	<b>SONARtrac<sup>®</sup> Technical Note</b>	
	TN0005	
	Subject: Process Pipe Grounding to Prevent Electrical Problems From Lightning	
		Date: 18May11
		Revision   03
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**Problem:**

Lightning strikes on or near process pipes and electronic instrumentation can cause electrical faults in process monitoring systems.

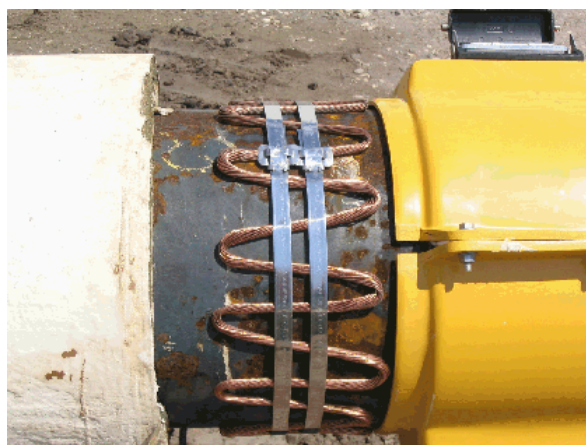
**Example Solution:**

One customer located in Florida’s “Lightning Alley” experienced electrical faults throughout their process instrumentation (including SONARtrac flow meter) as a result of lightning strikes.


In order to minimize recurrences, they installed a ground system around the SONARtrac meters. The ground straps consisted of about 15 – 20 feet of #1 stranded copper cable stripped of its insulation, bent into a series of “S” shapes and then secured to the pipe using steel bands. The ground straps were secured to individual ground rods driven into the ground that were reported to be ~12 feet long. This is illustrated in the figures below.



*Sensor Heads With Insulation Removed and Ground Straps Installed*



*Ground Strap Installed on Pipe*

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Although this is a solution employed by one particular customer, it does not adequately address the issues that direct or indirect lightning strikes can present.

The SONARtrac VF and GVF-100 is classified as an installation / overvoltage category 2 device which tolerates transients up to 2500V. Installation regions that are prone to lightning strikes (and have in fact experienced electronic instrumentation damage due to suspected direct or indirect lightning strikes) should follow the following guidelines:

- Process piping should have a proper earth grounding element installed in close proximity to the SONARtrac sensor head assembly. The previous example pictures illustrated a method employed by one customer. The preferred method would be to have the grounding system attached using an exothermic weld (CADWELD) to the pipe, to a flange bolt, or an appropriate pipe clamp.
- SONARtrac I/O connected to the plant infrastructure such as, Power (A/C Mains), Outputs (mA loops, pulse, alarm), Sensor Inputs (mA), and Communication Signals (Fieldbus, Serial) should all have appropriate transient voltage surge suppression (TVSS) devices or surge protection devices (SPD) installed in close proximity to the SONARtrac transmitter.

The IEEE 1100, IEC 62305 Series Standards present in detail precautions to be taken to limit damage due to lightning discharge.

There are several manufacturers of TVSS and SPD equipment suitable to be used with the SONARtrac flow meter instrumentation to help limit damage due to lightning discharge.

Contact CiDRA Corporate Services Technical Support if additional information is required.

## Revision History

Rev	Date	Changed By	Approved By	Change Description
01	8/22/07	B. Markoja	M. Sapack	Initial Release
02	7/29/08	V. Rojas-Haines	V. Rojas-Haines	Update Figures and name
03	5/18/11	Tim Griffin Mark Foss	B. Markoja	Changes made to reflect the current process to preventing electrical problems from lightning.