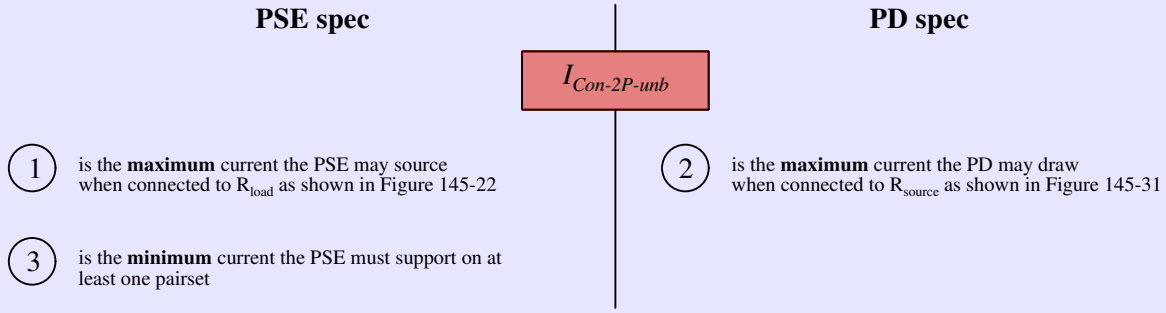
P802.3bt D3.0 – Creating margin in the unbalance specification v103

Info (not part of baseline)

The core parameter for 4-pair unbalance is $I_{Con\text{-}2P\text{-}unb}$ and $I_{Peak\text{-}2P\text{-}unb}$. $I_{Con\text{-}2P\text{-}unb}$ 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 $I_{Con\text{-}2P\text{-}unb}$ 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}. As such they are hard to change without large impact. Hence this baseline will decouple requirement 3 from $I_{Con\text{-}2P\text{-}unb}$ and create a new parameter for it: $I_{Unbalance\text{-}2P}$.

$I_{Con\text{-}2P\text{-}unb}$ then becomes a clear **maximum** parameter, which is used both for the PSE and the PD.

Note — the same applies to $I_{Peak\text{-}2P\text{-}unb}$, 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 $I_{Con\text{-}2P\text{-}unb}$, these values take precedence over what is here

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~~ Pairset current for PSE and PD, including unbalance, per the assigned Class (for single-signature PDs)						
	Class 1 to 4	$I_{Con\text{-}2P\text{-}unb}$	A	~~I_{Con} [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~~	0.55	3,4	
	Class 6			~~0.682~~	0.682	3,4	
	Class 7			~~0.781~~	0.781	4	
	Class 8			~~0.932~~	0.932	4	

Insert new item into Table 145–16, after item 5, as follows:

Item	Parameter	Symbol	Unit	Min	Max	PSE Type	Additional information
5a	Supported pairset current to account for unbalance per the assigned Class (for single-signature PDs)						
	Class 1 to 4	$I_{Unbalance\text{-}2P}$	A	I_{Con} [a]		3,4	See 145.2.8.5 and 145.2.8.5.1.
	Class 5			0.6		3,4	
	Class 6			0.7		3,4	
	Class 7			0.8		4	
	Class 8			0.95		4	

145.2.8.5 Continuous output current capability in the POWER_ON state

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

Replace Equation 145–8 as follows (changes highlighted in red):

$$I_{Con\text{-}2P} = \left\{ \begin{array}{ll} P_{Class}/V_{PSE} & \text{when in 2-pair mode} \\ \min(I_{Con} - I_{Port\text{-}2P\text{-}other},\ I_{Unbalance\text{-}2P}) & \text{when 4-pair powering a single-signature PD} \\ P_{Class\text{-}2P}/V_{PSE} & \text{when 4-pair powering a dual-signature PD} \end{array} \right\}_{A} \quad (145\text{–}8)$$

where

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

When powering a single-signature PD over 4 pairs, a PSE supports:

— A total current of I_{Con} defined in Equation (145–9), over both pairs with the same polarity;
— A minimum current of ~~$I_{Con\text{-}2P\text{-}unb}$~~ $I_{Unbalance\text{-}2P}$ over one of the pairs of the same polarity under maximum unbalance condition (see 145.2.8.5.1) in the POWER_ON state.