



POWER OVER ETHERNET SOLUTION For IP Video Surveillance

Preface

There are two PoE standard have been ratified by IEEE organization. IEEE802.3af -2003 and IEEE802.3at-2009. 802.3af standard offers the 15.4 Watt of DC power to powered device, Only 12.95 W is assured to be available at the powered device as some power dissipates in the cable. While the 802.3at standard also known as PoE+ or PoE plus, provides up to 25.5 Watt of power.

However, for powering IP PTZ cameras, much higher power is required. The most majority of IP PTZ cameras are rated at 35 Watt or above 60 Watt. So, a 60 Watt PoE standard becomes available in the market. 60 Watt PoE also called as Ultra PoE, UPoE, Hi-PoE. Unlike the 802.3af/802.3at standard, the UPoE/Hi-PoE is not ratified, the most mainstream PoE network switches only support PoE and PoE+.

When deploying the PoE technology to your IP surveillance system, please note that the furthest transmission distance is up to 90 meters if using the standard cat5/cat6 Ethernet cable. To the applications beyond this limit, it's recommended to use optical fiber cables which can provide up to kilometers transmission distance. Lastly, today almost all IP camera manufacturers produce cameras with PoE, PoE+, UPoE/Hi-PoE. The PoE can provide easy to maintenance and cost-effective cable layout solution by carrying power and data in the same network cable. It has become a standardized technology which is almost mandatory for IP camera systems.



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IEEE802.3af & IEEE802.3at Standard

Power Sourcing Equipment



802.3af
802.3at



15.4W 25.5W



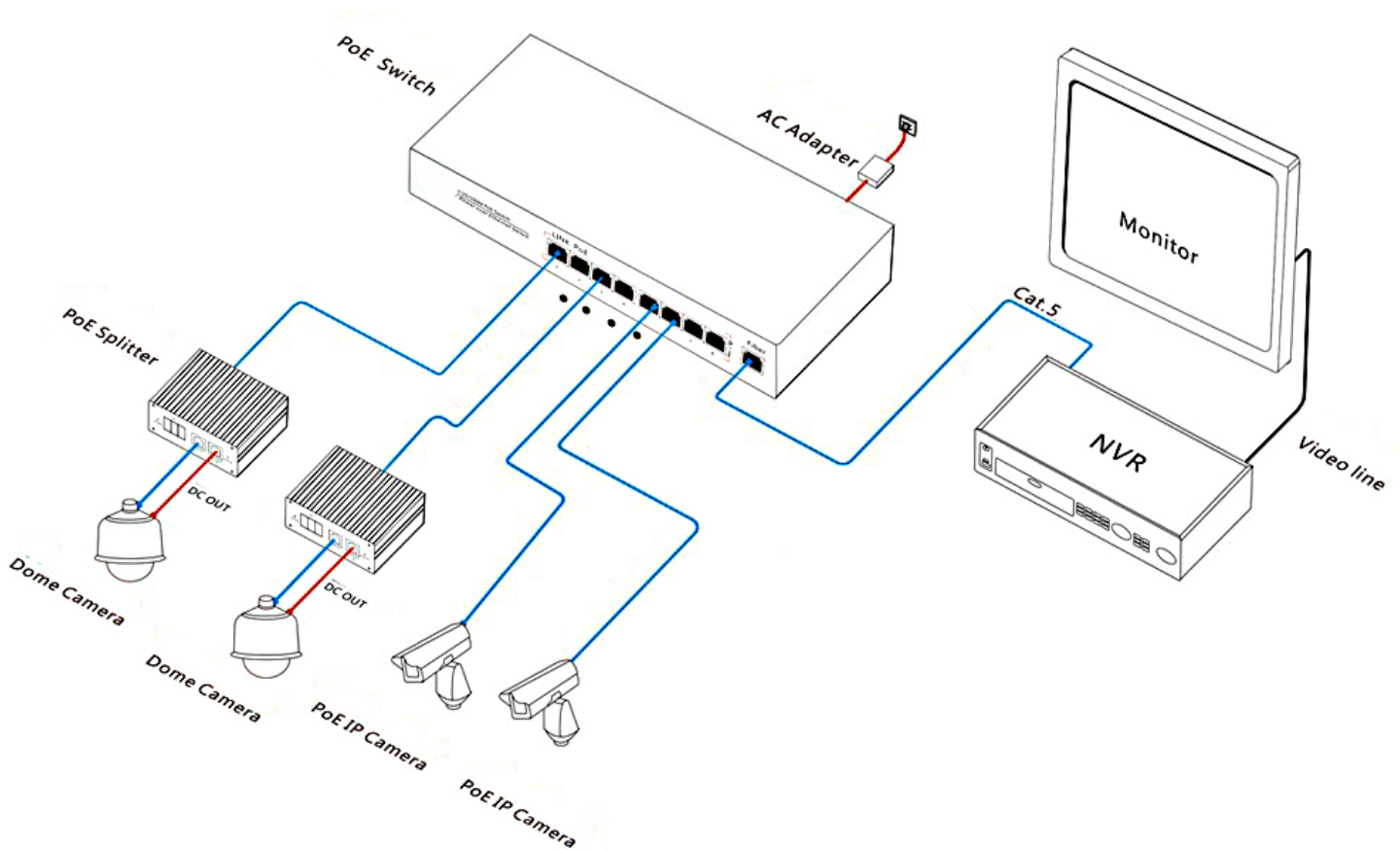
Powered Device



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How to choose a PoE switch?

Since using PoE technology is the best choice, what are factors should we consider when choosing a PoE network switch? For selecting right PoE network switches based on two major factors: PoE standard (802.3af or PoE+) & power requirements, bandwidth & ports requirements.



PoE standard & Power requirements

- PoE (802.3af) provides up to 15.4W per port with up to 12.9W available to the IP camera
- PoE+ (802.3at) provides up to 30W, with up to 25W available to the IP camera
- Hi-PoE/UPoE provides up to 60W, specifically work with IP PTZ cameras.

Most IP cameras are designed to accept Power over Ethernet with 802.3af standard. For high power consumption network cameras such as PTZ network camera they utilizes PoE+ (802.3at) standard. When choosing a PoE switch, the PoE standard must match each other.



Ports & Bandwidth Requirements

You need to know the quantity of network cameras will be in the network. This determines how many ports the switch will need. One port per camera, today there are 4 channel, 8 channel, 16 channel, 24 channel, 32 channel PoE switches available in the market.

Thereafter, you need to figure out what the average bandwidth required per camera. The bandwidth requirement depend on many factors, primarily the resolution, the frame rate. Using this camera bandwidth calculator, you can estimate the required network bandwidth for video streaming. After knowing the average bandwidth required per camera, you can calculate the total bandwidth required per switch.

Average bandwidth per camera x total number of cameras = total bandwidth

Adequate bandwidth for data transmission and resilience, security are key factors required to ensure a successful surveillance network. Undoubtedly, the network is an important element in any network surveillance installation, because it enables system function, not only transmitting video stream so they can be viewed and stored, but also carrying power to the cameras via a Power over Ethernet feature.

What's Midspans and PoE splitters





Midspans and splitters (also known as active splitters) are equipment that enable an existing network to support Power over Ethernet.

The midspan, which adds power to an Ethernet cable, is placed between the network switch and the powered devices. To ensure that data transfer is not affected, it is important to keep in mind that the maximum distance between the source of the data (e.g., switch) and the network video products is not more than 90m. This means that the midspan and active splitter(s) must be placed within the distance of 90m.

A splitter is used to split the power and data in an Ethernet cable into two separate cables, which can then be connected to a device that has no built-in support for PoE. Since PoE or PoE+ only supplies 48 V DC, another function of the splitter is to lower the voltage to the appropriate level for the device; for example, DC12 V or DC5 V.



Standard PoE Network Switches

Model	POE4100P	POE8101PF	POE1601PF	POE2401PF
Picture				
PoE Standard	IEEE802.3af (max. 15.4W)/at (max. 30W)			
RJ45 Ports	4x 10/100Mbps RJ45 Ethernet PoE Ports; 1x 10/100Mbps RJ45	8x 10/100Mbps RJ45 Ethernet PoE Ports; 1x Gigabit RJ45	16x 10/100Mbps Ethernet PoE Ports; 2x Gigabit RJ45	24x 10/100Mbps Ethernet PoE Ports; 2x Gigabit RJ45
SPF Ports	N/A	2x 1000Mbps Fiber SFP ports (Fiber, Combo mode)	2x 1000Mbps Fiber SFP ports (Fiber, Combo mode)	2x 1000Mbps Fiber SFP ports (Fiber, Combo mode)
Total Bandwidth	1.6Gigabit bps	8.8Gigabit bps	8.8Gigabit bps	8.8Gigabit bps
MAC	1K entry MAC address with auto-learning and auto-aging	4K entry MAC address with auto-learning and auto-aging	4K entry MAC address with auto-learning and auto-aging	8K entry MAC address with auto-learning and auto-aging
Addressing	48-bit MAC			
Status LEDs	Link, Activity, Speed, PoE Active, PoE Fault			
Standards	IEEE 802.3i 10BASET; IEEE 802.3u 100BASETX; IEEE 802.3x Flow Control; IEEE 802.1af DTE Power via MDI			
PoE Power Rate	65W	130W	250W	400W
Pairs	1/2+, 3/6- pairs (default)			
RF Standard	CE mark, commercial, FCC Part 15 Class B, VCCI Class B EN 55022 CISPR 22, Class B			
Power Supply	AC/DC Adapter DC52V 1.25A	AC100-240V 50/60Hz, 130W	AC100-240V 50/60Hz, 400W	AC100-240V 50/60Hz, 400W
Dimension	118 x 89x25mm	279x210x44mm	440x210x44mm	440x210x44mm
Installation	Wall-mount kit	Rack-mountable	Rack-mountable	Rack-mountable
Warranty	12 months factory warranty			
Operating Temp.	-20°C - 55°C (Celsius Degree)			
Ingress Protection	N/A (indoor only)			

Standard PoE Splitters






PD41001: 10/100M PoE Splitter/Adapter, Output DC12V, Compliant 802.3af standard, max. 15.4W, 1236 pairs

PD41001-at: 10/100M PoE Splitter/Adapter, Output DC12V, Compliant 802.3at standard, max. 30W, 4578 pairs

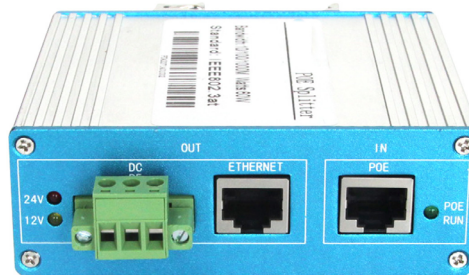


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60W PoE Network Switches

Model	POE4001P	POE4004P	POE4006P
Picture			
PoE Standard	IEEE802.3af (max. 15.4W)/at (max. 30W); 60W		
RJ45 Ports	1x 10/100Mbps PoE Port (up to 60W), 4x 10/100Mbps Ethernet RJ45 Ports	1234 ports support 60W PoE, 5678 ports are regular 10/100Mbps Ethernet Ports	12 ports support 60W PoE, 34 ports are regular Ethernet ports, 5678 ports support 15.4W (802.3af) PoE.
SPF Ports	N/A	N/A	N/A
Total Bandwidth	1.6Gigabit bps	1.6Gigabit bps	1.6Gigabit bps
MAC	1K entry MAC address with auto-learning and auto-aging	1K entry MAC address with auto-learning and auto-aging	1K entry MAC address with auto-learning and auto-aging
Addressing	48-bit MAC		
Status LEDs	Link, Activity, Speed, PoE Active, PoE Fault		
Standards	IEEE 802.3i 10BASET; IEEE 802.3u 100BASETX; IEEE 802.3x Flow Control; IEEE 802.1af DTE Power via MDI		
PoE Power Rate	110W	250W	250W
Pairs	1/2, 4/5+, 3/6, 7/8-		
RF Standard	CE mark, commercial, FCC Part 15 Class B, VCCI Class B EN 55022 CISPR 22, Class B		
Power Supply	AC/DC Adapter DC 52V 2.15A	AC100-240V 50/60Hz, 250W	AC100-240V 50/60Hz, 250W
Dimension	118 x 89x25mm	279x210x44mm	279x210x44mm
Installation	Wall-mount kit	Rack-mountable	Rack-mountable
Warranty	12 months factory warranty		
Operating Temp.	-20°C - 55°C (Celsius Degree)		
Ingress Protection	N/A (indoor only)		

60W PoE Splitters



PD3401: 10/100M PoE Splitter/Adapter, Output DC12V, max. 60W, 1/2, 4/5+, 3/6, 7/8- pairs

PD3401G: 1Gigabit PoE Splitter/Adapter, Output DC12V, max. 60W, 1/2, 4/5+, 3/6, 7/8- pairs



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