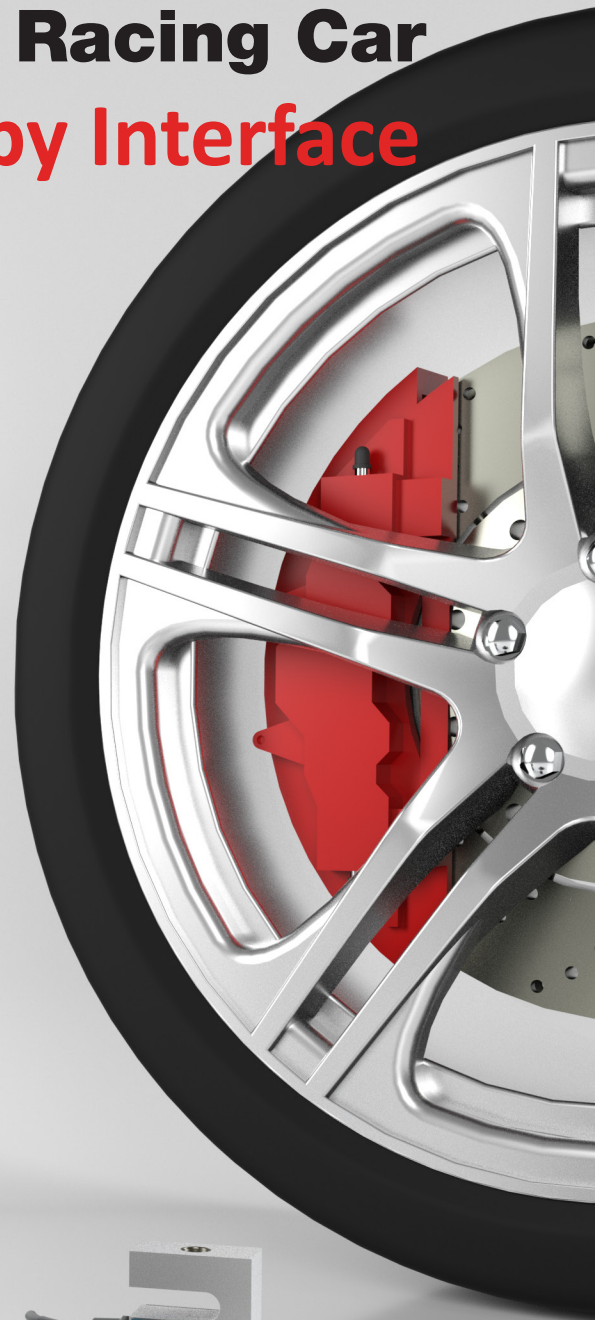
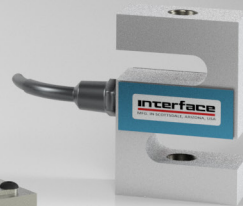
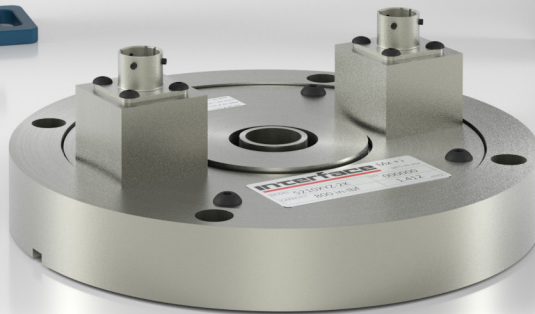


# Building a Championship Racing Car

## A Technical White Paper by Interface



## Interface- Driven to Perform

To succeed in automotive racing, a commitment is required...a commitment to always ask for more and to never settle for less. Continual improvement is necessary to stay ahead of your competition and win. This drive to be the best is part of Interface's DNA, from our product and service offering to the dedication of our employees.

Accurate force measurement is a vital requirement of the automotive industry and in the competitive arena, performance demands are pushed even higher. Interface takes great pride in being a leading solutions provider for these applications. Whether it's for NASCAR, IndyCar, or even the amateur level, engineers rely on Interface.

In addition, our team has hands on experience with the positive performance effects of force measurement in racing. Interface's Vice President of Sales has accomplished 8 National Championships in Sports Car Club of America (SCCA) Solo racing, and also competes in the One Lap of America cross country, week long multi-competition racing event. The annual SCCA National Championships draws over 1000 drivers from across North America to compete over two days, where wins are decided by mere thousandths of a second. Performance and precision are critical and Interface force measurement solutions help to fine tune critical racing variables.



Figure 1. The One Lap of America celebrates its 36th running in 2021; Chevrolet Grand Sport Corvette SGT-1BB driven by Interface's VP of Sales Brian Peters

### The TXY Multi-Axis Shear Load Cell

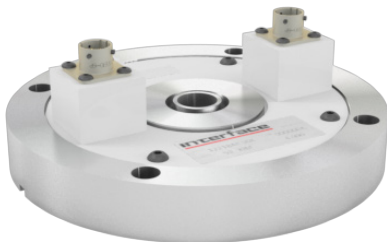


Figure 2. Interface's TXY load cell  
It is no surprise then, that in building a national championship winning car many technical decisions relied on accurate force and torque measurements, provided by accurate and reliable Interface load cells and torque transducer measurements. In racing, control is everything and a good race car is only as good as its tires and shocks. In fact, several leading tire manufacturers (including key SCCA sponsors) rely on the Interface TXY multi-axis shear load cell for precise test data on tire uniformity with minimal cross talk across its strain gage bridges.

This car's Koni 2812 series double adjustable shocks had their independent rebound and compression valving expertly dialed-in by ProParts USA on their CTW shock dynamometer. CTW, an industry benchmark for shock absorber development, has exclusively turned to Interface's moment compensated LowProfile™ load cell as the heart of its systems. Interface LowProfile™ load cell sensors are used in strut/shock/

spring testing machines.



Figure 3. Koni adjustable shock absorber and specifically rated coilover spring.



Figure 3. Used to measure the braking force / torque, load cells are integral parts to chassis dynamometers. Nissan 350Z's engine control unit being tuned for 100 octane gasoline

Different manufacturers use these machines to ensure their products are meeting their targeted performance levels. The car shown in Figure 3 saw more than a dozen different spring rate configurations during development, so when springs are being changed- out in small rate increments, it's good to know that a spring is actually delivering the force per displacement that it's expected to.

## S-Type Load Cells

Used to measure how much torque is getting to a vehicle's driven wheels, chassis dynamometers are very popular tools for effective engine tuning. Maximizing power is another massive piece to building a competitive car and it is yet another example of Interface measurement leading the industry.

There are a wide variety of chassis dynamometers, each using different methods to load the vehicle and measure the torque (force x arm length); and the most popular dynamometer systems rely on highly accurate load cells to provide the force measurement values in these systems. The SSM or the SM S-Type load cells have been a favorite force measurement solution in these applications – rugged, reliable, and accurate.

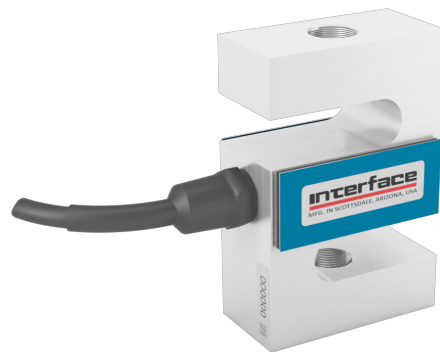


Figure 4. SSM environmentally sealed “S” type load cell for excellent force measurement accuracy and reliability.

## AxialTQ™

For product tests that require dynamic or rotary torque and RPM measurements during an active testing application, the AxialTQ™ is a favorable direct torque measurement solution. The AxialTQ™ torque transducer provides a bearing-less, compact wireless design that affords the test engineer suitable data collection for engine analysis, as well as brake HP calculations.

Interface's presence in the automotive test field is extensive. While this has only been a short look at a few automotive applications, it doesn't factor-in the hundreds of OEM R&D engineers that use our load cells, torque transducers, instruments, and calibration systems on a daily basis to build and evaluate their products. All Interface products are US manufactured to help system test engineers get the most accuracy, repeatability, and reliability from their performance systems.



Figure 5. Interface's AxialTQ™

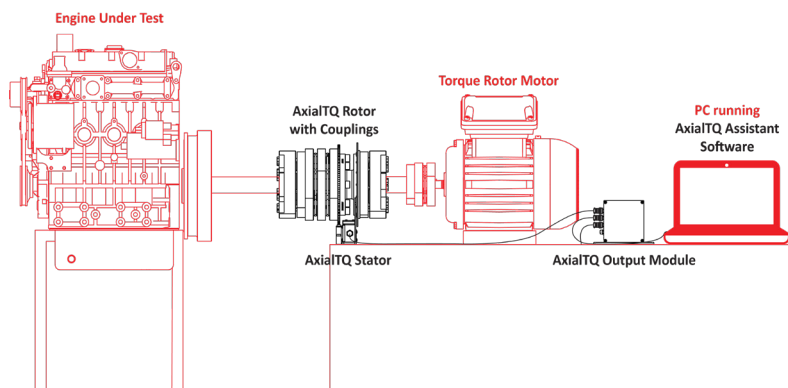


Figure 6. Interface's AxialTQ™ Wireless Rotary Torque Transducer comes with the AxialTQ™ Output Module and the provided AxialTQ™ Assistant software, that can be installed on a test bench.



**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.