

What do I do if I do not know my equipment specifications?

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What do I do if I don't know my equipment specifications?

There may come a time when you have a piece of test equipment or instrumentation for which you do not know the specifications. Perhaps you purchased a rather inexpensive unit from the internet. Maybe you found a meter in the back of a cabinet which has not seen daylight in twenty years and all the manuals are gone. In any case, you need to use the unit. So what do you do when you send the unit to your local calibration service provider for calibration? How do they know what specification to use when calibrating the unit?

One way is to simply make up your own specifications based on any number of factors including your own engineering needs, your customer's requirements, government safety regulations, and such. This method may or may not be sufficient if you have an outside auditor reviewing your quality system. This is especially true if you are trying to meet the requirements of ISO 17025:2017, *General Requirements for the Competence of Testing and Calibration Laboratories*.

There is a better way!

The IECEE, the *IEC System for Conformity Assessment Schemes for Electrotechnical Equipment and Components*, is a multilateral certification system based on IEC International Standards. Its members use the principle of mutual recognition (reciprocal acceptance) of test results to obtain certification or approval at national levels around the world. They publish a document, *IECEE OD-5014 - Instrument Accuracy Limits*, the purpose of which is to provide default instrument accuracies for measurement ranges when no other specifications exist. As specified in *Section 3 Normative References* this is an acceptable method to meet the ISO 17025:2017 requirements.

The document states:

2.1 This Operational Document provides default instrument accuracy requirements where the test standard does not provide criteria.

5.1 The default instrument accuracy requirements given below shall be applied when the standard does not provide criteria.

While this document does not cover every conceviable situation, it is a good starting point when you do not have the published specifications for your equipment. Keep in mind, you must analyze the published accuracy limits to ensure they will meet your actual requirements.





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IECEE OPERATIONAL DOCUMENT

IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System)

Committee of Testing Laboratories (CTL)

Instrument Accuracy Limits





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FOREWORD

Document Owner

CTL

History of changes

Date	Brief summary of changes	
2016-06-01	N/A, as first edition	
2019-03	3 year review, update to new OD document format	

Effective date	Next maintenance due date
2019-06-30	2022-06-01

Background

The CTL decided in 2016 to convert the CTL Decision Sheet (DSH) 251 into the IECEE Operational Document (OD) structure. Editorial adjustments have been made where necessary.

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1 Purpose

1.1 The purpose of this document is to provide default instrument accuracies for measurement ranges.

2 Scope

2.1 This Operational Document provides default instrument accuracy requirements where the test standard does not provide criteria.

3 Normative References

The following publication contains provisions which, through reference in this text, constitute modification or additions of this Operational Document.

ISO/IEC17025:2017	General requirements for the competence of testing and calibration
	laboratories

4 Responsibility of the laboratory

4.1 The Laboratory shall assure instruments meet required accuracy.

5 Requirements

5.1 The default instrument accuracy requirements given below shall be applied when the standard does not provide criteria:

Instrument Accuracy Limits

Parameter	<u>Range</u>	Range
Voltage		
≤ 1000 V	≤ 1 kHz	± 1,5%
	> 1kHz ≤ 5 kHz	± 2%
	> 5 kHz ≤ 20 kHz	± 3%
	> 20 kHz	\pm 5%
> 1000 V	dc ≤ 20 kHz	± 3%
	> 20 kHz	± 5%
Current		
≤ 5 A	dc ≤ 60 Hz	± 1,5%
	> 60 Hz ≤ 5 kHz	± 2,5%
	> 5 kHz ≤ 20 kHz	± 3,5%
	> 20 kHz	± 5%
> 5 A	dc ≤ 5 kHz	± 2,5%
	>5 kHz ≤ 20 kHz	± 3,5%
	> 20 kHz	± 5%
	'	
Leakage (Touch) current ¹	50 Hz ≤ 60 Hz	± 3,5%
	> 60 Hz ≤ 5 kHz	± 5%
	> 5 kHz ≤ 100 kHz	± 10%
	> 100 kHz ≤ 1 MHz	under consideration
Power (50/60 Hz)	< 3 kW	+ 3%
	> 3 kW	+ 5%
		_ • • •
Power Factor	50 ≤ 60 Hz	+ 0.05
	00 - 00 112	_ 0,00
Frequency	≤ 10 kHz	± 0.2%
		- ,
Resistance	1 mΩ ≤ 100 mΩ	± 5%
	>1 MΩ ≤ 1 TΩ	± 5%
	> 1 TΩ	± 10%
	for all other cases	± 3%
	,	
Temperature ^{2, 3}	≥ -35°C < 100° C	± 2°C
	100° C ≤ 500° C	\pm 3%
	< -35°C	± 3°C

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Instrument Accuracy Limits			
<u>Parameter</u>	<u>Range</u>	Instrument accuracy of Range	
Time	10 ms ≤ 200 ms	± 5%	
	>200 ms ≤ 1 s	± 10 ms	
	> 1 s	± 1%	
Linear dimensions	≤ 1 mm	± 0.05 mm	
	> 1 mm ≤ 25 mm	± 0,1 mm	
	> 25 mm	± 0,5%	
Mass	> 10 g ≤ 100 g	± 1%	
	> 100 g ≤ 5 kg	± 2%	
	> 5 kg	± 5%	
Force	for all values	± 6%	
Mechanical energy	for all values	± 10%	
Torque	for all values	± 10%	
Angles	for all values	± 1 degree	
Relative humidity	30% ≤ 95% RH	± 6 %RH	
Barometric air pressure	for all values	± 10 kPa	
Gas & fluid pressure	for static measurement	± 5%	
-			

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¹ The stated tolerances apply to the total tolerance of the leakage (touch) current circuit and metering instrument. Refer to IECEE CTL OD 5013 "Leakage (Touch) Current Measurement Instruments".

² Thermocouple not included in the Instrument accuracy of measuring range. Thermocouples type "K", T" and "J", premium grade, are recommended. Switching power supplies present an electrically noisy environment for test instrumentation. When measuring temperatures on and within switching power supplies, thermocouples are in the immediate vicinity or in intimate contact with component sources of the electrical noise. Type J thermocouples are made of material that is magnetic. Type K thermocouples are made of material that is slightly magnetic. Type T thermocouples are made of nonmagnetic materials. As a result Type T thermocouples are affected less by the high frequency magnetic fields present and give more accurate results.

³ Not for measurements related to relative humidity.

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