



校准证书

CALIBRATION CERTIFICATE

证书编号 GDDD202500142
Certificate No.

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客户名称 优利德科技(中国)股份有限公司
Name of the Customer

联络信息 广东省东莞市松山湖园区工业北一路6号
Contact Information

计量器具名称 光伏万用表(数字多用表, 电参数测量仪, 直流数字功率表)
Description

型号/规格 UT197PV
Model/Type

制造厂 UNI-T
Manufacturer

出厂编号 C223175309
Serial No.

设备管理编号/
Equipment No.

接收日期 2025 年 02 月 07 日
Receipt on Y M D

结论 见校准结果
Conclusion

校准日期 2025 年 02 月 08 日
Calibration on Y M D

发布日期 2025 年 02 月 12 日
Issue on Y M D

批准 何洪波
Authorized by

核 验 何洪波
Reviewed by

校 准 叶峻江
Calibrated by

证书专用章
Stamp



扫一扫查真伪



说明

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DIRECTIONS

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1. 本中心是国家市场监督管理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/或国际单位制(SI)。
All data issued by this laboratory are traceable to national primary standards and/or International System of Units (SI)
3. 校准地点、环境条件:
Place and environmental conditions of the calibration:
地点 A4-406恒温实验室 温度 (20.0~20.2) °C 相对湿度 (48~57) %
Location Temperature RH
4. 本次校准的技术依据:
Reference documents for the calibration:
JJF 1587-2016 数字多用表校准规范 C.S. for Multimeters
JJF 1491-2014 数字式交流电参数测量仪校准规范 C.S. for Digital AC Electrical Parameters Meter
JJG(粤) 055-2019 直流数字功率表检定规程 V.R. of DC Digital Power Meters

5. 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/型号规格/测量范围	编号	证书号/有效期/溯源单位	计量特性
Name of Equipment/Model/Type/Range	Serial No.	Certificate No./Due Date/Traceability to	Metrological Characteristic
多功能标准源 /5522A/DCV:1mV~1020V;ACV: 1mV~1020V;DCA:1μA~20.5A; ACA:30μA~20.5A;OHM:0.1Ω~100MΩ	4259901	DBS202400979 /2025-06-27 /省计量院	DCV: $U_{rel} = 0.0012\%$, ACV: $U_{rel} = 0.017\%$, DCA: $U_{rel} = 0.011\%$, ACA: $U_{rel} = 0.05\%$, DCR: $U_{rel} = 0.003\%$, DCW: $U_{rel} = 0.022\%$; ACW: $U_{rel} = 0.08\%$ ($k=2$)

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. “客户名称”、“联络信息”由委托方提供, “制造厂”、“型号规格”、“出厂编号”以及“设备编号”为仪器上标注。 The information Name of the Customer and Contact Information are provided by client, and the Manufacturer, Model/Type, Serial No. and Equipment No. are marked on the items.



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一、外观及通电检查

Appearance and power inspection

结论: Pass

二、数字多用表部分

1. 直流电压的示值误差 (直流电压): 见表1

Error of DC voltage indication(DC voltage): Shown in table 1

表1 Table 1

极性	量程	标准值	显示值	误差	最大允许误差	结论	不确定度
Polar	Range	Standard value	Indication Value	Error	MPE	Conclusion	U
	(mV)	(mV)	(mV)	(mV)	(mV)	P/F	(mV)
+	600	590.0	589.8	-0.2	±2.3	Pass	0.1
	(V)	(V)	(V)	(V)	(V)	P/F	(V)
	6	5.900	5.899	-0.001	±0.017	Pass	0.001
	60	59.00	58.99	-0.01	±0.17	Pass	0.01
	600	590.0	590.0	0.0	±1.7	Pass	0.1
	2500	1000	1000	0	±15	Pass	1
	(mV)	(mV)	(mV)	(mV)	(mV)	P/F	(mV)
-	600	590.0	589.8	-0.2	±2.3	Pass	0.1
	(V)	(V)	(V)	(V)	(V)	P/F	(V)
	6	5.900	5.896	-0.004	±0.017	Pass	0.001
	60	59.00	58.98	-0.02	±0.17	Pass	0.01
	600	590.0	589.7	-0.3	±1.7	Pass	0.1
	2500	1000	999	-1	±15	Pass	1



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2.交流电压的示值误差（交流电压）：见表2

Error of AC voltage indication(AC voltage):Shown in table 2

表2 Table 2

测试频率	量程	标准值	显示值	误差	最大允许误差	结论	不确定度
Freq	Range	Standard value	Indication Value	Error	MPE	Conclusion	U
(Hz)	(mV)	(mV)	(mV)	(mV)	(mV)	P/F	(mV)
50	600	590.0	590.1	0.1	±5.2	Pass	0.2
	(V)	(V)	(V)	(V)	(V)	P/F	(V)
	6	5.900	5.900	0.000	±0.052	Pass	0.002
	60	59.00	58.94	-0.06	±0.52	Pass	0.03
	600	590.0	590.3	0.3	±5.2	Pass	0.3
	1500	1000	1001	1	±13	Pass	1

3.直流电阻的示值误差（电阻）：见表3

Error of Resistance indication(Resistance):Shown in table 3

表3 Table 3

量程	标准值	显示值	误差	最大允许误差	结论	不确定度
Range	Standard value	Indication Value	Error	MPE	Conclusion	U
(Ω)	(Ω)	(Ω)	(Ω)	(Ω)	P/F	(Ω)
600	590.0	589.9	-0.1	±5.2	Pass	0.1
(kΩ)	(kΩ)	(kΩ)	(kΩ)	(kΩ)	P/F	(kΩ)
6	5.900	5.899	-0.001	±0.034	Pass	0.001
60	59.00	59.00	0.00	±0.35	Pass	0.01
600	590.0	590.1	0.1	±3.5	Pass	0.1
(MΩ)	(MΩ)	(MΩ)	(MΩ)	(MΩ)	P/F	(MΩ)
6	5.900	5.910	0.010	±0.035	Pass	0.002
60	10.00	10.00	0.00	±0.30	Pass	0.02



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4. 直流电流的示值误差 (直流电流): 见表4

Error of DC current indication(DC current): Shown in table 4

表4 Table 4

极性	量程	标准值	显示值	误差	最大允许误差	结论	不确定度
Polar	Range	Standard value	Indication Value	Error	MPE	Conclusion	U
	(A)	(A)	(A)	(A)	(A)	P/F	(A)
+	100	10.0	10.0	0.0	±0.6	Pass	0.7
		50.0	49.9	-0.1	±0.9	Pass	0.8
		100.0	100.1	0.1	±1.3	Pass	0.9
	1000	100	96	-4	±6	Pass	2
		500	499	-1	±9	Pass	3
		950	945	-5	±13	Pass	4
	100	10.0	9.6	-0.4	±0.6	Pass	0.8
		50.0	50.1	0.1	±0.9	Pass	0.8
		100.0	100.5	0.5	±1.3	Pass	0.9
	1000	100	100	0	±6	Pass	2
		500	502	2	±9	Pass	3
		950	951	1	±13	Pass	4

5. 交流电流的示值误差 (交流电流): 见表5

Error of AC current indication(AC current): Shown in table 5

表5 Table 5

测试频率	量程	标准值	显示值	误差	最大允许误差	结论	不确定度
Freq	Range	Standard value	Indication Value	Error	MPE	Conclusion	U
(Hz)	(A)	(A)	(A)	(A)	(A)	P/F	(A)
50	100	10.0	10.0	0.0	±0.6	Pass	0.7
		50.0	50.0	0.0	±1.0	Pass	0.8
		100.0	100.1	0.1	±1.5	Pass	0.9
	1000	100	100	0	±6	Pass	2
		500	500	0	±10	Pass	3
		950	951	1	±15	Pass	4



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三、电参数测量仪部分

1. 功率因数: 见表6

Power factor: Shown in table 6

表6 Table 6

	标准值	显示值	误差	最大允许误差	结论	不确定度
	Standard value	Indication Value	Error	MPE	Conclusion	U
	1.00	1.00	0.00	± 0.05	Pass	0.01
L	0.50	0.51	0.01	± 0.05	Pass	0.02
C	0.50	0.49	-0.01	± 0.05	Pass	0.02

2. 交流功率: 见表7

AC power(Power): Shown in table 7

表7 Table 7

量程	标准值	显示值	误差	最大允许误差	结论	不确定度
Range	Standard value	Indication Value	Error	MPE	Conclusion	U
(kW)	(kW)	(kW)	(kW)	(kW)	P/F	(kW)
60	2.20	2.24	0.04	± 0.12	Pass	0.02
	5.50	5.57	0.07	± 0.22	Pass	0.05
	11.00	11.14	0.14	± 0.38	Pass	0.06
	16.50	16.65	0.15	± 0.55	Pass	0.08
	22.00	22.20	0.20	± 0.72	Pass	0.11
0.5L	11.00	11.34	0.34	± 0.39	Pass	0.06
0.5C	11.00	11.06	0.06	± 0.38	Pass	0.06
150	100.0	100.3	0.3	± 3.5	Pass	0.5
600	220.0	222.2	2.2	± 7.2	Pass	1.1
1500	1000	1000	0	± 35	Pass	5



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四、直流数字功率表部分

1. 直流功率示值误差（功率）：见表8

DC power indication error(DC Power): Shown in table 8

表8 Table 8

量程	标准值	示值	误差	最大允许误差	结论	不确定度
Range	Standard value	Indication Value	Error	MPE	Conclusion	<i>U</i>
(kW)	(kW)	(kW)	(kW)	(kW)	P/F	(kW)
60	2.20	2.17	-0.03	±0.12	Pass	0.02
	11.00	10.98	-0.02	±0.38	Pass	0.03
	22.00	21.93	-0.07	±0.71	Pass	0.05
(kW)	(kW)	(kW)	(kW)	(kW)	P/F	(kW)
60	6.00	5.95	-0.05	±0.23	Pass	0.02
	30.00	29.92	-0.08	±0.95	Pass	0.06
	50.00	49.90	-0.10	±1.55	Pass	0.09
250	100.0	99.9	-0.1	±3.5	Pass	0.3
600	220.0	219.3	-0.7	±7.1	Pass	0.5
2500	1000	1001	1	±35	Pass	3

说明:

Note:

1. 本次测量结果的扩展不确定度:

The Expanded Uncertainty of Measurement:

包含因子 $k=2$, 本证书中给出的扩展不确定度依据JJF1059.1-2012《测量不确定度评定与表示》评定, 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。

Coverage factor $k=2$, the expanded uncertainty given in this certificate is evaluated according to JJF 1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement", which is obtained by multiplying the combined standard uncertainty by the coverage factor k corresponding to the coverage probability of about 95%.

2. 校准结果符合性判定依据JJF1094-2002《测量仪器特性评定》第5.3.1条款和该仪器说明书技术要求。

Decision rules of conformity is in JJF1094-2002 "Evaluation of the Characteristic of Measuring Instruments" (5.3.1) and the technical requirements in the manual.

3. 该仪器的溯源日期为本证书的“校准日期”, 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。更换重要部件、维修或对仪器性能有怀疑时, 应及时校准。



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The traceability date of this instrument is the "Calibration Date" on this certificate. According to the demand of reference document, next calibration is proposed within 1 year. In case of replacement of important parts, maintenance or doubt on the performance of the instrument, it shall be calibrated in time.

4. 校准活动中对测量结果有影响的条件:

Conditions under which the calibrations were made that have an influence on the measurement results:

温度(Temperature): (20.0~20.2)°C, 湿度(Humidity): (48~57)%RH.

5. 本次校准时, 客户未配置该说明书中使用的电流钳。按说明书描述10mV/A:1mV/A的比例输入电压信号到电流钳插口, 读取电流示值和功率示值。

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