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(54) SYSTEMS AND METHODS FOR BACK-EMF MONITORING AND SUPPRESSION DURING INSTALLATION OR PULLING OF PMM-DRIVEN ESP

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(57) **ABSTRACT**

Systems and methods for monitoring and suppressing a back EMF generated by an ESP motor when the ESP system is moved in a well. Embodiments provide both electrical braking to reduce the rotation of the motor (and corresponding back EMF) and warnings to alert users to hazardous conditions caused by the back EMF. One embodiment includes an ESP system having a permanent magnet motor, a back EMF safety system, and a power cable connected between them. The proximal ends of the cable's conductors are connected terminals of the back EMF safety system, which has switches that are closed to short circuit the conductors so that back EMF currents from rotation of the motor induce electrical braking in the motor. Currents and phase-to-phase voltages on the conductors are monitored to detect overcurrent and overvoltage conditions that may trigger alarms or other actions.