



# 校准证书

## CALIBRATION CERTIFICATE

证书编号 DBB201706242  
Certificate No.

第 1 页, 共 10 页  
Page of

委托方 广州市铨泰电子科技有限公司  
Client

委托方地址  
Add. of Client

计量器具名称 电能质量分析仪  
Description

型号规格 ETCR5000  
Model/Type

制造厂 广州市铨泰电子科技有限公司  
Manufacturer

出厂编号 50170053  
Serial No.

设备编号  
Equipment No.

接收日期 2017 年 08 月 17 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 2017 年 09 月 06 日  
Date of Calibration Y M D

批准人  
Approved Signatory

核 验  
Checked by

校 准  
Calibrated by

*戴伟*  
*石劲毅*  
*石劲毅*



证书专用章  
Stamp



扫一扫查真伪



# 说 明

证书编号 DBB201706242  
Certificate No.

## DIRECTIONS

第 2 页, 共 10 页  
Page of

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 17025:2005 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 17025:2005.

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

JJF1205-2008 谐波和闪烁分析仪校准规范 C.S.for Harmonious and Flicker Analysis System

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 Certificate No. /Due Date	计量特性 Metrological Characteristic
多功能校准源 Multifunction Calibrator	8528010	DBB201703769 /2018-05-08	ACV: $\pm 0.015\%$ rdg; ACA: $\pm 0.04\%$ rdg; FREQ: $\pm 2.5 \times 10^{-6}$ rdg
谐波功率标准	355771114/34067082 4/340670848	DLdr2017-0491 /2018-05-01	ACA Harmonic: $\pm 0.045\%$ ; ACV Harmonic: $\pm 0.045\%$ ; ACV: $\pm 0.006\%$ ; ACA: $\pm 0.006\%$ ; AC Power: $\pm 0.01\%$ ; Phase: $\pm 0.003^\circ$

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  $(22 \pm 2)^\circ\text{C}$  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。

2. 未经本机构书面批准, 不得部分复制此证书。

Note: 1. The results relate only to the items calibrated.

2. This certificate shall not be reproduced except in full, without the written approval of our laboratory.



# 校准结果

## RESULTS OF CALIBRATION

证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 3 页, 共 10 页  
Page of

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	49.8	50.00	- 0.2	±0.7	Pass
		99.7	100.00	- 0.3	±1.0	Pass
		300	300.00	0	±7	Pass
		501	500.00	+ 1	±8	Pass
		704	700.00	+ 4	±9	Pass
2	1000V	49.7	50.00	- 0.3	±0.7	Pass
		99.5	100.00	- 0.5	±1.0	Pass
		299	300.00	- 1	±6	Pass
		500	500.00	0	±8	Pass
		703	700.00	+ 3	±9	Pass
3	1000V	49.7	50.00	- 0.3	±0.7	Pass
		99.6	100.00	- 0.4	±1.0	Pass
		299	300.00	- 1	±6	Pass
		500	500.00	0	±8	Pass
		703	700.00	+ 3	±9	Pass



## 校准结果 RESULTS OF CALIBRATION

证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 4 页, 共 10 页  
Page of

三、交流电流: 见表 2,  $f=50$  Hz  
ACA: Shown in table 2

表 2  
Table 2

回路 Channel	量程 Range	示值 Indication Value (A)	实际值 Reference Value (A)	误差 Error (A)	允许误差 MPE (A)	结论 Conclusion (Pass/Fail)
1	10A	1.99	2.000	- 0.01	±0.11	Pass
		4.00	4.000	0.00	±0.14	Pass
		6.00	6.000	0.00	±0.17	Pass
		8.01	8.000	+ 0.01	±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
		8.01	8.000	+ 0.01	±0.20	Pass
		10.0	10.000	0.0	±1.0	Pass
3	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



## 校准结果 RESULTS OF CALIBRATION

证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 5 页, 共 10 页  
Page of

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 (W)	实际值 Reference Value (W)	误 差 Error (W)	允许误差 MPE (W)	结论 Conclusion (Pass/Fail)	
1	1000V/5A	1.0	396.7	400.00	- 3.3	±8.5	Pass	
		1.0	794.3	800.00	- 5.7	±16.5	Pass	
			(kW)	(kW)	(kW)	(kW)		
		1.0	1.192	1.2000	- 0.008	±0.030	Pass	
		1.0	1.590	1.6000	- 0.010	±0.038	Pass	
2	1000V/5A	1.0	1.988	2.0000	- 0.012	±0.046	Pass	
			(W)	(W)	(W)	(W)		
		1.0	396.3	400.00	- 3.7	±8.5	Pass	
		1.0	793.5	800.00	- 6.5	±16.5	Pass	
			(kW)	(kW)	(kW)	(kW)		
3	1000V/5A	1.0	1.190	1.2000	- 0.010	±0.030	Pass	
		1.0	1.588	1.6000	- 0.012	±0.038	Pass	
		1.0	1.985	2.0000	- 0.015	±0.046	Pass	
			(W)	(W)	(W)	(W)		
		1.0	395.6	400.00	- 4.4	±8.5	Pass	
123	1000V/5A	1.0	792.2	800.00	- 7.8	±16.4	Pass	
			(kW)	(kW)	(kW)	(kW)		
		1.0	1.189	1.2000	- 0.011	±0.030	Pass	
		1.0	1.586	1.6000	- 0.014	±0.038	Pass	
		1.0	1.983	2.0000	- 0.017	±0.046	Pass	
	(kW)	(kW)	(kW)	(kW)				
123	1000V/5A	1.0	1.188	1.2000	- 0.012	±0.030	Pass	
		1.0	2.379	2.4000	- 0.021	±0.054	Pass	
		1.0	3.572	3.6000	- 0.028	±0.077	Pass	
		1.0	4.768	4.8000	- 0.032	±0.033	Pass	
		1.0	5.962	6.0000	- 0.038	±0.039	Pass	



## 校准结果 RESULTS OF CALIBRATION

证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 6 页, 共 10 页  
Page of

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	0.515	0.5000	+ 0.015	±0.029	Pass
		0.874	0.8660	+ 0.008	±0.029	Pass
		1.000	1.0000	0.000	±0.029	Pass
	C	0.857	0.8660	- 0.009	±0.029	Pass
		0.484	0.5000	- 0.016	±0.029	Pass
2	L	0.525	0.5000	+ 0.025	±0.029	Pass
		0.880	0.8660	+ 0.014	±0.029	Pass
		1.000	1.0000	0.000	±0.029	Pass
		0.849	0.8660	- 0.017	±0.029	Pass
	C	0.472	0.5000	- 0.028	±0.029	Pass
3	L	0.515	0.5000	+ 0.015	±0.029	Pass
		0.874	0.8660	+ 0.008	±0.029	Pass
		1.000	1.0000	0.000	±0.029	Pass
		0.857	0.8660	- 0.009	±0.029	Pass
	C	0.481	0.5000	- 0.019	±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
	59.98	60.000	- 0.02	±0.03	Pass



## 校准结果 RESULTS OF CALIBRATION

证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 7 页, 共 10 页  
Page of

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 Harmonic	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	2th	10.0	10.000	0.0	±0.6	Pass
		3th	10.0	10.000	0.0	±0.6	Pass
		4th	10.0	10.000	0.0	±0.6	Pass
		5th	9.9	10.000	- 0.1	±0.6	Pass
		6th	9.9	10.000	- 0.1	±0.6	Pass
		7th	9.9	10.000	- 0.1	±0.6	Pass
		8th	9.9	10.000	- 0.1	±0.6	Pass
		9th	9.9	10.000	- 0.1	±0.6	Pass
		10th	9.9	10.000	- 0.1	±0.6	Pass
		20th	9.9	10.000	- 0.1	±0.6	Pass
		30th	9.9	10.000	- 0.1	±0.6	Pass
2	100V,50Hz	2th	9.9	10.000	- 0.1	±0.6	Pass
		3th	9.9	10.000	- 0.1	±0.6	Pass
		4th	9.9	10.000	- 0.1	±0.6	Pass
		5th	9.9	10.000	- 0.1	±0.6	Pass
		6th	9.9	10.000	- 0.1	±0.6	Pass
		7th	9.9	10.000	- 0.1	±0.6	Pass
		8th	9.9	10.000	- 0.1	±0.6	Pass
		9th	9.9	10.000	- 0.1	±0.6	Pass
		10th	9.9	10.000	- 0.1	±0.6	Pass
		20th	9.9	10.000	- 0.1	±0.6	Pass
		30th	9.9	10.000	- 0.1	±0.6	Pass
40th	9.9	10.000	- 0.1	±0.6	Pass		
50th	9.9	10.000	- 0.1	±0.6	Pass		



## 校准结果 RESULTS OF CALIBRATION

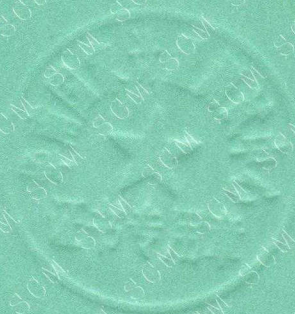
证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 8 页, 共 10 页  
Page of

续表 6  
Table 6

回路 Channel	基波电压 ACV	谐波 Harmonic	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	2th	9.9	10.000	- 0.1	±0.6	Pass
		3th	9.9	10.000	- 0.1	±0.6	Pass
		4th	9.9	10.000	- 0.1	±0.6	Pass
		5th	9.9	10.000	- 0.1	±0.6	Pass
		6th	9.9	10.000	- 0.1	±0.6	Pass
		7th	9.9	10.000	- 0.1	±0.6	Pass
		8th	9.9	10.000	- 0.1	±0.6	Pass
		9th	9.9	10.000	- 0.1	±0.6	Pass
		10th	9.9	10.000	- 0.1	±0.6	Pass
		20th	9.9	10.000	- 0.1	±0.6	Pass
		30th	9.9	10.000	- 0.1	±0.6	Pass
		40th	9.9	10.000	- 0.1	±0.6	Pass
50th	9.9	10.000	- 0.1	±0.6	Pass		







## 校准结果

### RESULTS OF CALIBRATION

证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 9 页, 共 10 页  
Page of

八、电流谐波: 见表 7

ACA Harmonic: Shown in table 7

表 7  
Table 7

回路 Channel	基波电流 ACA	谐波 Harmonic	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	2th	9.9	10.000	- 0.1	±1.0	Pass
		3th	9.9	10.000	- 0.1	±1.0	Pass
		4th	9.9	10.000	- 0.1	±1.0	Pass
		5th	9.9	10.000	- 0.1	±1.0	Pass
		6th	9.9	10.000	- 0.1	±1.0	Pass
		7th	9.8	10.000	- 0.2	±1.0	Pass
		8th	9.8	10.000	- 0.2	±1.0	Pass
		9th	9.8	10.000	- 0.2	±1.0	Pass
		10th	9.8	10.000	- 0.2	±1.0	Pass
		20th	9.8	10.000	- 0.2	±1.0	Pass
		30th	9.8	10.000	- 0.2	±1.0	Pass
		40th	9.7	10.000	- 0.3	±1.0	Pass
		50th	9.7	10.000	- 0.3	±1.0	Pass
2	10A,50Hz	2th	9.9	10.000	- 0.1	±1.0	Pass
		3th	9.9	10.000	- 0.1	±1.0	Pass
		4th	9.9	10.000	- 0.1	±1.0	Pass
		5th	9.9	10.000	- 0.1	±1.0	Pass
		6th	9.8	10.000	- 0.2	±1.0	Pass
		7th	9.8	10.000	- 0.2	±1.0	Pass
		8th	9.8	10.000	- 0.2	±1.0	Pass
		9th	9.8	10.000	- 0.2	±1.0	Pass
		10th	9.8	10.000	- 0.2	±1.0	Pass
		20th	9.8	10.000	- 0.2	±1.0	Pass
		30th	9.8	10.000	- 0.2	±1.0	Pass
		40th	9.7	10.000	- 0.3	±1.0	Pass
		50th	9.7	10.000	- 0.3	±1.0	Pass



## 校准结果 RESULTS OF CALIBRATION

证书编号 DBB201706242  
Certificate No.

原始记录号 020176242  
Record No.

第 10 页, 共 10 页  
Page of

续表 7

Table 7

回路 Channel	基波电流 ACA	谐波 Harmonic	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	2th	9.9	10.000	- 0.1	±1.0	Pass
		3th	9.9	10.000	- 0.1	±1.0	Pass
		4th	9.9	10.000	- 0.1	±1.0	Pass
		5th	9.9	10.000	- 0.1	±1.0	Pass
		6th	9.9	10.000	- 0.1	±1.0	Pass
		7th	9.9	10.000	- 0.1	±1.0	Pass
		8th	9.9	10.000	- 0.1	±1.0	Pass
		9th	9.9	10.000	- 0.1	±1.0	Pass
		10th	9.9	10.000	- 0.1	±1.0	Pass
		20th	9.8	10.000	- 0.2	±1.0	Pass
		30th	9.8	10.000	- 0.2	±1.0	Pass
		40th	9.8	10.000	- 0.2	±1.0	Pass
50th	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  $U_{rel}=0.06\%$

ACA

电压谐波  $U_{rel}=0.11\%$

ACV Harmonic

交流功率  $U_{rel}=0.06\%$

AC Power

电流谐波  $U_{rel}=0.11\%$

ACA 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.