



校准证书

CALIBRATION CERTIFICATE

证书编号: 112205022
Certificate No

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客户名称
Name of Customer

北京交通部科学研究院

客户地址
Address of Customer

北京市昌平区昌平科技园超前路12号

计量器具名称
Name of Instrument

接触电流测试仪

型号/规格
Type / Specification

TG76598

出厂编号
Serial No

03990-96831

资产编号
Asset No

制造单位
Manufacturer

天格(台湾)测控股份有限公司

校准依据
Calibrated in Accordance to

GB/T 12113-2003, IEC 60990:1999

(校准专用章)
Stamp



批准人:
Authorized by

蔡卫平(部门技术主管)

签名:
Signature

蔡卫平

校准日期:
Operation Date

2011 年 10 月 07 日
Year Month Day

建议复校日期:
Suggested Recal. Date

2012 年 10 月 06 日
Year Month Day



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重要声明

Important Statement

1. 本院(站)是由深圳市人民政府依据《中华人民共和国计量法》设置并由国家质量监督检验检疫总局和广东省质量技术监督局依法授权的法定计量检定机构。本院(站)获得中国合格评定国家认可委员会(CNAS)认可,符合ISO/IEC 17025要求。
Our academy/station is a legal metrology verification organization established by the Shenzhen Municipal Government and authorized by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) and Administration of Quality and Technology Supervision of Guangdong Province. Our academy/station has been accredited according to ISO/IEC 17025 by CNAS with the certificate.
2. 本院(站)进行的检定、校准和测试均可溯源到国家基准。
All verifications, calibrations and tests made by our academy/station are traceable to the International System of Unit (SI).
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4. 如果要满足被校准仪器的技术指标,或者技术法规要求,在规定范围内适用,请在建议复校日期前校准。
To ensure that the calibrated object is properly used under given conditions in compliance with technical specifications or regulations, recalibrate before the suggested date.
5. 本证书提供的结果仅对本次被校准的计量器具负责。
The results presented in this document applies only to the calibrated instrument.
6. 复印证书未加盖“校准专用章”无效。
Copies of this certificate without an official stamp of calibration are not valid.

校准用主要计量标准器具信息

Main Standards of Measurement Used

名称 / 特征 Equipment Name / Characteristics	设备编号 Equipment No	证书号 Certificate No	有效期 Due Date
参考级数字万用表	SB4419	DBS20101466	2011-12-23
多用表校准源	SB0575	检定字第201109005243号	2012-09-07
高频LCR电桥	SB6858	112106102	2012-09-25

附加说明

Appended Directions

委托日期: 2011年10月07日
Application Date
校准地点: 客户现场
Operation Location
环境条件: 温度 22 °C 相对湿度 58 %
Operation Environment
符合性及限制使用说明: 参见校准结果
Statement of Compliance and Limitation



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表 1 (Table 1) 感应/反应接触电流测量网络的输入阻抗

频率 Freq	理论值 Theor. Value	实测值 Meas. Value	误差 Error	最大允许误差 MPE	结论 Conclusion
(Hz)	(Ω)	(Ω)	(Ω)	(Ω)	(Pass or Fail)
20	1998	2002.2	-4.2	±40.0	P
50	1990	1996.8	-6.8	±39.8	P
60	1986	1999.0	-13.0	±39.7	P
100	1961	1964.6	-3.6	±39.2	P
200	1857	1865.5	-8.5	±37.1	P
500	1433	1427.5	5.5	±28.7	P
1000	973	967.6	5.4	±19.5	P
2000	661	658.4	2.6	±13.2	P
5000	512	510.6	1.4	±10.2	P
10000	485	484.5	0.5	±9.7	P
20000	479	477.6	1.4	±9.6	P
50000	477	475.3	1.7	±9.5	P
100000	476	475.3	0.7	±23.8	P
200000	476	475.0	1.0	±23.8	P
500000	476	471.8	4.2	±23.8	P
1000000	476	461.1	14.9	±23.8	P

摆脱电流测量网络的输入阻抗(IEC 60990 Fig 4): 见表 2

Input Impedance For Let-go Measuring network

(IEC 60990 Fig 3): see Table 3

表 2 (Table 2) 摆脱电流测量网络的输入阻抗

频率 Freq	理论值 Theor. Value	实测值 Meas. Value	误差 Error	最大允许误差 MPE	结论 Conclusion
(Hz)	(Ω)	(Ω)	(Ω)	(Ω)	(Pass or Fail)
20	1998	1998.5	-0.5	±40.0	P
50	1990	1990.5	-0.5	±39.8	P



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60	1986	1992.1	-6.1	±39.7	P
100	1961	1942.8	18.2	±39.2	P
200	1858	1860.2	-2.2	±37.2	P
500	1434	1438.0	-4.0	±28.7	P
1000	976	971.9	4.1	±19.5	P
2000	667	664.2	2.8	±13.3	P
5000	515	514.2	0.8	±10.3	P
10000	487	485.8	1.2	±9.7	P
20000	479	478.1	0.9	±9.6	P
50000	477	475.8	1.2	±9.5	P
100000	476	475.4	0.6	±23.8	P
200000	476	474.8	1.2	±23.8	P
500000	476	471.6	4.4	±23.8	P
1000000	476	460.7	15.3	±23.8	P

电压表电压测量示值误差: 见表

Indication Error of AC Voltage Measurement: see Table 3

表 3 (Table 3) 电压表电压测量示值误差

频率 Freq	标准示值 Std. Indication	被校示值 Cal. Indication	误差 Error	最大允许误差 MPE	结论 Conclusion
	(V)	(V)	(%)	(%)	(Pass or Fail)
DC	8.00	8.0	0.00	±2.0	P
20 Hz	8.00	7.9	-1.25	±2.0	P
50 Hz	8.00	7.9	-1.25	±2.0	P
60 Hz	8.00	7.9	-1.25	±2.0	P
100 Hz	8.00	7.9	-1.25	±2.0	P
200 Hz	8.00	7.9	-1.25	±2.0	P
500 Hz	8.00	7.9	-1.25	±2.0	P
1 kHz	8.00	7.9	-1.25	±2.0	P
2 kHz	8.00	7.9	-1.25	±2.0	P
5 kHz	8.00	7.9	-1.25	±2.0	P
10 kHz	8.00	7.9	-1.25	±2.0	P



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Results of Calibration

感知电流/反应电流测量网络的输出电压和输入电压的比值 (输入电压: $U_{in} = 4 V$): 见表 4
Output voltage to Input voltage ratios for perception or reaction Measuring network
(Input voltage: $U_{in} = 4 V$): see Table 4

表 4 (Table 4) 感知电流/反应电流测量网络的输出电压和输入电压的比值

频率 Freq	理论值 Theory Value	实测值 Meas. Value	误差 Error	最大允许误差 MPE	结论 Conclusion
	(U_2 / U_{in})	(U_2 / U_{in})			(Pass or Fail)
20 Hz	0.250	0.2499	0.0001	± 0.0125	P
50 Hz	0.251	0.2505	0.0005	± 0.0126	P
60 Hz	0.251	0.2507	0.0003	± 0.0126	P
100 Hz	0.252	0.2521	-0.0001	± 0.0126	P
200 Hz	0.259	0.2585	0.0005	± 0.0130	P
500 Hz	0.282	0.2839	-0.0019	± 0.0141	P
1 kHz	0.292	0.2952	-0.0032	± 0.0146	P
2 kHz	0.246	0.2501	-0.0041	± 0.0123	P
5 kHz	0.133	0.1354	-0.0024	± 0.0067	P
10 kHz	0.0708	0.0718	-0.0010	± 0.0035	P
20 kHz	0.0360	0.0365	-0.0005	± 0.0018	P
50 kHz	0.0145	0.0146	-0.0001	± 0.0007	P
100 kHz	0.00723	0.00735	-0.00012	± 0.0007	P
200 kHz	0.00362	0.00367	-0.00005	± 0.0007	P
500 kHz	0.00145	0.00145	0.00000	± 0.0007	P
1000 kHz	0.000723	0.00075	-0.00003	± 0.00004	P

摆脱电流测量网络的输出电压和输入电压的比值 (输入电压: $U_{in} = 4 V$): 见表 5
Output voltage to Input voltage ratios for Let-go Measuring network
(Input voltage: $U_{in} = 4 V$): see Table 5



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表 5 (Table 5) 摆脱电流测量网络的输出电压和输入电压的比值

频率 Freq	理论值 Theory Value	实测值 Meas. Value	误差 Error	最大允许误差 MPE	结论 Conclusion
	(U_3/U_{in})	(U_3/U_{in})			(Pass or Fail)
20 Hz	0.250	0.2503	-0.0003	±0.0125	P
50 Hz	0.251	0.2505	0.0005	±0.0126	P
60 Hz	0.251	0.2508	0.0002	±0.0126	P
100 Hz	0.253	0.2529	0.0001	±0.0127	P
200 Hz	0.261	0.2610	0.0000	±0.0131	P
500 Hz	0.298	0.2985	-0.0005	±0.0149	P
1 kHz	0.348	0.3502	-0.0022	±0.0174	P
2 kHz	0.377	0.3795	-0.0025	±0.0189	P
5 kHz	0.280	0.2815	-0.0015	±0.0140	P
10 kHz	0.164	0.1652	-0.0012	±0.0082	P
20 kHz	0.0860	0.0865	-0.0005	±0.0043	P
50 kHz	0.0349	0.0351	-0.0002	±0.0017	P
100 kHz	0.0175	0.0175	0.0000	±0.0009	P
200 kHz	0.00874	0.00877	-0.00003	±0.0009	P
500 kHz	0.00350	0.00350	0.00000	±0.0009	P
1000 kHz	0.00175	0.00170	0.00005	±0.0009	P

注: 1 本次测量不确定度说明:
Notes: Uncertainty in the Measurement

1.1 依据 JJF 1059-1999 测量不确定度评定与表示
According to JJF 1059-1999 Evaluation and Expression of Uncertainty in Measurement.

1.2 交流电压测量结果的相对扩展不确定度: $U_{rel} = 0.1\%$, $k = 2$
Related Expanded Uncertainty of AC Voltage: $U_{rel} = 0.1\%$, $k = 2$



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- 1.3 电阻测量结果的相对扩展不确定度: $U_{rel} = 0.1\%$, $k = 2$
Related Expanded Uncertainty of Resistance: $U_{rel} = 0.1\%$, $k = 2$
- 2 结论判断依据: 仪器说明书技术要求。
Basis for the conclusion: Technical Specification of the Instrument.

