

Power Meter PW3335



Standby Power Measurement



Power Meter PW3335

Majority of the world's electrical energy are generated by fossil fuels. In recent years, there is a rising concern about the environmental impact and from burning fossil fuels, especially coal. This is because combustion of fossil fuels produces carbon dioxide which contributes to the greenhouse effect, thus worsening global warming. It also produces harmful carbon pollutants which can cause respiratory health issues. Furthermore, the world's energy consumption is expected to increase as technology advances. Countries are looking into renewable energy sources such as solar energy, wave power and hydroelectricity, a progressive transition from fossil fuels to a

clean sustainable energy system. Various world organizations and international agencies are also creating awareness by initiating energy efficiency campaigns. One of such is the "One Watt" initiative by the International Energy Agency (IEA). The aim is to reduce standby power of appliance to not more than a watt in 2010, and 0.5 watts in 2013.

Standby power is the power consumed by devices when switched off or not performing their primary function. Standby power is mainly used to enable features such as digital clock display and receive remote control signals. Example of these devices are television, microwaves and computers.

Power Meter PW3335



Standby Power Measurement

Although the typical standby power consumption is low, but considering multiple electrical devices especially domestic appliances that is powered on 24 hours a day, 7 days a week in every household, it contributes to a significant amount to environmental impact and electricity wastage annually.

Standby power has been recognized as an energy concern and it would require the global effort to reduce. Regulators around the world have implemented guidelines to encourage manufacturers to ensure that their products are more energy efficient. Most of these guidelines are voluntary. An example is the international Energy Star programme in the USA.

Only products that meet a certain energy efficiency standards will be awarded with the energy label. To determine the product energy efficiency, test has to be conducted in accordance to international standards.

The International Electrotechnical Commission (IEC) has released an International Standard IEC 62301 (Household electrical appliances – Measurement of standby power). The European CENELEC Technical Committee also has a similar European Standard: EN 50564:2011 (Performance of household and similar electrical appliance). These standards define the test procedures such as test conditions and measurement methods to measure standby power consumption.



An Energy Star label displayed on washing machine at a Best Buy store in Marin City, California
Credits: Justin Sullivan/Getty Images

Power Meter PW3335



Standby Power Measurement

The International Electrotechnical Commission (IEC) has released an International Standard IEC 62301 (Household electrical appliances – Measurement of standby power). The European CENELEC Technical Committee also has a similar European Standard: EN 50564:2011 (Performance of household and similar electrical appliance). These standards define the test procedures such as test conditions and measurement methods to measure standby power consumption.

The IEC standard states that the test has to be conducted in ambient temperature 23°C still air environment, the supplied power should not have harmonic content exceeding 2%, up to the 13th harmonic and the crest factor should be between 1.34 and 1.49. The standards also defined the accuracy of the measuring equipment used. However it is dependent on the amount of power measured. Measurements higher than 0.5 Watts have to be made with an uncertainty of less than 2% at the 95% reliability.

Typically a power meter such as Hioki PW3335 is capable of measuring standby power consumptions. The PW3335 is built in compliant to the IEC 62301 standards. The power meter can easily interface with the host PC using the PW Communicator software.

The software has a user-friendly interface (Figure 1), selection of measurement methods in accordance to the standards, report generation (Figure 2) and saving of data in CSV format.



Figure 1: Power Measurement Interface

Power Meter PW3335



Standby Power Measurement

Standby Power Test Report (IEC 62301:2011)

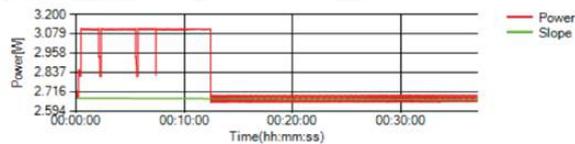
Summary		HIOKI PowerMeasurementSoftware V0.0.8.1
Date of test	2014/10/08	
Ambient temperature	23°C	
Test results remarks	Power supplied by EP600A	

Item	Contents
Product	HIOKI
Model	MR8870
Type	none
Serial number	123456789
Rated voltage / frequency	100V/60Hz
Measurement operating mode	The primary function mode
Mode category	active mode

Product description
The MR8870-20 is a handheld data acquisition recorder built in with 2 analog channels and 2MB of memory.

Product manufacturer details
Since its founding in 1935, HIOKI has been engaged in the development, manufacture, sale, and service of measuring instruments.

Item	Contents	Item	Contents
Average power	2.67W	UNCERTAINTY_UTOTAL	0.5387W
Integrated power	1.1638h	UNCERTAINTY_UE	0.011W
Measurement (integration) time	00:24:47	UNCERTAINTY_UN	0.0W
Stability detection condition	(Sampling method:LR)	UNCERTAINTY_US	0.5W
Stabilization detection value	[-15.079mW/h] < 26.705mW/h	UNCERTAINTY_UT	0.01W
Sampling interval	200ms	UNCERTAINTY_UX	0.2W
Power variations (IEC62301 Ed.1)	14.878%	Remarks	Normal End
Apparent power (min./max.)	8.09VA/7.08VA		
Real power factor (min./max.)	(LEAD)0.39/(LEAD)0.37		
Crest factor (I) (min./max.)	5.55/5.13		



Item	Contents	Item	Contents
Test conditions	Test voltage (min./max.) 100.7V/100.6V	Power meter	Manufacturer HIOKI
	Power supply Test frequency (min./max.) 60.0Hz/60.0Hz		Model PW3335
	Measurement period 00:27:10		Firmware ver. V1.01
	Cycle time 00:01:00		Serial number ser140799556
	Crest factor (U) (min./max.) 1.42/1.42		Voltage range 150V
	THD (min./max.) 0.3%/0.3%		Current range 100mA
		Remarks	Measure AC/DC Standby Power Up to Large Power Loads

Item	Contents
Test and laboratory details	Test report number X12345
	Laboratory name HIOKI E.E. CORPORATION
	Laboratory address 81 Koizumi, Ueda, Nagano
	Test contact Kenji HIOKI

Figure 2: Sample of Generated Report

Various electrical parameters such as total harmonic distortion (THD), crest factor, voltage, power consumption and harmonic distortion can also be measured simultaneously using the PW3335.

References:

- Article Title: One Watt Initiative
https://en.wikipedia.org/wiki/One_Watt_Initiative
- Article Title: Measuring Standby Power
<http://energy.gov/eere/emp/measuring-standby-power>
- Article Title: Product Retrospective- Standby Power
https://www.energystar.gov/sites/default/files/asset/document/Standby_Power_Highlights.pdf
- Article Title: Pulling the plug on standby power
<http://www.economist.com/node/5571582>

Note: Company names and Product names appearing in this catalog are trademarks or registered trademarks of various companies.

HIOKI
HIOKI E. E. CORPORATION

HEADQUARTERS
81 Koizumi, Ueda, Nagano, 386-1192, Japan
TEL +81-268-28-0562 FAX +81-268-28-0568
<http://www.hioki.com> / E-mail: os-com@hioki.co.jp

HIOKI USA CORPORATION
TEL +1-609-409-9109 FAX +1-609-409-9108
<http://www.hiokiusa.com> / E-mail: hioki@hiokiusa.com

HIOKI (Shanghai) SALES & TRADING CO., LTD.
TEL +86-21-63910090 FAX +86-21-63910360
<http://www.hioki.cn> / E-mail: info@hioki.com.cn

DISTRIBUTED BY

HIOKI SINGAPORE PTE. LTD.
TEL +65-6634-7677 FAX +65-6634-7477
E-mail: info-sg@hioki.com.sg

HIOKI KOREA CO., LTD.
TEL +82-2-2183-8847 FAX +82-2-2183-3360
E-mail: info-kr@hioki.co.jp