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An IT Solutions Company

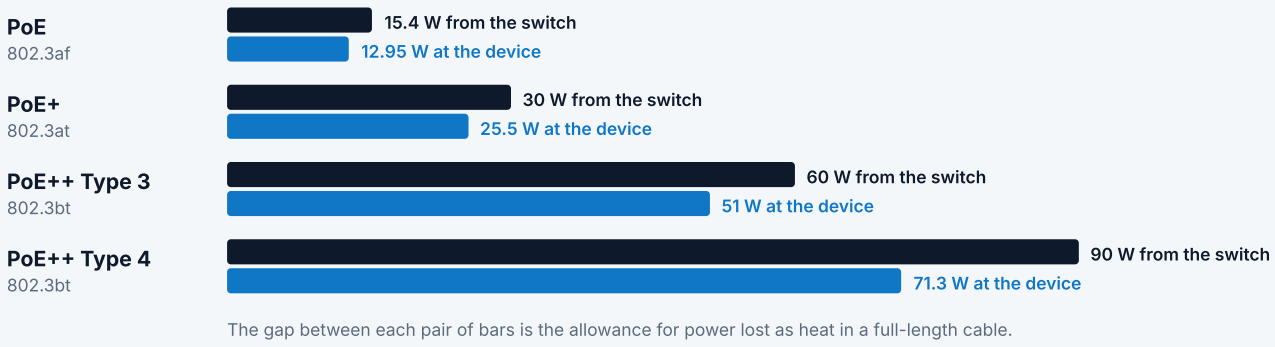
Power Over the Cable

Power over Ethernet: what it delivers, and what it asks of the cabling

Power over Ethernet, or PoE, sends electrical power down the same network cable that carries the data. It is the reason a camera can hang on a pole, an access point can sit in the middle of a ceiling, and a door reader can go on a frame with no outlet anywhere near. It has changed what a network cable is for, and it has raised the bar for the cable itself.

THE SHORT VERSION

- One cable carries data and power, up to 90 watts from the switch.
- Power comes from the network closet, so one battery backup protects every powered device.
- More power means more heat in the cable. Conductor quality and cable grade start to matter.
- Know the power budget of the switch, not only the power per port.



Power available under each standard.

The standards

Common name	Standard	Year	From the switch	At the device	Pairs used	Typical devices
PoE	IEEE 802.3af	2003	15.4 W	12.95 W	2	Desk phones, basic cameras, door readers
PoE+	IEEE 802.3at	2009	30 W	25.5 W	2	Access points, most cameras, video phones
PoE++ Type 3	IEEE 802.3bt	2018	60 W	51 W	4	Wi-Fi 6E and 7 access points, PTZ cameras
PoE++ Type 4	IEEE 802.3bt	2018	90 W	71.3 W	4	Displays, door controllers, lighting, small switches

The gap between the two wattage columns is the power lost as heat in the cable over a full-length run. The standards assume solid copper of a given size. Cable with more resistance loses more, which is the practical reason copper-clad aluminum and undersized conductors cause trouble with powered devices.

Devices and switches negotiate. A device asks for what it needs, and a switch that cannot supply it either offers less or refuses the port. Nothing is damaged by plugging a low-power device into a high-power port.

Why it is worth having

No electrician at every device
A camera or access point needs one cable, not a cable and a new outlet.

Backup power in one place
A battery backup on the switch keeps phones, cameras and door access alive when the lights go out.

Remote restart
A frozen camera can be restarted by cycling its port from a desk, without a ladder.

Safer
The switch checks for a compatible device before it sends power, and limits it afterward.

What it asks of the cabling

Solid copper conductors
Resistance turns power into heat. This is the first place poor cable shows itself.

Enough cable for the power
Cat6A has larger conductors and sheds heat better, one reason we run it to high-power devices.

Sensible bundles
Many high-power cables tied tightly together warm each other. Smaller, looser bundles on open supports run cooler.

The 328-foot limit still applies
Power does not extend the reach of copper. Past that, use a closer switch or fiber.

Good terminations
A poor connection is a point of resistance, and resistance under load is where heat goes.

A switch sized for the load
Total the devices against the power budget of the switch, with room to add.

Sizing the switch

Every PoE switch has a total power budget, and it is often less than the number of ports multiplied by the maximum per port. A 24-port PoE+ switch might supply 30 watts on any port but only 250 watts in total. Add up what the devices actually draw, allow headroom for devices added later and for cold-weather heaters in outdoor cameras, and choose the switch to match.

A quick way to estimate

Desk phone: 3 to 7 W. Fixed camera: 5 to 13 W. Camera with heater or infrared: up to 25 W. Wi-Fi 6 access point: 13 to 25 W. Wi-Fi 7 access point: 25 to 45 W. Door reader: under 10 W. Pan-tilt-zoom camera: 30 to 60 W. Check the data sheet for the exact figure before ordering.

How Smart Life plans for it

- We total the power for every device on the drawing and size the switches and battery backup to it, with room to add.
- High-power locations get Cat6A.
- Outdoor and pole-mounted devices get surge protection where the cable enters the building.
- We install the switches as well as the cable, so there is one company to call if a device will not power up.

Cable we run to powered devices

Select an item for its data sheet.



Cat6A plenum cable
23 AWG · CMP
Access points and other high-power devices.
Data sheet (PDF)



Cat6 plenum cable
23 AWG · CMP
Cameras, phones and door readers.
Data sheet (PDF)



Cat6 outdoor cable
23 AWG · UV-rated
Exterior cameras and outdoor access points.
Data sheet (PDF)



Cat6 outdoor shielded
F/UTP
Pole-mounted devices, with surge protection.
Data sheet (PDF)

Planning cable for a building? Send us the floor plan or walk it with us. We will mark what belongs where and give you a written estimate.

(502) 251-4775 · smartlifecorp.com/contact

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