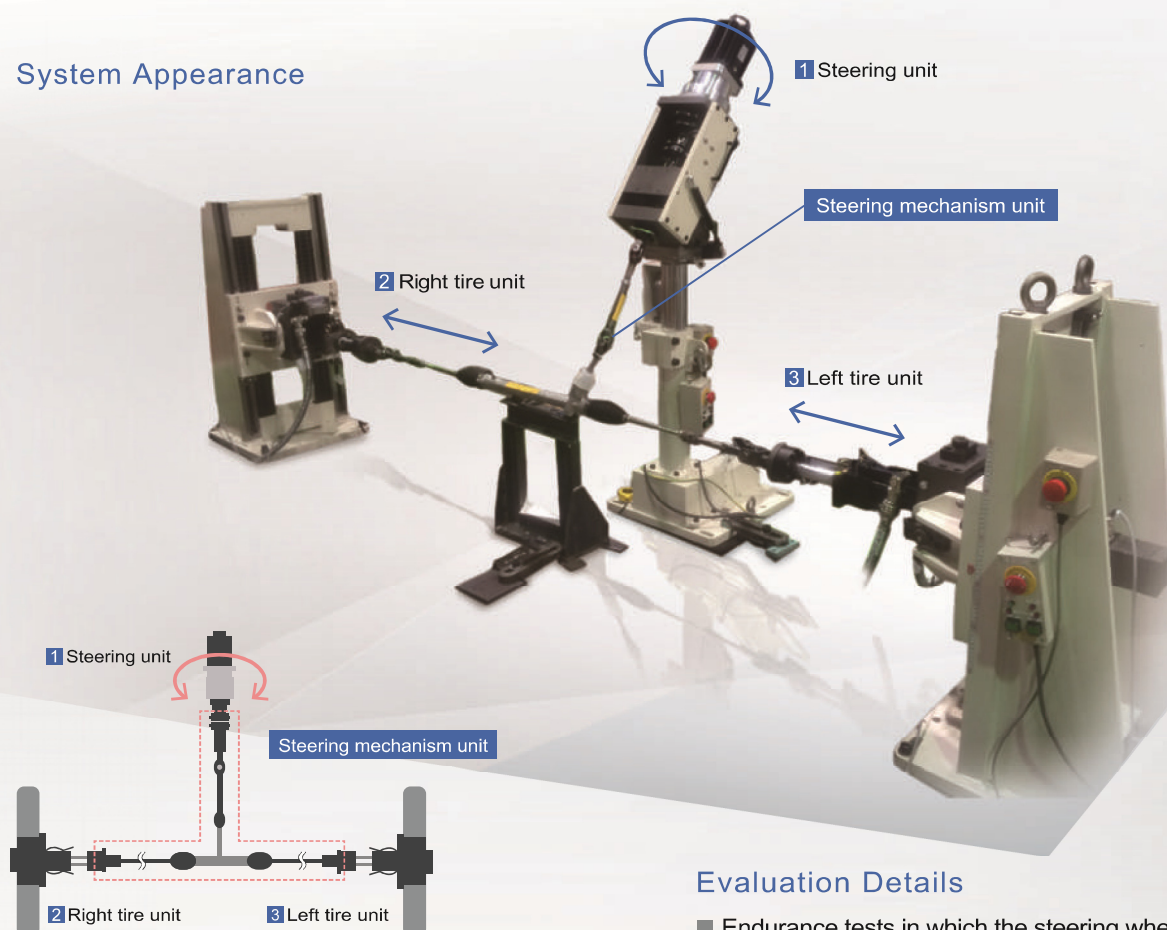


# Three-Axis Endurance Evaluations of Automobile Steering Mechanisms

## With Control via Actual Data, Endurance Evaluations Approximating Real Motion Can Easily Be Performed

Automobile steering units are important components that must be highly durable. There are also significant differences in driver arm strengths, so many cars are equipped with a power steering mechanism, which complicates the structure. In contrast, with luxury cars and sports cars, specifications are required that can achieve an operable feeling that heightens the sense of enhanced value. In regards to these new and diversified requirements, quantitation, not only evaluations by people, is increasingly needed. By combining three actuators with the 4830 controller, which is capable of high-accuracy control, this system can easily perform endurance tests under close to real conditions.

### System Appearance



### Evaluation Details

- Endurance tests in which the steering wheel is moved left and right more than one million times
- Endurance tests in which excessive force is applied to turn the steering wheel to the left or the right
- Quantitation of the sense of enhanced value (Rotational torque and angle of 1 and test force at 2 and 3 at each rotation point)

Endurance tests of the steering mechanism unit are performed by adding a rotational force via the steering wheel 1, and producing a reaction force originating from the tires in 2 and 3.

The reaction force from 2 and 3 corresponding to the rotational angle in 1 is obtained for use from an actual car.

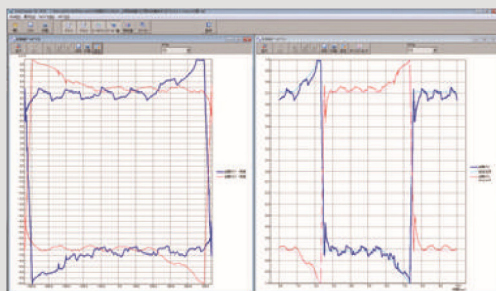
## Main Specifications

Left/Right Tire Units	<ol style="list-style-type: none"> <li>1) Rated capacity: <math>\pm 10</math> kN stroke <math>\pm 100</math> mm (static maximum load capacity <math>\pm 13</math> kN)</li> <li>2) With trunnion pin</li> <li>3) Maximum speed: 500 mm/sec (20 L/min hydraulic source, when unloaded)</li> </ol>
Lifting Stand (For the left/right tire units)	<ol style="list-style-type: none"> <li>1) Height: 300 mm to 800 mm (electric lift, manual bolt fastening)</li> <li>2) Angle: top/bottom <math>\pm 10^\circ</math> (can change fastened or mobile) and horizontal <math>\pm 10^\circ</math></li> </ol>
Steering Unit	<ol style="list-style-type: none"> <li>1) Rated capacity: <math>\pm 200</math> Nm, Angle: <math>\pm 1080</math> deg</li> <li>2) Maximum speed: 360 deg/sec</li> <li>3) Excitation frequency: 0.01 Hz to 2 Hz (<math>\pm 5</math> deg or more)</li> </ol>
Lifting Stand (For the steering unit)	<ol style="list-style-type: none"> <li>1) Height: 800 mm to 1200 mm (electric lift, manual bolt fastening)</li> <li>2) Angle: top/bottom <math>0^\circ</math> to <math>60^\circ</math> (can change fastened or mobile)</li> </ol>



4830 Controller

### Data Processing Example (PC Screen)



The left window shows the data chart results when the steering unit is turned to the left and right from the center position, and then returns to the center.

The window on the left shows a chart of angle versus test force.

The window on the right shows a chart of time versus test force.

The blue line is the test force for the right tire unit.

The red line is the test force for the left tire unit.



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