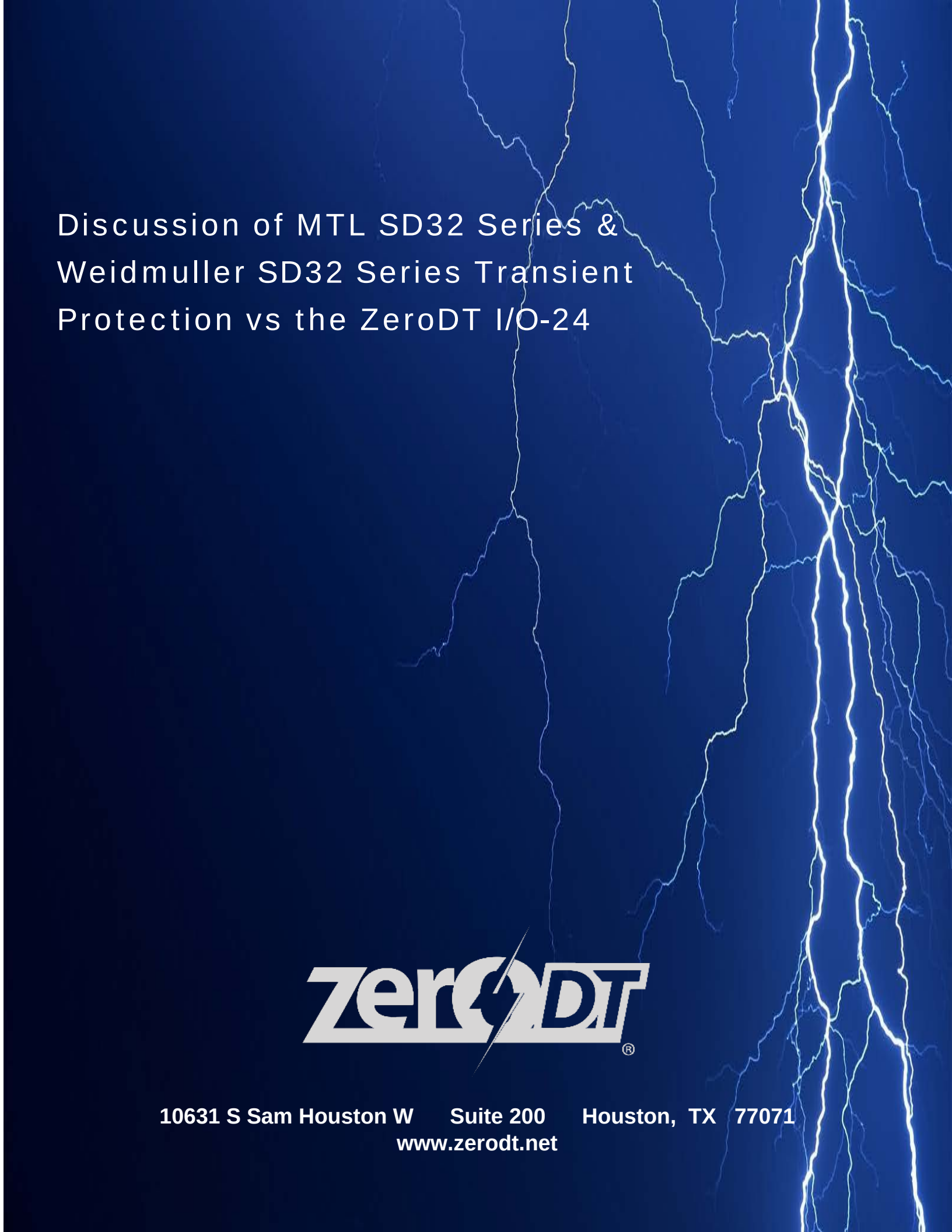
Discussion of MTL SD32 Series & Weidmuller SD32 Series Transient Protection vs the ZeroDT I/O-24



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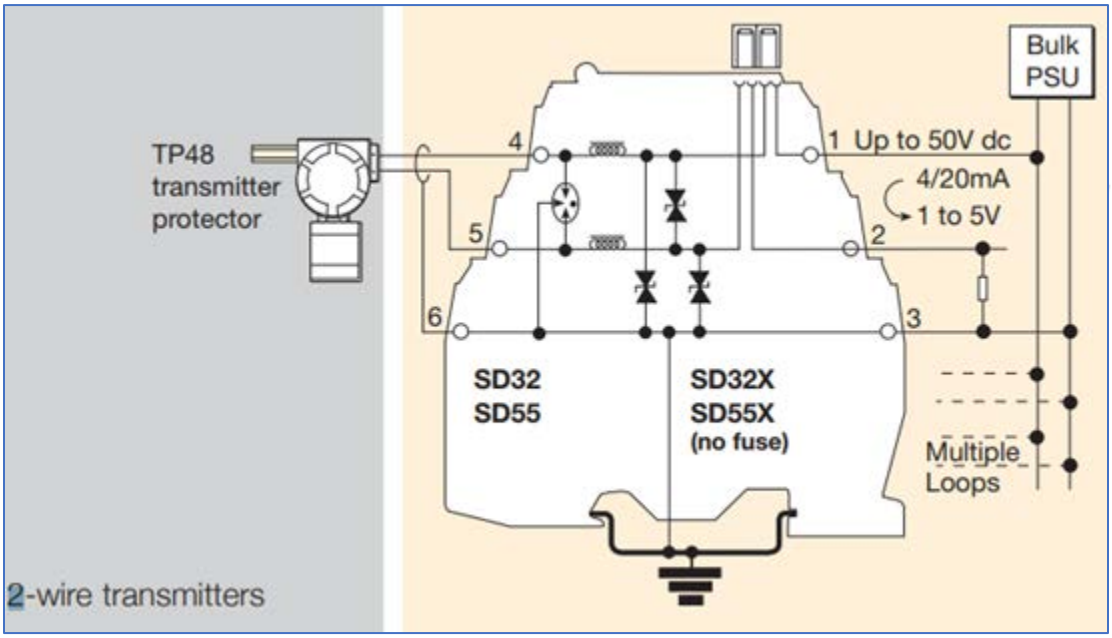
ZeroDT I/O-24 vs. MTL SD32 (fuse disconnect) and Weidmuller SD32X (without fuse disconnect)

The following discussion of MTL SD32 (with fuse disconnect) and SD32X (without fuse disconnect) units and how they compare to the ZeroDT I/O-24. Weidmuller private labels these same units with a cross licensing agreement. This discussion was extracted from an email between a customer that was experiencing issues with the MTL SD32X and was losing equipment. They came to ZeroDT and asked for our help in understanding how the MTL / Weidmuller units worked and if we could offer a superior solution.

First, lets look a simple schematic/diagram of the MTL SD32 line and talk about how it works.



The protection circuit for each line consists of a Gas Discharge Tube and a bi-polar diode along with an inductor as a coordinating element. The GDT is the primary protection component as it can handle big transient surge currents, but the problem is that it can be slow to turn on, so they include the diode to Ground/Earth to provide protection during this initial period before the GDT lights-up. The Diode will turn on fast (so there is some protection before the GDT is able to start protecting), but the diode they have chosen cannot handle the large surge currents and so they put the inductor in series to try to limit the current going to the diode (yes, you want the diode to conduct the surge current to protect the equipment, but you have to use the inductor to try and limit the current). The problem is that as the GDT starts degrading with repeated transient surges, its turn-on level starts increasing, and the diode

must provide protection for a longer duration, but it is not designed/rated for this increased surge current and longer use period, so the diode eventually fails. This takes the diode out of the circuit and the customer is left with just a Gas Discharge Tube protector that is degrading with usage. Now that the diode has failed, the device that this was intended to protect is taking the brunt of every surge that comes down the line until the voltage get high enough and the GDT has time enough to light its internal arc to Ground. The other issue with this protection circuit topology is that the inductor will be a high impedance to faster communications that require higher bandwidths. (that is why MTL offers a different version for higher bandwidths used by RS232, RS422, and RS485)

Before I jump into some other observations, I want to be up front and say that the things that a customer may see as an advantage of the SD32 over the ZeroDT I/O-24 are:

- Fuse Disconnect – by removing this disconnect, the user has the ability to isolate the circuitry without an additional disconnect switch (only applicable to the SD32 – there is no fuse disconnect capability on the SD32X)
- 3rd connection on each unit for the shield (however if you connect the shield to this terminal it Grounds the Shield of the cable at that point) which may not be the optimum point for effective shielding.

Some of my other observations regarding the MTL SD32:

- The SD32 unit protects 1 pair or loop and takes up 7 mm of DIN rail space. A ZeroDT I/O-24 only takes 12.5 mm of DIN rail space and protects 2 pair. Using 2 of the SD32s to protect 2 pairs takes 14 mm of DIN rail space or 17 % more space!
- The SD32 unit must be installed in the correct orientation for it to work (GDT towards the side the surge comes from). A ZeroDT I/O-24 is fully bi-directional and can be installed without worry as to the correct orientation.
- The ZeroDT I/O-24 uses only SASDs to provide protection that **do not degrade with usage**. The GDT component within the SD32 degrades every time it handles a surge and the arc lights. With the I/O-24, you are still getting the same level of protection five years down the road as you did the day it was installed.

- Similarly, the ZeroDT never gives you a unit that is partially functioning, you either have a unit that has 100% capability, or the unit has 'self-sacrificed' and is shorting the line to Ground so that you know that there is an issue with that circuit.
- There is no need for High bandwidth versions of the ZeroDT I/O-24 as it does not interfere with digital communications like RS232, RS422, and RS485 (customers tell us that it is essentially invisible to the communications).

For more information on the specification of the ZeroDT I/O-24 please see its data sheet.

Regards,

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