

JBMS

Measurement method of on mode power consumption for Data Projectors

JBMS-84 : 2011
(2016 re-affirmation)

Disclaimer

This is a translation of the authoritative text which JBMIA published.
This translated document is provided for convenience only;
any references to JBMIA on this Standard must be based on the Japanese version.

Established September, 2011

Japan Business Machine and Information System Industries Association

A List of Members of Data Projector Group

Chief of the Group	Kiyohide Takagi	NEC Display Solutions, Ltd.
Sub-chief of the Group	Satoshi Hirashima	Seiko Epson Corporation
Sub-chief of the Group	Minoru Kato	Hitachi Consumer Electronics Co., Ltd.
Member	Hitoshi Takahashi	KAGA COMPONENTS CO.,LTD.
	Fusao Niishiura	CASIO COMPUTER CO.,LTD.
	Nobuhiko Kawai	Canon Inc.
	Takanobu Suzuki	Canon Inc.
	Kazuto Sugimura	SANYO Electric Co.,Ltd.
	Yoshio Sasanuma	Sharp Corporation
	Satoshi Ohno	Sony Corporation
	Yoshihiro Masumoto	Panasonic Corporation
	Yosuke Yoshihara	Mitsubishi Electric Corporation
	Masato Yajima	Ricoh Company, Ltd.
	Hiroki Shimizu	Ricoh Company, Ltd.
Secretariat	Masashi Shinohara	Japan Business Machine and Information System Industries Association

Working Group for studying standards of Data Projector, Data Projector Group

Chief of the Meeting	Wei Sun	Hitachi Consumer Electronics Co., Ltd.
Sub-chief of the Meeting	Haruki Ohshiba	Sharp Corporation
Member	Hiroyuki Konno	Canon Inc.
	Atsushi Matsudaira	NEC Display Solutions, Ltd.
	Akira Oda	NEC Display Solutions, Ltd.
	Hiroyuki Meguro	Sony Corporation
	Shigekazu Yamagishi	Panasonic Corporation
	Hiroshi Kida	Mitsubishi Electric Corporation
	Akinori Kaneko	KAGA COMPONENTS CO.,LTD.
	Hirotaka Yanagisawa	Seiko Epson Corporation
	Yutaka Yanagisawa	CASIO COMPUTER CO.,LTD.
	Shinichi Okuno	SANYO Electric Co.,Ltd.
Secretariat	Masashi Shinohara	Japan Business Machine and Information System Industries Association

A List of Members of JBMS Promotion Subcommittee, Standardization Center

(Chief of the Subcommittee)	Akira Ito	Canon Inc.
(Member)	Yoshiyuki Shiratsuki	Fuji Xerox Co., Ltd.
	Tsutomu Motohashi	Ricoh Company, Ltd.
(Secretariat)	Masahito Takeshita	Japan Business Machine and Information System Industries Association

Standard No.: JBMS-84

Established: 2nd September, 2011

Drafted by: Working group for studying standards of Data Projector, Data Projector Group

Edited by: JBMS Promotion Subcommittee, Standardization center, Japan Business Machine and Information System Industries Association

Established by: Standardization center, Japan Business Machine and Information System Industries Association

Comments or questions if any, please contact Standardization center, Japan Business Machine and Information System Industries Association,

NP Onarimon Building, 3-25-33 Nishi-Shimbashi, Minato-ku, Tokyo 105-0003

Tel No.: +81-3-5472-1101 (Main switchboard)

Blank Sheet

Table of contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Terms & Definitions	1
4 General Principles	1
5 Measurement Conditions & Measurement Devices	2
5.1 Power Consumption Measurement and Power Supplies	2
5.2 Power Supply Voltage Conditions	2
5.3 Measurement Devices	3
5.4 Accuracy	3
6 Measurement Preparation and Configuration	3
6.1 Peripherals	4
6.2 Changing Devices	4
6.3 Analog and Digital Interface Data Projectors	4
6.4 Models Capable of Operating at Multiple Voltage-Frequency Combinations	4
6.5 External Power Supply	4
6.6 Color Regulation	4
6.7 Display Mode	4
6.8 Warm-up	4
6.9 Stability	4
7 Measurement Method	4
8 Conventions	5
Commentary	6

Foreword

This standard is copyrighted work protected by copyright laws.

Attention should be drawn to the possibility that a part of this Standard may conflict with a patent right, application for a patent right after opening to the public or utility model right which have technical properties. The Japan Business Machine and Information System Industries Association is not responsible for identifying the patent right, application of a patent right after opening to the public and utility model right which have the technical properties of this kind.

Measurement method of on mode power consumption for Data Projectors

Introduction

This standard specifies the measurement method of on mode power consumption for Data Projectors.

1 Scope

This standard specifies the measurement method of on mode power consumption for front projection type data projectors. The data projectors shall have a fixed resolution, a light valve system and a computer signal input port capable of projecting the image outputs from a computer. This standard is also applicable to data projectors that have a video signal input port as well as a computer signal input port.

This standard is not applicable to units for rear projection systems or with a video input terminal alone.

2 Normative references

The following referenced standards are indispensable to the composition of this standard. For references that do not have years noted, please refer to the latest edition of the respective standards (including any amendments) applies.

JIS X 6911	Data Projector Specifications
ISO/IEC 21118	Information to be included in specification sheets - Data projectors
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories

3 Terms & Definitions

The major terminology and definitions within this standard shall be as defined in JIS X 6911 and ISO/IEC 21118, and as follows.

3.1

On Mode

Operating condition where the data projector is connected to a power source, and is engaged in its primary function of displaying images.

4 General Principles

Either in-house or independent testing labs may be selected for testing, but the facilities shall have

quality management systems in place that ensure effective testing and calibration. It is recommended that these tests be performed in facilities that fulfill the general conditions and competence for testing and calibration as per ISO/IEC 17025.

5 Measurement Conditions & Measurement Devices

Prior to commencing measurement, please follow the following directions to prepare the measurement conditions and the measurement devices.

5.1 Power Consumption Measurement and Power Supplies

The average operating power consumption of the data projector is measured when in on mode.

- a) Power consumption is measured at a point between the data projector and the power source/outlet.
- b) Where the power source of the data projector is via a main line power supply, USB, IEEE1394, Power over Ethernet, Telephone systems or some other method, or some combination of these methods, the net AC electrical power consumed must be used, as required by the product (considering the conversion loss from AC to DC).
- c) For data projectors powered by standard low-voltage DC supply (eg. USB, USB PlusPower, IEEE 1394, Power over Ethernet), a power source shall be used that is appropriate for AC power operation. The power consumed by the power supply conducting AC power operation, will be measured and recorded as the power consumption of the data projector.
- d) For data projectors powered by USB, a dedicated hub should be used to power the data projector. For data projectors powered by Power over Ethernet or USB PlusPower, measurements shall be made at the distribution equipment at both the “connected” and “not connected” points, and the difference between the two readings may be recorded as the power consumption of the data projector.

In doing so, the person conducting the measurement shall consider inefficiencies in the power supply or power distribution, to confirm that the DC power consumption is appropriately reflected.

- e) For data projectors that are able to receive power from both AC power supply and standard low voltage DC power supply, tests operation shall be conducted using AC power.

5.2 Power Supply Voltage Conditions

Measurement shall be conducted under the power supply conditions of the country or region where it will be sold. The power supply voltage conditions and environmental conditions are as per Table 1.

Table 1 — Power Supply Voltage Conditions and Environmental Conditions

Power Supply Voltage	Japan North America/Taiwan Europe/Australia/New Zealand	100 (±1 %) Volt AC, 50 Hz (±1 %) / 60 Hz (±1 %) 115 (± 1 %) Volt AC, 60Hz (±1 %) 230 (± 1 %) Volt AC, 50Hz (±1 %)
Total Harmonic Distortion (THD) (Voltage)	< 2 % THD (<5 % THD for products with a maximum power consumption of greater than 1.5kW)	
Ambient Temperature	23 °C±5 °C	
Relative Humidity	10~80 %	

5.3 Measurement Devices

Regarding measurement devices, please use an appropriate device that fulfills the following conditions.

- a) Instrument Features: Instruments to be used shall have the following characteristics.
 - Rated range of 3 or more for the effective current crest factor
 - Current range minimum of 10mA or less
- b) Instrument Resolution: Recognized instruments shall have the following resolutions.
 - 0.01 W or better for measured power consumption values of 10W or less
 - 0.1 W or better for measured power consumption values of more than 10 W and less than 100 W
 - 1 W or better for measured power consumption values of greater than 100 W
- c) In addition to the above, the following features are also recommended.
 - Minimum frequency response of 3 kHz
 - Standard calibration as derived from NIST (The U.S. National Institute of Standards and Technology)

With regard to the measurement instrument, it is preferred that it is capable of measuring the average power consumption over a time interval selected by the operator (the most accurate devices calculate values internally, by dividing the aggregate power consumption by the elapsed time). Alternatively, it is possible to use an instrument which accumulates the power consumption over a time interval selected by the operator, and which is also capable of accumulating the displayed time with a resolution of 1 second or less.

5.4 Accuracy

Power consumption is measured with a confidence level of 95 %, with a margin or error of less than 2 %. Measurements are recorded in watts.

6 Measurement Preparation and Configuration

Before the commencement of measuring, adjust the settings and configuration of the data projector to be measured as appropriate, in accordance with the following instructions.

6.1 Peripherals

Only connect the analog interface, and ensure that peripherals such as other signals, LAN etc. are not connected.

6.2 Changing Devices

Changes to devices such as the removal of circuits, and other operations that cannot be used by regular users are not recognized.

6.3 Analog and Digital Interface Data Projectors

Except where the Data Projector is not equipped with an analog interface (in other words, digital interface data projectors that only have digital interfaces for the purpose of this test), the analog interface shall be used to perform the measurement.

For data projectors that are only equipped with a digital interface, the digital signal shall be used for measurement.

6.4 Models Capable of Operating at Multiple Voltage-Frequency Combinations

Product models should be tested to determine suitability for each of the power supply conditions for the markets that they are to be sold into. See 5.2 (Power Supply Voltage Conditions) regarding the power supply voltage conditions of the various markets.

6.5 External Power Supply

For data projectors that are shipped with external power supplies, the external power supply that will be shipped with the device shall be used in all tests. Alternative power supplies cannot be substituted.

6.6 Color Controls

All color controls (hue, saturation, gamma, etc.) shall be set at factory default settings.

6.7 Display Mode

Regardless of the aspect ratio, input signals at the panel's native resolution, and display in full screen mode, utilizing all of the effective pixels of the panel.

6.8 Warm-up

Before measuring, the data projector must be warmed up for at least 20 minutes. If it is not clear how long it takes to stabilize the device, operate for at least 30 minutes.

6.9 Stability

All measurements of power consumption shall be recorded after the reading on the measurement instrument has stabilized within 1 % range for 3 minutes.

7 Measurement Method

Before conducting testing, follow the instructions in Clause 5 (Measurement Conditions & Measurement Devices) and Clause 6 (Measurement Preparation and Configuration), and adjust the test conditions, device and settings etc.

- a) Connect the data projector into the outlet or power source, and connect the test device.
- b) Turn on the power of all testing devices, and adjust the voltage and frequency as appropriate.
- c) Confirm that the data projector is operating normally, and ensure that all adjustable settings are set to factory default values.

For devices with adjustable light output power, set to the brightest mode.

For internal speakers, cable/wireless LAN, and TV tuners etc., adjust to settings that consume the least possible power.

- d) Use the remote control or the on/off switch on the body of the data projector to set the data projector to the on mode.
- e) Input 100 % white patterns into the analog interface. The signal pattern level shall be within $0.7 V \pm 1\%$ of the $75 \Omega (\pm 1\%)$ end of the signal output source.
- f) Set to appropriate display mode [see 6.7 Display Mode].
- g) Allow sufficient time for the temperature and operation to stabilize before measuring. [See 6.8 Warm-up]
- h) Set the power meter current range. The power meter maximum value, derived from the crest factor ($I_{\text{peak}}/I_{\text{rms}}$), must be greater than the peak oscilloscope current reading.
- i) Wait until the reading on the power meter has stabilized, then read the effective power consumption value in watts from the power meter. The reading is considered stable if it remains unchanged by more than 1 % for a period of three minutes [see 6.9 Stability].
- j) Record the power consumption.

8 Conventions

When making representations that values are based upon this standard, these shall include the fact that the values were measured in accordance with this standard. The measured value shall not exceed 110 % of the displayed value.

Also, when referring to the efficiency, as shown by the “power consumption/brightness” or the “brightness/power consumption”, it shall be included that these were measured in accordance with this standard, or with ISO/IEC 21118 with regard to brightness.

Measurement method of on mode power consumption for Data Projectors Commentary

This commentary is for the purpose of explaining items contained within the body of the standard, and does not form a part of the standards.

1 Reason for Establishment

Regarding the power consumption of data projectors, the maximum power consumption under JIS X 6911 (Information to be included in specification sheets - Data projectors) shall be displayed in the product catalog etc. At the same time, in order to promote energy efficiency and environmentally friendly products in recent years, it has come to be considered profitable in the market to include power consumption displays for actual operating conditions.

Because of these circumstances, it has become necessary to clarify the methods for measuring the power consumption of data projectors in on mode.

2 History of Establishment

The method for measuring the power consumption of data projectors in on mode was established as guidelines in February 2011, as JBMIA-TR-21.

At this time, with a view to not only penetrating the domestic but also overseas markets with these measurement methods, this English version will be established at the same time, as JBMS. JBMIA-TR-21 was replaced by this JBMS.

3 Issues under Discussion

1) With regard to input signals [Clause 7e] in order to reduce the power consumption of current data projectors, systems have been developed to adjust light input depending on the input signal. This system is a beneficial solution, which provides a function that keeps power consumption as low as possible under actual operating conditions.

When deliberating on this standard, consideration was also given to the adoption of varying APL signals, instead of 100 % white input signals, so as to reproduce actual operating conditions as much as possible. As a result of deliberations, because there was not enough data to set signals that would signify the reproducibility of measurements and actual usage conditions, it was determined that 100 % white input signals would be adopted.

4 Concerns

With regard to the input signals specified under Clause 7 (Measurement Method) e), we will promote the surveying of usage data in the marketplace, and the accumulation of this data, so that the adoption of variable APL signals can be examined again in the future.

Blank Sheet

JBMS-84 Measurement method of on mode power consumption
for Data Projectors

Editor and

Hideo Nakanishi

Publisher

Publishing office: Japan Business Machine and Information System Industries
Association

NP Onarimon Building, 3-25-33 Nishi-Shimbashi, Minato-ku, Tokyo 105-0003

Tel: +81-3-5472-1101 (Main switchboard)