Piezo common rail injectors

Piezo common rail injectors may seem to be the same as older injectors, but they are very different. Bosch raises an important safety issue that every mechanic should be aware of.

During a recent training course, an older member of the group asked me, "what's all the fuss about? Not disconnecting Piezo common rail injectors whilst the engine is running? I pull the wires off petrol port injectors and crack off the injector pipes on old style rotary diesel pumps to find out which cylinder is misfiring. Why can't I do this with Piezo injectors?"

The difference is disconnecting Piezo injectors while the engine is running could possibly kill you and the engine. Piezo injectors work by passing a current through a Piezo stack in one direction to expand the Piezo crystals, then discharge them to ground to make them contract to their original size, this expansion and contraction operates a servo valve, this servo valve controls fuel pressure above the injector needle. The Piezo injectors are operated by up to 200 volts, 15 amps. This has the potential to kill you, and if you manage to disconnect the injector whilst the Piezo crystals are expanded, they will not be able to discharge to ground. This will cause the crystals to remain in their expanded state keeping the injector open.

The fuel pressure within the rail can be as high as 2000 Bar at higher engine speeds/loads, and even at idle it will be several hundred Bar. At this high pressure, the engine would not be able to burn the excessive amount of fuel being continuously injected and it would only take a few engine revolutions, to spray enough fuel into the combustion chamber to cause a hydraulic lock and serious engine damage. The full operation of Piezo and solenoid operated common rail injectors are explained in the Bosch training course VSD 15.