

MTS Non-Torque Loading (NTL) System

Improve the reliability and performance of wind turbine drive trains and bearing systems

Benefits

- » Available in a range of capacities
- » Applies rotational and off-axis loading for testing drive train systems
- » Replicates rotor hub and blade loading for testing pitch, yaw and main bearings
- » Robust and efficient design
- » Low-friction hydrostatic bearings
- » State-of-the-art MTS controls and software

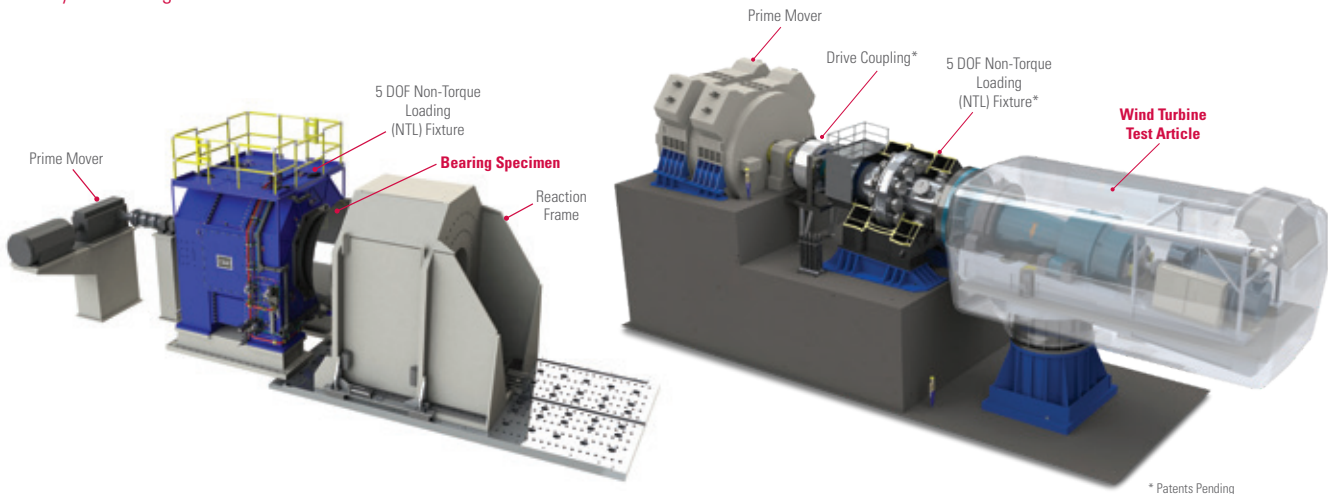
Innovative MTS Non-Torque Loading (NTL) Systems are engineered to deliver extreme loads in multiple degrees of freedom to accurately simulate the complex, real-world operating environments of a variety of wind turbine systems and components.

Available in a range of capacities (NTL 5U, NTL 10, NTL 20), these mechanical testing systems are ideal for optimizing the reliability of complete nacelle assemblies and drive train systems, as

well as testing a wide array of wind turbine bearings, including pitch, yaw and main bearing systems.

They feature highly robust and efficient designs that result in low cost of operation, high uptime and long life. Integral, low-friction hydrostatic bearing technology delivers superior dynamic performance, and state-of-the-art FlexTest® digital controls ensure high-fidelity simulations and optimum test accuracy.

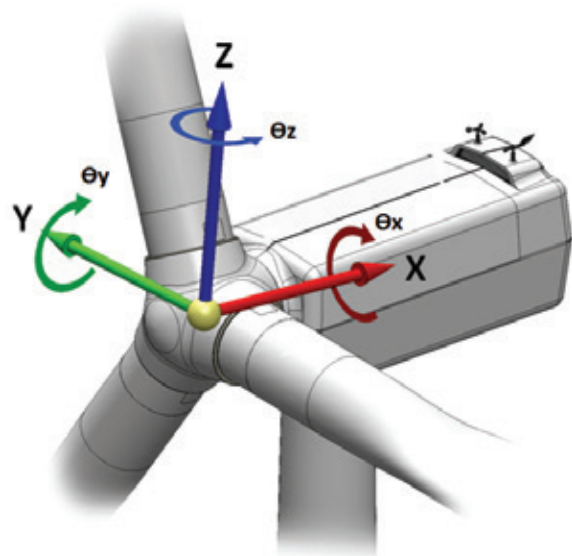
NTL System Configurations



* Patents Pending

NTL System Specifications ¹

| Parameters | Models | | |
|---|---------------------|--------------|-------------|
| | NTL 5U ² | NTL 10 | NTL 20 |
| Maximum Force & Moments ^{3,4} | | | |
| Axial Force (Fx) | 4 MN | 4 MN | 8 MN |
| Radial Force (Fy) | 3.25 MN | 3.25 MN | 8 MN |
| Vertical Force (Fz) | 3.25 MN | 3.25 MN | 8 MN |
| Drive Moment (Mx) | 8 MNm | 8 MNm | 19 MNm |
| Bending Moment (My) | 7.2 MNm | 14.3 MNm | 56 MNm |
| Bending Moment (Mz) | 7.2 MNm | 14.3 MNm | 56 MNm |
| Motion @ 0 angle ⁵ | | | |
| Axial Range of Motion (x) | +/-38 mm | +/-38 mm | +/-70 mm |
| Lateral Range of Motion (y) | +/-30 mm | +/-30 mm | +/-50 mm |
| Vertical Range of motion (z) | +/-30 mm | +/-30 mm | +/-50 mm |
| Angular Motion ⁵ | | | |
| Angular Range of Motion (Θ_y) | +/- 1.75 deg | +/- 1.75 deg | +/- 2.0 deg |
| Angular Range of Motion (Θ_z) | +/- 1.75 deg | +/- 1.75 deg | +/- 2.0 deg |
| Maximum Rotational Speed (N) | | | |
| | 50 rpm | 50 rpm | 30 rpm |
| System Dimensions/Weight | | | |
| Length (x/thrust direction) | 2.98 m | 2.98 m | - |
| Width (y/lateral direction) | 3.8 m | 3.8 m | - |
| Height ^{6,7} | 3.6 m | 3.6 m | - |
| Weight ⁸ | ~76,000 kg | ~80,000 kg | - |



NOTES:

1. Specifications subject to change, please contact MTS for specification verification
2. Fully field upgradable to NTL10 Moment capability
3. All forces and moments specified at face of NTL output shaft
4. Uniaxial (single-axis) performance
5. Under unloaded conditions
6. Does not include foundation adapter plate (must be at least 700 mm tall)
7. Does not include optional safety railing on top of system (approximately 1.1 m additional)
8. Does not include foundation adapter plate, coupling or input shaft; does include output shaft



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ISO 9001 Certified QMS

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