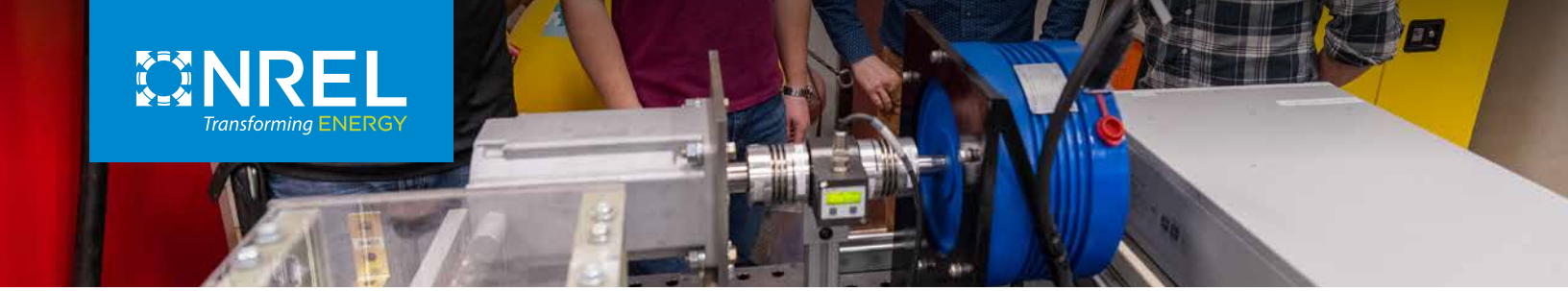

Photo by Werner Slocum, NREL 77321

# Dynamometer Facts

The National Renewable Energy Laboratory's (NREL's) Flatirons Campus features two dynamometers in the Water Power Systems Laboratory that can perform research validation on marine and hydrokinetic energy devices as well as wind turbine systems from 100 watts to 15 kilowatts (kW) in size. These capabilities can also be combined with programmable loads, blue economy (nrel.gov/water/powering-blue-economy.html) application simulators, and microgrid emulators to test an extensive range of system operation and technology integration.

The dynamometers replicate realistic operational conditions to assess power take-off systems and advance the technical readiness of innovations.

Refer to the following specifications for each of NREL's dynamometers or visit NREL's website to learn more: www.nrel.gov/water/dynamometers.html.

| | | 3-kW Dynamometer | 15-kW Dynamometer |
|---|---|---|---|
| **Facility** | Test Article Load Options | • 50-kilovolt-amperes (kVA) 4-quadrant alternating current (AC) power amplifier with dedicated controller and power hardware-in-the-loop (HIL) capabilities<br>• 4×20-kW 2-quadrant direct current (DC) power amplifiers with power-HIL-ready capabilities<br>• Resistive load bank<br>• 3-kW programmable DC load | • 50-kVA 4-quadrant AC power amplifier with dedicated controller and power HIL capabilities<br>• 4×20-kW 2-quadrant DC power amplifiers with power-HIL-ready capabilities |
| | Cooling/Heating | Air cooled | Air cooled |
| **Dynamometer** | Prime Mover | 5.37-kW (7.2-horsepower) permanent magnet servomotor with dedicated motor drive | 19.5-kW (26.15-horsepower) permanent magnet servomotor with dedicated motor drive |
| | Rated Power and Speed to Test Article | • 0–22.4 newton-meters (Nm), 65.2 Nm maximum<br>• 0–1,300 rotations per minute (rpm) (6,000 rpm maximum) | • 120–56 Nm, 213–67 Nm maximum, with respect to speed<br>• 0–2,400 rpm |
| | Drive Table | 48 inches (in.) x 30 in. x 36 in. | 30 in. x 30 in. x 72 in. |
| | Control System | • Position, speed, and torque control<br>• HIL capable through real-time control<br>• WEC-Sim in-the-loop ready (wec-sim.github.io/WEC-Sim) | • Position, speed, and torque control<br>• HIL capable through real-time control |
| **Nontorque Loading** | | • 1,940 N maximum radial force<br>• 2,200 N maximum axial force<br>• 2,500 rpm at radial force | • 2,000 N maximum radial force<br>• 1,700 N maximum axial force<br>• Rating higher at lower speeds |
| **Data Acquisition** | | NREL's Modular Ocean Data Acquisition (MODAQ) system (nrel.gov/water/open-water-testing.html) | NREL's MODAQ system (nrel.gov/water/open-water-testing.html) |

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