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Ion Cyclotron Resonance Heating Transmitter Opening Switch Upgrade

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Diversified Technologies Inc. (DTI) has installed a high-power solid-state opening switch upgrade package to replace the mercury ignitron crowbars in the Ion Cyclotron Resonance Heating (ICRH) Transmitters at MIT Plasma Fusion Science Center's (PFSC) Alcator C Mod, a Tokamak-type fusion experimental device. The anode plate switch is rated for 30 kV, 200 A. The speed of the series opening switch avoids the large fault currents on the transformer and power feed inherent with a crowbar. This improvement enables re-optimization of the Transformer/Rectifier (T/R) set, ultimately allowing increased power output and increased tetrode reliability. The ratings of the prior high voltage power supply are a compromise between high output power (lower impedance required from the T/R set) and crowbar reliability (higher impedance required from the power supply to limit fault current). DTI's opening switch upgrade safely allows the use of significantly reduced transformer impedance and lower droop, giving increased power as well as improved tube protection. DTI's opening switch kit can readily be adapted to any similar transmitters as an upgrade from a crowbar.

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