



# EXPLORE WHAT'S POSSIBLE.

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### Markets we serve:

-  Aerospace & Defense
-  Agricultural
-  Automation
-  Automotive
-  Manufacturing
-  Material & Endurance Testing
-  Medical & Pharmaceutical
-  Product Development & OEM
-  System Integrators

**FUTEK Advanced Sensor Technology, Inc. is a manufacturer of load cells, torque sensors, pressure sensors, multi-axis sensors, and related instruments and software. Located in Southern California, U.S.A., FUTEK has built a reputation as a quality provider of test and measurement and control feedback products.**

Specializing in the research and development of these advanced sensing devices; FUTEK's products are used in many industry applications, such as medical, system integrations, automation, and robotics. Vowing to produce the highest quality in performance and reliability, FUTEK's product line stands unmatched within the test and measurement industry. Every stage of design, development, and production is driven by an elevated quality standard. In fact, FUTEK guarantees that all products will meet and/or exceed the quality requirements outlined by the customer.

FUTEK provides the most effective sensor solution for your specific project. Our expertise in system integration allowed us to pursue a full line of instrumentation and software to ensure a complete testing platform. FUTEK prides itself for having a thorough support team available to their customers, including pre-application R&D consultations, as well as post-sales technical support.

This application guide outlines conceptual applications that show real-world uses for our sensors, instruments, and software.

Drawing Number: SP1182

**Sensor Solutions Source**  
Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

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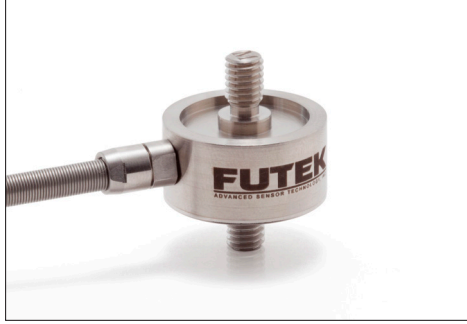


# New Products for 2016



## LCM100 MINIATURE LOAD CELL

- 0.17 in [4.2 mm] Flexure Size
- 1000 g to 25 lb Capacity
- RoHS Compliant



## LCM300 MINIATURE LOAD CELL

- 0.50 in [12.7 mm] Flexure Size
- 50 lb to 1000 lb Capacity
- RoHS Compliant



## USB220 HIGH-RESOLUTION USB OUTPUT KIT

- New Metal Housing
- Up to 4800 SPS
- CE Approved, RoHS Compliant



## IAA100 & IAA200 ANALOG AMPLIFIERS

- IAA100:  $\pm 5$  or  $\pm 10$  VDC Outputs
- IAA200: 4-20 mA Output
- CE Approved, RoHS Compliant



## IAA300 ANALOG AMPLIFIER

- Differential Input, Differential Output
- $\pm 5$  or  $\pm 10$  VDC Outputs
- CE Approved, RoHS Compliant



## USB520 HIGH-RESOLUTION USB OUTPUT KIT

- Amplified/Non Amplified + Encoder Input
- Non Linearity of  $\pm 0.005\%$  of FSR
- CE Approved, RoHS Compliant

## Certifications and accreditations

At FUTEK, we are committed to producing the highest quality sensors available in test-and-measurement and control feedback industries. With high quality comes a meticulous attention to all details. Every stage of design, development, and production is driven by this quality standard. We are so passionate about our quality assurance that we guarantee our products meet and/or exceed the quality clauses outlined by the International Organization of Standardization (ISO). We proudly carry certifications in the following ISO standards: 9001, 13485, and 17025.

Additionally, FUTEK holds certifications from the American National Standards Institute (ANSI) as a Z540 approved calibration laboratory; as well as CE and RoHS certificates of conformance for our standard instrumentation line.

For more information on FUTEK's certifications and compliances, please visit <http://www.futek.com/certifications.aspx>

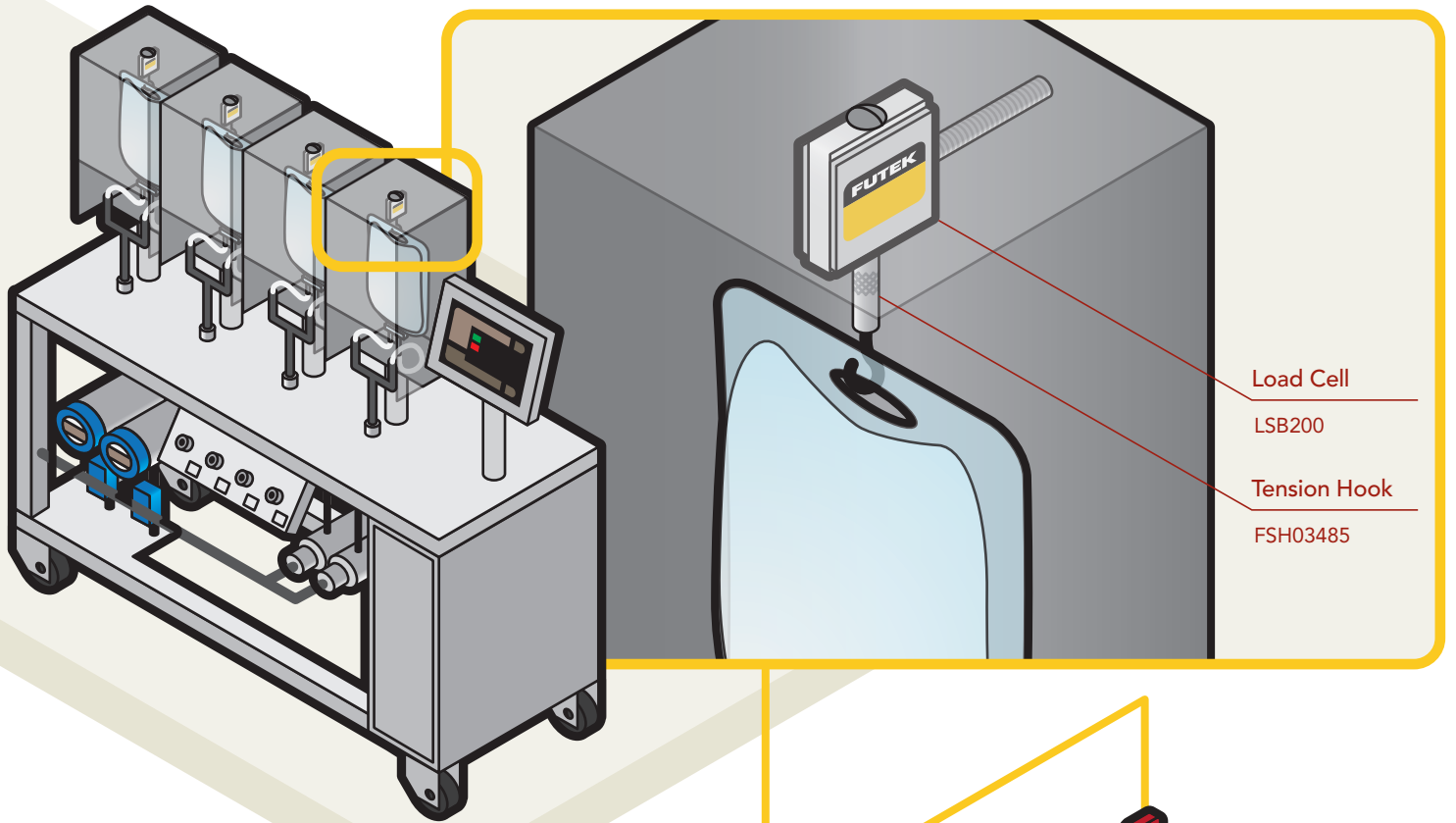
10 Thomas, Irvine, CA 92618 USA

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Fax: (949) 465-0905

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Load Cell  
LSB200  
Tension Hook  
FSH03485

**PRODUCTS IN USE**

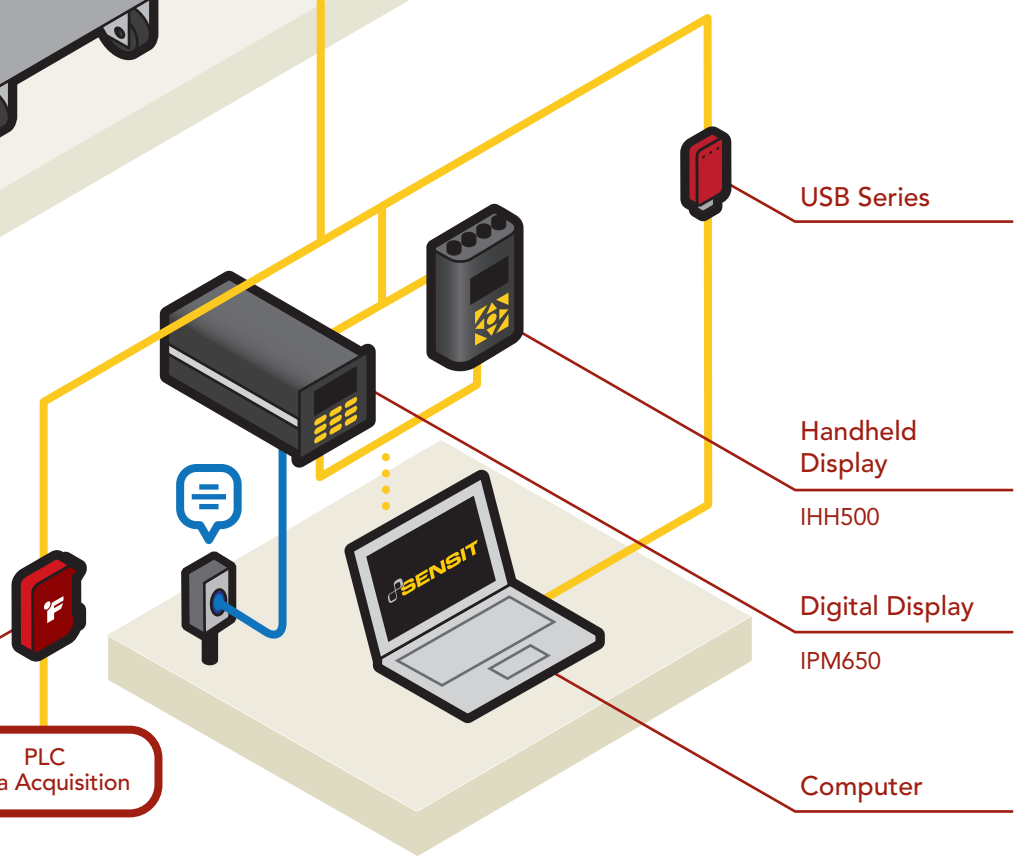
Miniature S-Beam Jr. (LSB200) paired with Instrumentation (IPM650, IHH500, USB Solutions, or IAA analog amplifier).

**APPLICATION SUMMARY**

Medical applications require the utmost precision. In IV or saline bag weighing, high-precision, In-Line load cells are needed. For this application, FUTEK's LSB200 Miniature S-Beam Load Cell will measure the tension force applied by an IV bag.

Amplifier  
IAA Series

PLC  
Data Acquisition



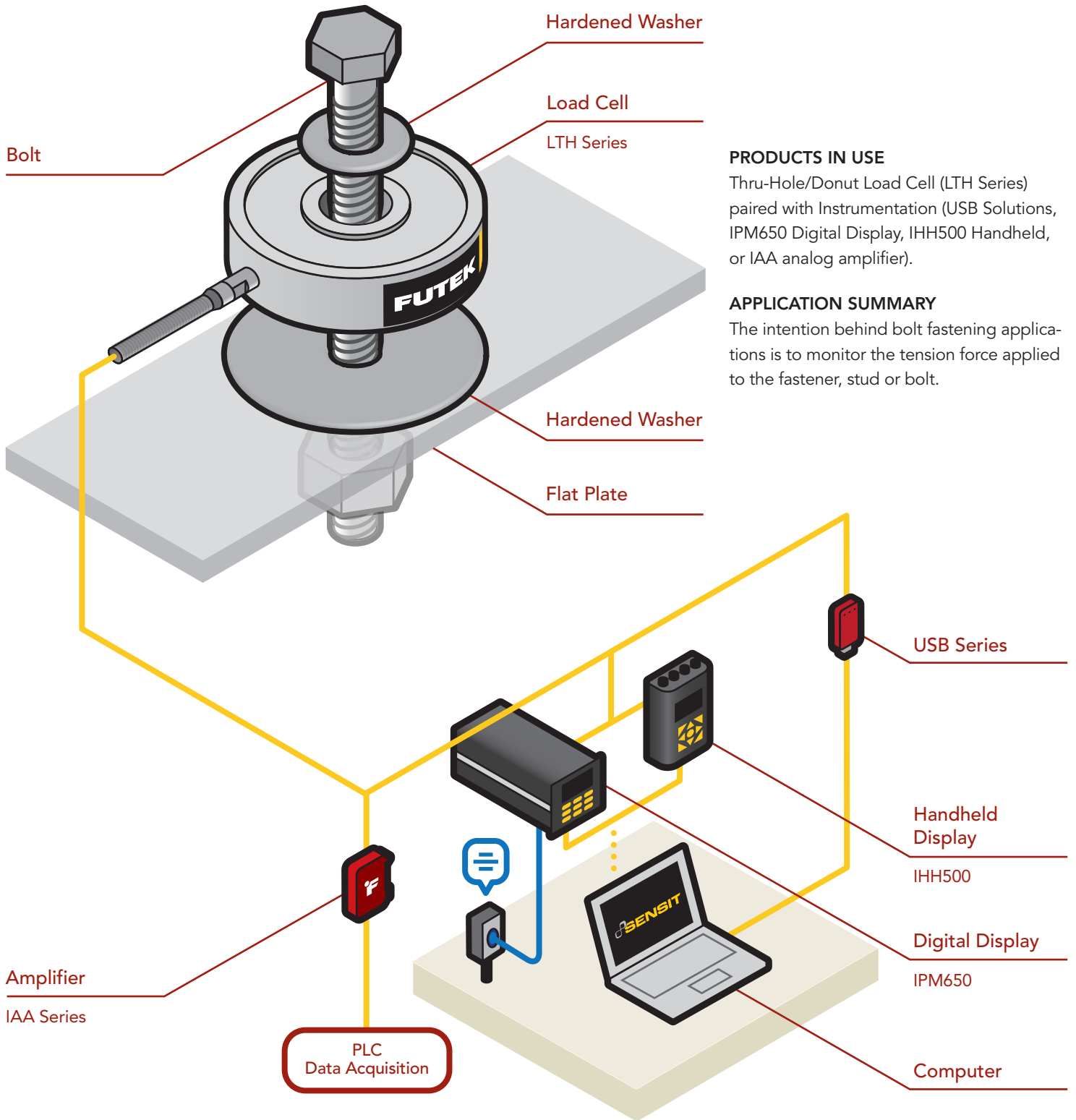
USB Series

Handheld Display  
IHH500

Digital Display  
IPM650

Computer



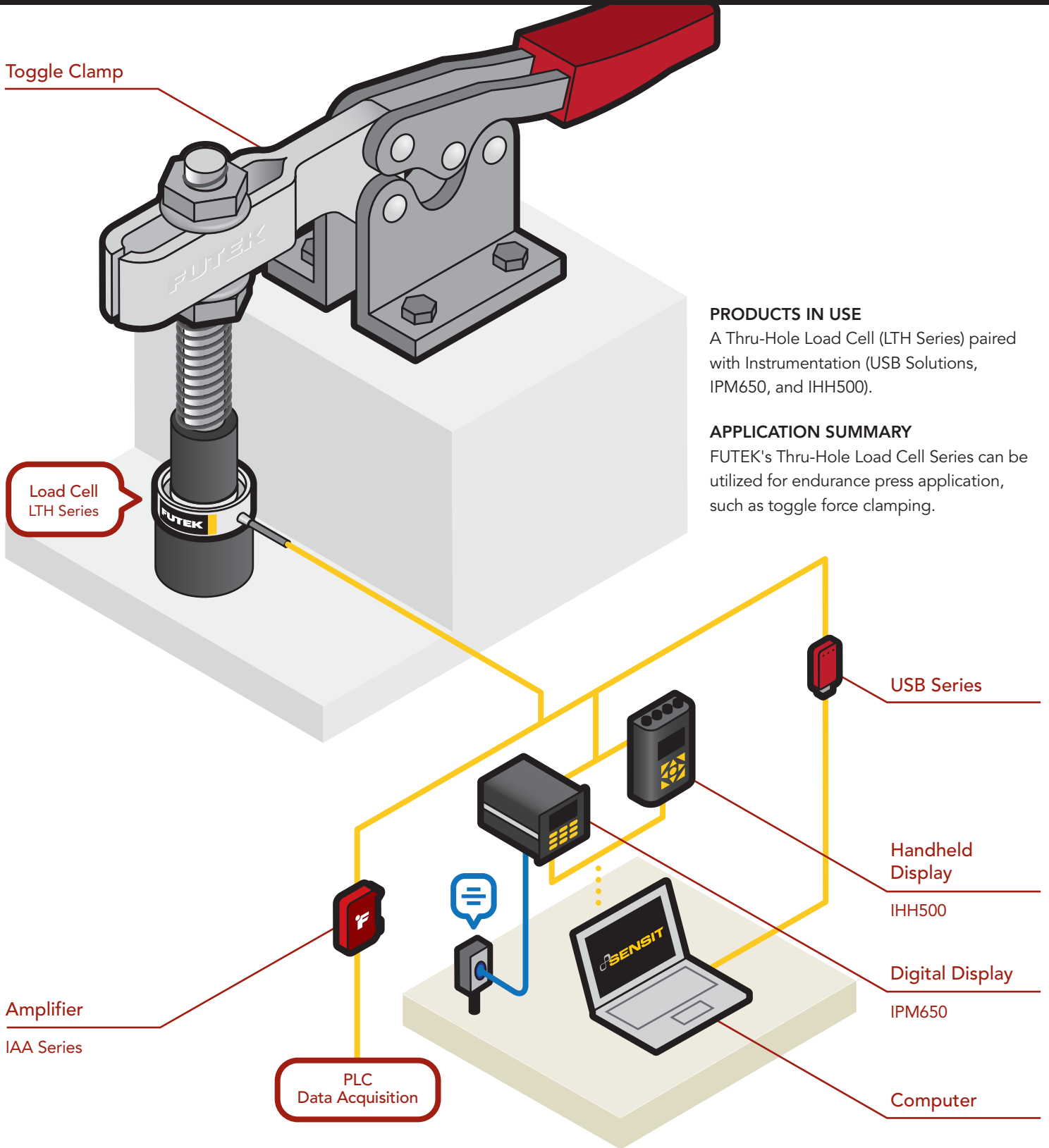


**PRODUCTS IN USE**

Thru-Hole/Donut Load Cell (LTH Series) paired with Instrumentation (USB Solutions, IPM650 Digital Display, IHH500 Handheld, or IAA analog amplifier).

**APPLICATION SUMMARY**

The intention behind bolt fastening applications is to monitor the tension force applied to the fastener, stud or bolt.



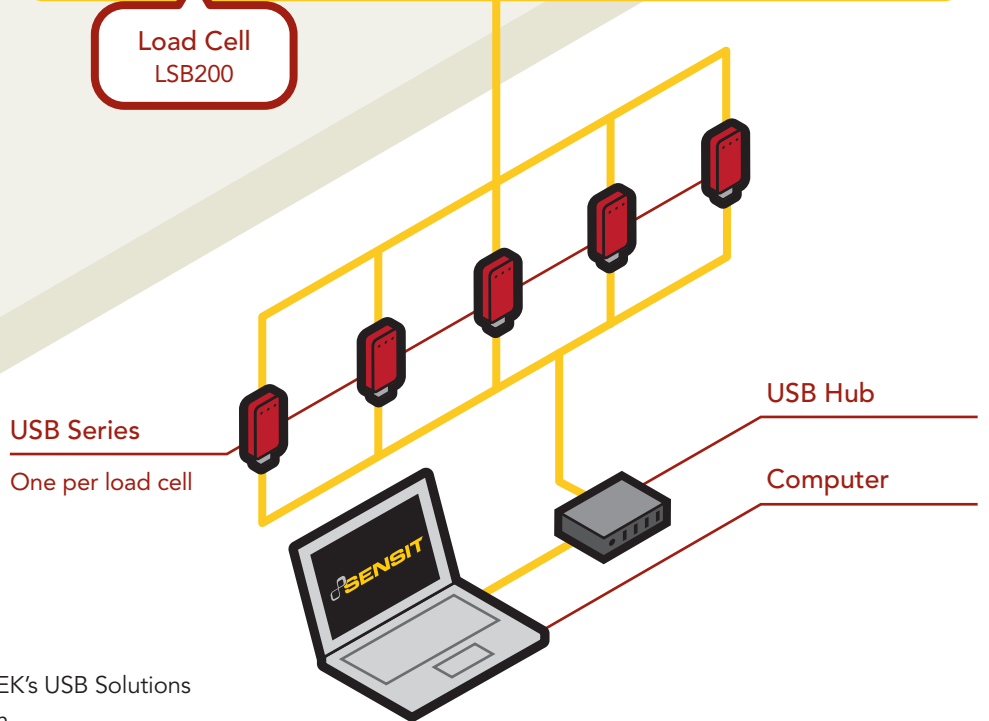
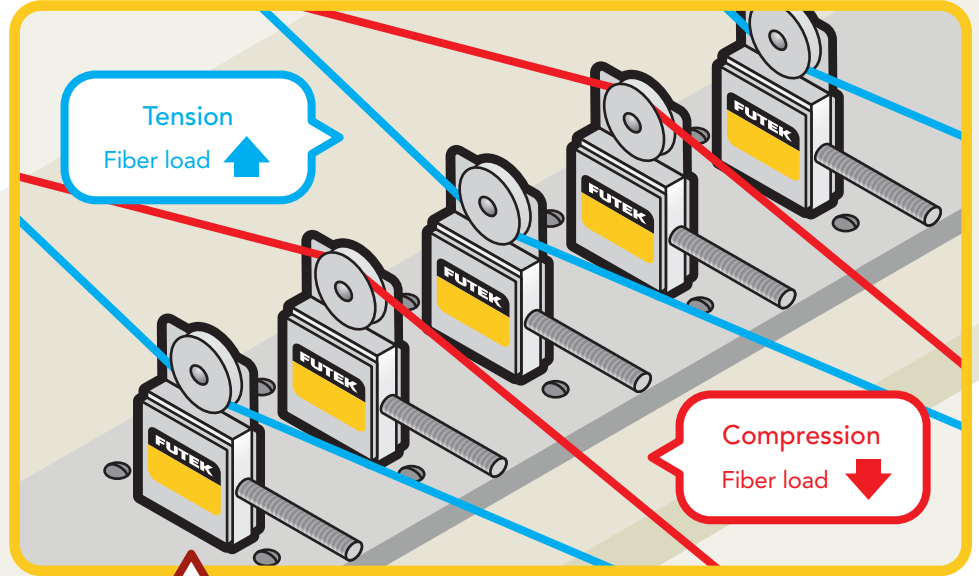
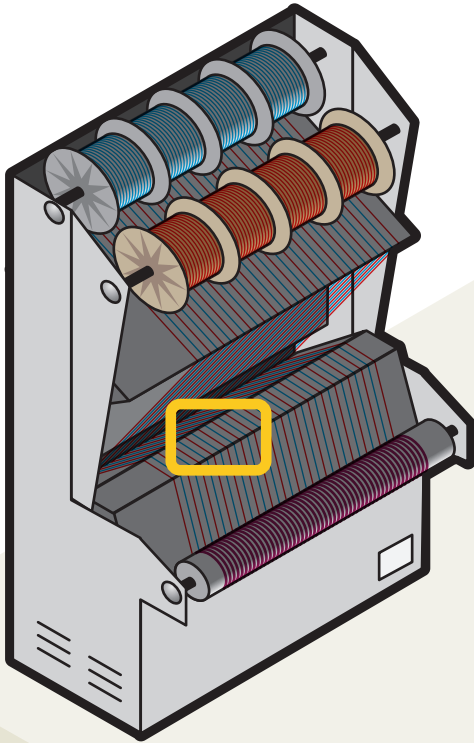
**PRODUCTS IN USE**

A Thru-Hole Load Cell (LTH Series) paired with Instrumentation (USB Solutions, IPM650, and IHH500).

**APPLICATION SUMMARY**

FUTEK's Thru-Hole Load Cell Series can be utilized for endurance press application, such as toggle force clamping.





**PRODUCTS IN USE**

Miniature S-Beam Jr. (LSB200) paired with FUTEK's USB Solutions for monitoring tension force and data collection.

**APPLICATION SUMMARY**

Wire tension measurement is an integral part for manufacturers of fibers, cables, and even textile fabrics. This method of measurement allows manufactures to ensure their products fit their requirements.

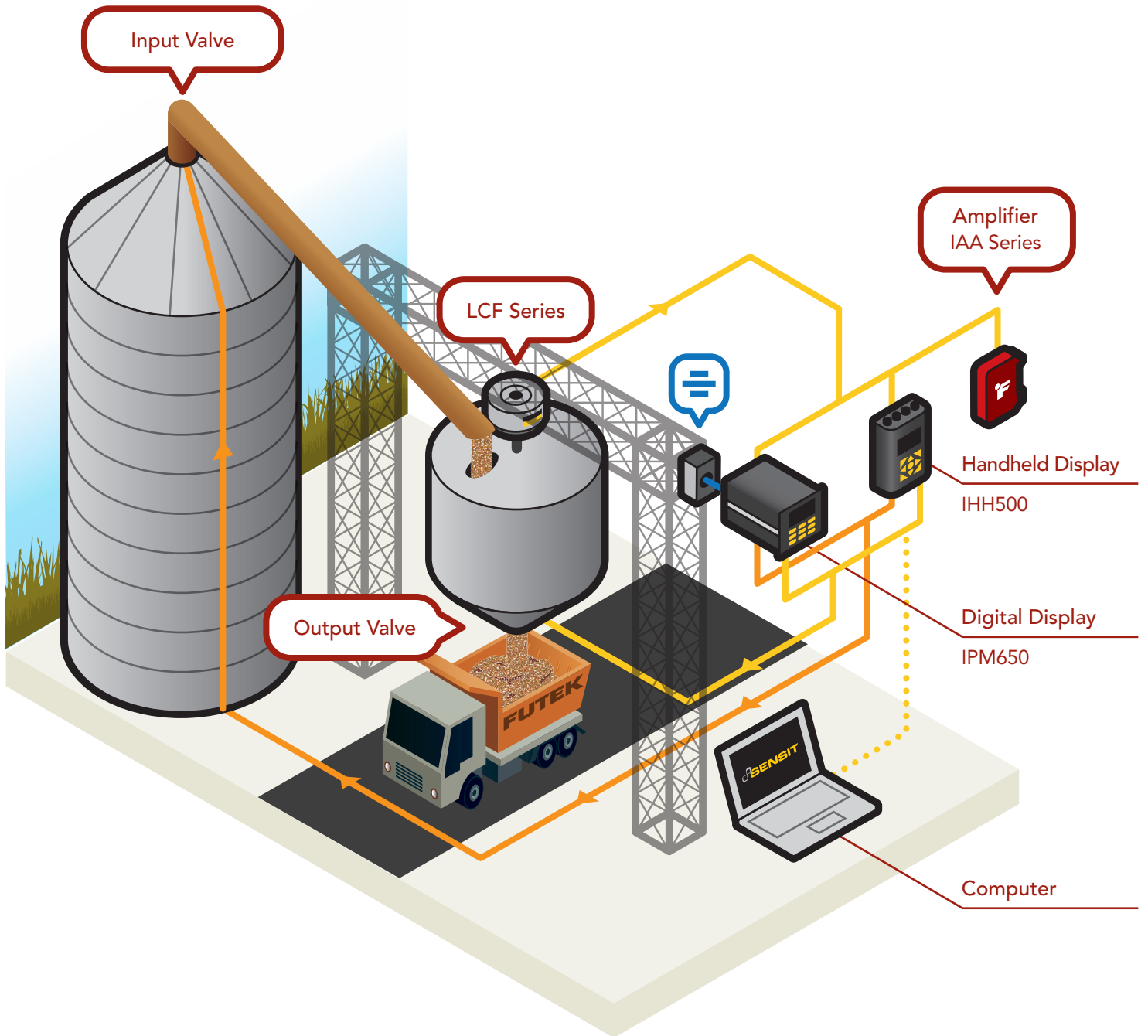
**Sensor Solution Source**

Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

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U.S. Manufacturer



**PRODUCTS IN USE**

One Pancake Load Cell (LCF Series) paired with Instrumentation (IPM650, IHH500 or IAA analog amplifier).

**APPLICATION SUMMARY**

Tank dispensing is based on the container's contents — both inputted and outputted. This application utilizes a full load cell system to ensure equal distribution.

**Sensor Solution Source**

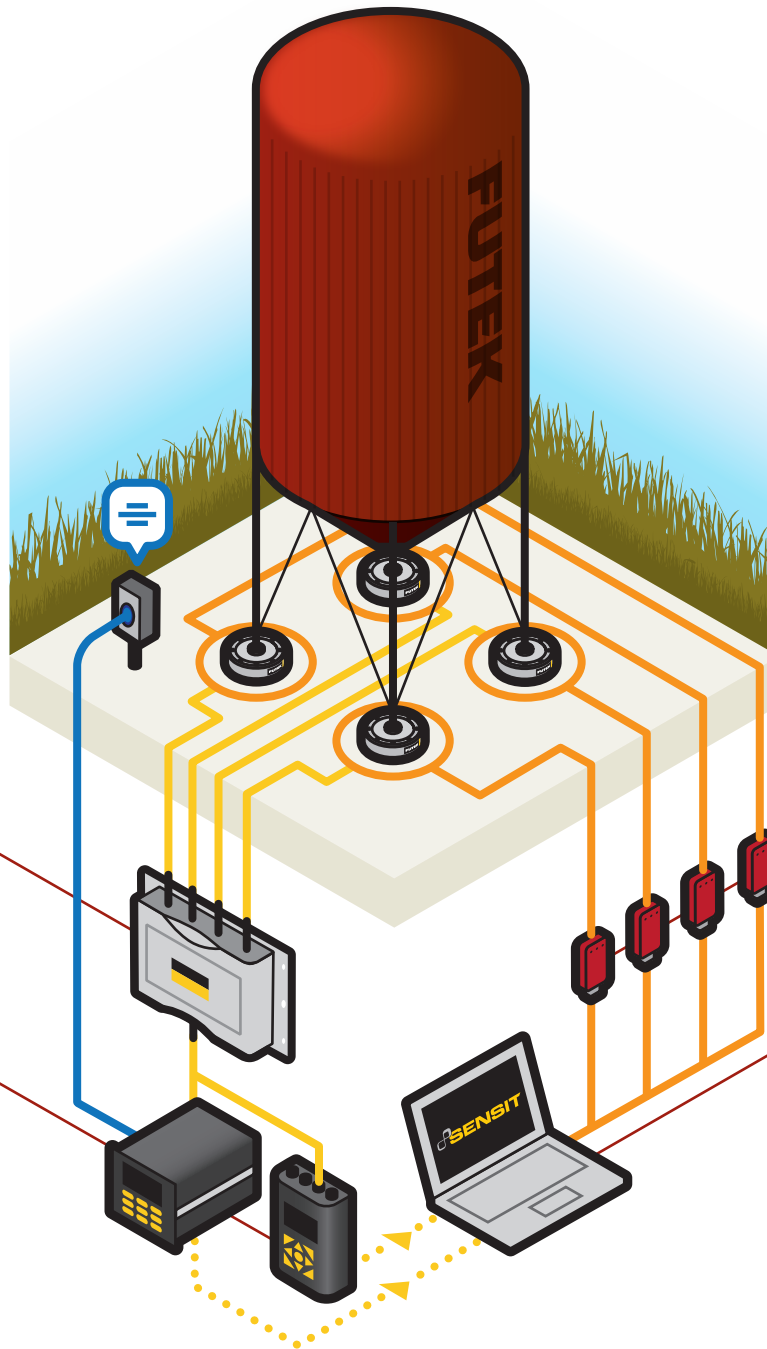
Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

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U.S. Manufacturer





Junction Box

USB Series

Digital Display

Computer

IPM650  
IHH500

**PRODUCTS IN USE**

Four Low Profile Pancake Load Cell (LCF Series) paired with Instrumentation (IAC200 Junction Box, IPM650, IHH500, or USB Solutions).

**APPLICATION SUMMARY**

Measuring the contents of any industrial tank, silo, or hopper requires a robust and precise system. Utilizing multiple high-capacity sensors in conjunction with powerful instrumentation can make for an effective platform.

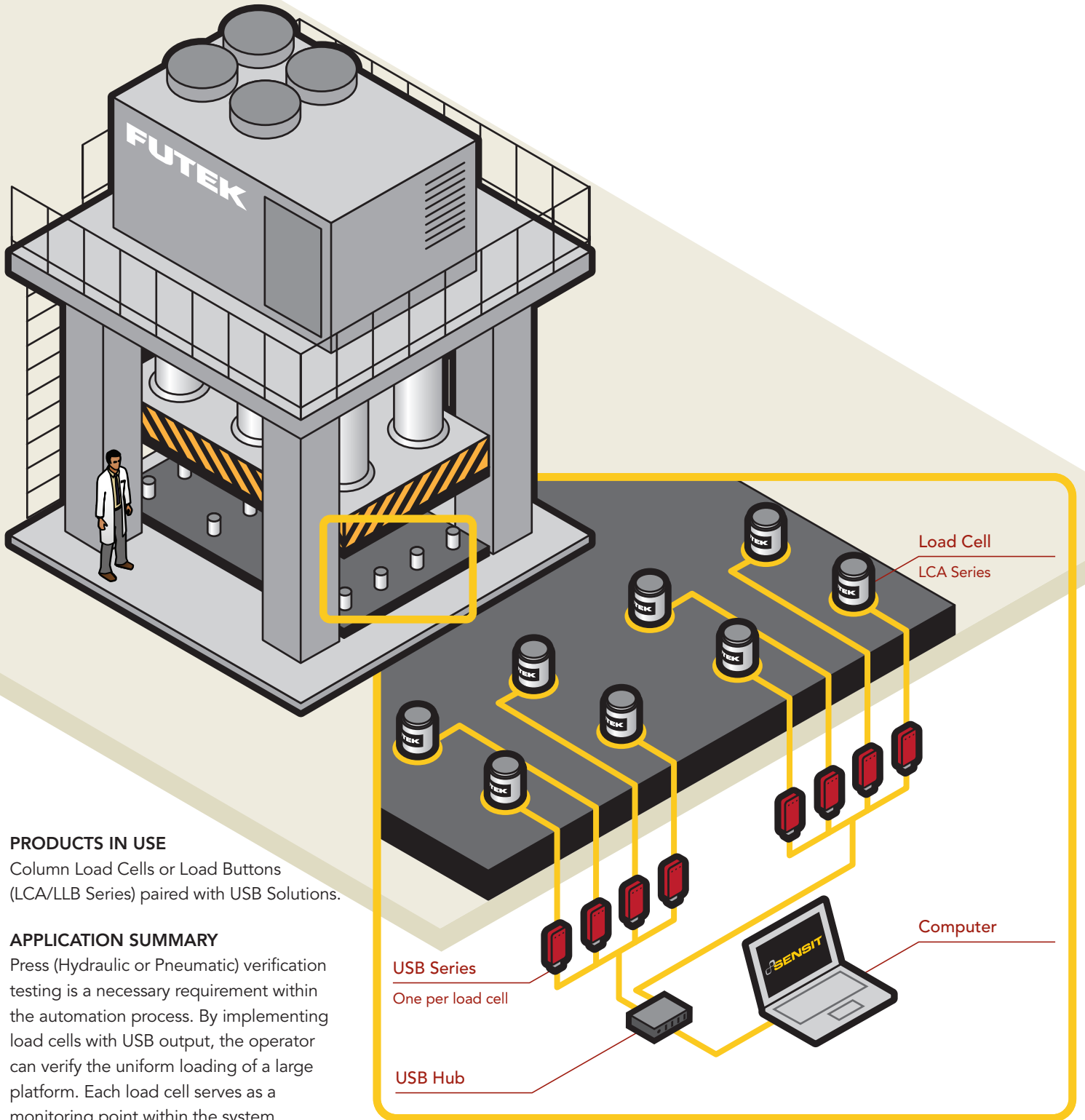
**Sensor Solution Source**

Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

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U.S. Manufacturer



**PRODUCTS IN USE**

Column Load Cells or Load Buttons (LCA/LLB Series) paired with USB Solutions.

**APPLICATION SUMMARY**

Press (Hydraulic or Pneumatic) verification testing is a necessary requirement within the automation process. By implementing load cells with USB output, the operator can verify the uniform loading of a large platform. Each load cell serves as a monitoring point within the system.

**Sensor Solution Source**

Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

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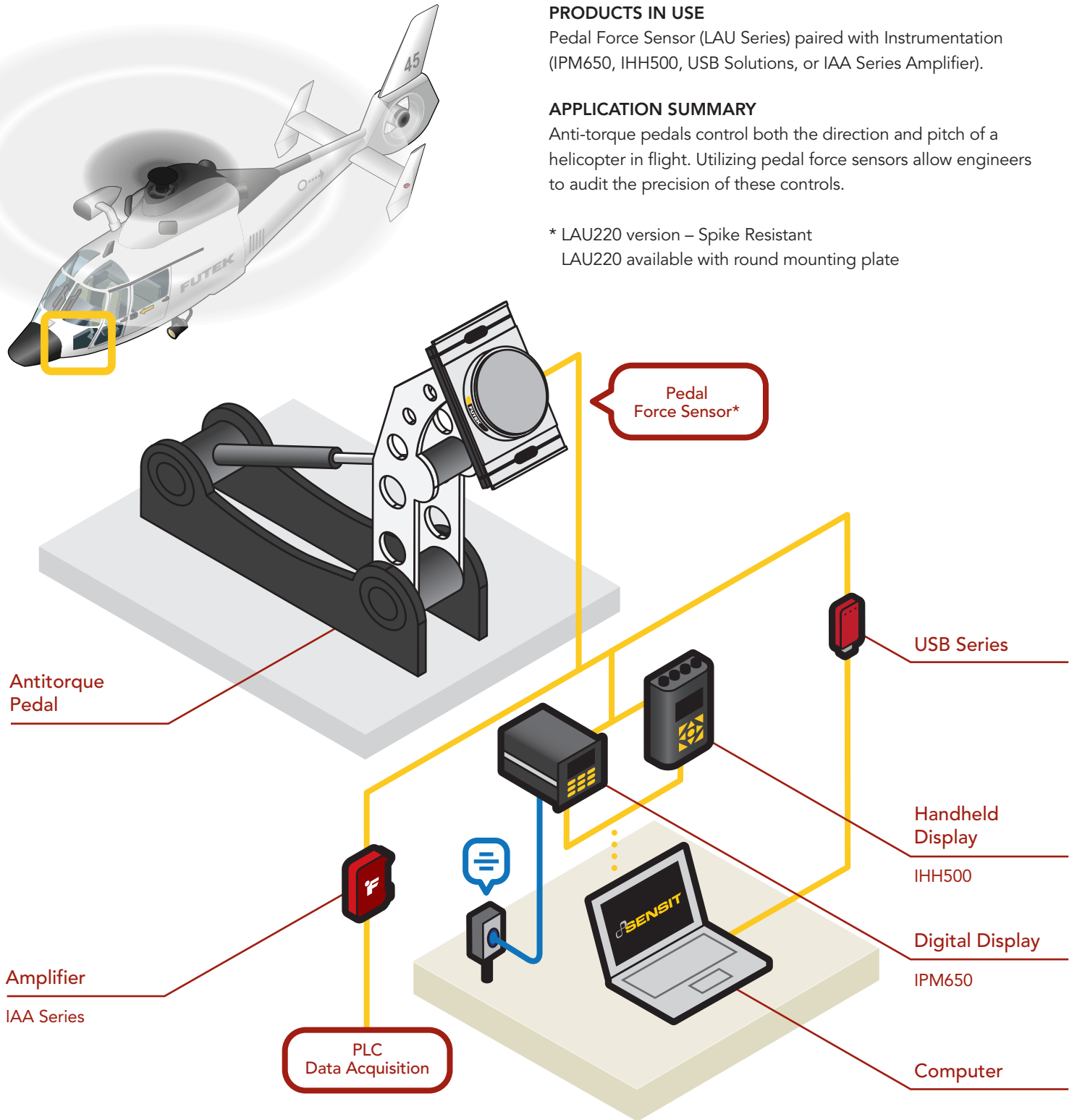
**PRODUCTS IN USE**

Pedal Force Sensor (LAU Series) paired with Instrumentation (IPM650, IHH500, USB Solutions, or IAA Series Amplifier).

**APPLICATION SUMMARY**

Anti-torque pedals control both the direction and pitch of a helicopter in flight. Utilizing pedal force sensors allow engineers to audit the precision of these controls.

\* LAU220 version – Spike Resistant  
LAU220 available with round mounting plate



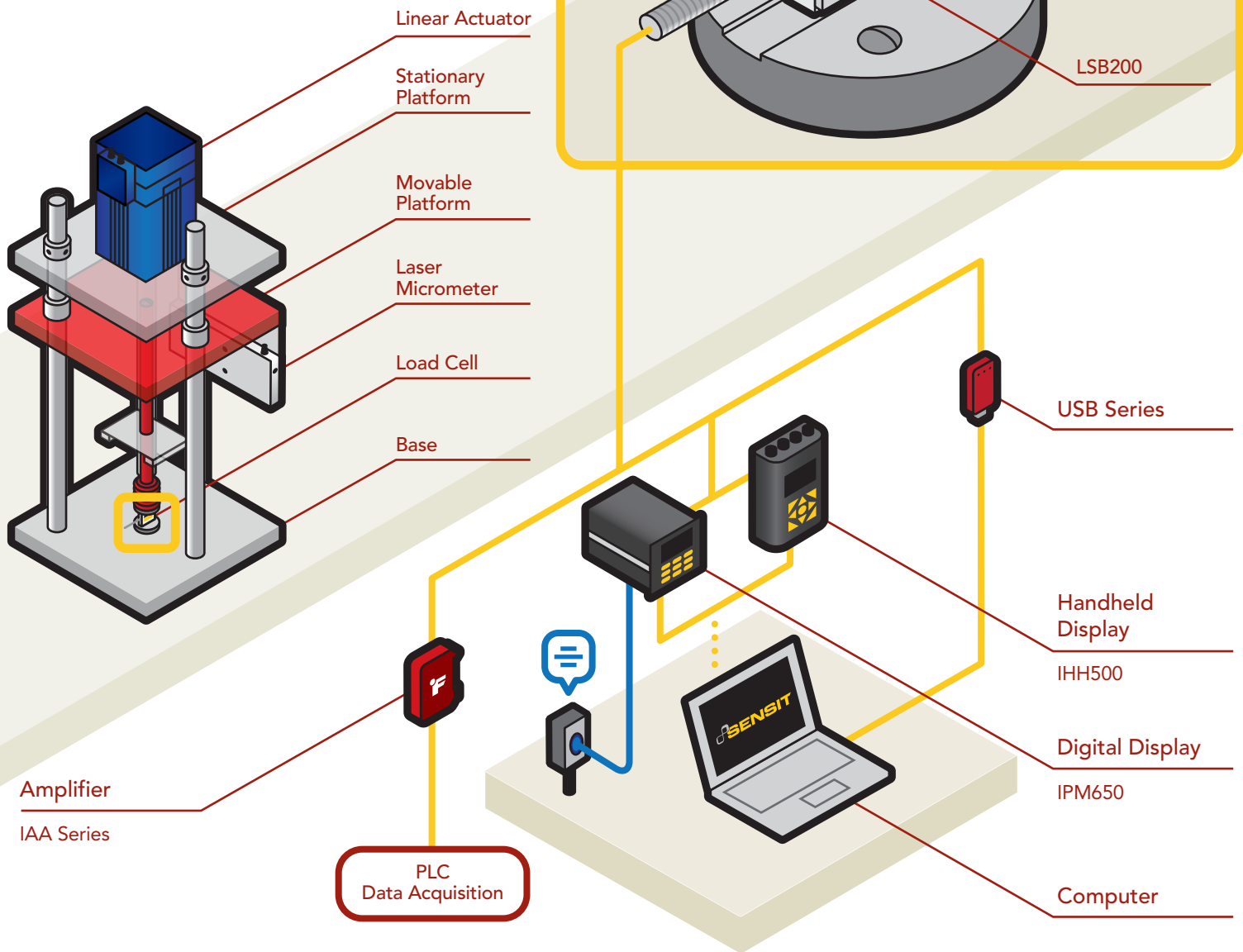


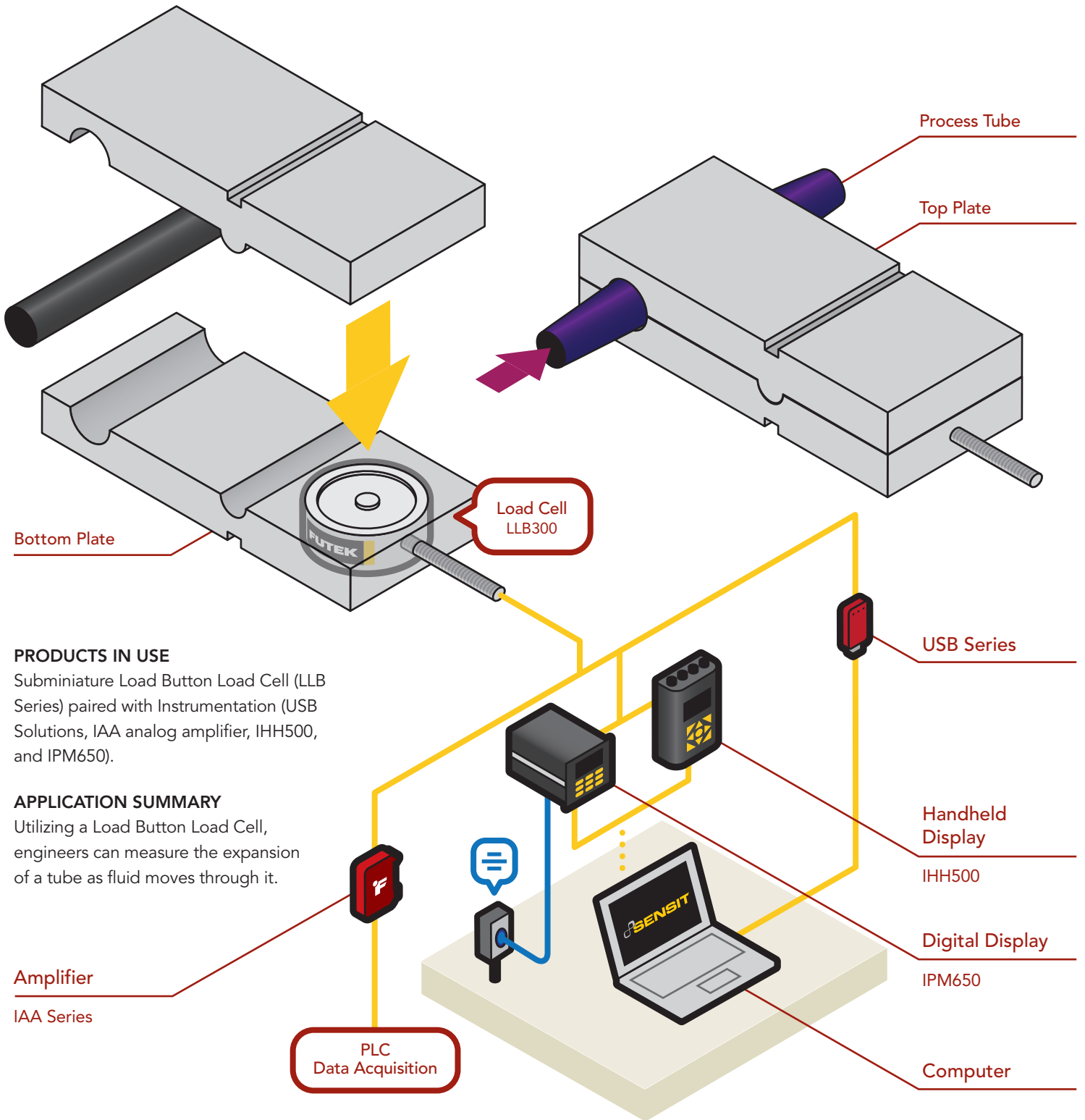
**PRODUCTS IN USE**

Miniature S-Beam Jr. (LSB200) paired with Instrumentation (IPM650, IHH500, USB Solutions, or IAA analog amplifier).

**APPLICATION SUMMARY**

Many industries use test fixtures to measure their presses or impact stands. FUTEK's LSB200 Load Cell is suitable for applications needing precise lower capacity impact test measurements.



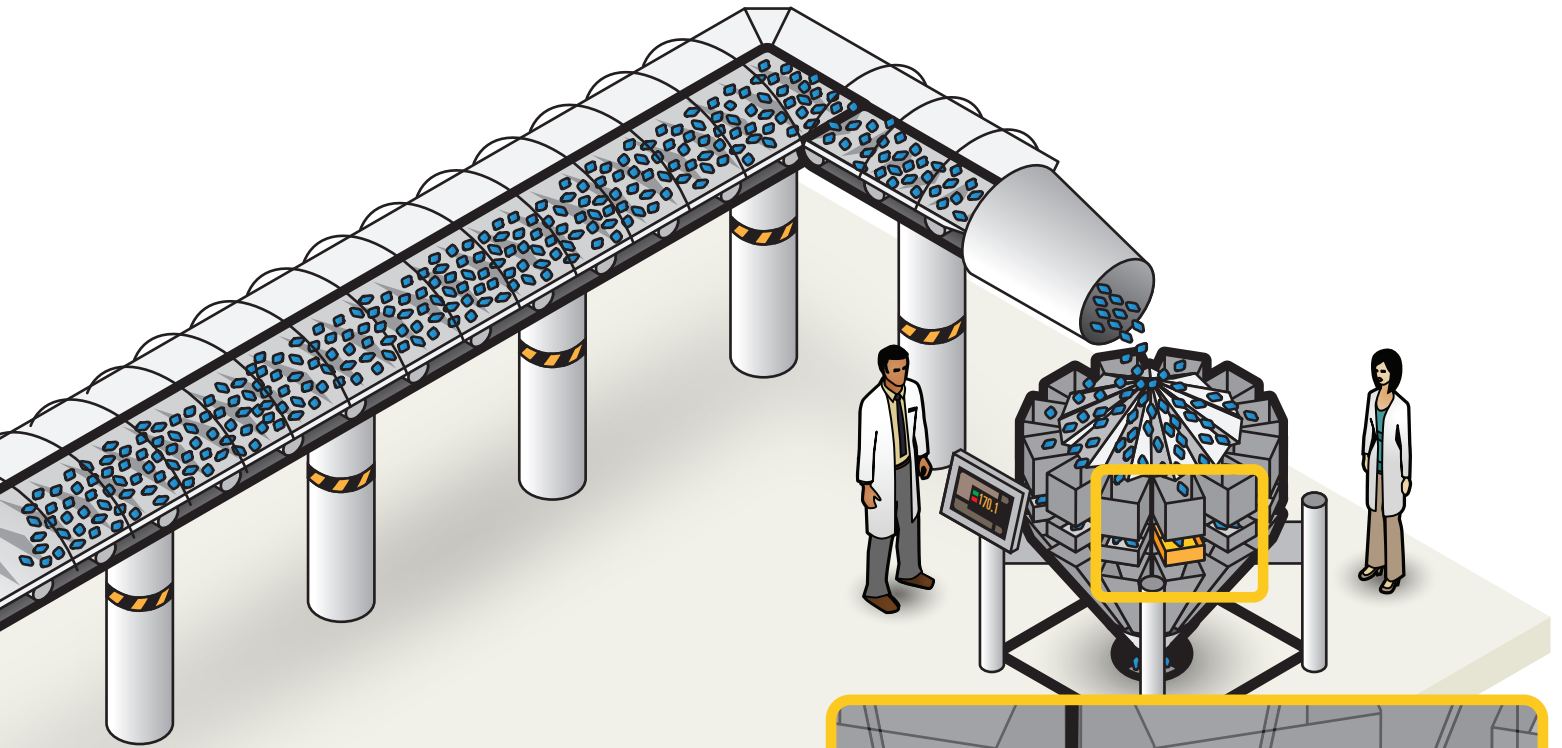


**PRODUCTS IN USE**

Subminiature Load Button Load Cell (LLB Series) paired with Instrumentation (USB Solutions, IAA analog amplifier, IHH500, and IPM650).

**APPLICATION SUMMARY**

Utilizing a Load Button Load Cell, engineers can measure the expansion of a tube as fluid moves through it.

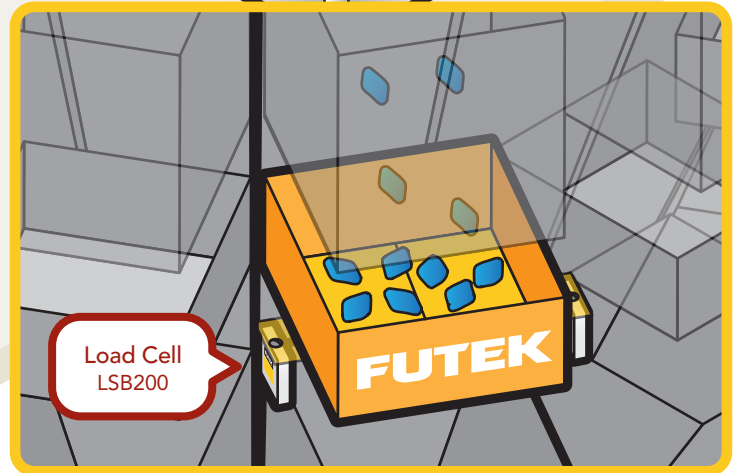


**PRODUCTS IN USE**

Miniature S-Beam Jr. (LSB200) paired with Instrumentation (IAA analog amplifier or IPM650).

**APPLICATION SUMMARY**

Load Cells and Force Sensors are commonly used to automate production lines. By using these sensors, production engineers are better able to control the automation process and improve their overall quality.



Load Cell  
LSB200

Amplifier  
IAA Series

PLC  
Data Acquisition

Digital Display  
IPM650



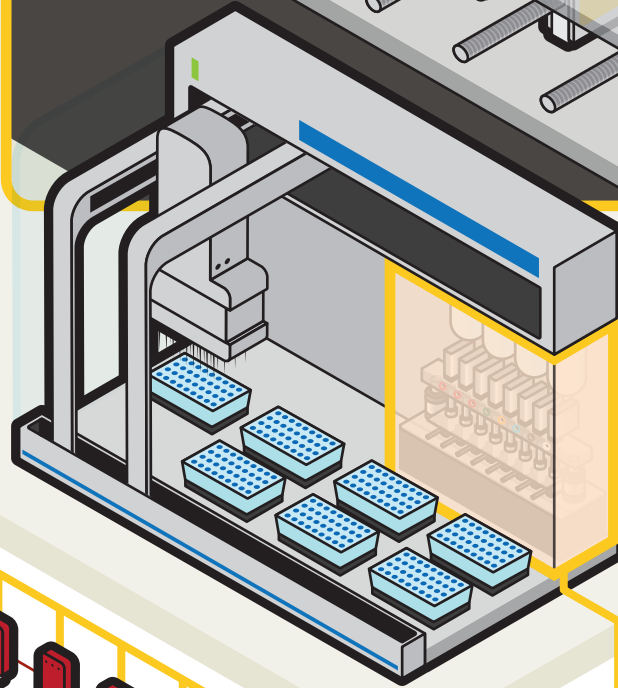
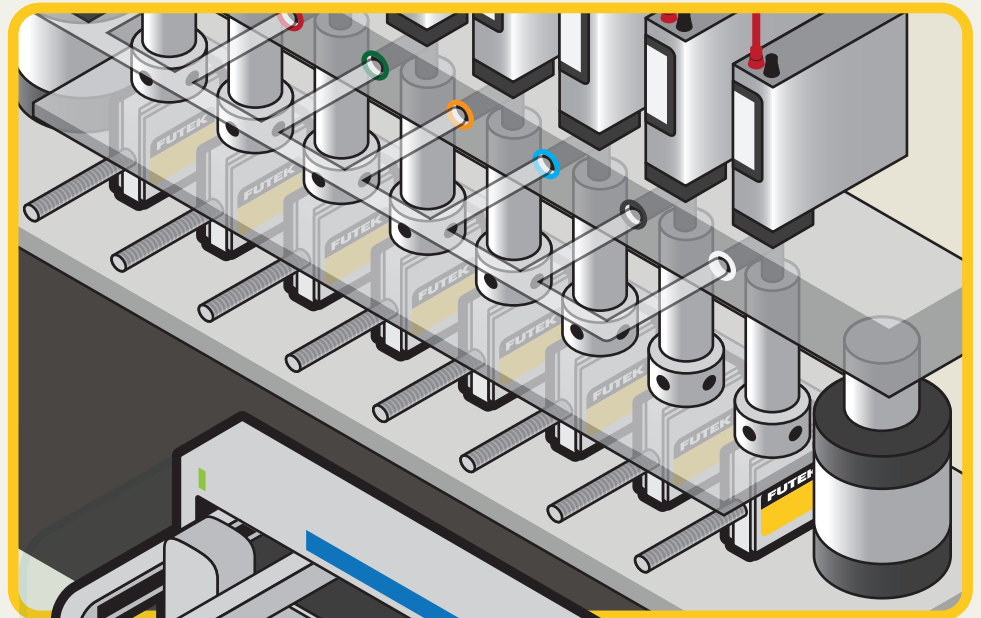


**PRODUCTS IN USE**

Miniature S-Beam Jr. (LSB200) paired with Instrumentation (USB Solutions or IAA analog amplifier).

**APPLICATION SUMMARY**

Integration of sensors in Bio-medical applications require high-accuracy, small size and accuracy (in micrograms). In DNA synthesis, bio-medical engineers can utilize FUTEK's LSB200 for its precision and sensitive capacity range.



Amplifier

IAA Series

Data Acquisition

USB Series

One per load cell

USB Hub

Computer

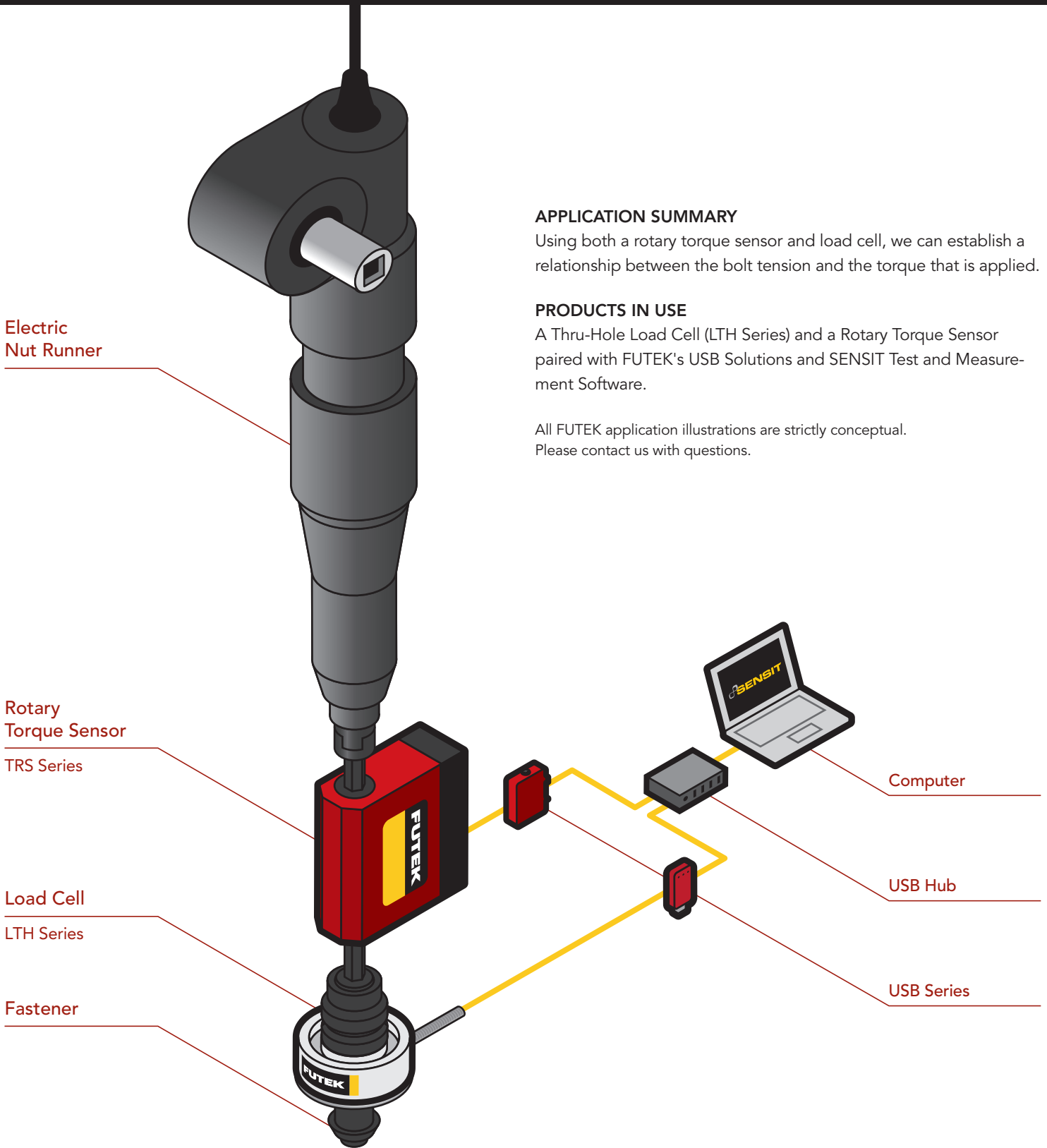
**Sensor Solution Source**

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U.S. Manufacturer



**APPLICATION SUMMARY**

Using both a rotary torque sensor and load cell, we can establish a relationship between the bolt tension and the torque that is applied.

**PRODUCTS IN USE**

A Thru-Hole Load Cell (LTH Series) and a Rotary Torque Sensor paired with FUTEK's USB Solutions and SENSIT Test and Measurement Software.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



Conveyor Speed  
Motor Controller

Set Point/Alarm 2

Load Cell

LSB or LCF Series

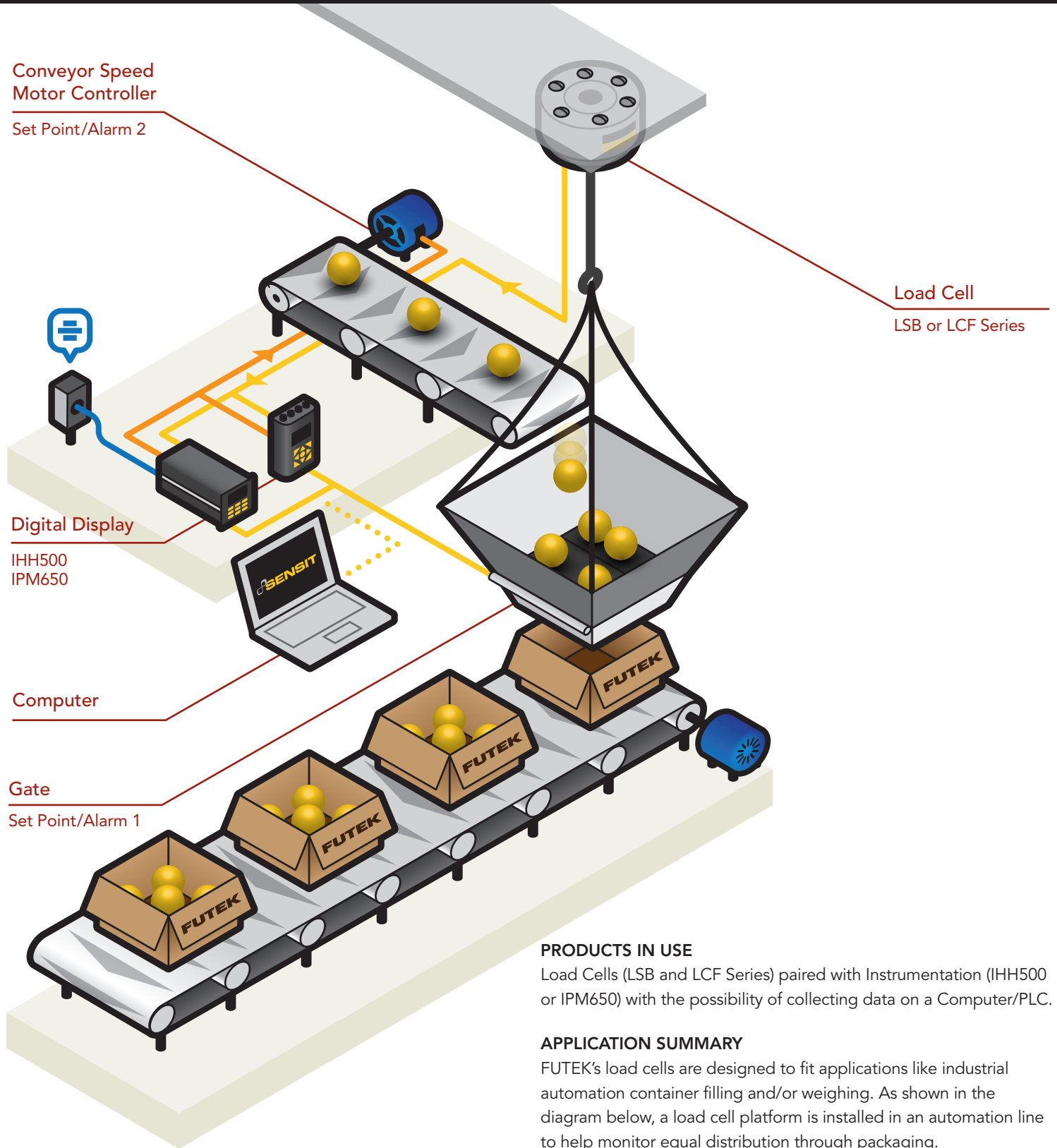
Digital Display

IHH500  
IPM650

Computer

Gate

Set Point/Alarm 1

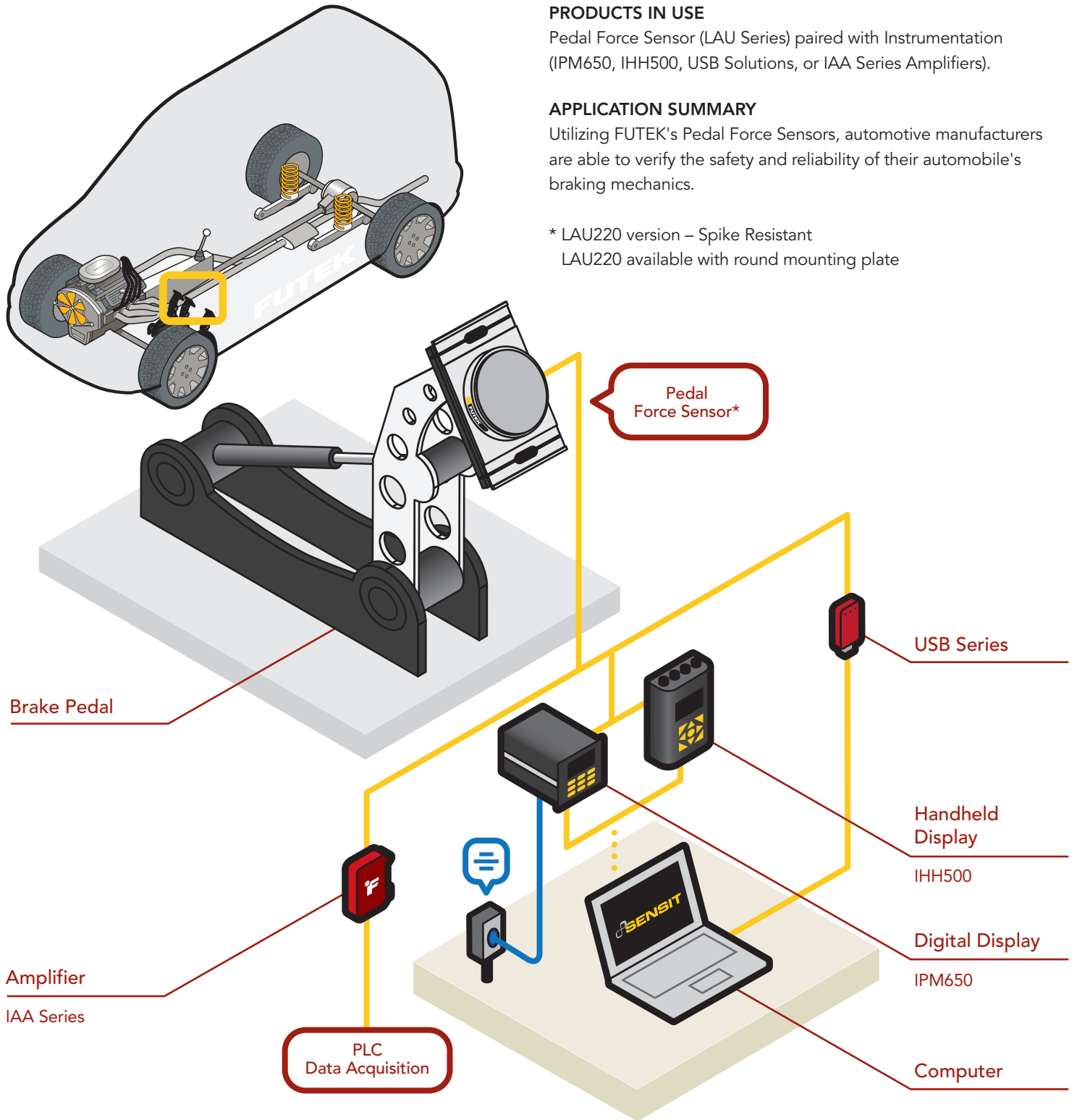


**PRODUCTS IN USE**

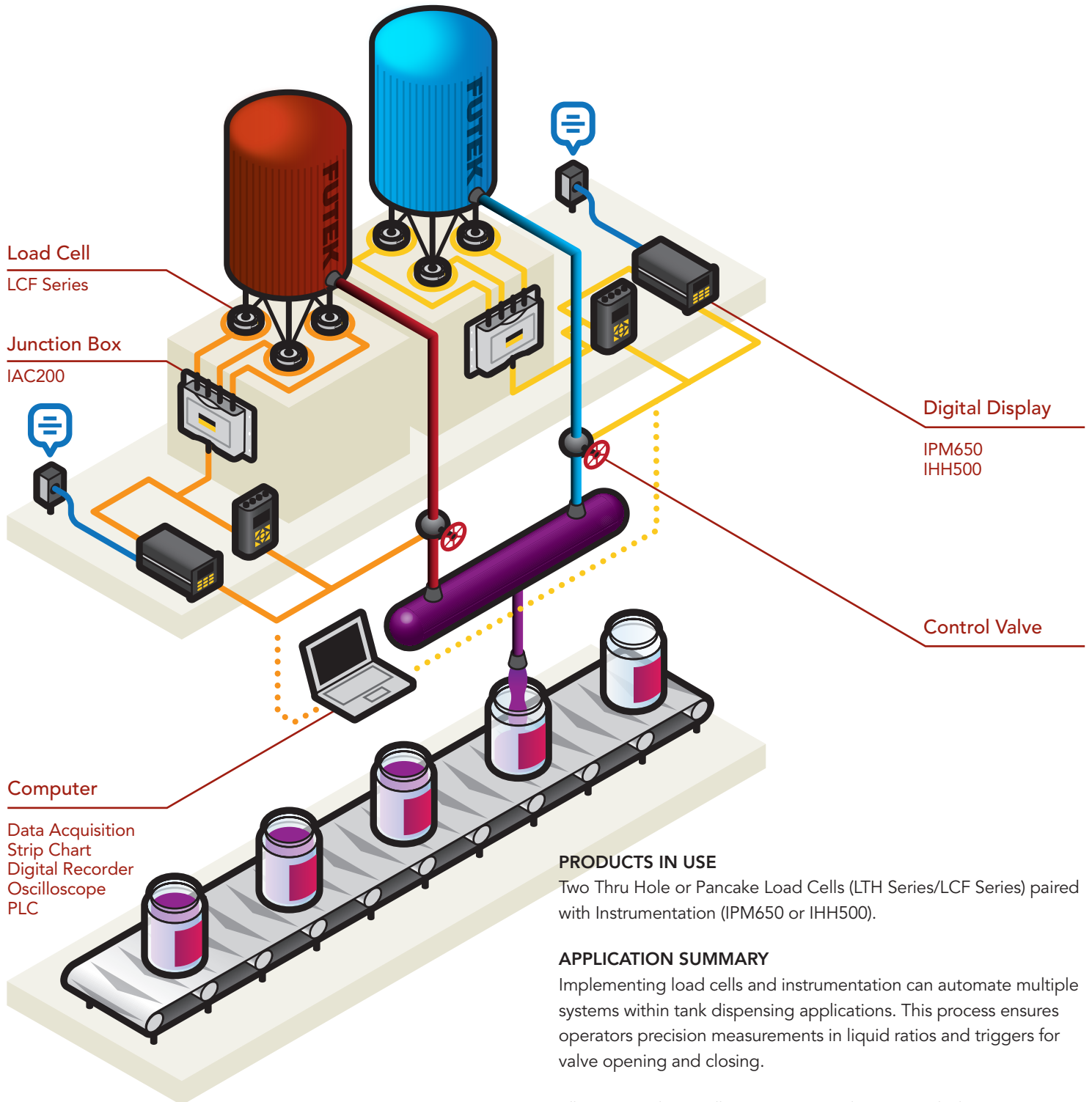
Load Cells (LSB and LCF Series) paired with Instrumentation (IHH500 or IPM650) with the possibility of collecting data on a Computer/PLC.

**APPLICATION SUMMARY**

FUTEK's load cells are designed to fit applications like industrial automation container filling and/or weighing. As shown in the diagram below, a load cell platform is installed in an automation line to help monitor equal distribution through packaging.







**PRODUCTS IN USE**

Two Thru Hole or Pancake Load Cells (LTH Series/LCF Series) paired with Instrumentation (IPM650 or IHH500).

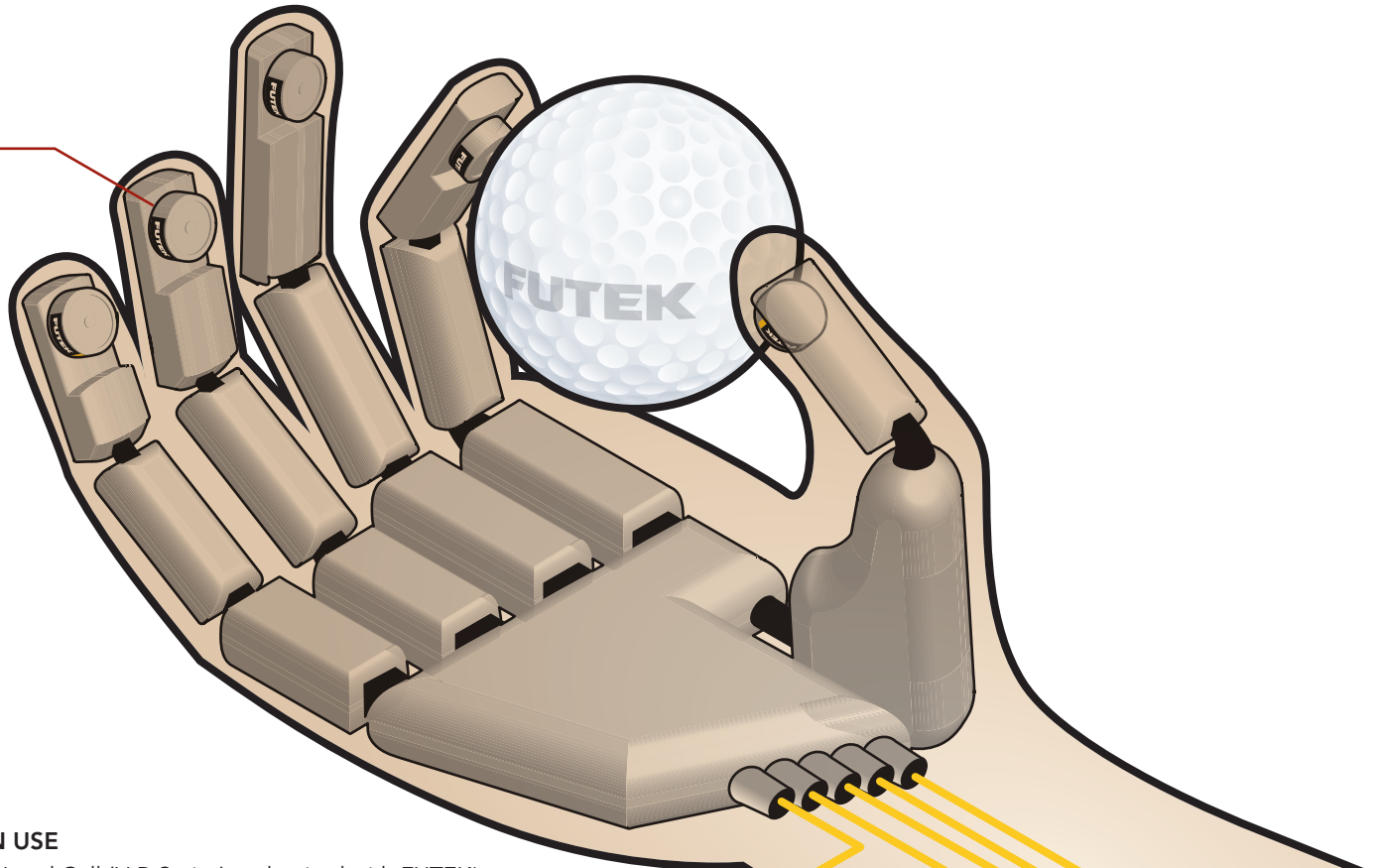
**APPLICATION SUMMARY**

Implementing load cells and instrumentation can automate multiple systems within tank dispensing applications. This process ensures operators precision measurements in liquid ratios and triggers for valve opening and closing.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



Load Cell  
LLB Series



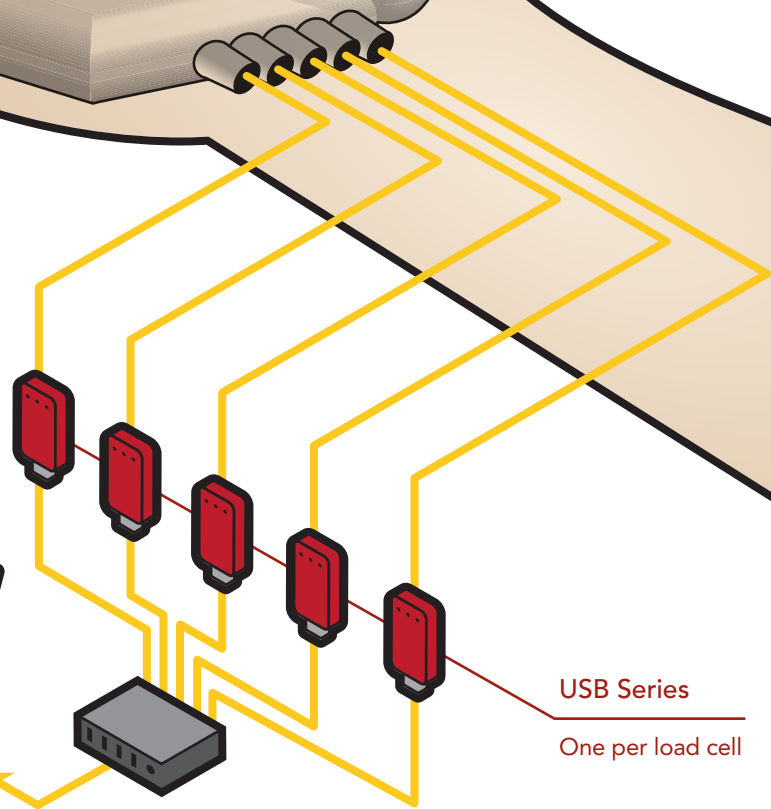
**PRODUCTS IN USE**

A Load Button Load Cell (LLB Series) and paired with FUTEK's USB Solutions and SENSIT Test and Measurement Software.

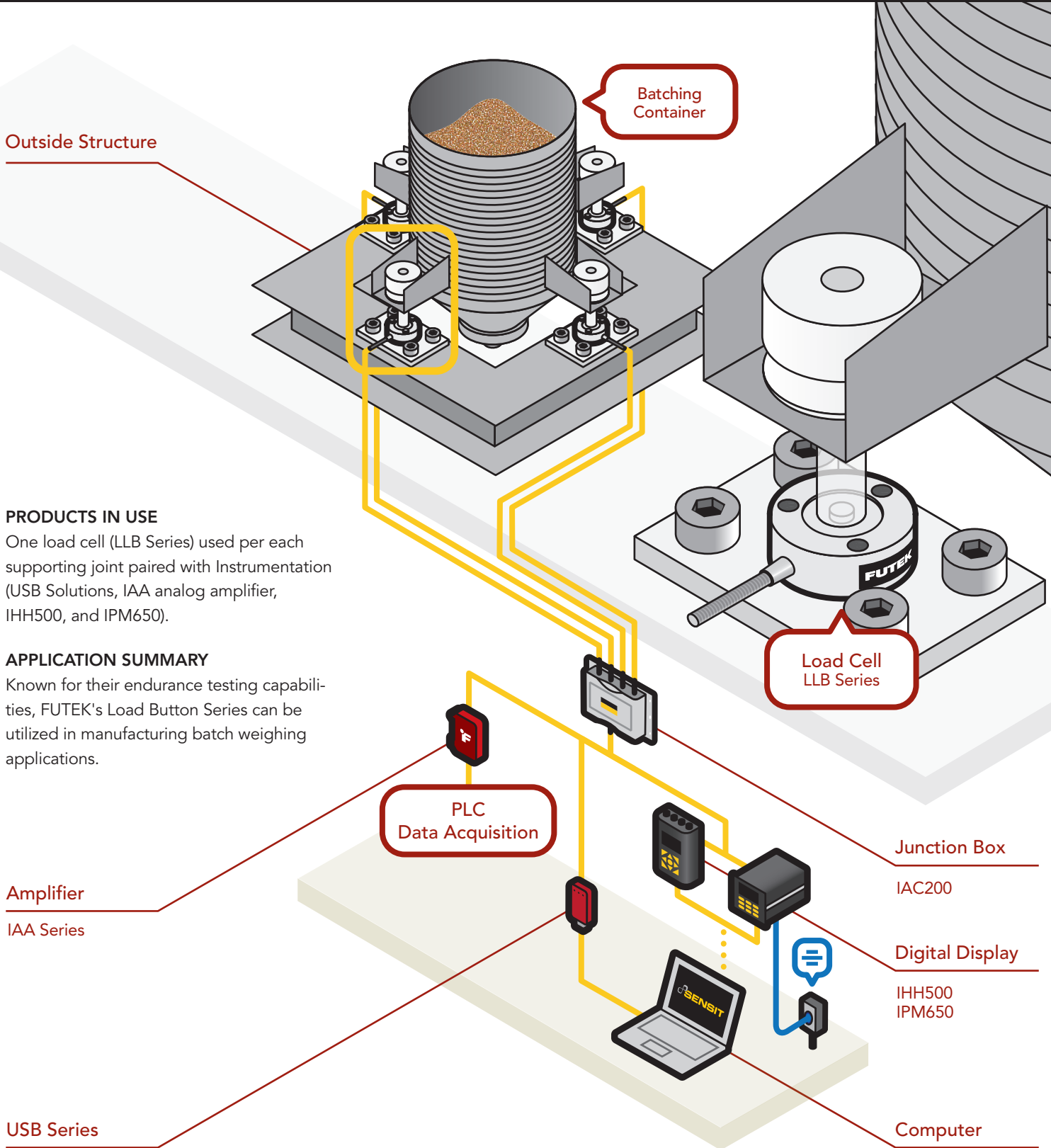
**APPLICATION SUMMARY**

Multiple Load Button Load Cells are utilized to measure the tactile force produced by an industrial robot.

Computer



USB Series  
One per load cell



**PRODUCTS IN USE**

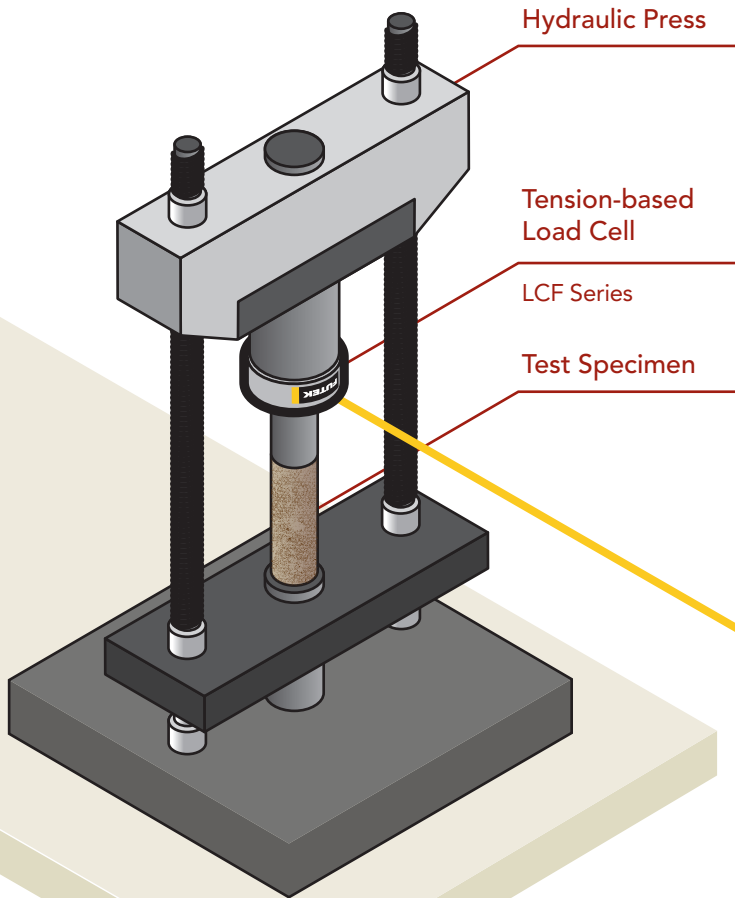
One load cell (LLB Series) used per each supporting joint paired with Instrumentation (USB Solutions, IAA analog amplifier, IHH500, and IPM650).

**APPLICATION SUMMARY**

Known for their endurance testing capabilities, FUTEK's Load Button Series can be utilized in manufacturing batch weighing applications.

Amplifier  
IAA Series

USB Series



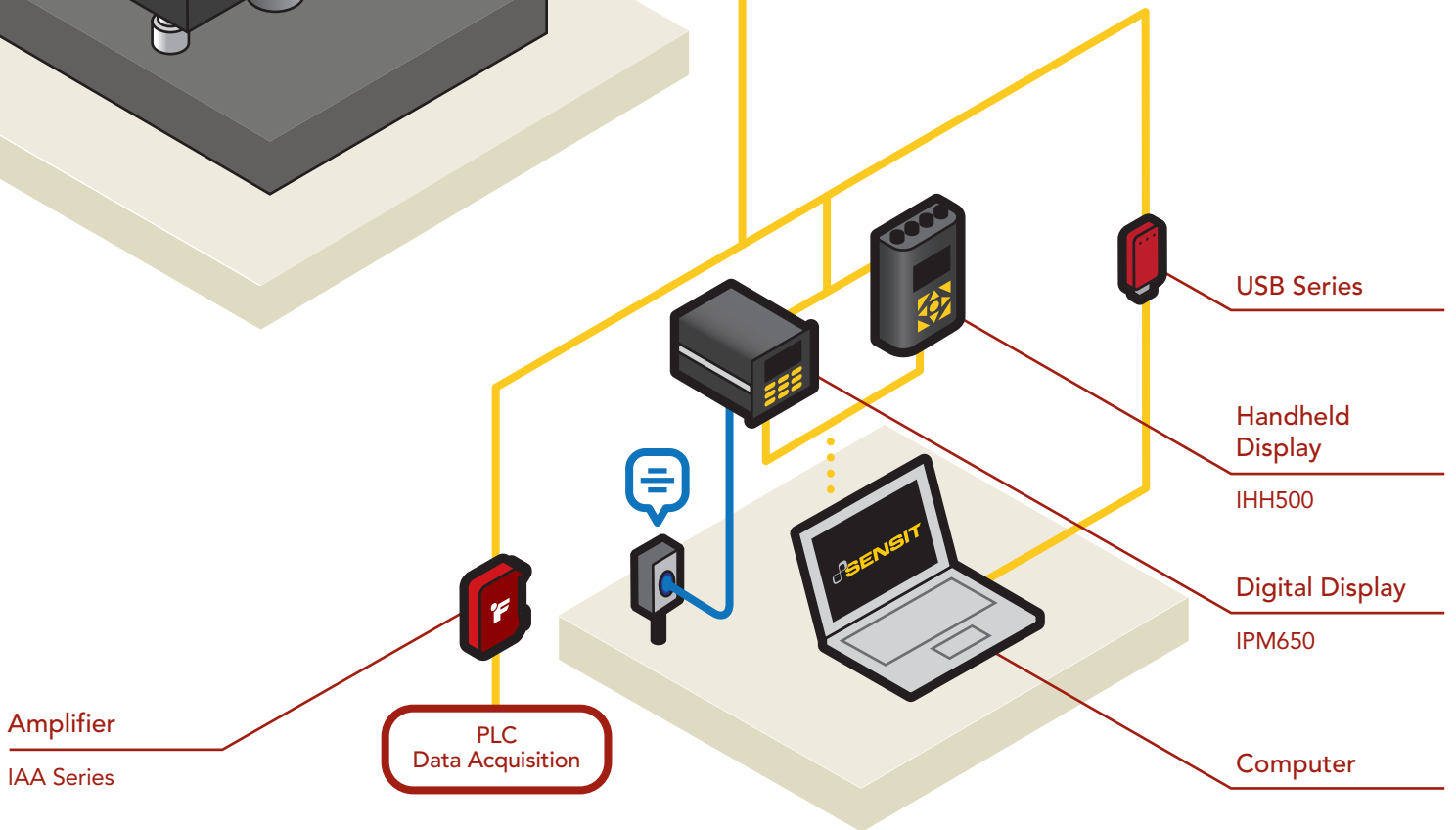
**PRODUCTS IN USE**

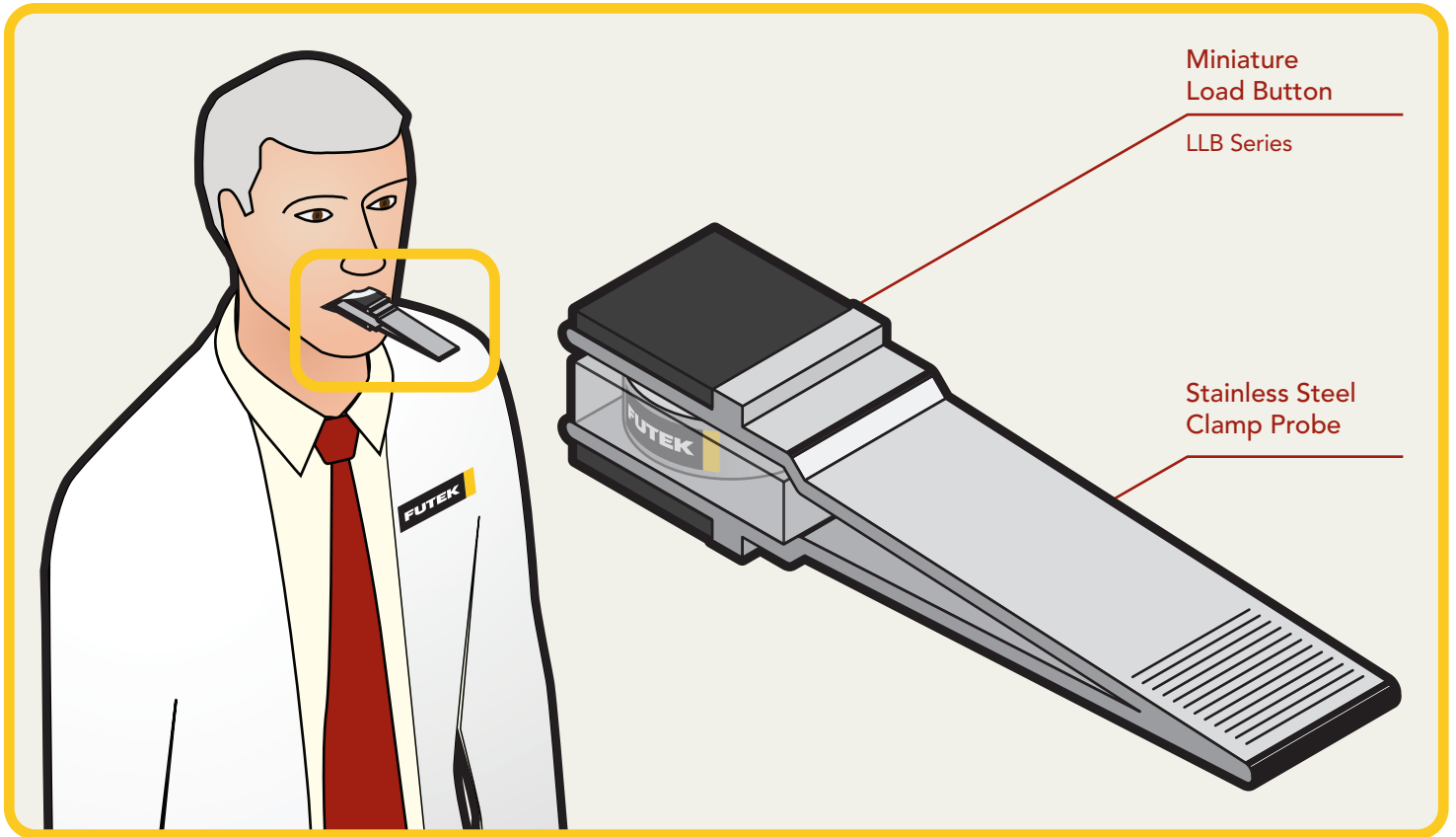
A Pancake Load Cell (LCF Series) paired within Instrumentation (IAA analog amplifier, IPM650, IHH500, USB Solutions).

**APPLICATION SUMMARY**

Utilizing a robust, high capacity load cell (LCF Series), industrial operators can measure the force applied to materials via a hydraulic press.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



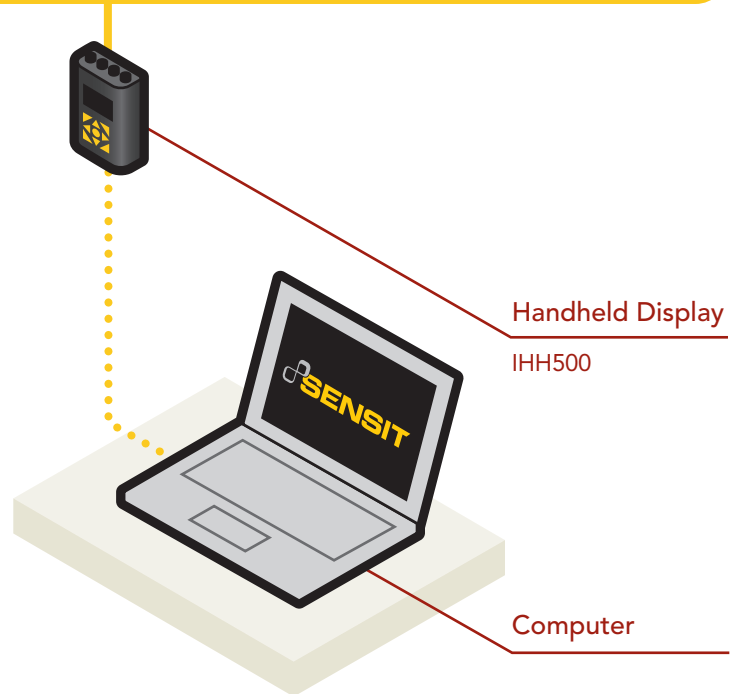


**PRODUCTS IN USE**

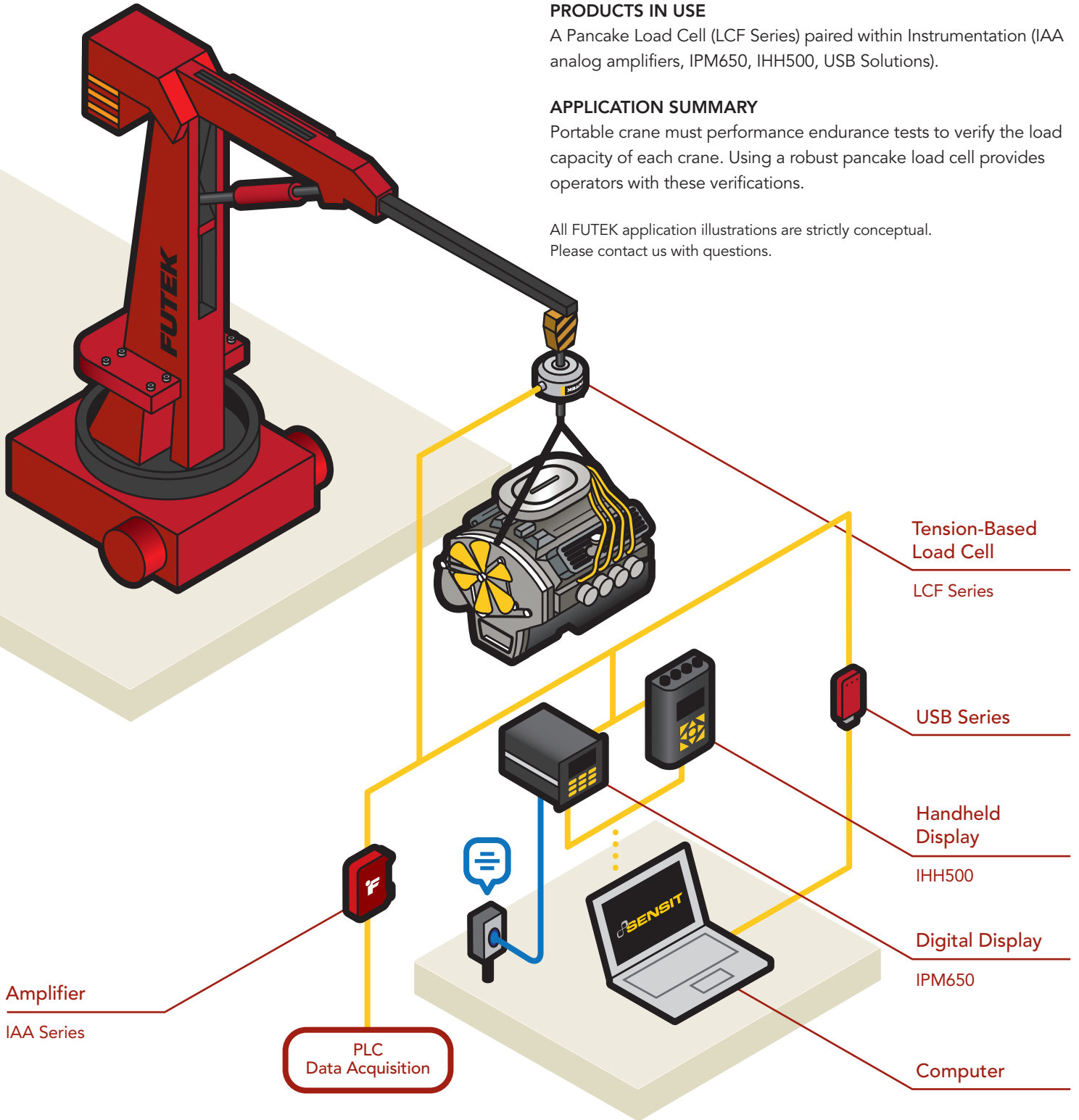
Miniature Load Button Load Cell (LLB Series) paired with FUTEK's Handheld Digital Display (IHH500).

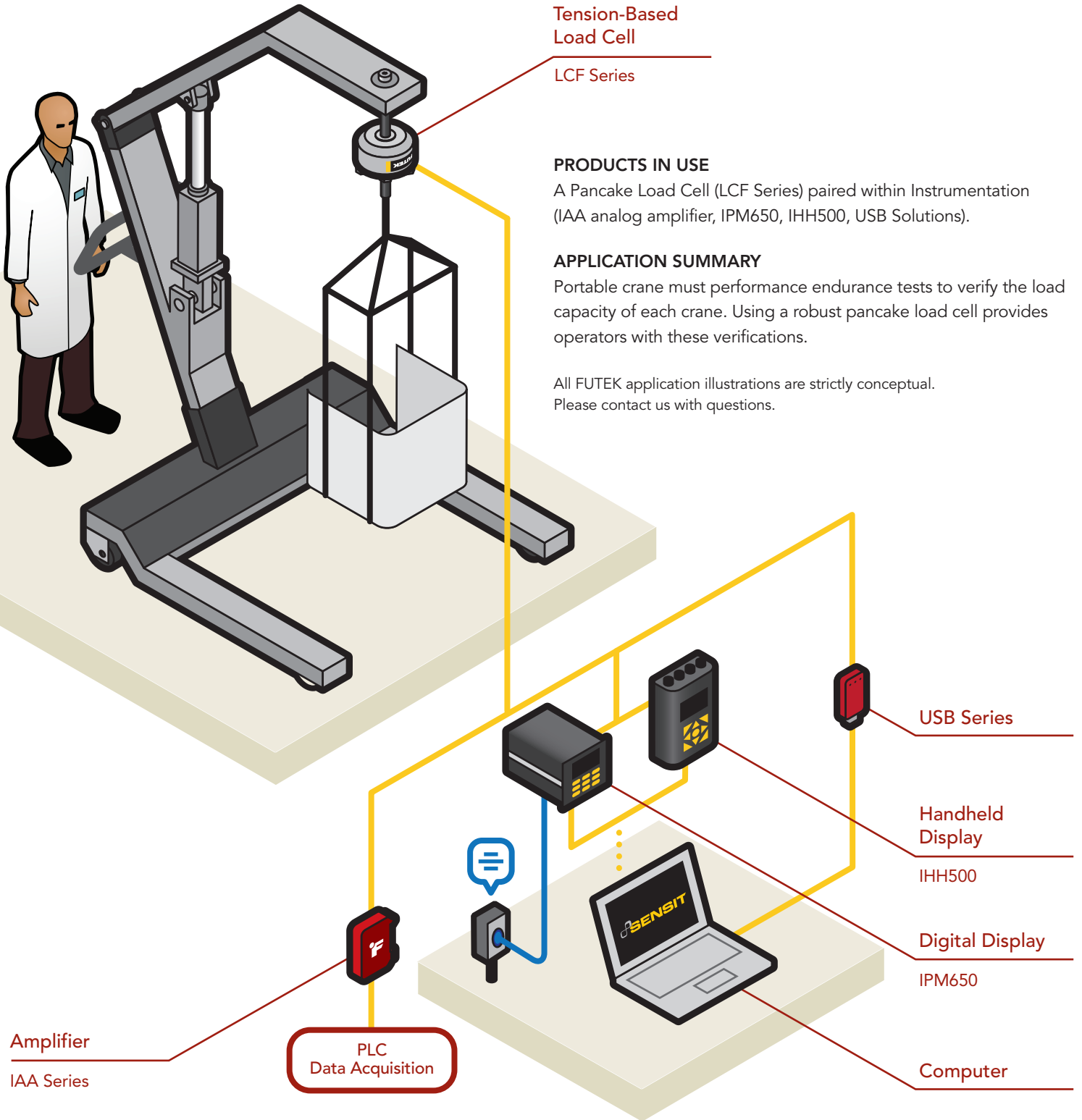
**APPLICATION SUMMARY**

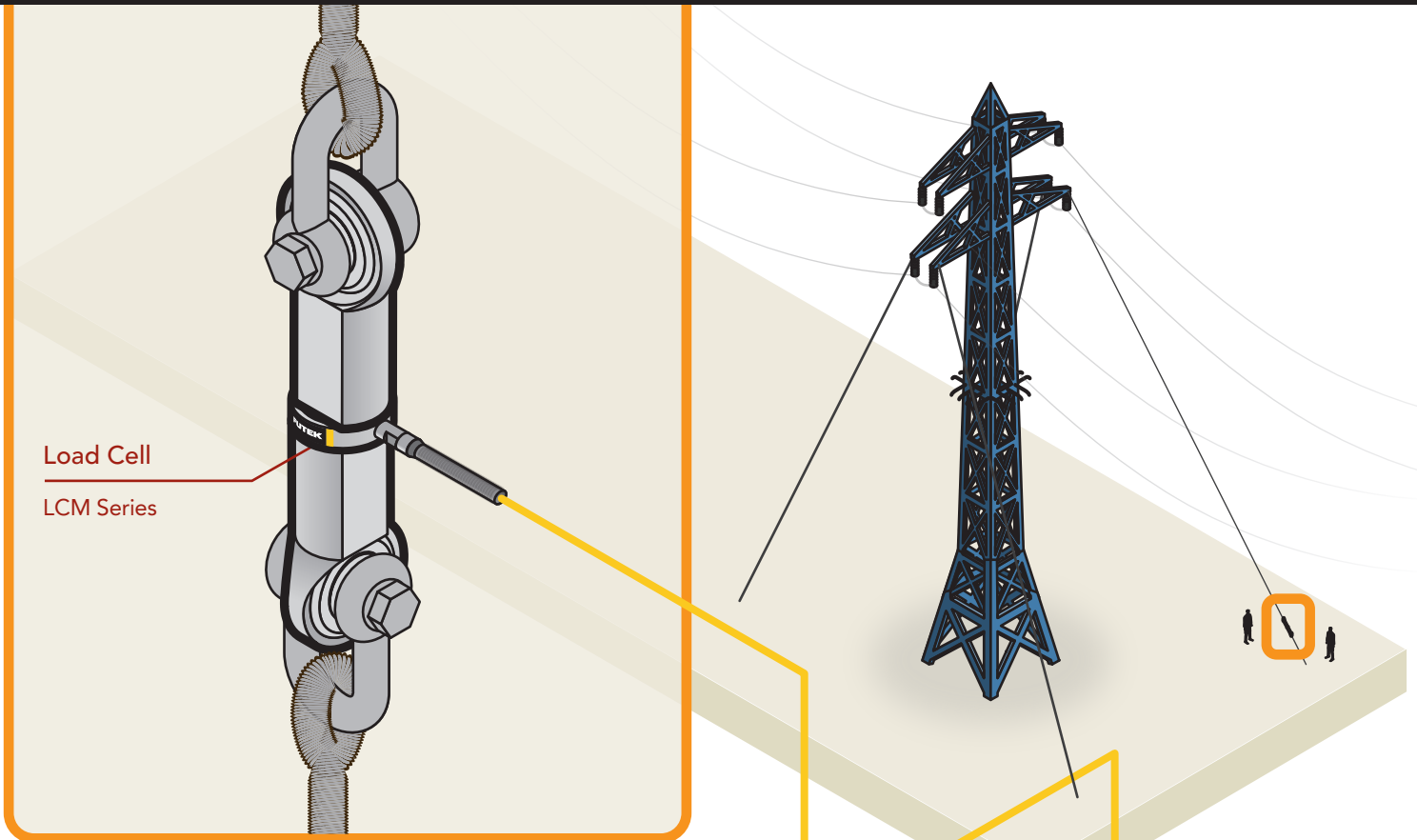
FUTEK had the opportunity to work along researchers at the University of Amsterdam, Netherlands to develop a miniature load button for their dementia research project . In essence, patients were asked to bite down on a clamp to measure the strength of their bite.











Load Cell  
LCM Series

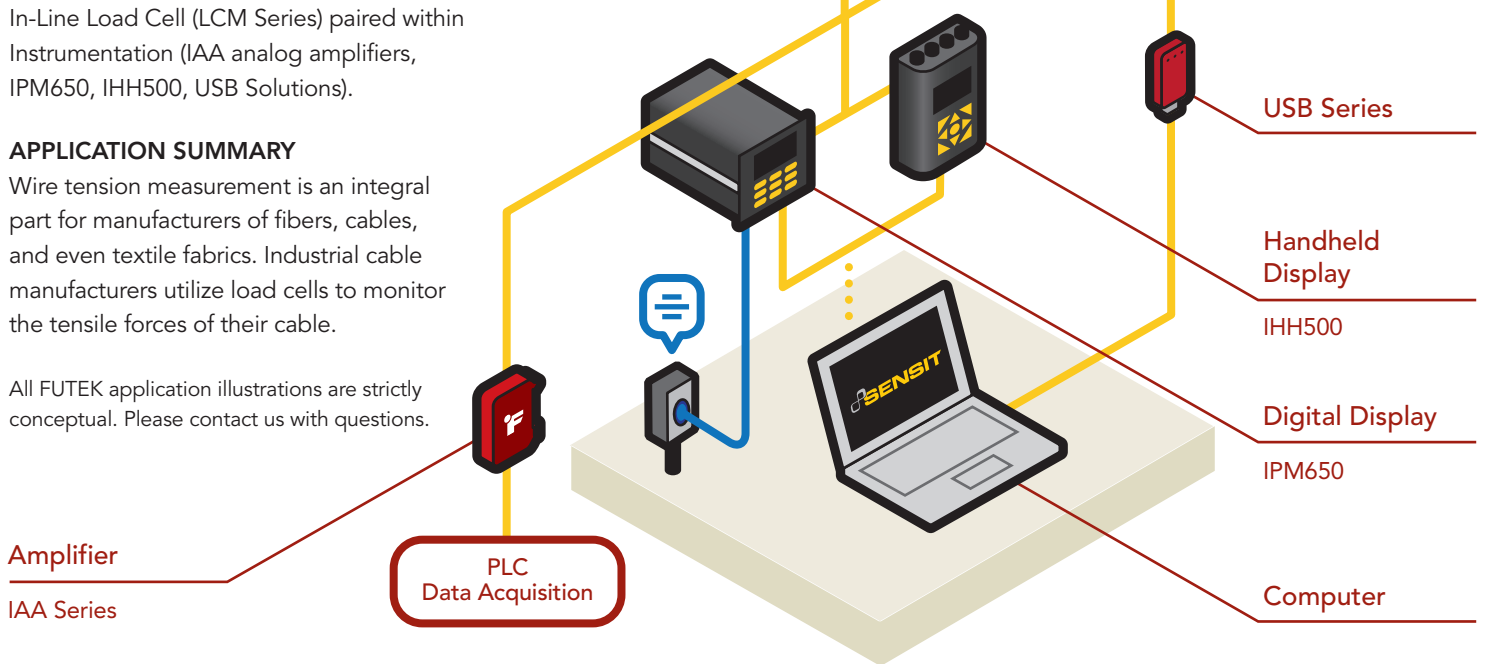
**PRODUCTS IN USE**

In-Line Load Cell (LCM Series) paired within Instrumentation (IAA analog amplifiers, IPM650, IHH500, USB Solutions).

**APPLICATION SUMMARY**

Wire tension measurement is an integral part for manufacturers of fibers, cables, and even textile fabrics. Industrial cable manufacturers utilize load cells to monitor the tensile forces of their cable.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



Amplifier  
IAA Series

PLC  
Data Acquisition

USB Series

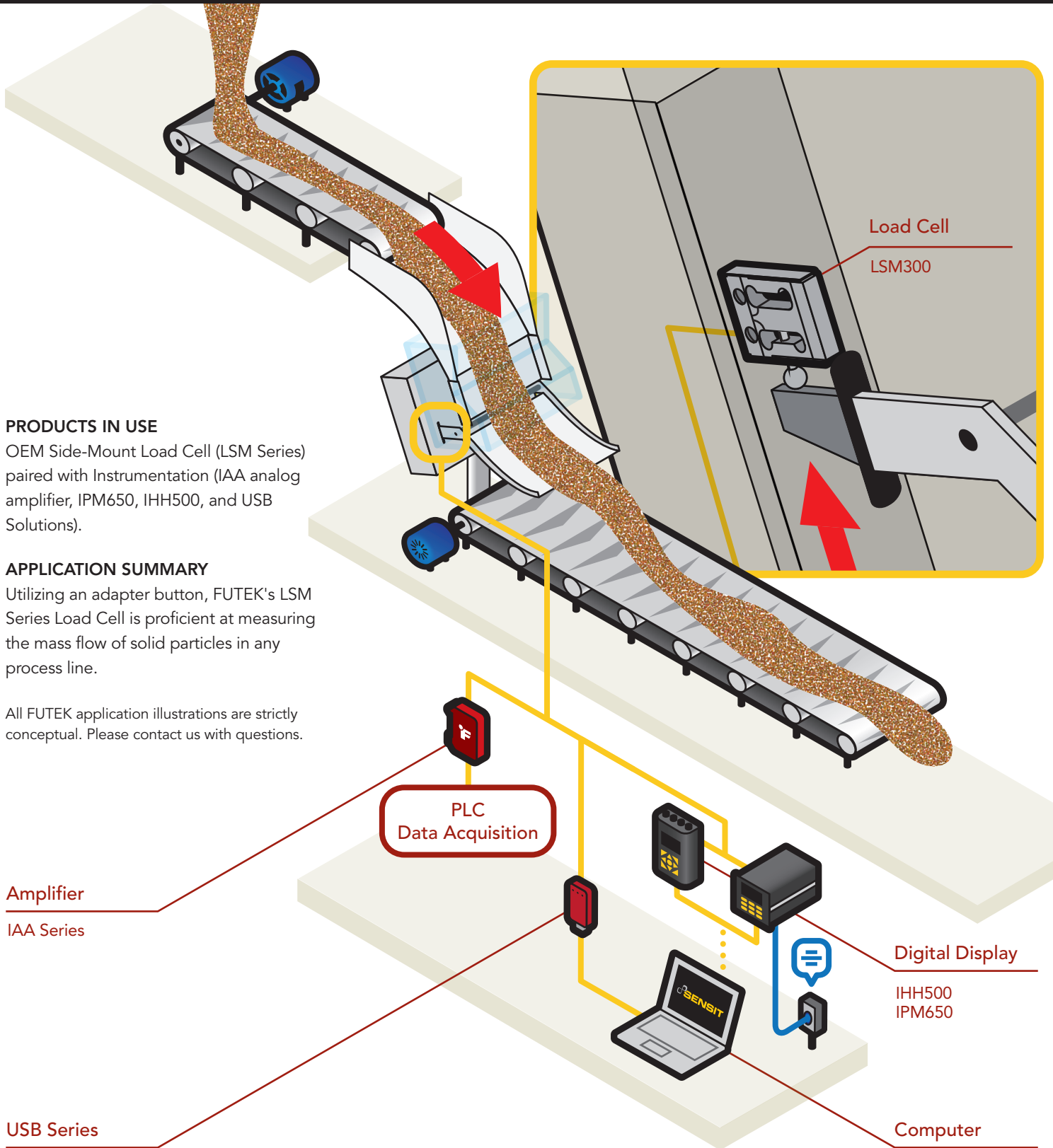
Handheld  
Display

IHH500

Digital Display

IPM650

Computer



**PRODUCTS IN USE**

OEM Side-Mount Load Cell (LSM Series) paired with Instrumentation (IAA analog amplifier, IPM650, IHH500, and USB Solutions).

**APPLICATION SUMMARY**

Utilizing an adapter button, FUTEK's LSM Series Load Cell is proficient at measuring the mass flow of solid particles in any process line.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

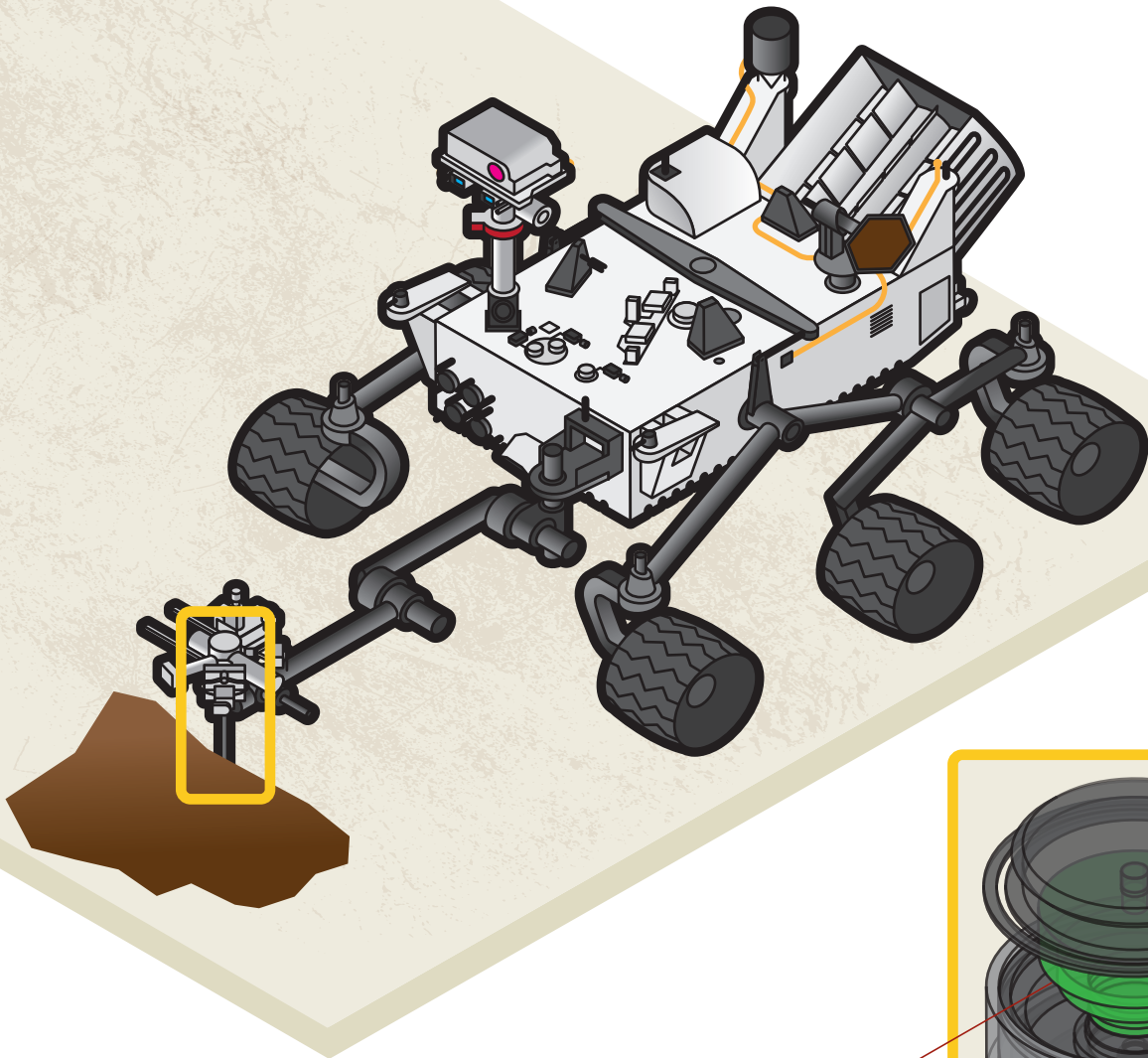
Amplifier  
IAA Series

PLC  
Data Acquisition

Digital Display  
IHH500  
IPM650

USB Series

Computer



**PRODUCTS IN USE**

NASA JPL space/flight qualified cryogenic dualbridge donut load cell and a space/flight qualified cryogenic 3-component multi-axial sensor.

**APPLICATION SUMMARY**

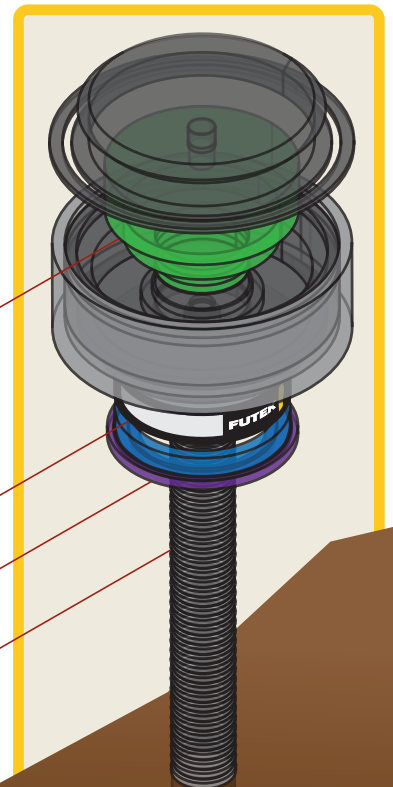
FUTEK developed two cryogenic sensors to operate aboard the rover. The donut load cell directly operates within *Curiosity's* drilling arm. It stands responsible to monitor the drill bit's force as it pierces into the Martian ground. The multi-axial load and torque sensor is responsible for the maneuvers of the robotic arm. Both of these sensors were specifically designed for the Mars Rover *Curiosity* mission.

DTM Actuator

Cryogenic Load Cell

Gimbal Assembly

Ball Screw



**Sensor Solution Source**

Load Cells · Pressure Sensors · Torque Sensors · Instruments · Software

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9001:2008

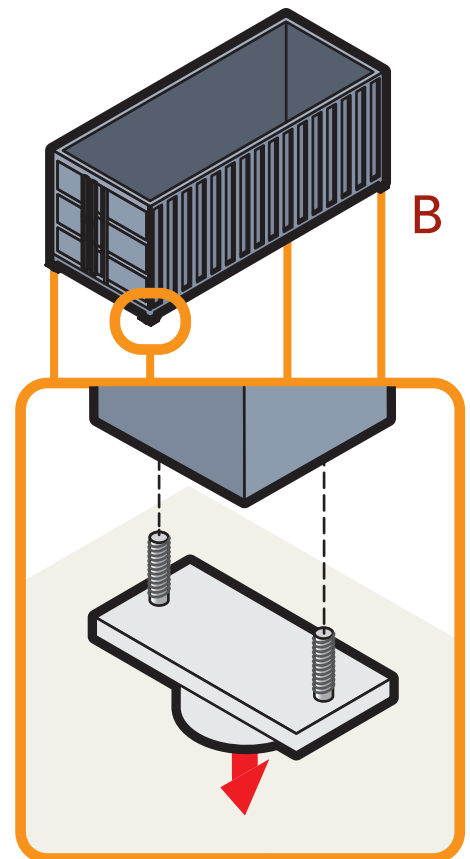
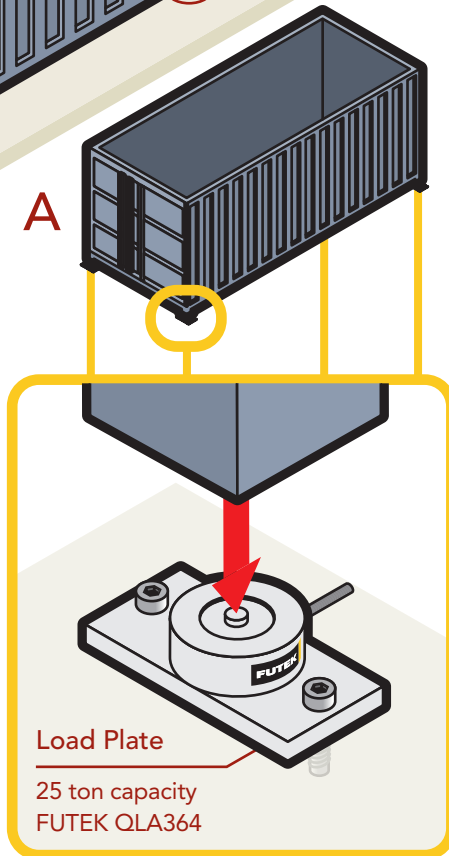
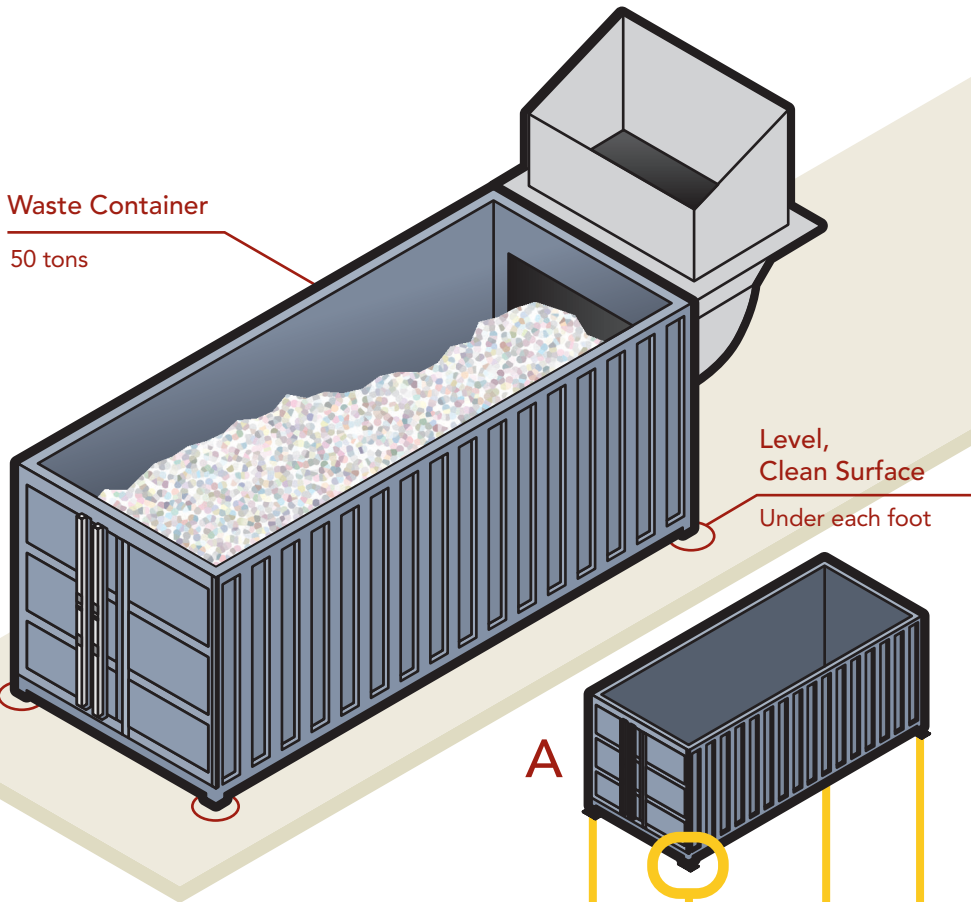


17025:2005



U.S. Manufacturer





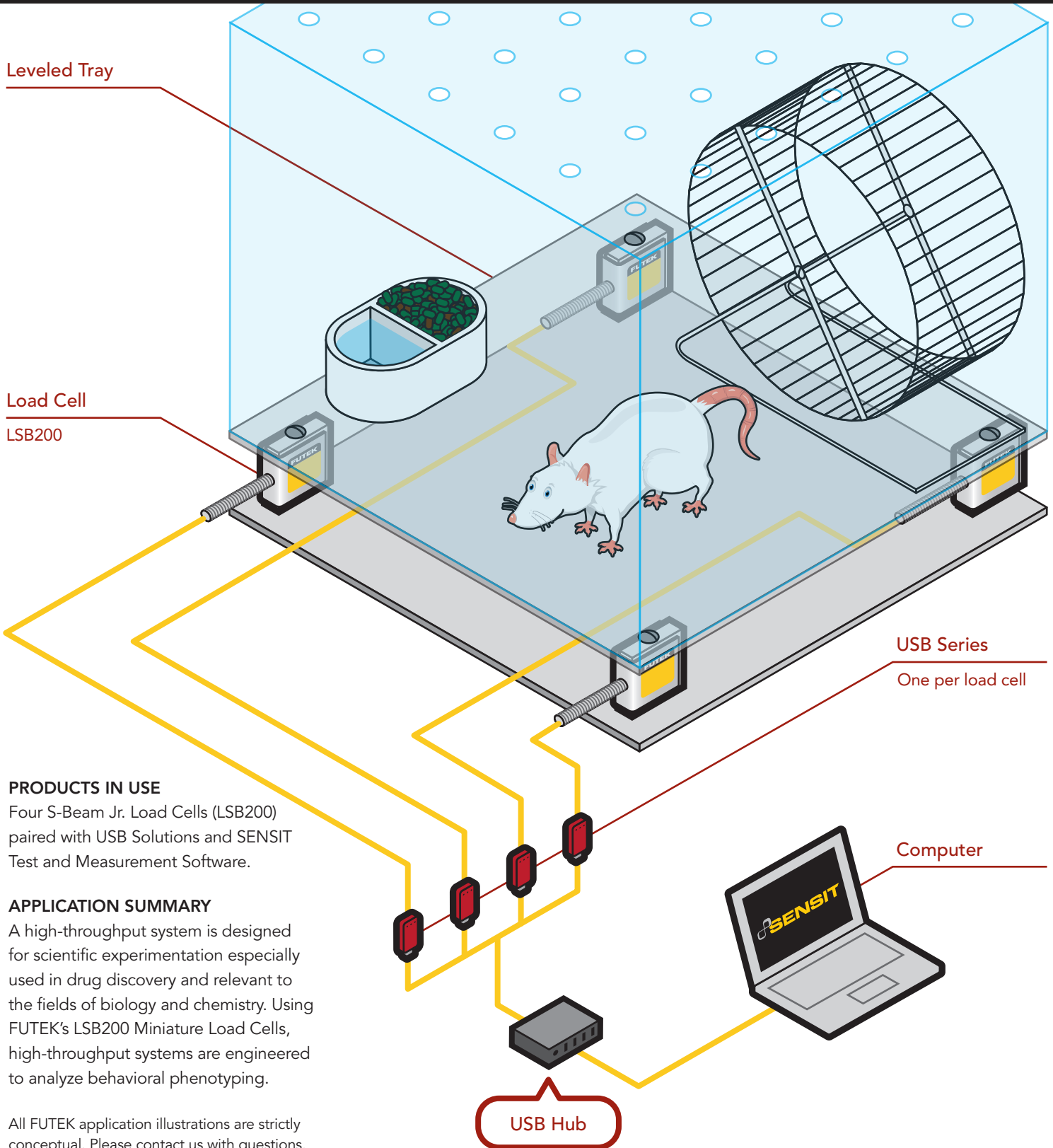
**PRODUCTS IN USE**

Four customized Load plates paired with Instrumentation (IAA analog amplifiers, IPM650, IHH500, USB Solutions).

**APPLICATION SUMMARY**

Large waste management containers are intended to collect trash until they reach a specific capacity. Once that capacity is reached, disposal of the contents is necessary. Utilizing load cells helps monitor the container's capacity increase.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



**PRODUCTS IN USE**

Four S-Beam Jr. Load Cells (LSB200) paired with USB Solutions and SENSIT Test and Measurement Software.

**APPLICATION SUMMARY**

A high-throughput system is designed for scientific experimentation especially used in drug discovery and relevant to the fields of biology and chemistry. Using FUTEK's LSB200 Miniature Load Cells, high-throughput systems are engineered to analyze behavioral phenotyping.

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**Sensor Solution Source**

Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

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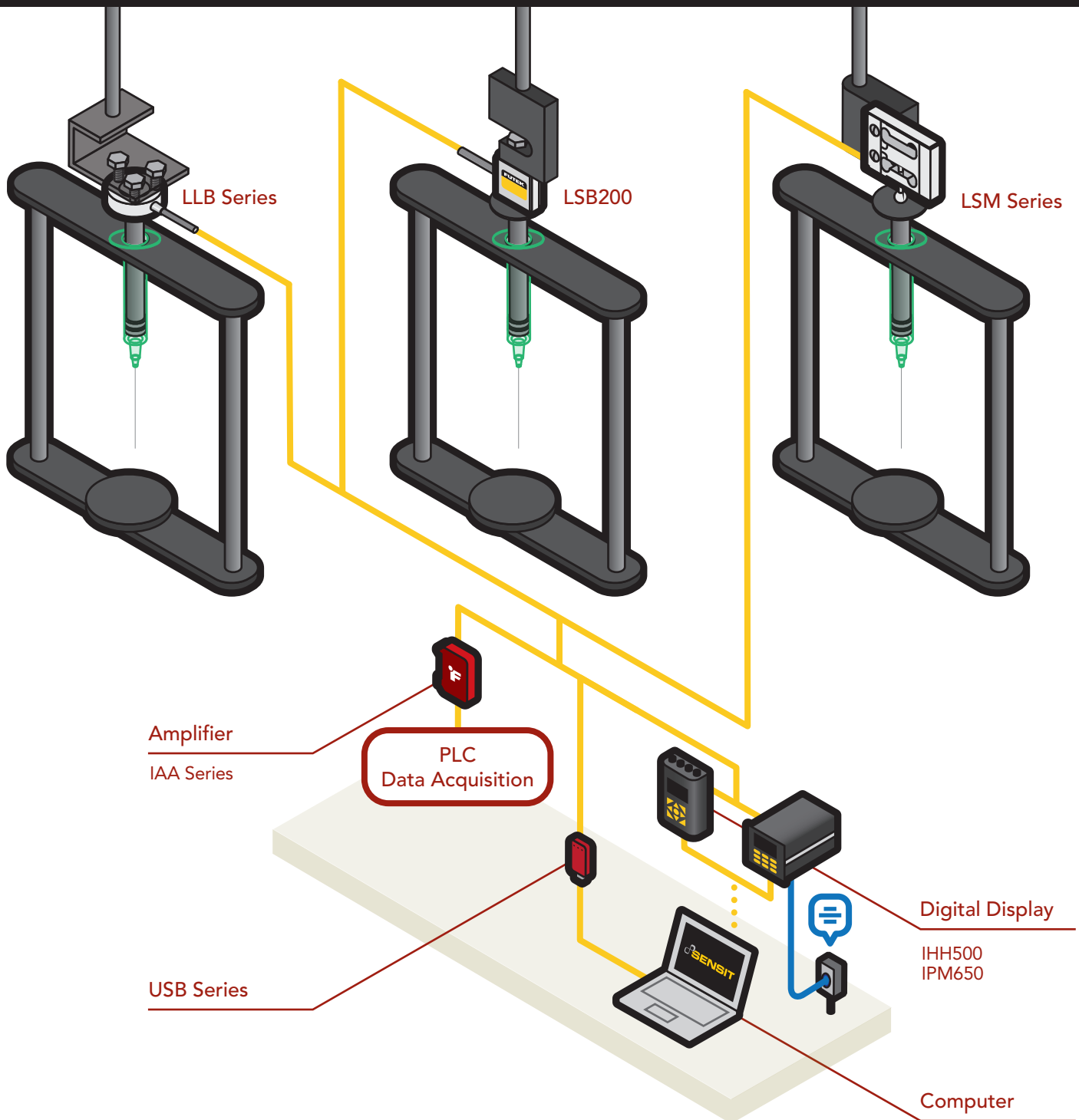
9001:2008



17025:2005



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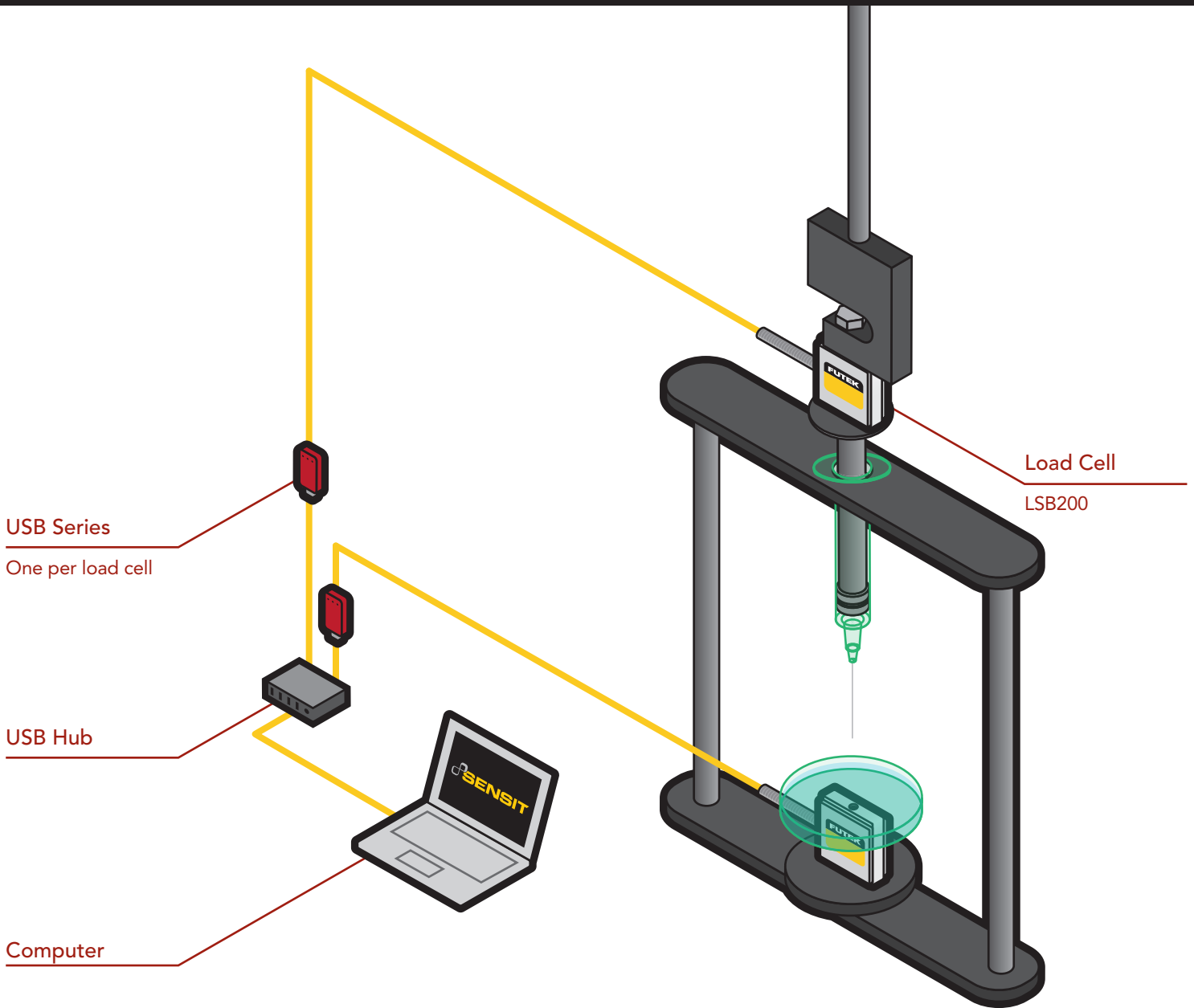


**APPLICATION SUMMARY**

Utilizing OEM load cells to audit syringes (infusion pumps) provides medical quality inspectors with assurance that these apparatuses will perform up to code.

**PRODUCTS IN USE**

One S-Beam Jr. Load Cell (LSB200), Side-Mount Series Load Cell (LSM Series), or Load Button Load Cell (LLB Series) paired with Instrumentation (IAA analog amplifier, IPM650, IHH500, or USB Solutions) and SENSIT™ Test and Measurement Software.



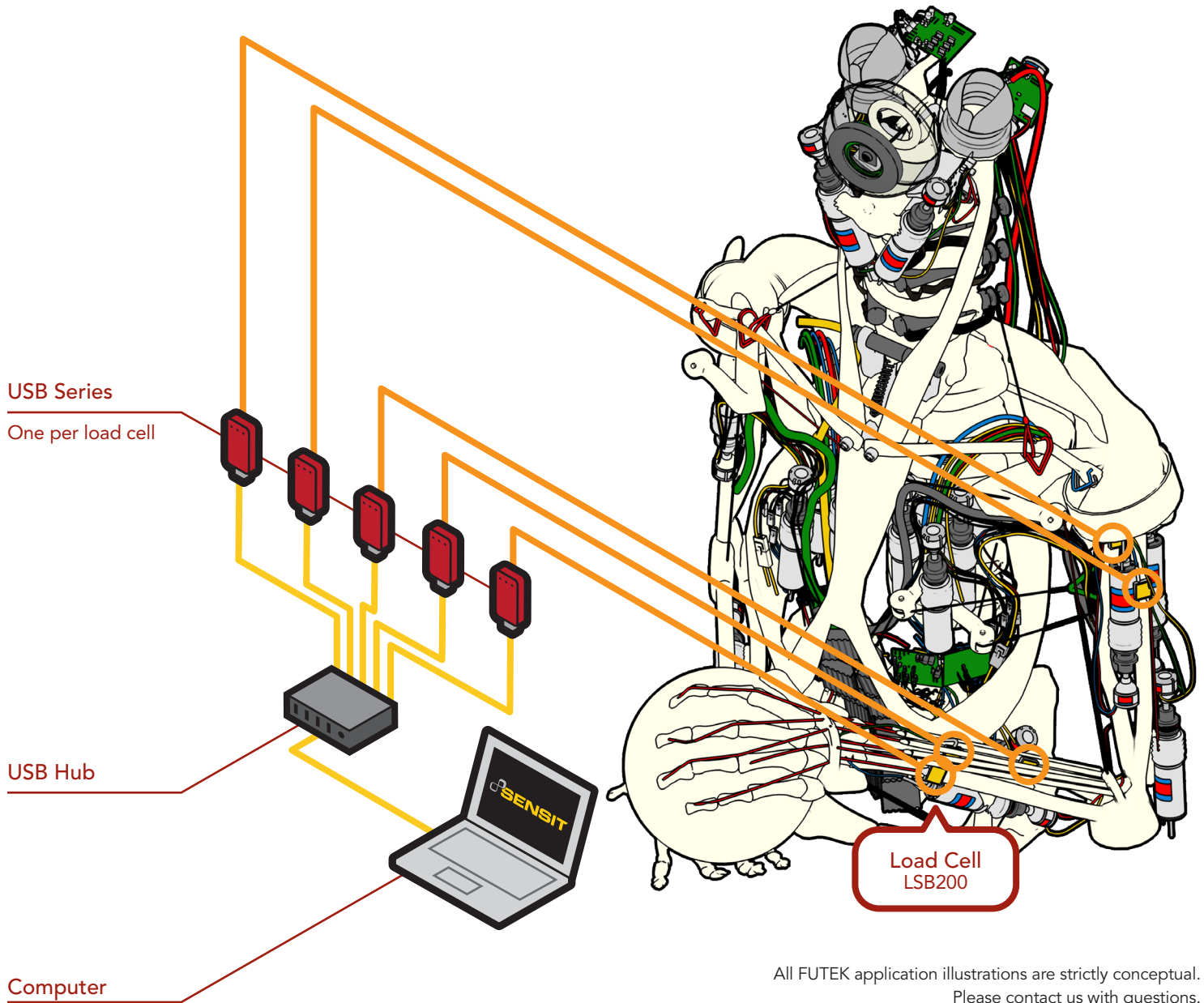
All FUTEK application illustrations are strictly conceptual.  
Please contact us with questions.

**APPLICATION SUMMARY**

Medical equipment requires precise testing. Utilizing FUTEK's LSB200 Miniature S-Beam Jr. provides quality inspectors with measurements down to the micro-gram on delicate applications, such as this syringe test stand (infusion pump).

**PRODUCTS IN USE**

Two S-Beam Jr. Load Cells (LSB200) paired with USB Solutions and SENSIT Test and Measurement Software.



All FUTEK application illustrations are strictly conceptual.  
Please contact us with questions.

**PRODUCTS IN USE**

60+ Miniature S-Beam Jr. Load Cells (LSB200) with USB Solutions and SENSIT™ Test and Measurement Software.

**APPLICATION SUMMARY**

FUTEK partnered with The Robot Studio, a specialist in biometric robotic hardware, to construct a fully functional humanoid robot. Over 60 of FUTEK's LSB200 Miniature S-Beam Jr. Load Cells are in operation to monitor the robot's movements.

**Sensor Solution Source**

Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

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U.S. Manufacturer





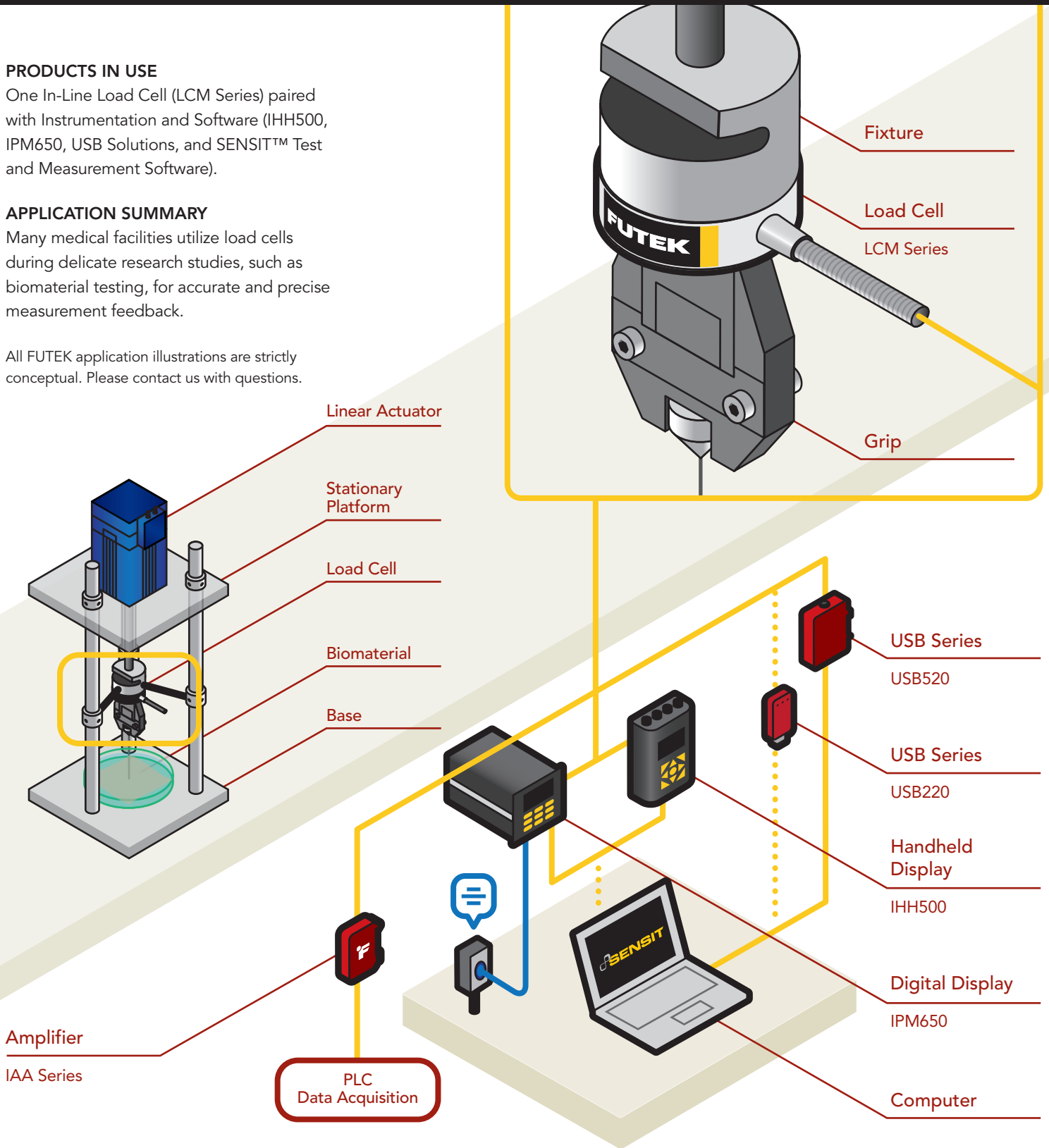
**PRODUCTS IN USE**

One In-Line Load Cell (LCM Series) paired with Instrumentation and Software (IHH500, IPM650, USB Solutions, and SENSIT™ Test and Measurement Software).

**APPLICATION SUMMARY**

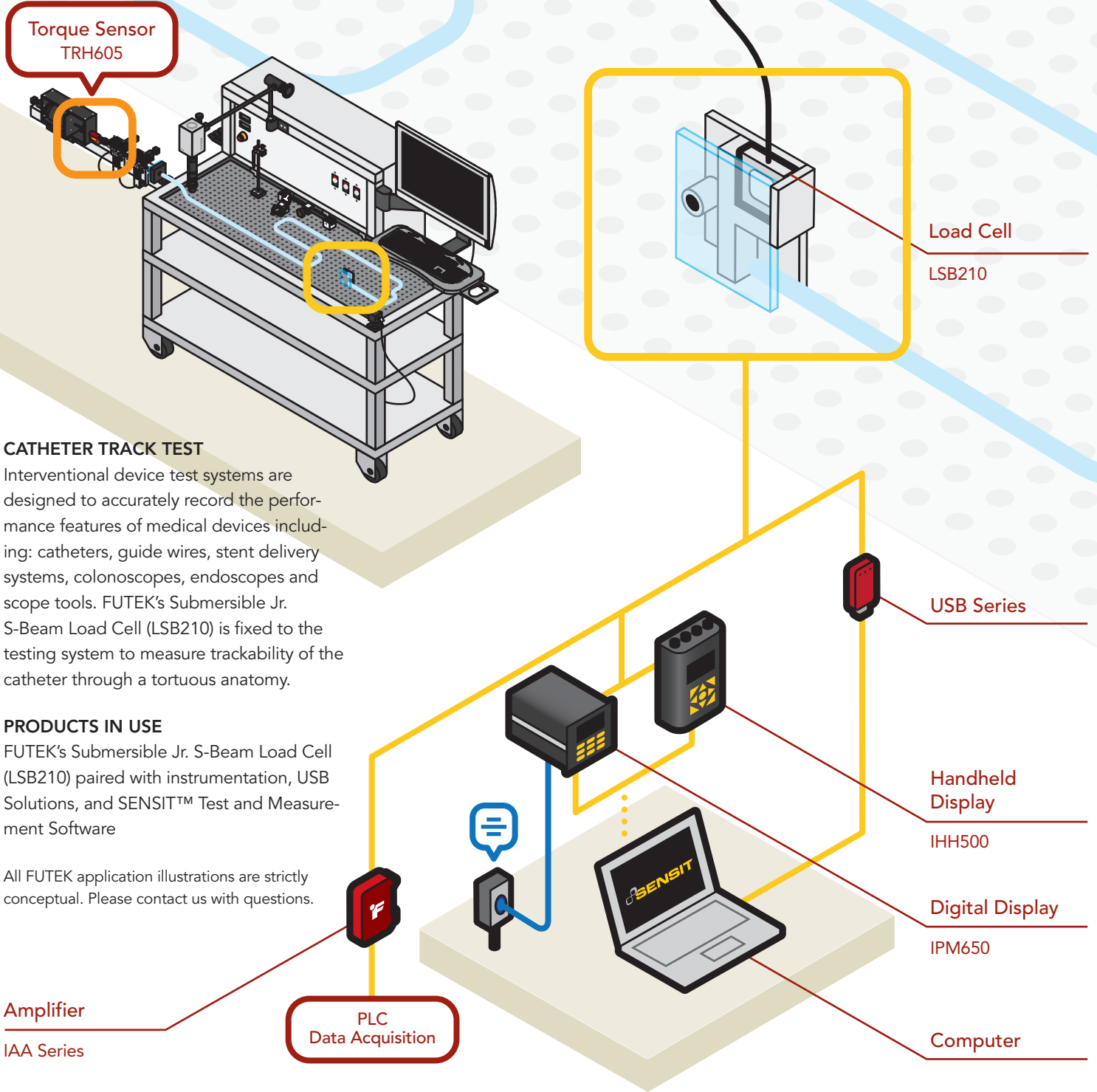
Many medical facilities utilize load cells during delicate research studies, such as biomaterial testing, for accurate and precise measurement feedback.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



Amplifier  
IAA Series

PLC  
Data Acquisition



**CATHETER TRACK TEST**

Interventional device test systems are designed to accurately record the performance features of medical devices including: catheters, guide wires, stent delivery systems, colonoscopes, endoscopes and scope tools. FUTEK's Submersible Jr. S-Beam Load Cell (LSB210) is fixed to the testing system to measure trackability of the catheter through a tortuous anatomy.

**PRODUCTS IN USE**

FUTEK's Submersible Jr. S-Beam Load Cell (LSB210) paired with instrumentation, USB Solutions, and SENSIT™ Test and Measurement Software

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

Amplifier  
IAA Series

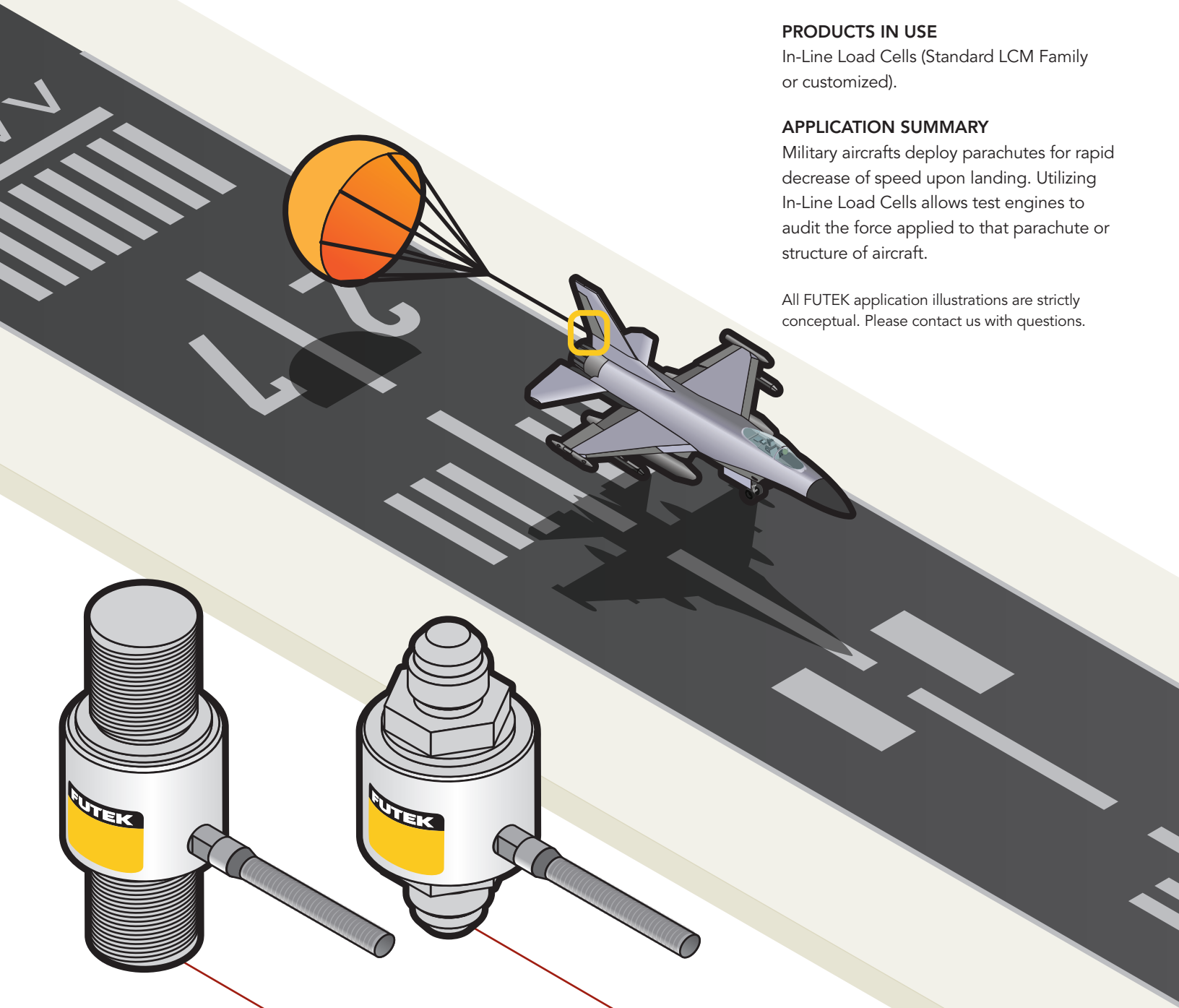
PLC  
Data Acquisition

USB Series

Handheld Display  
IHH500

Digital Display  
IPM650

Computer



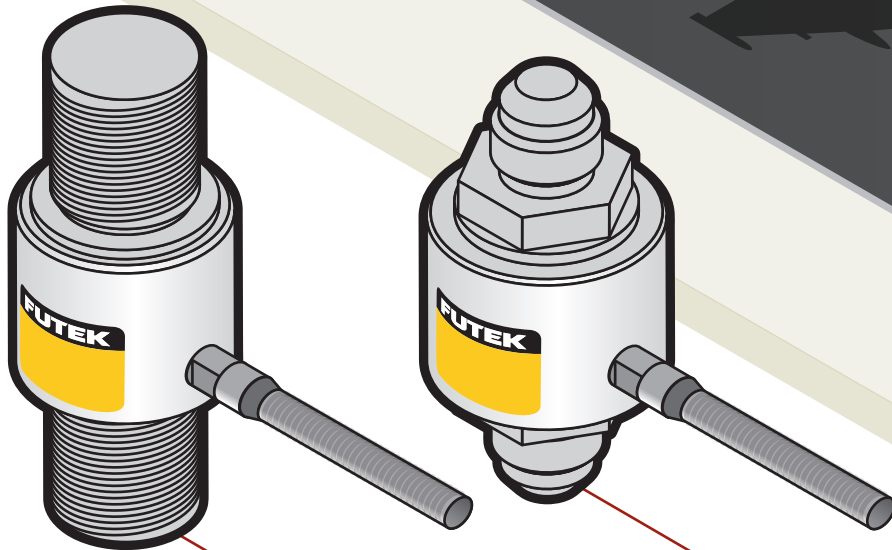
**PRODUCTS IN USE**

In-Line Load Cells (Standard LCM Family or customized).

**APPLICATION SUMMARY**

Military aircrafts deploy parachutes for rapid decrease of speed upon landing. Utilizing In-Line Load Cells allows test engines to audit the force applied to that parachute or structure of aircraft.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



Miniature Inline Threaded Tension and Compression Load Cell

LCM Series

Miniature Inline Threaded Load Cell

QLA317



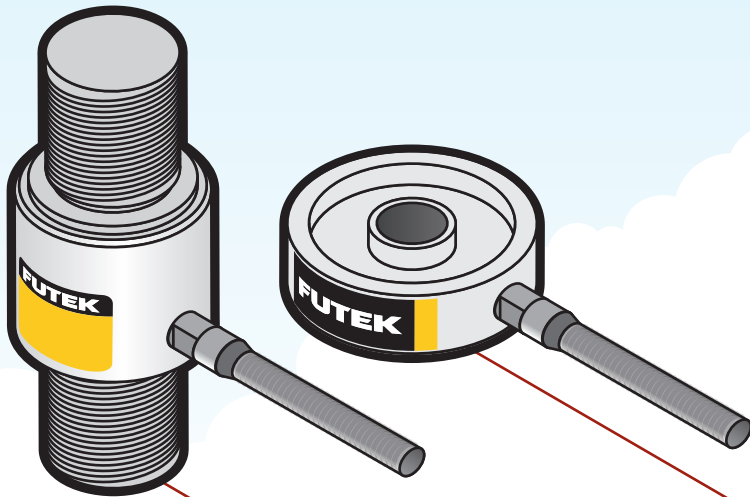
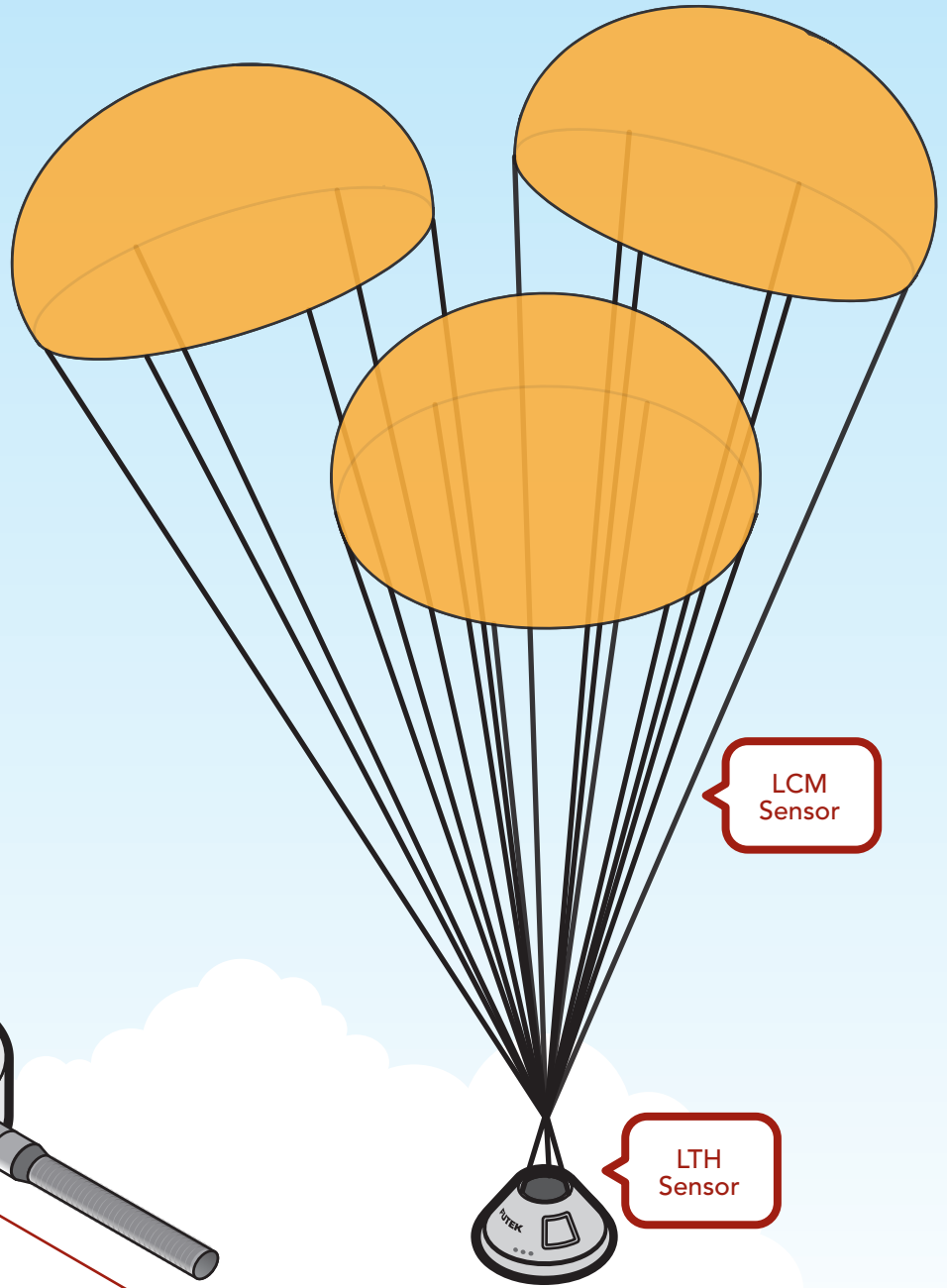
**PRODUCTS IN USE**

In-Line Load Cells (LCM Family) or Thru-Hole/Donut Load Cells (LTH Family).

**APPLICATION SUMMARY**

Aerospace parachute deployment mechanisms require high precision load cells throughout the testing phase. NASA's Orion capsule utilized FUTEK load cells to measure the force of the payload applied against the parachute system.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



Miniature Inline Threaded Tension and Compression Load Cell

LCM Series

Donut Load Cell

LTH Series





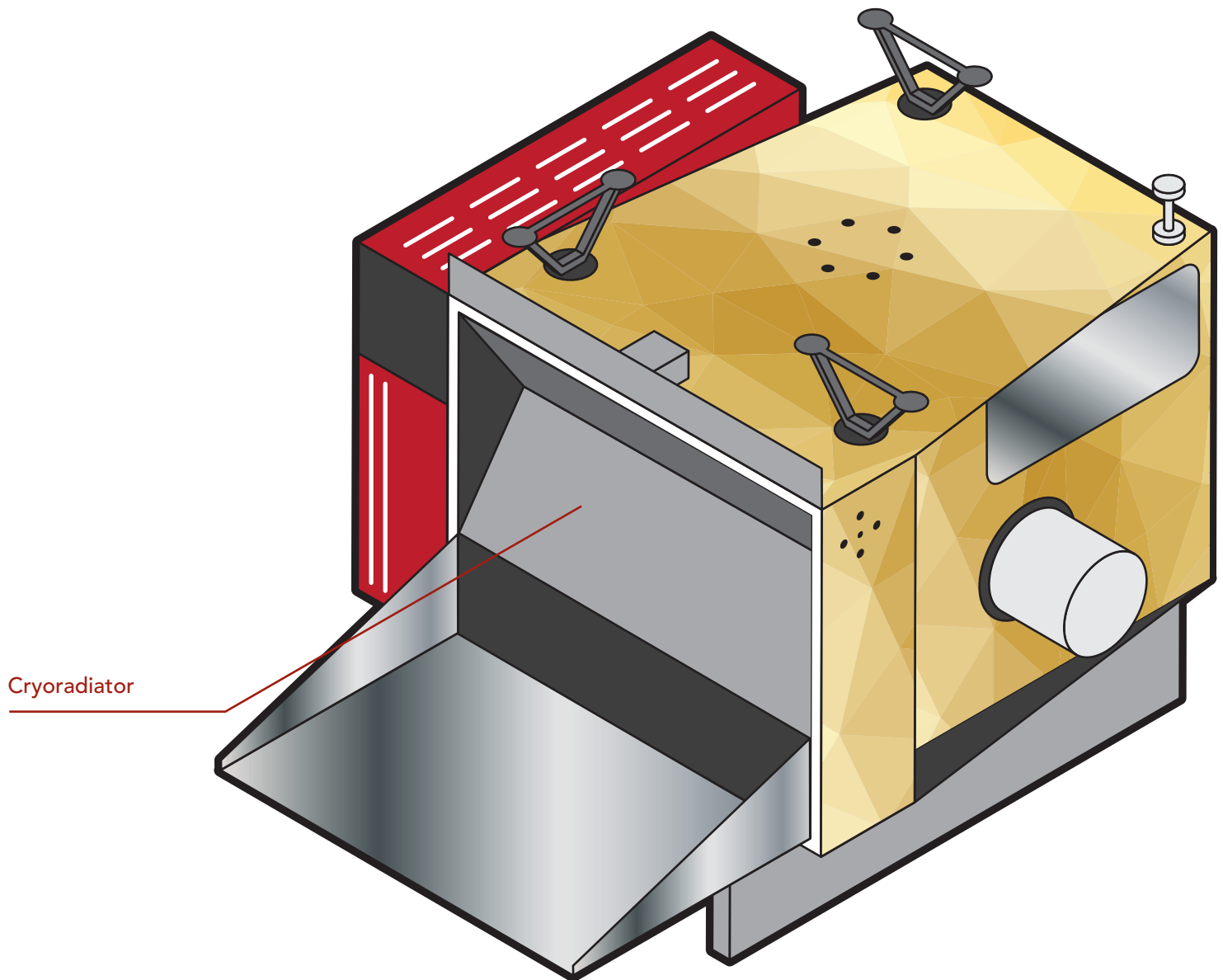
**PRODUCTS IN USE**

FUTEK designed two cryogenic load cells able to operate within the cryoradiator of the VIIRS component at the extreme temperature of  $-300^{\circ}\text{F}$  ( $-184^{\circ}\text{C}$ ).

All FUTEK application illustrations are strictly conceptual.  
Please contact us with questions.

**APPLICATION SUMMARY**

Within NASA's Suomi NPP Satellite are five weather instruments. Commissioned by Raytheon, FUTEK designed two cryogenic load cells for the Visible Infrared Imager Radiometer Suite (VIIRS) aboard the satellite.







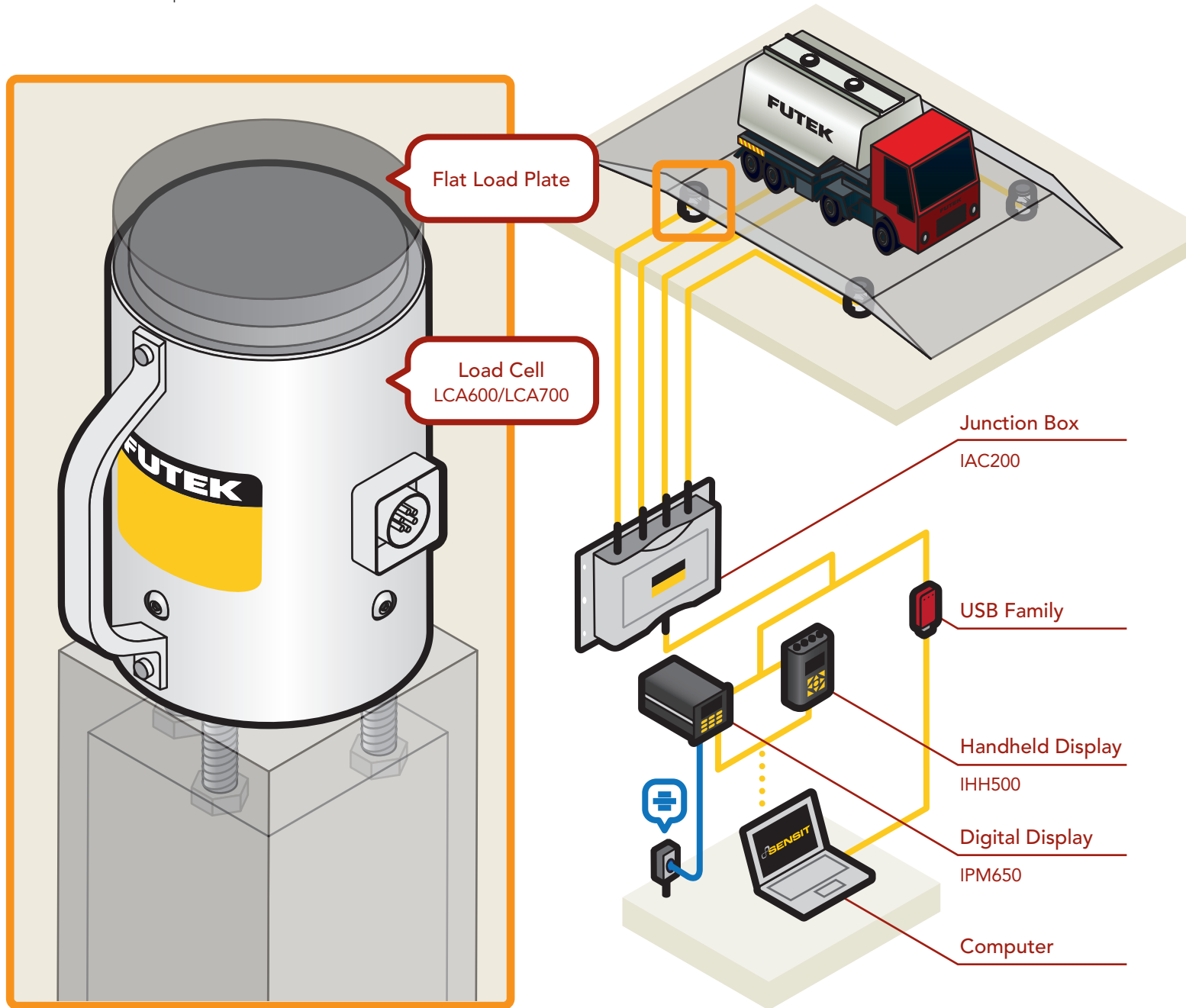
**APPLICATION SUMMARY**

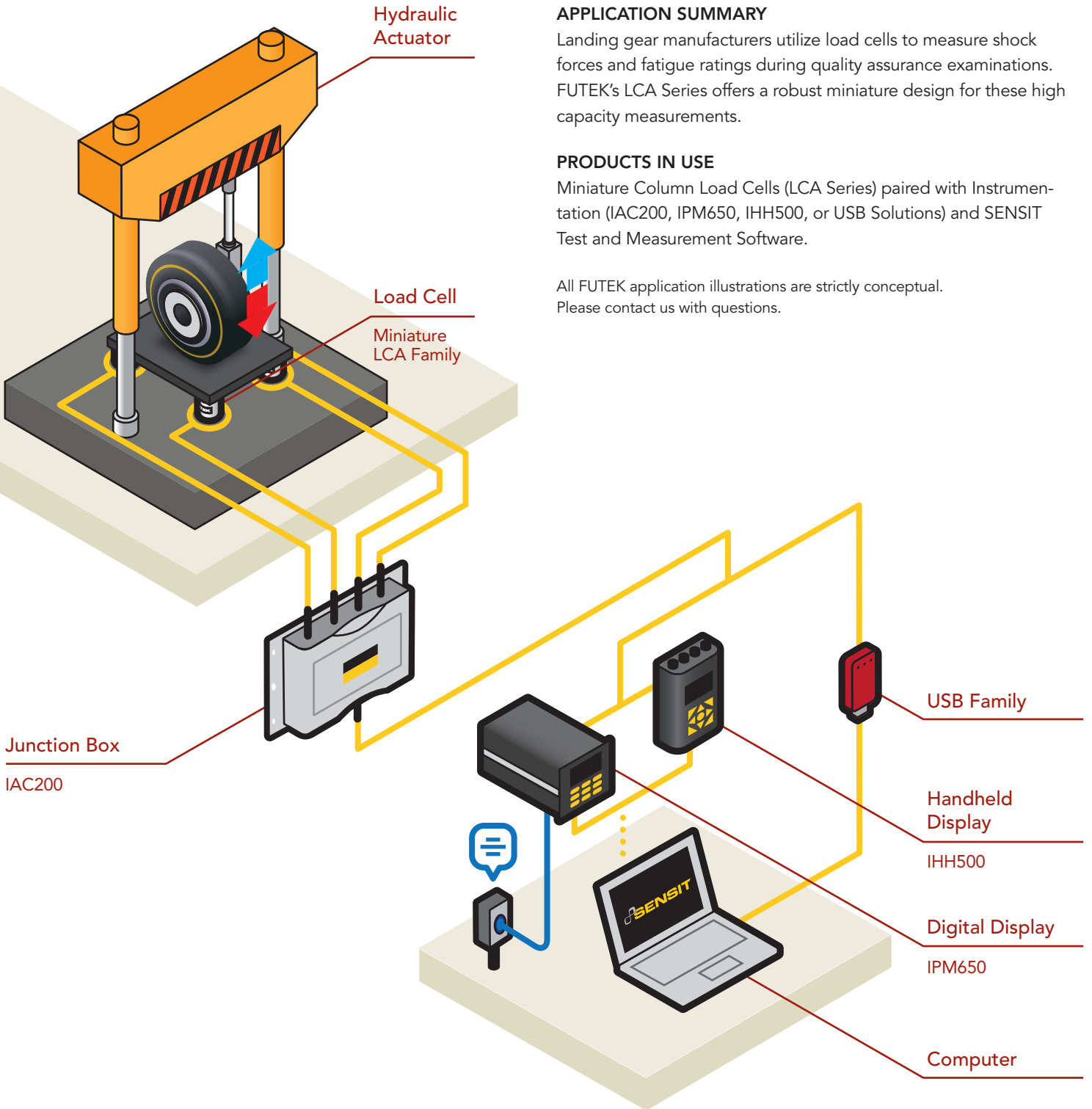
Weighbridges are utilized in various industries that manufacture or move bulk items. FUTEK's LCA Family offers a robust design for high capacity measurements.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

**PRODUCTS IN USE**

Load Column Cell (LCA600/LCA700) paired with Instrumentation (IPM650, IHH500, IAC200, or USB Solutions) and SENSIT™ Test and Measurement Software.





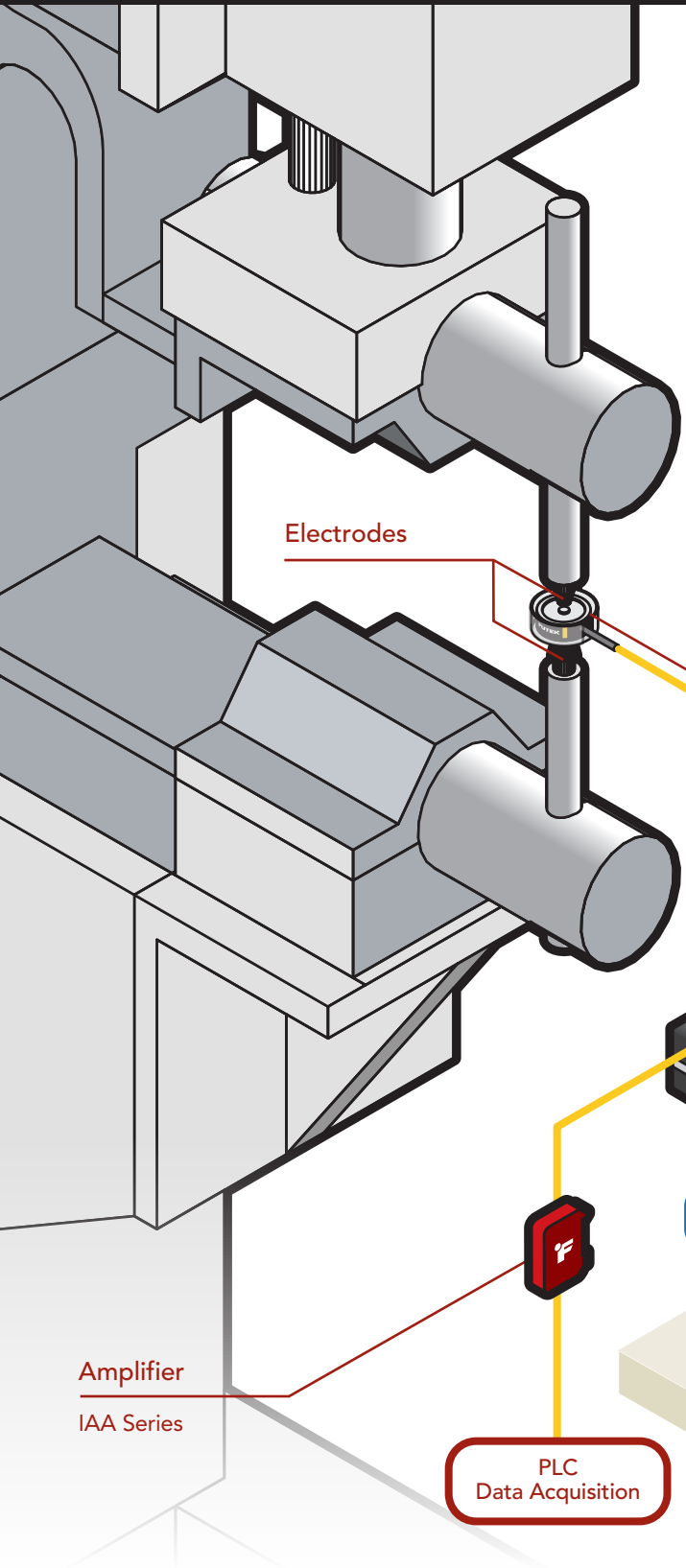
**APPLICATION SUMMARY**

Landing gear manufacturers utilize load cells to measure shock forces and fatigue ratings during quality assurance examinations. FUTEK's LCA Series offers a robust miniature design for these high capacity measurements.

**PRODUCTS IN USE**

Miniature Column Load Cells (LCA Series) paired with Instrumentation (IAC200, IPM650, IHH500, or USB Solutions) and SENSIT Test and Measurement Software.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



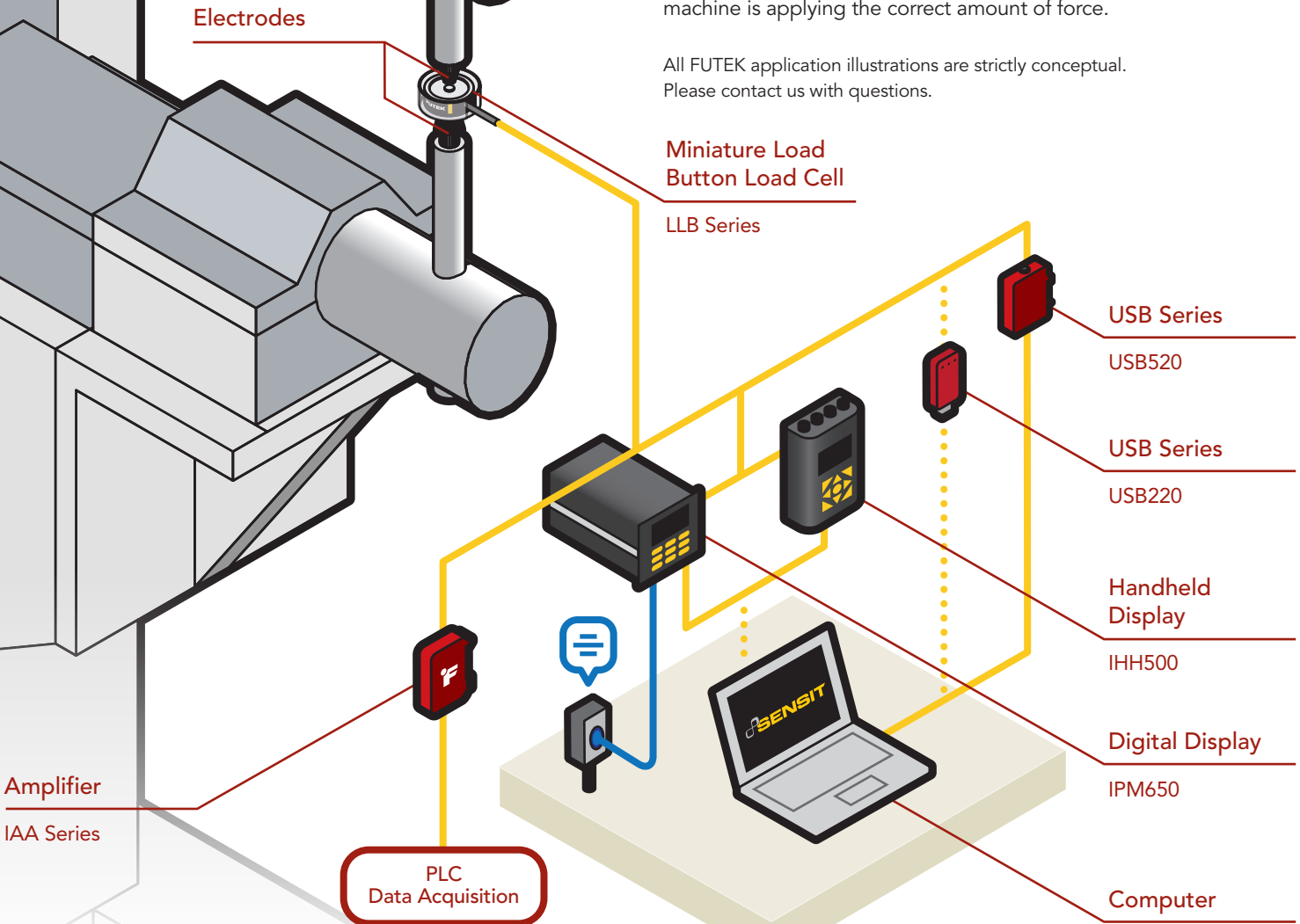
**PRODUCTS IN USE**

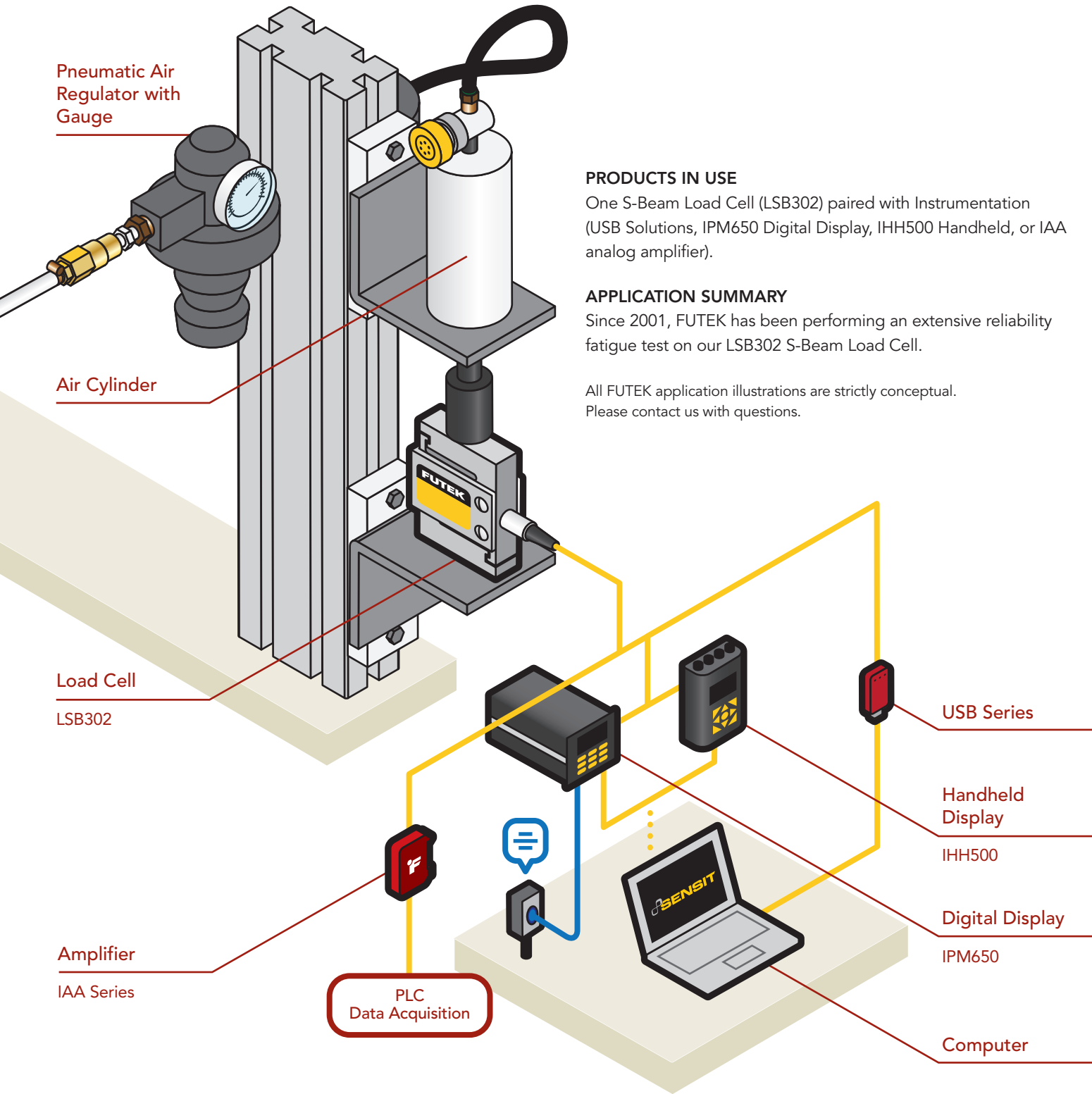
Subminiature Load Button Load Cell (LLB Series) paired with Instrumentation and Software (IHH500, IPM650, USB Solutions, and SENSIT™ Test and Measurement Software).

**APPLICATION SUMMARY**

Resistance Spot Welding is a process in which pieces of metal are joined together by the heat created by the electrical resistance of the material combined with the forces applied by the electrode to hold the pieces together. The forces applied by the electrodes are very critical to the process, as the incorrect amount might cause cracks, holes, and failures in the welds. FUTEK's LLB300 Subminiature Load Button Load Cell helps operators ensure that the welding machine is applying the correct amount of force.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.





**PRODUCTS IN USE**

One S-Beam Load Cell (LSB302) paired with Instrumentation (USB Solutions, IPM650 Digital Display, IHH500 Handheld, or IAA analog amplifier).

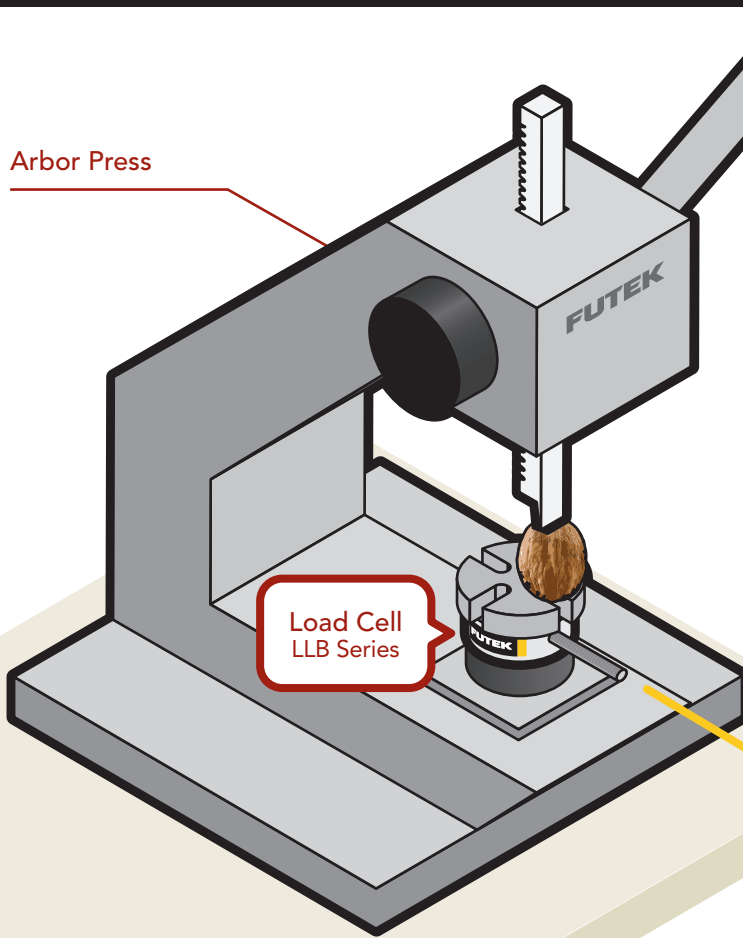
**APPLICATION SUMMARY**

Since 2001, FUTEK has been performing an extensive reliability fatigue test on our LSB302 S-Beam Load Cell.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



Arbor Press



Load Cell  
LLB Series

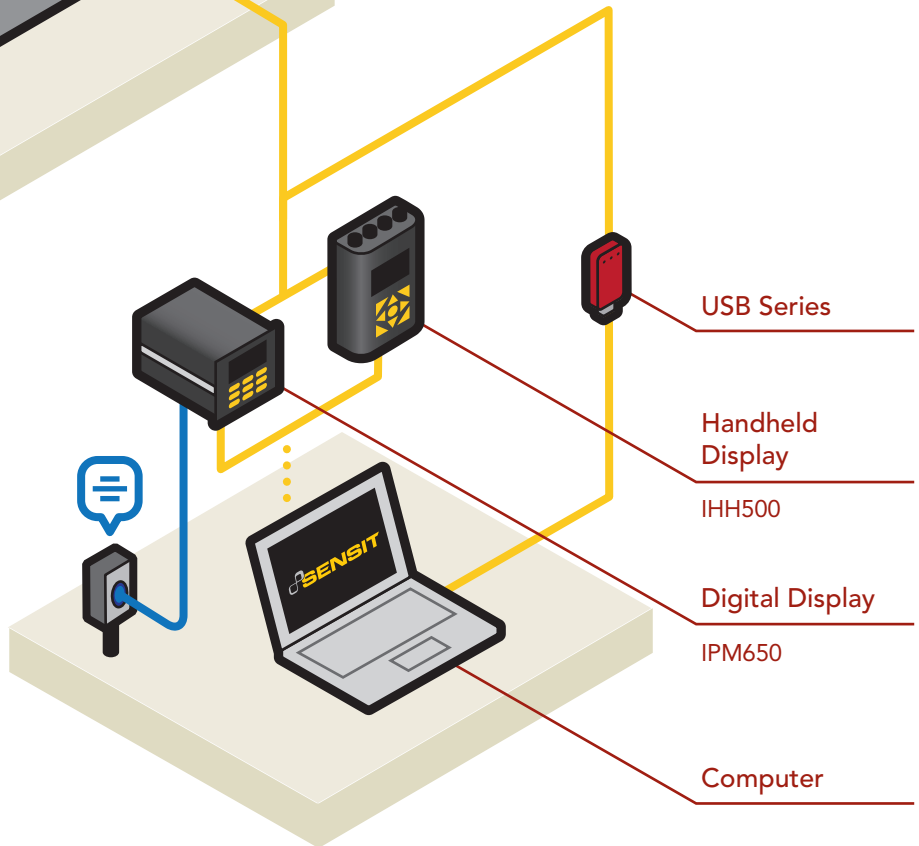
**PRODUCTS IN USE**

One Load Button Load Cell (LLB Series) with Instrumentation (IPM650, IHH500, or USB Solutions) and SENSIT™ Test and Measurement Software.

**APPLICATION SUMMARY**

Load cells are frequently used with arbor presses as auditing tools to gauge the amount of force required for a press fit or riveting process.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



USB Series

Handheld  
Display

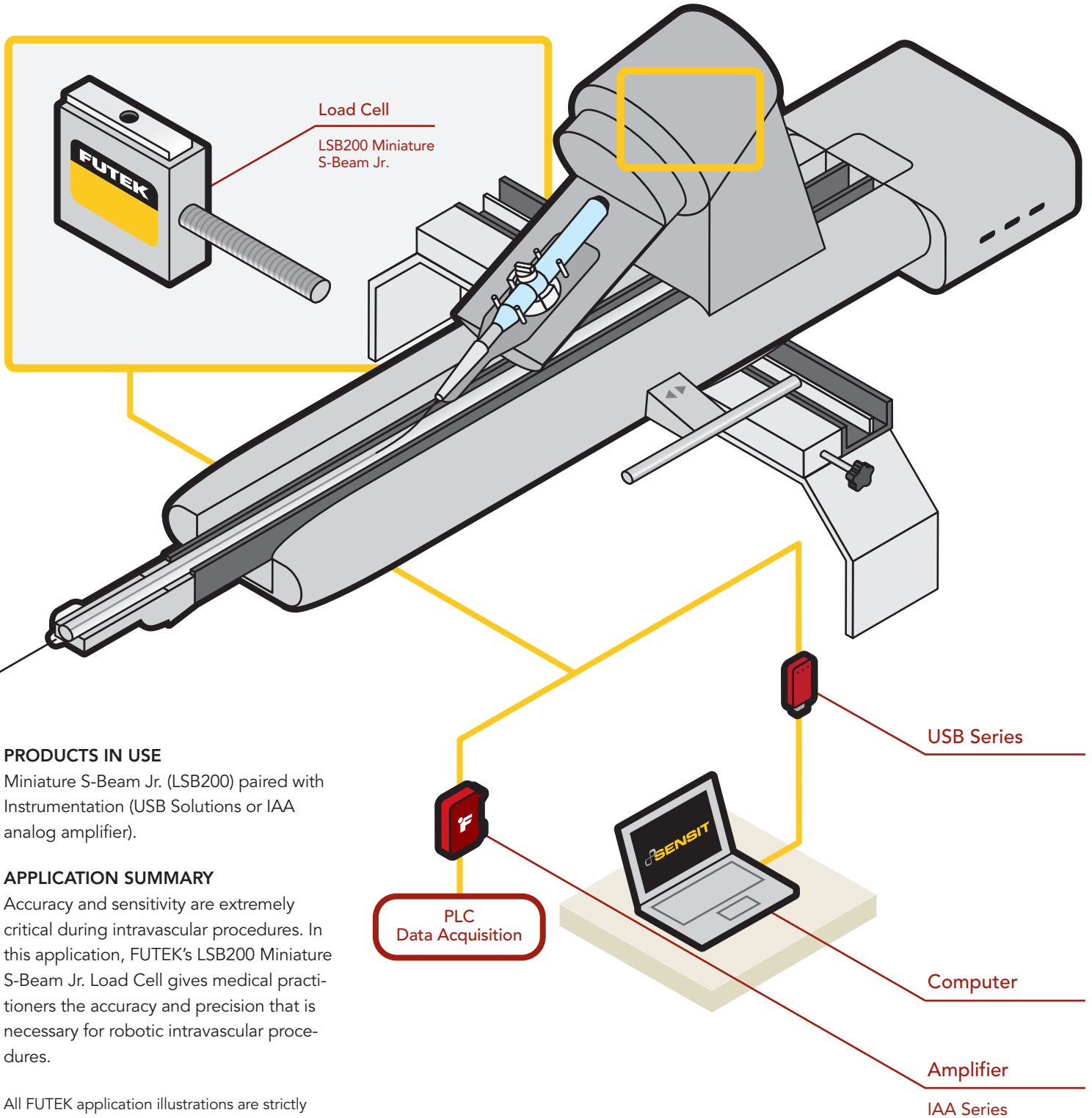
IHH500

Digital Display

IPM650

Computer





**PRODUCTS IN USE**

Miniature S-Beam Jr. (LSB200) paired with Instrumentation (USB Solutions or IAA analog amplifier).

**APPLICATION SUMMARY**

Accuracy and sensitivity are extremely critical during intravascular procedures. In this application, FUTEK's LSB200 Miniature S-Beam Jr. Load Cell gives medical practitioners the accuracy and precision that is necessary for robotic intravascular procedures.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

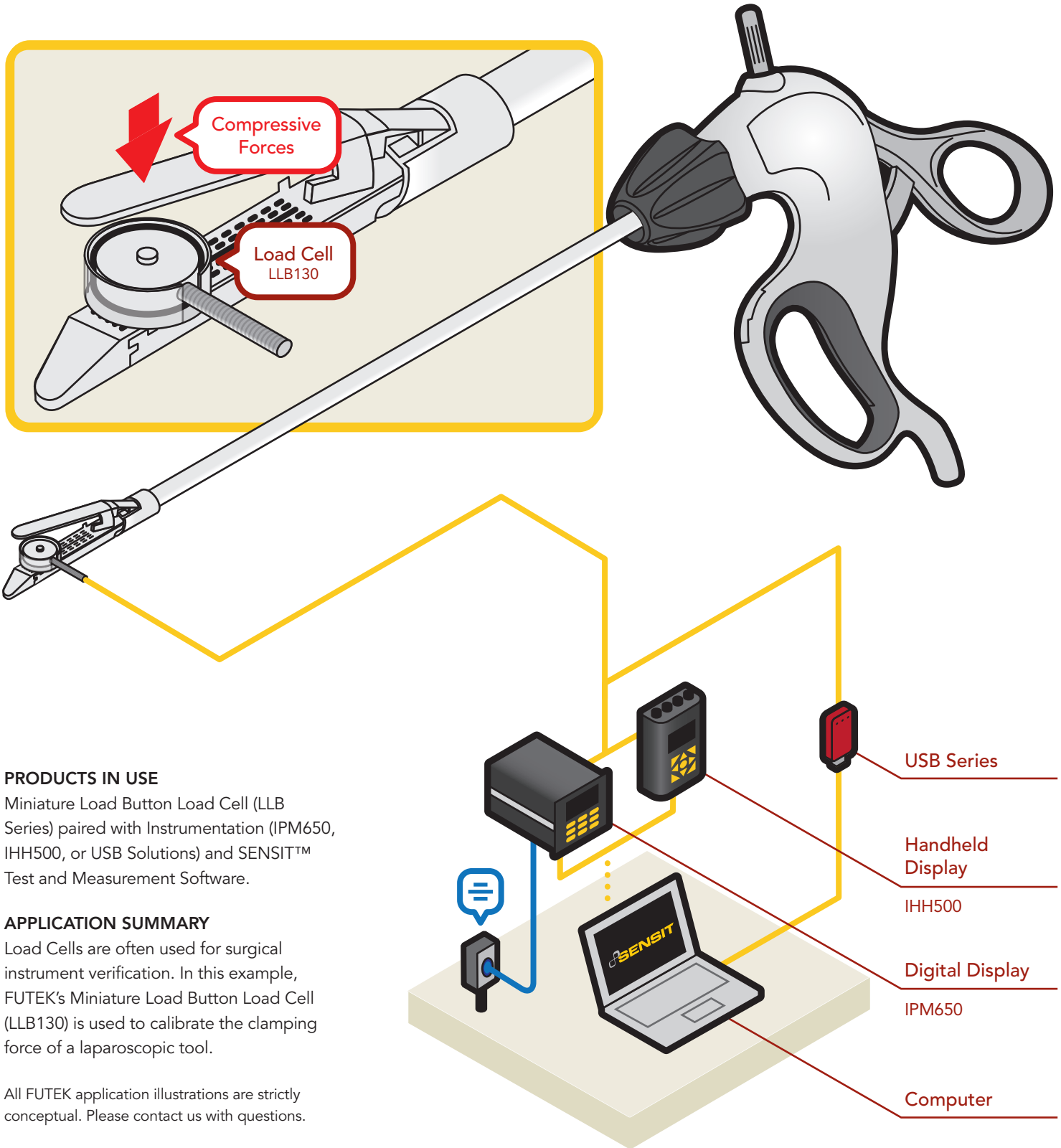
**Sensor Solution Source**

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U.S. Manufacturer



**PRODUCTS IN USE**

Miniature Load Button Load Cell (LLB Series) paired with Instrumentation (IPM650, IHH500, or USB Solutions) and SENSIT™ Test and Measurement Software.

**APPLICATION SUMMARY**

Load Cells are often used for surgical instrument verification. In this example, FUTEK's Miniature Load Button Load Cell (LLB130) is used to calibrate the clamping force of a laparoscopic tool.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

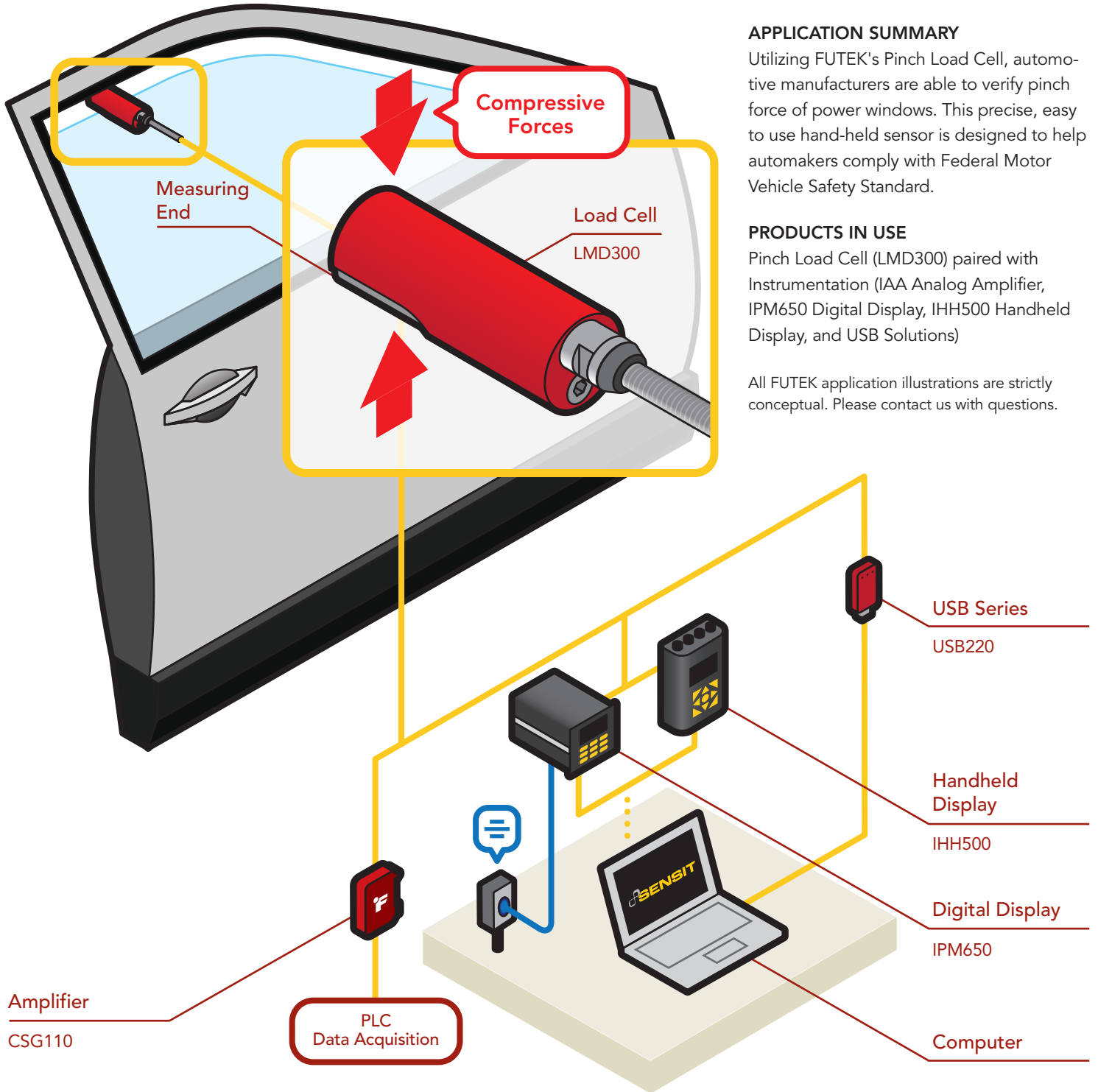
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U.S. Manufacturer



**APPLICATION SUMMARY**

Utilizing FUTEK's Pinch Load Cell, automotive manufacturers are able to verify pinch force of power windows. This precise, easy to use hand-held sensor is designed to help automakers comply with Federal Motor Vehicle Safety Standard.

**PRODUCTS IN USE**

Pinch Load Cell (LMD300) paired with Instrumentation (IAA Analog Amplifier, IPM650 Digital Display, IHH500 Handheld Display, and USB Solutions)

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

Amplifier  
CSG110

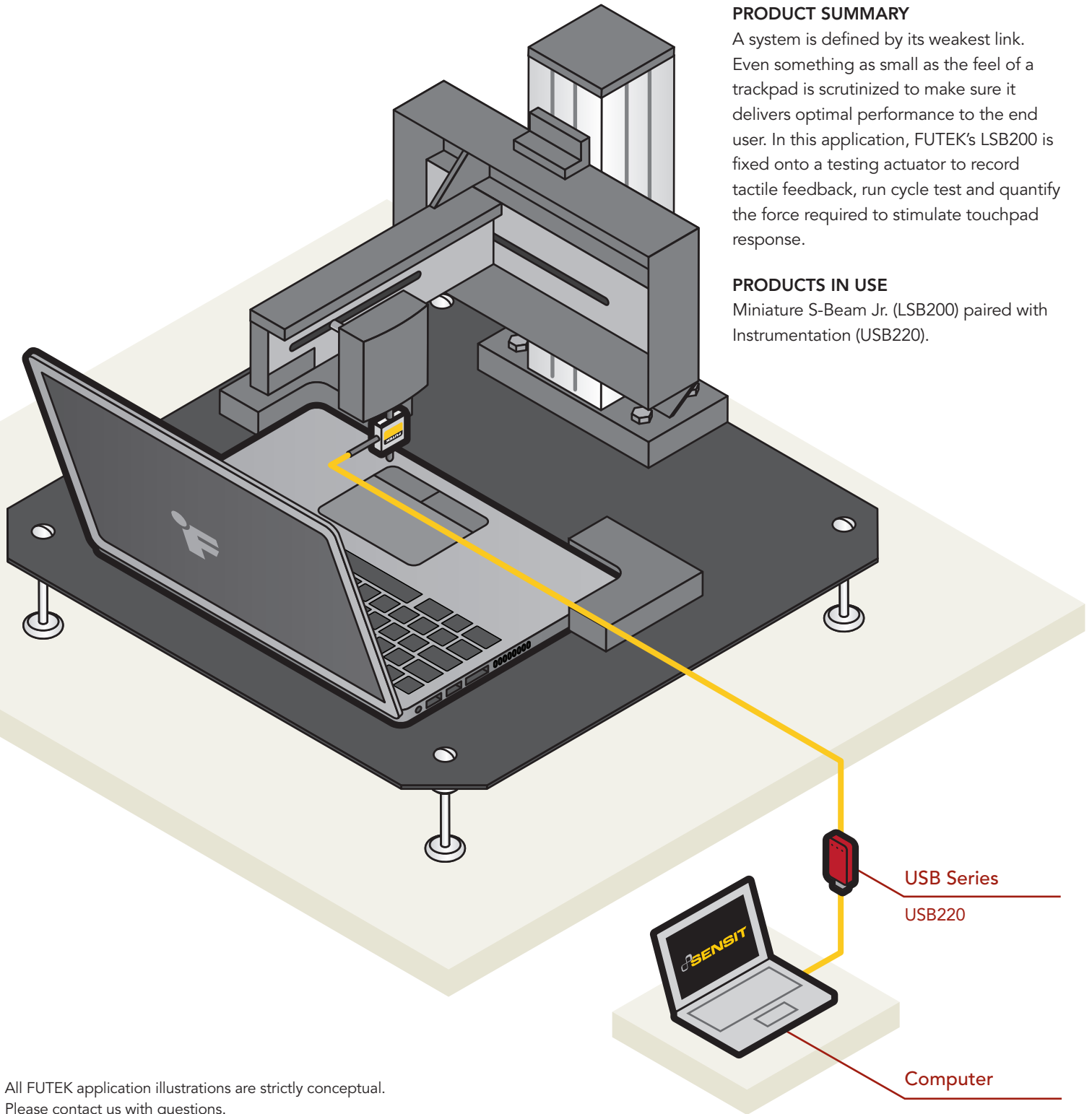
PLC  
Data Acquisition

USB Series  
USB220

Handheld  
Display  
IHH500

Digital Display  
IPM650

Computer



**PRODUCT SUMMARY**

A system is defined by its weakest link. Even something as small as the feel of a trackpad is scrutinized to make sure it delivers optimal performance to the end user. In this application, FUTEK's LSB200 is fixed onto a testing actuator to record tactile feedback, run cycle test and quantify the force required to stimulate touchpad response.

**PRODUCTS IN USE**

Miniature S-Beam Jr. (LSB200) paired with Instrumentation (USB220).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



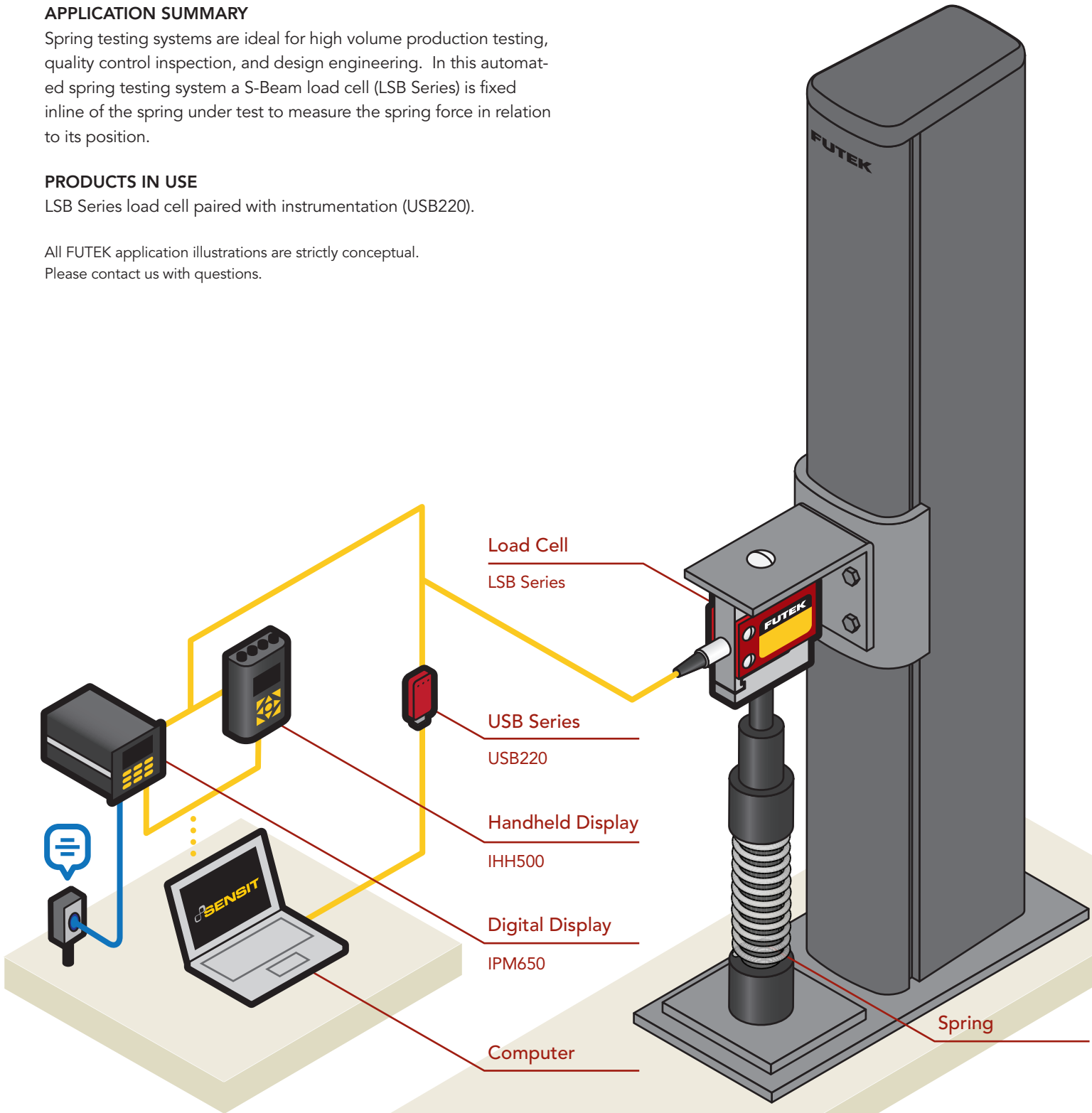
**APPLICATION SUMMARY**

Spring testing systems are ideal for high volume production testing, quality control inspection, and design engineering. In this automated spring testing system a S-Beam load cell (LSB Series) is fixed inline of the spring under test to measure the spring force in relation to its position.

**PRODUCTS IN USE**

LSB Series load cell paired with instrumentation (USB220).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.





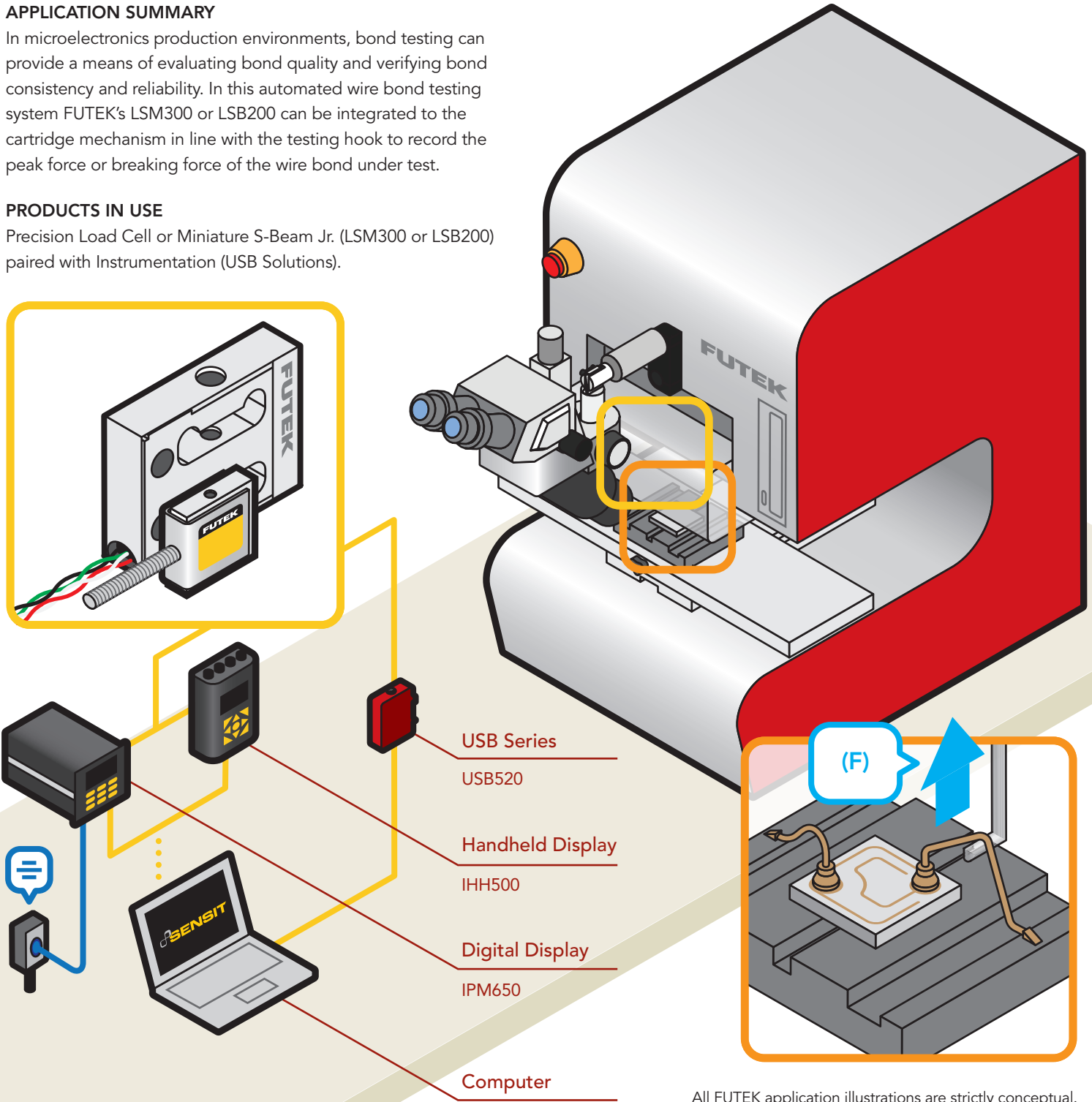


**APPLICATION SUMMARY**

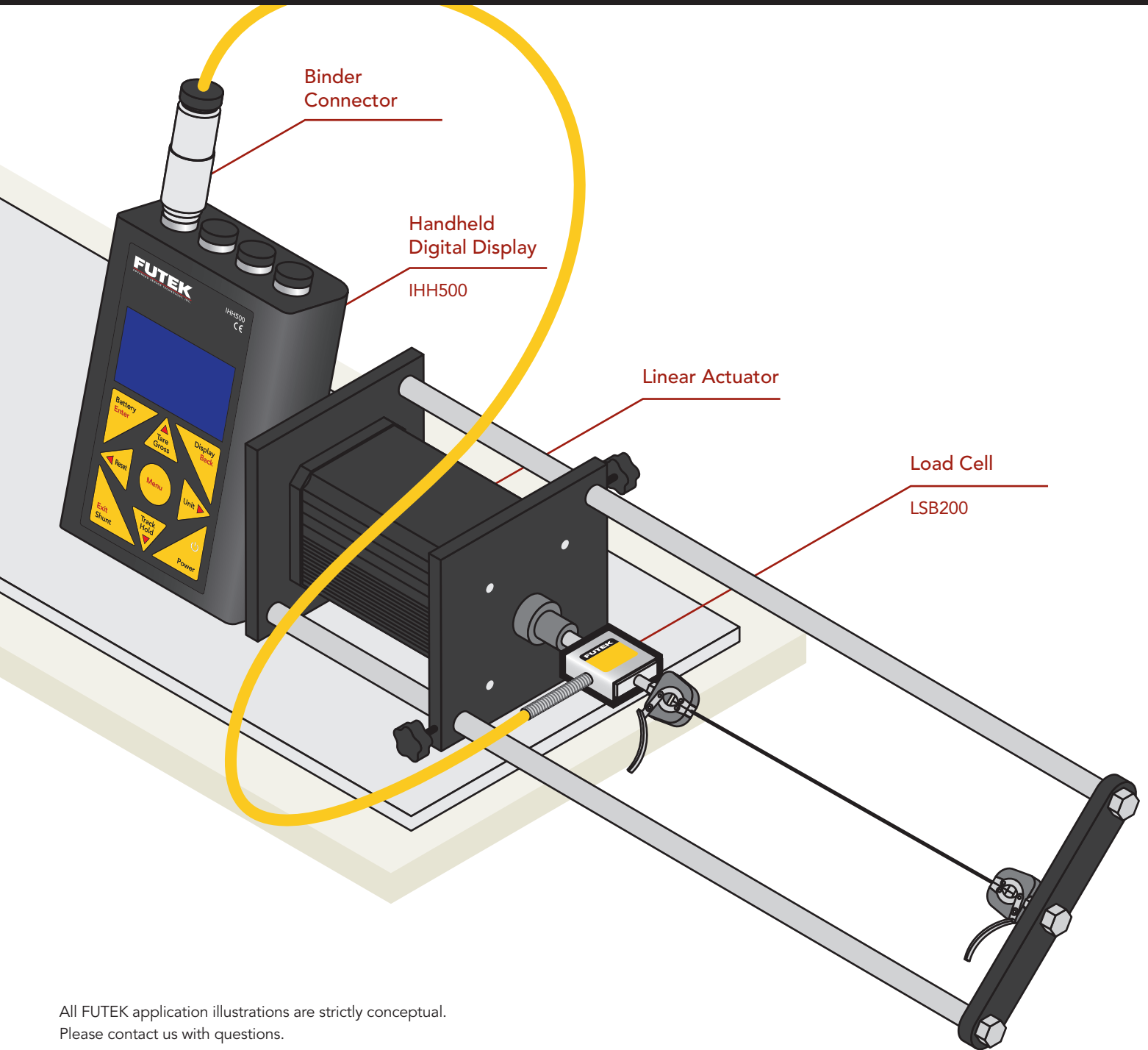
In microelectronics production environments, bond testing can provide a means of evaluating bond quality and verifying bond consistency and reliability. In this automated wire bond testing system FUTEK's LSM300 or LSB200 can be integrated to the cartridge mechanism in line with the testing hook to record the peak force or breaking force of the wire bond under test.

**PRODUCTS IN USE**

Precision Load Cell or Miniature S-Beam Jr. (LSM300 or LSB200) paired with Instrumentation (USB Solutions).



All FUTEK application illustrations are strictly conceptual.  
Please contact us with questions.



All FUTEK application illustrations are strictly conceptual.  
Please contact us with questions.

**APPLICATION SUMMARY**

In the medical industry, guidewire testing can provide a means of evaluating material quality, and core wire consistency and reliability. In this automated guidewire testing system FUTEK's LSB200 Miniature S-Beam Load Cell is integrated to the wire clamp, guided by an actuator, to record the peak force or breaking force of the guidewire under test.

**PRODUCTS IN USE**

Miniature S-Beam Jr. (LSB200) paired with Instrumentation (IHH500 or USB Solutions).

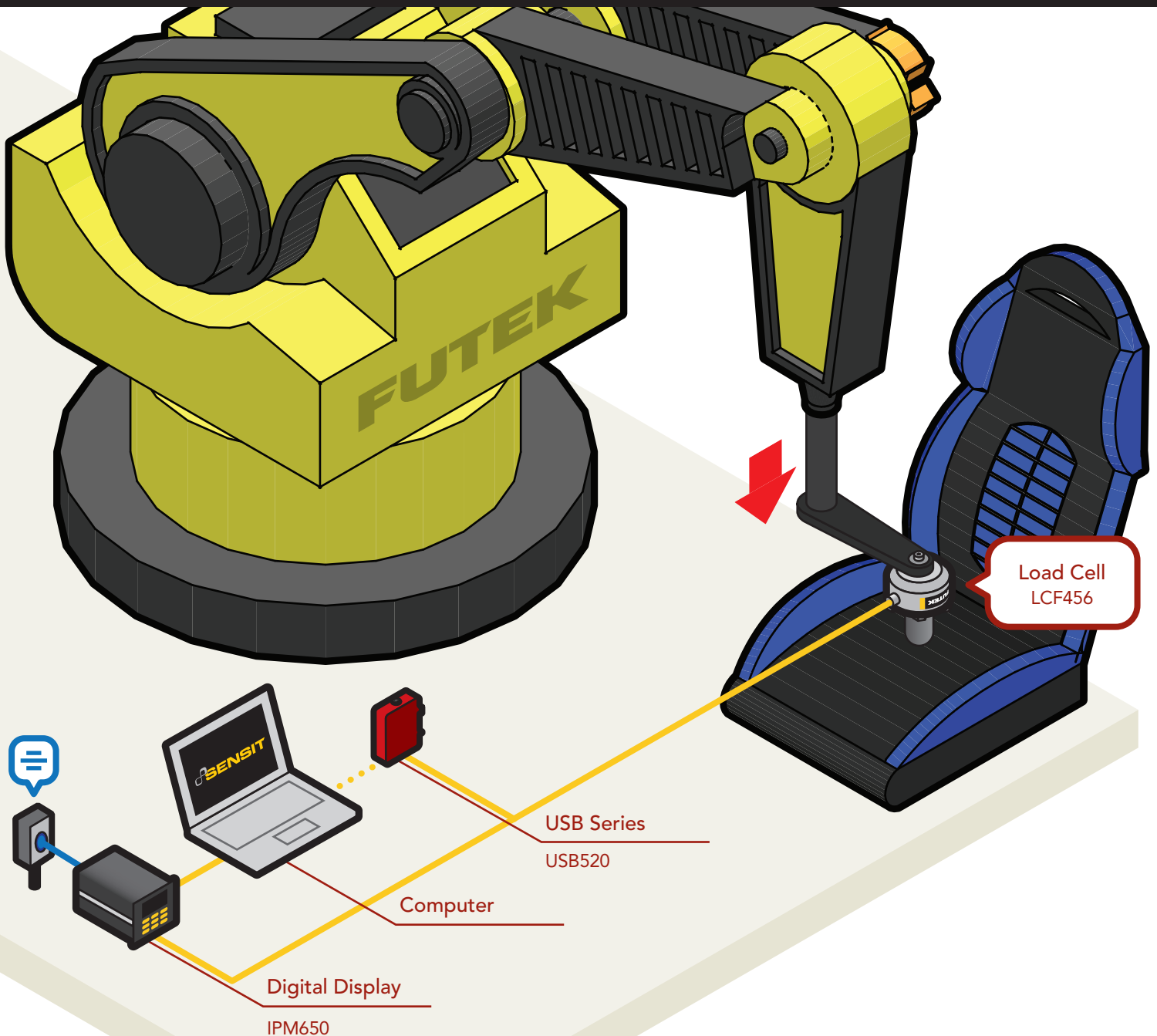
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U.S. Manufacturer



**PRODUCTS IN USE**

Pancake Load Cell (LCF456) paired with Instrumentation (USB Solutions or IPM650 Panel Mount).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

**APPLICATION SUMMARY**

In the automotive industry, robots are used to cycle test seats for wear and durability. Automakers research how people of all shapes and sizes affect the upholstery, seat cushions and seat structures over the life of the vehicle. FUTEK's Fatigue Rated Pancake Load Cell LCF456 is integrated into the custom testing robot to quantify data of the compression force placed onto a seat.

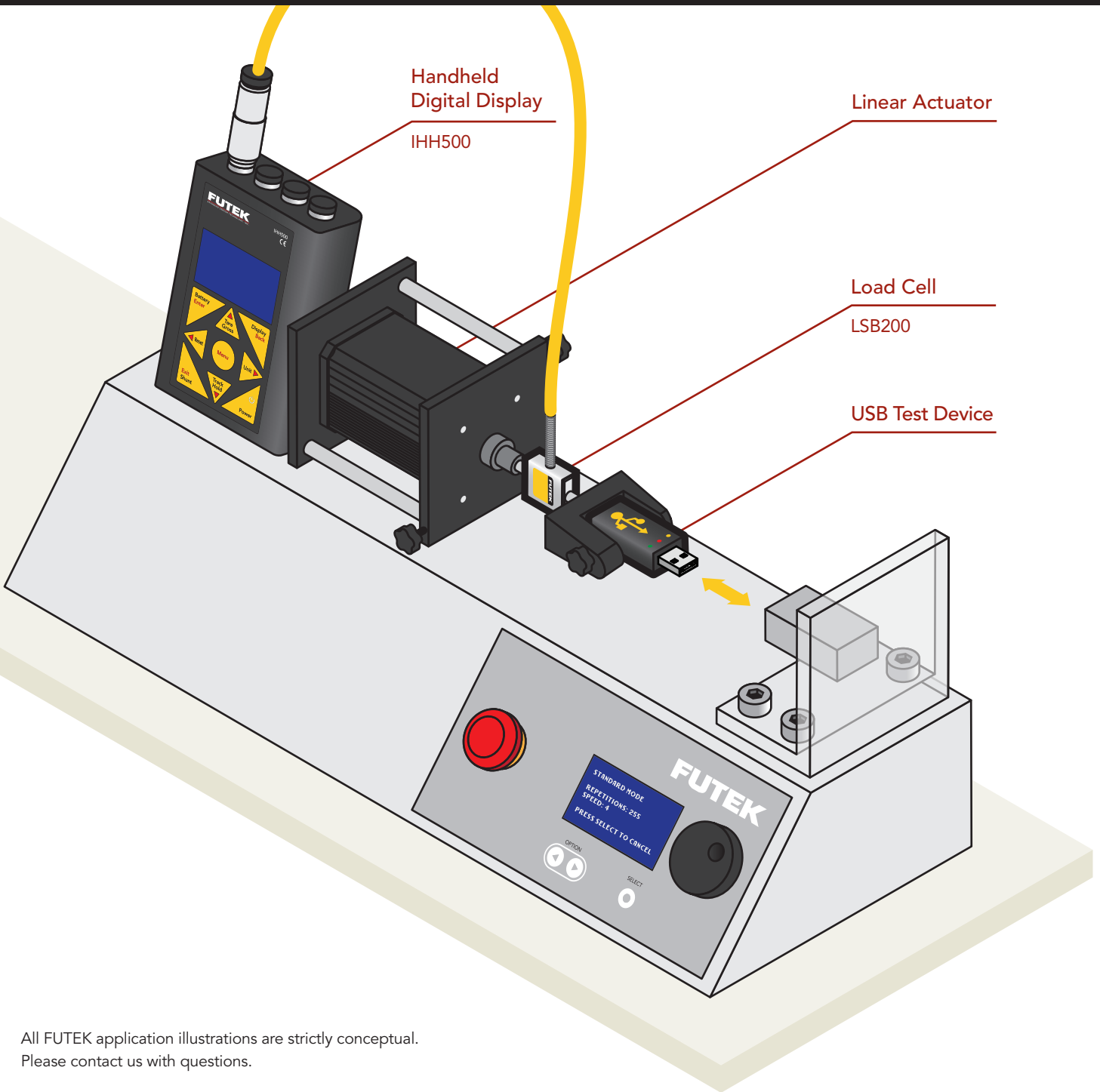
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U.S. Manufacturer



All FUTEK application illustrations are strictly conceptual.  
Please contact us with questions.

**APPLICATION SUMMARY**

Motorized insertion and extraction test are performed to determine the durability of a USB thumb-drive. Configuring the test stand with a FUTEK load cell (the LSB200 or LRM200) enables test engineers to quantify the exact force needed to insert or extract a USB connector over time.

**PRODUCTS IN USE**

Miniature S-Beam Load Cell (LSB200) or Miniature S Beam Load Cell with Male Thread (LRM200) paired with Instrumentation (IHH500).

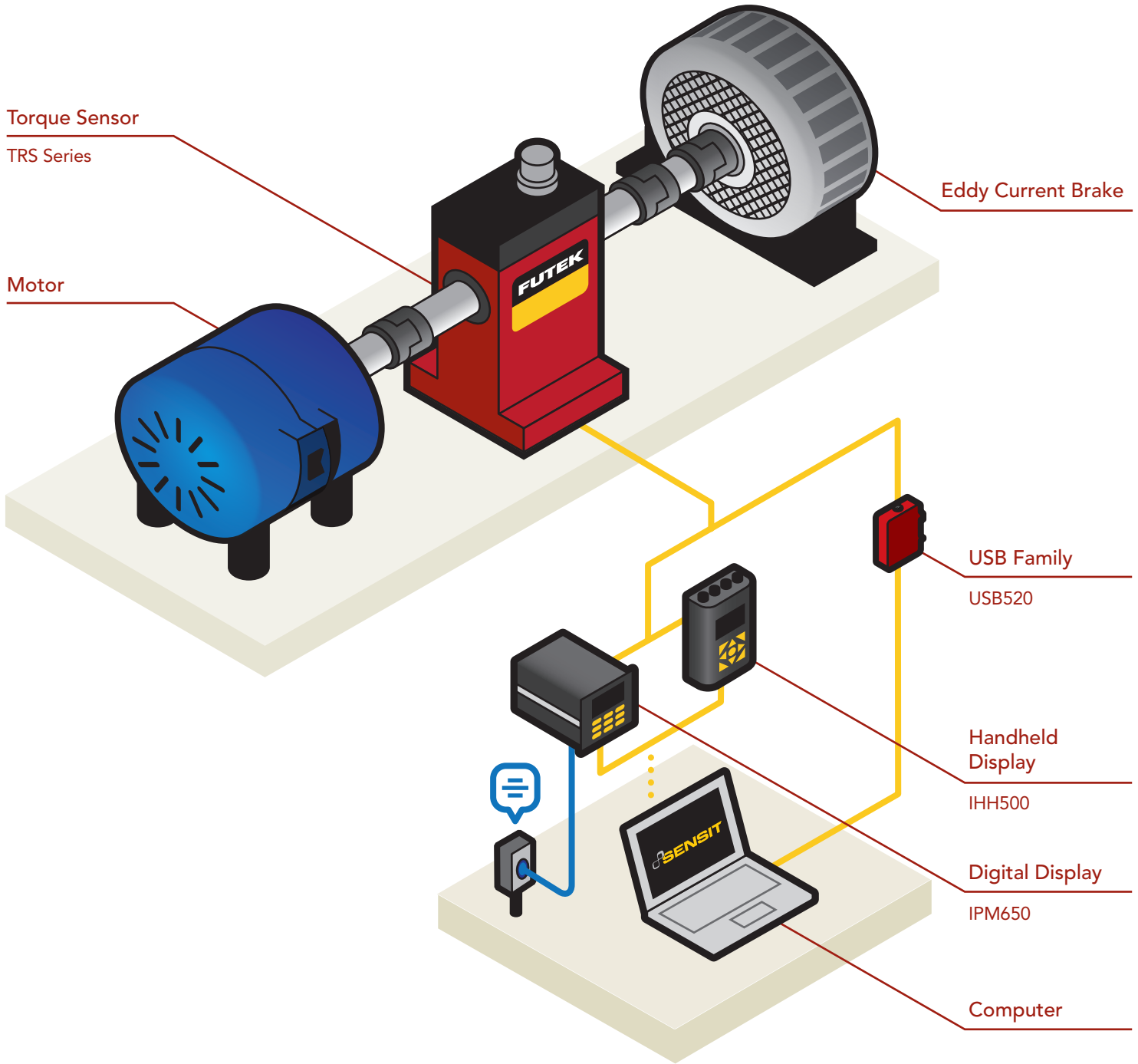
**Sensor Solution Source**

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U.S. Manufacturer



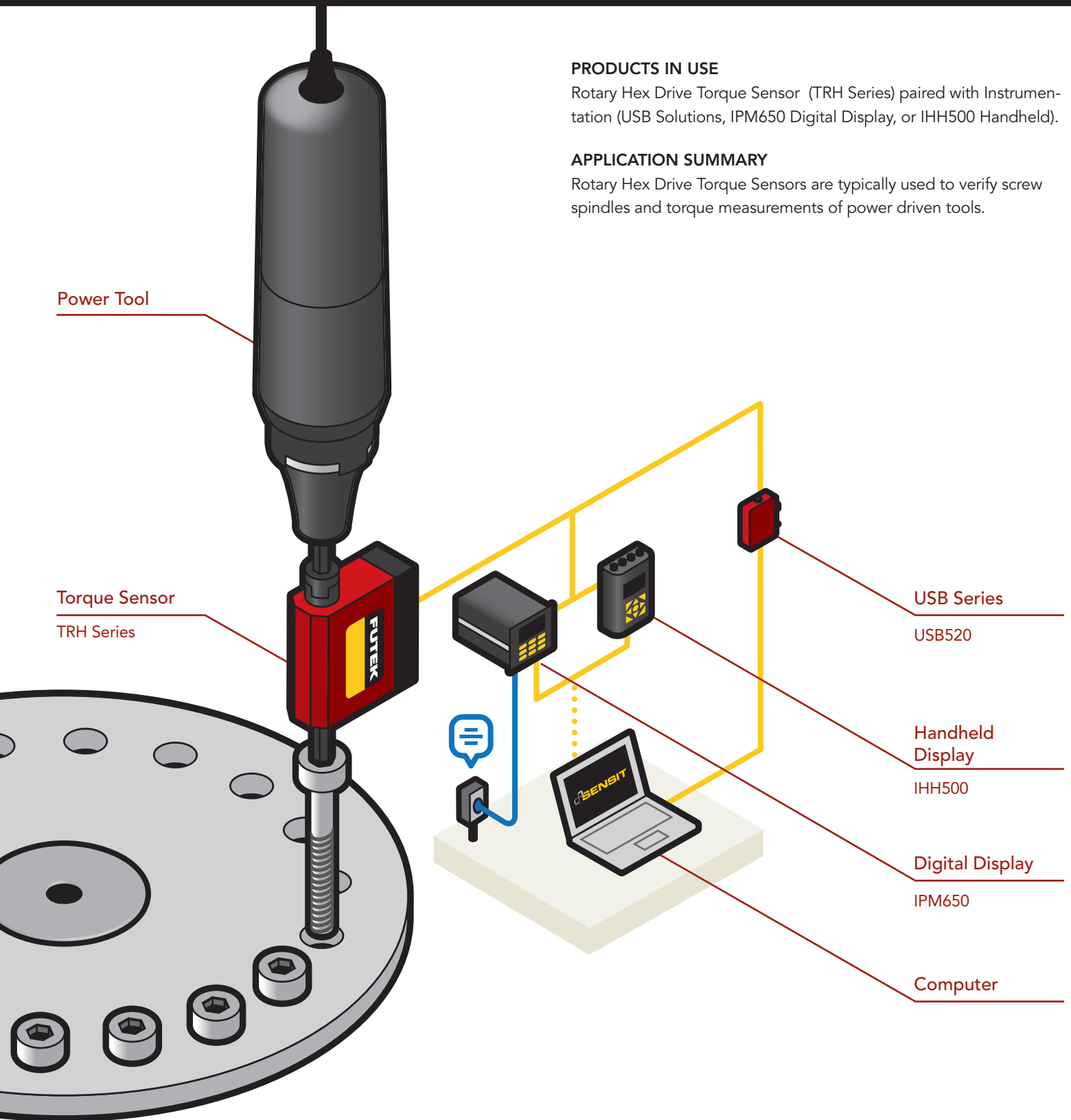
**PRODUCTS IN USE**

One Rotary Torque Sensor (TRS Series) paired with Instrumentation (IPM650, IHH500 or USB Solution).

**APPLICATION SUMMARY**

Rotary Torque Sensor are frequently used as auditing tools for motors, power tools, turbines, and generators.





**PRODUCTS IN USE**

Rotary Hex Drive Torque Sensor (TRH Series) paired with Instrumentation (USB Solutions, IPM650 Digital Display, or IHH500 Handheld).

**APPLICATION SUMMARY**

Rotary Hex Drive Torque Sensors are typically used to verify screw spindles and torque measurements of power driven tools.



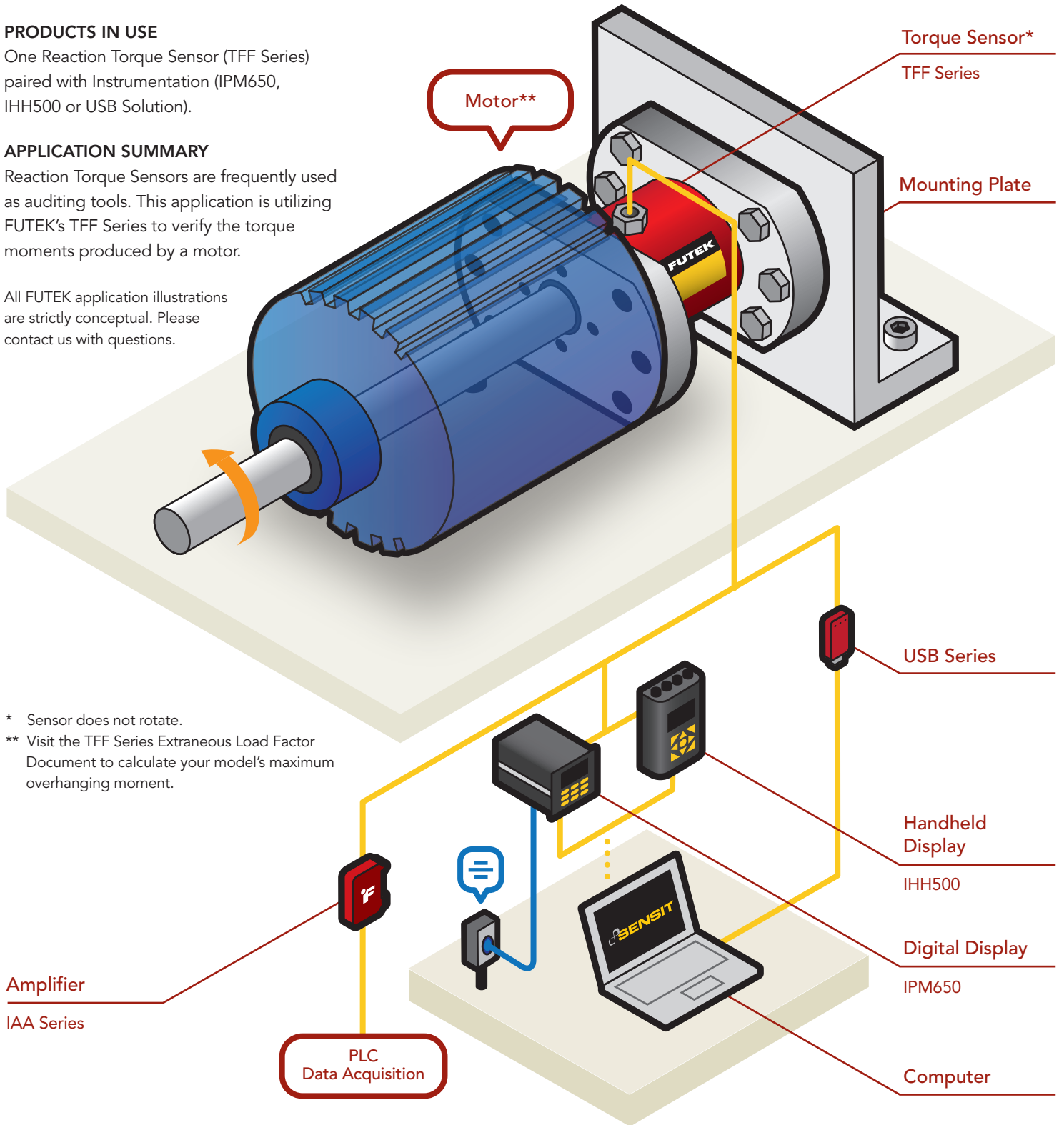
**PRODUCTS IN USE**

One Reaction Torque Sensor (TFF Series) paired with Instrumentation (IPM650, IHH500 or USB Solution).

**APPLICATION SUMMARY**

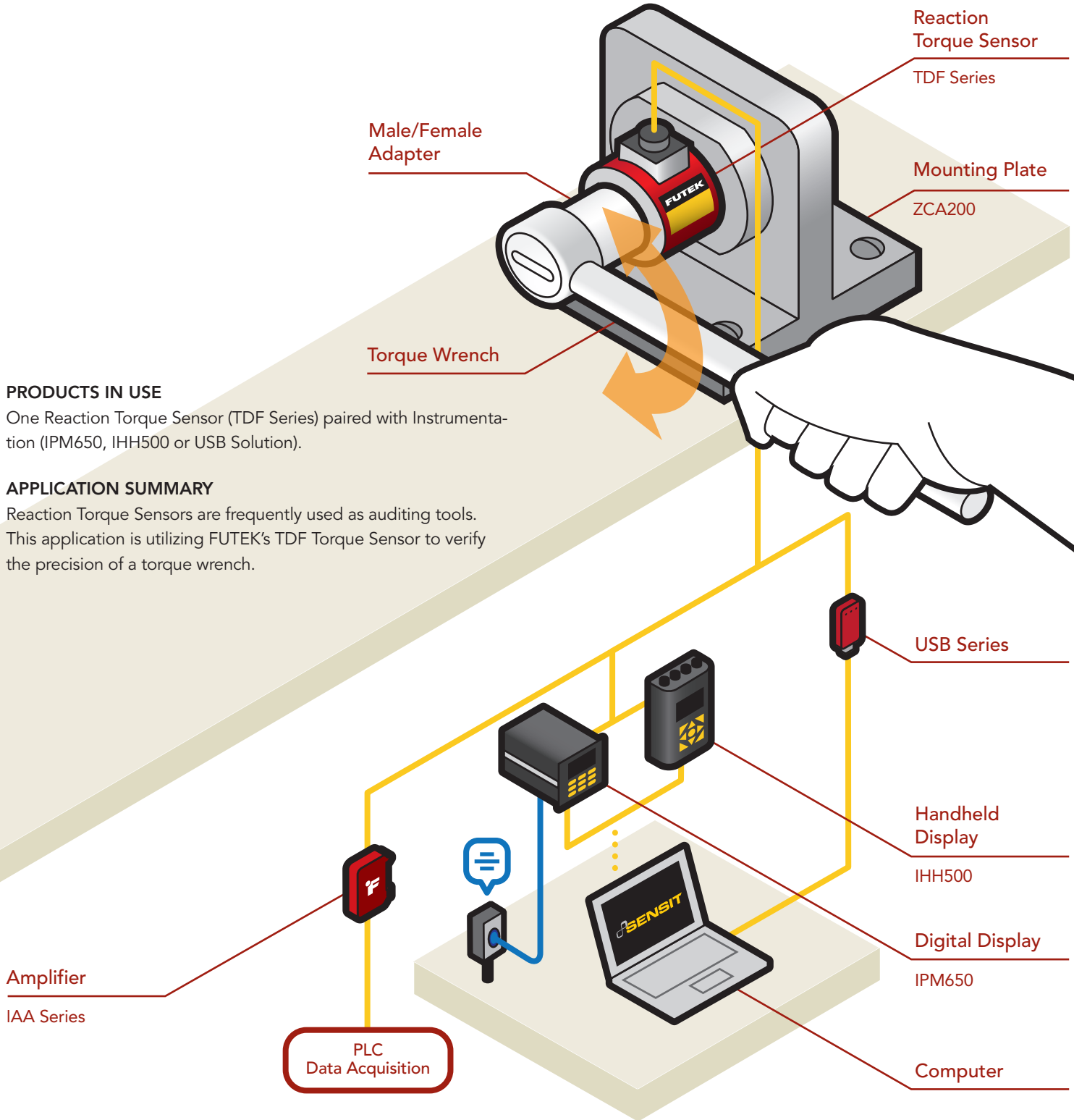
Reaction Torque Sensors are frequently used as auditing tools. This application is utilizing FUTEK's TFF Series to verify the torque moments produced by a motor.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



\* Sensor does not rotate.

\*\* Visit the TFF Series Extraneous Load Factor Document to calculate your model's maximum overhanging moment.

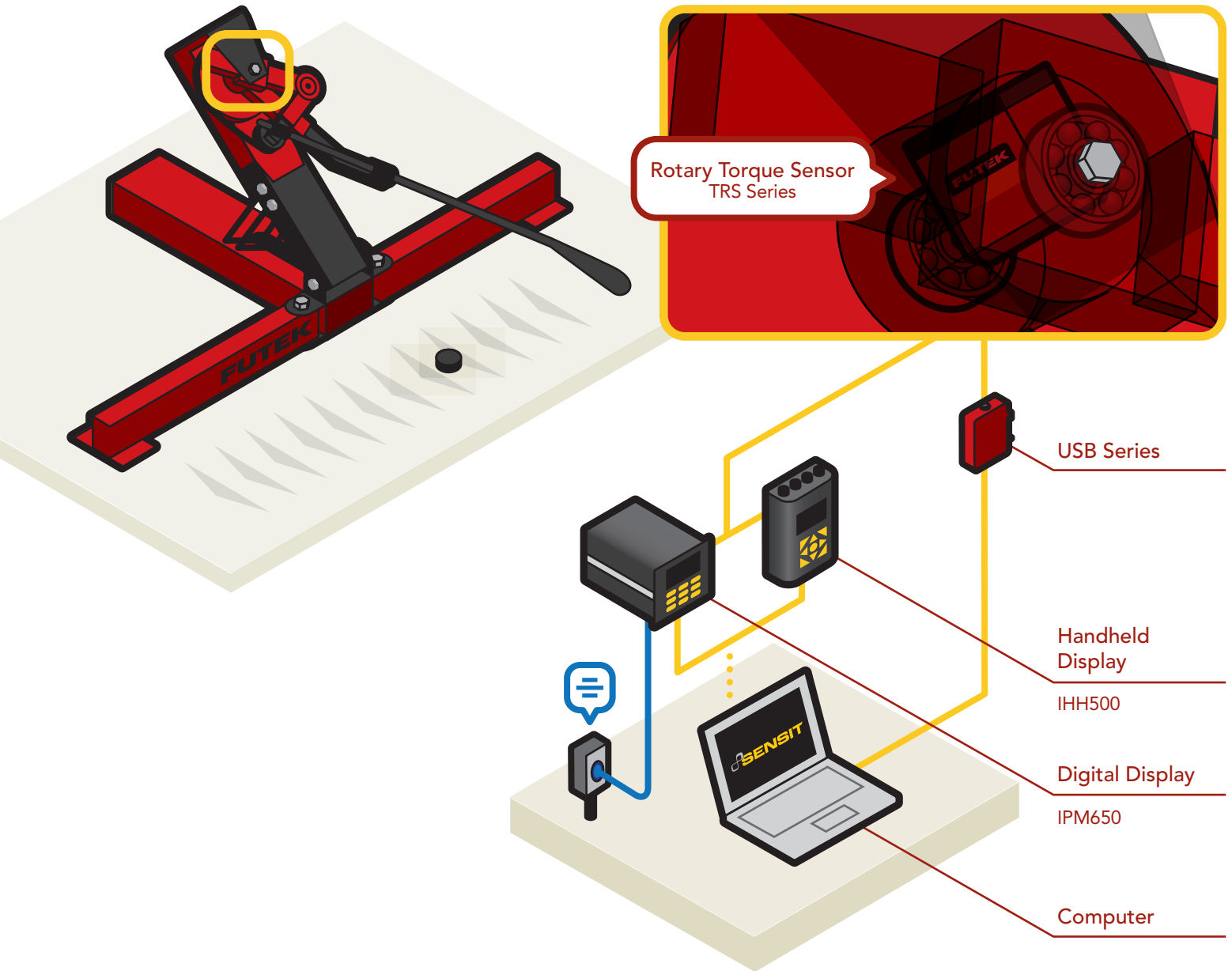


**PRODUCTS IN USE**

One Reaction Torque Sensor (TDF Series) paired with Instrumentation (IPM650, IHH500 or USB Solution).

**APPLICATION SUMMARY**

Reaction Torque Sensors are frequently used as auditing tools. This application is utilizing FUTEK's TDF Torque Sensor to verify the precision of a torque wrench.



**PRODUCTS IN USE**

Non-Contact Shaft-to-Shaft Rotary Torque Sensor paired with Instrumentation (IHH500, IPM650, and USB Solutions).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

**APPLICATION SUMMARY**

Robotic systems are often used in industrial plants but in this example how a robotic arm is creatively used in sports endurance application. The robotic arm mimics the slap shot of a hockey player and with the assistance of rotary torque sensors. Engineers can measure the force exerted at the tip of the hockey stick on various hockey sticks over high cycle testing. Data can be collected and analyzed to optimize or verify the stick design.

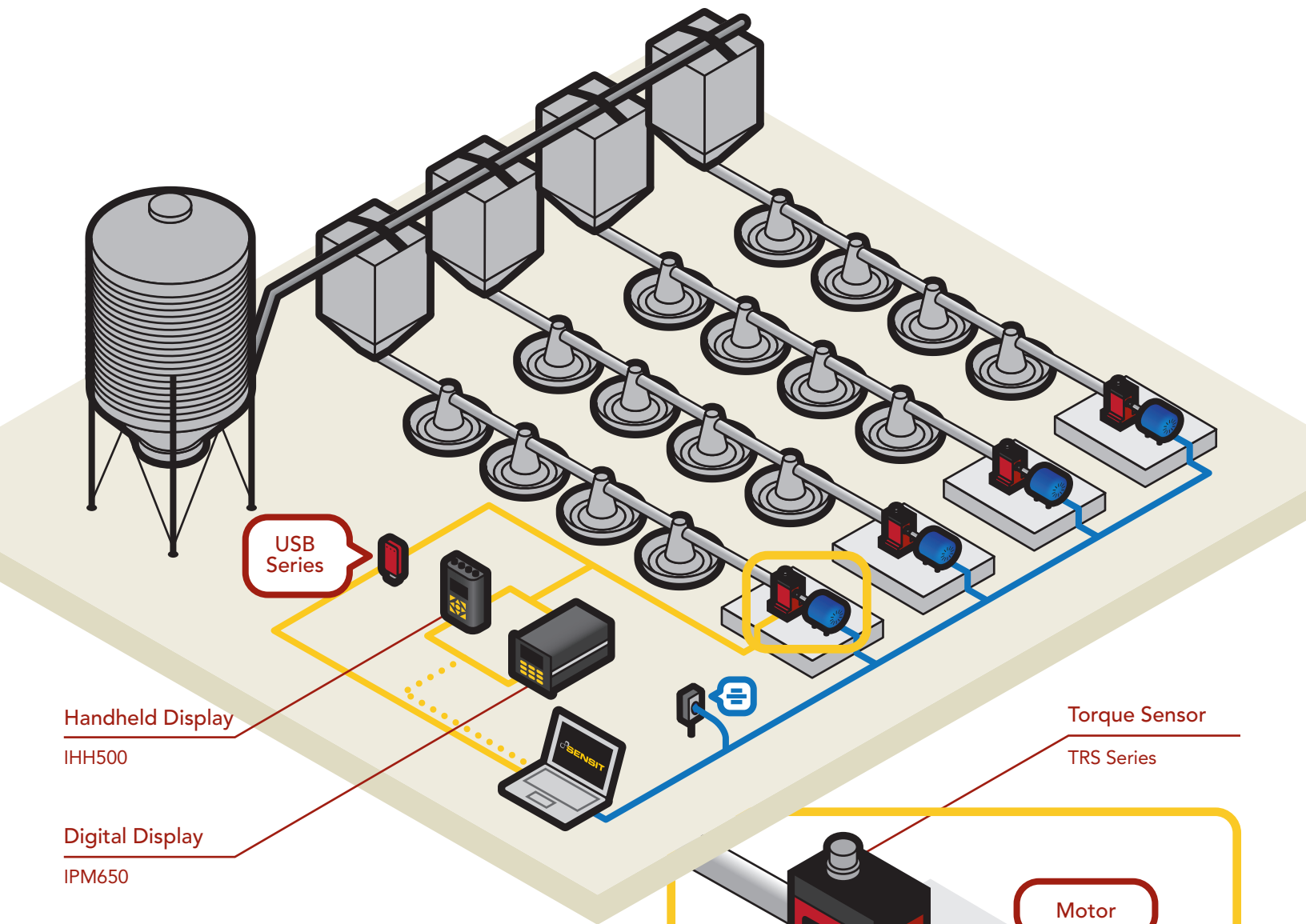
**Sensor Solution Source**

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U.S. Manufacturer



Handheld Display  
IHH500

Digital Display  
IPM650

Torque Sensor  
TRS Series

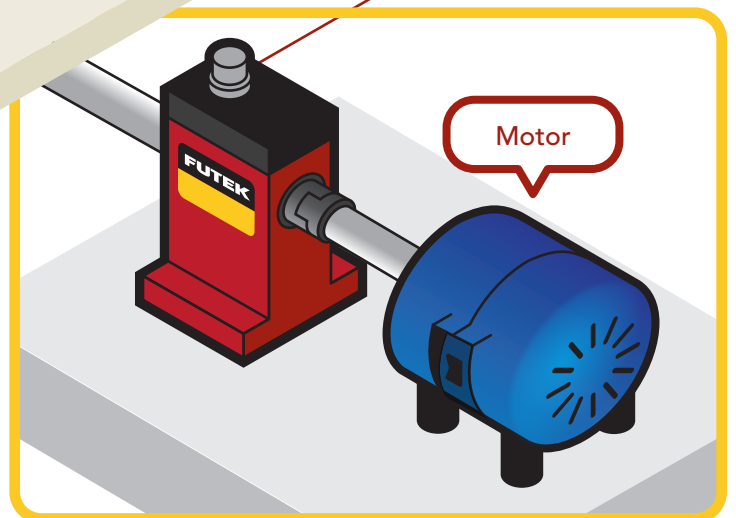
**APPLICATION SUMMARY**

Agricultural poultry feeders are responsible for the equal distribution of feed throughout a poultry house. Agricultural engineers often implement rotary torque sensors to monitor the motors operating each feeder.

**PRODUCTS IN USE**

Rotary Torque Sensor (TRS Series) paired within Instrumentation (IPM650, IHH500, or USB Solutions).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



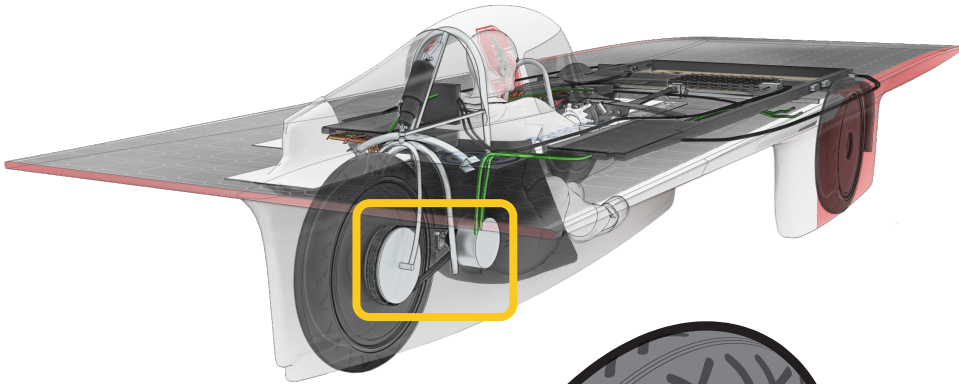
**Sensor Solution Source**

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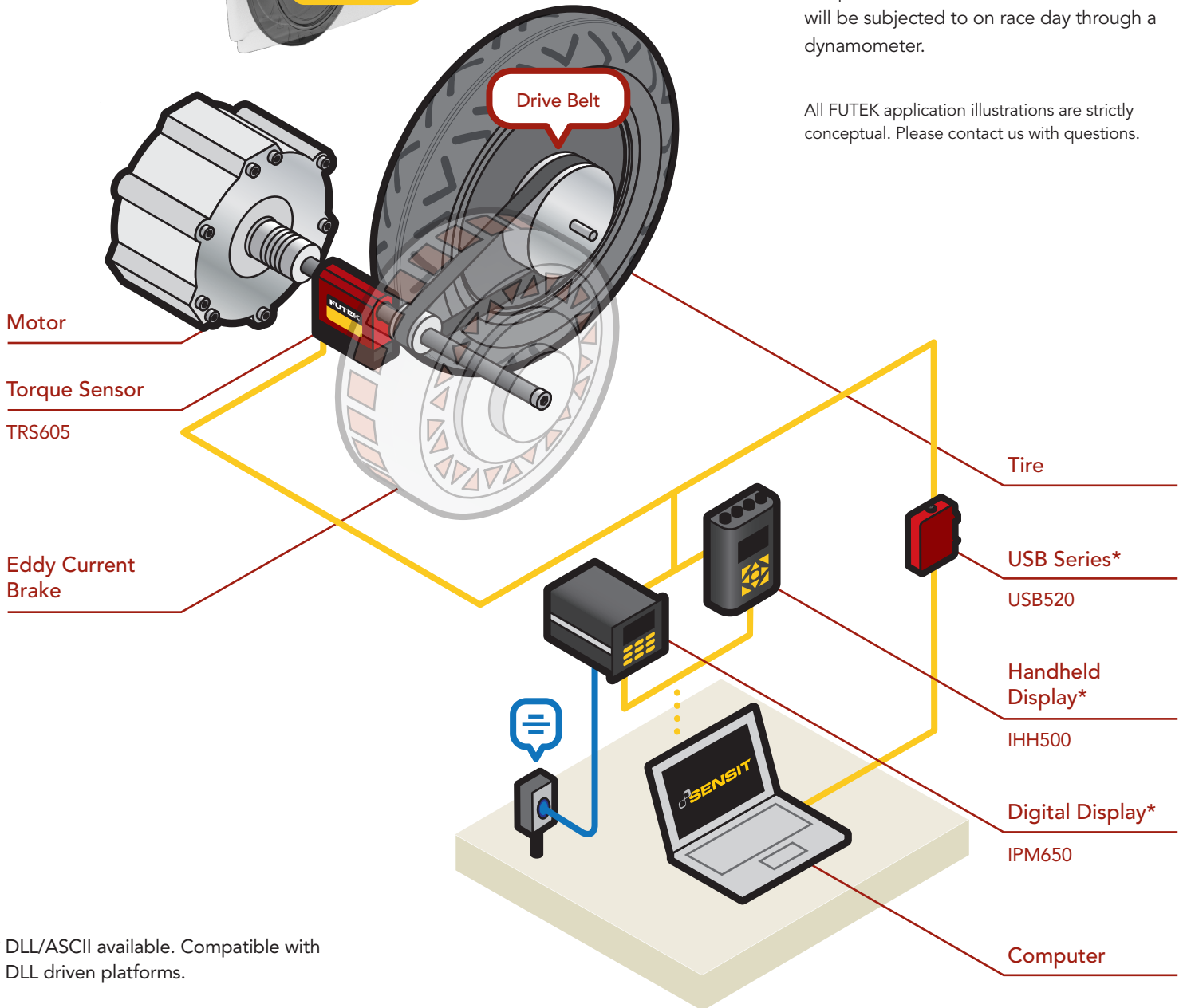
**PRODUCTS IN USE**

One Shaft-to-Shaft Rotary Torque Sensor (TRS Series) paired with Instrumentation (IPM650, IHH500 or USB Solution).

**APPLICATION SUMMARY**

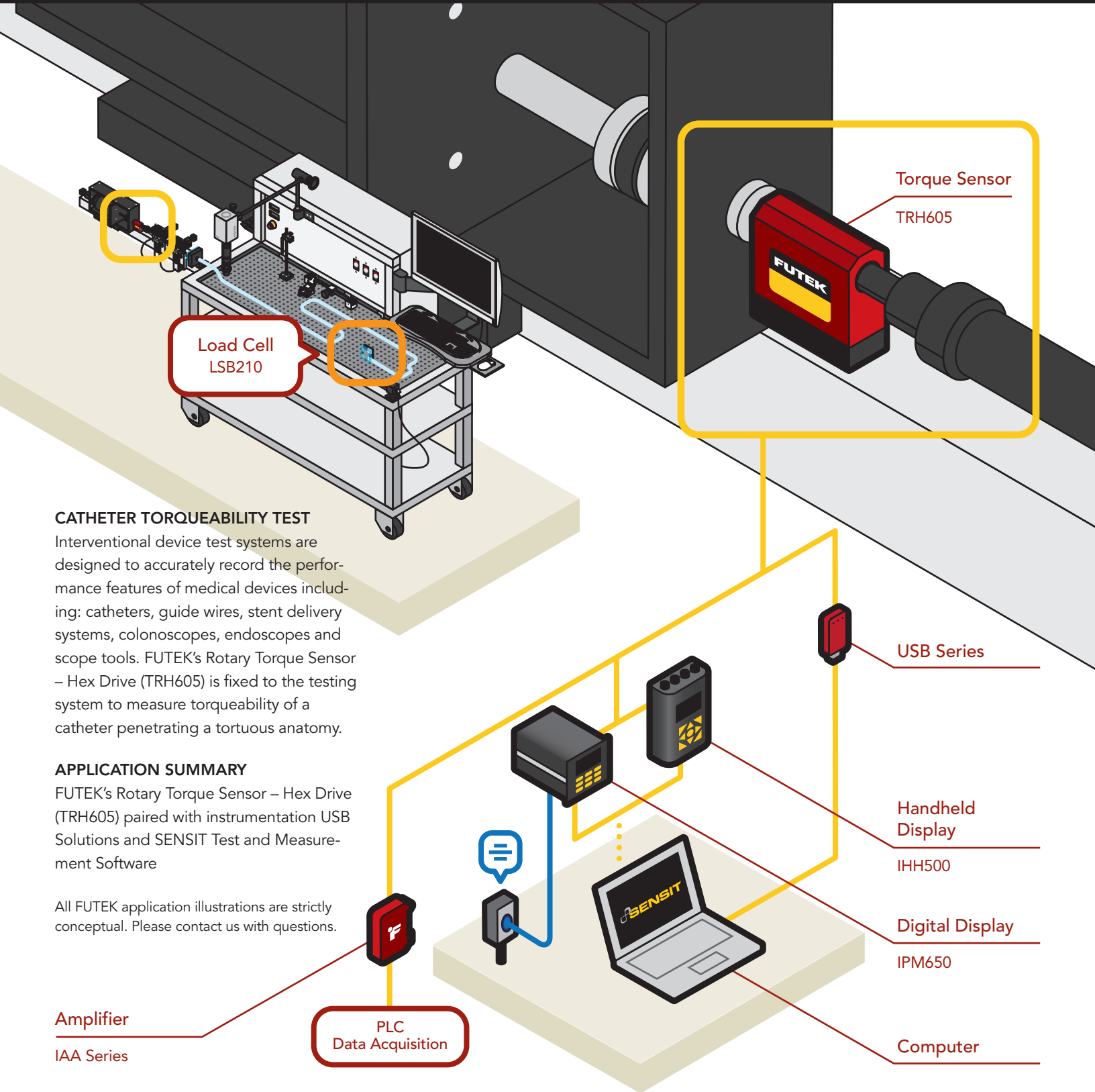
Stanford's 2013 Solar Car Project team utilized FUTEK's Shaft-to-Shaft Rotary Torque Sensor to emulate what the motor will be subjected to on race day through a dynamometer.

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



\* DLL/ASCII available. Compatible with DLL driven platforms.





Torque Sensor  
TRH605

Load Cell  
LSB210

**CATHETER TORQUEABILITY TEST**

Interventional device test systems are designed to accurately record the performance features of medical devices including: catheters, guide wires, stent delivery systems, colonoscopes, endoscopes and scope tools. FUTEK's Rotary Torque Sensor – Hex Drive (TRH605) is fixed to the testing system to measure torqueability of a catheter penetrating a tortuous anatomy.

**APPLICATION SUMMARY**

FUTEK's Rotary Torque Sensor – Hex Drive (TRH605) paired with instrumentation USB Solutions and SENSIT Test and Measurement Software

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

Amplifier  
IAA Series

PLC  
Data Acquisition

USB Series

Handheld  
Display  
IHH500

Digital Display  
IPM650

Computer

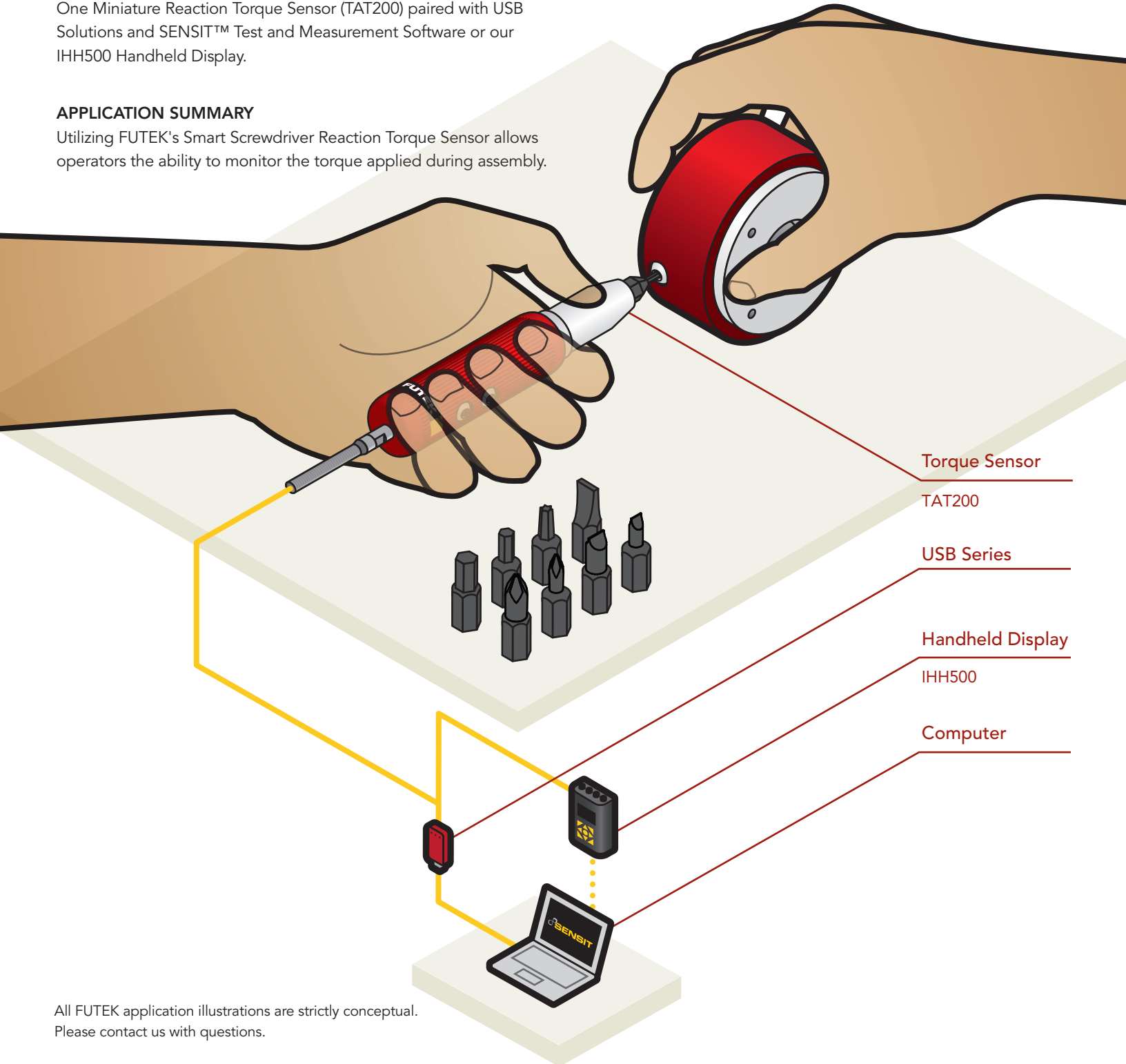


**PRODUCTS IN USE**

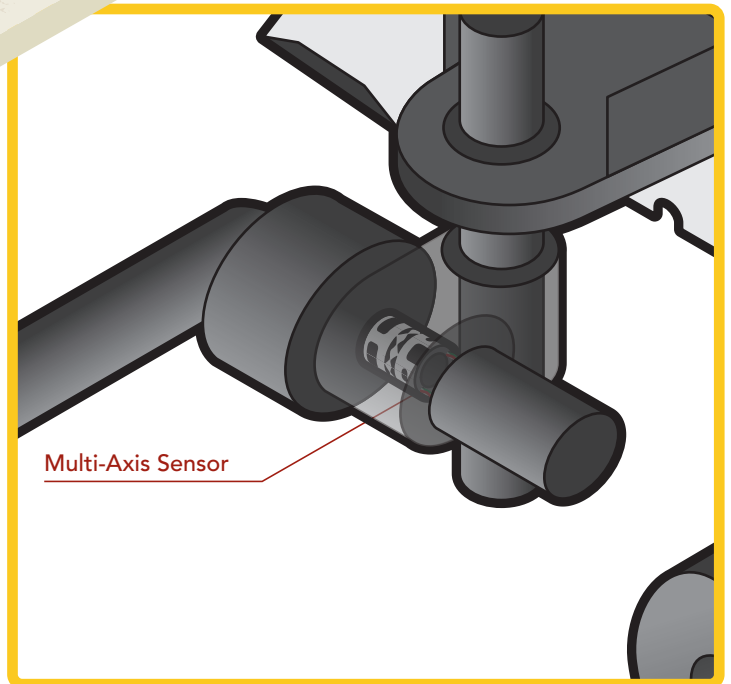
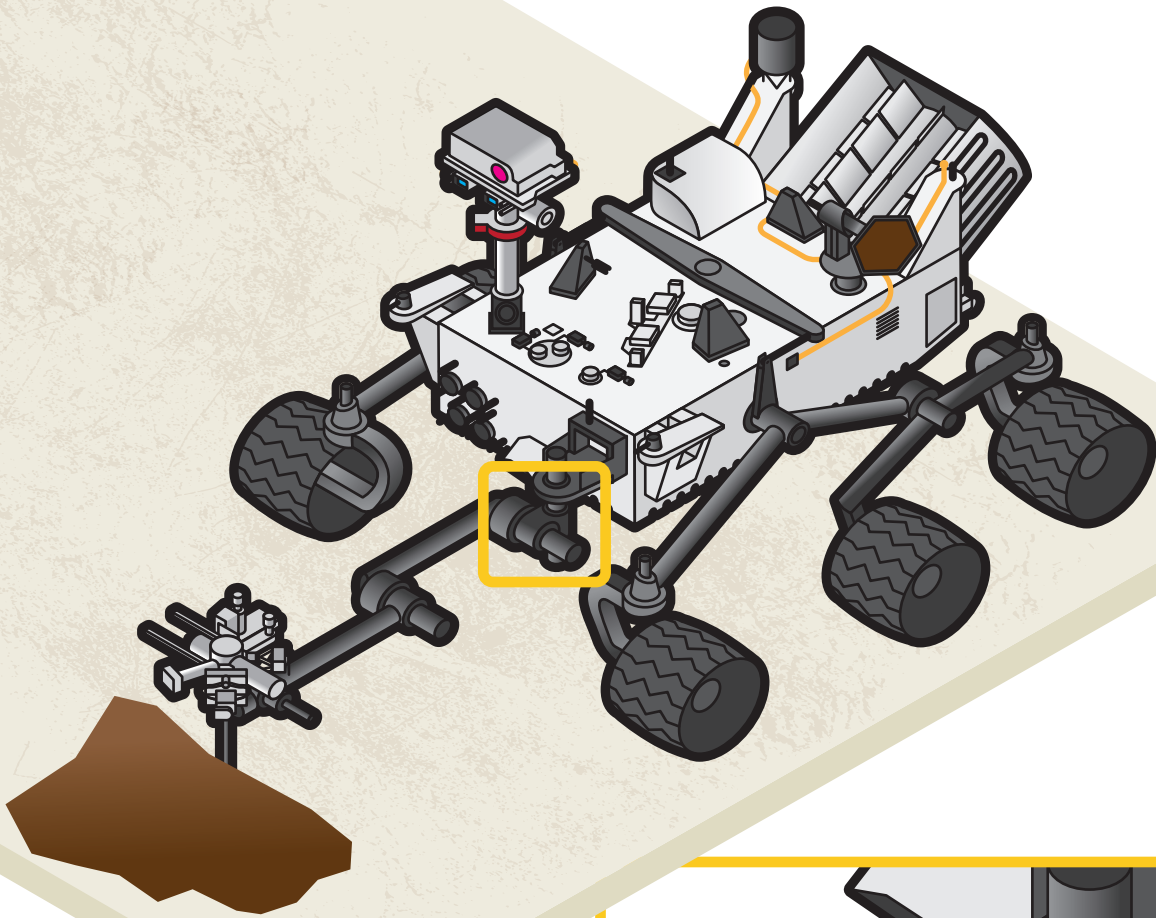
One Miniature Reaction Torque Sensor (TAT200) paired with USB Solutions and SENSIT™ Test and Measurement Software or our IHH500 Handheld Display.

**APPLICATION SUMMARY**

Utilizing FUTEK's Smart Screwdriver Reaction Torque Sensor allows operators the ability to monitor the torque applied during assembly.



All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



**PRODUCTS IN USE**

NASA JPL space/flight qualified cryogenic dualbridge donut load cell and a space/flight qualified cryogenic 3-component multi-axial sensor.

**APPLICATION SUMMARY**

FUTEK developed two cryogenic sensors to operate aboard the rover. The donut load cell directly operates within *Curiosity's* drilling arm. It stands responsible to monitor the drill bit's force as it pierces into the Martian ground. The multi-axial load and torque sensor is responsible for the maneuvers of the robotic arm. Both of these sensors were specifically designed for the Mars Rover *Curiosity* mission.

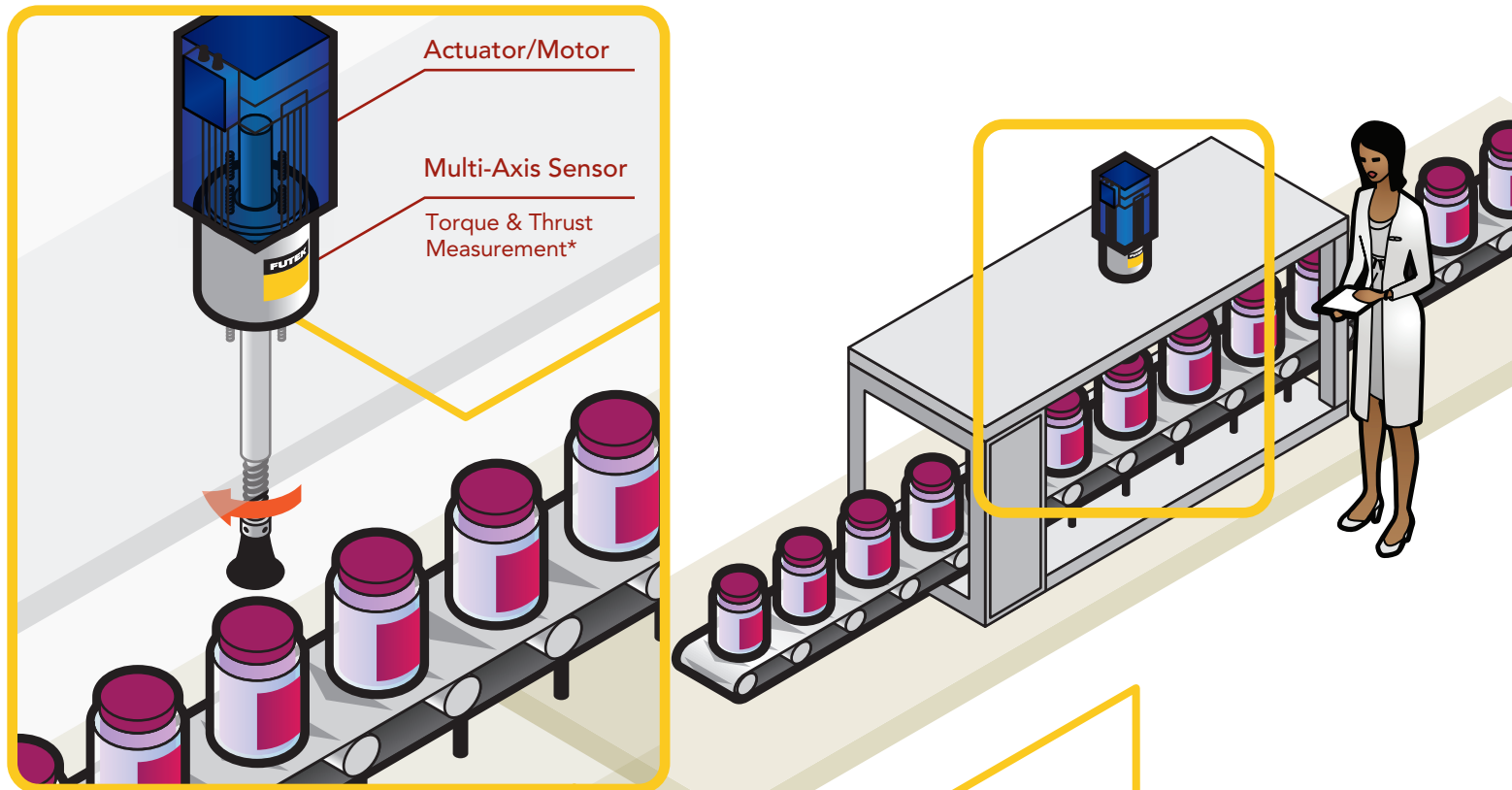
**Sensor Solution Source**

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**APPLICATION SUMMARY**

Utilizing a multi-axial sensor within an automated manufacturing line, such as a capping press, ensures precision and consistency.

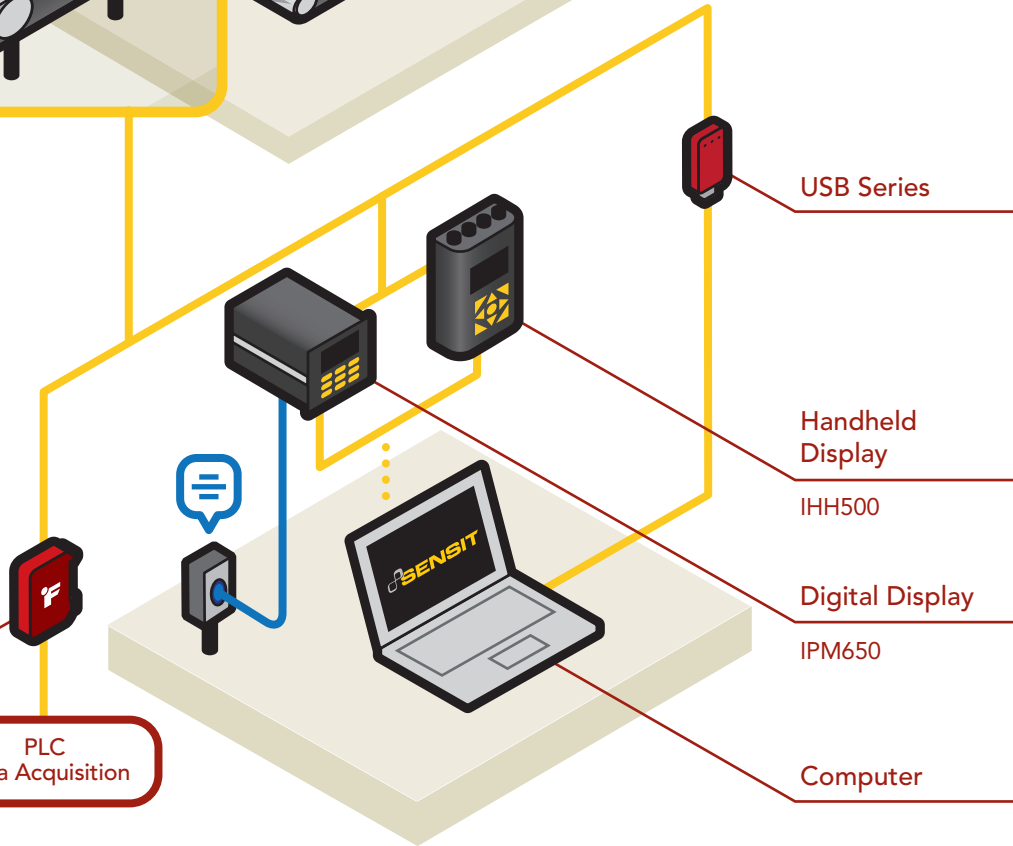
**PRODUCTS IN USE**

A Bi-Axial Sensor, measuring torque and thrust, paired within Instrumentation (IAA analog amplifier, IPM650, IHH500, USB Solutions).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.

**Amplifier**  
IAA Series

**PLC**  
Data Acquisition

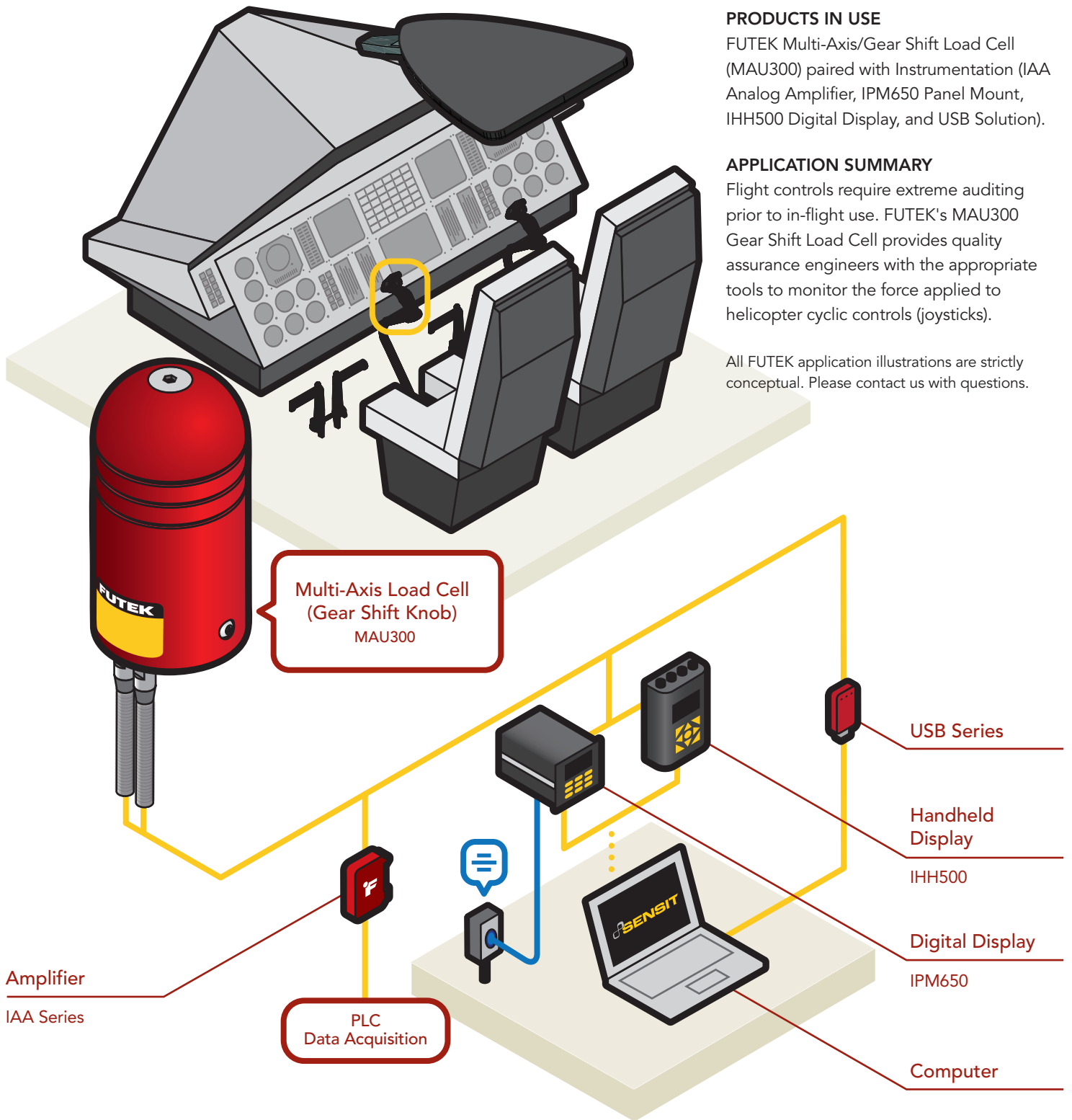


**USB Series**

**Handheld Display**  
IHH500

**Digital Display**  
IPM650

**Computer**



**PRODUCTS IN USE**

FUTEK Multi-Axis/Gear Shift Load Cell (MAU300) paired with Instrumentation (IAA Analog Amplifier, IPM650 Panel Mount, IHH500 Digital Display, and USB Solution).

**APPLICATION SUMMARY**

Flight controls require extreme auditing prior to in-flight use. FUTEK's MAU300 Gear Shift Load Cell provides quality assurance engineers with the appropriate tools to monitor the force applied to helicopter cyclic controls (joysticks).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.





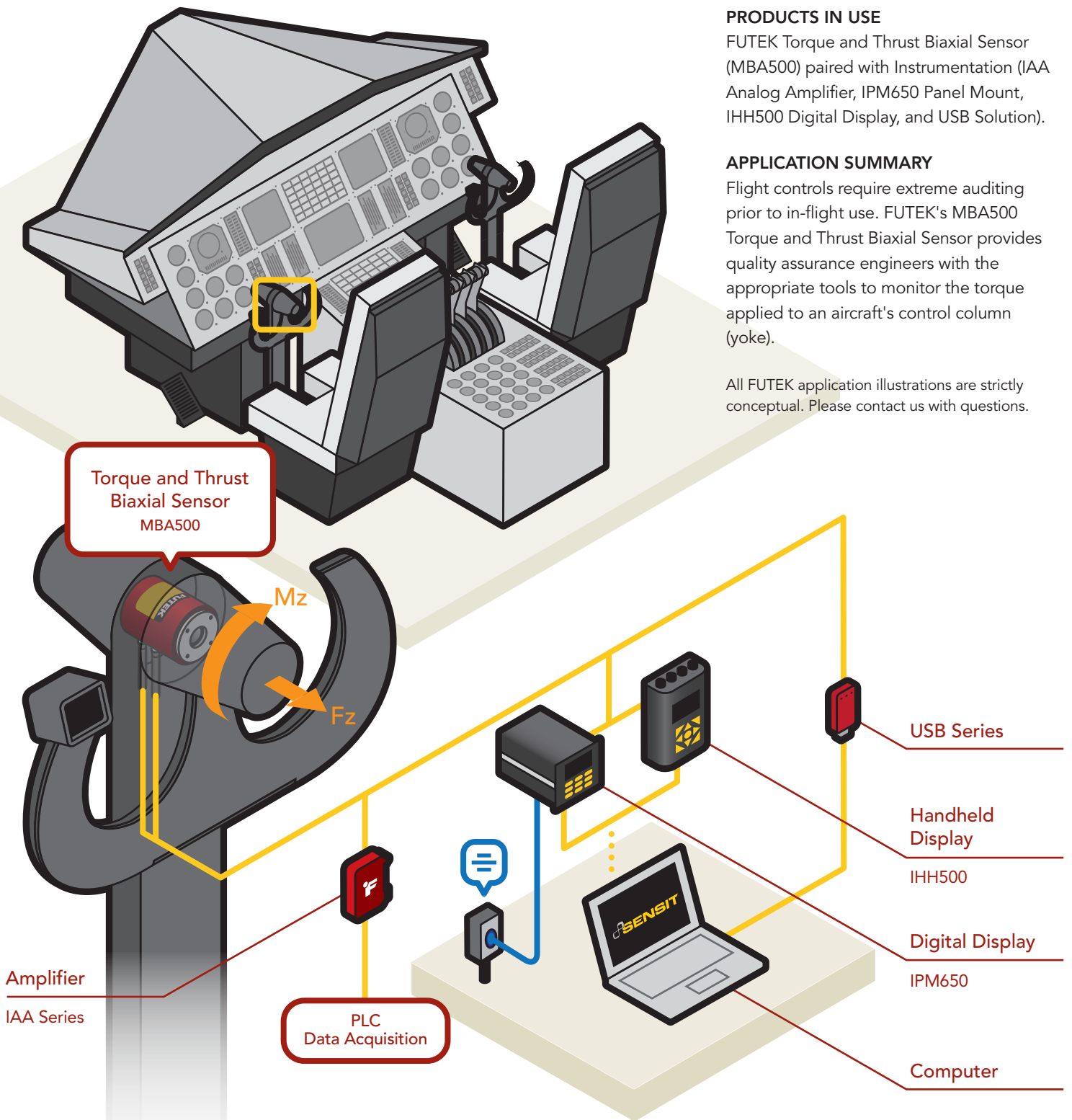
**PRODUCTS IN USE**

FUTEK Torque and Thrust Biaxial Sensor (MBA500) paired with Instrumentation (IAA Analog Amplifier, IPM650 Panel Mount, IHH500 Digital Display, and USB Solution).

**APPLICATION SUMMARY**

Flight controls require extreme auditing prior to in-flight use. FUTEK's MBA500 Torque and Thrust Biaxial Sensor provides quality assurance engineers with the appropriate tools to monitor the torque applied to an aircraft's control column (yoke).

All FUTEK application illustrations are strictly conceptual. Please contact us with questions.





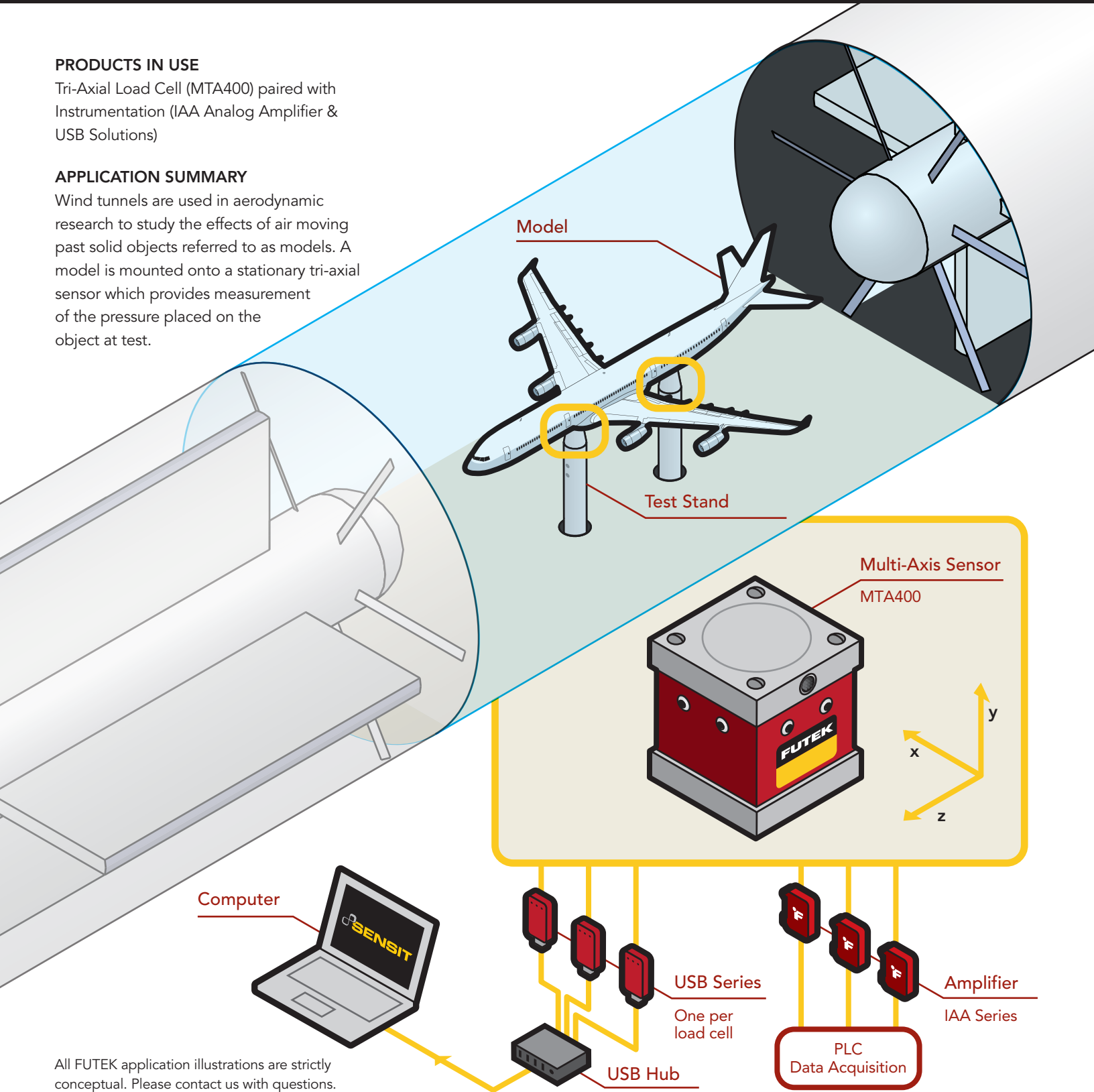


**PRODUCTS IN USE**

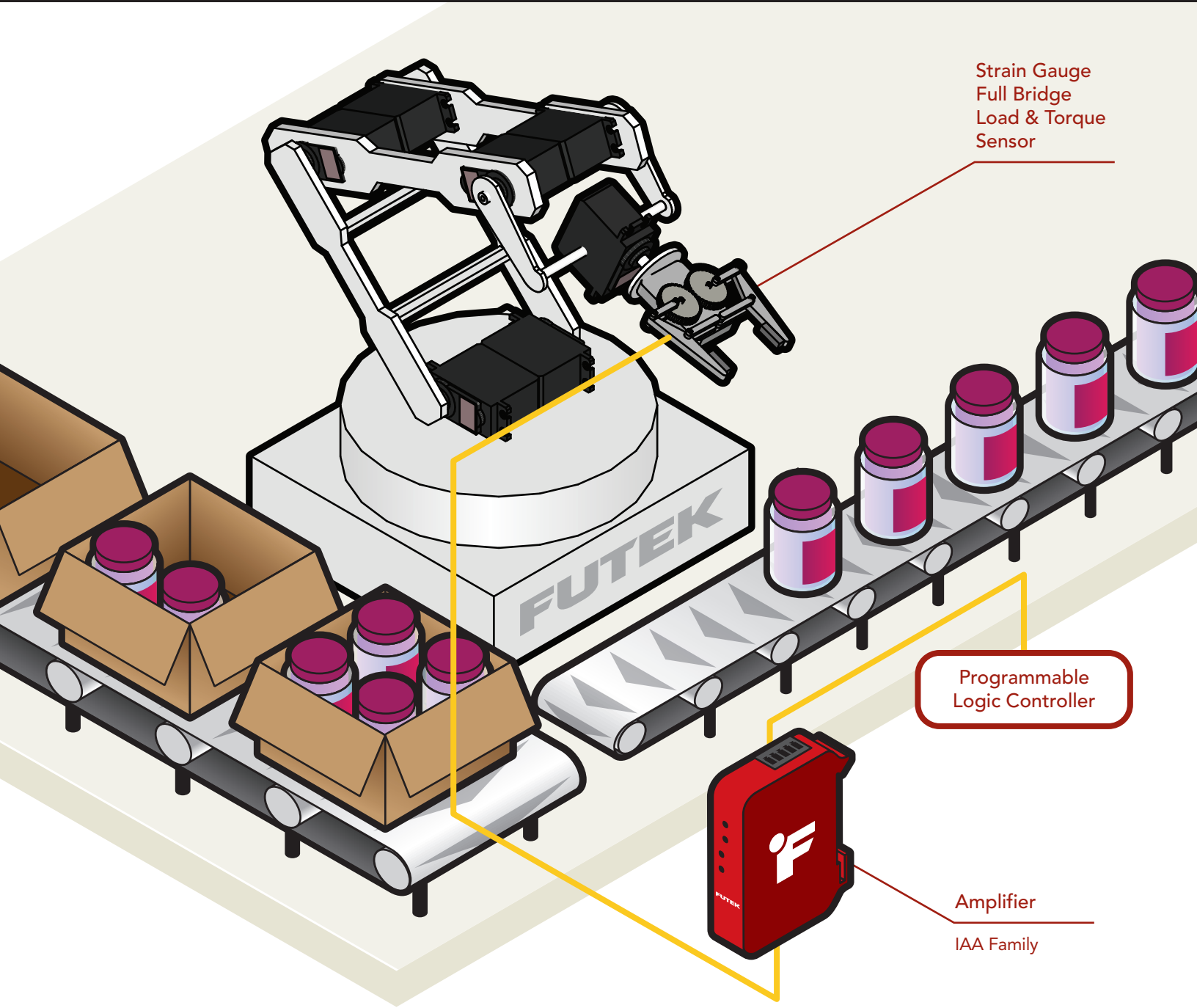
Tri-Axial Load Cell (MTA400) paired with Instrumentation (IAA Analog Amplifier & USB Solutions)

**APPLICATION SUMMARY**

Wind tunnels are used in aerodynamic research to study the effects of air moving past solid objects referred to as models. A model is mounted onto a stationary tri-axial sensor which provides measurement of the pressure placed on the object at test.



All FUTEK application illustrations are strictly conceptual. Please contact us with questions.



### PRODUCTS IN USE

A strain-gauge, full-bridge multi-axial sensor that measures torque and load paired with the IAA100 (voltage) or IAA200 (current).

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### APPLICATION SUMMARY

Industrial robots make assembly lines more efficient and reliable. Paired with a measurement device, operators can use new IAA signal conditioners to send clear, clean signals to logic controllers that govern the speed and position of assembly line machinery.

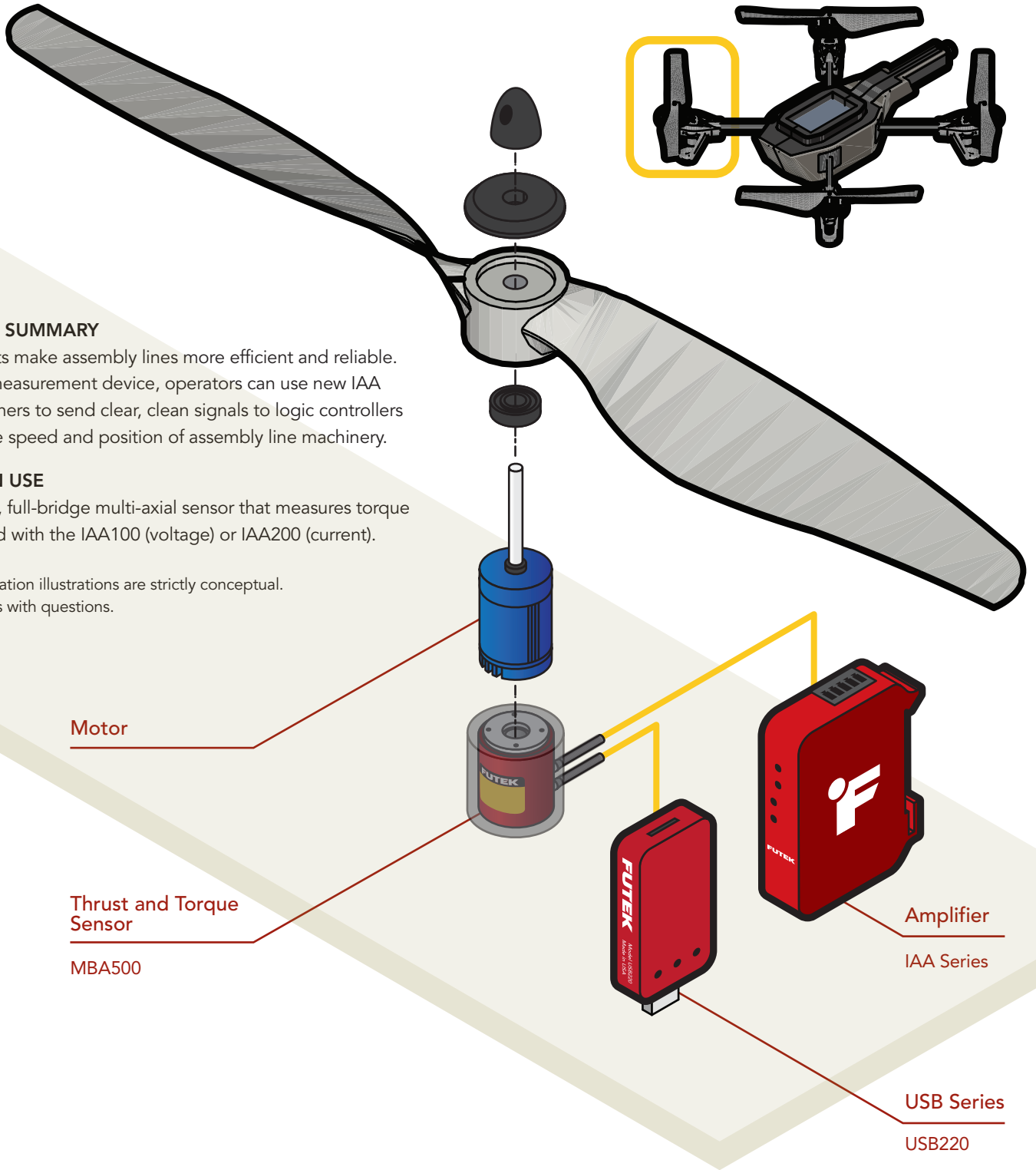
#### Sensor Solution Source

Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

[www.futek.com](http://www.futek.com)



U.S. Manufacturer



**APPLICATION SUMMARY**

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Motor

Thrust and Torque Sensor

MBA500

Amplifier

IAA Series

USB Series

USB220