

Interface

Robotics Solutions



In the rapidly growing robotics industry, force sensor technologies play a pivotal role in enhancing the capabilities and safety of robotic systems. Force sensors are integrated into robotic arms, grippers, and end-effectors to provide crucial tactile feedback, allowing robots to interact more intelligently with their environment.

Force sensor technologies contribute to advancements in force-controlled automation, enabling robots to perform intricate tasks, such as assembly and manufacturing, with increased accuracy and adaptability. Robots and cobots are highly versatile and adaptable to changing production demands, offering enhanced efficiency and agility in manufacturing processes. As the field of robotics progresses, cobots are set to play a significant role in shaping the future of work, creating a harmonious synergy between humans and machines.

Animatronics

In animatronics test labs, Interface's MRTP Miniature Overload Protected Flange Style Reaction Torque Transducer was connected to the servo motors in the limbs of the animatronics that make it move. When monitoring the test, the animatronics torque results can be viewed on a PC when the transducers are connected to the BX8-AS BlueDAQ Series Data Acquisition with Industrial Enclosure. Using this setup, customers are able to record the force results of his metal-bending machine with Interface's Wireless Telemetry System.

Cobot Safety Programming

Collaborative robots, or cobots, are offering more manufacturing operations in the industrial packaging industry. Protective cages or fences are no longer needed for safety purposes, but safety testing is still needed to ensure humans and robots can work alongside each other. Four 3-Axis Force Load Cells, creating one 6-Axis Force Plate, are installed between two metal plates at the base of the cobot. Interface suggests installing a 6-Axis force plate under the cobot, and also two ConvexBT Load Button Load Cells in the pinchers of the cobot. If a human were to knock into the cobot, or have a limb stuck in the pincher, the cobot would sense the amount of force measured from the load cells and be programmed to stop immediately.

Robot Surgery Force Feedback

A biomechanical medical company wants to test the force, torque, and tactile feedback from their robotic arm for invasive surgery. The surgeon's movements are mirrored by the robotic arm during surgery, and it is essential all haptic force feedback is measured to ensure safety during invasive surgery. A number of Interface's force and torque measurement products have been used on this robotic arm. These include the ConvexBT Load Button Load Cell, SMTM Micro S-Type Load Cell, and the MRTP Miniature Overload Protected Flange Style Reaction Torque Transducer. Force and torque results can be collected when connected to the BX8 8-Channel Data Acquisition and Amplifier, and viewed when attached to a laptop.

HIGHLIGHT: Autonomous Robot Dog

Customer Need / Challenge

Autonomous robot dogs are being used more and more for inspections in different industries such as oil and gas, manufacturing, construction, and even military applications. Force sensors play a crucial role in the stability, balance, and functionality for these autonomous robotic dogs.

Interface Solution

When it comes to sensing ground contact forces, force sensors are needed in the legs of these robot dogs to continuously measure how much force each foot is applying to the ground in order to stay balanced. Interface's LBM Compression Load Button Load Cell can be installed in the foot of the robot dog. When connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module, the movement data is wirelessly transmitted to the customer's PC through the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

During the autonomous robot dog's inspections, Interface's LBM Compression Load Button Load Cells successfully measured the robot dogs movements such as balance, foot pressure, and posture.

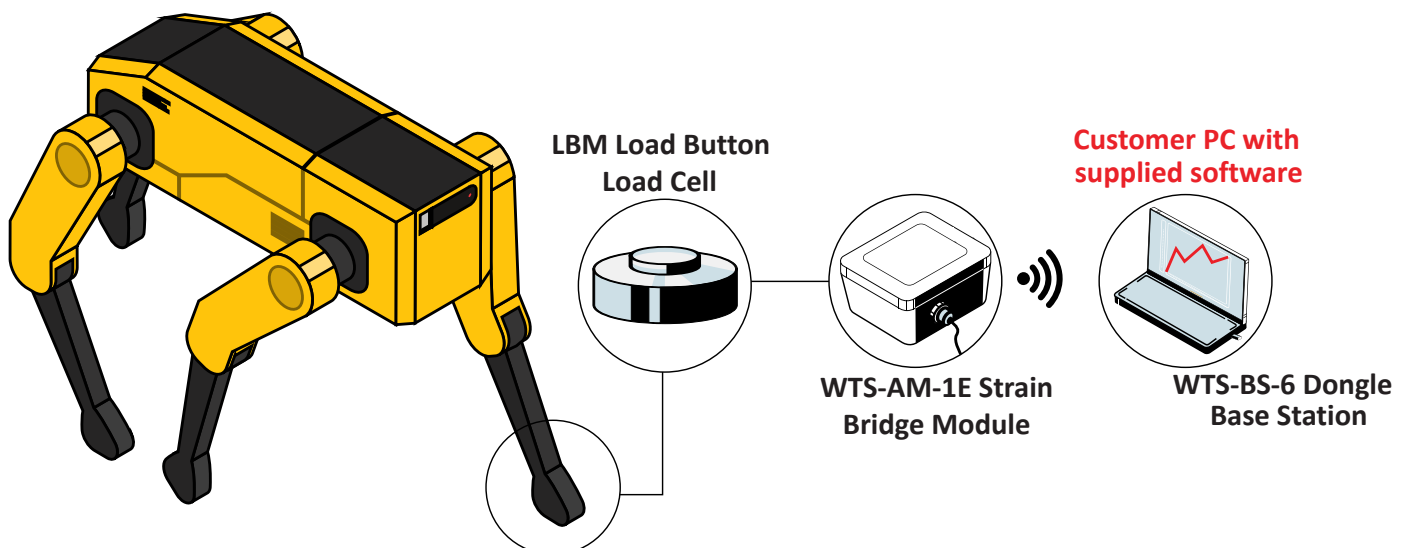
Materials

- LBM Compression Load Button Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software
- Customer PC or Laptop

How it Works

The LBM Compression Load Button Load Cell can be installed in the legs of the robot dog. The LBM's are connected to a WTS-AM-1E Wireless Strain Bridge Transmitter Module. As the robot dog autonomously does its inspections and gathering data, the LBM simultaneously records data on its balance, stride, strength, foot pressure, and posture. Data results are sent wirelessly to the customer's PC through the WTS-BS-6 Wireless Telemetry Dongle Base Station with supplied Log100 software.

Autonomous Robot Dog



Multi-Axis



3A Series 3-Axis Force Load Cell

Force: 4.5 lbf to 112K lbf
Force: 10 N to 500 kN



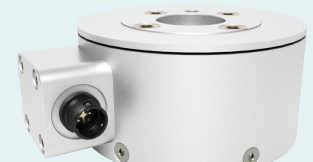
6A Series 6-Axis Standard Capacity Load Cells

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



6A55RI 6-Axis Robot Flange Force-Torque Sensor

Force: 11.24 to 449.62 lbf
Torque: 44.25 to 442.54 lb-in
Force: 50 N to 2 kN
Torque: 5 Nm to 50 Nm



6ADF Series 6-Axis DIN Flange-Type Load Cells

Force: 4.5 to 269 lbf
Torque: 8.85 to 531 lb-in
Force: 20 N to 1.2 kN
Torque: 1 Nm to 60 Nm

Interface Mini™



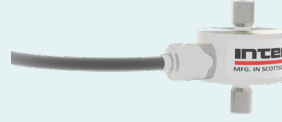
LBS Miniature Compression Load Button Load Cell

5 to 1K lbf
0.02 to 4.45 kN



SMTM Micro S-Type Load Cell

5 lbf to 50 lbf
20 N to 200 N



WMC Sealed Stainless Miniature Steel Load Cell

5 lbf to 500 lbf
22 N to 2,200 N



ConvexBT Load Button Load Cell

5 lbf to 1,000 lbf
22.24 N to 4.44 N

Torque Transducers



MRTM Miniature Overload Protected Flange Style R eaction Torque Transducer

1.77 lbf-in
0.2 Nm



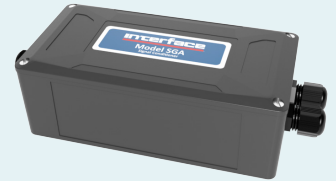
MRT2P Miniature Overload Protected Flange Style Reaction Torque Transducer

17.7 lbf-in to 17.7 lbf-in
0.2 Nm to 2 Nm



DMA2 DIN Rail Mount Signal Conditioner

± 10V, ± 5V, 4-20 mA
10-28VDC Power



SGA Signal Conditioner

1.7 lbf-in to 177 lbf-in
0.2 Nm to 445 kN

Instrumentation



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



BSC4D Multi-Channel Bridge Amplifier And PC Interface Module

±10V and 4-20mA or USB outputs
4 independent channels



9894 Analog Input Process Indicator

0-20 mA, 4-20 mA, 0-5 V, 1-5 V,
and ±10 V Inputs
0.03% Accuracy



BX8-HD44 BlueDAQ Series Data Acquisition System

±5V, ±10V, 4-20mA, and 0-20 mA Outputs
8-Channel Synchronized Sampling

Wireless Telemetry and Bluetooth® Telemetry Systems



WTS 1200 Standard Precision LowProfile™ Wireless Load Cell

300 lbf to 100K lbf
1.5 kN to 450 kN



WTS-BS-6 Wireless Telemetry Dongle Base Station

Compact & Portable Logging
Fast Configuration
500m Wireless Range



WTS-BS-1-HS Wireless Display for Single Transmitters

Simple operation
Connection to single transmitter module



BTS-AM-1 Bluetooth Telemetry System

“AA” Battery Powered Bluetooth
Strain Gage Transmitter

Advancements In Robotics

The field of robotics has witnessed remarkable advancements, revolutionizing various industries and transforming the way we live and work. Robots and cobots are usually equipped with sensors, actuators, and sophisticated algorithms to perceive and interact with their environment. Interface sensors are utilized in the design, testing and use of robotics. Engineers turn to Interface for load cells, torque transducers, multi-axis sensors, and instrumentation for testing, and to embed into robots for real-time feedback.

Robotics and collaborative robots, often referred to as cobots, have gained significant attention due to their ability to work alongside humans, enhancing productivity, safety, and efficiency in numerous applications. Cobots collaborate with humans in shared workspaces, and are designed to work alongside human operators, supporting them in various tasks. These robots are specifically built to be safe, easy to program, and capable of adapting to dynamic environments.

The use of Interface load cells and torque transducers in robotics offers several benefits. First, they can help to improve safety by detecting excessive forces or overloads. Second, they can help to optimize performance by providing feedback about the forces being applied by the robot. Third, they can enable more sophisticated control of robotic systems by providing real-time data about the forces and torques being generated. Our miniature load cells are commonly used by robotic OEMs to provide control and feedback.

Partner with Interface for Robotic Solutions

Interface boasts an accomplished team of renowned specialists in force and torque measurement engineering, manufacturing and technology. Leveraging our extensive expertise and diverse capabilities across various industries, we deliver comprehensive solutions tailored to your exact specifications.

The use of artificial intelligence (AI), robotics, and other smart enabled technologies are at the heart of Industry 5.0. To further automate and optimize production processes, there is a strong emphasis on human-centricity, sustainability, and resilience. Interface is working with industry leaders, integrators, and innovators to provide advanced sensor technologies that will support the adoption of Industry 5.0 products, with all the benefits of optimization and reliability.

Whether it's crafting special transducers to meet your unique needs or creating fully customized sensor, instrumentation, and software systems, we collaborate closely as part of your team to ensure precision and satisfaction.

For sales, service, or support, visit www.interfaceforce.com or call us directly at 480-948-5555 for immediate assistance.

Robotics Solutions

- Load Cells
- Torque Transducers
- Wireless Telemetry Solutions
- Weighcheck Systems
- S-Type Load Cells
- Load Pins and Load Shackles
- Load Buttons
- Interface Mini™ Load Cells
- Signal Conditioners
- Instrumentation
- Multi-Axis Sensors
- Digital Instrumentation
- Calibration Equipment

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
custom 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.