

负载箱 (TRA) Load Bank

■ 产品概述 (Product Introduction)

干式负载箱是我公司自主研发的电能负荷测试装置, 操作容易, 体积小, 运输方便. 可视负荷容量大小. 并联电阻堆的电路增减负荷容量. 调节负荷容量有手动型和电脑控制型. 与传统水负荷和电阻片负载箱相比, 无漏电, 不产生有害气体和废水, 负荷测试精度高, 调节更容易, 无需测试准备时间, 可连续长期使用等诸多优越性. 本公司定型生产的三相交流干式负载箱有高压10KV, 6.6KV, 3.3KV和低压690V, 400V, 200V及DC12V, 36V, 48V等电压等级. 功率因数从0-1.0可调, 低压三相交流400V负载箱可测三相400V和三相200V. 单相220V和110V四个电压等级. 高压负载箱为高压直接测试无需降压测试 (不需变压器) 所以体积更小, 测量更为方便. 更准确.

The dry-type load bank is the electrical energy load testing equipment which our company self research and develop: operate easily, small volume, convenient transportation, visible loading capacity, regulating the capacity according to the shunt resistance pile electric circuit. The adjustment of the loading capacity has manual control and computer control. Compared with the traditional water load and resistance load bank, it doesn't have the leakage, don't product the noxious gas and the waste water. The load test precision is high, the adjustment is easier, don't need to test the setup time, can continuously the long-time use and so on many superiorities. Our company lot product the three-phase AC dry-type load bank which has voltage classes: high voltage 10KV, 6.6KV, 3.3KV and low voltage 690V, 400V, 200V and DC12V, 36V, 48V and so on. Power factor can regulate from 0-1.0, low voltage three-phase AC 400V load bank can test three-phase 400V and three-phase 200V, single-phase 220V and 110V voltage classes. The high-voltage load bank doesn't need test for the high-voltage directly test (not to need transformer), therefore the volume is smaller, the survey is more convenient and more accurate

高性能, 高品质 High performance, High quality

采用我公司自主研发定型的温度系数低, 低阻抗的电阻管. 电阻管采用了不锈钢管和不锈钢散热片, 管内充满 (MGO) 材料. 密封了钢管两头. 防止湿气进入腐蚀电热元件品质. 因而可以长期保持高品质的质量. 采用了强制空气对流方法来冷却电阻管. 使电阻管可连续工作.

We select our company self research and develop low temperature coefficient, low impedance resistance tube. The resistance tube has used the stainless steel pipe and the stainless steel radiator fin, in the tube are full of the material (Mgo), has sealed the steel pipe two ends, preventing the moisture to enter to corrupt heating unit quality. Therefore the high quality may maintain for a long time. Using the forced air convection method to cool the resistance tube which can make the resistance tube continuously working

小型、轻巧、占地少 Small-type, light and handy, space saving

干式负荷装置采用了自主研发定型的电阻管, 使得负荷装置小型化, 全身机架用型材焊接而成. 使它的重量更轻, 容易搬动. 而且占有空间小. 可以在较小的空间内做测试工作.

The dry-type load installment has used our self-developed fixed-type resistance tube, which can make the load installment miniaturization. The whole body is insisted of welded materials, for which it is lighter, easier moving and space saving. We can the test work in a small space.

优越的操作性 Superior operation

操作者可以通过本公司开发的软件进行轻松地操作本装置, 可调整从0到最大的负荷容量, 另外在条件许可的情况下可以在操作面板上预制所需测试容量. 通过一个开关直接投入所需负荷容量, 大大提高了工作效率. 在种种条件下都能发挥出优秀的可操作性. 另外还可以选配远方操作控制箱, 在远处就能操纵负荷装置. 控制方式有: 按钮、控制接触器、PC控制接触器、PLC控制接触器. 在PC、PLC控制时可在电脑上显示被测的全部参数, 包括电压、电流、频率、有功功率、功率因数等. 电脑能够记录和保存测试的数据, 可随时调出查看和打印.

The operator can easily operate the installment by our self research and develop software, can regulate the load capacity from 0 to max-value. Further more you can setup the expected capacity on the operation panel directly input the need capacity by switch, which greatly increase the efficiency. Its superiors is obviously in this situation. You can select far-way control box, you can control the load installment far away. The control mode includes: key control contact device, PC control contact device, PLC control contact device. When PC, PLC control may demonstrate the complete parameters on the computer including voltage, current, frequency, active power, power factor and so on. The computer can record and preserve the test data, may momentarily assign out the examination and printing.



■ 负载箱用途 (Application for load bank)

发电机制造业 Motor manufacturing

负载箱是测试发电机的功率、频率、电压、电流、功率因数、发电机的稳定性等参数的理想检测设备. 发电机使用的燃料多为柴油, 柴油在低于50%负载或长时间空载情况下会造成燃油不充分、积碳、整机效率降低, 最终导致启动困难、动力不足、油耗增加、过早开缸维修导致报废, 而负载箱是发电机的理想假负载.

The load bank is an ideal test equipment for generator power, the frequency, the voltage, the current, power factor and other generator parameters. Most of the generator use the diesel oil, which can cause the fuel oil unfilled, carbon deposition, complete machine efficiency reduced when the diesel oil load is lower than 50% or in idling situation for a long time and even cause starting difficulty, power insufficiency, oil consumption increased, finally, opening the cylinder for maintenance too early and the abandonment, so the load bank will be generator's ideal false load.

变压器制造业 Transformer manufacturing

测试变压器的额定容量、电流、电压、频率、温升、吵声等参数. 铁路、电力、通讯基站电源站负载检测.

Measuring the transformer's parameters include rated capacity, current, voltage, frequency, temperature-rise and noise and so on. As a kind of load testing equipment for power station of the railway, power equipment and transportation.

■ 执行标准 (Normative Standards)

- @ 国际标准: ISO 8528-5:1993 《往复式内燃交流发电机 第5部分: 发电机组》
- @ 国家标准: GB/T 2820.5-1997 《往复式内燃交流发电机 第5部分: 发电机组》
- @ 国家标准: GB/T 13032-1991 《船用柴油发电机组通用技术条件》
- @ 国家标准: GB/T 14048.1-2000 《低压开关设备和控制设备》
- @ 行业标准: JB/T 10303-2001 《工频柴油发电机组技术条件》
- @ 行业标准: JB/T 9696.1-1999 《低压成套开关和控制设备用接线端子排》

- @ International standard: ISO 8528-5: 1993 «Reciprocating internal combustion alternator. Part 5: Generating set.»
- @ National standard: GB/T 2820.5-1997 «Reciprocating internal combustion alternator. Part 5 Generating set.»
- @ National standard: GB/T 13032-1991 «General technical condition for Marine Diesel Generator Set.»
- @ National standard: GB/T 14048.1-2000 «Low-voltage Switchgear and Controlgear.»
- @ Industry standard: JB/T 10303-2001 «Technical condition for Diesel Generating set.»
- @ Industry standard: JB/T 9696.1-1999 «Connecting terminals for Low-voltage Switchgear and Controlgear.»

■ 产品参数 (Product Parameters)

项目 Item	功率 Power		
总功率 Total power	100KW	200KW	400KW
测试电压 Test voltage	三相AC400V Three-phase AC400V	三相AC400V Three-phase AC400V	三相AC400V Three-phase AC400V
功率分段 Power step	5KW X 2段 (step) 10KW X 6段 (step) 20KW X 2段 (step)	2.5KW * 1段 (step) 5KW * 2段 (step) 10KW * 2段 (step) 20KW * 5段 (step) 40KW * 2段 (step)	1kw x1 2kw x1 4kw x1 8kw x1 12kw x2 24kw x4 48kw x6
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	单相AC220V Single-phase AC220V	二相AC380V Single-phase AC380V	单相AC220V Single-phase AC220V
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	L800 x W820 x H900	L800 x W820 x H1300	L800 x W1250 x H1600
重量 Weight (KG)	150	220	420
选配 Selected fitting	远方控制箱 / 电脑控制 Far-away control box / Computer control	远方控制箱 / 电脑控制 Far-away control box / Computer control	远方控制箱 / 电脑控制 Far-away control box / Computer control

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

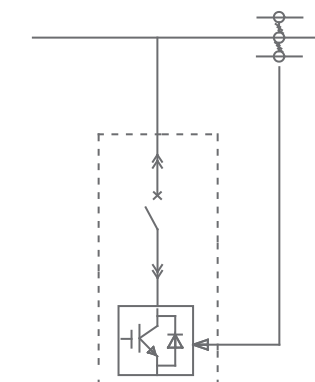
中性线电流
 Neutral current 44.1Arms

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.

