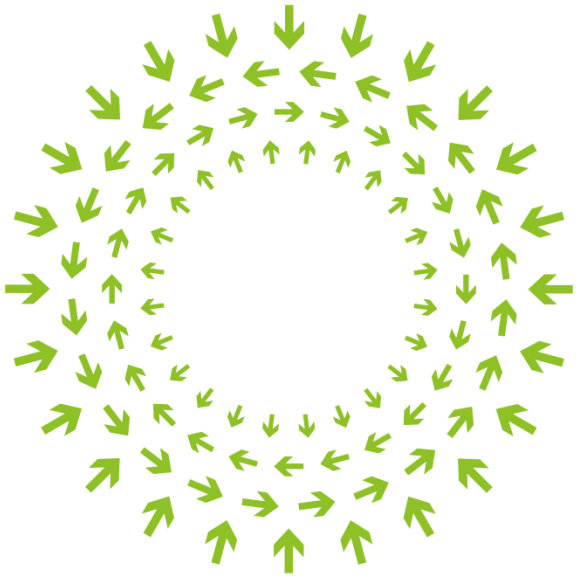


OPEN
Compute Project

Project Olympus Universal Power Cord Specification

Author:
Shaun Harris, Architect, Microsoft

Revision History

Date	Description
11/01/2017	Version 1.0 Ready for Project Olympus github

As of November 1, 2017, the following persons or entities have made this Specification available under the Open Web Foundation Final Specification Agreement (OWFa 1.0), which is available at http://www.openwebfoundation.org/legal/the-owf-1-0-agreements/owfa-1-0

Microsoft Corporation.

You can review the signed copies of the Open Web Foundation Agreement Version 1.0 for this Specification at Project Olympus License Agreements, which may also include additional parties to those listed above.

Your use of this Specification may be subject to other third party rights. THIS SPECIFICATION IS PROVIDED "AS IS." The contributors expressly disclaim any warranties (express, implied, or otherwise), including implied warranties of merchantability, non-infringement, fitness for a particular purpose, or title, related to the Specification. The entire risk as to implementing or otherwise using the Specification is assumed by the Specification implementer and user. IN NO EVENT WILL ANY PARTY BE LIABLE TO ANY OTHER PARTY FOR LOST PROFITS OR ANY FORM OF INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER FROM ANY CAUSES OF ACTION OF ANY KIND WITH RESPECT TO THIS SPECIFICATION OR ITS GOVERNING AGREEMENT, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), OR OTHERWISE, AND WHETHER OR NOT THE OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

CONTRIBUTORS AND LICENSORS OF THIS SPECIFICATION MAY HAVE MENTIONED CERTAIN TECHNOLOGIES THAT ARE MERELY REFERENCED WITHIN THIS SPECIFICATION AND NOT LICENSED UNDER THE OWF CLA OR OWFa. THE FOLLOWING IS A LIST OF MERELY REFERENCED TECHNOLOGY: INTELLIGENT PLATFORM MANAGEMENT INTERFACE (IPMI); I^2C IS A TRADEMARK AND TECHNOLOGY OF NXP SEMICONDUCTORS ; EPYC IS A TRADEMARK AND TECHNOLOGY OF ADVANCED MICRO DEVICES INC.; ASPEED AST 2400/2500 FAMILY PROCESSORS IS A TECHNOLOGY OF ASPEED TECHNOLOGY INC.; MOLEX NANOPITCH, NANO PICOBLADE, AND MINI-FIT JR AND ASSOCIATED CONNECTORS ARE TRADEMARKS AND TECHNOLOGIES OF MOLEX LLC; WINBOND IS A TRADEMARK OF WINBOND ELECTRONICS CORPORATION; NVLINK IS A TECHNOLOGY OF NVIDIA; INTEL XEON SCALABLE PROCESSORS, INTEL QUICKASSIST TECHNOLOGY, INTEL HYPER-THREADING TECHNOLOGY, ENHANCED INTEL SPEEDSTEP TECHNOLOGY, INTEL VIRTUALIZATION TECHNOLOGY, INTEL SERVER PLATFORM SERVICES, INTEL MANAGABILITY ENGINE, AND INTEL TRUSTED EXECUTION TECHNOLOGY ARE TRADEMARKS AND TECHNOLOGIES OF INTEL CORPORATION; SITARA ARM CORTEX-A9 PROCESSOR IS A TRADEMARK AND TECHNOLOGY OF TEXAS INSTRUMENTS; GUIDE PINS FROM PENCOM; BATTERIES FROM PANASONIC. IMPLEMENTATION OF THESE TECHNOLOGIES MAY BE SUBJECT TO THEIR OWN LEGAL TERMS.

Contents

Figures

1 Summary

The document describes this data center facility power cable assembly to be used in the Universal cable assembly rack Power Distribution Unit (PDU). IT Equipment Requirements

1.1 Universal VAC Input Plugs and Cables 4 Wire and 5 Wire Cable Assy

1.2 Universal Cable Cord Assembly and Power Rating

The PMDU uses different types of connectors externally.

Table 1 . Power Requirements

Microsoft Part Number	Vendor Part Number	Input Connector Part Number	Vendor Cable Assy Part Number	Output Connector Description/ Notes	Nominal Voltage	Equipment Load Limit	
						Power	Current
M1036623-001	73 42 200 0044	IEC60309, 4P 5Wire, 415/240VAC 30/32A	73 42 200 0044 : Han-Eco hood with receptacle modules	Pin female pin with plastic locking housing Connector	415VAC +/- 10%	17.2kW	24A/25A
		Cable: 4.5M Length, 5 conductors, dual rated, Neoprene Cordage with UL/CSA SOOW and <HAR> H07RN-F approval. Must be usable in European, North America, Asian, and Canadian cordage applications with one- part number. See country list. +75C Insulation rating. 9AWG/6mm^2					
M1036625-001	73 42 200 0046	CS8365, 3P 4Wire, 250VAC, 50A	73 42 200 0046 : Han-Eco hood with receptacle modules	Pin female pin with plastic locking housing Connector	208VAC +/- 10%	14.4kW	40A
		Cable: 4.5M Length, 4 conductors, Neoprene Cordage with UL/CSA SOOW approval. Must be usable in, North America, and Canadian cordage applications with one-part number. +75C Insulation rating, 6AWG.					

M1036624-001	73 42 200 0045	L21-30P, 3P 4Wire, 250VAC, 30	73 42 200 0045 : Han-Eco hood with receptacle modules	Pin female pin with plastic locking housing Connector	208VAC +/- 10%	8.6kW	24A
		Cable: 4.5M Length, 4 conductors, Neoprene Cordage with UL/CSA SOOW approval. Must be usable in, North America, and Canadian cordage applications with one-part number. +75C Insulation rating, 9AWG/6mm^2					
M1067444-001	Geist: CSN-H02A8-04500-3PS6B-S	IEC60309 2P 3Wire, 250VAC, 30A	TBD: Han-Eco hood with receptacle modules	Pin female pin with plastic locking housing Connector	208VAC +/- 10%	4.9kW	24A
		Cable: 4.5M Length, 3 conductors, Neoprene Cordage with UL/CSA SOOW approval. Must be usable in, North America, and Canadian cordage applications with one-part number. +75C Insulation rating, 9AWG/6mm^2					
M1067445-001	Geist: CSN-H02A8-04500-3TL6A-S	L6-30P, 2P 3Wire, 250VAC, 30A	TBD: Han-Eco hood with receptacle modules	Pin female pin with plastic locking housing Connector	208VAC +/- 10%	4.9kW	24A
		Cable: 4.5M Length, 3 conductors, Neoprene Cordage with UL/CSA SOOW approval. Must be usable in, North America, and Canadian cordage applications with one-part number. +75C Insulation rating, 9AWG/6mm^2					
M1035214-001	TBD	IEC60309,4P 5Wire, 415/240VAC, 30/32A	TBD: Han-Eco hood with receptacle modules	Pin female pin with plastic locking housing Connector	415VAC +/- 10%	17.2kW	24A/25A
		Cable: 0.9M Length, 5 conductors, dual rated, Neoprene Cordage with UL/CSA SOOW and <HAR> H07RN-F approval. Must be usable in European, North America, Asian, and Canadian cordage applications with one-part number. See country list. +75C Insulation rating. 9AWG/6mm^2					

M1069612-001	Geist: CSU-H02A3-44500-2PS56B-S	IEC60309,4P 5Wire, 415/240VAC, 16/20A	**TBD:** Han-Eco hood with receptacle modules	Pin female pin with plastic locking housing Connector	415VAC +/- 10%	11.5kW	16/20A
		Cable: 0.9M Length, 5 conductors, dual rated, Neoprene Cordage with UL/CSA SOOW and <HAR> H07RN-F approval. Must be usable in European, North America, Asian, and Canadian cordage applications with one-part number. See country list. +75C Insulation rating. 9AWG/6mm^2					

1.2.1 Equipment Cord Facility Breaker marking and conformity

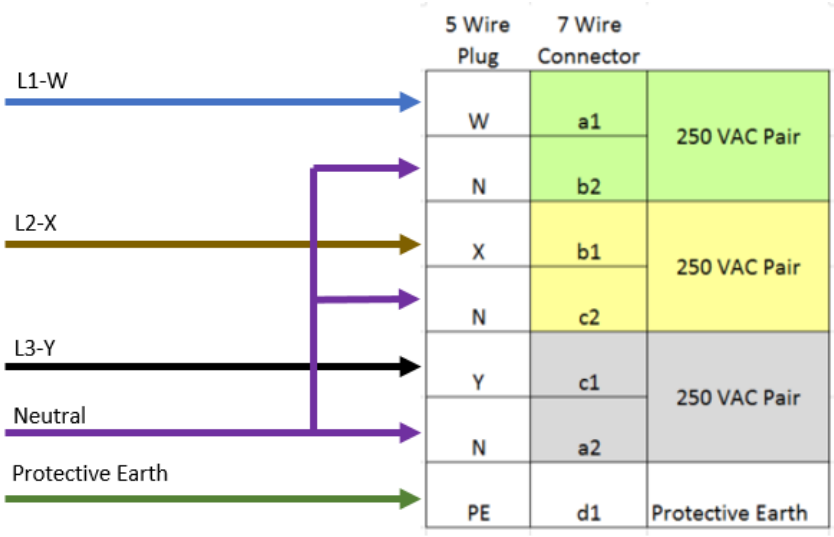
The 30A and 50A cords shall have a 30A and 50A rated breaker protection with UL marking and minimum conformity to UL 489, NEMA AB1, AB3 ANSI Std. C37.16, ANSI Std. C37.17, C37.50, IEEE® Std. C37.13, UL 1066 and the National Electrical Code suitable for products certified to U.S., Canadian, European and Japanese standards.

The 32A cord shall have 32A rated breaker protection with CE marking and minimum conformity to CE RCCB, 2014/35/EU, 2014/30/EU, 2011/65/EU, EN61008-1:2012+A:2014+A11:2015, and EN 61008-2-1:1994+A11:1998

Figure 1. Universal cable assembly options illustration

5 Wire Universal Power Cable Assy 30A/32A

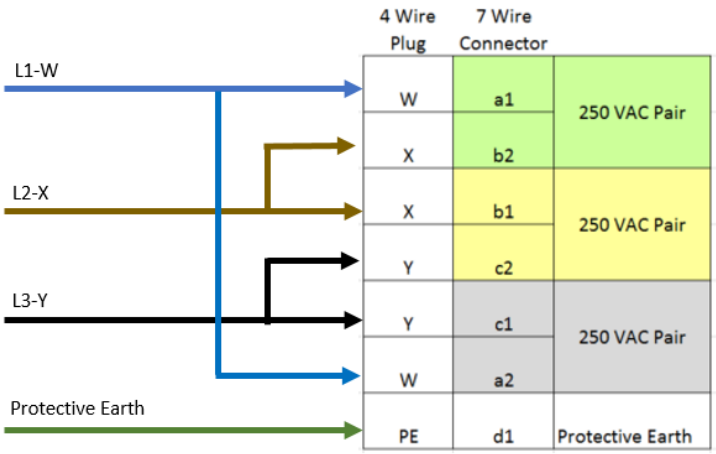
IEC 60390
5Wire



4 Wire 3 Phase Universal Power Cable Assy 50A and 30A

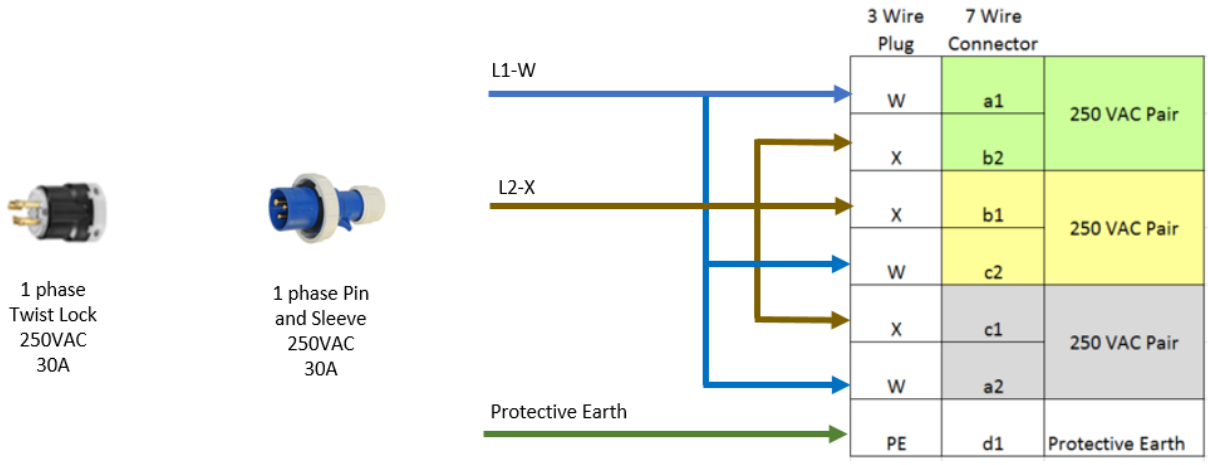
3 phase
Twist Lock
250VAC
50A

3 phase
Twist Lock
250VAC
30A



Note: The 30A connector is a 5 Wire plug used with a 4Wire cable. The connector neutral is not connected.

3 Wire 1 Phase Universal Power Cable Assy 30A



Note: Color used in cartoons above does not reflect actual conductor insulation color. See section 4 for insulation color.

Figure 2. Functional Block Diagram of PMDU Cable Assemblies

1.3 Universal Cable Assembly Output Connector detail

Standardize VAC connector, receptacle detail part numbers. The connector is not intended to be hot swapped during normal operation however the pin modules are required to survive 50 cycles at 240VAC 32Amps in accordance by UL test methods.

Table 2 . Universal Connector Part Number

Figure 3. Functional Block Diagram of Universal 7 Wire Cable. Note pin housing color may different

Table 3 . Universal Connector Pin Assignments

73 42 200 0030 cable assembly pinout					
IEC 60309 Position	Wire Color			Han-Eco Position	Wire ID
L1	Brown			a1	W
L2	Black			b1	X
L3	Gray			c1	Y
N	Blue	Splice	Blue	a2	N
			Blue	b2	N
			Blue	c2	N
PE	Green / Yellow			d1	Safety Ground

73 42 200 0031 cable assembly pinout					
CS8365 Position	Wire Color			Han-Eco Position	Wire ID
X	Black	Splice	Black	a1	W
			Black	a2	
Y	White	Splice	White	b1	X
			White	b2	
Z	Red	Splice	Red	c1	Y
			Red	c2	
PE	Green			d1	Safety Ground

73 42 200 0032 cable assembly pinout					
L21-30P Position	Wire Color			Han-Eco Position	Wire ID
W	No conductor			-	-
X	Black	Splice	Black	a1	W
			Black	a2	
Y	White	Splice	White	b1	X
			White	b2	
Z	Red	Splice	Red	c1	Y
			Red	c2	
Neutral	Not Connected				
PE	Green / Yellow			d1	Safety Ground

Note: This is a 4Wire cable using a 5 Wire plug. The neutral is not connected.

2 Warning Label

Warning label, MS P/N M1024367, shall be attached within 25mm of the of the mechanical cable strain relief of the plug body.

2.1 Attachment method

- A plastic strap (tie-wrap) must be used to secure the label. The strap shall not be removable without cutting

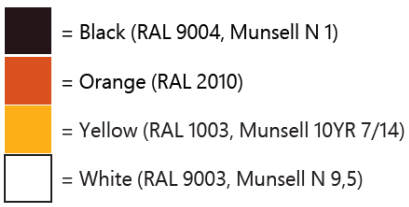
2.2 Label material

- The label must be laminated (i.e. 14 point gloss cover stock coated both sides with 1.7 mil clear polyester laminate)

2.3 Label content, font, color and minimum dimensions

- Electric shock symbol: 
- Signal word: 

  - Font: All capitol, Sans serif letters, bold
  - Dimension: Minimum 16 point
- Label Statement: *"Electric shock hazard. Equipment may be powered by multiple sources. Disconnect connector on the rack side first."*
  - Font: Sans serif letters
  - Dimension: Minimum 10 point
- Label colors:



2.4 Localization

The signal word "**WARNING**" and the statement "**Electric shock hazard. Equipment may be powered by multiple sources. Disconnect connector on the rack side first**." shall be translated in the language of each country where the cord is going to be shipped and/or deployed (see Country List).

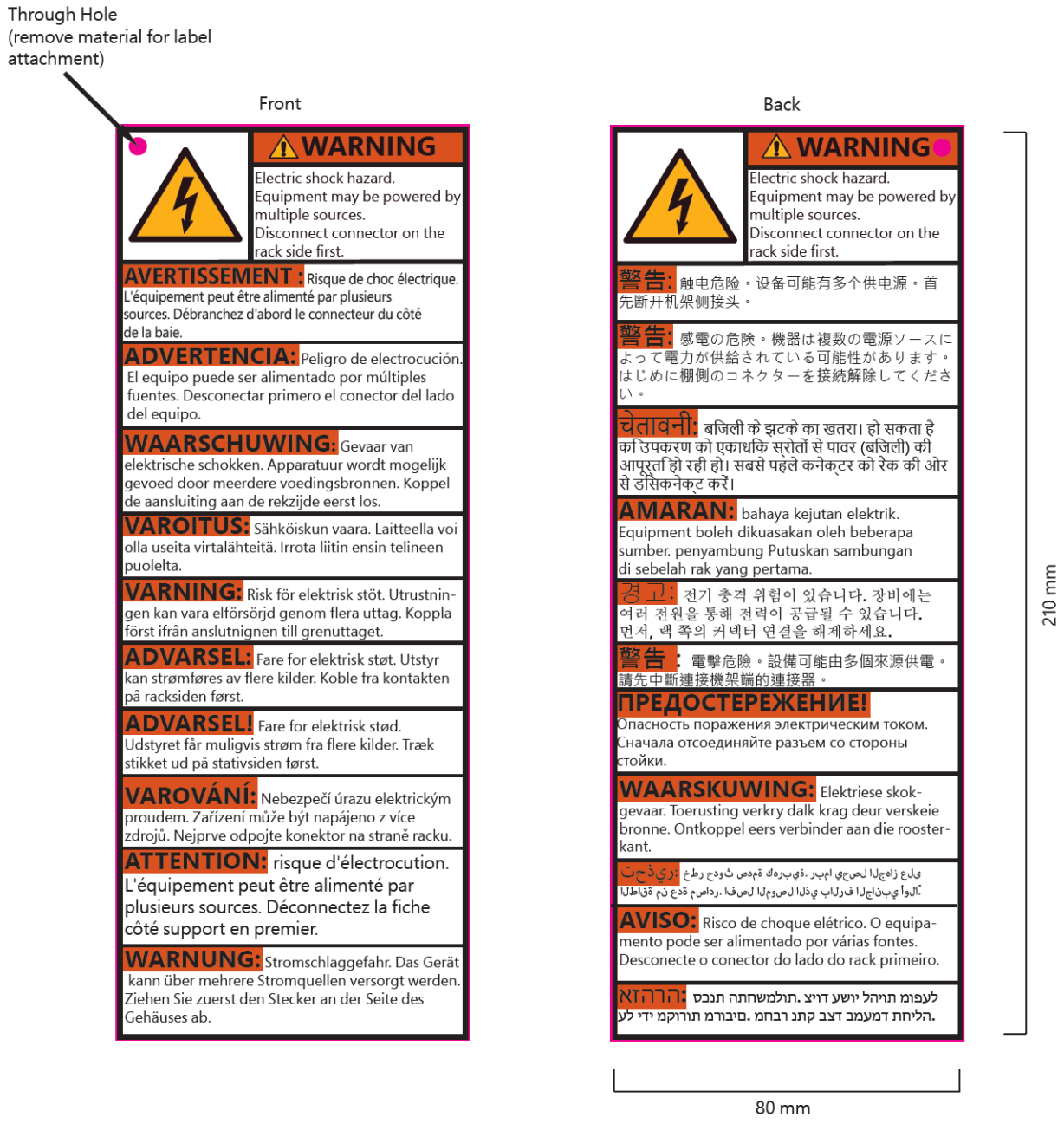


Figure 4. Warning Label, MS P/N M1024367

Language	Text
US English - source	WARNING: Electric shock hazard. Equipment may be powered by multiple sources. Disconnect connector on the rack side first.
fr-CA	AVERTISSEMENT : Risque de choc électrique. L'équipement peut être alimenté par plusieurs sources. Débranchez d'abord le connecteur du côté de la baie.
Es	ADVERTENCIA: Peligro de electrocución. El equipo puede ser alimentado por múltiples fuentes. Desconectar primero el conector del lado del equipo.
pt-BR	AVISO: Risco de choque elétrico. O equipamento pode ser alimentado por várias fontes. Desconecte o conector do lado do rack primeiro.
nl-NL	WAARSCHUWING: Gevaar van elektrische schokken. Apparatuur wordt mogelijk gevoed door meerdere voedingsbronnen. Koppel de aansluiting aan de rekzijde eerst los.
fi-FI	VAROITUS: Sähköiskun vaara. Laitteella voi olla useita virtalähteitä. Irrota liitin ensin telineen puolelta.
de-DE	WARNUNG: Stromschlaggefahr. Das Gerät kann über mehrere Stromquellen versorgt werden. Ziehen Sie zuerst den Stecker an der Seite des Gehäuses ab.
ms-MY	AMARAN: bahaya kejutan elektrik. Equipment boleh dikuasakan oleh beberapa sumber. penyambung Putuskan sambungan di sebelah rak yang pertama.
ko-KR	경고: 전기 충격 위험이 있습니다. 장비에는 여러 전원을 통해 전력이 공급될 수 있습니다. 먼저, 랙 쪽의 커넥터 연결을 해제하세요.
zh-CN	警告：触电危险。设备可能有多个供电源。首先断开机架侧接头。
ja-JP	警告: 感電の危険。機器は複数の電源ソースによって電力が供給されている可能性があります。はじめに棚側のコネクターを接続解除してください。
hi-IN	चेतावनी: बिजली के झटके का खतरा। हो सकता है कि उपकरण को एकाधिक स्रोतों से पावर (बिजली) की आपूर्ति हो रही हो। सबसे पहले कनेक्टर को रैक की ओर से डिसकनेक्ट करें।
ru-RU	ПРЕДОСТЕРЕЖЕНИЕ! Опасность поражения электрическим током. Сначала отсоединяйте разъем со стороны стойки.
af-ZA	WAARSKUWING: Elektriese skokgevaar. Toerusting verkry dalk krag deur verskeie bronne. Ontkoppel eers verbinder aan die roosterkant.
fr-FR	ATTENTION : risque d'électrocution. L'équipement peut être alimenté par plusieurs sources. Déconnectez la fiche côté support en premier.
sv-SE	VARNING: Risk för elektrisk stöt. Utrustningen kan vara elförsörjd genom flera uttag. Koppla först ifrån anslutnignen till grenuttaget.
nb-NO	ADVARSEL: Fare for elektrisk støt. Utstyr kan strømføres av flere kilder. Koble fra kontakten på racksiden først.
da-dk	ADVARSEL! Fare for elektrisk stød. Udstyret får muligvis strøm fra flere kilder. Træk stikket ud på stativsiden først.
cs-CZ	VAROVÁNÍ: Nebezpečí úrazu elektrickým proudem. Zařízení může být napájeno z více zdrojů. Nejprve odpojte konektor na straně racku.
ar-SA	تحذير: خطر حدوث صدمة كهربية. ربما يحصل الجهاز على الطاقة من عدة مصادر. افصل الموصل الذي بالرف الجانبي أولاً.
zh-TW	警告：電擊危險。設備可能由多個來源供電。請先中斷連接機架端的連接器。
he-IL	אזהרה: סכנת התחשמלות. ציוד עשוי להיות מופעל על ידי מקורות מרובים. מחבר נתק בצד במעמד תחילה.

Table 4 . Warning Label Localized Text