
TI#112917-1: Lightning and EMI/ESD Protection for Phoenix Loops

All of Phoenix traffic counters with the “V4” loop board (available since 2009) have loop surge suppression built right into the loop board. It is located right at the point where the internal cable connects to the board. From there, each loop board has its own ground braid strap that connects to the case of the counter. If you have then connected a quality, flat wire braid, ground strap from the case of the counter to a deep set ground rod you will have pretty good surge suppression already built into the traffic counter.

However, surge suppression is not as simple as “yes I have it” or “no I don’t”. It is always a degree of protection, and there are a lot of variables like:

- Quality of ground rod.
- Quality, width, and length of the external ground strap.
- Closeness of lightning strike.
- Age of components on the loop board providing the protection, and how many times they have been utilized.
- Water and material content of the earth that affects resistance and impedance to grounding components.
- Overall impedance and resistance through the surge suppression to ground.
- Etc.

What Diamond has built into the loop board gives you some level of surge suppression, but nothing provided is going to protect from a direct or very close lightning strike. This means adding external protection can also be a good idea. Surges always follow the path of least impedance, so the closer you can get to where the surge occurs the better the protection will work. Adding a surge protector right at the terminal strip that connects to the loops will be more effective than letting it get all the way inside the traffic counter before being shunted to ground. You should also install an external protection device if using the older V2 style loop boards.

It normally doesn’t hurt to have multiple surge protectors. There is a point where too many or the wrong type of surge suppression affects either the sensitivity or ability of the loop to function, but having surge protection built into the Phoenix and then another one on the terminal strip is very unlikely to cause either of these issues. It is also handy to have an external one which can be easily replaced if it goes bad after a lightning strike (which is what is supposed to happen in the case of a very large amount of power dissipation – it should short the loop to ground until replaced).

[Diamond Traffic Products](#) offers a LNPC (Lightning & Noise Protection Circuit) product which can be added right at where loops enter the cabinet. Contact them to order or for more information.