Legrand PoE Cabling System Selection Guide

1. Select PSE/PoE type
2. Under "Systems" locate your permanent link solution and document the value given for the distance of the permanent link
3. Finally select type and total length of the patch cords in the channel and subtract the number from the value identified in the permanent link to arrive at your max power delivered

EXAMPLE: If you're using a 15.4W PSE and installing a Legrand nCompass PW1G cabling system with the following channel components, 70m perm link with 10m C6A patch cordages, the cabling should provide the PD (i.e. Type 4, Class 8) with an estimated 14.9W (15.0-0.10) of power at 20°C room temperature.

PoE Loss Calculator

IEEE 802.3af Type 1

PSE: 15.4 W	Permanent Link (Watts)							
Systems	**10m**	**20m**	**30m**	**40m**	**50m**	**60m**	**70m**	**90m**
PW1G (22AWG)	15.3	15.2	15.2	15.1	15.1	15.0	15.0	14.9
nCompass 6/6A (23AWG)	15.2	15.2	15.1	15.1	15.0	15.0	14.9	14.8
nCompass 5E (24AWG)	15.2	15.2	15.1	15.0	15.0	14.9	14.8	14.7
	Total Patch Cords in Channel (Watts)							
Patch Cordage	**1m**	**2m**	**3m**	**5m**	**10m**	**15m**	**20m**	**25m**
Clarity C6/C5E (24AWG)	-0.01	-0.01	-0.02	-0.03	-0.06	-0.09	-0.12	-0.15
Clarity C6A (26AWG)	-0.01	-0.02	-0.03	-0.05	-0.10	-0.15	-0.20	-0.26
Reduced Dia (28AWG)	-0.02	-0.03	-0.05	-0.08	-0.15	-0.23	-0.30*	-0.38*

IEEE 802.3at Type 2

PSE: 30 W	Permanent Link (Watts)							
Systems	**10m**	**20m**	**30m**	**40m**	**50m**	**60m**	**70m**	**90m**
PW1G (22AWG)	29.7	29.6	29.4	29.2	29.1	28.9	28.7	28.4
nCompass 6/6A (23AWG)	29.7	29.5	29.3	29.1	28.9	28.6	28.4	28.0
nCompass 5E (24AWG)	29.6	29.4	29.1	28.9	28.6	28.3	28.1	27.6
	Total Patch Cords in Channel (Watts)							
Patch Cordage	**1m**	**2m**	**3m**	**5m**	**10m**	**15m**	**20m**	**25m**
Clarity C6/C5E (24AWG)	-0.02	-0.05	-0.07	-0.12	-0.24	-0.36	-0.48	-0.60
Clarity C6A (26AWG)	-0.04	-0.08	-0.12	-0.20	-0.40	-0.60	-0.80	-1.00
Reduced Dia (28AWG)	-0.06	-0.12	-0.18	-0.30	-0.59	-0.89	-1.18*	-1.48*

IEEE 802.3bt Type 3 | CISCO UPoE

PSE: 60 W	Permanent Link (Watts)							
Systems	**10m**	**20m**	**30m**	**40m**	**50m**	**60m**	**70m**	**90m**
PW1G (22AWG)	59.6	59.2	58.9	58.5	58.2	57.9	57.5	56.9
nCompass 6/6A (23AWG)	59.5	59.1	58.6	58.2	57.8	57.4	57.0	56.1
nCompass 5E (24AWG)	59.4	58.9	58.3	57.8	57.3	56.8	56.3	55.2
	Total Patch Cords in Channel (Watts)							
Patch Cordage	**1m**	**2m**	**3m**	**5m**	**10m**	**15m**	**20m**	**25m**
Clarity C6/C5E (24AWG)	-0.05	-0.10	-0.16	-0.26	-0.52	-0.78	-1.04	-1.29
Clarity C6A (26AWG)	-0.08	-0.17	-0.26	-0.43	-0.86	-1.29	-1.72	-2.15
Reduced Dia (28AWG)	-0.13	-0.25	-0.38	-0.63	-1.27	-1.90	-2.53*	-3.17*

*Loss exceeds acceptable parameters
NOTE: Permanent link calculation includes connectivity & horizontal cable.
Patch Cord calculation assumes stranded conductor cordage.

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IEEE 802.3bt Type 4 | CISCO UPoE+

PSE: 90 W	Permanent Link (Watts)							
Systems	**10m**	**20m**	**30m**	**40m**	**50m**	**60m**	**70m**	**90m**
PW1G (22AWG)	89.1	88.4	87.6	86.9	86.1	85.3	84.6	83.0
nCompass 6/6A (23AWG)	89.0	88.0	87.1	86.1	85.2	84.3	83.3	81.4
nCompass 5E (24AWG)	88.7	87.6	86.4	85.2	84.1	82.9	81.7	79.4
	Total Patch Cords in Channel (Watts)							
Patch Cordage	**1m**	**2m**	**3m**	**5m**	**10m**	**15m**	**20m**	**25m**
Clarity C6/C5E (24AWG)	-0.1	-0.2	-0.3	-0.5	-1.1	-1.6	-2.2	-2.7
Clarity C6A (26AWG)	-0.2	-0.4	-0.5	-0.9	-1.8	-2.7	-3.6	-4.5
Reduced Dia (28AWG)	-0.3	-0.5	-0.8	-1.3	-2.7	-4.0	-5.3*	-6.7*

For PoE cabling system installations, calculating the estimated power losses is an important factor to ensure proper operation of the end component PD.

*Loss exceeds acceptable parameters
NOTE: Permanent link calculation includes connectivity & horizontal cable.
Patch Cord calculation assumes stranded conductor cordage.

Considerations for PoE cabling design architecture:

1. Cabling pair-to-pair current unbalance: This measurement is different than unbalance within a pair, as it's important to providing functional and proper power to an end device, check the manufactures cabling system if specified.
2. Be careful of cable bundling heating effect. Guidelines are provided in the Technical Service Bulletin TSB 184 and TSB 184-A for recommendation and guidelines concerning bundling rise limits (less than 15°C) and cabling lengths. For example if cabling temperature is an issue, increasing the cabling gauge size (AWG) will reduce its overall loop resistance and thus reduce the overall cabling temperature.
3. Know or be aware of the cabling natural power losses due to its design components. A chart (A) as shown above from the cabling system manufacture should assist in estimating the power losses from a given Power Source Equipment (PSE) delivery to the Power Device (PD). Also note there could be additional power losses due to high ambient environments effect on the cabling system horizontal layout.
4. Elevated and extreme ambient environment temperatures could add 1-2 watts of extra power loss to the cabling channel system.

Power Over Ethernet Specifications

IEEE

4-PAIR CABLING

Property	802.3af (802.3at Type 1)	802.3at	802.3bt	802.3bt
PoE Type	1	2	3	4
Maximum power delivered by PSE	15.4W	30W	60W	90W
Power available at PD	12.95W	25.50W	51W	71W
Voltage range (at PSE)	44.0–57.0V	50.0–57.0V	50.0–57.0V	52.0–57.0V
Voltage range (at PD)	37.0–57.0V	42.5–57.0V	42.5–57.0V	41.1–57.0V
Maximum current I max/pair	350mA	600mA	600mA	960mA (1A)
Maximum current I max/wire	175mA	300mA	300mA	480mA (.5A)
Maximum cable resistance per pairset	20Ω (Cat3)	12.5Ω (Cat5E)	12.5Ω	12.5Ω
Derating of maximum cable ambient operating temperature	None	5°C (9°F) with one mode (two pairs) active	10°C (20°F) with more than half of bundled cables pairs at Imax	10°C (20°F) with temperature planning required
Supported modes	Mode A (endspan), Mode B (midspan)	Mode A, Mode B	Mode A, Mode B, 4-pair mode	4-pair mode

Other Systems:

CISCO Phone Delivery 15.4 Watts PSE, 2 pair, (compatible to 802.3af)
CISCO UPoE, 60 Watts PSE, 4 pair, (compatible to 802.3at)
CISCO UPoE+, 90 Watts PSE, 4 pair, (compatible to 802.3bt)
HDBASE-T PoH, 100W,4 pair, 50-57vdc, .5A/pair

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