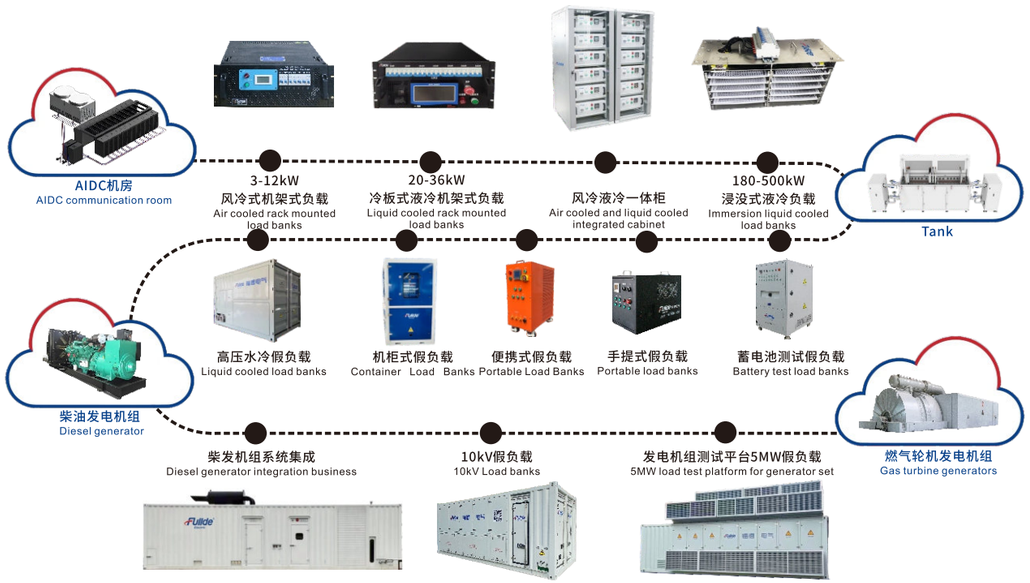
智算中心假负载系列产品
Load banks of AIDC

假负载是一种模拟真实设备电力特性的测试工具，通过消耗电能验证电源系统的稳定性与可靠性，核心功能包括负荷测试、性能测试、设备保护、能效验证及系统调试。它广泛应用于数据中心/智算中心、智能电网、通信基站、新能源、工业制造、航空航天、船舶、工矿企业、大型发电站等领域。

Load banks are a testing tool that simulates the power characteristics of real equipment, verifying the stability and reliability of the power system by consuming electrical energy. The core functions include load testing, performance testing, equipment protection, energy efficiency verification, and system debugging. It is widely used in data centers/intelligent computing centers, smart grids, communication base stations, new energy, industrial manufacturing, aerospace, ships, industrial and mining enterprises, large power plants and other fields.



福德负载箱产品系列图
Fullde Load Banks Product Series Diagram

负载箱在智算中心/数据中心的核心价值在于用可控的测试成本，替代不可控的故障风险。详细在全生命周期中的作用及使用场景：

The core value of Load banks in AIDC/IDC lies in replacing uncontrollable failure risk with controllable test cost. The role of detail in the whole life cycle and its usage scenarios:

建设阶段 Construction stage：

●作用：规避设计缺陷，确保基础设施“先天健康”。验证基础设施设计的可靠性和冗余能力，确保设备在满负荷或超负荷下的性能。
Function: Avoid design defects and ensure the "innate health" of infrastructure.Verify the reliability and redundancy of infrastructure design and ensure the performance of equipment under full load or overload.

●使用场景 Usage scenario:
▶在数据中心竣工后、投产前，对电力、制冷等系统进行模拟负载测试。
After the data center is completed and before it is put into production, the simulated load test is carried out on the power and refrigeration systems.
▶测试供电系统的切换能力（如市电→UPS→发电机），验证冗余设计是否有效。
Test the switching ability of power supply system (such as mains →UPS→ generator) and verify whether the redundancy design is effective.
▶评估空调制冷系统在高负载下的散热效率。
Evaluate the heat dissipation efficiency of air conditioning refrigeration system under high load.

●被测设备 Tested equipment：
▶UPS（不间断电源）：测试其满负荷运行时的输出稳定性及切换响应时间。
UPS (Uninterruptible Power Supply): Test its output stability and switching response time when it is running at full load.
▶柴油发电机：模拟长时间带载运行，验证燃料消耗、输出功率等参数。
Diesel generator: simulate long-term on-load operation and verify parameters such as fuel consumption and output power.
▶配电柜（PDU）：检查电流分配均衡性及断路器保护机制。
Power distribution cabinet (PDU): Check the balance of current distribution and the protection mechanism of circuit breaker.
▶精密空调/冷水机组：评估制冷量与负载发热量的匹配程度。
Precision air conditioning/Water Chiller: Evaluate the matching degree between cooling capacity and load calorific value.

投运阶段：Operation stage:

●作用：降低业务上线风险，提升系统稳定性。确保数据中心从测试环境平稳过渡到实际生产环境，降低业务中断风险。
Function: Reduce the risk of business online and improve the stability of the system. Ensure the smooth transition of data center from test environment to actual production environment, and reduce the risk of business interruption.

●使用场景 Usage scenario:
▶ It设备上架后，逐步增加负载至设计容量，验证系统整体稳定性。
After the IT equipment is put on the shelves, the load is gradually increased to the design capacity to verify the overall stability of the system.
▶ 模拟真实业务流量，测试网络设备、存储系统的吞吐能力及延迟。
Simulate real business traffic, and test the throughput and delay of network equipment and storage system.
▶验证IT设备与基础设施（如供电、制冷）的联动兼容性。
Verify the linkage compatibility between IT equipment and infrastructure (such as power supply and refrigeration).

●被测设备 Tested equipment:
▶服务器集群：测试CPU、内存、磁盘在高负载下的性能表现。
Server cluster: test the performance of CPU, memory and disk under high load.
▶网络交换机/路由器：验证带宽、包转发率及故障切换能力。
Network switch/router: verify bandwidth, packet forwarding rate and failover capability.
▶存储系统：评估IOPS（每秒读写次数）和延迟是否达标。
Storage system: Evaluate whether IOPS (reads and writes per second) and latency meet the standards.

运维阶段Operation and maintenance stage:

●作用：延长设备寿命，减少计划外停机。定期维护、故障排查及优化系统性能，保障数据中心持续稳定运行。
Function: Prolong equipment life and reduce unplanned downtime.Regular maintenance, troubleshooting and optimization of system performance to ensure the continuous and stable operation of the data center.

●使用场景 Usage scenario:
▶预防性维护：定期对UPS电池进行放电测试，避免容量衰减导致断电风险。
Preventive maintenance: Conduct discharge test on UPS battery regularly to avoid the risk of power failure caused by capacity attenuation.
▶故障复现：在设备异常（如电压波动）时，模拟负载以定位根本原因。
Fault recurrence: when the equipment is abnormal (such as voltage fluctuation), simulate the load to locate the root cause.
▶能效优化：通过负载测试分析PUE（电源使用效率），优化制冷策略。
Energy efficiency optimization: analyze PUE (power utilization efficiency) through load test and optimize refrigeration strategy.

●被测设备 Tested equipment:
▶UPS蓄电池组：测试实际容量与标称容量的差异。
UPS battery pack: test the difference between actual capacity and nominal capacity.
▶柴油发电机：定期带载试运行，防止“积碳”等问题。
Diesel generator: Test run with load regularly to prevent "carbon deposition" and other problems.
▶空调系统：验证滤网堵塞或冷媒不足时的制冷能力下降情况。
Air conditioning system: verify the cooling capacity decline when the filter screen is blocked or the refrigerant is insufficient.

扩容/升级阶段Expansion/upgrade stage:

●作用：支持平滑扩展，避免过度投资或资源不足。验证新增设备或升级方案的可行性，避免扩展后系统失衡。
Function: Support smooth expansion to avoid over-investment or insufficient resources.Verify the feasibility of adding new equipment or upgrading scheme, and avoid the system imbalance after expansion.

●使用场景 Usage scenario:
▶新增机柜上线前，测试现有配电和制冷系统是否支持额外负载。
Test whether the existing power distribution and refrigeration system can support the extra load before the new cabinet goes online.
▶替换老旧设备（如高压直流电源）时，模拟负载验证兼容性。
When replacing old equipment (such as high voltage DC power supply), simulate load to verify compatibility.
▶预测未来业务增长，通过阶梯式负载测试评估系统扩展极限。
Predict the future business growth, and evaluate the system expansion limit through step load test.

●被测设备 Tested equipment:
▶新增PDU/母线槽：测试电流承载能力及与其他配电单元的协同性。
Add PDU/ bus duct: test the current carrying capacity and its coordination with other power distribution units.
▶模块化UPS：验证并联扩容后的均流性能及效率。
Modular UPS: verify the current sharing performance and efficiency after parallel expansion.
▶液冷系统：在高密度服务器场景下，测试冷却液流量与散热效率。
Liquid cooling system: in the high-density server scenario, test the coolant flow and heat dissipation efficiency.

智算中心假负载两大典型应用
Two typical applications of Load banks in AIDC



风冷机架式负载、液冷机架式负载
Air cooled rack mounted load banks、
Liquid cooled rack mounted load banks

风冷机架式负载适用于中小功率场景（如边缘节点、传统机房），以低成本、灵活部署见长，支持短期测试与供电验证；液冷负载则针对高密度数据中心（如AI集群、超算中心），通过高效散热实现大功率（50kW+）持续压力测试，优化能效并保障极端负载下的稳定性。
Air cooled rack mounted load banks are suitable for small and medium power scenarios (such as edge nodes and traditional data centers), known for their low cost and flexible deployment, and support for short-term testing and power supply verification; Liquid cooled load banks are designed for high-density data centers (such as AI clusters and supercomputing centers), achieving high power (50kW+) continuous pressure testing through efficient heat dissipation, optimizing energy efficiency, and ensuring stability under extreme loads.

●推荐型号Recommended model
LB-8KW-AC220V/DC270V-J
LB-12KW-AC220V/DC270V-J
LB-20kW-AC415V-J
LB-30KW-AC200V~250V/DC180V~290V-J
LB-36kW-AC200V~250V/DC180V~290V-J

智算中心的柴发机组作为备用电源，需在市电中断时迅速可靠供电。假负载能模拟智算中心柴发机组的实际负载，测试柴发机组的输出功率稳定性、电压波动、频率偏差等关键性能，确保在关键时刻稳定供电，提升智算中心供配电系统的可靠性。
The diesel generator set in the AIDC serves as a backup power source and needs to provide fast and reliable power in the event of a power outage. Load banks can simulate the actual load of the diesel generator set in the AIDC, test the key performance of the output power stability, voltage fluctuation, frequency deviation, etc. of the diesel generator set, ensure stable power supply at critical moments, and improve the reliability of the power supply and distribution system in the AIDC.

●推荐型号Recommended model
LB-2000kW-10.5kV-J
LB-2400kW-10.5kV-J
LB-2000kW-1350kvar-10.5kV-J



柴发机组测试假负载
Diesel Genset Load Bank