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Neutral Beam Injection System for the C-2W Field Reversed Configuration Experiment ALEXANDER DUNAEVSKY, Tri Alpha Energy, ALEXANDER IVANOV, VYACHESLAV KOLMOGOROV, Budker Institute of Nuclear Physics, ARTEM SMIRNOV, SERGEY KOREPANOV, MICHL BINDER-BAUER, Tri Alpha Energy, TAE TEAM, BINP TEAM — C-2U Field-Reversed Configuration (FRC) experiment proved substantial reduction in turbulence-driven losses via tangential neutral beam injection (NBI) coupled with electrically biased plasma guns at the plasma ends. Under such conditions, highly reproducible, advanced beam-driven FRCs were produced and sustained for times significantly longer (more than 5 ms) than all characteristic plasma decay times without beams. To further improve FRC sustainment and demonstrate the FRC ramp-up, the C-2U experimental device is undergoing a major upgrade. The upgrade, C-2W, will have a new NBI system producing a record total hydrogen beam power of 20+ MW in a 30ms pulse. The NBI system consists of eight positive-ion based injectors featuring flexible, modular design. Four out of eight NBI injectors have a capability to switch the beam energy during a shot from the initial 15 keV to 40 keV at a constant beam current. This feature allows to increase the beam energy and thereby optimize the beam-plasma coupling during the magnetic field ramp up. This presentation provides an overview of the C-2W NBI system, including the design of the switchable energy injectors, layout of the power supply system, and results of the prototype testing.

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