



THE Norscan REPORT

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Product Profile:

WINNER
TECHNOLOGIES
RELEASES
UPDATED MINI-
MONITORING
UNIT pg6

Welcome to the Norscan community. Our newsletters address current issues that influence the high tech industry today, and provide value and solutions. We appreciate any comments or suggestions that our readership may have which can be forwarded to:

newsletter@norscan.com.

To unsubscribe to this newsletter, please use the above address.



NEWS ALERT!

NHL Winter Classic Engineered to Perfection (and powered by Norscan)

New Year's Eve, Laurie Sullivan (The RF Edge) reported on the technology behind the ice for the Bridgestone NHL Winter Classic. This application for the NHL hockey league, is the latest in market expansions for the product line Norscan engineered for their customer Eye On The Ice (www.eyeontheice.com). [Click here](#) for the full story.

Problematic Pests: *Protecting Your Cables*



Insulating your fiber optic communication cables against weather conditions is not the only part of Mother Nature that you have to worry about. When trying to protect your installations, you also have to worry about your fellow furry friends: rodents.

Rodent damage can be extensive in both below grade and aerial installations. In fact, each cable installation even has its own rodent type to contend with. Gophers are the number one problem for buried installations in North America and squirrels are the worst pests when it comes to aerial installations.

tree dwelling rodents. Communication cables without a protective armor or those not installed within a conduit, are far more susceptible to damage. This damage ultimately affects the fiber optic cable strands, causing communication disruptions.

Dealing with rodent damage and the rodents themselves can be a daunting task. Attempts are made to keep up with the repairs, only to find out that what was just repaired a day or so ago is damaged again by the same animals. Furthermore, when pest control measures are started, it is soon realized that unless these measures are maintained, rodents will repopulate these areas shortly after these measures are suspended. Many businesses have already had "run ins" with rodents and many know how frustrating this experience can be.



Why the Problem Occurs:

If you do have a problem with rodents, don't take it personally. The attraction these animals have to communication cables has more to do with the size of the cable and where the cables are placed than with any other factor (USDA National Wildlife Research Center - Rodent & Pests 2007 by Gary W. Witmer/Richard M. Engerman). Often, rodents will mistake cables for vegetative roots or tree limbs that blend into their natural habitat.

The Witmer/Engerman study indicates that the average root system in plants is anywhere between ground level and to a depth of 1.3 meters (or four feet). Any communication cables that are installed within these depths are more prone to rodent damage because this is within their natural habitat. Intertwining tree limbs within aerial installations cause the same effect for

Simple Tips and Tricks to Solve the Problem

From our experience with customers and the outside plant, we've collected the following six recommendations to consider as you look to reduce rodent damage on your below grade and aerial cable installations:

- 1) **Use Armoured Cable** - Communication cables with protective metallic armor (better known as armored fiber optic cable) are less susceptible to rodent damage and, in the very least, remain operational longer than all dielectric cable. Furthermore, monitoring solutions (such as those provided by Norscan Instruments) are available for detecting the damage on armored cable providing operators with visibility of maintenance requirements.
- 2) **Use a Conduit** - For all dielectric cables or for added protection to armored cables, below grade installations should be placed within a conduit for maximum protection against rodents, especially if the cable is to be installed within the root system (ground level to a depth of 1.3 meters or 4 feet).

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Problematic Pests cont'd...

- 3) **Avoid Root Systems** - Ensure cables are buried below the vegetative root system (minimum depth 1.3 meter or 4 feet).
- 4) **Compact OSP Deployments** - Ensure that the soil area is well compacted within the cable trenches (rodents burrow underground within the path of least resistance).
- 5) **Avoid Known Rodent Habitats** - When possible, try to avoid cable installations in already-known rodent infested areas.
- 6) **Manage Flora Growth** - In aerial installations ensure regular tree pruning practices are followed, to avoid close contact between tree limbs and communication cable.

Long-Term Solutions for the Reoccurring Problem

Rodent damage can put a substantial strain on outside plant maintenance routines, resources, and budgets. Conventional methods of pest control deal more with reactive measures, such as setting traps or laying out poison in the rodent infested areas within fiber optic cable infrastructures. However, some Norscan customers have discovered that proactive measures, such as creating a deterrent to rodent contact activity, has proven to be a more effective and economical long term solution to minimize damage by rodents and reduce communication outages for their customers. For example, one such method is to have a fiber optic cable installed into a harden duct system (an option for new installations, but one that cannot be retrofitted onto existing cable infrastructures).

Implementing a retro-fit rodent deterrent on existing cable infrastructures can be challenging, but is actually possible. Field reports have suggested electricity that is applied to armored cable provides a rodent deterrent similar to hardened duct. Building on the inherent benefit of a metallic armor as a deterrent, the cable armor can be energized with DC (Direct Current) or AC (Alternating Current) voltages. This electric current on the armor then creates the invisible deterrent to rodent activity on the cable. When a rodent makes contact between the cable armor and ground (or in the case of aerial cable, the cable lashing), the rodent experiences an electric shock which, from customer reports, appears to restrict or eliminate the rodent

activity on the cable armor.

How it Works

The methodology of energizing the cable armor will sound familiar to those service providers that have Norscan central office cable monitoring and/or cable locate transmitter equipment already deployed throughout their outside plant cable networks.



The voltages used in either application are relatively harmless to humans, but would provide some discomfort to rodents when contact is made to the energized cable armor.

The AC voltage mode (also known as Cable Locate mode) may be the best option to discourage rodent activity because of the relatively higher voltage and current levels that are applied to the outside plant (100 Vac at 500 mA). The AC voltage mode can be set for a 12 hour period with automatic turn off, at which time the lower DC voltage mode would take over. When in the DC voltage mode (also known as the Monitoring mode), an overall indication of how well the polyethylene is holding up to rodent activity in either below grade or aerial installations will become apparent. Threshold levels can be defined and once exceeded, alarm reports can be sent out indicating the damage levels and which lines are most affected by possible rodent damage activity. Although Monitoring mode cannot distinguish between what is rodent damage and what is simply an alternate force acting upon the cable, there is a measured notification of cable armor exposure. Service providers are then alerted to the possibility of damaging forces acting against their fiber optic cable network.

Although rodent problems consume time and money, they are a fact of North American living. The key to staying on top of this issue is to have regular maintenance programs that target the cable in greatest need of repair. Once this is established, there is a good possibility that major communication service disruptions can be avoided, giving you better customer service and in the long run, more cost-effective solutions. **n**



H₂O and Your Fiber Optic Cables

With fiber optic cables now in use for more than 30 years, the effects of long term exposure to the environment are becoming an increasing part of regular maintenance. The most extreme symptoms of these environmental influences are the effects on data transmission and bandwidth. Aside from some of the more noticeable influences that can affect a fiber optic cable overall (construction, rodent and lightning damage), one of the most often overlooked environmental factors is the effect that water can have on fiber optic cables over a prolonged period of time.

The most vulnerable location within a fiber optic network where water contact can do the most damage is a splice location (where two or more fiber optic cable segments are joined together). It is now known that if water is left in a splice enclosure for prolonged periods of time, data communication and strength of the fiber strands within the splice enclosure can be compromised. The obvious concern for water entering into a splice enclosure is in below grade installations because they usually share storm drains and roadway infrastructures. However, while wet splice occurrences are more prominent in below grade installations, aerial installations can have the same occurrences and, in some instances, may have more severe consequences (Figure 1).

A fiber strand consists of three parts: the Core, the Cladding, and the Buffer Coat (the last two are protective layers to the Core). The average fiber strand has a diameter of 125 micro-meters (roughly the thickness of a human hair) and is quite vulnerable within a splice enclosure (Figure 2).

In a splice enclosure, fiber strands from incoming and outgoing cables are fusion spliced together and laid out separately on fiber trays. The fiber trays offer physical stability and protection to the fiber strands, but are not water tight – water can infiltrate many points on the trays. The damage starts to occur when water enters the fiber tray and engulfs the fiber strands. Usually, ground water contains corrosive elements that react with the cladding, coating, and core of the fiber strand (Figure 3).

Field observation indicates that long term exposure of active or dark fiber strands to water can cause them to become brittle. This is most noticeable when the fiber strands are handled. The worse case scenario is when all the fiber strands and their respective slack loops within the fiber trays are damaged to the point that the fiber cable needs to be cut back to find more robust strands. Repeating this repair in the same location over time will eventually consume the cable slack loops and could lead to installing another splice of cable segment – both of which can be expensive.

Another condition that has been observed from extended contact with water is that the Core within the fiber strand becomes opaque. This has a direct effect on data traffic and bandwidth capabilities. Here again the water contact can lead to some or all fiber strands being affected whether they are active and dark fiber strands. The corrective action is the same as it is for fiber optic strands that are brittle – fiber strands are cut back and fused together from slack loops that are available at the splice location.

When water is left in a splice enclosure for prolonged periods of time and in areas where freezing temperatures can occur, the fiber strands can become embedded in ice. This can result in the most destructive occurrence to the fiber strands – an ice crush. An ice crush can result from the build up of pressure in a splice tray consumed by ice or ice movement within the splice. In addition to the potential damage from the ice crush, extreme care must be taken to thaw the splice to minimize damage of the fiber strands when handled (Figure 4).



FIGURE 1

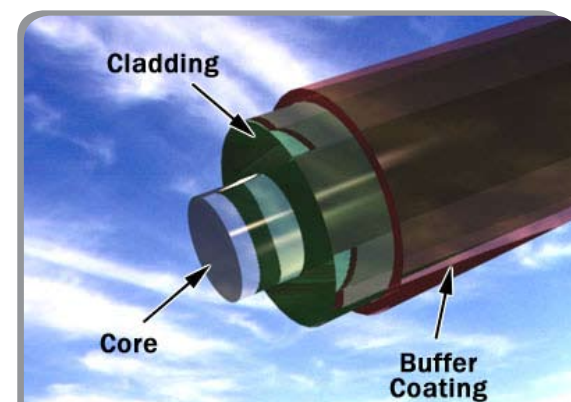


FIGURE 2



FIGURE 3

Continued on page 5...



H₂O cont'd...

Keeping water out of splice enclosures can be a challenge for any service provider. Below grade installations are by far the most susceptible, but aerial installations can be affected as well. For below grade installations, it is important that all splice enclosures are sealed properly and are pressurized as per the manufacturer's specification to prevent the entry of water.

Aerial installations are more forgiving when it comes to splice leakage, but are still susceptible to water ingress. When an aerial splice is heated all day by the hot summer sun, a rain shower occurring later in the day causes the splice housing to cool rapidly. When this occurs, the internal temperature of the air within the splice is noticeably hotter than the air outside of the splice enclosure. The hotter air inside the splice enclosure contracts from being cooled, thus creating a vacuum effect that can draw the outside rain water inside the splice through weak passage ways in the splice seal area. Once the pressure equalizes, there is a good chance that water within the splice cannot escape back out of the splice enclosure. Now that the water is trapped inside, it can become very hot in the ensuing hot summer days or very cold in the freezing winter months, causing damage to the fiber optic strands within the splice enclosure.

There are obvious difficulties in keeping up with which splice enclosures are allowing water to enter, thus leading to fiber strand deterioration. To physically visit each splice enclosure with any regularity would be next to impossible, but some form of visibility into the splice enclosure infrastructure is required to prevent data communication outages. The most efficient and reliable solution is to place water detecting sensors within every splice enclosure and have them report to a monitoring station indicating when and where the water ingress occurs. Norscan's monitoring solutions facilitate



FIGURE 4

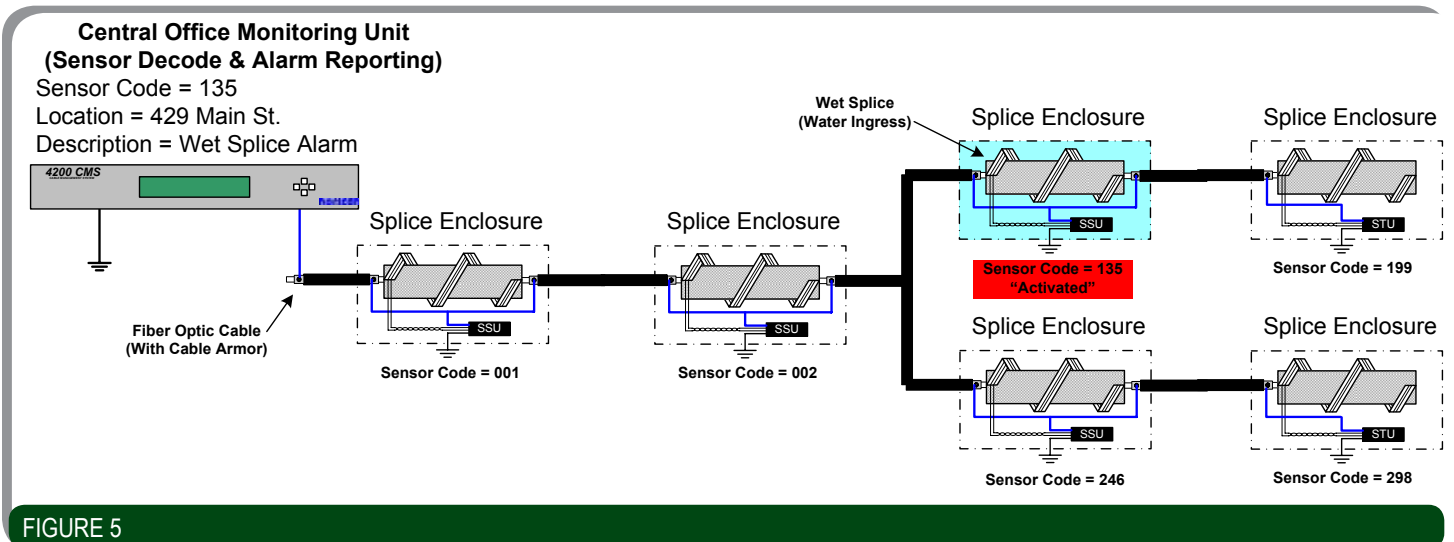


FIGURE 5

this function with Splice Sensor Units located in each splice enclosure and utilizing either a cable armor, copper pair, or trace wire to both power the Splice Sensor Units and communicate back to a central office Cable Management System. Each splice sensor unit is identified by a unique digital code and when received by the central office monitoring equipment, a specific location and description would be cross referenced for the exact location of the wet splice condition. Alarm reports are sent out immediately in a variety of ways such as email, text messages, pagers, and SNMP traps which provide real time conditions of outside plant splice enclosures. Once the wet splice locations are identified, scheduled repairs can be initiated before data communication is affected (Figure 5).

Norscan's solutions for monitoring wet splices have been a proven technology for over 25 years and are a straight forward addition to new fibre deployments or can be retrofitted for existing networks. **n**



Product Profile:

NORSCAN PARTNER WINMER TECHNOLOGY INNOVATORS RELEASES UPDATED MINI-MONITORING UNIT MODEL 5318L

Equipped with ETHERNET and FULL COMPATIBILITY with existing 5318 deployments and applications

www.winmertech.com



Norscan has partnered with Winmer Technology Innovators to produce Winmer's 5318L Mini-Monitoring Unit (MMU). This latest announcement is part of an ever expanding product offering for the broadband and telecom outside plant. The jointly developed 5318L MMU is an upgrade from the 5318 unit previously manufactured by Sparton Technology. With Sparton's decision to exit the telecom monitoring marketplace, Winmer Technology Innovators reached an agreement to begin producing monitoring products and to support all equipment that was previously manufactured by Sparton. The 5318L MMU is a next generation, Ethernet capable device that is fully compatible and a plug and play upgrade/replacement for currently deployed 5318 units.

WINMER'S 5318L MINI MONITORING UNIT (MMU) is a combination of concepts that are derived from Winmer's 25 years worldwide experience in monitoring technology applications, and Norscan's 28 year leadership in the design and manufacturing of solutions for the telecom and broadband industry. The 5318L is a single board designed with an integral Local Area Network (LAN) node, 56K baud internal modem and 9600 baud local port which, in combination with its powerful operating system offers real multi-user operation. The 5318L incorporates a RISC based programming architecture which supports a true multi-tasking, redundant and highly reliable operating platform. Incorporating this state of the art technology provides a quantum leap forward in both reliability and functionality over similar systems of this size. The 5318L includes a number of features that are typically found in much larger stand-alone systems, while at the same time because of its compact size, the 5318L MMU offers the most cost-effective solution for monitoring as many as 25 standard resistive air pressure transducers, flow transducers, or dry (non-powered) binary contact closures.

The 5318L can operate completely independently from other monitoring equipment, and can also be used as a satellite in conjunction with any systems utilizing a Sparton 5300 satellite polling protocol. **n**

HIGHLIGHTS:

- An affordable and practical monitoring system that can monitor up to 25 dedicated transducers or dry contact binary sense points
- Can function simultaneously as both a completely standalone system and as a satellite to a 5300 type host system
- Incorporates Ethernet LAN, 56K modem, 9600 baud local connection and supports true multi-tasking communications
- Menu-driven software simplifies data entry and system operation
- Compact enclosure occupies only 5 1/4" of vertical wall mounting space
- Power input range of -36V to -56VDC

