

Application Note

Considerations before installing cable with surge protection

When installing a PARADIGM™ extended distance solution that involves an outdoor component entering the building, a primary surge protector is often required by local building codes. A secondary surge protector is also recommended, which helps protect the network powered device should a surge event occur along the installation path. Please consult your local authority having jurisdiction for surge protection requirements.

Application Note ID:

NS-AN26-0002

Date:

2026-04-13

Product Line:

PARADIGM™ Solution

Part Numbers Affected:

Stadion OSP
SST CMP
SST CMR
SST B2ca
SST Cca

In general, surge protection devices are not component compliant, which means that when installed, the resultant link and channel will not be compliant to its appropriate category or class. This effect is expected. To account for these impacts on the channel, surge protectors require a reduction in overall length to maintain network performance. The exact amount of reduction will depend on the manufacturer and models of the surge protectors.

Leviton performed testing with the Ditek DTK-110CAPOE primary surge protector and DTK-MRJPOES secondary surge protector, using Ethernet data rates from 10 Mb to 2.5 Gb, to determine the support capability. When consulting the distances in the PARADIGM System Data Sheet or the Extended Distance Application Guide, the maximum supported extended distance length must be reduced by 20 m (66 ft) to account for the surge protector effects.

When planning the network installation, this 20 m (66 ft) length reduction must be taken into account to ensure network communication occurs without disruption. These reductions may affect placement of network powered devices. It is advised to account for the length changes during planning, not during installation, to reduce any issues. Please note, lengths planned below this modified maximum length are not affected. Due to component differences, this length will be different for different models and manufacturers; the length reductions above is specific to the Ditek models noted above.

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For example, when using these Ditek surge protectors, a link for 1000BASE-T, made of 35 m (114 ft) of SST cable, the Stadion OSP cable has a maximum length of 136 m (623 ft) without surge protectors. The new maximum length of the Stadion OSP section would be 116 m (380 ft) with surge protectors. If the link is planned to use 110 m (360 ft), no modification to the plan is required. If the length is greater than this new maximum, device locations will need to be modified to account for the change.

Leviton has no control over components manufactured by third parties. Therefore, the 20 m (66 ft) extended distance length reductions may no longer apply if Ditek alters their components. Installers would need to verify with Ditek that installed components match the current rev available as of the date of this document.

There are many effects, such as DC Resistance increases, increased NEXT and Return Loss noise, that a surge protector applies to a channel that can impact communications and PoE capabilities. Because surge protectors are not component compliant, distance from the ends will impact the crosstalk and return loss electrical noise, which in turn can impact how the channel performs with BASE-T communication. Because different manufacturers have their own proprietary technology for surge suppression, the exact length reduction will vary by manufacturer.

It is recommended to use both a primary surge protector (often required by local building codes, please see your local authority having jurisdiction for details) and a secondary surge protector. Surge events can travel in both directions on the cable; having a protector at both ends helps protect network devices. Please note, surge protectors only work if a good, quality ground is in place, and it is connected according to the surge protection manufacturer's instructions.

Leviton only provides warranties on our manufactured components. Test data on the individual segments must be provided. Leviton warranties do not cover surge protection damage nor cover the surge protectors themselves; such a warranty would need to come from the protector's manufacturer.

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As a general summary:

Required Surge Protectors	Primary surge protectors are required for cables entering the building per local codes. Please see your local authority having jurisdiction for further details
Recommended Surge Protectors	Secondary surge protectors are recommended to protect network powered devices
Standards Compliance	Surge protectors are not component compliant; links and channels tested with surge protector will not pass category or custom limits.
Performance Impact	Surge protectors add noise; reducing length from the maximum supported length will help compensate for active data transmissions
	Surge protectors add DC Resistance which can impact Power over Ethernet applications; reducing length from the maximum supported length will help compensate for power loss
Planning Guidance	Primary Surge Protector: Ditek DTK-110CAPOE Secondary Surge Protector: Ditek DTK-MRJPOES Length Reduction: 20 m (66 ft) for 10/100/1000/2.5GBASE-T extended distance applications
	Length reduction will vary for other surge protector manufacturers
Warranty	Leviton warranties only cover Leviton-manufactured components
	Test data required for individual segments
	Leviton warranties do not cover surge protection damage or the surge protectors themselves; surge protector warranty coverage would need to come from the surge protector manufacturer.

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