10SPE Powering Discussion

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Power “profiles” and What is Expected from the Standard

There appears to be various types of implementations or “profiles”. For example, here are some of them:

1. Process industry
   - Typically with up to 1km trunk cable, with 4-5 switches driving 10-30 field devices over ~200m cable each.
   - Preferrable to have data and power over single twisted pair.
   - Point-to-point interconnection for data communication.
   - Could be with daisy-chaining between field switches (this is NOT for multi-drop).
   - Some devices with intrinsic safety requirements.
2. Factory automation
   a) On-machine and In-Cabinet: up to ~50m cable. Multipoint could be an option for data, currently using daisy-chain (linear configuration).
   b) Plant-Wide (1km cable) Factory automation
   - In many cases, ok with a cable including 2 separate pairs (power vs data).
3. Building automation and control
   - Separate pairs for power and data

Power “profiles” and What is Expected from the Standard

- Since it’s not realistic to have a unique specification, one approach could be to define a list of “profiles” or “Use Cases”.
- Profile definition could include sub-categories like operating voltage, channel resistance range, sourced power, load power, etc.
- A compliant device or equipment would then need to meet the requirements defined for a specific profile.
- Once the profiles are defined, we need to define what should be the requirements to ensure interoperability. In other words, what are we expecting from the standard.
- Requirements could include for example inrush spec (sourcing equipment or field device TBD), Load di/dt, Current limit, etc.
- One question is also if we support power without data

Possible Power “use cases”

#	Profile	Sub-Profile	VPSE max	VPD min	P_{PD} max*	Max Loop R	Detect-class required	Daisy-chaining?	
1	Process Industry	Non-Intrinsically safe	57V	28.5	100W	?			
		Increased safety (Ex e)	48V	24	60W	?			
		Intrinsically safe (Ex i)	17.5V	9	500mW	11 ohms			
2	Factory Automation	On machine							
		In cabinet							
		Plant wide							
3	Building Automation and Control								
4	Automotive								

* P_{PD} max is the maximum (functional) power we need to supply to a PD.