources.

4.2 场地承重与空间要求 Load-Bearing & Space Requirements

中文：安装地面需平整、坚固、承重达标，可稳定承载机柜、功能模块及配套电池组的总重量。机柜四周预留标准运维散热空间：顶部预留 $\geq 300\text{mm}$ ，前后左右四面预留 $\geq 600\text{mm}$ ，保障设备通风散热及后期检修、模块更换作业。机房环境通风良好，严禁存放易燃易爆、腐蚀性危险物品。

English: The installation floor must be flat, firm and load-bearing qualified to stably bear the total weight of the cabinet, functional modules and supporting battery banks. Standard heat dissipation and maintenance space shall be reserved around the cabinet: $\geq 300\text{mm}$ at the top and $\geq 600\text{mm}$ on all sides to ensure ventilation, heat dissipation and convenient later inspection and module replacement. The computer room shall be well ventilated without flammable, explosive or corrosive dangerous goods.

5. 设备安装步骤 Installation Procedures

5.1 机柜固定 Cabinet Fixing

中文：1. 将机柜平稳搬运至指定安装点位，调节机柜地脚，校准柜体水平垂直，无倾斜偏移；2. 依据机柜底部固定孔定位打孔，安装膨胀螺栓并锁紧固定；3. 晃动测试机柜，确认柜体稳固无晃动，避免运行震动位移；4. 将设备专用接地端与机房标准接地排可靠连接，确保接地参数合规达标。

English: 1. Move the cabinet stably to the designated installation position, adjust the cabinet feet and calibrate the cabinet to be horizontal and vertical without inclination and deviation; 2. Drill holes according to the bottom fixing holes of the cabinet and fasten with expansion bolts; 3. Test the cabinet stability to avoid vibration displacement during operation; 4. Reliably connect the dedicated equipment grounding terminal to the standard machine room grounding bar to meet grounding parameter standards.

5.2 模块安装 Module Installation

中文：1. 拆除机柜空置槽位防尘挡板；2. 对准卡槽平稳推入 100kVA 功率模块，直至卡扣完全锁紧固定；3. 拧紧模块两侧固定螺丝，杜绝松动接触不良；4. 按系统容量需求依次安装对应数量功率模块，所有空置槽位必须安装挡板防尘防护；5. 对位安装控制模块与旁路模块，确保接口完全贴合、接触可靠。模块自重较大，需双人协同作

业，轻拿轻放，避免磕碰损坏硬件。

English: 1. Remove the dust baffles of empty cabinet slots; 2. Push the 100kVA power module steadily into the corresponding slot until the buckle is fully locked; 3. Tighten the fixing screws on both sides of the module to prevent loose connection; 4. Install power modules in required quantity according to system capacity, and install baffles for all empty slots for dust prevention; 5. Install control modules and bypass modules in corresponding positions to ensure full fitting and reliable contact. Modules are heavy and require two-person cooperative operation with careful handling to avoid hardware collision damage.

5.3 电气接线 Electrical Wiring

中文：设备采用全球通用三相五线制（3P+N+PE）接线方式，适配 380/400/415Vac 国际标准电压。1. 输入接线：分别对接市电主输入、旁路输入端子，严格区分火线、零线、地线，接线紧固、排列规整；2. 输出接线：UPS 输出端子对应连接后端负载设备，杜绝错接、虚接；3. 电池接线：适配 30–50 节 12V 铅酸电池组，出厂默认 40 节配置，支持高压锂电改造，严格区分正负极，严防反接、短路；4. 通讯接线：按需接入 RS485、CAN、以太网、SNMP 通讯接口，对接机房 DCIM 智能监控系统。接线完成后全面复核所有线路，彻底消除安全隐患。

English: The equipment adopts global universal 3-phase 5-wire (3P+N+PE) wiring, compatible with 380/400/415Vac international standard voltage. 1. Input wiring: Connect main mains input and bypass input to corresponding terminals with strictly distinguished live wire, neutral wire and ground wire, ensuring firm and neat wiring; 2. Output wiring: Connect UPS output terminals to backend loads without wrong or loose connection; 3. Battery wiring: Adapt to 30–50pcs 12V lead-acid battery banks (default 40pcs factory configuration) and support high-voltage lithium battery retrofit. Strictly distinguish positive and negative poles to prevent reverse connection and short circuit; 4. Communication wiring: Connect RS485, CAN, Ethernet and SNMP interfaces as required for DCIM system docking. Fully recheck all wiring after completion to eliminate potential safety hazards.

6. 开机调试与系统设置 Power-On Commissioning & System Setting

6.1 首次开机流程 First Power-On Procedure

中文：1. 全面复核接线、接地、设备状态，确认场地安全无隐患后，闭合电池断路器接入直流电源；2. 设备触控屏点亮，系统自动启动自检程序，检测模块状态、电池参数、通讯链路完整性；3. 自检无故障告警后，闭合市电输入断路器，设备进入待机状态；4. 通过触控屏手动启动 UPS，设备进入在线双变换工作模式，输出稳定纯净正弦

电源；5. 核对输入、输出、电池、负载各项参数，确认设备运行正常、无异常告警。

English: 1. Fully recheck wiring, grounding and equipment status, close the battery breaker to connect DC power after confirming site safety; 2. The touch screen lights up, and the system automatically performs self-inspection to verify module status, battery parameters and communication link integrity; 3. Close the mains input breaker after no fault alarm in self-inspection, and the equipment enters standby state; 4. Manually start the UPS via the touch screen to enter online double-conversion mode and output stable pure sine power; 5. Verify input, output, battery and load parameters to confirm normal equipment operation without abnormal alarms.

6.2 核心参数设置 Core Parameter Setting

中文：设备搭载 10 英寸高清触控屏，支持全中文/英文界面切换，可自主配置核心运行参数：输入电压保护阈值、频率同步跟踪范围、过载保护逻辑、电池充放电参数、ECO 节能模式开关、并联冗余策略、通讯协议、告警阈值、高低温保护参数等。设备出厂参数已适配全球通用电网工况，特殊项目工况可由专业工程师自定义调试适配。

English: Equipped with a 10-inch high-definition touch screen with switchable Chinese and English interfaces, the device supports independent configuration of core operating parameters: input voltage protection threshold, frequency synchronization tracking range, overload protection logic, battery charge-discharge parameters, ECO mode switch, parallel redundancy strategy, communication protocol, alarm threshold and high/low temperature protection parameters. Factory default parameters adapt to global general grid conditions, and professional engineers can customize and debug parameters for special project working conditions.

6.3 模式切换操作 Mode Switching Operation

中文：1. 在线模式（默认）：设备核心工作模式，实时稳压、滤波、净化电网，为负载提供不间断纯净电源；2. ECO 节能模式：电网电压、频率稳定时自动切换，降低设备损耗，提升整机运行能效；3. 旁路模式：设备检修、过载保护、系统异常时自动切换，保障后端负载不间断供电；4. 电池逆变模式：市电断电、电网异常时无缝切换，电池组逆变供电，持续保护核心负载设备。

English: 1. Online Mode (Default): The core working mode of the device, which realizes real-time voltage stabilization, filtering and grid purification to provide uninterrupted pure power for loads; 2. ECO Energy-Saving Mode: Automatically switched when grid voltage and frequency are stable to reduce equipment loss and improve overall energy efficiency; 3. Bypass Mode: Automatically activated during equipment maintenance, overload protection and system abnormality to ensure uninterrupted power supply for backend loads; 4. Battery Inversion Mode: Seamlessly switched in case of mains power failure and grid abnormality, with battery bank inversion power supply to continuously protect core load equipment.

7. 日常运行操作 Daily Operation

7.1 常规运行监控 Regular Operation Monitoring

中文：设备运行期间，可通过触控屏实时监测输入输出电压、电流、频率、负载率、电池剩余容量、设备内部温度、模块运行状态及系统工作模式。设备正常运行时无异常声响、无高温发热、无故障告警。日常运行建议负载率维持在 30%–80% 区间，有效延长设备使用寿命，提升供电稳定性。

English: During operation, real-time monitoring of input and output voltage, current, frequency, load rate, remaining battery capacity, internal equipment temperature, module operating status and system working mode is available via the touch screen. Normal operation features no abnormal noise, overheating or fault alarms. It is recommended to maintain the load rate at 30%–80% in daily operation to effectively extend equipment service life and improve power supply stability.

7.2 开关机标准操作 Standard Start/Shutdown Operation

中文：标准开机流程：接通电池直流电源与市电电源 → 系统自动自检 → 手动启动设备 → 进入在线正常运行状态。标准关机流程：逐级关闭后端负载设备 → 关停 UPS 主机 → 切断市电输入电源 → 切断电池直流电源。严禁带载强制关机、违规断电，避免设备硬件损坏与负载设备故障。

English: Standard Power-On Process: Connect battery DC power and mains power → system automatic self-inspection → manual device start-up → normal online operation. Standard Power-Off Process: Turn off backend loads step by step → shut down UPS main unit → cut off mains input power → cut off battery DC power. Forced shutdown with loads and illegal power cut-off are strictly prohibited to avoid equipment hardware damage and load failure.

8. 热插拔与冗余维护 Hot-Swap & Redundancy Maintenance

中文：本系列 UPS 支持**零停机在线热插拔维护**，设备带载运行状态下，可直接更换故障功率模块、控制模块、旁路模块，无需切断后端负载供电。标准维护流程：1. 系统自动识别锁定故障模块，冗余模块自动接管全部负载；2. 拧松故障模块固定螺丝，平稳抽出故障模块；3. 插入同型号全新模块并锁紧固定螺丝；4. 系统自动识别、适配并激活新模块，恢复冗余状态，完成维护。设备支持 N+1、N+X 冗余架构及多机组并联组网，大幅提升数据中心供电可靠性，适配无人值守机房运维场景。

English: This series of UPS supports **zero-downtime online hot-swap maintenance**. Faulty power modules, control modules and bypass modules can be directly replaced under loaded operation without cutting off power supply to backend loads. Standard maintenance process: 1. The system automatically identifies and locks the faulty module, and redundant modules take over all loads automatically; 2. Loosen the fixing screws of the faulty module and pull it out steadily; 3. Insert a new module of the same model and tighten the fixing screws; 4. The system automatically identifies, adapts and activates the new module to restore the redundant state and complete maintenance. Supporting N+1, N+X redundant architecture and multi-unit parallel networking, the equipment greatly improves data center power supply reliability and adapts to unattended computer room operation scenarios.

9. 故障告警与排查 Alarm & Troubleshooting

9.1 常见故障与解决方案 Common Faults & Solutions

中文: 1. 市电异常告警: 检查上级市电供电状态、输入断路器通断、线路连接是否松动; 2. 电池低压告警: 检测电池组单体电压、线路连接、电池老化程度, 及时充电或更换老化电池; 3. 模块异常告警: 通过系统定位故障模块, 执行在线热插拔更换; 4. 过载告警: 核查后端负载总功率, 及时削减冗余负载, 匹配设备额定容量; 5. 高温告警: 检查机房通风环境、设备散热风口堵塞情况、环境温度, 及时清理灰尘、改善散热条件; 6. 通讯异常告警: 检查通讯线材、接口连接、DCIM 协议配置, 复位通讯系统。

English: 1. Mains Abnormality Alarm: Check upper-level mains power status, input breaker switch state and loose wiring connection; 2. Battery Low Voltage Alarm: Detect single-cell battery voltage, wiring connection and battery aging degree, and charge or replace aging batteries in time; 3. Module Abnormality Alarm: Locate the faulty module through the system and perform online hot-swap replacement; 4. Overload Alarm: Verify the total power of backend loads and reduce redundant loads to match the rated capacity of the equipment; 5. Over-Temperature Alarm: Check computer room ventilation, vent blockage and ambient temperature, and clean dust to improve heat dissipation; 6. Communication Abnormality Alarm: Check communication cables, interface connection and DCIM protocol configuration, and reset the communication system.

9.2 紧急处理规范 Emergency Handling

中文: 设备运行中若出现短路、冒烟、起火、剧烈异响、异常高温等紧急故障, 需立即切断所有输入电源 (市电、电池), 隔离故障设备, 禁止再次通电开机, 并第一时间联系厂家技术售后团队进行专业检修。

English: In case of emergency faults such as short circuit, smoking, fire, severe

abnormal noise and abnormal high temperature during equipment operation, cut off all input power (mains and battery) immediately, isolate the faulty equipment, prohibit re-powering and starting up, and contact the factory technical after-sales team for professional maintenance at the earliest opportunity.

10. 日常保养与定期维护 Daily & Periodic Maintenance

10.1 日常保养 Daily Maintenance

中文：保持机房环境干燥、洁净、通风良好；每日巡查设备运行状态，记录运行参数与告警信息；定期清理设备散热风口灰尘，保证散热通畅；定期检查接地系统完整性与可靠性；严禁在设备周边堆放杂物、危险品。

English: Keep the computer room dry, clean and well ventilated; inspect equipment operation status daily and record operating parameters and alarm information; regularly clean dust from heat dissipation vents to ensure unobstructed heat dissipation; regularly check the integrity and reliability of the grounding system; do not stack sundries and dangerous goods around the equipment.

10.2 季度/年度维护 Quarterly/Annual Maintenance

中文：季度维护：紧固所有电气接线、检测模块运行状态、测试电池充放电性能、核查通讯系统稳定性。年度维保：由厂家授权工程师上门执行整机深度检测，包含电池容量校准、散热系统检修、运行参数校准、冗余功能测试、电气绝缘性能检测，全面保障设备长期稳定运行。

English: Quarterly Maintenance: Fasten all electrical wiring, inspect module operating status, test battery charge-discharge performance and verify communication system stability. Annual Maintenance: Officially authorized engineers conduct on-site in-depth whole-machine inspection, including battery capacity calibration, heat dissipation system maintenance, operating parameter calibration, redundant function test and electrical insulation performance detection, to fully ensure long-term stable equipment operation.

11. 认证与合规 Certification & Compliance

中文：本产品严格遵循 IEC62040 不间断电源国际标准，拥有 CE、TUV、ISO9001 质量管理体系、ISO14001 环境管理体系、RoHS 环保全套国际认证，符合欧盟 ErP 节能规范。产品满足全球绝大多数国家电网准入、海关合规及工程验收标准，可合法合规应用于全球工业、数据中心、政企重点工程项目。

English: Strictly complying with the IEC62040 international standard for

uninterruptible power supplies, this product is fully certified with CE, TUV, ISO9001 quality management system, ISO14001 environmental management system and RoHS environmental certification, and meets EU ErP energy-saving specifications. It satisfies grid access, customs compliance and project acceptance standards of most countries worldwide, and can be legally applied to global industrial, data center, government and enterprise key projects.

12. 质保与全球售后 Warranty & Global After-Sales Service

中文：1. 质保政策：设备整机标准质保期3年，大型重点工程项目可申请5年专项延保服务；2. 全球服务：在欧洲、东南亚、中东、美洲、非洲等区域设立本地化服务中心与备件仓库，支持48小时全球备件配送；3. 技术支持：提供7×24小时多语种远程技术支持、跨境上门调试、项目技术培训服务；4. 定制服务：支持OEM/ODM个性化定制，适配不同区域电网工况及特殊项目需求。

English: 1. Warranty Policy: The standard warranty period for the whole equipment is 3 years, and a 5-year extended warranty service is available for large key projects upon application; 2. Global Service: Local service centers and spare parts warehouses are established in Europe, Southeast Asia, Middle East, America, Africa and other regions, supporting 48-hour global spare parts delivery; 3. Technical Support: 24/7 multilingual remote technical support, cross-border on-site commissioning and project technical training services are provided; 4. Custom Service: OEM/ODM personalized customization is supported to adapt to regional grid conditions and special project requirements.

13. 免责声明 Disclaimer

中文：因非持证专业人员违规安装、操作、私自改装设备导致的设备损坏、功能故障及人身安全事故，厂家不承担质保责任与相关赔偿责任。自然灾害、电网极端故障、人为恶意破坏、私自拆机改装、未按手册规范运维导致的设备故障，均不在质保覆盖范围。本手册内容仅供参考，产品参数、功能及技术升级恕不另行通知。

English: The manufacturer shall not bear warranty liability or relevant compensation liability for equipment damage, functional failure and personal safety accidents caused by illegal installation, operation and unauthorized equipment modification by non-certified professionals. Equipment faults caused by natural disasters, extreme grid faults, malicious human damage, unauthorized disassembly and modification, and non-standard maintenance are not covered by the warranty. The content of this manual is for reference only. Product parameters, functions and technical upgrades are subject to change without prior notice.

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<https://www.upsmax.com> (cn)

<https://www.upsboss.com> (en)

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