OmniConverter®
SPoE Distance on Different Cable Types

OmniConverter
Single Pair Power over Ethernet Product Family

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OVERVIEW

Single-Pair Power over Ethernat (SPoE) is defined to work with the 10BASE-T1L 10Mb/s protocol. SPoE enables data and power to reach devices at a distance of up to 1km. It is design to operate over a single-pair Ethernet (SPE) cabling, IEC 61156-13 (fixed) or IEC 61156-14 (flexible) 18AWG, at a distance of up to 1km. However, other cabling types can be used but the distance will vary due to cabling resistance and class of end device.

SPoE deployments use two operating line voltages (24V and 55V DC) depending on the distance and the Class of the end device. There are six Classes defined for SPE networks. Classes 10, 11, and 12 use 24V DC power and Classes 13, 14, and 15 use 55V DC power.

The table below shows the operating parameters for the six Classes.

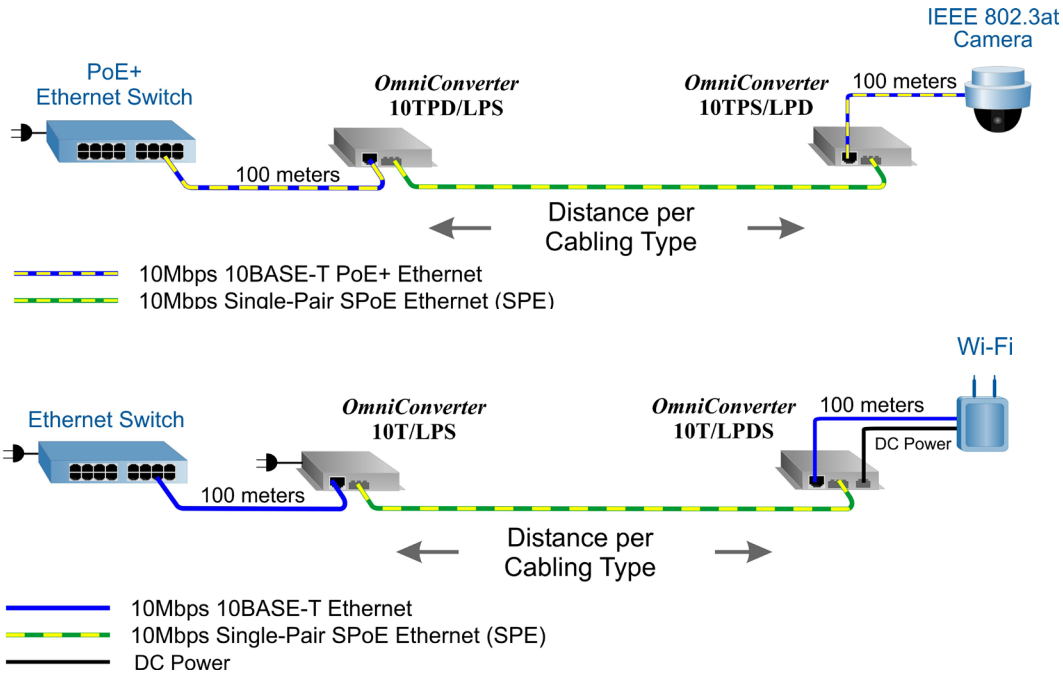
Operating Parameters	Classes					
	10	11	12	13	14	15
Supply Voltage V_{PSE}(min/typ/max)	20/24/30			50/55/58		
Voltage @ PD V_{PD}(min)	14VDC	14VDC	14VDC	35VDC	35VDC	35VDC
Power @ PD P_{PD}(max)	1.23 Watts	3.2 Watts	8.4 Watts	7.7 Watts	20 Watts	52 Watts
Current across cabling I_{CABLE}(max)	0.092A	0.240A	0.632A	0.230A	0.600A	1.579A

The table below shows actual test data for the different cable types using a bookend configuration (Class 13 - 15).

Cable Type	Cable Gauge	Max Cable Length with no data errors	Max SPoE Power at PSE for V_{PD} min (35V)	SPoE Power Available at PD after Max Cable Length	Power Available for PoE or Splitter
CAT5e	24 AWG	700m	8W	5W	n/a
CAT6a	23 AWG	900m	7W	4W	n/a
SPE101	18 AWG	1000m	23W	15W	10W
3090A	16 AWG	1000m	63W	40W	35W

The data shown for the 3090A cable is based on theoretical calculations.

“n/a” indicates the voltage drop across the cable is such that the voltage at the PD is below the minimum level.



The table below shows actual test data for the different cable types for directly connected devices (Class 10 - 12).

Cable Type	Cable Gauge	Max cable length with no data errors	Max SPoE Power at PSE for V_{PD} min (14V)	SPoE Power Available at PD after Max Cable Length
CAT5e	24 AWG	700m	3W	1W
CAT6a	23 AWG	900m	3W	1W
SPE101	18 AWG	1000m	9W	4W
3090A	16 AWG	1000m	18W	11W

The data shown for the 3090A cable is based on theoretical calculations.