



Operation/Reference Guide

NXA-PDU-1508-08

Power Distribution Unit
(110V/220V)



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NXA-PDU-1508-8 (110V/220V)

Overview

The NXA-PDU-1508-8 Power Distribution Unit (FG673-01) provides switching of mains power to each of eight AC power outlets. The two built-in AxLink bus strips provide connectivity (AxLink data / power) for up to eight AxLink connections.

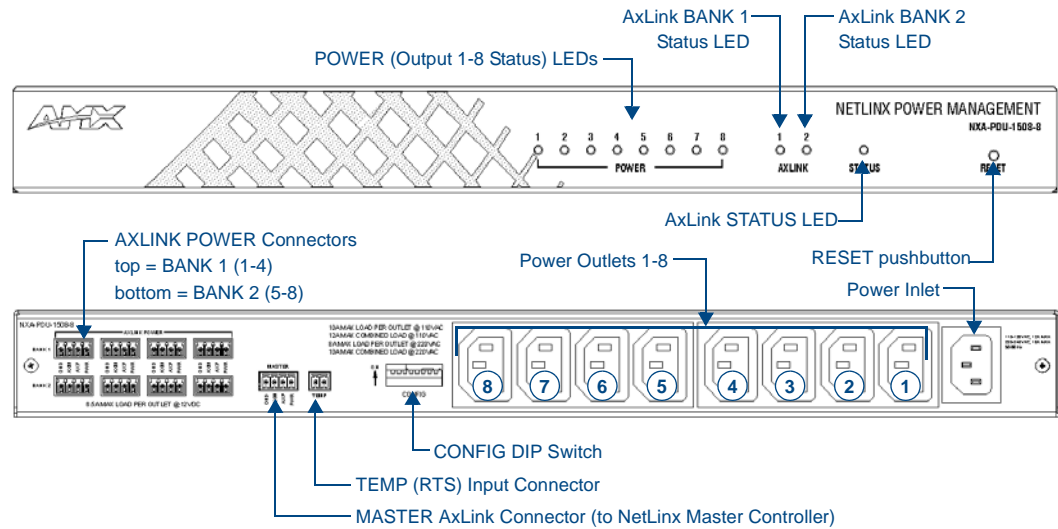


FIG. 1 NXA-PDU-1508-8

Product Specifications

NXA-PDU-1508-8 Specifications		
Power: <i>Note: The PDU auto-senses the voltage of the supplied power.</i>	<ul style="list-style-type: none"> Powered via 110-220 VAC, 50/60Hz mains power on an IEC-320 C-14 connector Required voltage = 110 to 220 VAC, 50/60Hz Total Combined Current (including AxLink): <ul style="list-style-type: none"> 10A at 220V-240V 12A at 110V-120V Idle current draw: 0.5W max 	
AC Current:	• 110-120VAC:	Input: 15A Regulatory Derated Input Current (North America) 12A @ 110 VAC 10A Max Load Per Outlet @ 110VAC 12A Max Combined Load @ 110VAC
	• 220-240VAC:	Input: 10A @ 220 VAC 8A Max Load Per Outlet @ 220VAC 10A Max Combined Load @ 220VAC
Overcurrent Notification:	• 110-120VAC:	Single Outlet: 10A Overall: 12A
	• 220-240VAC:	Single Outlet: 8A Overall: 10A

NXA-PDU-1508-8 Specifications (Cont.)			
Front Panel Components:			
POWER LEDs (1-8):	Eight green LEDs illuminate to indicate that the associated Power Outlet (#1 - #8) is in use.		
AXLINK LEDs:	Two red LEDs illuminate to indicate when the associated AxLink Bus Strips (Bank 1 or Bank 2) on the PDU is in use.		
AXLINK STATUS LED:	Green LED illuminates to indicate AxLink communication activity between the PDU and the NetLinx Master: <ul style="list-style-type: none"> • ON - power, no master connection • OFF - no power • Blink - powered, communicating with master 		
RESET pushbutton:	<ul style="list-style-type: none"> • Press/hold for 3 seconds: Resets the AxLink power line (minimum 0.5 seconds toggle) • Press/hold for 17 seconds: Resets the PDU (similar to a full power cycle of the unit) 		
Rear Panel Components:			
AXLINK POWER connectors (8):	<p>A 13.5VDC, 6.5A power supply is provided for AxLink power.</p> <p>Eight 3.5mm (4-pin) AxLink captive-wire connectors provide power and data for up to eight AxLink connections.</p> <ul style="list-style-type: none"> • AxLink power is switched in two banks of four outputs each. <ul style="list-style-type: none"> BANK 1 contains AxLink connectors 1-4 BANK 2 contains AxLink connectors 5-8 • The PDU provides up to 6.5A total across all AxLink outputs. 		
MASTER connector	3.5mm Phoenix (4-pin) AxLink connector provides connectivity to the NetLinx Master (always on).		
TEMP (RTS) input:	3.5mm Phoenix (2 pin) connector provides connection to a Remote Temperature Sensor (RTS).		
CONFIG DIP Switch:	Eight-position DIP switch sets the AxLink device address.		
Power Outlets (8):	<ul style="list-style-type: none"> • Connector Type: IEC C-13, 12A/10A • Maximum allowable current on a single high-voltage output: 10A@110VAC / 8A@220VAC 		
Power Inlet (1):	<ul style="list-style-type: none"> • Connector Type: IEC C-14, 12A/10A 110-120VAC: 12A Input 220-240VAC: 10A Input 		
Dimensions (HWD):	<ul style="list-style-type: none"> • 1 3/16" x 17" x 9 11/16" (2.97cm x 43.18cm x 24.54 cm) • 1 RU 		
Weight:	9 lbs (4.08 kg)		
Enclosure:	Steel, black powder coated finish		
Environmental:	<ul style="list-style-type: none"> • Operating Environment: 0°C - 40°C (32°F - 104°F) • Storage Environment: -10°C - 60°C (14°F - 140°F) • Relative Humidity: 5% - 85%, non-condensing 		
Certifications:	<table border="0"> <tr> <td> <ul style="list-style-type: none"> • CE • CB Scheme • UL </td> <td> <ul style="list-style-type: none"> • FCC • CSA • C-Tick </td> </tr> </table>	<ul style="list-style-type: none"> • CE • CB Scheme • UL 	<ul style="list-style-type: none"> • FCC • CSA • C-Tick
<ul style="list-style-type: none"> • CE • CB Scheme • UL 	<ul style="list-style-type: none"> • FCC • CSA • C-Tick 		
Included Accessories:	<ul style="list-style-type: none"> • Power Cord, NEMA 5-15P TO C13, 15A, 14/3, 6' (64-0673-01) <p>Note: See <i>Power Cord Requirements</i> below for details.</p> <ul style="list-style-type: none"> • ENV-VST-TSO, Temperature Sensor (FG2050-22) • (2) Removable mounting brackets • (9) 4-pin, 3.5mm captive-wire connectors (41-5047) 		
Other AMX Equipment:	<ul style="list-style-type: none"> • ENV-VST-TSF, Flush Mount Temperature Sensor (FG2050-21) • CC-C13-C14: C13 to C14 Power Cable (FG10-673-01) • CC-C14-NEMA: C14 to NEMA Power Cable (FG10-673-02) 		

The following table lists the specifications for the ENV-VST-TSO Outdoor Temperature Sensor:

ENV-VST-TSO Outdoor Temperature Sensor Specifications	
Sensing Element:	Thermistor (thermal resistor)
Accuracy:	±0.6° C from -20° to 60° C
Temperature Range:	-50° C to 110° C
Temperature Response:	NTC Thermistor
Connection:	1" (2 1/2 cm) 24 AWG pigtails
Mounting:	Surface mount or 1/4" hole
Color:	White plastic case
Threaded Case Length:	1 3/16 in. (30 mm)
Threaded Case Diameter:	1/4 in. (7 mm)
Sensor Face Diameter:	1/4 in. (7 mm)
Sensor Face Thickness:	1/13 in. (2 mm)
Weight:	0.88 oz. (29.94 g)

SAFETY INSTRUCTIONS

- There are NO user serviceable parts within the NXA-PDU-1508-8.
- The NXA-PDU-1508-8 is intended for indoor use only.
- DO NOT install or operate the NXA-PDU-1508-8 in an area where the ambient temperature exceeds 40°C (104°F) or falls below 0°C (32°F).
- DO NOT install or operate the NXA-PDU-1508-8 in an area in which the ambient relative humidity exceeds 85% or an area that is prone to condensation.
- DO NOT install or operate the NXA-PDU-1508-8 near water or in a location which may be prone to water seepage, dripping or splashing.
- DO NOT place objects containing liquids on the NXA-PDU-1508-8.

安全上のご注意

- NXA-PDU-1508-8 内には、ユーザーが利用できるパーツは含まれていません。
- NXA-PDU-1508-8 は、屋内での使用を目的とします。
- 周囲温度が 40°C (104°F) を超える、あるいは 0°C (32°F) 以下に下がる場所に NXA-PDU-1508-8 を設置、または、稼働をしないでください。
- 周囲の相対的湿度が 85% を超える場所、あるいは結露しやすい場所に NXA-PDU-1508-8 を設置、または、稼働をしないでください。
- 水の近く、水につかる所、あるいは水滴、水しぶきのある場所に NXA-PDU-1508-8 を設置、または、稼働をしないでください。
- NXA-PDU-1508-8 上に液体を含む物を置かないでください。

FIG. 2 SAFETY INSTRUCTIONS

注意

この製品はクラスA情報技術装置です。住宅環境で使用する場合は、電波障害を発生させる恐れがあります。その際、この製品の利用者は、適切な手段を講ずることが必要とされることがあります。

FIG. 3 CLASS A NOTIFICATION

Power Cord Requirements

The NXA-PDU-1508-8 ships with a power cord, except to those countries which prohibit the shipment of the power cord selected. When selecting a power cord for use in Japan, please consider the following:

The NXA-PDU-1508-8 requires a type VCTF or HVCTF and 1.25 or 2.0 sq.mm jacketed power cord with connectors and plugs that are 125V-12A or 125V-15A rated should be used.

Rack-Mounting



For safety, the socket-outlet should be installed near the NXA-PDU-1508-8 and must be easily accessible.

Before rack mounting the PDU, pay particular attention to the following factors:

- **Temperature:** Since the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range.
- **Mechanical Loading:** Do not place any equipment on top of a rack-mounted unit.
- **Circuit Overloading:** Be sure that the supply circuit to the rack assembly is not overloaded.
- **Grounding:** Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains.

The NXA-PDU-1508-8 can be mounted in a standard 19-inch equipment rack:

1. Attach the brackets to the PDU using the bracket screws provided in the Bracket Mounting Kit (FIG. 4).

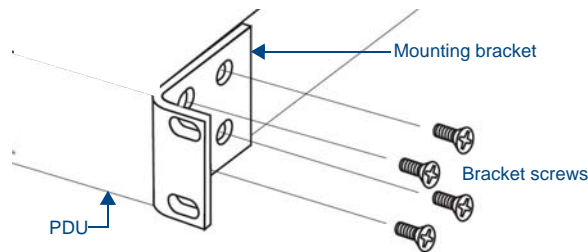


FIG. 4 Attaching the Brackets

2. Mount the PDU in the rack, using 4 rack-mounting screws (not provided, see FIG. 5).

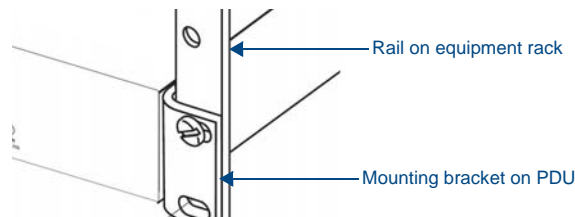


FIG. 5 Installing the PDU in a Rack

Installation

Front Panel Components

The front panel components of the NXA-PDU-1508-8 are shown in FIG. 6:

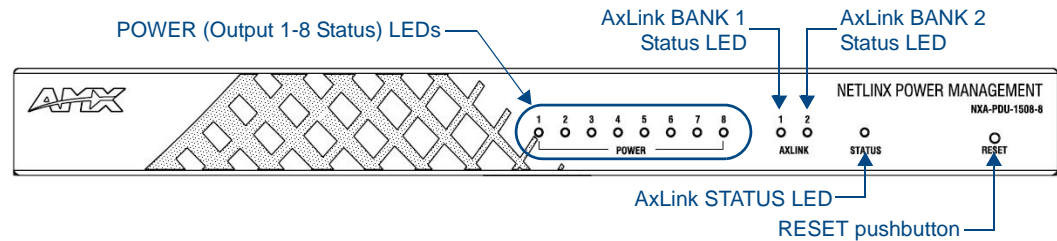


FIG. 6 NXA-PDU-1508-8 - Front Panel Components



NOTE

See the Specifications table for descriptions of the LEDs on the front panel.

RESET Pushbutton

The RESET pushbutton is a momentary breaker reset switch for the MASTER AxLink power connection.

- Press/hold for 3 seconds: Resets the AxLink power line (minimum 0.5 second toggle). Holding the RESET pushbutton disconnects the master AxLink power for at least 0.5 seconds.
- Press/hold for 17 seconds: Resets the PDU (similar to a full power cycle of the unit).

Rear Panel Components

The rear panel components of the NXA-PDU-1508-8 are described below (FIG. 7):

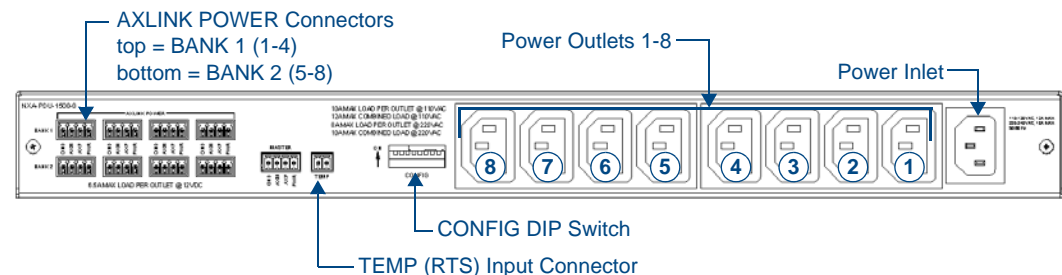


FIG. 7 NXA-PDU-1508-8 - Rear Panel Components

AXLINK POWER Connectors 1-8

The eight AxLink connectors (labelled “AXLINK POWER”) are standard 4-pin AxLink captive-wire connectors that provide data and power for up to 8 AxLink connections.

The AxLink device connectors are separated into two Banks:

- BANK 1 (top) includes AxLink connectors 1-4, numbered from right-to-left (see FIG. 7)
- BANK 2 (bottom) contains AxLink connectors 5-8, numbered from right-to-left (see FIG. 7)

The PDU provides switched power to banks 1 and 2.



NOTE

The AxLink bus strip does not provide switching on AxLink data lines.

MASTER Connector

The 3.5mm 4-pin captive-wire AxLink connector labelled “MASTER” provides AxLink connectivity between the PDU and the NetLinx Master (see FIG. 7).



This connector is always ON.

TEMP Connector

The 3.5mm 2-pin captive-wire connector labelled “TEMP” (see FIG. 7) provides the option to connect a Remote Temperature Sensor (RTS). The NXA-PDU-1508-8 comes with one ENV-VST-TSO Temperature Sensor (FG2050-22).

Connect either wire from the RTS to either pin on the TEMP connector (FIG. 8).

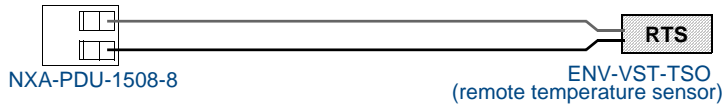


FIG. 8 TEMP Connector



The NXA-PDU-1508-8 is also compatible with the ENV-VST-TSF Indoor Flush Mount Temperature Sensor (FG2050-21 - not included).

Preparing Captive Wires

1. Strip 0.25 inch (6.35 mm) of wire insulation off all wires.
2. Insert each wire into the appropriate opening on the connector according to the wiring diagrams and connector types described in this section.
3. Turn the flat-head screws clockwise to secure the wires in the connector.



Do not over-torque the screws; doing so can bend the seating pins and damage the connector.

AxLink Data and Power Connections

Connect the AxLink device’s AxLink connector to one of the AxLink connectors (1-8) on the rear panel of the PDU for data and 12 VDC power as shown in FIG. 9.

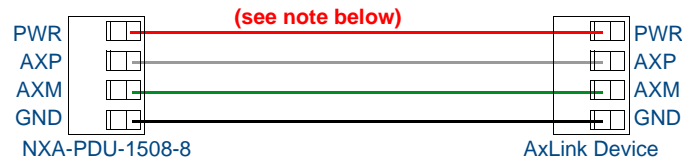


FIG. 9 AxLink straight-thru wiring



If the PDU is connected to a NetLinx Master that is self-powered (powered by a stand-alone power supply other than the PDU, or the DVX-2100HD which features an internal power supply), do not use the AxLink Power connection between the PDU and the NetLinx Master.

AxLink Wiring Guidelines

AxLink devices require 12 VDC power to operate properly. The necessary power is supplied via the AxLink cable. The maximum AxLink wiring distance is determined by power consumption, supplied voltage, and the wire gauge used for the cable.

Use the 3-step formula below to calculate the maximum wiring lengths allowable between the PDU and connected AxLink devices.

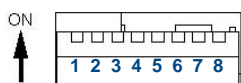
1. $\langle \text{Total current consumption of all connected AxLink devices} \rangle \times \langle \text{Resistance/Foot} \rangle \times 2 = \langle \text{voltage drop per foot} \rangle$ (see table below for Resistance/Foot values.)
2. $\langle \text{Power supply voltage} \rangle - 12 \text{ VDC} = \langle \text{surplus voltage dissipation for cable run} \rangle$.
3. $\langle \text{surplus voltage dissipation for cable run} \rangle / \langle \text{voltage drop per foot} \rangle = \text{Max. distance.}$

The following table lists the resistance factors used in the formula.

Cable Gauge/Resistance Factors		
	Solid Copper Wiring	Stranded Copper Wiring
Wire gauge	Resistance/Foot	Resistance/Foot
18 AWG	.00639	.00692
20 AWG	.0101	.01090
22 AWG	.0162	.01690
24 AWG	.0257	.02770

CONFIG DIP Switch

The NXA-PDU-1508-8 uses an 8-position DIP Switch (labelled "CONFIG") to specify a unique device address for itself in a NetLinx Control System (FIG. 10).



CONFIG

FIG. 10 CONFIG DIP Switch

Setting the Device Address of the PDU

The NXA-PDU-1508-8 firmware implements 8 AxLink device IDs, starting from the device ID denoted by the DIP switch. The device IDs used by the NXA-PDU-1508-8 are as follows:

- **Dev 1:** (Power Outlet 1) + (AxLink-Bank 1 Power) + (Input Voltage) + (Temp)
- **Dev 2:** (Power Outlet 2) + (AxLink-Bank 2 Power)
- **Dev 3-8:** (Power Outlets 3-8)



NOTE

AxLink devices IDs are always in the range of 1-255. However, the PDU requires seven open device numbers above the PDU device number setting to accommodate its sub-devices. Therefore, device addresses 249-255 are not valid for the PDU.

To set the Device Address:

1. If connected, disconnect the power supply.
2. Set the CONFIG DIP switch according to the values shown below:

Switch	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	128

The device number is set by the total value of DIP switch positions that are in the ON position. Note that the ON position is indicated on the DIP Switch.

If you later change the device number, remove and reconnect the power connector to enter the new device number into memory.



NOTE

Use the "Dip Switch2" software application to calculate dip switch position values (available to download from www.amx.com).

Power Outlets 1-8

The eight 110-220VAC 50/60Hz, IEC C-13, 15A AC Power Outlet Connectors provide AC power to connected devices (see FIG. 7).



Maximum load on a single outlet = 10A @ 110-120 VAC / 8A @ 220-240VAC.

Power Inlet

The IEC C-14, 15A power inlet connector provides 110-220VAC, 50/60Hz mains power to the PDU.

Powering Up The NXA-PDU-1508-8

When power is applied to the PDU for the first time, the outlets are powered in sequence (1-8), with a delay of 0.5 second between outlets.

By default, the state of all outlets upon initial power-up is ON.

Initial Response Time

Allow the PDU approximately ten seconds *after it appears online* to register internal processes before attempting to turn on a channel.

Persistence of On/Off States for All Outlets

By default, *Persistence* for all outlets is set to ON.

Persistence can be turned off via the **PERSIST** Send_Command (page 11).

For subsequent power-ups (from a power off state or on system reset), the PDU will restore the last recorded state of any outlet in a sequenced fashion, starting from outlet 1 in numerical order, with a delay of 0.5 second between energizing any two outlets, assuming the default Persistence setting of ON has not been changed.

NetLinX Programming

Device IDs

The NXA-PDU-1508-8 uses 8 AxLink device IDs, starting from the device ID denoted by the DIP switch:

- **Dev 1:** Output 1 + AxLink Power 1 + Input Voltage + Temperature
- **Dev 2:** Output 2 + AxLink Power 2
- **Dev 3-8:** Outputs 3-8

Supported SEND_COMMANDS

SEND_COMMANDS	
PERSIST	<p>Configures the designated power outlet to return to the last state on loss of power or reset of the PDU.</p> <p>By default, a shipping PDU shall have all power outlets PERSIST setting ON.</p> <p>Syntax:</p> <pre>PERSIST-<outlet #>=<value></pre> <p>Variables:</p> <ul style="list-style-type: none"> • <value> may be ON or OFF • <outlet#> 1-8 for AC outlets, 9 and 10 for AxLink 1 and 2 bus power, respectively. <p>Note: As there are limited write cycles to the storage of the persistent data, setting an outlet to PERSIST ON should only be used when absolutely necessary, and never for very frequent toggling operations.</p>
?PERSIST	<p>Queries the PERSIST state of all outlets.</p> <p>Returns a comma-delimited list in the form:</p> <pre>PERSIST-1=<value>, 2=<value>, 3=<value>, 4=<value>, 5=<value>, 6=<value>, 7=<value>, 8=<value>, 9=<value>, 10=<value></pre> <p><value> will be 1 for ON or 0 for OFF, (e.g.):</p> <pre>PERSIST-1=1, 2=0, 3=0, 4=0, 5=0, 6=0, 7=0, 8=0, 9=1, 10=0</pre>
?PHASEANGLE	<p>Syntax:</p> <pre>?PHASEANGLE-<outlet #></pre> <p>Responds with:</p> <pre>PHASEANGLE-<outlet #>=<Phase Angle></pre> <p>Note: "Phase angle" is the difference in phase between Voltage and Current, useful for determining inductive vs. capacitive loading.</p>
RESET	<p>Syntax:</p> <pre>RESET</pre> <p>Triggers a <i>Power-On-Reset</i> of the PDU. A Power-On-Reset toggles all interruptible power outlets.</p>
?SERIAL	<p>Syntax:</p> <pre>?SERIAL</pre> <p>Retrieves the 16-byte serial number assigned to the PDU.</p> <p>Responds with:</p> <pre>SERIAL <XXXXXXXXXXXXXXXXXX></pre> <p>where <XXXXXXXXXXXXXXXXXX> is the 16-byte serial number assigned to the unit.</p>
TRIGGER	<p>Syntax:</p> <pre>TRIGGER-<outlet #>=<Power Sense Trigger></pre> <p>Sets the Power Sense Trigger of the specified outlet to the specified value in tenths of Watts.</p> <p>Note: A "Trigger" is a current level which will cause a power sense channel to activate if the current exceeds the value.</p>

SEND_COMMANDs (Cont.)	
?TRIGGER	<p>Syntax: ?TRIGGER-<outlet #></p> <p>Responds with: TRIGGER-<outlet #>=<Power Sense Trigger> to report the trigger value in use on the outlet.</p>
VER	<p>Syntax: VER</p> <p>Responds with: Version (string) - example: "Vx.xx"</p>
ZAP!	<p>Syntax: ZAP!</p> <p>Restores all settings on the PDU to factory default settings.</p>



Unsupported options in responses are ignored / not reported.

Channels

The PDU uses channels as specified in the following table.

Channel	Dev 1	Dev 2	Dev 3	Dev 4	Dev 5	Dev 6	Dev 7	Dev 8
1	Relay On/Off	Relay On/Off	Relay On/Off	Relay On/Off	Relay On/Off	Relay On/Off	Relay On/Off	Relay On/Off
2	Temp Scale (off=C/on=F)							
3	Ax 1 On/Off	Ax 2 On/Off						
255	Power Sense	Power Sense	Power Sense	Power Sense	Power Sense	Power Sense	Power Sense	Power Sense

- **Relay On/Off:** relay status
- **Temp Scale:** Off = C, On = F,
The PDU measures temperature with an accuracy of 1 degree C) via a remote temperature probe. Temperature kept in non-volatile storage to retain across reboot.
- **Power Sense:** Signals that power (in watts) is above or below the specified trigger level (set via the TRIGGER command).

Levels

16-bit Level	Dev 1	Dev 2	Dev 3	Dev 4	Dev 5	Dev 6	Dev 7	Dev 8
1	Power	Power	Power	Power	Power	Power	Power	Power
2	Current	Current	Current	Current	Current	Current	Current	Current
3	Power Factor	Power Factor	Power Factor	Power Factor	Power Factor	Power Factor	Power Factor	Power Factor
4	Energy	Energy	Energy	Energy	Energy	Energy	Energy	Energy
5	Input Voltage	Ax Voltage						
6	Ax 1 Power	Ax 2 Power						
7	Ax 1 Current	Ax 2 Current						
8	Temp							

- **Power (W):** Resolution to 0.1W (data scale factor = 10)
- **Current (A):** Resolution to 0.1A (data scale factor = 10)
- **Voltage (V):** Resolution to 0.1V (data scale factor = 10)
- **Power Factor:** W/VA, 2 decimal places (data scale factor = 100).

"Power Factor " is the ratio of real power to apparent power.



NOTE

For power factor, AMX has added an offset of 100 to the value to cope with the possibility of negative numbers. To obtain the correct value of the power factor, first subtract 100 from the level returned by the PDU, then divide by 100.

Example:

$fPowerFactor1 = (LEVEL.VALUE - 100) / 100.0$ //NB fPowerFactor1 is a FLOAT variable"

The level range is 0-200.

- **Energy (kW-hr):** Power over time, resolution to 0.1kW-hr (data scale factor = 10)
- **Temp (Degrees C or F):** Resolution to 0.1C (data scale factor = 10, writing 0 resets counter)

Resetting Level 4 (Accumulated Energy Reading)

The Level 4 value (accumulated energy reading) can be reset to 0 (zero) in three ways:

1. When the PDU is reset or power cycled, Level 4 will go to 0 on all outputs (see *Powering Up The NXA-PDU-1508-8* on page 10).
2. If `SEND_LEVEL <PDU dev>,4,0` is sent, Level 4 will go to 0 on that output (if not already at 0).
3. The max value of the level is **65535**, if that is exceeded the level will roll over to 0.

Overcurrent Reporting

The PDU reports alerts of overcurrent via the following AxLink string:

```
OVERCURRENT-<Outlet #>=<Current>
```



NOTE

If reporting overcurrent for the entire unit, the outlet # is specified as **0** (zero).



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