

NOVARIS

Application Note
(0015-D70V2)

SURGE PROTECTION FOR VDSL SYSTEMS

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Introduction

Like all electrical and electronic equipment VDSL equipment can be damaged by electrical surges induced from adjacent wiring and from lightning.

VDSL or Very High Speed Digital Subscriber Line is an advanced data transmission system that uses complex modulation techniques to achieve very high bit rates over standard copper cables such as a telephone line. VDSL can achieve up to 52Mbit/s in the downstream direction whilst the newer VDSL2 permits data rates up to 300+ Mbit/s downstream and upstream on twisted pairs using a bandwidth up to 35 MHz.

Surge Protection

The high bandwidth requirement of VDSL means that many common types of Surge Protection Devices (SPD) will not work effectively, they will either reduce the data transmission speeds possible or completely block the signal.

To achieve adequate protection for the VDSL equipment connected to the line a specially designed surge protector is required that is able to pass the high frequency signals and provide protection to both common and transverse modes.

Common Mode

This is a surge appearing between the lines and earth. For systems with long transmission distances this is the mode that causes the bulk of damage to the connected electronic equipment. Most commercially available VDSL modems can only tolerate 1500 volts between the line connections and earth, a value that can easily be exceeded without the correct SPD fitted.

Transverse Mode

This is a surge appearing between one line and the other. As most telephone lines are a twisted pair this effect is usually much smaller than the common mode, however with other types of cable such as a flat twin this can be larger and an SPD has to be able to limit these transverse mode surges to values that will not damage the connected equipment.

MPP-VDSL Surge Protector

The Novaris Modular Plug Protector, MPP-VDSL is specifically designed to protect VDSL equipment in both modes without reducing the system bandwidth.

It is designed to protect a single cable pair and is provided with two RJ45 type connectors, one to connect to the cable or line side and the other for the protected equipment such as a modem; this is designated the equipment side.

The MPP-VDSL is also provided with a number of adaptors to allow different connectors to be used, these are an RJ12 reducer and a two-way terminal block, shown below in Figure 2.



Figure 1. MPP-VDSL Surge Protector



Figure 2. RJ45 to Two Way Terminal Adapter

The product data sheet for the MPP-VDSL is numbered NDS1.2363 and is available from the Novaris website.

For effective protection of the VDSL equipment protection needs to be applied to both ends of the cable as shown in Figure 2 below.

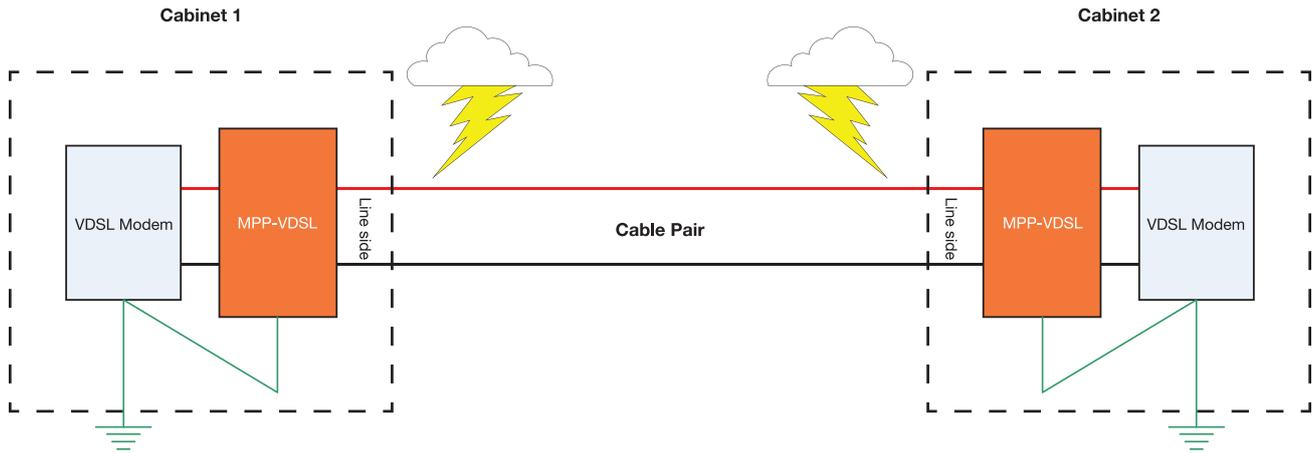


Figure 3. Connections for MPP-VDSL

03 **Grounding**

The MPP-VDSL unit has a number of different grounding options. It is supplied with a stainless steel DIN rail mounting clip that directly grounds the body of the device to the DIN rail. It also comes with an earth connection lead that can be used to connect directly to an earth connection on the VDSL modem as shown in Figure 3 above.

There are two options for grounding the MPP-VDSL depending on the type of VDSL Modem being used.

1. **Metallic body modem with earth terminal**

Use the earth connection lead supplied with the MPP-VDSL to connect directly to the earth terminal or casing on the VDSL modem as shown in Figure 3. Mount the MPP-VDSL as close to the VDSL modem as possible and ensure the earth connection is also secured to the cabinet frame or earth bar.

2. **Plastic body modem with separate power supply**

These modems usually are powered from a separate plug pack power supply and are double insulated with no earth connection or terminal provided. In this case the MPP-VDSL should be earthed to mains earth point where the plug pack derives its AC power.