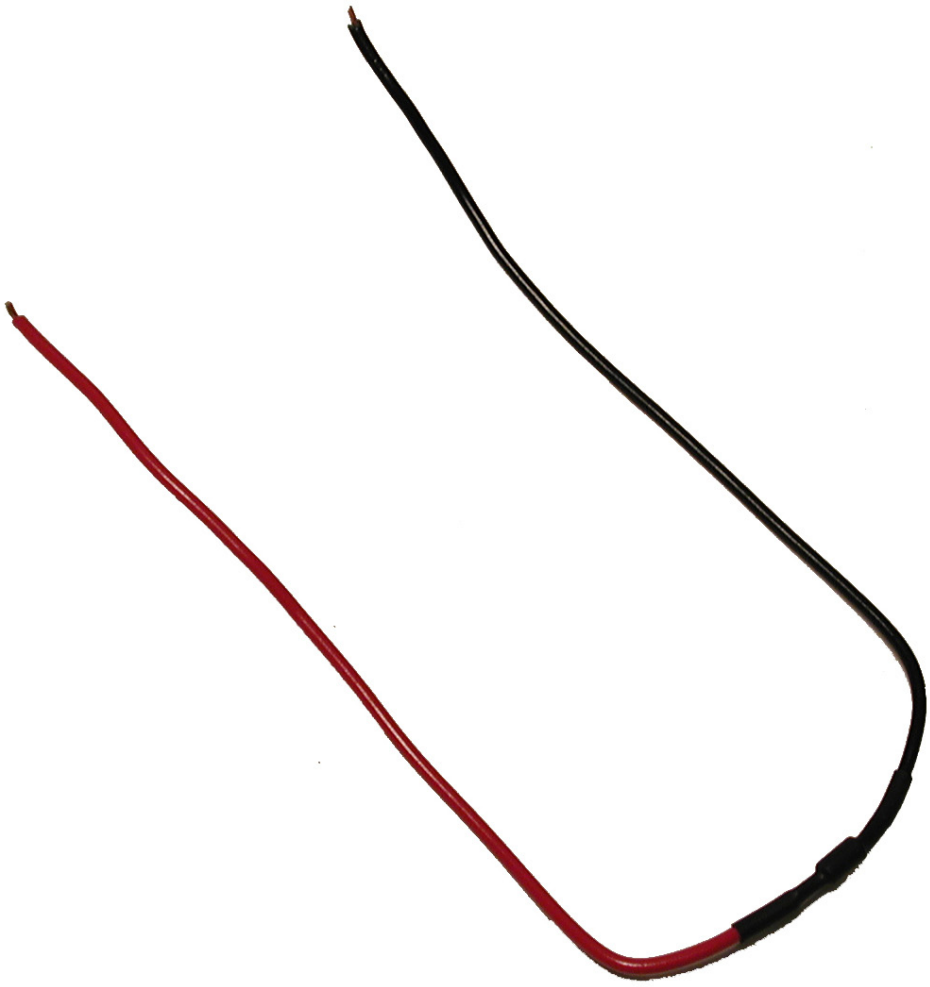
Lingenfelter

Transient Voltage Suppression (TVS) Diode



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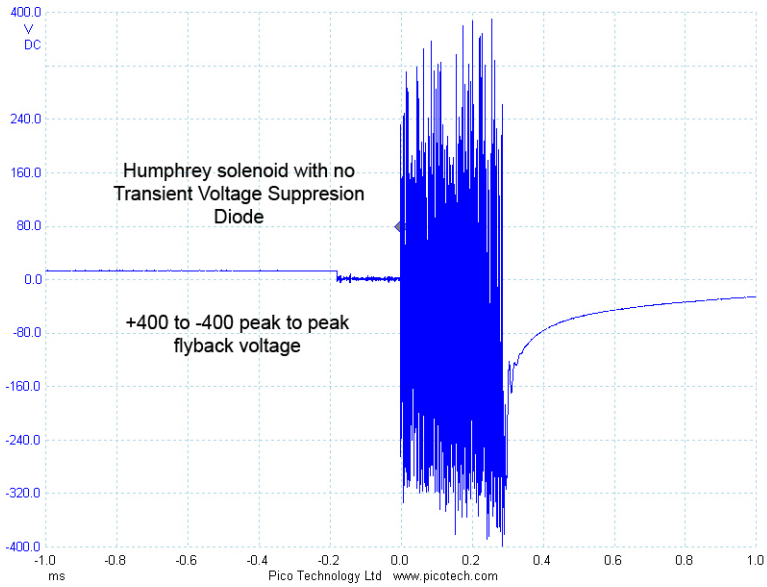
Release Date: 4-June-2012

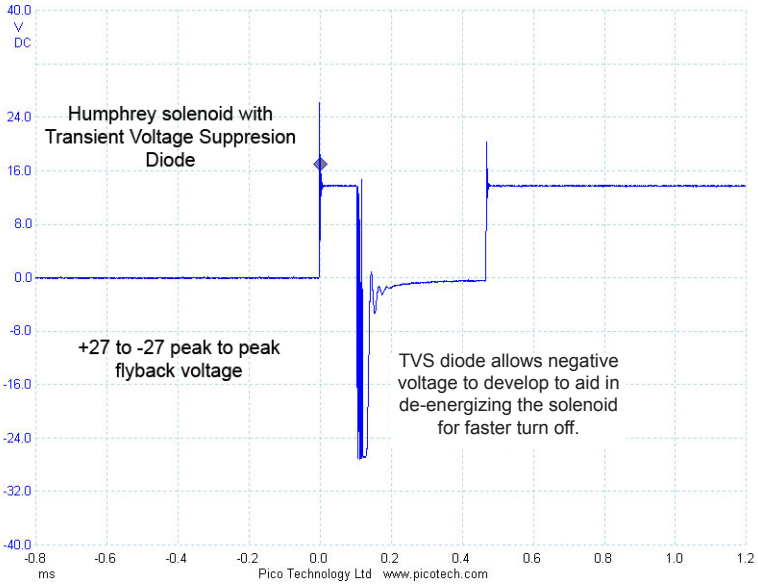
Description:
A Transient Voltage Suppression (TVS) diode is a voltage clamping/limiting device used to protect sensitive electronics from voltage spikes. The TVS diode is NOT a normal diode. Rather, it is a bi-directional device that allows the voltage to swing from -28 volts to +28 volts before clamping the flyback voltage. This allows the field of the solenoid to collapse faster and in most applications allows the solenoid to turn OFF faster while still maintaining the flyback voltage level and reducing electrical noise. Because these TVS diodes are rated at 600 watts each, there is a possibility of surpassing the total power dissipation limit if multiple solenoids are placed on the same diode.



In an automotive environment there can be many sources that can create harmful voltage spikes. The captured scope image to the left is the actual flyback voltage produced when a common control solenoid is switched OFF. Peak voltages of +/- 400 volt are present. This flyback voltage can and will cause intermittent and permanent failure of electronic devices.

What it does:
The transient voltage suppression diode clamps and/or limits the voltage peaks. The captured scope image to the right shows the same solenoid flyback voltage shown above with a 27 volt TVS diode installed. The +/-400 volt peak voltages are clamped at +/-27 volts.

The addition of the TVS diode eliminates harmful voltage transients produced by the turning ON/OFF of solenoids. One key benefit of a TVS Diode over a standard Rectifier diode is the TVS diode still allows a negative voltage to be developed in the solenoid windings to aid in the collapse of the magnetic field, which in turn allows for a faster turnoff.



Note that the above graph is on a +/- 40 V DC scale instead of a +/- 400 V DC scale of the graph at the top of the page .

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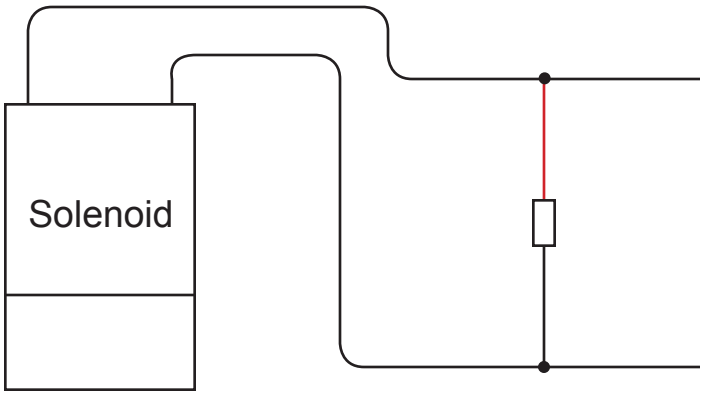
Installation



Install the TVS diode across the solenoid wires as close to the solenoid as possible. Polarity does not matter (Red and Black wires can go to either solenoid wire). If there is no accessible ground terminal to connect the diode to, such as the case with a transbrake solenoid, the diode should be connected to the nearest ground source. In the case of the diode for the trans-brake solenoid, the diode should be connected to the transmission case as it will provide a ground path.

LPE recommends using TVS diodes on:

- Nitrous solenoids
- Line-lock solenoids
- Trans-brake solenoids

For additional product installation information and technical support, contact LPE or your LPE products distributor. You can also find technical support and usage discussions regarding this product and many other LPE products in our Internet forums:

http://www.lingenfelter.com/LPEforumfiles

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