

# 检测报告

## TEST REPORT

委托单位名称 深圳市盛弘电气股份有限公司  
Client Name ..... Shenzhen Sinexcel Electric Co., Ltd

产品名称 静止无功发生器  
Name of product ..... Static Var Generator

制造厂商 深圳市盛弘电气股份有限公司  
Manufacturer ..... Shenzhen Sinexcel Electric Co., Ltd

商标型号 Sinexcel 100 SVG  
Trade mark & model .....

检测类别 型式试验  
Test sort ..... Type test



中检集团南方电子产品测试(深圳)有限公司  
CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

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# 检测报告

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样品名称 Name of sample	静止无功发生器 Static Var Generator		商标 Trade mark	/	
制造厂商 Manufacturer	深圳市盛弘电气有限公司 Sinexcel Electric Co., Ltd		型号规格 Model/Type	Sinexcel 100 SVG	
委托单位 Client	深圳市盛弘电气有限公司 Sinexcel Electric Co., Ltd		取样方式 Sampling method	送样 Send samples	
抽样单位 Sampler	/		抽样母数 Amount of samples	/	
抽样地点 Sampling place	/		样品数量 Quantity of samples	1 台 1 set	
生产日期 Production date	/	抽样日期 Sampling date	/	送检日期 Application data	2014.04.11
检验日期 Test date	2014.04.11 to 2014.04.22		检验环境 Environment condition	20.2-23.3°C, 45.6-63.9%RH	

### 样品说明(Sample description):

本次所检测的静止无功发生器 (Static Var Generator) 样品, 通过智能跟踪负载实时产生与电网无功电流幅值相等、方向相反的电流抵消电网无功电流, 从而实现补偿无功功能。本样品主电路部分采用三电平拓扑电路, 控制软件具有智能补偿、逐次补偿两种补偿模式, 在补偿无功的

The static Var Generator sample detected by this time generates the compensation reactive power by canceling the reactive current of the grid with the same magnitude and opposite direction of the grid reactive current by real-time tracking load. The main circuit part of this sample adopts three-level topology circuit, The control software has two compensation modes: intelligent compensation and successive compensation. It can compensate the three-phase unbalanced load while compensating for reactive power.

共检验 1 台样品, 样品容量为100kvar, 3 相4 线制接入模式, 通过软件设置可更改设备的线制, 机架式安装方式。检验前样品完好无损, 功能正常。

Total 1 unit was tested, and the reactive power compensation capacity of the sample was 100kvar, 3-phase 4-wire. 3P3W or 3P4W can be changed by software settings. The sample was intact and functioning normally before the test.

具体参数如下所示:

Detail parameters are as follows:



 **Sinexcel**<sup>®</sup>

产品型号：Sinexcel 100 SVG



输入：380/400/415VAC  
3Φ+N+PE/3Φ+PE  
50/60Hz

输出：50kvar 100kvar  
制造商：深圳市盛弘电气有限公司  
S/N：SHSVG1001402160088

MADE IN CHINA

以下报告中出现的“SVG”为静止无功发生器的简称。

The "SVG" appearing in the following report is an abbreviation for Static Var Generator.

工作温度：-10℃+40℃，相对湿度：5%-95% RH, 无冷凝，海拔高度：1500m 以下

Operating temperature: -10℃+40℃, relative humidity: 5%-95%RH, no condensation, altitude: below 1500m



检验项目(Test item): 设备外观、铭牌信息、无功补偿率试验、补偿三相不平衡试验、额定补偿电流试验、电压不平衡试验、输入电压范围试验、输入频率范围试验、系统效率试验、动态响应试验、噪声试验、轻载试验、绝缘电阻试验、绝缘强度试验、输入缺相试验、输入电压超限试验、输入频率超限试验、静电放电抗扰度试验、电快速瞬变脉冲群抗扰度试验、浪涌(冲击)抗扰度试验、工频磁场抗扰度试验、温升试验、防护等级试验、低温试验、高温试验、湿度试验、振动试验、冲击试验、碰撞试验、包装跌落试验

Appearance, Nameplate information, Reactive power compensation rate test, Three-phase unbalanced compensation test, Rated compensation current test, Voltage imbalance test, Input voltage range test, Input frequency range test, System efficiency test, Dynamic response test, Noise test, Light load test, Harmonic compensation test, Constant reactive power control test, Control monitoring test, Insulation resistance test, Dielectric strength test, Protection and alarm test, electrostatic discharge immunity test, pulse group interference test, electrical fast transient interference test, radiated electromagnetic field interference test, power terminal conduction disturbance voltage test, radiation disturbance field strength test, Temperature rise test, protection level test, Low-temperature test, High-temperature test, Humidity test, Vibration test, Impact test, packaging drop test, Fast response time test

检测依据(Reference documents):

☆Q/F0800\_A0 《Sinexcel SVG 系列 静止无功发生器》 部分条款

☆ Q/F0800\_A0 《Sinexcel SVG series static reactive power generator"》 partial provisions

检验概况(Summary):

对Sinexcel 100 SVG 按照企业标准中型式试验要求进行了测试, 数据详见后页

Sinexcel 100 SVG has been tested according to the type test requirements of enterprise standards, and the data are shown in the following page

试验情况不适用本试验产品

不适用

The test conditions are not applicable to test product

N (not applicable)

试验样品满足要求

通过

Test sample meets requirements

P (Passed)

试验样品不满足要求

不通过

Test sample does not meet the requirements

F (failed)

未进行试验

未进行

Not carried out tested

(not carried out)

检验结论(Test conclusion):

共检验30项, 均符合企业标准要求

A total of 30 tests, all in line with the requirements of enterprise standards

(检验单位盖章stamp)

检测:

王振核:

批准

Test

Audit

Approval

2014年04月22日

2014年04月22日

2014年04月22日

Y M D

Y M D

Y M D



## 检验项目

Test items

产品名称 Name	认证依据标准 Certification criteria	检验项目 Test items	判定 Assessment	
静止无功 发生器 Static Var Generator	☆ Q/F0800_A0 《Sinexcel SVG 系列 静止无功 发生器》部分 条款 Q/F0800_A0 《Sinexcel SVG series Static Var Generator》Part of the provisions	设备外观、铭牌信息 Equipment appearance and nameplate information	符合标准要求 Qualified	
		性能试验 Performance test	无功补偿率试验 Reactive power compensation rate test	≥99%，符合标准要求 ≥99%，Qualified
			补偿三相不平衡试验 three phase unbalanced compensation test	补偿后三相电流不平衡 度≤5%，符合标准要求 After compensation, the unbalance degree of three- phase current is less than 5%, Qualified
			额定补偿电流试验 Rated compensation current test	符合标准要求 Qualified
			电压不平衡试验 Voltage unbalance test	符合标准要求 Qualified
			输入电压范围试验 Input voltage range test	相电压 138-265V， 符合标准要求 Phase voltage 138-265V， Qualified
			输入频率范围试验 Input frequency range test	45-55Hz，符合标准要求 45-55Hz，Qualified
			系统效率试验 System efficiency test	≥97%，符合标准要求 ≥97%，Qualified
			动态响应试验 Dynamic response test	快速响应时间：33.4us， Quick response time: 33.4us， 全响应时间：14.7ms， Full response time: 14.7ms 符合标准要求 Qualified
			噪声试验 The noise test	64.0dB，符合标准要求 64.0dB，Qualified
			轻载试验 Light load test	符合标准要求 Qualified
		安全试验 Safety test	绝缘电阻试验 Insulation resistance test	500MΩ，符合标准要求 500MΩ，Qualified
			绝缘强度试验 Insulation strength test	2820Vdc，符合标准要求 2820Vdc，Qualified
			输入缺相试验 Input phase loss test	符合标准要求 Qualified
			输入电压超限试验 Input voltage over-limit test	符合标准要求 Qualified
			输入频率超限试验 Input frequency over-limit	符合标准要求 Qualified



	test	
电磁兼容试验 Electromagnetic compatibility test	静电放电抗扰度试验 Electrostatic immunity test	符合标准要求 Qualified
	电快速瞬变脉冲群抗扰度试验 Electrical fast transient burst immunity test	符合标准要求 Qualified
	浪涌（冲击）抗扰度试验 Surge (impact) immunity test	符合标准要求 Qualified
	工频磁场抗扰度试验 Power frequency magnetic field immunity test	符合标准要求 Qualified
	温升试验 Temperature rise test	符合标准要求 Qualified
防护等级试验 IP Class test	IP20, 符合标准要求 IP20, Qualified	
环境试验 Environmental testing	低温试验 Low temperature test	-20 C, 2h, 符合标准要求 -20 C, 2h, Qualified
	高温试验 High temperature test	40 C, 2h, 符合标准要求 40 C, 2h, Qualified
	湿度试验 Humidity test	40 C, 95%RH, 48h, 符合标准要求 40 C, 95%RH, 48h, Qualified
	振动试验 Vibration test	符合标准要求 Qualified
	冲击试验 Impact test	符合标准要求 Qualified
	碰撞试验 Crash test	符合标准要求 Qualified
	包装跌落试验 Package drop test	符合标准要求 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
4	分类与命名 Classification and naming		
4.3	外形结构 External structure	见样品照片 Reference sample photo	合格 Qualified
4.4	外观要求 Appearance requirements		
	<p>产品表面不应有明显的凹痕、划伤、裂缝、变形等现象，表面涂覆层不应起泡、龟裂和脱落，金属零件不应有锈蚀及其他机械损伤</p> <p>开关操作应方便、灵活、可靠、零部件牢固无松动</p> <p>说明功能的文字符号及功能显示应清晰端正</p> <p>There should be no obvious dents, scratches, cracks, deformations, etc. on the surface of the product , The surface coating layer should not bubble, crack and fall off, metal parts should not rust and other mechanical damage</p> <p>Switching operation should be convenient, flexible, reliable,the parts are firm and not loose,description of the function of the text symbol and function display should be clear and correct</p>	符合标准要求 Comply with the standard	合格 Qualified
5	技术要求 Technical requirement		
5.1	环境条件 Environmental conditions		
5.1.1	气候环境条件 Climatic environmental conditions		
	<p>工作温度：-10℃+40℃(-20℃低温启动)</p> <p>Operating temperature: -10 °C - +40 °C (-20 °C low temperature start)</p>	见条款6.2.6 环境试验 Clause 6.2.6 Environmental Test	合格 Qualified
	<p>储存温度：-40℃-70℃</p> <p>Storage temperature: -40 °C -70 °C</p>	见条款6.2.6 环境试验 Clause 6.2.6 Environmental Test	合格 Qualified
	<p>相对湿度：5%-95% RH, 无冷凝</p> <p>Relative humidity: 5%-95% RH, no condensation</p>	见条款6.2.6 环境试验 Clause 6.2.6 Environmental Test	合格 Qualified
	<p>海拔高度：&lt;1500m, 1500m以上按照GB/T3859.2-2013 降额使用</p> <p>Altitude: &lt;1500m, above 1500m derated according to GB/T3859.2-2013</p>	1500m以上时客户应按照GB/T3859.2-2013 要求降额 Above 1500m, customers should derate according to GB/T3859.2-2013 requirements	合格 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
	频率范围: 45Hz-55Hz Frequency range: 45Hz-55Hz	见条款 6.4.1.7 输入频率范围试验 Clause 6.4.1.7 input frequency range test	通过 Qualified
	快速响应时间: <50us 全响应时间: <15ms Fast response time: <50us Full response time: <15ms	见条款 6.4.1.9 动态响应试验 Clause 6.4.1.9 dynamic response test	通过 Qualified
5.3	系统特性 System features		
	系统效率(100%负载): ≥97% System efficiency (100% load) : ≥97%	见条款 6.4.1.8 系统效率试验 Clause 6.4.1.8 system efficiency test	通过 Qualified
	EMC/EMI	见条款 6.4.3、6.4.4、6.4.5、6.4.8 Clauses 6.4.3, 6.4.4, 6.4.5 and 6.4.8	通过 Qualified
	噪音: ≤65dB Noise: ≤65dB	64.0dB, 符合标准要求 64.0dB, Qualified	通过 Qualified
	防护等级 IP class	IP20, 符合标准要求 IP20, Qualified	通过 Qualified
	接线方式 Connection mode	后进线 Back line	通过 Qualified
5.4	报警信息 The alarm information		
	输入电压保护 (输入缺相、输入电压异常) Input voltage protection (input phase missing, input voltage abnormal)	见条款 6.4.2.5 输入异常报警试验 Clause 6.4.2.5 input abnormal alarm test	通过 Qualified
	输入频率异常 Input frequency anomaly	见条款 6.4.2.5 输入异常报警试验 Clause 6.4.2.5 input abnormal alarm test	通过 Qualified
5.5	面板功能 Panel function		
	系统可以只采用 LED 进行简单显示, 也可以采用 LCD+LED 的显示方式, 方便客户进行实时波形和数据的查看	LCD 显示, 中文语言 LCD display, Chinese	通过 Qualified





Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
	The system can only use LED for simple display, or LCD+LED display to facilitate customers to view real-time waveform and data	language	
5.7	安全要求 Safety requirements		
5.7.2	绝缘电阻(试验电压 500Vdc) Insulation resistance (test voltage 500Vdc)		通过 Qualified
	交流输入端口短接对机壳的绝缘电阻大于 2 MΩ The AC input port is shorted to the insulation resistance of the chassis is greater than 2 MΩ	500 MΩ	通过 Qualified
5.7.3	绝缘强度 Insulation strength		通过 Qualified
	交流输入端短接对机壳, 承受 2820Vdc 电压, 漏电流<3.5mA, 试验中无击穿或飞弧现象 The AC input terminal is shorted to the chassis, withstands 2820Vdc voltage, leakage current <3.5mA, no breakdown or arcing during the test.	2820Vdc	通过 Qualified

6	试验方法 Test methods
6.4	试验步骤 Test steps

6.4.1	主要性能试验 Main performance test		
6.4.1.2	无功补偿率试验 Reactive power compensation rate test		通过 Qualified
	SVG 与无功发生装置并联, 无功发生装置输出的无功大小要在 SVG 额定容量范围内, 测试 SVG 投入前、后电网侧的三相无功功率大小的变化, 在 SVG 容量范围内, 无功补偿率应大于等于 99% SVG is connected in parallel with the reactive power generating device, the reactive power output of the reactive power generator is within the SVG rated capacity, test the change of the three-phase reactive power of the grid side before and after the SVG input, within the SVG capacity range, the reactive power compensation rate should be greater than or equal to 99%	(见表格 6.4.1.2a、6.4.1.2b、6.4.1.2c) (Forms 6.4.1.2a, 6.4.1.2b, 6.4.1.2c)	通过 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
6.4.1.3	补偿三相不平衡试验 Three phase unbalance compensation test		通过 Qualified
	SVG 开机前, 启动并调整非线性负载, 使其三相电流不平衡度大于 10%, SVG 设置为补偿不平衡模式后开机, 待 SVG 输出稳定后, 在 SVG 容量范围内 三相电流不平衡度应小于等于 5% Before starting up SVG, start up and adjust the non-linear load so that the imbalance degree of three-phase current is more than 10%. After SVG is set to compensate for the imbalance mode, start up. After the output of SVG is stable, the imbalance degree of three-phase current within the capacity range of SVG should be less than or equal to 5%	(见表格 6.4.1.3a、 6.4.1.3b、 6.4.1.3c) (Forms 6.4.1.3a, 6.4.1.3b, 6.4.1.3c)	通过 Qualified
6.4.1.4	额定补偿电流试验 Rated compensation current test		通过 Qualified
	SVG 连接大于等于其输出容量的无功发生装置后开机, 待 SVG 输出稳定后, SVG 应该能输出额定容量的补偿电流, 并且补偿后电网侧功率因数明显增大 After the SVG connection is greater than or equal to its output capacity, the reactive power generating device is turned on, after the SVG output is stable, the SVG should be able to output the compensation current of the rated capacity, and the power factor of the grid side will increase significantly after compensation.	(见表格 6.4.1.4) (Form 6.4.1.4)	通过 Qualified
6.4.1.5	电压不平衡试验 Voltage unbalance test		通过 Qualified
	SVG 正常开机后, 在满载状态下调节交流电源其中一相输出电压, SVG 在其中一相电压为输入电压上限和下限时, SVG 应该能够正常工作 After the SVG is turned on normally, adjust the output voltage of one phase of the AC power supply under full load., When the SVG voltage is the upper and lower limits of the input voltage, the SVG should work normally.	(见表格 6.4.1.5) (Form 6.4.1.5)	通过 Qualified
6.4.1.6	输入电压范围试验 Input voltage range test		通过 Qualified
	SVG 正常开机后, 在满载状态下调节交流电源的三相相电压, 使其在 138-265(1±3%) Vac 范围内变化 SVG 应该能够正常工作 After the SVG is turned on normally, adjust the three-	(见表格 6.4.1.6) (Form 6.4.1.6)	通过 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
	phase voltage of the AC power supply under full load to change the SVG within 138-265 (1±3%) Vac range.		
6.4.1.7	输入频率范围试验 Input frequency range test		通过 Qualified
	SVG 正常开机后, 在满载状态下调节交流电源的频率, 使其在 45-55(1±0.1)Hz 范围内变化, SVG 应该能够正常工作 After normal startup of SVG, adjust the frequency of ac power supply under the condition of full load to make it change within the range of 45-55(1±0.1)Hz. SVG should be able to work normally	(见表格 6.4.1.7) (Form 6.4.1.7)	通过 Qualified
6.4.1.8	系统效率试验 System efficiency test		通过 Qualified
	SVG 开机后满载运行, 测量 SVG 三相消耗的有功功率之和以及三相视在功率之和, 系统的效率为 P/S)*100%, 系统效率应满足大于等于 97% After the SVG is started up and running at full load, the sum of the active power consumed by the three-phase SVG and the sum of the three-phase apparent power are measured. The efficiency of the system is (1-p /S)*100%, and the system efficiency should be greater than or equal to 97%	(见表格 6.4.1.8) (Form 6.4.1.8)	通过 Qualified
6.4.1.9	动态响应试验 Dynamic response test		通过 Qualified
	SVG 与无功发生装置并联, 待 SVG 处于开机状态后, 投入无功发生装置, 测量无功发生装置开始输出 SVG is in parallel with the reactive power generating device. When SVG is in the power-on state, it is put into the reactive power generating device, and the measurement of the reactive power generating device starts to output	(见表格 6.4.1.9a、6.4.1.9b) (Forms 6.4.1.9a and 6.4.1.9b)	通过 Qualified
	输入频率超限试验 Input frequency overrun test		通过 Qualified
	当 SVG 的输入频率超出工作范围, SVG 应能报警并停止工作; 当输入频率恢复正常后, SVG 应能够自动开机稳定工作 When the input frequency of SVG exceeds the working range, SVG should alarm and stop working; When the input frequency returns to normal, SVG should be able to start up automatically and work steadily	SVG 停止工作, 保护停机, 报警信息显示在 LCD 显示屏上, “1#输入频率异常”; 频率恢复正常, SVG 自动开机运行 SVG stops working and protects downtime, the alarm information is	通过 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
		displayed on the LCD display screen, "1# input frequency is abnormal";The frequency returns to normal and SVG starts up automatically	
6.4.3	静电放电抗扰度试验 Electrostatic immunity test	(见表格 6.4.3) ( Form 6.4.3)	通过 Qualified
6.4.4	电快速瞬变脉冲群抗扰度试验 Electrical fast transient pulse group immunity test	(见表格 6.4.4) (Form 6.4.4)	通过 Qualified
6.4.5	工频磁场抗扰度试验 Power frequency magnetic field immunity test	(见表格 6.4.5) ( Form 6.4.5)	通过 Qualified
6.4.8	浪涌(冲击)抗扰度试验 Surge (impact) immunity test	(见表格 6.4.8) (Form 6.4.8)	通过 Qualified
6.4.9	防护等级试验 IP class test	外壳防护等级 IP20 Enclosure protection grade IP20	通过 Qualified
6.4.10	温升试验 Temperature rise test	(见表格 6.4.10) ( Form 6.4.10)	通过 Qualified
6.4.11	环境试验 Environmental testing		
6.4.11.1	低温试验 Low temperature test		通过 Qualified
	低温箱中的温度偏差不超过 $\pm 2^{\circ}\text{C}$ ，SVG 的控制装置表面与低温箱内壁之间的最小距离不小于 150mm，低温箱以不超过 $1^{\circ}\text{C}/\text{min}$ 速度降温，待温度达到 $-20^{\circ}\text{C}$ 并稳定后，SVG 应能够正常启动，显示和通讯功能应正常工作  The temperature deviation in the cryostat does not exceed $\pm 2^{\circ}\text{C}$ , the minimum distance between the surface of the SVG control device and the inner wall of the cryostat is not less than 150 mm, and the cryostat is cooled at a speed not exceeding $1^{\circ}\text{C}/\text{min}$ until the temperature reaches $-20^{\circ}\text{C}$ and is stable. After that, SVG should be able to start normally, display and communication functions should work normally	-20 C, 2h, 实验后 SVG 能正常工作，显示和通讯功能正常  -20 C, 2h, after the experiment, SVG can work normally and display and communication functions are normal	通过 Qualified
6.4.11.2	高温运行试验 High temperature running test		通过 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
	<p>高温箱中的温度偏差不超过<math>\pm 2^{\circ}\text{C}</math>，SVG 的控制装置表面与高温箱内壁之间的最小距离不小于 150mm。高温箱以不超过 <math>1^{\circ}\text{C}/\text{min}</math> 速度升温，待温度达到 <math>+40^{\circ}\text{C}</math> 并稳定后开始计时，SVG 连续通电在满载下运行 2h，SVG 在试验过程中的输出、显示和通讯功能应正常工作</p> <p>The temperature deviation in the high-temperature box shall not exceed <math>\pm 2^{\circ}\text{C}</math>, and the minimum distance between the surface of SVG control device and the inner wall of the high-temperature box shall not be less than 150mm. The high-temperature box should be heated up at a speed of no more than <math>1^{\circ}\text{C}/\text{min}</math>, and start timing when the temperature reaches <math>+40^{\circ}\text{C}</math> and becomes stable. SVG should be powered on continuously for 2h under full load, and the output, display and communication functions of SVG in the test process should work normally</p>	<p>40 C, 2h, SVG 能正常工作，显示和通讯功能正常</p> <p>40 C, 2h, After the experiment, SVG can work normally and display and communication functions are normal</p>	通过 Qualified
6.4.11.3	<p>恒定湿热试验</p> <p>Constant humidity and heat test</p>		通过 Qualified
	<p>将 SVG 空开置于断开状态，放入试验箱内，使箱内温度升至 <math>40^{\circ}\text{C} \pm 3^{\circ}\text{C}</math>，温度变化平均速率为 <math>(0.7^{\circ}\text{C} - 1^{\circ}\text{C})/\text{min}</math>，当 SVG 达到热平衡后，在 1 小时内使湿度升至 <math>95(1+2\%) - 95(1-3\%)</math>，当温湿度达到规定数值后，开始计算存放时间，存放时间为 48 小时，试验期满后，在 1 小时内将湿度降到 <math>45\% - 75\%</math>，然后以温度变化平均速率 <math>(0.7^{\circ}\text{C} - 1^{\circ}\text{C})/\text{min}</math>，使箱内温度降到常温，取出 SVG，恢复 2 小时，SVG 能正常工作</p> <p>The SVG empty open was placed in the disconnected state and placed in the test box. The temperature in the box was increased to <math>40^{\circ}\text{C} \pm 3^{\circ}\text{C}</math>, and the average rate of temperature change was <math>(0.7^{\circ}\text{C} - 1^{\circ}\text{C})/\text{min}</math>. When the heat balance of SVG is reached, the humidity should rise to <math>95(1+2\%) - 95(1-3\%)</math> within 1 hour. When the temperature and humidity reach the specified value, the storage time should be calculated and the storage time should be 48 hours. After the expiration of the test, the humidity should be reduced to <math>45\% - 75\%</math> within 1 hour. Then, at the average rate of temperature change <math>(0.7^{\circ}\text{C} - 1^{\circ}\text{C})/\text{min}</math>, the temperature in the cabinet was reduced to normal temperature, and SVG was removed and restored for 2 hours. SVG could work normally.</p>	<p>40 C, 95%RH, 48h, 实验后 SVG 能正常工作</p> <p>40 C, 95%RH, 48h, after the experiment, SVG can work normally and display</p>	通过 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
6.4.11.4	振动试验 Vibration test	(见表格 6.4.11.4) ( Form 6.4.11.4)	通过 Qualified
6.4.11.5	冲击试验 Impact test	(见表格 6.4.11.4) (Form 6.4.11.4)	通过 Qualified
6.4.11.6	包装跌落试验 Package drop test	(见表格 6.4.11.6) ( Form 6.4.11.6)	通过 Qualified
6.4.11.7	碰撞试验 Crash test	(见表格 6.4.11.4) ( Form 6.4.11.4)	通过 Qualified



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

表格 6.4.1.2a: 无功补偿率试验-100%无功功率 Table 6.4.1.2a: reactive power compensation rate test -100% reactive power	通过 Qualified
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补偿前 Before compensation					
无功功率 (kvar) Reactive power (kvar)			功率因数 (PF) Power factor (PF)		
A 相 Phase A	B 相 Phase B	C 相 Phase C	A 相 Phase A	B 相 Phase B	C 相 Phase C
32.144	32.044	32.118	0.069	0.072	0.081
补偿后 After compensation					
无功功率 (kvar) Reactive power (kvar)			功率因数 (PF) Power factor (PF)		
A 相 Phase A	B 相 Phase B	C 相 Phase C	A 相 Phase A	B 相 Phase B	C 相 Phase C
-0.252	-0.305	-0.069	0.998	0.996	0.999
无功补偿率 Reactive power compensation rate					
A 相 Phase A	99.22%	B 相 Phase B	99.05%	C 相 Phase C	99.78%





Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
补偿前无功功率和功率因数 Reactive power and power factor before compensation		补偿后无功功率和功率因数 Reactive power and power factor after compensation	
注： 1、截图中的字母和数字含义如下： Irms: 电流有效值    S: 视在功率    Q: 无功功率    λ: 功率因数    1/2/3: 代表 A/B/C 三相 2、无功补偿率公式为：(1-补偿后无功功率/补偿前无功功率) *100% Note: 1. The meanings of letters and numbers in the screenshot are as follows: Irms: effective value of current    S: apparent power    Q: reactive power    λ: power factor    1/2/3: represents A/B/C three-phase 2. The formula of reactive power compensation rate is :(1- reactive power after compensation/reactive power before compensation) *100%			

表格 6.4.1.2b: 无功补偿率试验-约 75%无功功率 Table 6.4.1.2b: reactive power compensation rate test - about 75% reactive power					通过 Qualified
补偿前 Before compensation					
无功功率 (kvar) Reactive power (kvar)			功率因数 (PF) Power factor (PF)		
A 相	B 相	C 相	A 相	B 相	C 相
25.094	24.971	25.316	0.128	0.123	0.130
补偿后 After compensation					
无功功率 (kvar) Reactive power (kvar)			功率因数 (PF) Power factor (PF)		
A 相	B 相	C 相	A 相	B 相	C 相
-0.217	-0.233	-0.063	0.999	0.998	0.999
无功补偿率 Reactive power compensation rate					
A 相	99.14%	B 相	99.07%	C 相	99.75%





Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment



补偿前无功功率和功率因数

Reactive power and power factor before compensation



补偿后无功功率和功率因数

Reactive power and power factor after compensation

注:

1、截图中的字母和数字含义如下:

Irms: 电流有效值 S: 视在功率 Q: 无功功率 λ: 功率因数 1/2/3: 代表A/B/C三相

2、无功补偿率公式为: (1-补偿后无功功率/补偿前无功功率) \*100%

Note:

1. The meanings of letters and numbers in the screenshot are as follows:

Irms: effective value of current S: apparent power Q: reactive power λ: power factor 1/2/3: represents A/B/C three-phase

2. The formula of reactive power compensation rate is :(1- reactive power after compensation/reactive power before compensation) \*100%

表格 6.4.1.2c: 无功补偿率试验-约 15%无功功率					通过
Table 6.4.1.2c: reactive power compensation rate test - about 15% reactive power					Qualified
补偿前					
Before compensation					
无功功率 (kvar)			功率因数 (PF)		
Reactive power (kvar)			Power factor (PF)		
A 相	B 相	C 相	A 相	B 相	C 相
5.490	5.596	5.488	0.227	0.244	0.256
补偿后					
After compensation					



Q/F0800_A0						
条款 Items	要求 - 试验 Requirement-Experiment			结果 - 评述 Result- Review		判定 Assessment
无功功率 (kvar) Reactive power (kvar)			功率因数 (PF) Power factor (PF)			
A 相	B 相	C 相	A 相	B 相	C 相	
-0.016	-0.016	0.055	0.999	0.999	0.999	
无功补偿率 Reactive power compensation rate						
A 相	99.71%	B 相	99.71%	C 相	99.00%	
补偿前无功功率和功率因数 Reactive power and power factor before compensation			补偿后无功功率和功率因数 Reactive power and power factor after compensation			
<p>注:</p> <p>1、截图中的字母和数字含义如下:            Irms: 电流有效值 S: 视在功率 Q: 无功功率 λ: 功率因数 1/2/3: 代表A/B/C 三相            2、无功补偿率公式为: (1-补偿后无功功率/补偿前无功功率) *100%</p> <p>Note:</p> <p>1. The meanings of letters and numbers in the screenshot are as follows:            Irms: effective value of current S: apparent power Q: reactive power λ: power factor 1/2/3: represents A/B/C three-phase            2. The formula of reactive power compensation rate is :(1- reactive power after compensation/reactive power before compensation) *100%</p>						



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

表格 6.4.1.3a: 补偿三相不平衡试验 Table 6.4.1.3b: compensation for three-phase unbalance test						通过 Qualified
SVG 投入前三相电流不平衡度 Imbalance degree of current before SVG input						
电压 (V) Voltage (V)			电流 (A) Current (A)			三相电流不平衡度 (%) Three-phase current unbalance degree (%)
A 相	B 相	C 相	A 相	B 相	C 相	
221.120	233.654	230.533	130.963	5.762	5.667	88.93%
角度 Angle						
$\Phi$ (U1-I1)		$\Phi$ (U1-I2)		$\Phi$ (U1-I3)		
359.192°		95.076°		214.490°		
SVG 投入后三相电流不平衡度 Three - phase current unbalance degree after SVG input						
电压 (V) Voltage (V)			电流 (A) Current (A)			三相电流不平衡度 (%) Three-phase current unbalance degree (%)
A 相	B 相	C 相	A 相	B 相	C 相	
227.659	227.706	229.289	51.492	52.757	51.339	2.06%
角度 Angle						
$\Phi$ (U1-I1)		$\Phi$ (U1-I2)		$\Phi$ (U1-I3)		
3.586°		118.594°		239.280°		
注: 1、截图中的字母和数字含义如下: Urms: 电压有效值 Irms: 电流有效值 P: 有功功率 1/2/3: 代表A/B/C 三相						
Note: 1. The meanings of letters and numbers in the screenshot are as follows: Urms: effective voltage value Irms: effective current value P: active power 1/2/3: represents A/B/C three-phase						

表格 6.4.1.3b: 补偿三相不平衡试验 Table 6.4.1.3b: compensation for three-phase unbalance test						通过 Qualified
SVG 投入前三相电流不平衡度 Imbalance degree of current before SVG input						
电压 (V)			电流 (A)			三相电流不平衡度 (%)
A 相	B 相	C 相	A 相	B 相	C 相	
227.659	227.706	229.289	51.492	52.757	51.339	2.06%
角度 Angle						
$\Phi$ (U1-I1)		$\Phi$ (U1-I2)		$\Phi$ (U1-I3)		
3.586°		118.594°		239.280°		




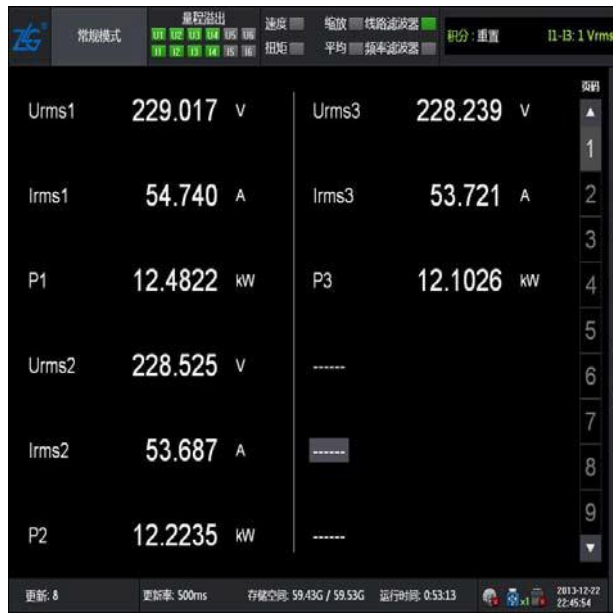
Q/F0800_A0						
条款 Items	要求 - 试验 Requirement-Experiment			结果 - 评述 Result- Review		判定 Assessment
Voltage (V)			Current (A)			Three-phase current unbalance degree (%)  89.52%
A相	B相	C相	A相	B相	C相	
230.466	220.308	235.287	5.377	135.090	5.720	
角度 Angle						
$\Phi$ (U1-I1)		$\Phi$ (U1-I2)		$\Phi$ (U1-I3)		
336.759°		121.945°		218.167°		
SVG 投入后三相电流不平衡度 Three - phase current unbalance degree after SVG input						
电压 (V) Voltage (V)			电流 (A) Current (A)			三相电流不平衡度 (%) Three-phase current unbalance degree (%)  2.61%
A相	B相	C相	A相	B相	C相	
228.970	226.993	229.177	52.283	51.675	52.419	
角度 Angle						
$\Phi$ (U1-I1)		$\Phi$ (U1-I2)		$\Phi$ (U1-I3)		
358.943°		123.382°		238.766°		
<p>补偿前三相电流 Before compensation of the three phase current</p>				<p>补偿后三相电流 After compensation of the three phase current</p>		
注： 1、截图中的字母和数字含义如下：						



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
Urms: 电压有效值 Irms: 电流有效值 P: 有功功率 1/2/3: 代表A/B/C 三相			
Note:			
1. The meanings of letters and numbers in the screenshot are as follows:			
Urms: effective voltage value Irms: effective current value P: active power 1/2/3: represents A/B/C three-phase			

表格 6.4.1.3c: 补偿三相不平衡试验 Table 6.4.1.3c: compensation for three-phase unbalance test						通过 Qualified
SVG 投入前三相电流不平衡度 Imbalance degree of current before SVG input						
电压 (V) Voltage (V)			电流 (A) Current (A)			三相电流不平衡度 (%) Three-phase current unbalance degree (%)
A 相	B 相	C 相	A 相	B 相	C 相	89.50%
235.076	229.486	221.198	5.597	5.797	136.965	
角度 Angle						
$\Phi$ (U1-I1)		$\Phi$ (U1-I2)	$\Phi$ (U1-I3)			
335.753°		95.761°	240.795°			
SVG 投入后三相电流不平衡度 Three - phase current unbalance degree after SVG input						
电压 (V) Current (A)			电流 (A) Current (A)			三相电流不平衡度 (%) Three-phase current unbalance degree (%)
A 相	B 相	C 相	A 相	B 相	C 相	2.37%
229.017	228.525	228.239	54.740	53.687	53.721	
角度 Angle						
$\Phi$ (U1-I1)		$\Phi$ (U1-I2)	$\Phi$ (U1-I3)			
358.403°		118.697°	243.503°			



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
	 <p style="text-align: center;">补偿前三相电流 Before compensation of the three phase current</p>	 <p style="text-align: center;">补偿后三相电流 After compensation of the three phase current</p>	
<p>注：</p> <p>1、截图中的字母和数字含义如下： Urms: 电压有效值 Irms: 电流有效值 P: 有功功率 1/2/3: 代表A/B/C 三相</p> <p>Note:</p> <p>1. The meanings of letters and numbers in the screenshot are as follows: Urms: effective voltage value Irms: effective current value P: active power 1/2/3: represents A/B/C three-phase</p>			

表格6.4.1.4: 额定补偿电流试验 Table 6.4.1.4: rated compensation current test					通过 Qualified
额定补偿感性无功电流 Rated compensation inductive reactive current					
补偿前无功功率(kvar) Reactive power before compensation (kvar)			补偿后无功功率(kvar) Reactive power after compensation (kvar)		
A 相	B 相	C 相	A 相	B 相	C 相
33.6268	33.7730	33.5719	-0.08257	-0.22773	-0.28881



Q/F0800_A0			
条 款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

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补偿前三相电流和功率因数 Compensation for the first three phase current and power factor	补偿后三相电流和功率因数 Compensation after three - phase current and power factor
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额定补偿容性无功电流 Rated compensation capacitive reactive current					
--	--	--	--	--	--

补偿前无功功率(kvar) Reactive power before compensation (kvar)			补偿后无功功率(kvar) Reactive power after compensation (kvar)		
--	--	--	---	--	--

A 相	B 相	C 相	A 相	B 相	C 相
-34.8378	-34.9221	-34.6960	-0.09995	0.07576	-0.12112

--	--

补偿前三相电流和功率因数 Compensation for the first three phase current and power factor	补偿后三相电流和功率因数 Compensation after three - phase current and power factor
---	---

注：1、截图中的字母和数字含义如下：  
 Irms: 电流有效值    S: 视在功率    Q: 无功功率    λ: 功率因数    1/2/3: 代表 A/B/C 三相  
 Note: 1. The meanings of letters and numbers in the screenshots are as follows:  
 Irms: effective value of current    S: apparent power    Q: reactive power    λ: power factor    1/2/3: represents A/B/C three-phase



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

表格 6.4.1.5: 电压不平衡试验 Table 6.4.1.5: voltage unbalance test	通过 Qualified
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A 相电压不平衡, 运行在额定功率下  
A - phase voltage imbalance, operating at the rated power

A 相	138.15	B 相	222.52	C 相	220.19	A 相	265.77	B 相	226.56	C 相	225.32

A 相电压下限  
A phase lower limit

A 相电压上限  
A phase voltage upper limit

B 相电压不平衡, 运行在额定功率下  
The voltage of B phase is unbalanced and operates at the rated power

A 相	219.03	B 相	138.15	C 相	216.70	A 相	225.25	B 相	264.90	C 相	226.51

B 相电压下限

B 相电压上限

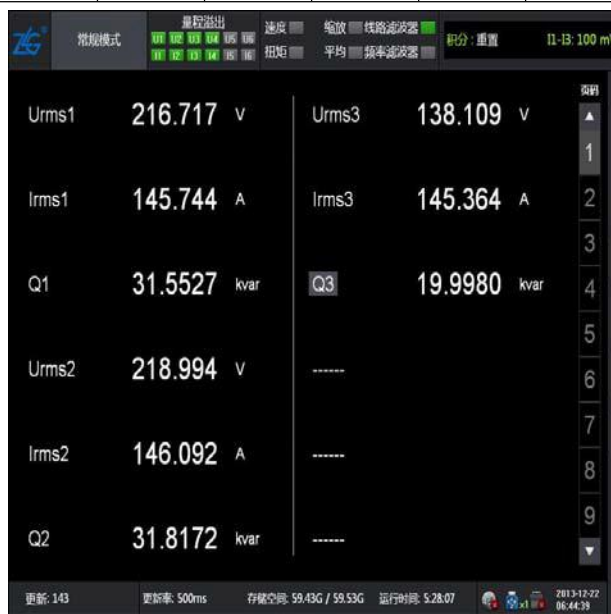




Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
B phase lower limit		B phase voltage upper limit	
注：1、截图中的字母和数字含义如下： Urms：电压有效值    Irms：电流有效值    Q：无功功率    1/2/3：代表 A/B/C 三相 Note: 1. The meanings of letters and numbers in the screenshots are as follows: Urms: effective voltage value    Irms: effective current value    Q: reactive power    1/2/3: represents A/B/C three-phase			

续表格 6.4.1.5: 电压不平衡试验 Table 6.4.1.5: voltage unbalance test	通过 Qualified
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C 相电压不平衡，运行在额定功率下 The C-phase voltage is unbalanced and operates at the rated power											
A 相	216.71	B 相	218.99	C 相	138.10	A 相	226.41	B 相	225.33	C 相	265.36



C 相电压下限 Lower limit of C phase voltage	C 相电压上限 Upper limit of c-phase voltage
---	---

注： 1、截图中的字母和数字含义如下： Urms：电压有效值    Irms：电流有效值    Q：无功功率    1/2/3：代表A/B/C 三相 Note: 1. The meanings of letters and Numbers in the screenshot are as follows: Urms: effective voltage value    Irms: effective current value    Q: reactive power    1/2/3: represents A/B/C three-phase
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表格 6.4.1.6: 输入电压范围试验 Table 6.4.1.6: input voltage range test	通过 Qualified
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Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

SVG 在下限电压正常运行  
SVG works normally at the lower limit voltage

A 相电压(V) Phase A voltage	138.346	B 相电压(V) Phase A voltage	138.259	C 相电压(V) Phase A voltage	138.306
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SVG 在上限电压正常运行  
SVG works normally at the upper limit voltage

A 相电压(V) Phase A voltage	264.929	B 相电压(V) Phase B voltage	264.847	C 相电压(V) Phase C voltage	264.362
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注：  
1、截图中的字母和数字含义如下：  
Urms: 电压有效值 Irms: 电流有效值 Q: 无功功率 1/2/3: 代表A/B/C 三相

Note:  
1. The meanings of letters and Numbers in the screenshot are as follows:  
Urms: effective voltage value Irms: effective current value Q: reactive power 1/2/3: represents A/B/C three phase

表格 6.4.1.7: 输入频率范围试验 Table 6.4.1.7: input frequency range test					通过 Qualified
SVG 在下限频率正常运行 SVG works normally at the lower limit frequency					
A 相	44.9893	B 相	44.9896	C 相	44.9943



Q/F0800_A0						
条款 Items	要求 - 试验 Requirement-Experiment			结果 - 评述 Result- Review		判定 Assessment
SVG 在上限频率正常运行 SVG works normally at the upper bound frequency						
A 相	55.0007	B 相	55.0009	C 相	55.0009	
<p>注： 1、截图中的字母和数字含义如下： Irms: 电流有效值 fU: 频率 1/2/3: 代表A/B/C 三相</p> <p>Note: 1. The meanings of letters and numbers in the screenshot are as follows: Irms: rms current fU: frequency 1/2/3: represents A/B/C three-phase</p>						



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

表格 6.4.1.8: 系统效率试验  
Table 6.4.1.8: system efficiency test

通过  
Qualified



效率测试图 (效率: 97.22%)  
Efficiency test chart (efficiency: 97.22%)

注:

1、截图中的字母和数字含义如下:

Irms: 电流有效值    S: 视在功率    P: 有功功率    Q: 无功功率    1/2/3: 代表A/B/C 三相

2、效率计算公式为

效率=(1-(A 相有功功率+ B 相有功功率+ C 相有功功率)/(A 相视在功率+ B 相视在功率+ C 相视在功率))\*100%

Note:

1. The meanings of letters and Numbers in the screenshot are as follows:

Irms: effective value of current    S: apparent power    P: active power    Q: reactive power    1/2/3: represents A/B/C three-phase

2. The efficiency calculation formula is

Efficiency =(1-(A phase active power + B phase active power + C phase active power)/(A phase active power + B phase active power + C phase active power))\*100%

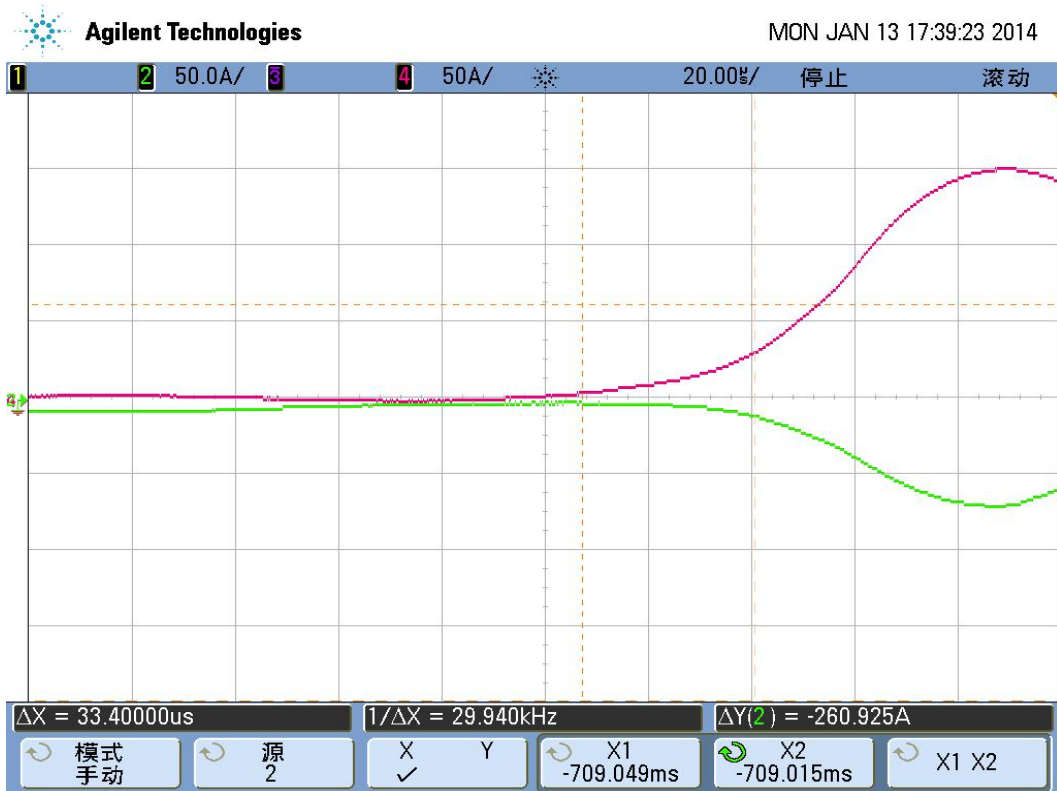


Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

表格 6.4.1.9a: 动态响应试验  
Table 6.4.1.9a: dynamic response test

通过  
Qualified

快速响应时间 Fast response time		
示波器采集信号 Oscilloscope acquisition of signals	快速响应时间 Fast response time (us)	要求值 Required value (us)
无功电流与输出补偿电流 Reactive current and output compensation current	33.4	≤50(±2.5)



快速响应时间图  
Fast response time graph

注:

- 1、红色曲线是突加载无功电流曲线，绿色曲线是SVG 补偿电流曲线。
- 2、快速响应时间为从突加载无功电流的时间到SVG 输出补偿电流增加的时间。

Note:

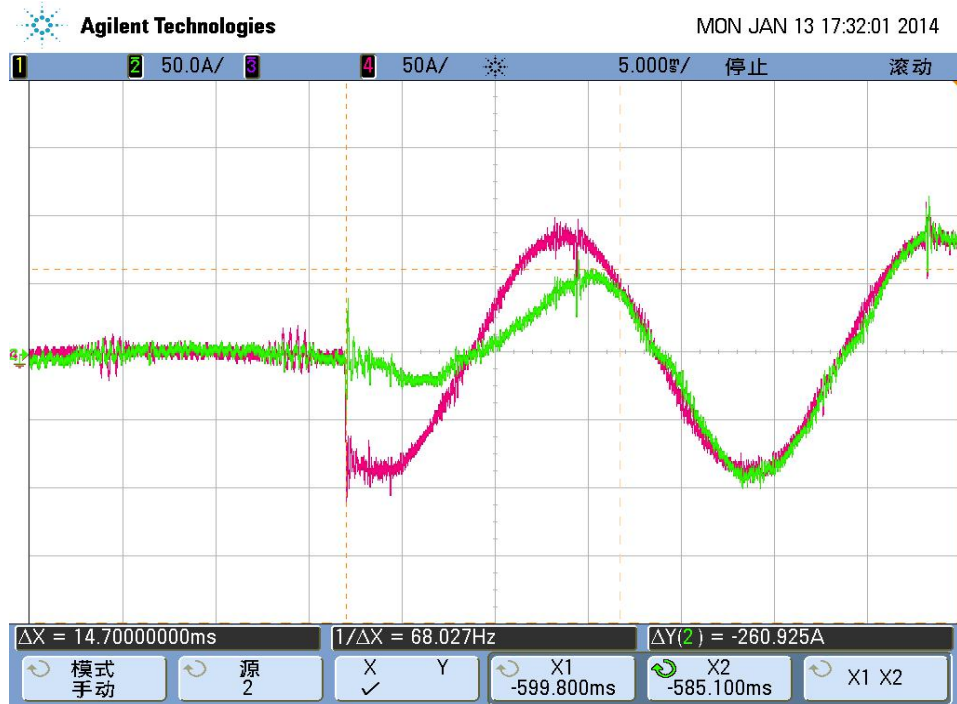
1. The red curve is the reactive current curve of sudden loading, and the green curve is the SVG compensation current curve.
2. The fast response time is the time from the time of the reactive current suddenly loaded to the time when the SVG output compensation current increases.



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

表格 6.4.1.9b: 动态响应试验 Table 6.4.1.9b: dynamic response test	通过 Qualified
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全响应时间 Full response time		
示波器采集信号 Oscilloscope acquisition of signals	全响应时间 Full response time (ms)	要求值 Required value (ms)
负载电流与输出补偿电流 Load current and output compensation current	14.7	≤15



全响应时间图

Full response time graph

注:

- 1、红色曲线是突加载无功电流曲线，绿色曲线是SVG 补偿电流曲线。
- 2、全响应时间为从突加载无功电流的时间到SVG 补偿电流达到加载无功电流的90%左右之间的时间。

Note:

1. The red curve is the reactive current curve of sudden loading, and the green curve is the SVG compensation current curve.
2. The full response time is the time between the time of the reactive current loading suddenly and the time when the SVG compensation current reaches about 90% of the reactive current loading.



Q/F0800_A0				
条款 Items	要求 - 试验 Requirement-Experiment		结果 - 评述 Result- Review	判定 Assessment
表格 6.4.2.2: 绝缘电阻、绝缘强度试验 Table 6.4.2.2: insulation resistance, insulation strength test			通过 Qualified	
测试部位 The test site	绝缘电阻(MΩ) Insulation resistance (M Ω)		要求值(MΩ) Required value (M Ω)	
输出端子与保护地之间 Between the output terminal and the protective ground	500		>2	
输出端子与外壳之间 Between the output terminal and the housing	500		>2	
测试部位 The test site	施加电压(Vdc) Applied voltage (Vdc)	测试值(mA) Test values (mA)	要求值(mA) Required value (mA)	
输入/输出端子对保护地之间 Input/output terminals to protect between	2820	0.051	<3.5	



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
表格 6.4.3: 静电放电抗扰度 Table 6.4.3: electrostatic emission immunity			通过 Qualified
<p>试验条件: 温度: 24°C, 湿度: 55 %RH, 正常大气压。 电磁条件保证受试设备正常工作, 并不影响试验结果。 Test conditions: temperature: 24°C, humidity: 55 %RH, normal atmospheric pressure. Electromagnetic conditions ensure the normal operation of the tested equipment and do not affect the test results. 依据标准: GB/T17626.2-2006, 企业标准要求 Standard: GB/ T17626.2-2006, enterprise standard requirements 判定准则: A 级, 在规范极限值内性能正常; Determination criterion: Class A, normal performance within the limit value of the specification; B 级, 功能或性能暂时降低或丧失, 但能自行恢复, 储存数据不应丢失; Class B, temporarily reduced or lost function or performance, but can self-recovery, stored data should not be lost; C 级, 功能或性能暂时降低或丧失, 但需操作者干预或系统重调(或复位), 存储在非易失存储器内的或由备用电池保护的功能和(或)信息不应丢失; Class C, temporary reduction or loss of function or performance, subject to operator intervention or system reset (or reset), Functions and/or information stored in non-volatile memory or protected by spare batteries shall not be lost d) 空气放电, 试验电压±8kV, 要求符合性能判据 B。 d) air discharge, test voltage ±8kV, performance criterion b is required.</p> <p>试验布置: 严格按照标准要求。 Test layout: strictly follow the standard requirements. EUT 状态: 试验前工作正常, 试验中按照设定程序运行。 EUT status: it works normally before the test, and runs according to the set program during the test. 试验过程: a) 对 EUT 可接触的导电表面、螺钉、端口等金属体进行接触放电, 分别选择 4 个以上试验点进行(每点至少 50 次, 正负极性各 25 次), 其中一个试验点承受水平耦合板前边缘中心距 EUT 0.1m 处至少 50 次间接(接触)放电。试验电压 6kV, 用尖端接触放电枪头, 最大放电重复频率为 1 次/s。试验电压应从最小值逐渐增加至规定的试验值, 以确定故障的临界值。 b) 对 EUT 可接触的壳体表面, 按键、指示灯、壳体等的缝隙进行空气放电, 分别选择 3 个以上试验点, 每点进行至少 20 次单次放电, 正负极性各 10 次, 试验电压 8kV, 用圆形空气放电枪头。试验电压应从最小值逐渐增加至规定的试验值, 以确定故障的临界值。 Test procedure: a) Contact discharge of conductive surfaces, screws, ports and other metal bodies that can be contacted by EUT, select 4 or more test points (at least 50 times per point, 25 times for positive and negative polarity), one of which is subjected to horizontal test The center of the front edge of the coupling plate is at least 50 indirect (contact) discharges at 0.1 m from the EUT. Test voltage 6kV, with tip contact discharge gun head, maximum release The electrical repetition frequency is 1 time/s. The test voltage should be gradually increased from the minimum value to the specified test value to determine the critical value of the fault. b) Air discharge of the surface of the shell that can be contacted by the EUT, buttons, indicator lights, housing, etc., select 3 or more test points, perform at least 20 single discharges per point, 10 times for positive and negative polarity, test voltage 8kV, with a circular air discharge gun head. The test voltage should be gradually increased from the minimum value to the specified test value to determine the critical value of the fault.</p>			





Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
<p>EUT 表现：在整个试验过程中 EUT 屏幕工作异常，但不影响 EUT 工作，试验后工作正常，表现出抗扰能力。符合性能判据 B。</p> <p>EUT performance: during the whole test, EUT screen worked abnormally, but it did not affect the work of EUT. after the test, it worked normally and showed disturbance resistance ability.It meets the performance criterion B.</p> <p>结果说明：被测样品符合企业标准要求中静电放电抗扰度的判据要求。</p> <p>The results show that the tested samples meet the criterion of electrostatic immunity in the enterprise standard</p>			
 <p>静电放电抗扰度图 Electrostatic immunity diagram</p>			



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
	表格 6.4.4: 电快速瞬变脉冲群抗扰度 Table 6.4.4: electrical fast transient pulse group immunity		通过 Qualified
	<p><b>试验条件:</b> 温度: 24°C, 湿度: 55 %RH, 正常大气压。 电磁条件保证受试设备正常工作, 并不影响试验结果。</p> <p>Test conditions: temperature: 24°C, humidity: 55 %RH, normal atmospheric pressure.</p> <p>Electromagnetic conditions ensure the normal operation of the tested equipment and do not affect the test results.</p> <p><b>依据标准:</b> GB/T17626.4-2008, 企业标准要求 Standard: GB/ T17626.4-2008, enterprise standard requirements</p> <p><b>判定准则:</b> A 级, 在规范极限值内性能正常; Determination criterion: Class A, normal performance within the limit value of the specification; B 级, 功能或性能暂时降低或丧失, 但能自行恢复, 储存数据不应丢失; Class B, temporarily reduced or lost function or performance, but self-recovery, stored data should not be lost; C 级, 功能或性能暂时降低或丧失, 但需操作者干预或系统重调(或复位), 存储在非易失存储器内的或由备用电池保护的功能和(或)信息不应丢失; Class C, temporary reduction or loss of function or performance, subject to operator intervention or system reset (or reset), functions and/or information stored in non-volatile memory or protected by spare batteries shall not be lost; D 级, 因装置(或元件)损坏而不可恢复的功能降低或丧失。 Class D, reduction or loss of non-recoverable function due to damage to the device (or component).</p> <p><b>试验等级(企业技术要求):</b> 在EUT 交流电源输入端口: 试验电压峰值2kV; 重复频率5kHz, 5/50ns Tr/Td 脉冲群波形。脉冲群持续时间、周期分别为15ms, 300ms。要求符合性能判据B。</p> <p>Test grade (technical requirements of the enterprise) : EUT ac power supply input port: peak test voltage 2kV; Repeat frequency 5 KHZ, 5/50ns Tr/Td pulse group waveform. The duration and cycle of the pulse group were 15ms and 300ms respectively. It is required to meet the performance criterion B.</p> <p><b>试验布置:</b> 严格按照标准要求。</p> <p>Test layout: strictly follow the standard requirements.</p> <p><b>EUT 状态:</b> 试验前工作正常, 试验中按照设定程序运行。</p> <p>EUT status: it works normally before the test, and runs according to the set program during the test.</p> <p><b>试验过程:</b> EUT 的交流电源输入端口插入电快速瞬变脉冲群发生器的EUT 插座端口, 加峰值为2kV 的试验电压, 试验持续时间为1 分钟, 分别进行正负极性试验。</p> <p>Test process: the input port of EUT ac power supply is inserted into the EUT socket port of the electrical fast transient pulse swarm generator. Add the test voltage with a peak value of 2kV and the test duration is 1 minute. carry out positive and negative polarity tests respectively.</p> <p><b>EUT 表现:</b> 在整个试验过程中没有出现危险或不安全的后果, 试验后EUT 工作正常, 表现出抗扰能力。符合性能判据A。</p> <p>EUT performance: there was no dangerous or unsafe consequence during the whole test. EUT worked normally after the test and showed disturbance resistance. It meets the performance criterion A.</p> <p><b>结果说明:</b> 被测样品符合企业标准中电快速瞬变脉冲群抗扰度的判据要求。 The results show that the tested samples meet the criterion of fast transient pulse group immunity in the enterprise standard.</p>		




Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
			
电快速瞬变脉冲群抗扰度图 Electrical fast transient pulse group immunity diagram			



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment

表格 6.4.5: 工频磁场抗扰度 Table 6.4.5: power frequency magnetic field immunity		通过 Qualified
<p>试验条件: 温度: 24℃, 湿度: 55 %RH, 正常大气压。 电磁条件保证受试设备正常工作, 并不影响试验结果。 Test conditions: temperature: 24℃, humidity: 55 %RH, normal atmospheric pressure. Electromagnetic conditions ensure the normal operation of the tested equipment and do not affect the test results.</p> <p><b>依据标准:</b> GB/T 17626.8-2006, 企业标准 Standard: GB/T 17626.8-2006, enterprise standard</p> <p><b>判定准则:</b> A 级, 在规范极限值内性能正常; Determination criterion: grade A, normal performance within the limit value of the specification; B 级, 功能或性能暂时降低或丧失, 但能自行恢复, 储存数据不应丢失; Class B, temporarily reduced or lost function or performance, but self-recovery, stored data should not be lost; C 级, 功能或性能暂时降低或丧失, 但需操作者干预或系统重调(或复位), 存储在非易失存储器内的或由备用电池保护的功能和(或)信息不应丢失; Class C, temporary reduction or loss of function or performance, subject to operator intervention or system reset (or reset), Functions and/or information stored in non-volatile memory or protected by spare batteries shall not be lost d) 空气放电, 试验电压±8kV, 要求符合性能判据 B。 d) air discharge, test voltage ±8kV, performance criterion b is required.</p> <p><b>EUT 表现:</b> 在整个试验过程中没有出现危险或不安全的后果, 试验后EUT 工作正常, 表现出抗扰能力。 符合性能判据 A。 EUT performance: there was no dangerous or unsafe consequence during the whole test. EUT worked normally after the test and showed disturbance resistance. It meets the performance criterion A.</p> <p>结果说明: 被测样品符合企业标准要求中工频磁场抗扰度的判据要求。 The results show that the measured samples meet the requirements of the enterprise standard for medium power frequency magnetic field disturbance immunity.</p>		



Q/F0800_A0			
条款 Items	要求 - 试验 Requirement-Experiment	结果 - 评述 Result- Review	判定 Assessment
			
<p>工频磁场抗扰度图 Power frequency magnetic field immunity diagram</p>			

表格 6.4.8: 浪涌 (冲击) 抗扰度 Table 6.4.8: surge (impact) immunity	通过 Qualified
<p><b>试验条件:</b> 温度: 24°C, 湿度: 55%RH, 正常大气压。 电磁条件保证受试设备正常工作, 并不影响试验结果。 Test conditions: temperature: 24°C, humidity: 55%RH, normal atmospheric pressure. Electromagnetic conditions ensure the normal operation of the tested equipment and do not affect the test results.</p> <p><b>依据标准:</b> GB/T17626.5-2008, 企业标准 <b>依据标准:</b> GB/T17626.2-2006, 企业标准要求 Standard: GB/ t17626.2-2006, enterprise standard requirements <b>判定准则:</b> A 级, 在规范极限值内性能正常; Determination criterion: grade A, normal performance within the limit value of the specification; B 级, 功能或性能暂时降低或丧失, 但能自行恢复, 储存数据不应丢失; Class B, temporarily reduced or lost function or performance, but self-recovery, stored data should not be lost; C 级, 功能或性能暂时降低或丧失, 但需操作者干预或系统重调(或复位), 存储在非易失存储器内的或由备用电池保护的功能和 (或) 信息不应丢失; Class C, temporary reduction or loss of function or performance, subject to operator intervention or system reset (or reset), Functions and/or information stored in non-volatile memory or protected by spare batteries shall not be lost d) 空气放电, 试验电压±8kV, 要求符合性能判据 B。 d) air discharge, test voltage ±8kV, performance criterion b is required.</p> <p><b>EUT 表现:</b> 在整个试验过程中没有出现危险或不安全的后果, 试验后EUT 工作正常, 表现出抗扰能力。 符合性能判据B。 EUT performance: there was no dangerous or unsafe consequence during the whole test. EUT worked normally after the test and showed disturbance resistance. It meets the performance criterion B. <b>结果说明:</b> 被测样品符合企业标准要求中浪涌 (冲击) 抗扰度的判据要求。 The results show that the tested samples meet the criterion of surge (impact) immunity in the enterprise standard.</p>	
	
浪涌 (冲击) 抗扰度图 Surge (impact) immunity diagram	



表格 6.4.10 Form 6.4.10	温升试验 Temperature rise test		通过 Qualified
	试验电压(V): Test voltage (V):	400Vdc	
	环境温度 t1(°C): Ambient temperature t1(°C):	40°C	
	环境温度 t2(°C): Ambient temperature t2(°C):	40°C	
零部件/位置 Parts/location	实测温度(°C) Measured temperature (°C)	允许的温度(°C) Allowable temperature (°C)	
逆变电感/L9 Inverting inductance /L9	65.07	90	
滤波电感/L3 Filter inductance /L3	66.34	90	
整流二极管/D6 Rectified diode /D6	67.00	90	
Y 电容/C27 Y capacitance/C27	58.81	85	
母线吸收电容/C13 Bus absorption capacitance /C13	73.40	85	
输入母排 Enter the bus	64.61	---	
辅助电源 IGBT/Q7 Auxiliary power IGBT/Q7	96.60	105	
辅助电源开关板 Auxiliary power switch board	79.85	115	
辅助电源变压器绕组/T2 Auxiliary power transformer winding /T2	82.84	150	
变压器铁芯/T2 Transformer core /T2	78.16	90	
交流继电器/RLY2 Ac relay /RLY2	54.12	110	
交流断路器 Ac circuit breaker	61.49	85	
电流互感器/T5	73.25	150	

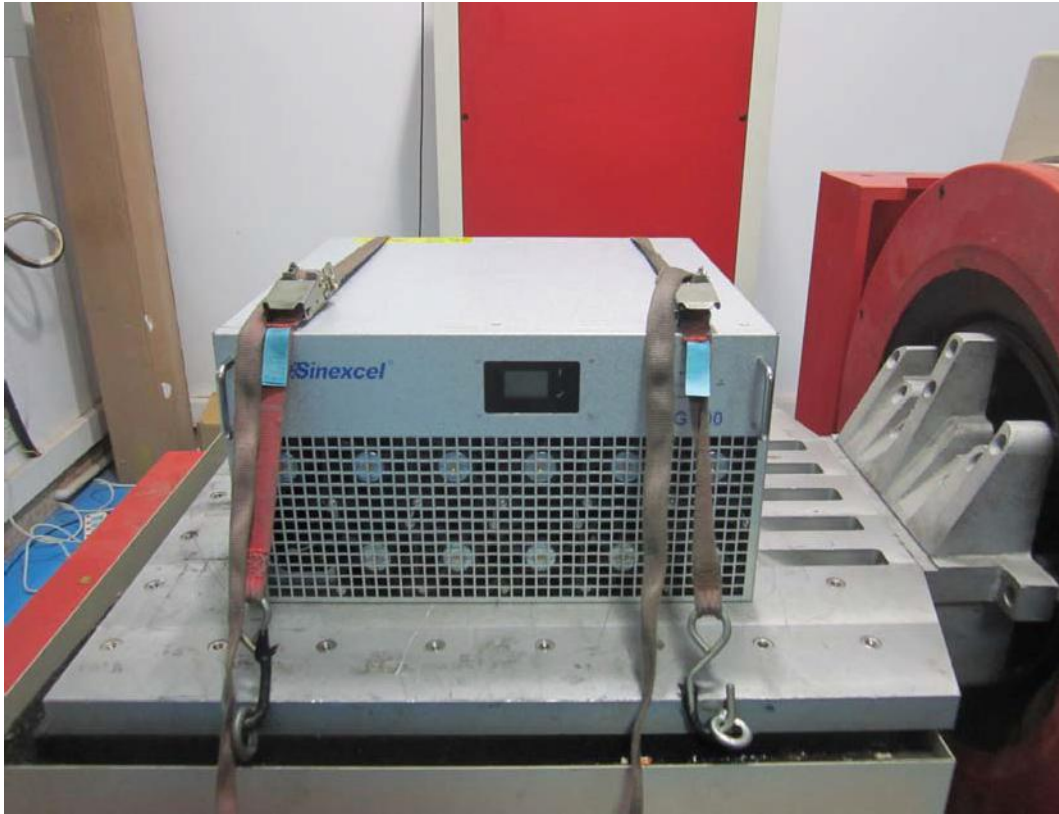


Current transformer /T5					
显示面板 Display panel	54.82				65
风扇 fan	67.49				90
外壳 The shell	52.97				70
散热口温度 Cooling port temperature	53.67				--
环境温度 Environment temperature	40.00				--
绕组的温升 Temperature rise of winding	R1 ( $\Omega$ )	R2 ( $\Omega$ )	温升 (K) Temperature (K)	允许的温升(K) Allowable temperature rise (K)	绝缘等级 Insulation class
/	/	/	/	/	/
注: Note:					



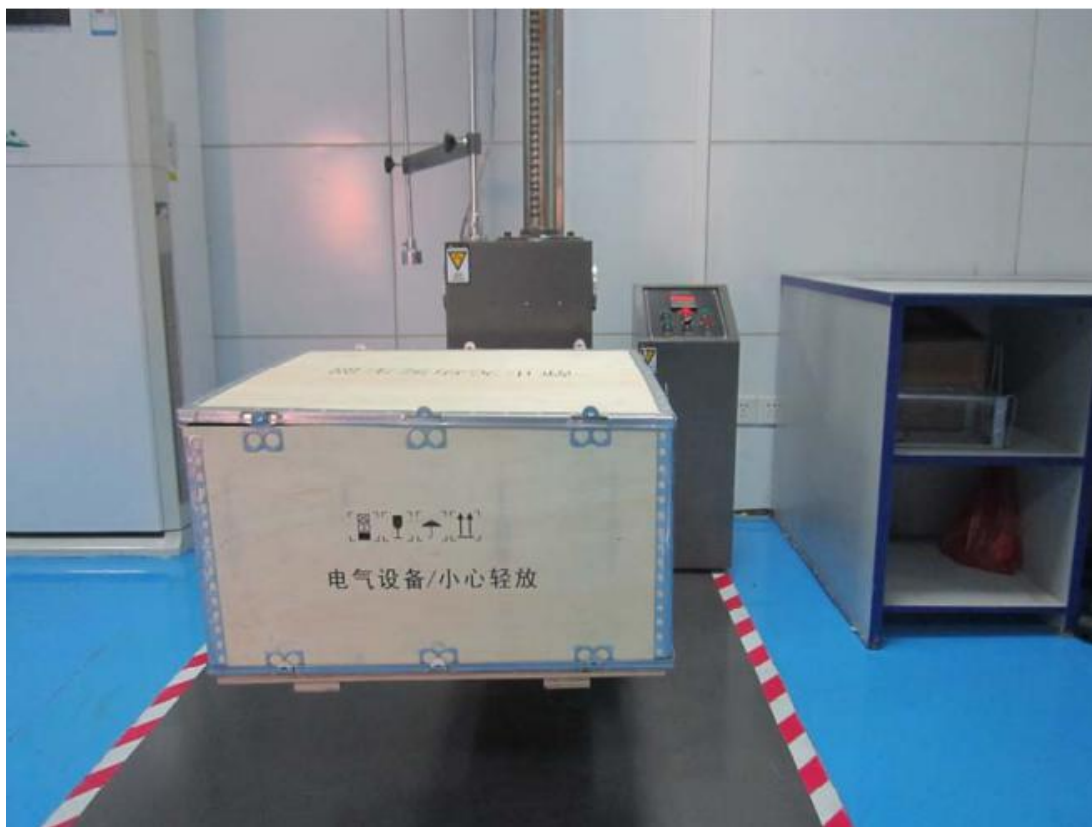


表格 6.4.11.4: 振动、冲击、碰撞试验 Table 6.4.11.4: vibration, impact and collision tests		通过 Qualified								
检验项目 Test items	条件要求 requirements	结论 conclusion								
振动试验 Vibration test	<table border="1"> <thead> <tr> <th>频率范围 Frequency range (Hz)</th> <th>斜率 The slope (dB/Oct)</th> <th>加速度 The acceleration (m/s<sup>2</sup>)</th> <th>扫描次数 Number of scanning</th> </tr> </thead> <tbody> <tr> <td>10-55</td> <td>/</td> <td>5.0</td> <td>20 次/轴 20times/shaft</td> </tr> </tbody> </table> <p>样品在三个互相垂直的轴向上振动。试验后，样品外观结构和功能应正常。 The sample vibrates on three mutually perpendicular axes. After the test, the appearance structure and function of the sample should be normal.</p>	频率范围 Frequency range (Hz)	斜率 The slope (dB/Oct)	加速度 The acceleration (m/s <sup>2</sup> )	扫描次数 Number of scanning	10-55	/	5.0	20 次/轴 20times/shaft	符合标准要求 Qualified
频率范围 Frequency range (Hz)	斜率 The slope (dB/Oct)	加速度 The acceleration (m/s <sup>2</sup> )	扫描次数 Number of scanning							
10-55	/	5.0	20 次/轴 20times/shaft							
冲击试验 Impact test	<p>峰值加速度: 150 m/s<sup>2</sup> Peak acceleration: 150 m/s<sup>2</sup></p> <p>脉冲持续时间: 11ms Pulse duration: 11ms</p> <p>冲击次数: 6 个方向, 每个方向 3 次 试验后, 样品外观结构和功能应正常。 Impact times: 6 directions., after 3 tests in each direction, the appearance structure and function of the sample should be normal.</p>	符合标准要求 Qualified								
碰撞试验 Crash test	<p>峰值加速度: 250 m/s<sup>2</sup> Peak acceleration: 250 m/s<sup>2</sup></p> <p>脉冲持续时间: 6ms Pulse duration: 6ms</p> <p>冲击次数: 6 个方向, 每个方向 3 次 试验后, 样品外观结构和功能应正常。 Impact times: 6 directions, after 3 tests in each direction, the appearance structure and function of the sample should be normal</p>	符合标准要求 Qualified								



振动、冲击、碰撞试验图片  
Pictures of vibration, impact and collision tests

表格 6.4.11.6: 包装跌落试验 Table 6.4.11.6: package drop test		通过 Qualified
检验项目 Test items	条件要求 requirements	结论 conclusion
跌落试验 Drop test	跌落高度: 300mm Drop height: 300mm 跌落部位: 样品正面 Drop site: front of sample 跌落平台: 钢板 Falling platform: steel plate 跌落次数: 2 次 Number of drops: 2 试验后, 样品外观结构和功能应正常。 After the test, the appearance structure and function of the sample should be normal.	符合标准要求 Qualified



跌落试验图片  
 Drop test picture

样品照片  
Samples pictures



图1 (机体正面)



图2 (机体侧面)

## 样品照片



图3（机体后面）



产品型号：Sinexcel 100 SVG

输入：380/400/415VAC  
3Φ+N+PE/3Φ+PE  
50/60Hz输出：50kvar 100kvar

制造商：深圳市盛弘电气有限公司

S/N：SHSVG1001402160088



MADE IN CHINA

图4（铭牌）



## 试验仪器设备清单

序号 No.	仪器设备名称 Equipment	型号 Type	编号 SN	制造厂商 Manufacture	校准有效期至 Valid	本次使用(√)
1	功率分析仪 Power analyzer	PA3000-4	A-SZ-YH-117	广州致远电子 股份有限公司	2014.07.04	√
2	数字示波器 Digital oscilloscope	5014	A-SZ-YH-004	安捷伦	2014.09.17	√
3	可编程交流源 Programmable AC source	Emerson-200K	A-SZ-YH-035	艾默生	--	√
4	非线性(RCD)负载 Nonlinear (RCD) load	AC400V150KW	--	尔华电子有 限公司	--	√
5	无功发生装置 Reactive power generator	500 SVG	--	--	--	√
6	恒温恒湿试验 箱 Constant temperature and humidity test chamber	LP-420U	H2013041392	广东宏展科技 有限公司	2014.07.21	√
7	绝缘电阻表 Insulation resistance meter	ZC25B-3	12-0173	上海精密科学 仪器有限公司	2014.09.17	√
8	静电放电测试 仪 Electrostatic discharge tester	ESD30C	A0712513	EM TEST	2014.09.24	√
9	浪涌电快速脉 冲群综合模拟 器 Surge power rapid pulse group integrated simulator	UCS500N7.7	A130201094	EM TEST	2014.12.19	√
10	100A 三相耦合 网络 100A three-phase coupled network	CNI503B9.3	A130201095	EM TEST	2014.12.19	√
	工频磁场发生器					√



11	Power frequency magnetic field generator	MAG 100.1	A0103109	HAEFELY	2014.06.10	
12	电磁振动台 Electromagnetic vibrating table	ACT-2000-R032 0S	A1107722	北京中元	2014.07.08	√
13	单臂跌落试验机 Single arm drop tester	ETR-F-315S	ETR1212086	深圳依特尔	2014.09.06	√
14	数字噪声计 Digital noise meter	TES 1350A	1108055	台湾 TES	2014.09.19	√
15	数据采集器 Data collector	FLUKE 2625A/08	SH-008	美国福禄克公司	2014.12.07	√
16	高低温交变试验箱 High and low temperature alternating test chamber	ESL-10KW	A0302197	广州爱斯佩克	2014.09.01	√
17	小型试验指 Minor test	--	A0412371	广州电器所	2014.12.05	√
	压力试验指 Pressure test index	KXT-308	KX2008082900 1	东莞市科翔试验设备有限公司	2014.08.05	√

注：打“√”为本次检验使用仪器、设备，所有仪器、设备均在校准有效期内。

Note: please mark "√" as the instrument and equipment used in this test. All instruments and equipment are within the calibration period.



# 声明

## STATEMENT

1. 本实验室是经过中国合格评定国家认可委员会认可的检测实验室，证书号：**L1659**。

This test laboratory is accredited by CNAS, Accreditation Certificate No.L1659.

2. 报告未加盖“检测专用章”无效。

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The test report is invalid if erased and corrected.

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Test results of the report is valid to the test samples if sampling by client.

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If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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