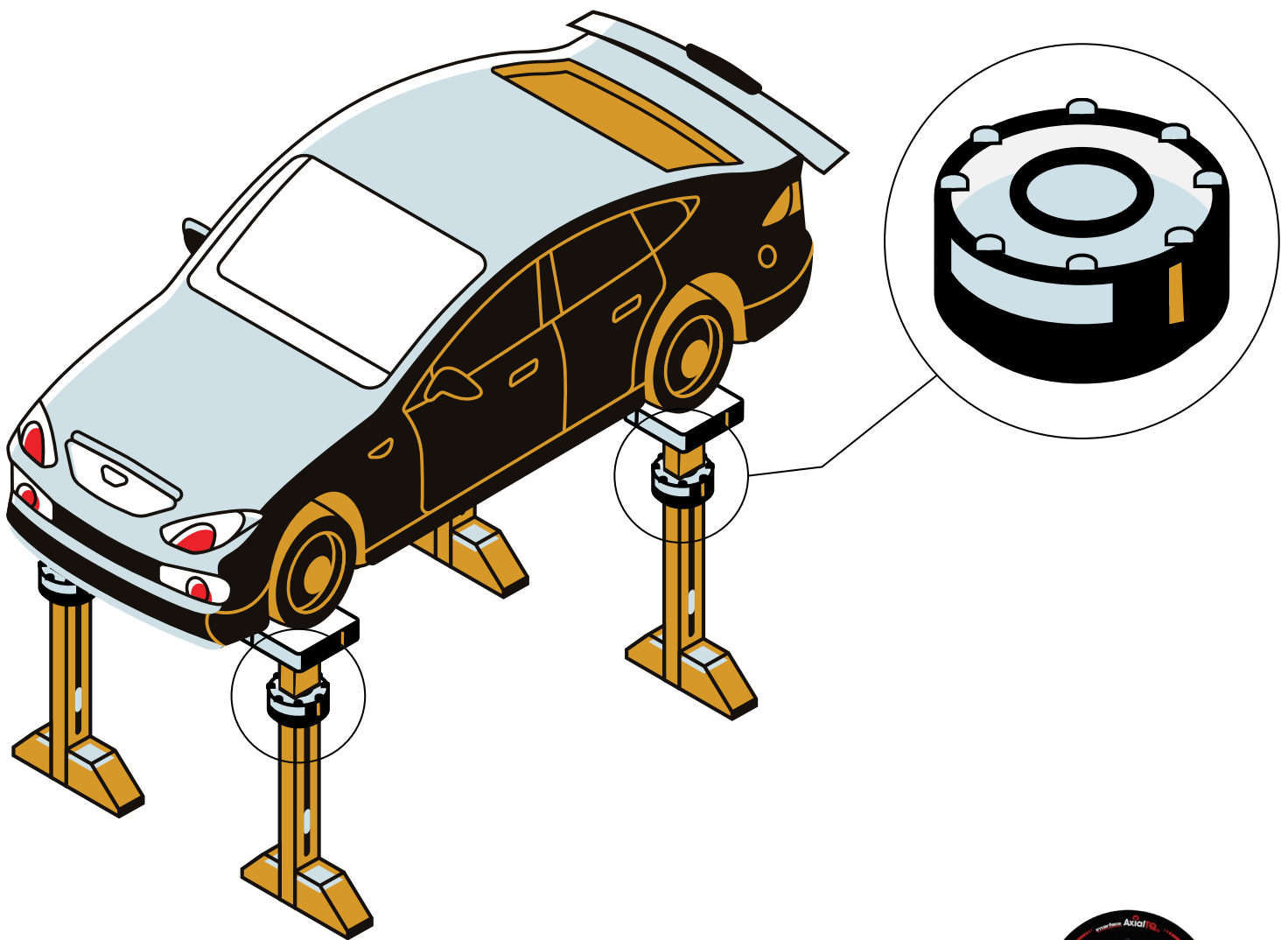


# Interface

## Automotive and Vehicle Brochure



Automotive and Vehicle Brochure v1.1

**interface**  
FORCE MEASUREMENT SOLUTIONS.

The World Leader in Force Measurement Solutions™



# Vehicle Solutions

Interface introduced our load cells to the auto and vehicle industry more than five decades ago. We understand the complexities of testing throughout the entire journey, from component design and prototyping to rigorous safety testing of every piece of equipment. Our quality and precision sensor technologies are essential to manufacturing and production.



## Automotive + Vehicle

Interface's sensor solutions, instrumentation and accessories are used across all facets of the automotive and vehicle industry. As the industry has evolved and transformed, so has the products we supply to our customers in this market.

By creating highly responsive, critically accurate, and safer load cell and torque sensors, we are seeing our products used in the testing of engines and exterior bodies, tires, batteries, fuel pumps, displays, electronics and more.

Since 1968, Interface has worked with all types of users in the automotive industry. Whether they are supplying equipment to advance manufacturing at the plant or making parts used in assembly, we provide solutions to design houses, engineers, machine builders, testing labs and top makers. Our success is aligned to the industry's success in bringing new products to market and innovation in design and usability.

### Industry Leading Quality

Interface is celebrated for meeting and exceeding the quality needs for our customers. Our products are built in accordance with A2LA, International Standard ISO/IEC 17025:2005 and ANSI/NCCL Z540-1-1994. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system.

Every part we make is calibrated and tested before we ship it to our customer. It is our relentless commitment to quality and accuracy. It's our way to ensure your getting the best in precision sensor technologies.



## Solution Capabilities

- Stainless steel and rugged designs for faster, lighter, and more responsive vehicle sensors
- Digital and advanced instrumentation
- Testing systems and load frames for onsite labs
- Mobile testing units
- Precision design and quality for all products
- Proprietary strain gages
- Environmentally sealed products
- Wireless telemetry system components
- Vast inventory of sensors and instrumentation for fast delivery
- Custom solutions designed to your exact requirements for safety equipment
- OEM engineered products for all steps of the automotive manufacturing process

## Vehicle Solutions

# What classifies as the automotive industry involves a complex and dynamic mix of suppliers, makers and designers of all types of vehicles, as well as prototypes and advanced manufacturing.

Faster, lighter, safer, more responsive load cell sensors are built by Interface to meet the growing demands of the automotive and vehicle industry. Nearly every segment of the industry deals with numerous priorities as they compete to design, engineer, build and supply new and innovative vehicles.

From the focus on extreme performance of racing vehicles to the safety focus of consumer automobiles, Interface can provide force and torque measurement solutions to help you, today and in the future. Here are a few examples of how Interface solutions are used in the industry now.

## Lug Nut Assembly Torque

When the need to increase productivity for automobile wheel installation, while ensuring that the lug nuts are installed to the proper torque values for safety purposes, Interface stepped into provide the answer. The solution was the T33 Spindle Style Rotary Torque Transducer, used within the customer's wheel installation assembly machine. These reliable and durable transducers come standard with +/-5VDC analog output for torque measurements and a 360 pulse, 2-track encoder for speed and angle measurement with simplified installation. Our customer was able to perform five simultaneous torque measurements during wheel installation in seconds. The T33 Spindle Torque Transducer provided a signal torque and TTL for angle measurement back to customer's control system so that proper values could be applied and recorded.

## Bluetooth® Brake Pedal

Testing engineers utilize advanced connectivity and communication technologies for easy, fast testing. The customer needed to measure brake pedal force during vehicle testing. As the pedal is pressed, force is measured by the BPL-300-C Brake Pedal Load Cell. Results are transmitted by the BTS-AM-1 Bluetooth Low Energy (BLE) Strain Bridge Transmitter Module to the BTS Toolkit Mobile App and displayed on a mobile device. The customer objective has been achieved when a brake test was executed the force measurement was simultaneously displayed and graphed for examination in real time in the tested vehicle.

## Examples of Automotive and Vehicle Applications Using Interface Measurement Solutions:

- Engine dynamometer
- Brake and clutch pedal force
- Bearing press and press to fit
- Lug nut assembly
- Door fatigue testing
- Wet sanding force monitoring
- Airbag connector testing
- Engine head bolt tightening
- Fastening work bench
- EV battery testing
- Vehicle crash test wall
- Bluetooth® brake pedal
- ICE and EV motor torque testing
- Race car suspension testing
- Window pinch force testing
- Equipment fatigue testing
- Seat testing machine
- Sealing sensor installation testing
- Motor test stand
- Electric bike motor tests
- Production line robotic sensors
- Durability testing
- Transmission gear box and gear mesh
- Drive train and Differential
- Precision car weight and distribution
- Autonomous vehicle tests
- Coil and valve spring testing
- Tire and shock absorber testing

# HIGHLIGHT: Torque Measurement for Electric Vehicles

## Customer Need / Challenge

An electric vehicle manufacturer needed a torque measurement system for their electric vehicle motors. These motors run at significantly higher rotational speeds than their internal combustion engine (ICE) counterparts, and have much higher power densities due to the small size and light weight. The system would be used to test the torque and speed of their electric motors to achieve and ensure optimum instant peak torque performance.

## Interface Solution

Interface's AxialTQ™ Wireless Rotary Torque Transducer is a highly accurate system that provides the highest quality torque measurement. This product comes with the AxialTQ™ Output Module and the provided AxialTQ™ Assistant software, that can be installed on a test bench. Data results are calculated and collected in real-time.

## Results

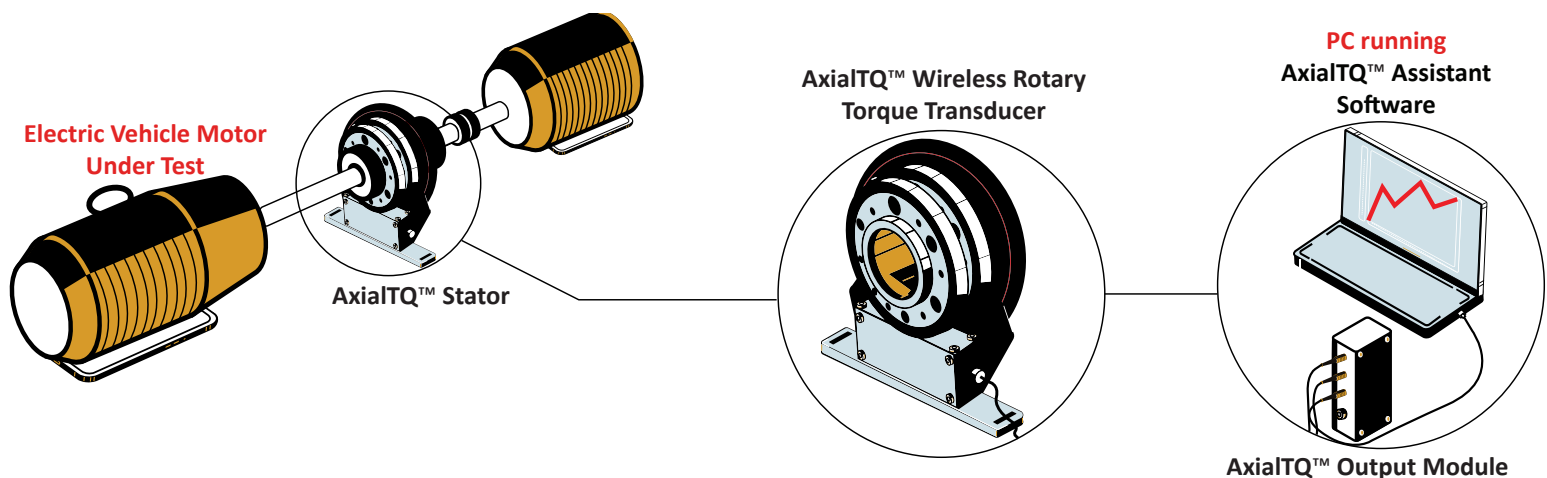
Interface's AxialTQ Wireless Rotary Torque Measurement System accurately measured the torque and RPM of the electric vehicle motor and they were able to achieve their required instant peak torque.

## Materials

- AxialTQ™ Wireless Rotary Torque Transducer
  - Rotor
  - Stator
  - AxialTQ™ Output Module
  - supplied AxialTQ™ Assistant Software
- AxialTQ™ Speed Gear Option
- Interface Integrated Disc Couplings
- Customer's PC or Laptop
- Customer's test bench

## How it Works

The AxialTQ™ Wireless Rotary Torque Transducer is installed on a test bench. The AxialTQ™ Wireless Rotary Torque Transducer tests and senses the electric vehicles motor with high accuracy. It both measured and calculated the electric vehicles torque and rotational speed (RPM), while collecting data. Results can be reviewed on the customer's PC or laptop with the included AxialTQ™ Assistant Software.



# Product Examples for Automotive Solutions



**AxialTQ™ Wireless Rotary Torque Transducer**  
885 lbf-in to 88.5K lbf-in  
100 Nm to 10 kNm



**BPL Pedal Load Cell**  
50 lbf to 500 lbf  
250 N to 2.5 kN



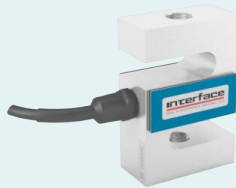
**1200 Standard Precision LowProfile™ Load Cell**  
300 lbf to 100K lbf  
1.33 kN to 445 kN



**1100 Ultra Precision LowProfile™ Load Cell**  
200 lbf to 300K lbf  
1.33 kN to 890 kN



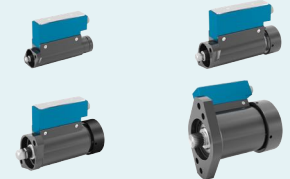
**2400 Standard Stainless Steel Low Capacity Load Cell**  
100 lbf to 5K lbf  
0.44 kN to 22 kN



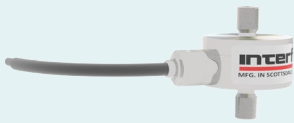
**SSMF Fatigue Rated S-Type Load Cell**  
25 lbf to 2.5K lbf  
100 N to 10 kN



**T15 Hex Drive Style Rotary Torque Transducer**  
1.77 lbf-in to 177 lbf-in  
0.2 Nm to 20 Nm



**T31, T32, T33, and T34 Spindle Style Rotary Torque Transducer**  
8.85 lbf-in to 4.43K lbf-in  
1 Nm to 500 Nm



**WMC Sealed Stainless Miniature Steel Load Cell**  
5 lbf to 500 lbf  
22 N to 2,200 N



**SML Low Height S-Type Load Cell**  
5 lbf to 2000 lbf  
22 N to 9 kN



**6A Series 6-Axis Standard Capacity Load Cells**  
Force: 11.2 to 22.5K lbf  
Torque: 8.85 to 88.5K lb-in  
Force: 50 to 100K N  
Torque: 1 to 10K Nm



**6A Series 6-Axis High Capacity Load Cells**  
Force: 11.2K to 180K lbf  
Torque: 88.5K to 354K lb-in  
Force: 50K to 800K N  
Torque: 10K to 40K Nm



**3AXX 3-Axis Force Load Cell**  
Force: 4.5 lbf to 112K lbf  
Force: 10 N to 500 kN



**CSC Miniature Sealed Stainless Steel Load Cell**  
5 lbf to 500 lbf  
22 N to 2,200 N



**INF-USB3 Universal Serial Bus Single Channel PC Interface Module**  
±3 mV/V, ±4.5 mV/V ±5 VDC, ±10 VDC  
4-20 mA, 12 ±8 mA and 5V TTL



**BX8 8-Channel Data Acquisition System and Amplifier**  
±5V, ±10V, 4-20mA, and 0-20 mA Outputs  
8-Channel Synchronized Sampling



**9330 Battery Powered High Speed Data Logging Indicator**  
Powers up to 4x 350 ohm sensors  
Stores up to 6 sensor calibrations



**9870 High-Speed High Performance TEDS Ready Indicator**  
Powers up to 4x 350 ohm sensors  
Stores up to 6 sensor calibrations



**BSC4D Multi-Channel Bridge Amplifier and PC Interface Module**  
5 lbf to 500 lbf  
22 N to 2,200 N



**BlueTooth® Telemetry System**  
Noise free resolution of 1 in 92000 counts (16.5 bit) used with a 3mV/V sensor and 1 in 184,000 counts (17.5 bit) when used with a 6mV/V sensor

## Interface Innovates with Vehicle Market

Any time innovation is introduced into the market, it takes many years to iterate and realize the full potential of the technology. In today's marketplace, new designs and electric vehicles (EV) are reaching a point where the technology and capabilities are fully realized and is primed for an outbreak on mass scale. Test and measurement played a pivotal role in these advancements and will continue to have a major part in the future.

Interface continues supply precision force and torque test and measurement systems that meet the demands for superior testing requirements of all components used to make vehicles. The automotive market, and especially EVs, are subjected to extremely strict regulations. Therefore, test and measurement are critical for safety, reliability, durability, and overall vehicle performance.

As a steadfast partner, we have long been poised for growth and started early in investing in the development of measurement technologies designed specifically to support testing of advancements in the industry. Our products are already well-known within the automotive industry because of our ability to deliver superior quality and high accuracy. Solutions that auto manufacturers and testing labs rely upon. Making transitions to new types of vehicles, use case of sensor technologies and advanced manufacturing is why Interface is a partner of choice.

## Interface Solutions Advance the Auto Industry

Interface understands the important roles and requirements of the development of the automotive industry. Interface supplies high quality, precision load cells to automotive manufacturers, including custom one-off sensors and special application-specific designs. Whether we look at where we are today with hybrid and electric motors, or autonomous rigs and people movers in test now, one thing that is constant is Interface's role in providing vital measurement solutions for testing and real-time performance monitoring in the automotive and vehicle markets.

Besides critical accuracy, there are several different considerations to make when designing and building load cells used in automotive applications. The automotive and vehicle industry has long relied on Interface products and services for accurate test and measurement programs and OEM products. Whether they are using our standard or custom load cells, calibration systems, load frames, multi-axis sensors or specialized torque transducers like AxialTQ, the applications uses for our quality sensor technologies are diverse in this sector.

Interface products are used for crash walls, brake testing, energy storage tests in the lab, seat belt and headrest testing, just to name a few. Interface is proud that their torque and force products play a major role in making vehicles move and ensuring it's safe for drivers and pedestrians alike.

# Vehicle Solutions

- Load Cells
- Multi-Axis Sensors
- Load Frames and Calibration Systems
- Torque Transducers
- Interface Mini™ Load Cells
- Load Button Load Cells
- Data Acquisition Systems
- Instrumentation
- Digital Instrumentation

*If you know what you need and are ready to talk to our application engineers, email or call today!*

**To learn more  
about the Interface  
automotive solutions  
provided call  
480-948-5555.**

**Interface is the world's trusted leader in technology, design and manufacturing of force measurement solutions. Our clients include a "who's who" of the aerospace, automotive and vehicle, medical device, energy, industrial manufacturing, test and measurement industries.**

Interface engineers around the world are empowered to create high-level tools and solutions that deliver consistent, high quality performance. These products include load cells, torque transducers, multi-axis sensors, wireless telemetry, instrumentation and calibration equipment.

Interface, Inc., was founded in 1968 and is a US-based, woman-owned technology manufacturing company headquartered in Scottsdale, Arizona.



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