



# 校准证书

CALIBRATION CERTIFICATE

证书编号 088201204483  
Certificate No.

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委托方 广州市钰泰电子科技有限公司  
Client

委托方地址  
Add. of Client

计量器具名称 AUTO DOBULE CLAMP DIGITAL PHASE VA METER  
Description

型号规格 4000A  
Model/Type

制造厂 ETCR  
Manufacturer

出厂编号 XWB1109005 设备编号  
Serial No. Equipment No.

接收日期 2018年 2月 8日  
Date of Receipt Y M D

结论 见校准结果页  
Conclusion Shown in the results of calibration

校准日期 2018年 2月 15日  
Date of Calibration Y M D

批准人  
Approved Signatory

核 验 曹前  
Inspected by

校 准 石劲毅  
Calibrated by





# 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, 计量授权证书号是: (国) 注计(2007) 01043号, (国) 注计(2007) 01032号, 本中心是中国合格评定国家认可委员会(CNAS) 认可实验室, 认可证书号为: CNAS L0730.

This laboratory is the National Legal Metrological Verification Institution in southern China set up by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) under authorization certificates No.(2007)01043 & (2007)01032. This laboratory is accredited by China National Accreditation Service for Conformity Assessment under Laboratory Accreditation Certification No. CNAS L0730.

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:

JJG 780-1992 交流数字功率表检定规程 V, K. of AC Digital Powermeter

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/型号 Name of Equipment /Model	编号 Serial No.	证书号/有效期 Certificate No. /Due Date	计量特性 Metrological Characteristic
三相标准功率电表 Three-phase Standard Watt-Hour Meter /PS200.3	20692	DLd2011-0321 /2019-04-10	0.02 级 Grade 0.02
功率标准器 Electrical Power Standard Testing Equipm /6100A	852147534~85214753 6	DLd2011-0893 /2019-09-19	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 温度 (23±2) °C 相对湿度 (50±5) %  
Place 室(Electrics-magnetics Lab) Temperature RH

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. 未经本中心书面批准, 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

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一、外观：符合要求(Apparent inspection Pass)

二、交流电压：见表1 (ACV: In table 1, f=50 Hz)

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)
U1	600V	50.0	50.000	0.0	±1.1	Pass
		100	100.00	0	±5	Pass
		200	200.00	0	±6	Pass
		299	300.00	-1	±7	Pass
		399	400.00	-1	±9	Pass
		499	500.00	-1	±10	Pass
U2	600V	50.0	50.000	0.0	±1.1	Pass
		99.9	100.00	-0.1	±1.3	Pass
		200	200.00	0	±6	Pass
		299	300.00	-1	±7	Pass
		399	400.00	-1	±9	Pass
		499	500.00	-1	±10	Pass

三、交流电流：见表2 (ACA: In table 2, f=50 Hz)

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)
I1	20A	1.98	2.000	-0.02	±0.06	Pass
		4.97	5.000	-0.03	±0.10	Pass
		9.98	10.000	-0.02	±0.18	Pass
		15.00	15.000	0.00	±0.26	Pass
		19.02	19.000	+0.02	±0.32	Pass
I2	20A	1.99	2.000	-0.01	±0.06	Pass
		4.98	5.000	-0.02	±0.10	Pass
		10.00	10.000	0.00	±0.18	Pass
		15.03	15.000	+0.03	±0.26	Pass
		19.07	19.000	+0.07	±0.32	Pass



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四、单相交流功率: 见表3 (Single-phase AC Power: In table 3/ $f=50$  Hz)

表 3 (Table 3)

回路 Channel	量程 Range	功率因数 PF	示 值 Indication Value (kW)	实际值 Reference Value (kW)	误差 Error (kW)	允许误差 MPE (kW)	结论 Conclusion (Pass/Fail)
P1	600V/20A	1.0	0.3960	0.40000	- 0.0010	$\pm 0.0122$	Pass
		1.0	0.9930	1.00000	- 0.0018	$\pm 0.0301$	Pass
		1.0	1.9940	2.00000	- 0.0015	$\pm 0.0601$	Pass
		1.0	2.9970	3.00000	- 0.0008	$\pm 0.0902$	Pass
		1.0	3.8022	3.80000	+ 0.0006	$\pm 0.1144$	Pass
		0.5L	1.7888	1.90000	- 0.0278	$\pm 0.0540$	Pass
		0.5C	2.0214	1.90000	+ 0.0304	$\pm 0.0609$	Pass
P2	600V/20A	1.0	0.3980	0.40000	- 0.0005	$\pm 0.0122$	Pass
		1.0	0.9960	1.00000	- 0.0010	$\pm 0.0302$	Pass
		1.0	2.0000	2.00000	0.0000	$\pm 0.0603$	Pass
		1.0	3.0060	3.00000	+ 0.0015	$\pm 0.0905$	Pass
		1.0	3.8140	3.80000	+ 0.0035	$\pm 0.1147$	Pass
		0.5L	1.8498	1.90000	- 0.0126	$\pm 0.0558$	Pass
		0.5C	1.9652	1.90000	+ 0.0163	$\pm 0.0593$	Pass

五、功率因数: 见表4 (PF: In table 4/ $f=50$  Hz)

表 4 (Table 4)

回路 Channel		示 值 Indication Value (cos $\phi$ )	实际值 Reference Value (cos $\phi$ )	误差 Error (cos $\phi$ )	允许误差 MPE (cos $\phi$ )	结论 Conclusion (Pass/Fail)
PF1	L	0.472	0.5000	- 0.028	$\pm 0.030$	Pass
		0.848	0.8660	- 0.018	$\pm 0.030$	Pass
		0.999	1.0000	- 0.001	$\pm 0.030$	Pass
		0.883	0.8660	+ 0.017	$\pm 0.030$	Pass
		0.530	0.5000	+ 0.030	$\pm 0.030$	Pass
PF2	L	0.485	0.5000	- 0.015	$\pm 0.030$	Pass
		0.857	0.8660	- 0.009	$\pm 0.030$	Pass
		1.000	1.0000	0.000	$\pm 0.030$	Pass
		0.875	0.8660	+ 0.009	$\pm 0.030$	Pass
		0.515	0.5000	+ 0.015	$\pm 0.030$	Pass



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### 六、相位: 见表5 (Phase: In table 5/ $f=50\text{ Hz}$ )

表 5 (Table 5)

通道 Channel	示值 Indication Value (°)	实际值 Reference Value (°)	误差 Error (°)	允许误差 MPE (°)	结论 Conclusion (Pass/Fail)
U1U2	29.9	30.00	-0.1	$\pm 1.0$	Pass
	59.9	60.00	-0.1	$\pm 1.0$	Pass
	299.9	300.00	-0.1	$\pm 1.0$	Pass
	329.9	330.00	-0.1	$\pm 1.0$	Pass
	359.9	360.00	-0.1	$\pm 1.0$	Pass
I1I2	0.4	0.00	+0.4	$\pm 1.0$	Pass
	30.3	30.00	+0.3	$\pm 1.0$	Pass
	60.3	60.00	+0.3	$\pm 1.0$	Pass
	300.3	300.00	+0.3	$\pm 1.0$	Pass
	330.3	330.00	+0.3	$\pm 1.0$	Pass
U1I1	28.3	30.00	-1.7	* $\pm 1.0$	Fail
	58.3	60.00	-1.7	* $\pm 1.0$	Fail
	298.3	300.00	-1.7	* $\pm 1.0$	Fail
	328.3	330.00	-1.7	* $\pm 1.0$	Fail
	358.3	360.00	-1.7	* $\pm 1.0$	Fail
U2I2	28.7	30.00	-1.3	* $\pm 1.0$	Fail
	58.7	60.00	-1.3	* $\pm 1.0$	Fail
	298.8	300.00	-1.2	* $\pm 1.0$	Fail
	328.7	330.00	-1.3	* $\pm 1.0$	Fail
	358.7	360.00	-1.3	* $\pm 1.0$	Fail

### 七、频率: 见表6 (FREQ: In table 6)

表 6 (Table 6)

示值 Indication Value (Hz)	实际值 Reference Value (Hz)	误差 Error (Hz)	允许误差 MPE (Hz)	结论 Conclusion (Pass/Fail)
49.99	50.000	-0.01	$\pm 1.03$	Pass
59.97	60.000	-0.03	$\pm 1.23$	Pass



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说明(Notes):

1. 测量结果的扩展不确定度(The Expanded Uncertainty of Measurement):

交流电压(VACA)  $U_{95}=0.04\%$  交流电压(ACV)  $U_{95}=0.04\%$

交流功率(AC Power)  $U_{95}=0.04\%$  相位(Phase)  $U_{95}=0.3^\circ$

频率(FREQ)  $U_{95}=0.010\%$  功率因数(PF)  $U_{95}=0.10\%$

(包含因子 $k=2$  依据 JJF 1059-1999 测量结果不确定度评定与表示)

(Coverage factor  $k=2$ , According to JJF 1059-1999 Evaluation and Expression of Uncertainty in Measurement)

2. 建议校准周期不超过1年。

The period of calibration advised within one year.

