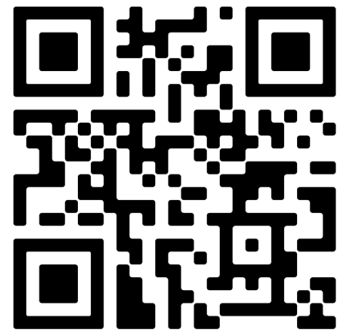
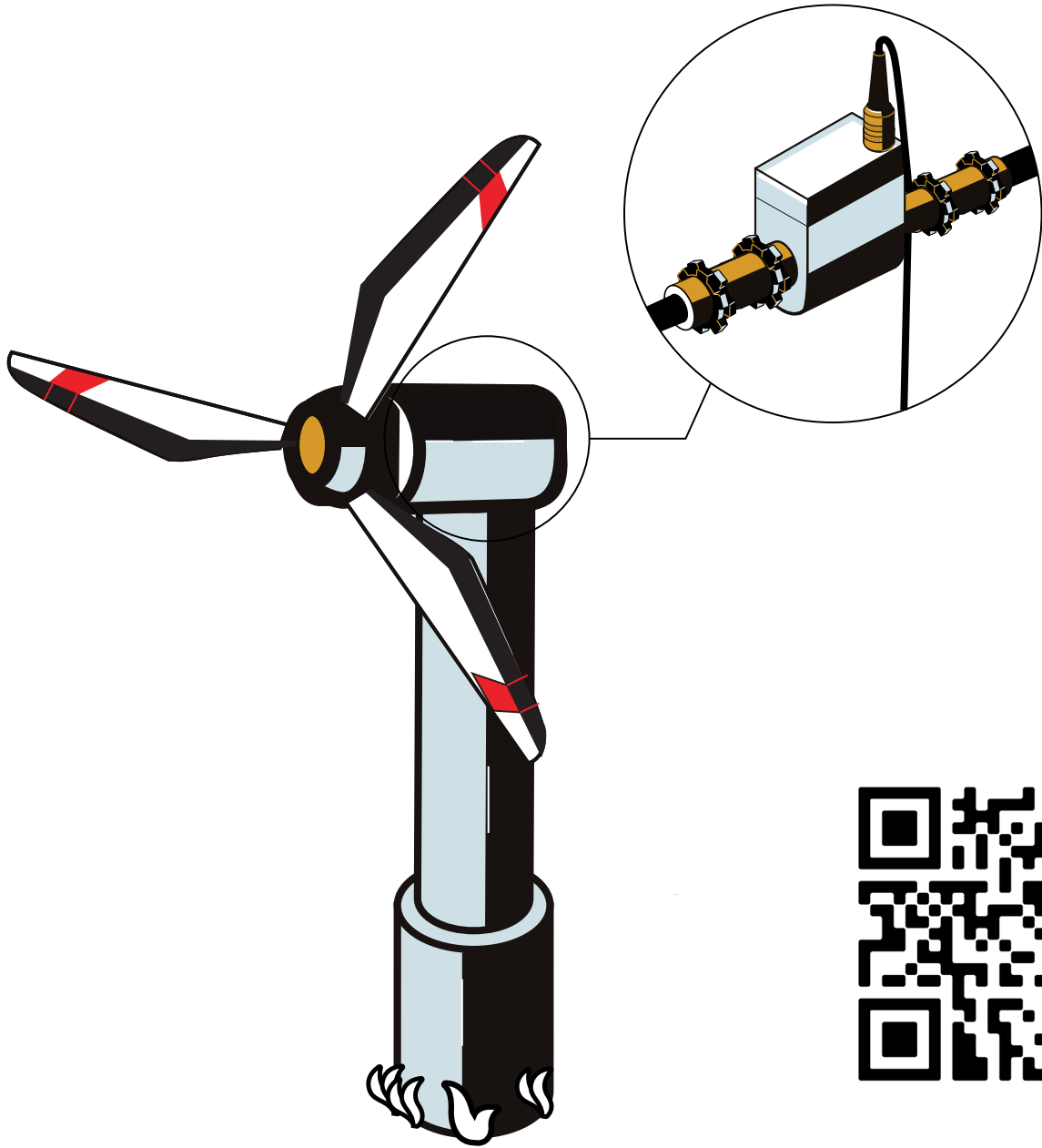


# Interface

## Energy Solutions



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# Energy Solutions

Interface, inventors of LowProfile™ load cells, utilize industry-leading engineers, proprietary technology, and strain gage manufacturing expertise in designing and supplying force measurement solutions to the global energy industry. Our experts know the requirements for accurate, quality sensors used in all energy sectors.



## Energy

Interface force measurement solutions are used in all type of energy related applications to product oil, gas, wind, coal, solar, hydro, nuclear, geothermal and emerging energy sources around the world. We are recognized as a provider of choice for our reliability and accuracy in designing, engineering, testing, innovating, and manufacturing precision sensor-based solutions for the energy industry.

Interface force measurement solutions are used components, machines and field equipment used in energy production. From researching to monitoring equipment, our durable load cells and torque transducers assist suppliers of parts along with energy industry leaders and innovators to fuel the world.

As a pioneer of load cell technology, Interface has long been recognized around the world for providing the most accurate and reliable force measurement solutions on the market. Accuracy matters for safety and reliability in test and measurement projects, engineering and product design, and in the original equipment manufacturing of products that require precision sensor technology capabilities, especially in the various energy sectors.

### Industry Leading Quality

Interface is recognized by energy companies for product reliability, accuracy and innovative design. Since 1968, Interface has been making world-class low profile load cells and exceeding the quality needs for our customers.

Our products are built in accordance with A2LA, International Standard ISO/IEC 17025:2017 and ANSI/NCSL Z540-1-1994. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system.



## Solution Capabilities

- Intrinsically safe products used in harsh environments
- Stainless steel and rugged designs for different temperatures and climates
- Wide variety of wireless telemetry system components to use in all types of environmental conditions
- Mobile testing solutions to take in the field and on remote locations
- Instrumentation for accurate and reliable data
- Custom solutions designed to your exact specifications for energy components and equipment
- Proprietary downhole pressure compensated load cell products
- OEM engineered products for high-production counts



## Energy Solutions

# Interface addresses the challenges of the broad energy industry, with quality, accurate and durable measurement solutions that meet the stringent requirements for precision measurement across all types of environmental conditions.

## Harsh Environments

One of the industries where our knowledge of force measurement is vertically integrated into production and manufacturing processes is in the energy industry. The conditions energy professionals work in can be harsh. They are often in dangerous environments extracting oil and natural gas, wind, or coal to fuel our world's dependencies for power. The equipment our energy sector customers use must be rugged and provide the most accurate results possible. If the equipment fails, our customers risk steep losses and exposure to safety hazards.

Our moment and temperature compensated LowProfile™ load cells use proprietary alloy strain gages to provide the most accurate readings possible in the harshest environments, such as downhole drilling, wirelines, pipelines, and wind turbines. Interface has a special line of intrinsically safe solutions for harsh environments. Our LowProfile load cells with loop-powered intrinsically safe amplified output are designed for use in the oil field and other hazardous locations. These load cells are specifically designed from Interface models by adding high resistance strain gages for low-current loop power and shielded internal amplifier for extra low emissions and minimal EMI susceptibility. Interface's S-Type Load Cell series provides a suitable force measurement sensor for applications in coal mining and transfer and other heavy industries where explosive dust and environment conditions. Our miniature load cells are found to measure alternate energy testing, such as hydro-power equipment and solar testing.

## Interface Pressure Compensated Downhole Load Cell

The downhole environment poses many challenges for well-drillers, operators, tool-string designers, and other engineers in the oil and gas industry. Obtaining accurate force measurements poses some real challenges in certain use cases based on the sensor technologies used and while these types of solutions are available, they fall short in performance, reliability, or capability. For example, the oil and gas industry has used "wet" load cells to monitor forces on their downhole load strings. These downhole load strings are equipped with a variety of sensors, and they travel down thousands of feet during exploratory drilling operations. The problem with wet load cells is that they don't hold up for extended use in wells that extend several thousand feet underground and where there are extreme pressures and temperatures in a caustic environment. To address this issue, Interface created a "dry" load cell that protects the sensitive parts with innovative design, reduces the number of sensors required in the customer's downhole load string, and allows the load cell to last 10 years or more.

## Types of Energy Applications Using Interface Measurement Solutions

- Oil and gas extraction equipment and parts
- Hydro power generation
- Windmill energy equipment
- Wireline spool tension control
- Fuel management and measurement
- Solar panel testing
- Hook load tension
- Torque tong monitoring
- Tool recovery and fishing
- Wave energy generator
- Downhole equipment
- Plug setting
- Calibration and equipment maintenance
- Storing crude oil and natural gas
- Transporting crude oil and natural gas
- Wireless monitoring equipment
- Activation of components
- Submersible and hazardous environments

# HIGHLIGHT: Downhole Tool Recovery

## Customer Need / Challenge

Deviated and lateral wells render topside measurements of little value. Successful pump down services require accurate tool string tension readings, downhole, at the source.

## Interface Solution

The IPCD Pressure Compensated Downhole Load Cell is an accurate and reliable load cell that Interface has developed specifically for downhole tension and compression measurements in high temperature, high pressure well conditions. Featuring proprietary pressure and temperature compensation, precise tool string force measurements can be monitored real time through customer instrumentation.

## Results

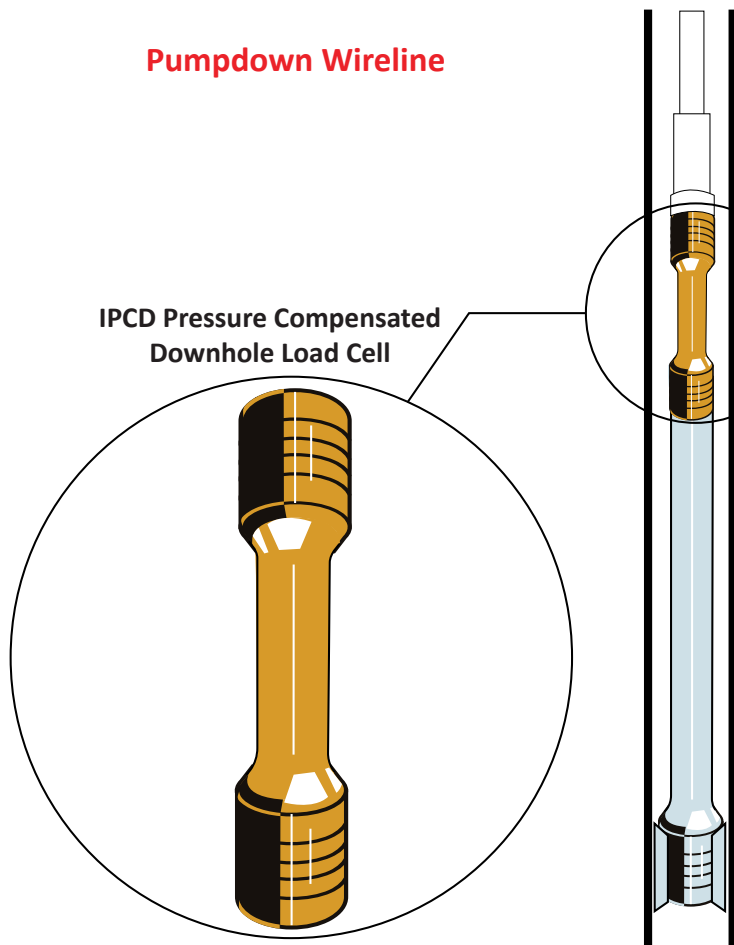
Customer was able to control pumping forces on the tool string with incredible accuracy. Regulating this process ensured service success without the risk of tool pump off, avoiding a devastating and expensive fishing operation.

## Materials

- IPCD Pressure Compensated Downhole Load Cell
- Customer Instrumentation

## How it Works

The IPCD Pressure Compensated Downhole Load Cell is integrated near the top of the tool string. During pump down, the IPCD measures the tension between the cable head and the tool string. Connected to the customer's instrumentation, actual cable head tension is closely monitored across any variation of temperature or pressure.



# Product Examples for Energy Solutions



**IPCD Pressure Compensated Downhole Load Cell**  
10K lbf  
44.5 kN



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



**3200 Precision Stainless Steel Load Cell**  
2.5 lbf to 100K lbf  
12.5 kN to 445 kN



**2400 Standard Stainless Steel High Capacity Load Cell**  
7.5 lbf to 50K lbf  
33.4 kN to 250 kN



**3201 Precision Stainless Steel Load Cell**  
5K lbf to 100K lbf  
25 kN to 450 kN



**2404 Standard Stainless Steel 2-Wire Amplified Load Cell**  
100 lbf to 5K lbf  
23 kN to 445 kN



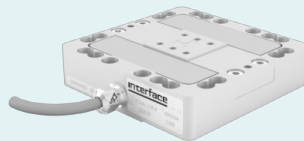
**3410 Intrinsically Safe LowProfile™ Load Cell**  
750 lbf to 10K lbf  
3.37 kN to 45 kN



**3416 and 3430 Coil Tubing Intrinsically Safe Load Cells**  
20K lbf to 60K lbf  
89 kN to 267 kN



**3420 Coil Tubing Intrinsically Safe Load Cells**  
40K lbf to 50K lbf  
178 kN to 222 kN



**3AXX 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



**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



**1500 Low Capacity LowProfile™ Load Cell**  
25 lbf to 300 lbf  
111 N to 1.33 kN



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



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



**WTS Wireless Telemetry System**  
17.7 lbf-in to 44.3K lbf-in  
2 Nm to 5K Nm

## Rugged and Sustainable Solutions from Interface

At Interface, one of the ways we contribute to industrial safety is with the development of our Interface Ex Rated Load Cells, also known as Interface Intrinsically Safe Products. These specialized load cells and force measurement solutions are designed and manufactured so that the materials and electronic components are safe for use in hazardous gas and dust environments when installed per applicable installation instructions. These components play an integral role in the safety of the men and women working in dangerous environments in particular industries like oil and gas, mining, fuel suppliers and transporters, and more.

There several different regulatory bodies focused on product safety throughout the world, and each has different specifications for explosiveness that need to be met based on the area in which the product is sold. Consult with our Application Engineers to see what types of products are suited for your market.

## Exploring the Possibilities

Often, our energy industry customers require a custom force measurement solution to deal with these unique challenges for all energy types including thermal, radiant, chemical energy, nuclear, electrical, motion, sound, elastic, and gravitational energy. That is where we can apply our test and measurement expertise. Tell us your requirements, and we will work to meet your exact specifications.

Innovation in the energy market is also heavily dependent upon accuracy in performance, whether it is advancing in the capabilities in the extraction of oil or measuring forces in solar and geothermal.

Interface is relied upon by the energy industry leaders and OEM solution providers for their vast ranges of standard and customized load cells, torque transducers, digital instrumentation products and expanding wireless technologies.

Interface is committed to designing products that have high quality, durability and reliability for the energy industry. Our products play a huge role in creating force measurement solutions that are durable and provide the accuracy that the energy industry requires.

With a variety of load cells, miniature load cells, torque transducers, multi-axis sensors and instrumentation solutions, our experts and product engineers can help you design a measurement solution for your energy application requirements.

Our decades of experience in working with the energy industry can lend itself to helping you get exactly what you need for your use case. Contact us today, we are ready to help!

# Energy Solutions

- Intrinsically Safe Load Cells
- High Capacity Load Cells
- LowProfile™ Load Cells
- Torque Transducers
- Load Pins
- Load Shackles
- Multi-Axis
- Instrumentation
- Wireless Telemetry Solutions
- Gold Standard™ Calibration
- 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  
energy 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.