



校准证书

CALIBRATION CERTIFICATE

证书编号 DBB201905932
Certificate No.

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委托方 山西欧信环能技术服务有限公司
Client

委托方地址
Add. of Client

计量器具名称 POWER & QUALITY ANALYZER
Description

型号规格 5000
Model/Type

制造厂 ETCR
Manufacturer

出厂编号 50190078
Serial No.

设备编号
Equipment No.

接收日期 2019 年 05 月 28 日
Date of Receipt Y M D

结果 见校准结果
Results Shown in the results of calibration

校准日期 2019 年 06 月 05 日
Date of Calibration Y M D

批准人 吴海益
Approved Signatory

核 验 石劭毅 石劭毅
Reviewed by

校 准 叶跃华 叶跃华
Calibrated by



扫一扫查真伪



说 明

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DIRECTIONS

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1. 本中心是国家质量监督检验检疫总局在华南地区设立的国家法定计量检定机构, 本中心的质量管理体系符合 ISO/IEC 17025:2017 标准的要求。

This laboratory is the National Legal Metrological Verification Institution in southern China set up by the General Administration of Quality Supervision. The quality system is in accordance with ISO/IEC 17025:2017.

2. 本中心所出具的数据均可溯源至国家计量基准和国际单位制(SI)。

All data issued by this laboratory are traceable to national primary standards and International System of Units (SI).

3. 本次校准的技术依据:

Reference documents for the calibration:

JJF1491-2014 数字式交流电参数测量仪校准规范 C.S. for Digital AC Electrical Parameters Meter

DL/T 1028-2006 电能质量测试分析仪检定规程 Verification code for power quality analyzer

4. 本次校准所使用的主要计量标准器具:

Major standards of measurement used in the calibration:

设备名称 Name of Equipment	编号 Serial No.	证书号/有效期/溯源单位 Certificate No./Due Date /Traceability to	计量特性 Metrological Characteristic
多功能校准源 Multifunction Calibrator	8528010	DBB201905227 /2020-05-09 /本中心	ACV: $\pm 0.015\%$ rdg; ACA: $\pm 0.04\%$ rdg; FREQ: $\pm 2.5 \times 10^{-6}$ rdg
功率标准源 Electrical Power Standard	852147534~852 147536	DBB201806234 /2019-06-27 /本中心	0.02 级 Grade 0.02

5. 校准地点、环境条件:

Place and environmental conditions of the calibration:

地点 本中心电磁实验室(Electrics-magnetics Lab) 温度 $(21 \pm 2) ^\circ\text{C}$ 相对湿度 $(55 \pm 5) \%$
Place Temperature R.H.

6. 被校准仪器限制使用条件:

Limiting condition of the instrument calibrated:

注: 1. 本证书校准结果只与受校准仪器有关。The results relate only to the items calibrated.

Note: 2. 未经本机构书面批准, 不得部分复制此证书。This certificate shall not be reproduced except in full, without the written approval of our laboratory.

3. 本次校准日期视为发布日期。The calibration date is the date of issue of the report.



校准结果 RESULTS OF CALIBRATION

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一、外观: 符合要求

Apparent inspection: Pass

二、交流电压: 见表 1, $f=50\text{ Hz}$

ACV: Shown in table 1

表 1

Table 1

回路 Channel	量 程 Range	示 值 Indication Value (V)	实际值 Reference Value (V)	误 差 Error (V)	允许误差 MPE (V)	结论 Conclusion (Pass/Fail)
1	1000V	50.0	50.00	0.0	± 0.8	Pass
		100	100.00	0	± 1	Pass
		200	200.00	0	± 6	Pass
		301	300.00	+ 1	± 7	Pass
		402	400.00	+ 2	± 7	Pass
2	1000V	50.1	50.00	+ 0.1	± 0.8	Pass
		100	100.00	0	± 1	Pass
		200	200.00	0	± 6	Pass
		301	300.00	+ 1	± 7	Pass
		402	400.00	+ 2	± 7	Pass
3	1000V	50.0	50.00	0.0	± 0.8	Pass
		100	100.00	0	± 1	Pass
		200	200.00	0	± 6	Pass
		301	300.00	+ 1	± 7	Pass
		402	400.00	+ 2	± 7	Pass

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三、交流电流: 见表 2, $f=50$ Hz

ACI: Shown in table 2

表 2
Table 2

回路 Channel	量 程 Range	示 值 Indication Value	实际值 Reference Value	误 差 Error	允许误差 MPE	结论 Conclusion
		(A)	(A)	(A)	(A)	(Pass/Fail)
1	10A	1.99	2.000	- 0.01	±0.11	Pass
		3.99	4.000	- 0.01	±0.14	Pass
		6.00	6.000	0.00	±0.17	Pass
		8.00	8.000	0.00	±0.20	Pass
		10.0	10.000	0.0	±1.0	Pass
2	10A	2.00	2.000	0.00	±0.11	Pass
		4.00	4.000	0.00	±0.14	Pass
		6.01	6.000	+ 0.01	±0.17	Pass
		8.02	8.000	+ 0.02	±0.20	Pass
		10.0	10.000	0.0	±1.0	Pass
3	10A	2.00	2.000	0.00	±0.11	Pass
		4.00	4.000	0.00	±0.14	Pass
		6.01	6.000	+ 0.01	±0.17	Pass
		8.02	8.000	+ 0.02	±0.20	Pass
		10.0	10.000	0.0	±1.0	Pass

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四、交流功率: 见表 3, $f=50$ Hz
AC Power: Shown in table 3

表 3
Table 3

回路 Channel	量 程 Range	功率因数 PF	示 值 Indication Value	实际值 Reference Value	误 差 Error	允许误差 MPE	结论 Conclusion	
			(W)	(W)	(W)	(W)	(Pass/Fail)	
1	1000V/5A	1.0	397.6	400.00	- 2.4	±8.6	Pass	
		1.0	795.8	800.00	- 4.2	±16.5	Pass	
			(kW)	(kW)	(kW)	(kW)		
		1.0	1.194	1.2000	- 0.006	±0.030	Pass	
		1.0	1.595	1.6000	- 0.005	±0.038	Pass	
2	1000V/5A	1.0	1.991	2.0000	- 0.009	±0.046	Pass	
			(W)	(W)	(W)	(W)		
		1.0	398.8	400.00	- 1.2	±8.6	Pass	
		1.0	797.8	800.00	- 2.2	±16.6	Pass	
			(kW)	(kW)	(kW)	(kW)		
3	1000V/5A	1.0	1.197	1.2000	- 0.003	±0.030	Pass	
		1.0	1.596	1.6000	- 0.004	±0.038	Pass	
		1.0	1.996	2.0000	- 0.004	±0.046	Pass	
			(W)	(W)	(W)	(W)		
		1.0	398.4	400.00	- 1.6	±8.6	Pass	
123	1000V/5A	1.0	797.3	800.00	- 2.7	±16.5	Pass	
			(kW)	(kW)	(kW)	(kW)		
		1.0	1.196	1.2000	- 0.004	±0.030	Pass	
		1.0	1.595	1.6000	- 0.005	±0.038	Pass	
		1.0	1.995	2.0000	- 0.005	±0.046	Pass	
	(kW)	(kW)	(kW)	(kW)				
123	1000V/5A	1.0	1.195	1.2000	- 0.005	±0.030	Pass	
		1.0	2.390	2.4000	- 0.010	±0.054	Pass	
		1.0	3.587	3.6000	- 0.013	±0.078	Pass	
		1.0	4.785	4.8000	- 0.015	±0.033	Pass	
		1.0	5.982	6.0000	- 0.018	±0.039	Pass	



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五、功率因数: 见表 4, $f=50$ Hz
PF: Shown in table 4

表 4
Table 4

回路 Channel		示 值 Indication Value	实际值 Reference Value	误 差 Error	允许误差 MPE	结论 Conclusion
		(cosφ)	(cosφ)	(cosφ)	(cosφ)	(Pass/Fail)
1	L	0.489	0.5000	- 0.011	±0.029	Pass
		0.859	0.8660	- 0.007	±0.029	Pass
		1.000	1.0000	0.000	±0.029	Pass
		0.872	0.8660	+ 0.006	±0.029	Pass
	C	0.510	0.5000	+ 0.010	±0.029	Pass
2	L	0.477	0.5000	- 0.023	±0.029	Pass
		0.854	0.8660	- 0.012	±0.029	Pass
		1.000	1.0000	0.000	±0.029	Pass
		0.877	0.8660	+ 0.011	±0.029	Pass
	C	0.522	0.5000	+ 0.022	±0.029	Pass
3	L	0.486	0.5000	- 0.014	±0.029	Pass
		0.858	0.8660	- 0.008	±0.029	Pass
		1.000	1.0000	0.000	±0.029	Pass
		0.873	0.8660	+ 0.007	±0.029	Pass
	C	0.513	0.5000	+ 0.013	±0.029	Pass

六、频率: 见表 5
FREQ: Shown in table 5

表 5
Table 5

示 值 Indication Value	实际值 Reference Value	误 差 Error	允许误差 MPE	结论 Conclusion
(Hz)	(Hz)	(Hz)	(Hz)	(Pass/Fail)
49.98	50.000	- 0.02	±0.03	Pass
59.99	60.000	- 0.01	±0.03	Pass



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七、电压谐波: 见表 6

ACV Harmonic: Shown in table 6

表 6
Table 6

回路 Channel	基波电压 ACV	谐波次数 Harmonic Order	示值 Indication Value (%)	实际值 Reference Value (%)	误差 Error (%)	允许误差 MPE (%)	结论 Conclusion (Pass/Fail)
1	100V,50Hz	2	10.0	10.000	0.0	±0.6	Pass
		3	10.0	10.000	0.0	±0.6	Pass
		4	10.0	10.000	0.0	±0.6	Pass
		5	10.0	10.000	0.0	±0.6	Pass
		6	10.0	10.000	0.0	±0.6	Pass
		7	10.0	10.000	0.0	±0.6	Pass
		8	10.0	10.000	0.0	±0.6	Pass
		9	10.0	10.000	0.0	±0.6	Pass
		10	10.0	10.000	0.0	±0.6	Pass
		20	10.0	10.000	0.0	±0.6	Pass
		30	10.0	10.000	0.0	±0.6	Pass
		40	10.0	10.000	0.0	±0.6	Pass
		50	10.0	10.000	0.0	±0.6	Pass
2	100V,50Hz	2	10.0	10.000	0.0	±0.6	Pass
		3	10.0	10.000	0.0	±0.6	Pass
		4	10.0	10.000	0.0	±0.6	Pass
		5	10.0	10.000	0.0	±0.6	Pass
		6	10.0	10.000	0.0	±0.6	Pass
		7	10.0	10.000	0.0	±0.6	Pass
		8	10.0	10.000	0.0	±0.6	Pass
		9	10.0	10.000	0.0	±0.6	Pass
		10	10.0	10.000	0.0	±0.6	Pass
		20	10.0	10.000	0.0	±0.6	Pass
		30	10.0	10.000	0.0	±0.6	Pass
		40	10.0	10.000	0.0	±0.6	Pass
		50	10.0	10.000	0.0	±0.6	Pass



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续表 6

Table 6

回路 Channel	基波电压 ACV	谐波次数 Harmonic Order	示值 Indication Value (%)	实际值 Reference Value (%)	误差 Error (%)	允许误差 MPE (%)	结论 Conclusion (Pass/Fail)
3	100V,50Hz	2	10.0	10.000	0.0	±0.6	Pass
		3	10.0	10.000	0.0	±0.6	Pass
		4	10.0	10.000	0.0	±0.6	Pass
		5	10.0	10.000	0.0	±0.6	Pass
		6	10.0	10.000	0.0	±0.6	Pass
		7	10.0	10.000	0.0	±0.6	Pass
		8	10.0	10.000	0.0	±0.6	Pass
		9	10.0	10.000	0.0	±0.6	Pass
		10	10.0	10.000	0.0	±0.6	Pass
		20	10.0	10.000	0.0	±0.6	Pass
		30	10.0	10.000	0.0	±0.6	Pass
		40	10.0	10.000	0.0	±0.6	Pass
50	10.0	10.000	0.0	±0.6	Pass		

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八、电流谐波: 见表 7

ACI Harmonic: Shown in table 7

表 7
Table 7

回路 Channel	基波电流 ACI	谐波次数 Harmonic Order	示值 Indication Value (%)	实际值 Reference Value (%)	误差 Error (%)	允许误差 MPE (%)	结论 Conclusion (Pass/Fail)
1	10A,50Hz	2	10.0	10.000	0.0	±1.0	Pass
		3	10.0	10.000	0.0	±1.0	Pass
		4	10.0	10.000	0.0	±1.0	Pass
		5	10.0	10.000	0.0	±1.0	Pass
		6	10.0	10.000	0.0	±1.0	Pass
		7	10.0	10.000	0.0	±1.0	Pass
		8	9.9	10.000	- 0.1	±1.0	Pass
		9	9.9	10.000	- 0.1	±1.0	Pass
		10	9.9	10.000	- 0.1	±1.0	Pass
		20	9.8	10.000	- 0.2	±1.0	Pass
		30	9.7	10.000	- 0.3	±1.0	Pass
		40	9.7	10.000	- 0.3	±1.0	Pass
		50	9.7	10.000	- 0.3	±1.0	Pass
2	10A,50Hz	2	10.0	10.000	0.0	±1.0	Pass
		3	10.0	10.000	0.0	±1.0	Pass
		4	10.0	10.000	0.0	±1.0	Pass
		5	10.0	10.000	0.0	±1.0	Pass
		6	10.0	10.000	0.0	±1.0	Pass
		7	10.0	10.000	0.0	±1.0	Pass
		8	9.9	10.000	- 0.1	±1.0	Pass
		9	9.9	10.000	- 0.1	±1.0	Pass
		10	9.9	10.000	- 0.1	±1.0	Pass
		20	9.8	10.000	- 0.2	±1.0	Pass
		30	9.7	10.000	- 0.3	±1.0	Pass
		40	9.7	10.000	- 0.3	±1.0	Pass
		50	9.7	10.000	- 0.3	±1.0	Pass



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续表 7

Table 7

回路 Channel	基波电流 ACI	谐波次数 Harmonic Order	示值 Indication Value (%)	实际值 Reference Value (%)	误差 Error (%)	允许误差 MPE (%)	结论 Conclusion (Pass/Fail)
3	10A,50Hz	2	10.0	10.000	0.0	±1.0	Pass
		3	10.0	10.000	0.0	±1.0	Pass
		4	10.0	10.000	0.0	±1.0	Pass
		5	10.0	10.000	0.0	±1.0	Pass
		6	10.0	10.000	0.0	±1.0	Pass
		7	10.0	10.000	0.0	±1.0	Pass
		8	10.0	10.000	0.0	±1.0	Pass
		9	9.9	10.000	- 0.1	±1.0	Pass
		10	9.9	10.000	- 0.1	±1.0	Pass
		20	9.9	10.000	- 0.1	±1.0	Pass
		30	9.8	10.000	- 0.2	±1.0	Pass
		40	9.7	10.000	- 0.3	±1.0	Pass
		50	9.7	10.000	- 0.3	±1.0	Pass

说明:

Note:

1. 测量结果的扩展不确定度:

Expanded uncertainty of measuring results:

交流电压 $U_{rel}=0.06\%$

ACV

功率因数 $U_{rel}=0.10\%$

PF

频率 $U_{rel}=0.01\%$

FREQ

交流电流 $U_{rel}=0.06\%$

ACI

电压谐波 $U_{rel}=0.11\%$

ACV Harmonic

交流功率 $U_{rel}=0.06\%$

AC Power

电流谐波 $U_{rel}=0.11\%$

ACI Harmonic

包含因子 $k=2$, 依据“JJF1059.1-2012测量不确定度评定与表示”

Coverage factor $k=2$. In accordance with JJF 1059.1-2012: "Evaluation and Expression of Uncertainty in Measurement"

2. 结论: 以上校准结果符合该仪器说明书技术要求。

Conclusion: The data of instrument calibration above comply with the technical requirements in the manual.

3. 按照所依据技术文件的规定, 建议复校时间间隔不超过1年。

According to the demand of reference document, next calibration is proposed within 1 year.