

CALIBRATION CERTIFICATE

Certificate No.



J202609083262A-0003

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Client

Servico Nacional de Aprendizagem Industrial

Contact Inf.

Av. Assis Brasil, 8787 Bairro Sarandi, ZIP CODE 91140-001, Porto Alegre - RS, Brasil

Description

Four-Quadrant Bipolar Voltage Variation Simulator(Automotive Transient Immunity Generator+DC power supply)

Manufacturer

LISUN GROUP

Model/Type

LIS-APS-4030K300

Receipt Date

2026-09-14

Y M D

Serial No.

SO20260331A03

Cal. Date

2026-09-14

Y M D

Asset No.

Issued Date

2026-09-15

Y M D

Approved by

罗文初

luo wang chu

Inspected by

李士

li shi

Calibrated by

文斌

wen bin

(Stamp)

Headquarters Add.:

No.8, Chuangyun Road, Shiqi Town, Panyu District, Guangzhou, Guangdong, China

Add.of the Lab:

No.8, Chuangyun Road, Shiqi Town, Panyu District, Guangzhou, Guangdong, China

Tel.:400-602-0999

Postcode:511450

Website:http:// www.grgtest.com

E-mail:grgtest@grgtest.com



Scan

CheckCode: 888276

DIRECTIONS OF CALIBRATION

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1.The quality system is in accordance with ISO/IEC 17025:2017,the calibration results are traceable to the International System of Units (SI).

2.The result is only valid for the calibrated sample.The certificate shall not be reproduced except in full,without the written approval of our laboratory .please feedback to us within 15 days if you have any question.

3.Each certificate has a unique number. The suffix of "-Gx" will be added to the number as a replacement of the old version. The original certificate will be officially invalid once the new certificate number is issued.The modified certificate shall be based on the client content.

4.MPE & judgement result in the datasheet is only for reference , "P" is "Pass" , "F" is "Fail" and "N/A" is "Not Applicable".Whereas users should evaluate the effects of MU of calibration results on conformance assessment by actual measurement.

5.The traceability date of this instrument is the calibration date on this certificate.

6.Place and environmental conditions of the calibration:

Place: Room 703, Building A4, Huanchuang Enterprise Plaza, Yuelu District, Changsha

Temperature: 21.6℃

Relative Humidity: 55%

7.Suggested calibration interval is 1 year or it can be altered depending on the actual usage of the user.

8.Reference document and accredited scope by CNAS for calibration, beyond which isn't accredited. Please see the attachment of certificate on CNAS website for details.

JJF(电子) 0019-2018 汽车电瞬态传导骚扰模拟器校准规范(C.S. for Road vehicles- Electrical Transient Conduction Disturbance Simulators) 试验电压: $\pm 50V$ 脉冲幅度: $\pm 600V$ 上升/下降时间: 1ns~10ms 脉冲宽度/重复时间: 100ns~10s

JJF 1597-2016 直流稳定电源校准规范(C.S. for DC stabilized power supplies) 电流/Current: (0.001~1000)A; 电压/Voltage: (0.01~1000)V; 纹波电压/Ripple Voltage: 0.1mV~1V; 负载调整率/Load Regulation: (0.005~1)%; 源电压调整率/Voltage Regulation: (0.005~1)%

JJG (军工) 77-2015 直流稳压电源检定规程(V.R. for DC voltage stable source) 电流: (0.001~1000)A; 电压: (0.01~1000)V; 纹波电压: 0.1mV~1V; 负载调整率: (0.005~1)%; 源电压调整率: (0.005~1)%

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9. Main Standards of Measurement Used in the Calibration.:

Description	Serial No.	Certificate No./ Due Date	Traceability Institute	Technique Character
Digital multimeter	MY47067750	J202510230552- 0010 2026-11-14	广电计量检测集 团股份有限公司	DCV: $\pm 0.005\%$ ACV: $\pm 0.06\%$ DCI: $\pm 0.05\%$ ACI: $\pm 0.1\%$ R: $\pm$ 0.01% Freq: $\pm 0.01\%$
digital oscilloscope	C010584	J202603193714- 0008 2027-03-31	广电计量检测集 团股份有限公司	V: $\pm 1\%$, t: $\pm 0.01\%$
ELECTRONIC LOAD	802121172797140 004	J202605220046- 0074 2027-05-30	广电计量检测集 团股份有限公司	DCV: 500V 0.1级; DCA: 60A 0.1级;
Diverter	LX23247	J202607234394- 0090 2027-08-04	广电计量检测集 团股份有限公司	直流0.01级, 交流0.03级

10. Measurement traceability declaration.:

数字多用表/Digital multimeter(MY47067750)→多产品校准器(6333601)→精密数字电桥/RLC Digibridge(G1-18511145)→标准因素损耗因数箱/Standard factor loss box(1680119070101)→自动电容电桥(北京东方计量测试研究所/CASC);

数字示波器/digital oscilloscope (C010584)→多功能校准器/multifunction calibrator(6025904)→数字多用表/Digital multimeter(456175079)→精密交直流同轴分流器/AC/DC coaxial shunt(05155847)→直流电阻副基准装置(中国计量科学研究院/NIM);

电子负载/ELECTRONIC LOAD(802121172797140004)→直流电源(62012PD01427)→分流器/Diverter(LX23248)→超级大电流发生器(5908701)→分流器/Shunt(566579241~566579254)→分流器(北京东方计量测试研究所/CASC);

分流器/Diverter(LX23247)→超级大电流发生器(5908701)→数字多用表/Digital multimeter(971756779)→数字多用表校准装置(中国计量科学研究院/NIM);

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1、外观以及一般性检查: 正常

In view of External and Generality check : Pass

2、Pulse 2b (Nominal 12 V System)

测试项目	标称值	实测值	误差	不确定度	允许误差	结论
Test Items	Nominal	Measured	Error	$U_{rel} (k=2)$	MPE	Conclusion
	(V)	(V)	(V)	(%)	(V)	(Pass/Fail)
U _a	13.5	13.50	0.00	3.5	± 1.35	P
U _s	10	10.0	0.0	3.5	± 1.0	P
	(ms)	(ms)	(ms)	(%)	(ms)	
T ₁₂	1	0.96	0.04	5.5	± 0.50	P
T ₆	1	1.00	0.00	5.5	± 0.50	P
T _r	1	0.96	0.04	5.5	± 0.50	P
T _d	200	202	-2	5.5	± 40	P

3、Pulse 2b (Nominal 24V System)

测试项目	标称值	实测值	误差	不确定度	允许误差	结论
Test Items	Nominal	Measured	Error	$U_{rel} (k=2)$	MPE	Conclusion
	(V)	(V)	(V)	(%)	(V)	(Pass/Fail)
U _a	27	26.8	0.2	3.5	± 2.7	P
U _s	20	19.6	0.4	3.5	± 2.0	P
	(ms)	(ms)	(ms)	(%)	(ms)	
T ₁₂	1	1.00	0.00	5.5	± 0.50	P
T ₆	1	0.98	0.02	5.5	± 0.50	P
T _r	1	0.96	0.04	5.5	± 0.50	P
T _d	200	202	-2	5.5	± 40	P

4、Pulse 4 (Nominal 12 V System)

测试项目	标称值	实测值	误差	不确定度	允许误差	结论
Test Items	Nominal	Measured	Error	$U_{rel} (k=2)$	MPE	Conclusion
	(V)	(V)	(V)	(%)	(V)	(Pass/Fail)
U _B	12	11.8	0.2	3.5	± 1.2	P
U _{S6}	6	5.9	0.1	3.5	± 0.6	P
U _S	6.5	6.4	0.1	3.5	± 0.7	P
	(ms)	(ms)	(ms)	(%)	(ms)	
T ₆	15	15.0	0.0	5.5	± 1.5	P
T ₇	50	50.0	0.0	5.5	± 5.0	P
T ₈	1000	996	4	5.5	± 100	P
T _f	5	5.0	0.0	5.5	± 0.5	P
T _r	5	5.0	0.0	5.5	± 0.5	P

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5、Pulse 4 (Nominal 24V System)

测试项目 Test Items	标称值 Nominal (V)	实测值 Measured (V)	误差 Error (V)	不确定度 $U_{rel}(k=2)$ (%)	允许误差 MPE (V)	结论 Conclusion (Pass/Fail)
U_B	24	23.8	0.2	3.5	± 2.4	P
U_{S6}	6	5.9	0.1	3.5	± 0.6	P
U_S	10	9.9	0.1	3.5	± 1.0	P
	(ms)	(ms)	(ms)	(%)	(ms)	
T_6	50	50.0	0.0	5.5	± 5.0	P
T_7	50	50.0	0.0	5.5	± 5.0	P
T_8	1000	1000	0	5.5	± 100	P
T_f	10	10.0	0.0	5.5	± 1.0	P
T_r	10	10.0	0.0	5.5	± 1.0	P

6、直流电压的校准(Calibration of DC Voltage):

	标称值 Nominal (V)	实测值 Measured (V)	误差 Error (V)	不确定度 $U_{rel}(k=2)$ (%)	允许误差 MPE (V)	结论 Conclusion (Pass/Fail)
正向 Positive	4	3.9996	0.0004	0.02	± 0.0020	P
	8	8.0005	-0.0005	0.02	± 0.0040	P
	12	11.9987	0.0013	0.02	± 0.0060	P
	16	15.9991	0.0009	0.02	± 0.0080	P
	20	19.999	0.001	0.02	± 0.010	P
	30	29.998	0.002	0.02	± 0.015	P
	40	39.998	0.002	0.02	± 0.020	P
负向 Negative	4	4.0003	-0.0003	0.02	± 0.0020	P
	8	7.9994	0.0006	0.02	± 0.0040	P
	12	11.9991	0.0009	0.02	± 0.0060	P
	16	15.9983	0.0017	0.02	± 0.0080	P
	20	19.999	0.001	0.02	± 0.010	P
	30	29.999	0.001	0.02	± 0.015	P
	40	39.999	0.001	0.02	± 0.020	P

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7、直流电流的校准(Calibration of DC Current):

	标称值 Nominal (A)	实测值 Measured (A)	误差 Error (A)	不确定度 $U_{rel}(k=2)$ (%)	允许误差 MPE (A)	结 论 Conclusion (Pass/Fail)
正向 Positive	3	2.9989	0.0011	0.07	± 0.0060	P
	6	5.998	0.002	0.07	± 0.012	P
	9	8.994	0.006	0.07	± 0.018	P
	15	14.989	0.011	0.07	± 0.030	P
	20	19.983	0.017	0.07	± 0.040	P
	25	24.971	0.029	0.07	± 0.050	P
负向 Negative	30	29.955	0.045	0.07	± 0.060	P
	3	2.9977	0.0023	0.07	± 0.0060	P
	6	5.994	0.006	0.07	± 0.012	P
	9	8.991	0.009	0.07	± 0.018	P
	15	14.985	0.015	0.07	± 0.030	P
	20	19.979	0.021	0.07	± 0.040	P
	25	24.971	0.029	0.07	± 0.050	P
	30	29.956	0.044	0.07	± 0.060	P

8、纹波噪声的校准 (Calibration of Ripple and Noise):

电压 Voltage (V)	电流 Current (A)	实测值 Measured (mVrms)	不确定度 $U_{rel}(k=2)$ (%)	允许值 MPE (mVrms)	结 论 Conclusion (Pass/Fail)
40	30	22	1.8	≤ 35	P

备注:

Notes:

结论 (Conclusion): 所校项目符合技术要求 (The calibrated items meet the technical specifications)

1.本报告给出的扩展不确定度是由合成标准不确定度乘以包含概率约为95%时对应的包含因子 k 得到的。

The extended uncertainty given in the report is obtained by multiplying the combined standard uncertainty by the coverage factor k corresponding to the inclusion probability of about 95%.

2.依据(Reference document)

JJF 1059.1-2012 测量不确定度评定与表示

(JJF 1059.1-2012 Evaluation and Expression of Uncertainty in Measurement)

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