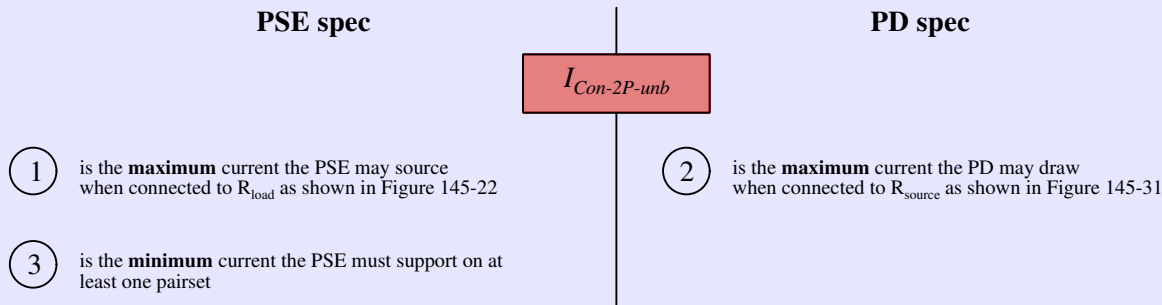


P802.3bt D3.0 – Creating margin in the unbalance specification v110 (test)

Info (not part of baseline)

The core parameter for 4-pair unbalance is $I_{Con-2P-usb}$ and $I_{Peak-2P-usb}$. $I_{Con-2P-usb}$ is defined in the PSE section (Table 145–16) as a **minimum**. Three distinct requirements hinge on it:



Because the same parameter is used for all 3 requirements, there is no margin between the maximum current that can flow (and must be supported), and the minimum current that a PSE must support. Additionally, because $I_{Con-2P-usb}$ is defined as a minimum, but used twice as a maximum, we have the potential for confusion.

Requirements 1 and 2 are very tightly coupled together with the definitions of R_{source} and R_{load} . Since this parameter is a system parameter (used in requirements in both the PSE and the PD), it doesn't really belong in the PSE table.

Some juggling is required as follows (executed in this order):

- **Rename** $I_{Con-2P-usb}$ to $I_{Unbalance-2P}$ (throughout the draft!)
- **Move** $I_{Unbalance-2P}$ out of the PSE section into 145.1.3 System parameters
- **Add** “new” parameter $I_{Con-2P-usb}$, which applies ONLY to the PSE and is the amount of current the PSE must support. This number to be slightly higher than $I_{Unbalance-2P}$.

$I_{Con-2P-usb}$ then becomes a clear **minimum** parameter, which is used only in the PSE. $I_{Unbalance-2P}$ is then the PSE/PD shared unbalance current under worst-case unbalance operation.

Note — the same applies to $I_{Peak-2P-usb}$, however it is more complicated because this parameter is not a constant. That first needs to be resolved before we can give it a similar treatment.

Note — darshan_xx modifies the values of $I_{Con-2P-usb}$, these values take precedence over what is here

Rename $I_{Con-2P-usb}$ to $I_{Unbalance-2P}$ throughout the draft.

Insert new subclause 145.1.3.3 as follows:

145.1.3.3 Pair-to-pair current unbalance

When a PSE supplies power to a PD using all 4 pairs, the current will not equally divide between the pairs that are at the same polarity. This is referred to as pair-to-pair current unbalance. The degree to which the current is unbalanced depends on the specific combination of PSE, cabling, and the PD.

The maximum pair current in a system depends on the assigned Class (see 145.2.7), and is defined in Table 145–1a.

Table 145–1a — Maximum pair-to-pair current unbalance

Parameter	Assigned Class	Unit	Value
$I_{Unbalance-2P}$	1 to 4	A	I_{Con}
	5		0.55
	6		0.682
	7		0.682
	8		0.682

145.2.8 Power supply output

Change Table 145–16 as follows:

Item	Parameter	Symbol	Unit	Min	Max	PSE Type	Additional information
5	Pairset current including unbalance effect per the assigned Class, when powering single-signature PDs						
	Supported pairset current to account for unbalance per the assigned Class (for single-signature PDs)						
	Class 1 to 4	$I_{\text{Con-2P-unb}}$	A	I_{Con}^a		3,4	See 145.2.8.5, and 145.2.8.5.1 , and 145.3.8.10.
	Class 5			0.55 0.56		3,4	
	Class 6			0.68 0.69		3,4	
	Class 7			0.78 0.79		4	
Class 8	0.93 0.94				4		

145.2.8.5 Continuous output current capability in the POWER_ON state

PSEs shall be able to source $I_{\text{Con-2P}}$, the current the PSE supports on each powered pairset, as defined in Equation (145–8).

Change description of Equation 145–8 as follows (changes highlighted in red):

where

...
 ~~$I_{\text{Con-2P-unb}}$~~ is the current a PSE is able to source on a pairset due to unbalance as defined in Table 145–16
 $I_{\text{Con-2P-unb}}$ is the current a PSE is able to source on a pairset to account for pair-to-pair unbalance
 ...