

Keeper Ring Fatigue Tester

The keeper ring (lock ring) fatigue tester was designed to apply regular cyclic impact stress to a wheel nut lock ring, at a specified adjustable frequency and load rate, simulating impact stresses encountered in actual truck wheel nut load conditions. The unit was designed around a Trilogic T100MD1616+ programmable logic controller (PLC). This device utilizes variable current output through a current to voltage converter to drive a pneumatic servo control valve, powering an air cylinder through a mechanical linkage and a load cell. The air valve is equipped with a calibrated air pressure sensor to monitor actual air pressure applied to the valve. This supplies a voltage feedback loop to the PLC providing loop pressure control. The load cell monitors actual load forces, and also supplies this calibrated data to the PLC. The resulting control action enables the test unit to operate accurately from 0 to 6 Hz. and from 0 to 80 PSI pressure settings, providing accurate loads ranging from 0 to 108 ft/lbs to the keeper ring under test.

A typical test is one million plus cycles. The air cylinder is fitted with two Hall effect stroke limiting devices to provide failure and out of tolerance warnings to the PLC. The PLC is controlled by three pushbuttons for menu selections on a 4 by 20 LCD display. All test data is displayed on this device and is also logged on a panel PC and channeled through to an intranet/internet connection for remote access and control. The entire unit is powered by a single 24 VDC, 1.5 A. power supply. A Lexan safety cover, with an interlocking proximity switch, pauses the operation of the machine without test interruption if removed for part inspection. Testing resumes when the cover is replaced.