

Lenovo 1U Switched and Monitored Power Distribution Units

Product Guide

The 1U Switched and Monitored Power Distribution Units (PDUs) make it quick and simple to deploy, protect, and manage your high-availability rack environment. These space efficient and power dense PDUs come in two unique 1U designs, either nine IEC-320-C19 (16A) and three IEC-320-C13 (10A) or 12 IEC-320-C13 (10A), with single-phase 30A, 32A, 60A, 63A and three-phase 32A and 60A solutions available to meet the requirements of your most power-demanding systems.

The receptacles on these PDUs are switched for additional intelligent power management capabilities. They provide on and off functionality to allow for power sequencing and to help prevent unintended overloading. The PDUs are shown in Figure 1.



Figure 1. 1U Switched and Monitored PDUs (left: model with C19 outlets, right: with C13 outlets)

Did you know?

These PDUs also combine receptacle density with advanced intelligent power management capabilities that can be remotely monitored and managed via a web interface. Switched and Monitored PDU models don't just monitor the incoming power of the PDU, but also provide a more granular and precise view of power usage at the individual receptacle level.

Part number information

Table 1 lists the four available switched and monitored PDUs. Two require that a separate line cord be ordered from Table 2, and two have a line cord permanently attached.

Table 1. Ordering part numbers and feature codes

Part number	Feature code	Description	Line cord
46M4002	5896	1U 9 C19/3 C13 Switched and Monitored DPI PDU	Detachable - see Table 2
46M4003	5897	1U 9 C19/3 C13 Switched and Monitored 60A 3-phase PDU	Fixed - IEC 309 3P+Gnd
46M4004	5894	1U 12 C13 Switched and Monitored DPI PDU	Detachable - see Table 2
46M4005	5895	1U 12 C13 Switched and Monitored 60A 3-phase PDU	Fixed - IEC 309 3P+Gnd

The line cords that are available for the PDUs with part numbers 46M4002 and 46M4004 are listed in Table 2.

Table 2. Line cord part numbers and feature codes

Part number	Feature code	Description	Maximum input current (Amps)
40K9611	6504	DPI 32a Line Cord (IEC 309 3P+N+G)	32 A
40K9612	6502	DPI 32a Line Cord (IEC 309 P+N+G)	32 A
40K9613	6503	DPI 63a Cord (IEC 309 P+N+G)	63 A
40K9614	6500	DPI 30a Line Cord (NEMA L6-30P)	24 A (30 A derated)
40K9615	6501	DPI 60a Cord (IEC 309 2P+G)	48 A (60 A derated)
40K9617	6505	DPI Australian/NZ 3112 Line Cord	32 A
40K9618	6506	DPI Korean 8305 Line Cord	30 A

The detachable line cords, with the exception of the IEC 309 3P+N+G power cable, are shown below in Figure 2.



Figure 2. Line cords

The part numbers for the 1U Switched and Monitored PDUs are shipped with the following items:

- 1 power distribution unit
- Environmental Monitoring Probe kit - sensor, CAT5 cable, mounting hardware
- Mounting rails for supported System x racks - horizontal and vertical mounting
- 1 blank 1U filler panel
- RS232 to RJ45 serial cable
- Miscellaneous hardware kit

Introduction to PDUs

A power distribution unit (PDU) is a highly reliable, multiple outlet power strip designed to consolidate line cords within the rack and distribute conditioned power from a UPS or utility power to servers and other IT equipment. The PDU efficiently distributes power within the rack and provides fault-tolerant power redundancy for high availability requirements.

There are three types of PDUs available from Lenovo: basic, monitored, and switched and monitors. The PDUs covered in this document are of the switched and monitored type.

- **Basic:** The simplest and most cost-effective power distribution. Available with various outlet configurations and line cord options to support differing systems and load requirements.
- **Monitored (also known as PDU+):** Provides the same benefits as a Basic PDU, but adds additional advanced PDU power monitoring down to the load group. This enables businesses to have a cross-platform rack level power and thermal view for trending analysis to improve power management.
- **Switched and Monitored:** These are next-generation advanced power management solutions, providing power monitoring at the outlet level, with increased accuracy at low amperages, for more precise views of power consumption down to the individual component/server level instead of at the consolidated load group. These PDUs also offer management via a web-based interface which includes individual outlet switching (on/off). Outlet switching allows for remote power sequencing and helps prevent unintended PDU overloading.

Features

Table 3 compares the major features of the PDUs.

Table 3. Feature comparison

Feature	1U 9 C19/3 C13 Switched and Monitored DPI PDU	1U 9 C19/3 C13 Switched and Monitored 60A 3 Phase PDU	1U 12 C13 Switched and Monitored DPI PDU	1U 12 C13 Switched and Monitored 60A 3 Phase PDU
Part number	46M4002	46M4003	46M4004	46M4005
Line cord	Order separately	Permanently attached	Order separately	Permanently attached
Line cord connector	Varies - see Table 2	IEC 309 3P+Gnd	Varies - see Table 2	IEC 309 3P+Gnd
Input current maximum	Varies - see Table 2	48 A (60 A derated) (27.7 A/phase)	Varies - see Table 2	48 A (60 A derated) (27.7 A/phase)
Number of phases	Single or 3 phase wye	3 phase power delta	Single or 3 phase wye	3 phase power delta
Number of C13 outlets	3 (on rear of unit)	3 (on rear of unit)	12	12
Number of C19 outlets	9	9	0	0
Circuit breakers	9 double-pole branch rated circuit breakers rated at 20 amps	9 double-pole branch rated circuit breakers rated at 20 amps	6 double-pole branch rated circuit breakers rated at 20 amps	6 double-pole branch rated circuit breakers rated at 20 amps

The 1U Switched and Monitored PDUs have the following features:

- 1U Rack Dense design with input cable connection, primary outlets, communication connections, and breakers on one face to improve usability and cable management
- Hardware included to mount in either EIA space or sidepocket of rack
- Easily accessible individual breakers per receptacle for high availability environments
- Switched Receptacles with on and off functionality to allow for power sequencing and to prevent unintended overloading
- Monitored power draw at the receptacle level
- Advanced remote monitoring capability
- Detailed data logging for statistical analysis and diagnostics
- Management using SNMPv3
- An Environmental Monitoring Probe (EMP) included to provide both temperature and humidity values

Outlet ratings:

The power outlets for C19 models (46M4002 and 46M4003) have the following ratings:

- 9 IEC320 -C19 outlets rated at 16 amps
- 3 IEC320-C13 outlets rated at 10 amps

The power outlets for C13 models (46M4004 and 46M4005) have the following ratings:

- 12 IEC320-C13 outlets rated at 10 amps

Environmental Monitoring Probe:

The Environmental Monitoring Probe (EMP) is shown in Figure 3 and is used to report local temperature and humidity values and make that information available to the web interface of the PDU.



Figure 3. The Environmental Monitoring Probe (EMP)

The EMP is attached to the PDU as shown in Figure 4.

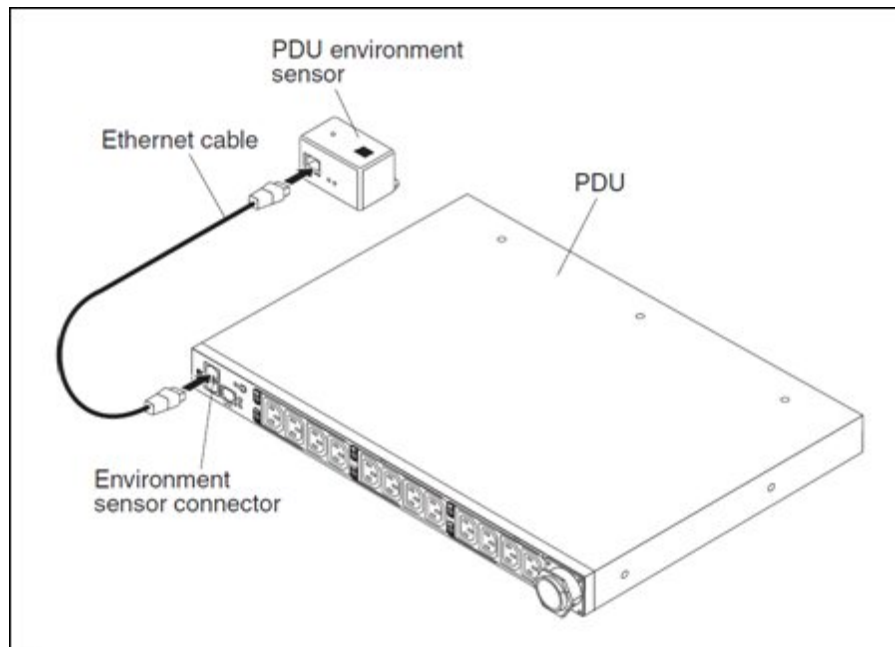


Figure 4. Attaching the Environmental Monitoring Probe

The Environmental Monitoring Probe has the following features:

- Temperature and humidity sensor enables you to remotely monitor the temperature and humidity and status of two contact devices in the rack
- Hot-swap feature simplifies installation by enabling you to install the probe safely without turning off power to the PDU or to the loads that are connected to it
- Measures temperatures between 0 and 80°C (32 and 176°F) with an accuracy of $\pm 1^{\circ}\text{C}$
- Measures relative humidity between 10 and 90% with an accuracy of $\pm 5\%$
- Can be located away from the PDU with a CAT5 network cable up to 20 m (65.6 ft)
- User-selectable alarm thresholds enable you to define acceptable temperature or humidity limits
- E-mail notification through SMTP

Management methods:

The Switched and Monitored DPI PDUs can be managed by any of the following methods:

- Web browser
- Telnet
- SNMP
- Serial connection

Connectors

The two 1U 9 C19/3 C13 Switched and Monitored DPI PDUs have the following connectors on the front of the unit (Figure 5).

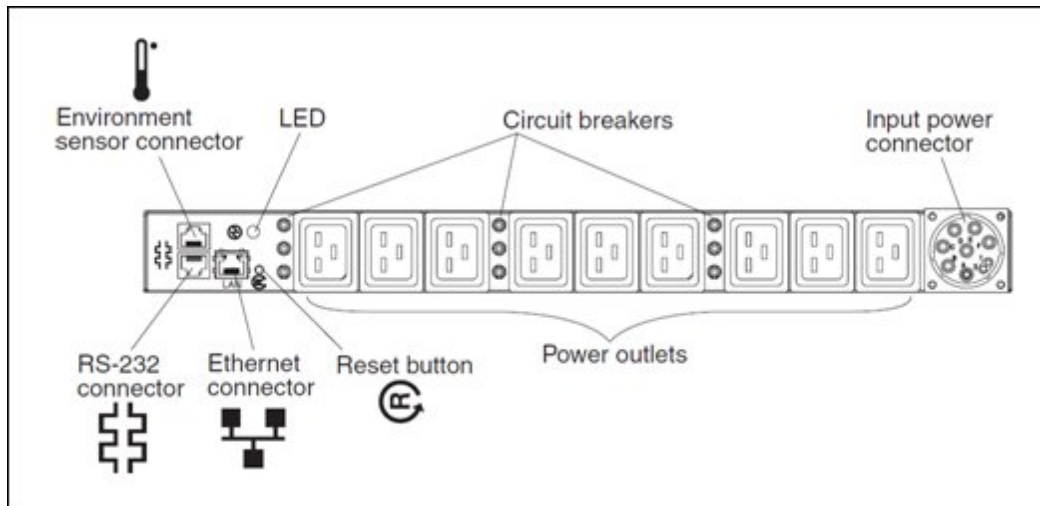


Figure 5. 1U 9 C19/3 C13 Switched and Monitored DPI PDU (front)

Figure 6 shows the rear of the 1U 9 C19/3 C13 Switched and Monitored DPI PDUs where the three C13 outlets are located.

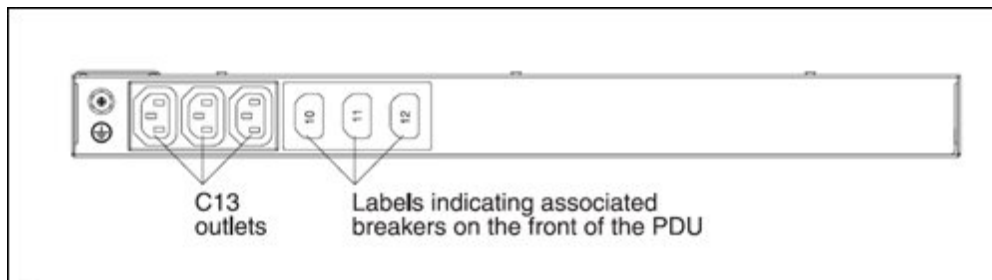


Figure 6. 1U 9 C19/3 C13 Switched and Monitored DPI PDU (rear)

The two 1U 12 C13 Switched and Monitored DPI PDUs have the following connectors (Figure 7). There are no additional connectors on the rear of the unit.

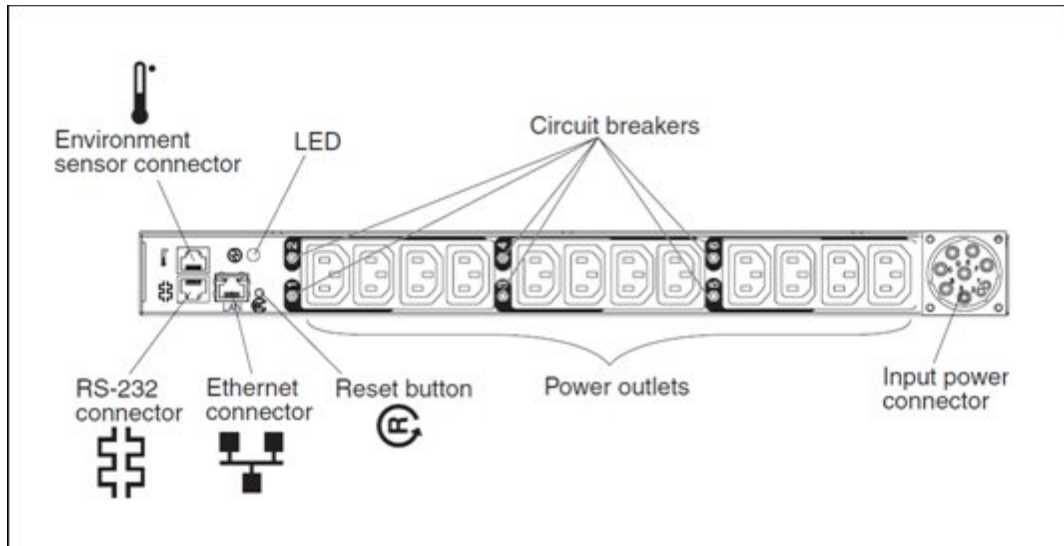


Figure 7. 1U 12 C13 Switched and Monitored DPI PDUs (front)

Physical specifications

1U Switched and Monitored PDUs have the following dimensions:

- Approximate height: 43.9 mm (1.73 in.)
- Approximate width: 447 mm (17.6 in.)
- Approximate depth: 350 mm (13.78 in.)
- Approximate weight: (not including power cord) 6.3 kg (13.8 lb)
- Weight of power cord (approximate, varies by PDU model) 5.4 kg (11.8 lb)
- Additional clearance 25 mm (0.98 in.) for circuit breakers and 3 mm (0.12 in.) for outlets

Operating environment

The 1U Switched and Monitored PDUs operate in the following environment:

- Temperature: 10 to 60 °C (50 to 140 °F)
- Relative humidity: 8% to 80% (non-condensing)

Electrical specifications

The following tables list the specific rated voltage, rated current, and maximum power rating for each combination of PDU and line cord.

Table 4. Rated input power source for the 1U 9 C19/3 C13 Switched and Monitored DPI PDU with all line cord combinations

Description of PDU + Line cord	PDU part number	Line cord part number	Rated voltage, rated current	Max power rating
DPI 32 amp / 250 V three-phase 1U 9 C19 / 3 C13 switched and monitored DPI PDU with IEC 309 3P+N+Gnd connector	46M4002	40K9611	220-240 V, 50-60 Hz, 32 A, three-phase Wye	23040 VA
DPI 32 amp / 250 V single-phase 1U 9 C19 / 3 C13 switched and monitored DPI PDU with IEC 309 P+N+Gnd connector	46M4002	40K9612	220-240 V, 50-60 Hz, 32 A, single-phase	7680 VA
DPI 63 amp / 250 V single-phase 1U 9 C19 / 3 C13 switched and monitored DPI PDU with IEC 309 P+N+Gnd connector	46M4002	40K9613	220-240 V, 50-60 Hz, 63 A, single-phase	15120 VA
DPI 30 amp / 208 V single-phase 1U 9 C19 / 3 C13 switched and monitored DPI PDU with NEMA L6-30P (2P+Gnd) connector	46M4002	40K9614	200-208 V, 50-60 Hz, 24 A, single-phase	4992 VA
DPI 60 amp / 208 V single-phase 1U 9 C19 / 3 C13 switched and monitored DPI PDU with IEC 309 2P+Gnd connector	46M4002	40K9615	200-208 V, 50-60 Hz, 48 A, single-phase	9984 VA
DPI 32 amp / 250 V single-phase 1U 9 C19 / 3 C13 switched and monitored DPI PDU with special connector for Australia and New Zealand (not IEC 309)	46M4002	40K9617	220-240 V, 50-60 Hz, 32 A, single-phase	7680 VA
DPI 30 amp / 250 V single-phase 1U 9 C19 / 3 C13 switched and monitored DPI PDU with special Korea connector - P+N+Gnd connector	46M4002	40K9618	220-240 V, 50-60 Hz, 30 A, single-phase	7200 VA

Table 5. Rated input power source for the 1U 9 C19/3 C13 Switched and Monitored 60A 3-phase PDU

Description of PDU + Line cord	PDU part number	Line cord part number	Rated voltage, rated current	Max power rating
DPI 60 amp / 208 V three-phase 1U 9 C19 / 3 C13 switched and monitored PDU with fixed IEC 309 3P+Gnd connector	46M4003	fixed	200-208 V, 50-60 Hz, 48 A, three-phase Delta	17292 VA

Table 6. Rated input power source for the 1U 12 C13 Switched and Monitored DPI PDU with all cord combinations

Description of PDU + Line cord	PDU part number	Line cord part number	Rated voltage, rated current	Max power rating
DPI 32 amp / 250 V three-phase 1U 12 C13 switched and monitored DPI PDU with IEC 309 3P+N+Gnd connector	46M4004	40K9611	220-240 V, 50-60 Hz, 32 A, three-phase Wye	23040 VA
DPI 32 amp / 250 V single-phase 1U 12 C13 switched and monitored DPI PDU with IEC 309 P+N+Gnd connector	46M4004	40K9612	220-240 V, 50-60 Hz, 32 A, single-phase	7680 VA
DPI 63 amp / 250 V single-phase 1U 12 C13 switched and monitored DPI PDU with IEC 309 P+N+Gnd connector	46M4004	40K9613	220-240 V, 50-60 Hz, 63 A, single-phase	15120 VA
DPI 30 amp / 208 V single-phase 1U 12 C13 switched and monitored DPI PDU with NEMA L6-30P (2P+Gnd) connector	46M4004	40K9614	200-208 V, 50-60 Hz, 24 A, single-phase	4992 VA
DPI 60 amp / 208 V single-phase 1U 12 C13 switched and monitored DPI PDU with IEC 309 2P+Gnd connector	46M4004	40K9615	200-208 V, 50-60 Hz, 48 A, single-phase	9984 VA
DPI 32 amp / 250 V single-phase 1U 12 C13 switched and monitored DPI PDU with special connector for Australia and New Zealand (not IEC 309)	46M4004	40K9617	220-240 V, 50-60 Hz, 32 A, single-phase	7680 VA

Table 7. Rated input power source for 1U 12 C13 Switched and Monitored 60A 3-phase PDU

Description of PDU + Line cord	PDU part number	Line cord part number	Rated voltage, rated current	Max power rating
DPI 60 amp / 208 V three-phase 1U 12 C13 switched and monitored PDU with fixed IEC 309 3P+Gnd connector	46M4005	fixed	200-208 V, 50-60 Hz, 48 A, three-phase Delta	17292 VA

Warranty

These switched and monitored PDUs are offered with a three-year, limited warranty.

Supported rack cabinets

The 1U Switched and Monitored PDUs can be installed in all 19 inch rack cabinets including the following:

- iDataPlex Rack Cabinet (7825)
- S2 42U Standard Rack Cabinet (Types 9307 and 9956)
- Enterprise Rack Cabinet (Types 1410 and 9308)

Installation can be either vertically in side pockets of the rack or horizontally in a 1U space. The PDU part numbers include the necessary rack installation hardware for either configuration.

Related publications and links

For more information refer to these documents:

- Rack and power infrastructure portfolio (PDU home page)
<https://www.lenovo.com/us/en/data-center/servers/server-options/system-x-options/rack-and-power-infrastructure/power-distribution-units/c/power>
- User Manual
http://systemx.lenovofiles.com/help/topic/com.lenovo.sysx.racks.doc/ch_1Uc19c13swmonpdu.html?cp=0_5_1_1_1
- Lenovo PDU Quick Reference Guide - North America
<http://lenovopress.com/redp5266-pdu-quick-reference-north-america>
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<http://support.lenovo.com/documents/LNVO-POWINF>
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Related product families

Product families related to this document are the following:

- [Power Distribution Units](#)

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This document, TIPS0775, was created or updated on March 9, 2020.

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