

# Unbalance

Rev. 3

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- ▶  $I_{\text{Unbalance-2p}}$  and  $I_{\text{Con-2p-unb}}$  were set above the modeled values in Draft 3.1
- ▶ Unbalance interoperability has been compromised
  - PSEs and PDs may now be more unbalanced and pass compliance tests
- ▶ These PSEs and PDs may fail to interoperate in the field

# How do we add Margin

## ► Option 1:

- Set lunbalance-2p numbers to the exact numbers that the models derive
  - All real hardware that matches the modeled unbalance or better will be compliant
- Set Icon-2p-unb to lunbalance-2p + X
  - This ensures that PSEs supply Icon-2p-unb without turning off
  - Everyone seems to like X=2mA

## ► Option 2:

- Set lunbalance-2p numbers below the numbers that the models derive
  - Some of the worst case hardware that was modeled will not be compliant
- Set Icon-2p-unb to numbers from Draft 3.0 or greater
  - Worst case hardware should still interoperate in the field

## ► Option 2A:

- Use icon-2p-unb numbers from option 2
- Replace tables 145-31 and 145-17 with an equation:
$$\text{lunbalance-2p} = \text{Icon-2p-unb} - 10\text{mA}$$

# Icon-2p-unb from Draft 3.0

► For reference:

5	Pairset current including unbalance effect per the assigned Class, when powering single-signature PDs						
	Class 1 to 4	$I_{\text{Con-2P-umb}}$	A	$I_{\text{Con}}^a$		3, 4	See 145.2.8.5 and 145.2.8.5.1.
	Class 5			0.55		3, 4	
	Class 6			0.682		3, 4	
	Class 7			0.781		4	
	Class 8			0.932		4	

# Solution 1 (1 of 3)

- 1) Reset Table 145-17 to Draft 3.0 values as follows:

**Table 145–17—Maximum pair-to-pair current unbalance**

Parameter	Assigned Class	Unit	Value
$I_{\text{Unbalance-2P}}$	1 to 4	A	$I_{\text{Con}}$
	5		<del>0.56</del> 0.55
	6		<del>0.695</del> 0.682
	7		<del>0.793</del> 0.781
	8		<del>0.937</del> 0.932

## Solution 1 (2 of 3)

- 2) Reset Table 145-31 to Draft 3.0 values as follows:

**Table 145–31—Maximum pair-to-pair current unbalance**

Parameter	Assigned Class	Unit	Value
$I_{\text{Unbalance-2P}}$	1 to 4	A	$I_{\text{Con}}$
	5		<del>0.56</del> 0.55
	6		<del>0.695</del> 0.682
	7		<del>0.793</del> 0.781
	8		<del>0.937</del> 0.932

# Solution 1 (3 of 3)

- Change Table 145-16 as follows
- Use  $I_{\text{Con-2p-unb}}$  values from Table 145-16 in Draft 3.0 then add 2mA

5	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	$I_{\text{Con}}^a$		3, 4	See 145.2.8.5 and 145.2.8.5.1.
	Class 5		0.552	<del>0.56</del>		3, 4	
	Class 6		0.684	<del>0.695</del>		3, 4	
	Class 7		0.783	<del>0.795</del>		4	
	Class 8		0.934	<del>0.937</del>		4	

## Solution 2 (1 of 3)

- ▶ Change Table 145-17 as follows:
- ▶ Use  $I_{\text{Con-2p-unb}}$  values from Table 145-16 in Draft 3.0 then subtract 10mA for test precision and system margin

**Table 145–17—Maximum pair-to-pair current unbalance**

Parameter	Assigned Class	Unit	Value
$I_{\text{Unbalance-2P}}$	1 to 4	A	$I_{\text{Con}}$
	5		<del>0.56</del> 0.54
	6		<del>0.695</del> 0.672
	7		<del>0.793</del> 0.771
	8		<del>0.937</del> 0.922



## Solution 2 (2 of 3)

- Change Table 145-31 as follows:
- Use  $I_{\text{Con-2p-unb}}$  values from Table 145-16 in Draft 3.0 then subtract 10mA for test precision and system margin

**Table 145–31—Maximum pair-to-pair current unbalance**

Parameter	Assigned Class	Unit	Value
$I_{\text{Unbalance-2P}}$	1 to 4	A	$I_{\text{Con}}$
	5		<del>0.56</del> 0.54
	6		<del>0.695</del> 0.672
	7		<del>0.793</del> 0.771
	8		<del>0.937</del> 0.922

## Solution 2 (3 of 3)

- Use  $I_{\text{Con-2p-unb}}$  values from Table 145-16 in Draft 3.0 then round up to less precise numbers:

5	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	$I_{\text{Con}}^a$		3, 4	See 145.2.8.5 and 145.2.8.5.1.
	Class 5		0.55	<del>0.56</del>		3, 4	
	Class 6		0.69	<del>0.695</del>		3, 4	
	Class 7		0.79	<del>0.795</del>		4	
	Class 8		0.94	<del>0.937</del>		4	

# Solution 2A (1 of 2)

## ► Change section 145.2.8.5.1 as follows:

The maximum pair current in a system depends on the assigned Class (see 145.2.7), and is defined in ~~Table 145-17.~~ **Equation 145-XX.**

**Table 145–17—Maximum pair-to-pair current unbalance**

Parameter	Assigned Class	Unit	Value
$I_{\text{Unbalance-2P}}$	1 to 4	A	$I_{\text{Con}}$
	5		0.56
	6		0.695
	7		0.793
	8		0.937

$$I_{\text{Unbalance-2P}} = I_{\text{con-2p-unb}} - 10\text{mA}$$

## Solution 2A (2 of 2)

### ► Change section 145.3.8.9 as follows:

The maximum pair current in a system depends on the assigned Class (see 145.3.6), and is defined in ~~Table 145-17~~. **Equation 145-XX.**

**Table 145-31—Maximum pair-to-pair current unbalance**

Parameter	Assigned Class	Unit	Value
$I_{\text{Unbalance-2P}}$	1 to 4	A	$I_{\text{Con}}$
	5		0.56
	6		0.695
	7		0.793
	8		0.937

$$I_{\text{Unbalance-2P}} = I_{\text{con-2p-unb}} - 10\text{mA}$$