



Power over Ethernet

30 or 60 watts over the data cable

Where is the development of “power over Ethernet” headed?

Power over Ethernet (PoE) is one of the processes developed at the Institute of Electrical and Electronics Engineers (IEEE) with which network devices can be provided electricity via an Ethernet cable. The amount of energy which is allowed to flow through the network cable is specified both for electricity suppliers (Power Source Equipment, PSE) and consumers (Power Devices, PD). Older devices, which do not recognize PoE, cannot be damaged.

The main advantage of this process is the saving of a power cable in the connection of devices. This minimizes costs as well as cable clutter and allows the relatively flexible use of terminals, even when difficult to access.

Retrospective examination of “Power over Ethernet”

The first attempts at providing power via Ethernet were made in the 90s; there were a few isolated applications, but nothing widespread. Commonly used standards were first set in 1999 with the PoE IEEE 802.3af process. At that time, most desktops were connected with CAT3 cables, which were partially four-wire, had a maximum length of 100 meters and resistance of 20 ohms. Due to the physical properties of CAT3 cables, there was a maximum permissible current of 350 mA. Hence, is the PoE standard with a maximum output of 15.4 W per switch port ascertainable (see diagram). Less the loss of power, a PoE-enabled network device has a maximum of 12.95 W available. Unfortunately, in many cases, this is not sufficient. Modern WLAN access points or network cameras with pan, tilt, and zoom function usually need more power.



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„Power over Ethernet is a technology of the future which, along with cost savings, offers technically optimized applications“

Development of Power over Ethernet plus

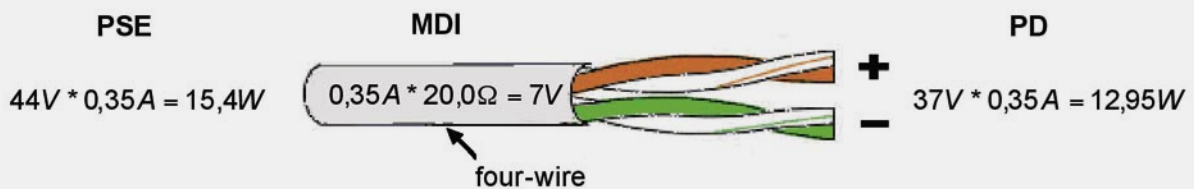
Since 2005, in an effort to get the PoE process to meet changing demand, a working group of the IEEE (DTE Power Enhancement Task Force) has been working on the expansion of the then current PoE specifications (IEEE 802.3af in at 802.3). Key parameters for the development of Power over

Ethernet plus (PoE plus) are:

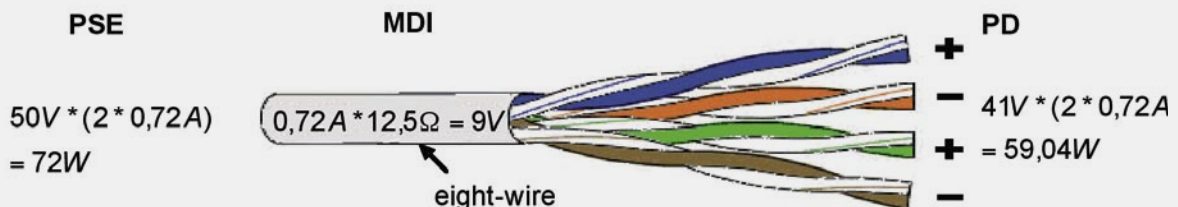
- PoE plus PSEs are backward compatible with PoE PDs
- PoE plus PDs can be operated with PoE PSEs, if necessary, but indicate that they have a plus PoE PSE need
- PoE plus should make available at least 30 W at PD

The new standard (IEEE 802.3at), requires the use of a CAT5 network cable or better. This cable has only 62.5% of the power resistance of a CAT3 cable. Then the IEEE working group followed the recommendations of the Telecommunications Industry Association (TIA) and set the maximum rated current to 720 mA, which is more than twice as high as the PoE standard. In addition, there are now eight instead of four wires available, leading to a further doubling of the current. But it is not just the electricity which has increased. The minimum voltage at the output of the PSE has increased from 44 V to 50 V. After deducting the line losses, there are now 59 W available at the terminal.

Power over Ethernet



Power over Ethernet plus



Outlook

Unfortunately, theory and practice do not always go hand in hand, otherwise, the working group would long be through with their research and the new standard would have been adopted. On the contrary, in March of this year, in an update of the corresponding operation instructions, the minimum output of 30 W at the entrance to the PD was reduced to 24 W. However, the voltage was routed through four pairs of data cable, not two as in the 802.3af. This way, there is no increase in current. This is to prevent lines from overheating, possibly melting or even from cables catching fire. You can already look forward to when, and especially the conditions under which, a maximum power output of 60 W over an Ethernet data cable will be realized. Until further notice, only 24 W are available.

We have extensive experience in the application of Power over Ethernet, please contact us.

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