

Fence and Processor Grounding

Introduction

A key ingredient to Fiber SenSys' success has been the stand-alone alarm processing unit (APU) with its intrinsically safe properties. Using non-conductive optical cable as a sensor allows the system to safely function in the midst of extreme conditions such as flammable gas or high electricity. Fiber SenSys also offers an insensitive lead-in optical cable option that allows for APUs to be located up to 20km away from the sensing zone thereby removing the processor from potentially dangerous areas. However, unless the fence and APUs have been properly grounded, there is a potential that electricity could damage the cable or processor. This installment of tech tips will give the reader the knowledge needed to properly ground a perimeter fence as well as grounding the alarm processor itself.

Why Ground?

Grounding is a vital element of the system design because effective grounding provides safety, equipment protection, facility preservation, and electronic noise reduction. Electrical danger can originate from natural or manmade sources and should never be overlooked because it cannot always be controlled; thus, planning for the worse case is recommended. Proactively planning for possible electrical surges before they happen saves money and provides higher security in the long run.



* The above APU may have been spared if the fence and unit were properly grounded

Grounding the APU

Fiber SenSys' 300 series stand-alone processors are all equipped with grounding points located at the mid-top and mid-bottom of each unit's protective steel shell. The small holes are uncovered by the protective powder coating layer so that an effective electrical contact with a grounding element can be possible. Use Crimp Terminal or Spade Terminal connectors to attach grounding wires to the grounding terminal. Grounding wires should be copper and the proper gauge depends on wire length and the expected current of a possible electrical surge. The military recommendation for wire gauge and grounding rod is #2 AWG wire with a minimum of 3/4 inch diameter grounding rod that is at least 10ft in length.

500 series stand-alone APUs do not have the grounding notch added so the surface must be manually created. To create a proper surface, use a rotary tool with a grinding attachment and remove a small section of the powder coated layer from one of the mounting tabs. An effective way to couple a terminal connector to the grounding surface would be to sandwich it between the grounding surface and mounting screw.

Grounding the Perimeter Fence

By military standards, fences should be grounded with ground rods at intervals no more than 500 ft. (152m) as well as at either side of all gate openings, at each corner, end post, or change in direction. The fence should be bonded with #2 AWG copper wires that connect to a grounding rod. Grounding rods should be composed of copper clad galvanized steel or copper clad stainless steel and be a minimum of 3/4 inch diameter and 10ft in length. Grounding rods should be hammered a minimum of 12" below grade and the resistance to earth should not exceed 10 ohms. When grounding a perimeter fence, there are often differing requirements based on location and climate. Electrical substations likely have more stringent grounding requirements than military bases; be sure to consult all available grounding documentation before installing hardware.



* Fence grounding example

Conclusion

Although Fiber SenSys utilizes optical cable as its sensor, the processors are not completely immune to damage from electricity. A wide range of grounding processes and policies are uniquely applied for all situations and should be strictly adhered to. If a grounding standards document is not available, follow the guidelines outlined by the military or commercial construction standards. In most cases, both the processor and perimeter fence should be grounded. The APU has two grounding points at the top and bottom of the chassis and perimeter fences should also be grounded periodically based on site standards.



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