



ThinkSystem 430-16e SAS/SATA HBA and 430-8e SAS/SATA HBA Installation and User Guide



Note

Before using this information and the product it supports, read the general information in Appendix A “Getting help and technical assistance”, Appendix B “Notices”, the safety information, warranties, and licenses information on the Lenovo Web site at: <https://support.lenovo.com/documents/LNVO-DOCS>.

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Chapter 1: Hardware Installation

1.1 Requirements

The following items are required for installation of your adapter:

- A ThinkSystem 430-16e SAS/SATA Host Bus Adapter (HBA) or a ThinkSystem 430-8e SAS/SATA HBA
- A host system with an available PCI Express (PCIe) expansion slot
- The *ThinkSystem Storage Adapter Software User Guide*
- Standard 12Gb/s SAS cables for connections to SAS/SATA drives, backplanes, or SAS expanders

1.2 Hardware Installation Instructions

To install your Lenovo adapter, follow these steps:

1. **Unpack the adapter, and inspect it for damage.** Unpack the adapter in a static-free environment. Remove the adapter from the antistatic bag, and carefully inspect the adapter for damage. If you notice any damage, contact Lenovo or your reseller support representative.

ATTENTION To avoid the risk of data loss, back up your data before you change your system configuration.

2. **Prepare the computer.** Turn off the computer, and disconnect the power cord from the rear of the power supply.

CAUTION Disconnect the computer from the power supply and from any networks, or you risk damaging the system or experiencing electrical shock.

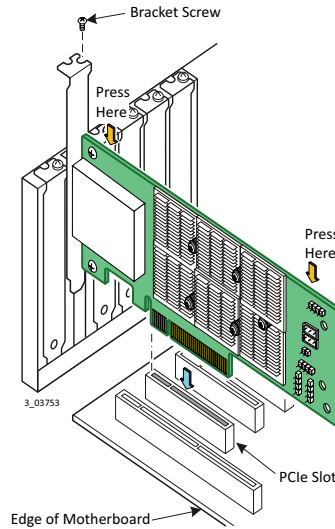
3. **Remove the cover from the chassis.**
4. **Check the mounting bracket on the adapter (system- dependent)** If required for your system, replace the full-height mounting bracket that ships on the adapter with the low-profile bracket supplied. Complete the following steps to attach the low-profile bracket.
 - a. Using a No.1 Phillips screwdriver that is ESD safe, remove the two Phillips screws that connect the full-profile bracket to the board. Unscrew the two screws located at the top and bottom edges of the board. Avoid touching any board components with the screwdriver or bracket.
 - b. Remove the full-profile bracket. Do not damage the adapter.
 - c. Place the adapter on top of the low-profile bracket. Position the bracket so that the screw holes in the tabs align with the openings in the board.
 - d. Using a No.1 Phillips torque screwdriver that is ESD safe, set to a maximum torque of 4.8 ± 0.5 inch-pounds. Replace the two Phillips screws removed in step a.

ATTENTION Exceeding this torque specification can damage the board, connectors, or screws, and can void the warranty on the board.

5. **Insert the adapter into an available PCIe slot.** Locate an empty x8 PCIe slot adequate for your adapter. Remove the blank bracket panel on the rear of the computer that aligns with the empty PCIe slot. Save this bracket screw, if applicable. Align the adapter to a PCIe slot. Press down gently, but firmly, to seat the adapter correctly in the slot. The following figure shows how to insert the adapter into a PCIe slot.

NOTE The shape, size, and locations of the components on your adapter and its bracket might vary from this illustration. The adapter requires an x8 PCIe slot.

Figure 1 Installing the ThinkSystem 430-16e HBA in a PCIe Slot



- Connect SAS cables between the adapter and the SAS backplane or any other SATA device or SAS device.** Use cables with an external or internal mini-SAS HD connector on one end to connect to the adapter and the appropriate connector on the other end to attach to the backplane or the SAS/SATA devices. Connectors must be cabled to specific drive slots, as shown in the following table.

Connector	Drive Slots
C0	Drive slot 0-3
C1	Drive slot 4-7
C2	Drive slot 8-11
C3	Drive slot 12-15
C4	Drive slot 16-19
C5	Drive slot 20-23

NOTE See [Section 2.4.2, Board Layout, LEDs, Jumpers, and Connectors](#) for more information about the connectors for your adapter.

- Replace the cover and reconnect any cords and cables, and power up the system.** Replace the chassis's cover, reconnect any power cords, and reconnect any network cables. Turn on the power.
- Run the Human Interface Infrastructure (HII) Configuration Utility**
Run the HII Configuration Utility to make any desired configuration changes. Refer to the *ThinkSystem Storage Adapters Software User Guide* for detailed steps on drive configuration.

The hardware installation of your adapter is complete.

1.3 Installing the Driver

This adapter can operate under various operating systems; however, you must install the software drivers. The firmware and drivers are routinely updated and made available on the Lenovo web site. Refer to <http://support.lenovo.com> for details on the software versions and device driver support.

Chapter 2: Overview

2.1 Overview

The ThinkSystem 430-16e SAS/SATA HBA, based on the SAS3416 controller, and the ThinkSystem 430-8e SAS/SATA HBA, based on the SAS3408 controller, are high-performance PCIe-to-SATA/SAS adapters.

Each adapter provides the following storage interface data transfer rates:

- SAS data transfer rates of 12Gb/s, 6Gb/s, and 3Gb/s per lane
- SATA data transfer rates at 6Gb/s and 3Gb/s per lane

The adapter negotiates between the speeds and the protocols to recognize and concurrently interface with any of these storage devices.

The following list summarizes many of the key features of the ThinkSystem 430-16e SAS/SATA adapter.

- Ports – 16 external
- I/O processor – SAS3416
- Form factor – LP-MD2
- Storage interface connectors – Four SFF-8644 x4
- Host interface – x8 PCIe 3.1
- Storage interface – SAS and SATA

The following list summarizes many of the key features of the ThinkSystem 430-8e SAS/SATA adapter.

- Ports – 8 external
- I/O processor – SAS3408
- Form factor – LP-MD2
- Storage interface connectors – Two SFF-8644 x4
- Host interface – x8 PCIe 3.1
- Storage interface – SAS and SATA

2.2 Functional Descriptions

2.2.1 PCIe Host Interface

The ThinkSystem HBAs have eight PCIe PHYs, which provide host-side maximum transmission and reception rates of 64 Gb/s (8 Gb/s per PHY). The HBAs adapters use a packet-based communication protocol to communicate over the serial interconnect. Other PCIe host interface features include:

- Eight PCIe host lane interface
- Power management
 - Supports the *PCI Bus Power Management Interface Specification*, Revision 1.2
 - Supports Active State Power Management by placing links in a power-saving mode during times of no link activity
- Error handling
- High bandwidth per pin with low overhead and low latency
- Lane reversal and polarity inversion

- Single-phy (one-lane) link transfer rate of 8GT/s, 5GT/s, and 2.5GT/s in each direction
- Eight-lane aggregate bandwidth of up to 8 GB/s (8000 MB/s)
- Support of x8, x4, x2, and x1 link widths

2.2.2 SAS/SATA LED Operation

LED signals indicate an error condition or drive activity. SAS/SATA LED management is supported by SGPIO. The functionality is described in the SFF-8485 specification.

See [Section 2.4.2, Board Layout, LEDs, Jumpers, and Connectors](#) for the descriptions and locations of the LEDs on your adapter.

Refer to the *Lenovo ThinkSystem Storage Adapter Software User Guide* for more information about actions you can take related to the LEDs.

2.3 Operating System Support

To check for the latest list of supported operating systems and to download the device drivers for those operating systems, go to <http://support.lenovo.com>.

2.4 Adapter Characteristics

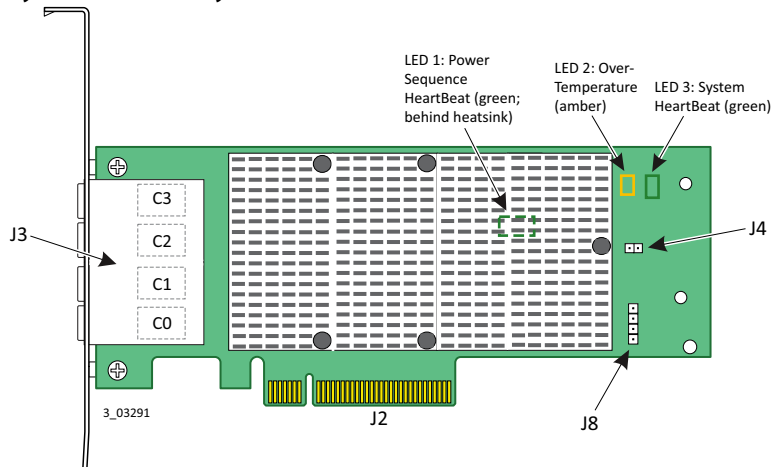
2.4.1 Board Layout, LEDs, Jumpers, and Connectors

The ThinkSystem 430-16e HBA and the ThinkSystem 430-8e HBA are 6.600 in. × 2.712 in. (167.65 mm × 68.90 mm) boards. The component height on the top and bottom of the HBA complies with the PCIe specification. This subsection provides the board layout, and the LED, connector and jumper information for the adapter.

NOTE The ThinkSystem 430-8e HBA is the same as the -ThinkSystem 430-16e HBA except the ThinkSystem 430-16e HBA has four mini-SAS HD-4i external connectors (J3, C0 through C3), and the ThinkSystem 430-8i HBA has two (J3, C0 and C1).

The following figure shows the board layout for the ThinkSystem 430-16e HBA.

Figure 2 Board Layout of the ThinkSystem 430-16e HBA



The following table describes the LEDs, jumpers, and connectors on the ThinkSystem 430-16e HBA.

Table 1 LEDs, Jumpers, and Connectors

Jumper/Connector	Type	Description
J2	Standard board edge connector	PCIe x8 board edge connector Along with the PCIe interface, this connector provides power to the board and an I ² C interface connected to the I ² C bus for the Intelligent Platform Management Interface (IPMI).
J3	C0 – Quad x4 SAS Port 0 through Port 3 external connector	One SFF-8644 Mini SAS HD external connector Connects the adapter by cable to SAS drives or SATA drives.
	C1 – Quad x4 SAS Port 4 through Port 7 external connector	One SFF-8644 Mini SAS HD external connector Connects the adapter by cable to SAS drives or SATA drives.
	C2 – Quad x4 SAS Port 8 through Port 11 external connector	One SFF-8644 Mini SAS HD external connector Connects the adapter by cable to SAS drives or SATA drives.
	C3 – Quad x4 SAS Port 12 through Port 15 external connector	One SFF-8644 Mini SAS HD external connector Connects the adapter by cable to SAS drives or SATA drives.
J4	Mode select	2-pin connector Reserved for Lenovo debug.
J8	On-board serial Universal Asynchronous Receiver/Transmitter (UART) connector	4-pin connector Reserved for Lenovo debug.
LED 1	Power sequence heartbeat	Used for power-on and power-off sequencing.
LED 2	ROC Over-temperature	This yellow LED stays solid on to indicate that the SAS3416 or SAS3408 device temperature sensor is over temperature threshold. When the device is in the proper temperature range, the LED is off.
LED 3	System heartbeat	This green LED indicates that the SAS3416 or SAS3408 ROC ASIC is operating normally. This LED blinks at 1 Hz.

2.5 Safety Characteristics

All ThinkSystem RAID adapters and HBAs meet or exceed the requirements of UL flammability rating 94 V0. Each bare board is also marked with the supplier name or trademark, type, and UL flammability rating. For the boards installed in a PCIe bus slot, all voltages are lower than the Safety Extra Low Voltage (SELV) 42.4V limit.

2.5.1 Marks, Certifications and Compliance

The design and implementation of the ThinkSystem adapters minimize electromagnetic emissions, susceptibility to radio frequency energy, and the effects of electrostatic discharge. The storage adapters show the following marks and certifications:

- CE mark
- RCM mark
- FCC Self-Certification logo
- Canadian Compliance Statement
- KCC
- Taiwan BSMI
- Japan VCCI
- CISPR Class B

The adapter is compliant with the following standards:

- CSA C22.2 No. 60950-1-07 2nd Edition 2014-10
- UL 60950-1 2nd Edition 2014-10-14
- UL file number E257743

Appendix A: Getting Help and Technical Assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you can find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at <http://datacentersupport.lenovo.com>.

A.1 Contacting Support

You can contact support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to <https://datacentersupport.lenovo.com/us/en/serviceprovider> and use filter to search for different countries.

For Lenovo support telephone numbers, go to <https://datacentersupport.lenovo.com/us/en/supportphonenumber>. In the U.S. and Canada, call 1-800-426-7378. In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

China Product Support

To contact product support in China, go to <http://support.lenovo.com.cn/lenovo/wsi/es/ThinkSystem.html>, You can also call 400-106-8888 for product support. The call support is available Monday through Friday, from 9 a.m. to 6 p.m.

Taiwan Product Support

To contact product support for Taiwan, call 0800-016-888. The call support is available 24 hours a day, 7 days a week.

Appendix B: Notices

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Morrisville, NC 27560

U.S.A.

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

B.1 Trademarks

Lenovo and ThinkSystem are trademarks of Lenovo in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

B.2 Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

B.3 Recycling information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to: <http://www.lenovo.com/recycling>



US & Canada Only



US & Canada Only

B.4 Particulate Contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 2 Limits for Particulates and Gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none"> ■ The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV9) according to ASHRAE Standard 52.2^a. ■ Air that enters a data center must be filtered to 99.97% efficiency or greater, using high- efficiency particulate air (HEPA) filters that meet MIL-STD-282. ■ The deliquescent relative humidity of the particulate contamination must be more than 60%^b. ■ The room must be free of conductive contamination such as zinc whiskers.
Gaseous	<ul style="list-style-type: none"> ■ Copper: Class G1 as per ANSI/ISA 71.04-1985^c ■ Silver: Corrosion rate of less than 300 Å in 30 days

- a. ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
- b. The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.
- c. ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

B.5 Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

B.6 Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

B.7 Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

B.8 Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

B.9 Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

B.10 Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

B.11 European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A equipment according to European Standards harmonized in the Directives in compliance. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

B.12 CE



Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

B.13 Germany Class A statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit Dieses Produkt entspricht den Schutzanforderungen der EU Richtlinie 2014/30/EU zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der Klasse A der Norm gemäß Richtlinie.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln

Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EMV EU Richtlinie 2014/30/EU in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EU Richtlinie 2014/30/EU, für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Meitnerstr. 9, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55032 Klasse A.

Nach der EN 55032: „Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.“

Nach dem EMVG: „Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.“ (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

B.14 Japanese electromagnetic compatibility statements

Figure 4 Japan VCCI Class A Statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波障害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 V C C I - A

Figure 5 Japanese Electrical Appliance and Material Safety Law statement (for detachable AC power cord)

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Figure 6 JEITA harmonics guideline - Japanese Statement for AC power consumption (W)

定格入力電力表示
(社) 電子情報技術参照委員会 家電・汎用品高調波抑制対策ガイドライン
実行計画書に基づく定格入力電力値： W
お手持ちのユニットの定格入力電力値(W)はユニットの電源装置に貼付されている電源仕様ラベルをご参照下さい

Figure 7 JEITA harmonics guideline - Japanese Statement of Compliance for Products Less than or Equal to 20A per phase

JEITA 高調波電流抑制対策適合品表示 (JEITA harmonics statements– Japan)
定格電流が 20A/相以下の機器 (For products where input current is less than or equal to 20A per phase)

日本の定格電流が 20A/相 以下の機器に対する高調波電流規制高調波電流規格
JIS C 61000-3-2 適合品

B.15 Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

B.16 Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ!

Настоящее изделие относится к оборудованию класса А. При использовании в бытовой обстановке это оборудование может нарушать функционирование других технических средств в результате создаваемых промышленных радиопомех. В этом случае от пользователя может потребоваться принятие адекватных мер.

B.17 People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声明

此为A类产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

B.18 Taiwan Class A compliance statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

B.19 Taiwan BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁶⁺)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組套件	-	○	○	○	○	○
空氣傳動設備	-	○	○	○	○	○
冷卻組套件	-	○	○	○	○	○
內存模塊	-	○	○	○	○	○
處理器模塊	-	○	○	○	○	○
鍵盤	-	○	○	○	○	○
調製解調器	-	○	○	○	○	○
監視器	-	○	○	○	○	○
滑鼠	-	○	○	○	○	○
電纜組套件	-	○	○	○	○	○
電源	-	○	○	○	○	○
儲備設備	-	○	○	○	○	○
電池匣組套件	-	○	○	○	○	○
有mech的電路卡	-	○	○	○	○	○
無mech的電路卡	-	○	○	○	○	○
雷射器	-	○	○	○	○	○
<p>備考1. “超出0.1 wt %” 及 “超出0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。 Note1 : “exceeding 0.1wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.</p> <p>備考2. “○” 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note2 : “○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.</p> <p>備考3. “-” 係指該項限用物質為排除項目。 Note3 : The “-” indicates that the restricted substance corresponds to the exemption.</p>						

B.20 Taiwan import and export contact information

Contacts are available for Taiwan import and export information.

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