

InPower LLC Technical Bulletin

Subject: Damaged Shift-Lock Circuits Due To Unclamped or Unsuppressed Inductive Loads

Affected Products: ITM122A, ITM123A, ITM131, ITM132, ITM133, ITM124 and ITM125

Symptoms: On ITM122A and ITM123 systems vehicle will no longer shift out of Park. On ITM131, ITM132, ITM133, ITM124 and ITM125 systems the door input or the park brake input may stop working.

Diagnosis: On the ITM122 and ITM123 systems the Shift-Lock circuit of the interlock has been damaged and is no longer functional. On the ITM124, ITM125, ITM131, ITM132 and ITM133 systems an overvoltage on the parking brake input or door input will damage the internal blocking diodes.

Cause of Failure:

Certain installations of interlock systems have been connected to power circuits with unsuppressed or unclamped inductive loads such as HVAC systems and other solenoid or relay circuits. An unclamped or unsuppressed inductive load is capable of generating voltage spikes at hundreds of volts (see figures 1 and 2), causing power surges in any other loads or circuits on the same power line. These spikes, while short in duration, generate sufficient power to damage other electrical devices attached, including vehicle OEM electronics.

The use of any unsuppressed or unclamped inductive load in a Ford vehicle is a violation of QVM Bulletin Q-130 requirements. In GM vehicles it is a violation of GM Upfitter UI Bulletin #86.

Figure 1
Un-Suppressed HVAC System

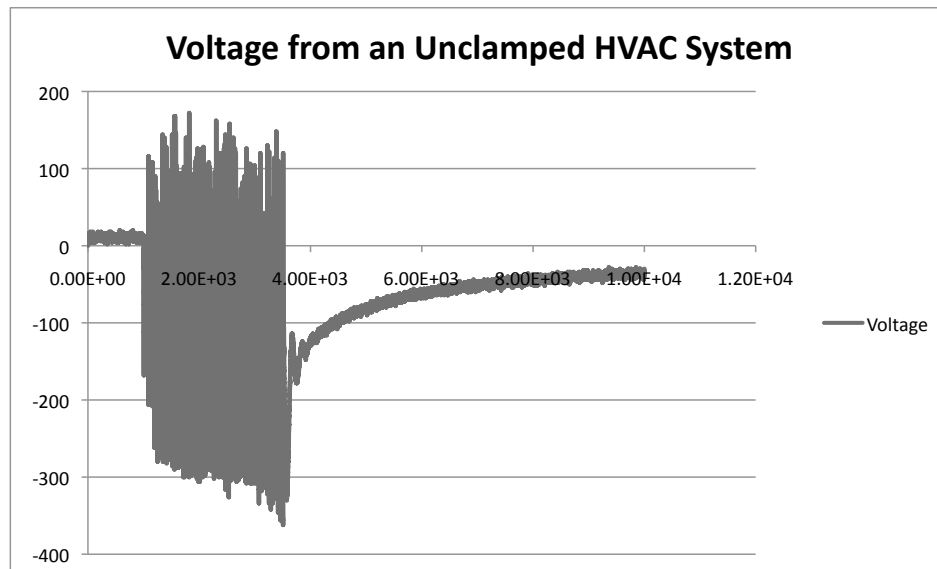
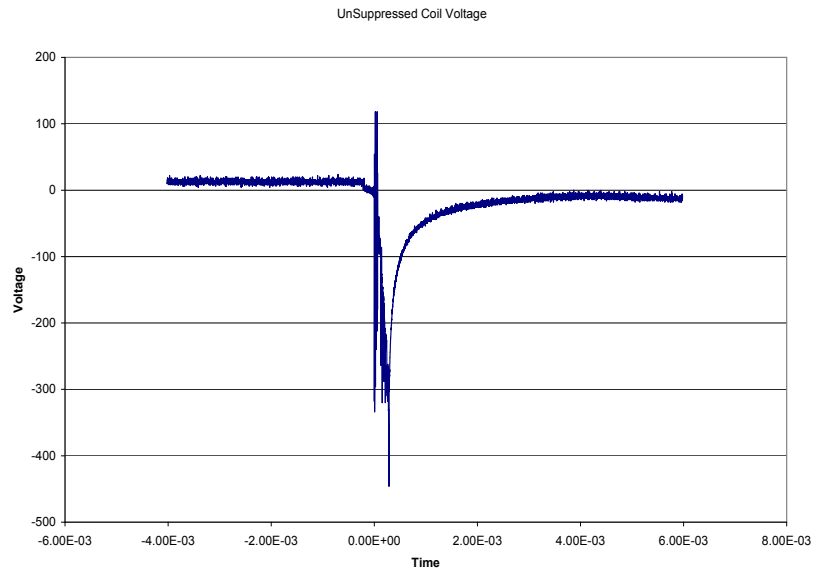


Figure 2
Un-Suppressed Coil Voltage



Reference Documents:

1. Ford QVM Bulletin: Q-130, *General Electrical Practices*

Bulletin Q-130 States:

“All electrical devices that have inductive loads (i.e. electrical motors, relay coils, PTO clutch pump clutches, etc.) must be provided with isolation discharge paths for the reverse voltage generated when power is disconnected from the device... [Any Disconnection] will cause a large reverse voltage pulse of very short duration to be sent through any connected electrical conductor. This short duration precludes the use of fuses as protective devices. Additionally, any connection between a device with an inductive load and the OEM electrical system should be isolated with a relay.”

2. GM Upfitter Integration UI Bulletin #86, *Voltage Noise Spike Suppression of Aftermarket-Installed Relays and/or Solenoids*

Bulletin #86 States:

“This bulletin documents the recommended practice of installing of a diode to aftermarket solenoids/relays to suppress voltage spikes (this is in the event non-automotive grade relay or solenoid has been used). This diode installation eliminates potential excessive voltage spike.”

Corrective Action:

Affected customers need to contact the interlock/wheelchair lift installer.