X-PoE FAQs

WHAT IS POE?

Power over Ethernet (PoE) is a technology that allows electrical power and data to be transmitted over a single standard Ethernet cable.

This eliminates the need for separate electrical wiring to devices like lighting controllers, sensors, and access points.

PoE is standardized under the **IEEE 802.3** family, and depending on the version, can deliver anywhere from **15 W (802.3af)** to **90 W (802.3bt)** per port.

It simplifies installation, reduces costs, and improves reliability by centralizing power distribution and control.

Cisco explains PoE well here, but there are tons of great resources out there.

WHAT IS X-POE?

X-PoE is an extension of the IEEE 802.3 standard that has been around for 25 years. X-PoE delivers **40% more power** than traditional PoE, and the switches used on this project are also reverse compatible with IEEE standards (i.e., they are **802.3bt-capable and SIFOS-compliant**).

X-PoE is most optimized for lighting loads - it eliminates the need for additional hardware downstream of the switch (traditional PoE Lighting would call these "nodes"), and eliminates the need for LED Drivers inside of light fixtures.

BUT X-POE ISN'T A STANDARD! DOESN'T THAT MAKE IT RISKY?

All of the 802.3 standards were actually published **6–8 years after the technology was first released** to the market.

The standards primarily enable smooth interoperability between device and switch manufacturers. Safety and reliability, however, are covered by **UL and NEC**—and X-PoE is a **certified Class 2 power supply**.

Cisco, for example, released **UPoE (Universal PoE)** capable of delivering 60 W in 2011, but it wasn't until 2018 that this technology was codified in the 802.3bt standard.

ISN'T THE LIMIT FOR CLASS 2 100W?

Yes — that's why each X-PoE port is actually **two individually regulated Class 2 circuits**.

So one cable can deliver up to 130W, but each Cat6 cable is made up of 8 smaller cables, and those cables are broken into two sets of 4 cables - each individually controlled and regulated.

BUT AREN'T YOU VENDOR-LOCKED NOW THAT YOU CHOSE THIS TECHNOLOGY FOR YOUR BUILDING?

The **X-PoE IP is licensable**, and we believe many manufacturers will be building and selling **X-PoE-compatible** versions of their products soon.

IS THE ONLY GOOD THING ABOUT X-POE THE 130 W?

Not even close! The most valuable feature of X-PoE is that it's **optimized for lighting loads**. When powering light fixtures, it allows the distributed, failure-prone **LED drivers** to be removed from the luminaires and **centrally located in the X-PoE switch**. This can:

- **Increase the life expectancy** of luminaires by ~400% (reducing maintenance)
- **Reduce installed materials** in the building
- Allow fixtures to be **installed by low-voltage contractors** rather than master electricians

WHAT IS THE INPUT VOLTAGE RANGE OF THE LIGHTING CONTROLLER?

48V-57VDC, see D1.1 - Input Power Range.

WHAT IS THE MAXIMUM OUTPUT POWER OF EACH PORT?

Each physical port on the X-PoE lighting controller (LCNS) is capable of outputting 2.23A total. To calculate the maximum output power, 2.23A should be multiplied by the input voltage supplied to the switch. See D1.2 - Output Power Range.

The max output in Amps is: 2.23

> **USE THE FOLLOWING TABLE TO CORRELATE INPUT VOLTAGE TO MAX OUTPUT POWER**

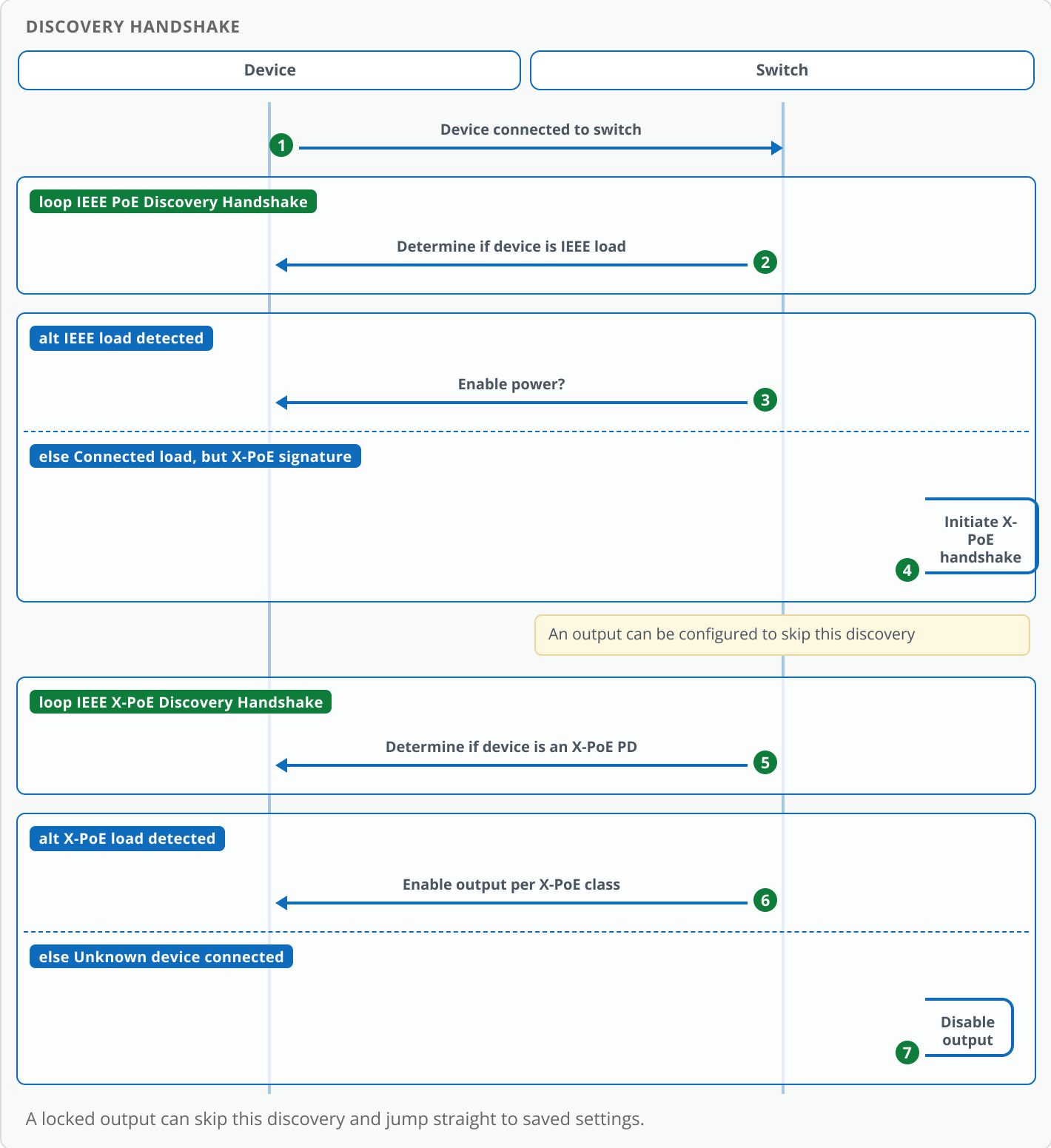
Input Voltage	Max Output Current	Max Output Per Channel	Max Output Per Port
48V	2.23A	53.5W	107W
57V	2.23A	65W	130W

CAN X-POE SWITCHES SUPPORT TRADITIONAL IEEE POE LOADS?

Of course it can. That's the whole point. When a user connects a load to the switch, the switch will begin by checking to see if the connected device is a traditional PoE Load. If it is, it will enable power according to the classification of that load.

If the connected load turns out to be an X-PoE load, the switch will then allocate power according to the X-PoE classification.

If an output on the switch has already been configured to specific settings and has been "Locked" (link to lock info), then the switch will jump straight to those settings.



A locked output can skip this discovery and jump straight to saved settings.

DOESN'T NEC LIMIT THE AMOUNT OF POWER PER CABLE TO 100VA WHEN A CABLE IS CARRYING BOTH POWER AND DATA?

There's a common misconception that the National Electrical Code (NEC) limits "PoE cables" to 100 VA per cable. When the code was originally updated in 2017, the language was a bit vague and has been often misunderstood. In reality, the NEC sets **current limits per individual conductor** — not per cable — and the 2020 update to Table 725.144 makes that more clear.

A Cat6 cable is made up of four pairs of conductors, electrically managed as two individual class 2 circuits (2 pair per circuit).

The Purpose of NEC 725.144

Article 725 governs **Class 2 and Class 3 power-limited circuits**. Section 725.144 specifically addresses **circuits that transmit power and data** — for example, PoE, 4PPoE, or other structured-cable power systems.

The limits in Table 725.144 are thermal, not wattage caps. They exist to ensure that bundled cables do not overheat under load. The key phrase is:

"Maximum Current (A) per Conductor"

This means *each individual copper wire* in a 4-pair Ethernet cable is rated for that current, not the whole cable assembly.

NEC 2020 Table 725.144 (Excerpt)

AWG	Bundle Size	60 °C	75 °C	90 °C	Note
23 AWG	(92–192 cables)	0.45 A	**0.55 A**	0.63 A	*Per conductor*

(From NEC 2020 Table 725.144)

The **0.55 A** value (added in 2020) reflects refined IEEE 802.3bt thermal testing for 23 AWG, 75 °C cable. Each conductor can safely carry 0.55 A continuously in bundles of up to 192 cables.

The Simple Math

Each twisted pair carries equal and opposite current through two conductors:

I(pair) = 2 × 0.55 A = 1.10 A per pair loop

If an Ethernet cable energizes two pairs per channel (as X-PoE does):

I(channel) = 2 × 1.10 A = 2.20 A total conductor current (1.1 A per loop)

At **54 V DC**, that's about **59.4 W per loop**, or **118.8 W per 2-pair channel** — fully compliant with NEC 2020 Table 725.144 for 23 AWG/75 °C cable in bundles up to 192 runs.

Key Takeaways

- **The NEC does not impose a 100 VA "per cable" limit.** That figure originates from the Class 2 source definition, not from Table 725.144.
- **Table 725.144 governs current, not total wattage.** The intent is thermal safety, not limiting system power.
- **The 0.55 A per conductor rating** (NEC 2020) allows 1.1 A per 2-pair channel at 75 °C. X-PoE is specified at 1.115 A per channel and 2.23 A per port.
- **Compliance paths:**
  - Stay within the per-conductor ampacity in Table 725.144.
  - Use 75 °C or 90 °C rated cable depending on bundle size and current.
  - Document isolation and current limiting to maintain Class 2 compliance.

Bottom Line X-PoE carries **1.115 A per 2-pair channel** (0.5575 A per conductor) on 23 AWG, 75 °C-rated conductors. That is the product spec (2.23 A per two-channel port), within about 2% of the NEC 2020 Table 725.144 ampacity of **0.55 A per conductor** in bundles up to 192 cables. This is the **correct interpretation of the Code's intent**: **safe thermal performance per wire, not arbitrary VA caps per cable.**

X-PoE systems, which operate within these parameters, are **fully compliant** with this standard, demonstrating adherence to NEC 2020's per-conductor ampacity requirements.

Here is the full table for context:

New Ampacity Table 725.144

Table 725.144, Ampacities of Each Conductor (in Amperes) in a 4-Pair Class 2 or Class 3 Data Cables, Based on Copper Conductors at Ambient Temperature of 30°C (86°F) with all Conductors in All Cables Carrying Current, 60°C (140°F), 75°C (167°F) and 90°C (194°F) Rated Cables

AWG	Number of 4-Pair Cables in a Bundle																				
	1			2-7			8-19			20-37			38-61			62-91			92-192		
	Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating		
	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C
26	1.0	1.0	1.0	1.0	1.0	1.0	0.7	0.8	1.0	0.5	0.6	0.7	0.4	0.5	0.6	0.4	0.5	0.6	NA	NA	NA
24	2.0	2.0	2.0	1.0	1.4	1.6	0.8	1.0	1.1	0.6	0.7	0.9	0.5	0.6	0.7	0.4	0.5	0.6	0.3	0.4	0.5
23	2.5	2.5	2.5	1.2	1.5	1.7	0.8	1.1	1.2	0.6	0.8	0.9	0.5	0.7	0.8	0.5	0.7	0.8	0.4	0.5	0.6
22	3.0	3.0	3.0	1.4	1.8	2.1	1.0	1.2	1.4	0.7	0.9	1.1	0.6	0.8	0.9	0.6	0.8	0.9	0.5	0.6	0.7

Note 1: For bundle sizes over 192 cables, or for conductor sizes smaller than 26 AWG, ampacities shall be permitted to be determined by qualified personnel under engineering supervision.

Note 2: Where only half of the conductors in each cable are carrying current, the values in the table shall be permitted to be increased by a factor if 1.4.

Informational Note: The conductor sizes in data cables in wide spread use are typically 22 - 26 AWG.

RELATED INFORMATION

Technical Support

Questions about X-PoE power, classification, or cable limits can be sent to support@luum.io.

Document Feedback

While we have taken great care to ensure the accuracy and completeness of this document, we welcome your feedback and suggestions. If you notice any errors or omissions, or feel a topic could benefit from further explanation, please email your feedback to support@luum.io.

Revision History

Date	Revision	Notes
11/3/2026	A	Converted to the current guide format.

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