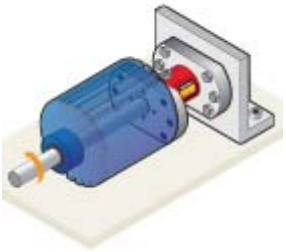
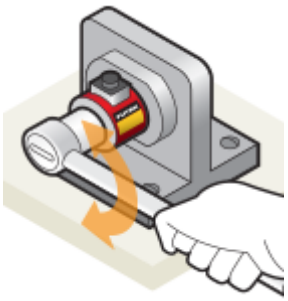
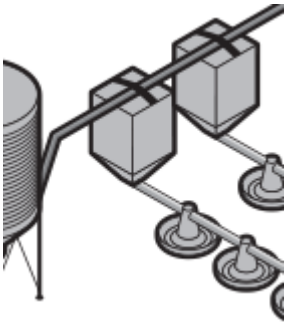
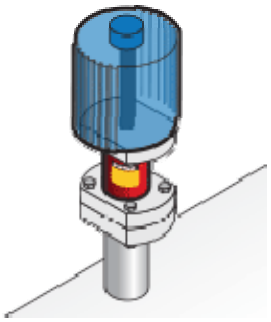
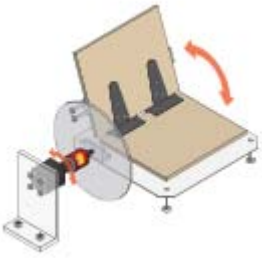
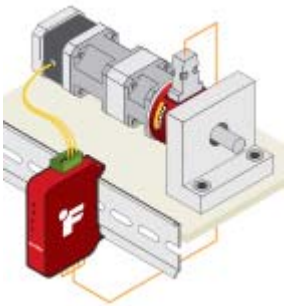
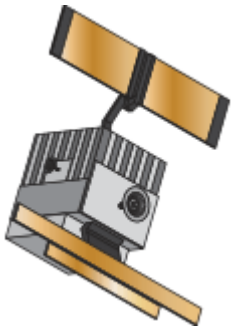
Celle torsionali

Uno dei principali vantaggi di essere una società di soluzioni è una costante propensione allo sviluppo di nuovi prodotti. Le esigenze delle misure di torsione sono molteplici: dai test in laboratorio, al controllo dei processi di assemblaggio, alla caratterizzazione di motori elettrici e componenti elettronici.

Rocket Engine Thrust Stand (Application 161)	Motor Test Stand (Application 303)	Torque Verification/Calibration (Application 304)
		
Industrial Robotic Automation (Application 308)	Agricultural Poultry Feeder (Application 309)	Valve Torque Testing (Application 312)
		
OEM Torque Motor Stand (Application 313)	Hinge Fatigue Testing (Application 314)	Servo Motor Torque Control (Application 315)
		

Sensors for Robot Joints (Application 316)	Satellite Reaction Wheel Torque (Application 317)	Rheometer Torque Measurement (Application 318)
		

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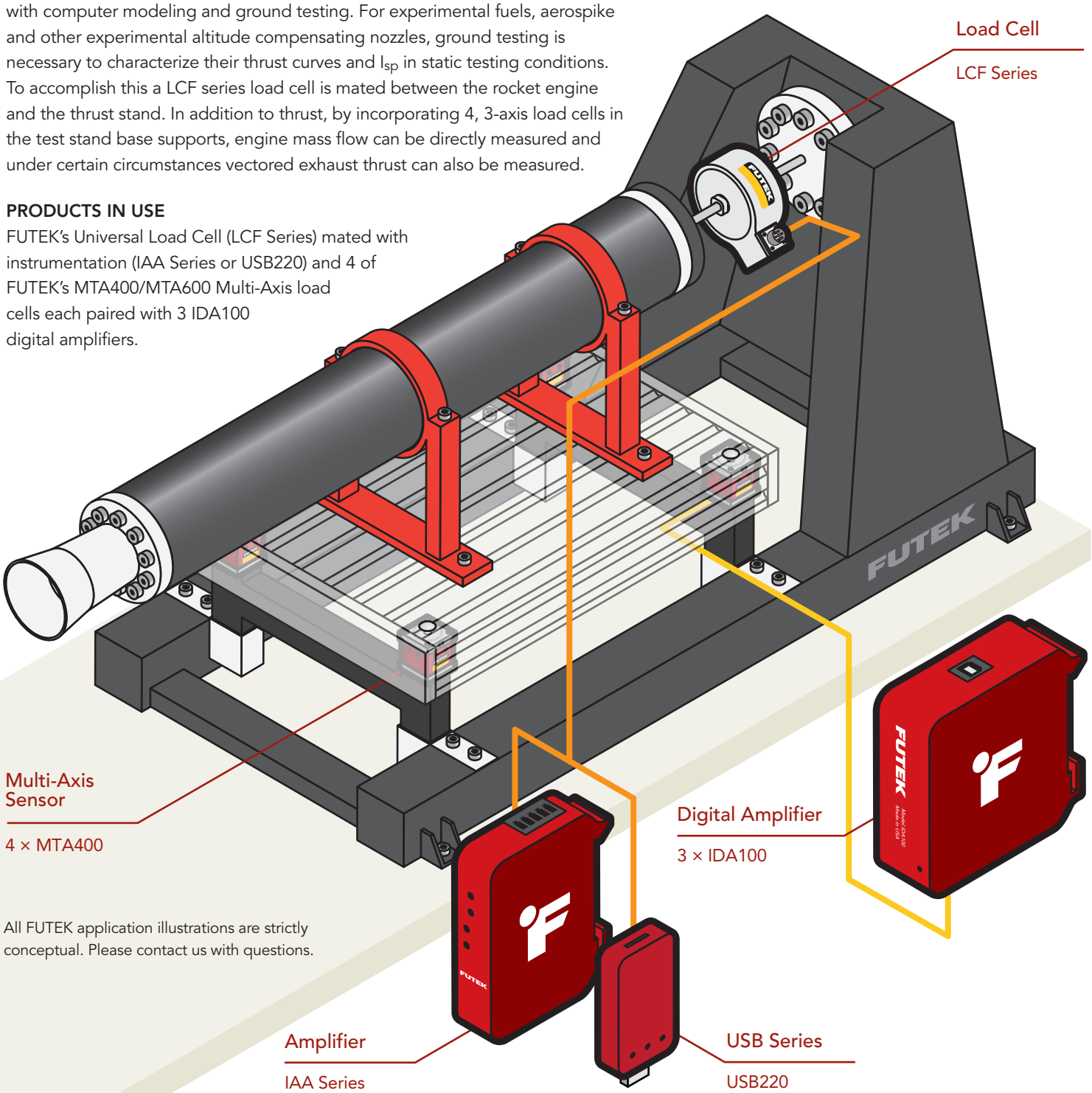
APPLICATION 161
Rocket Engine Thrust Stand

APPLICATION SUMMARY

Characterization of solid, liquid, and hybrid rocket engines is often performed with computer modeling and ground testing. For experimental fuels, aerospike and other experimental altitude compensating nozzles, ground testing is necessary to characterize their thrust curves and I_{sp} in static testing conditions. To accomplish this a LCF series load cell is mated between the rocket engine and the thrust stand. In addition to thrust, by incorporating 4, 3-axis load cells in the test stand base supports, engine mass flow can be directly measured and under certain circumstances vectored exhaust thrust can also be measured.

PRODUCTS IN USE

FUTEK's Universal Load Cell (LCF Series) mated with instrumentation (IAA Series or USB220) and 4 of FUTEK's MTA400/MTA600 Multi-Axis load cells each paired with 3 IDA100 digital amplifiers.



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APPLICATION 303
Motor Test Stand

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.

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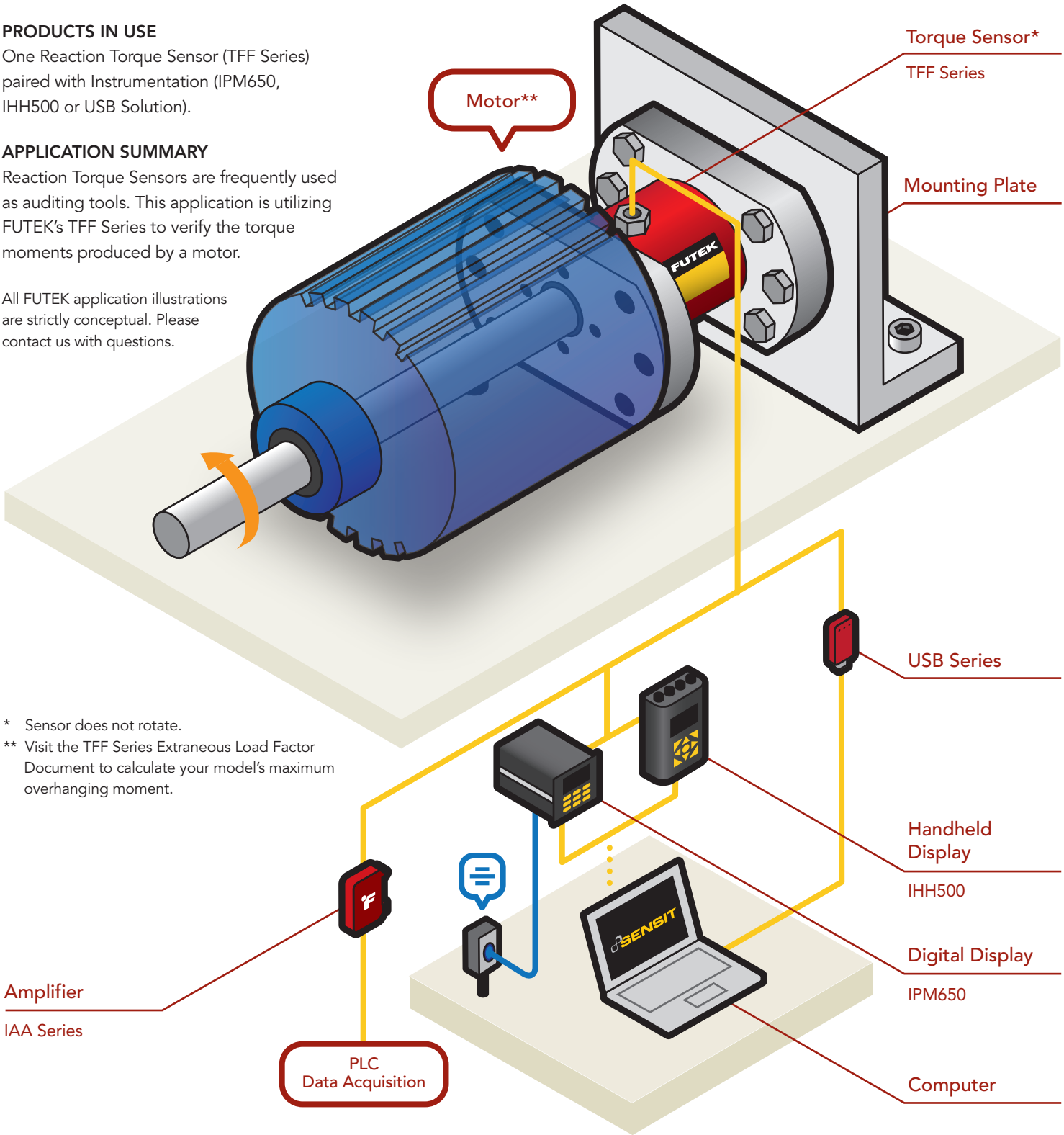

* Sensor does not rotate.
** Visit the TFF Series Extraneous Load Factor Document to calculate your model's maximum overhanging moment.

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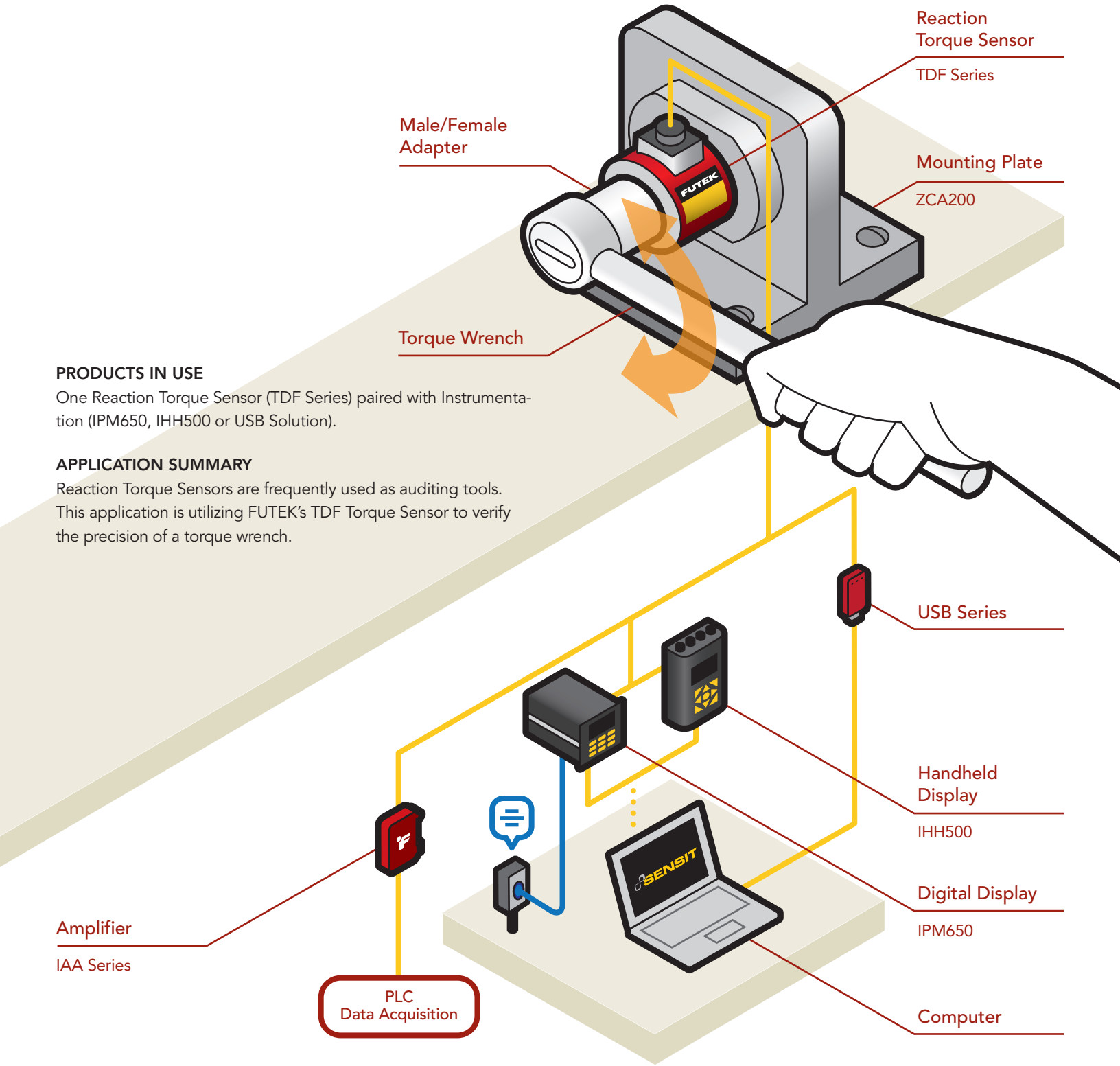
APPLICATION 304
Torque Verification/Calibration



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.

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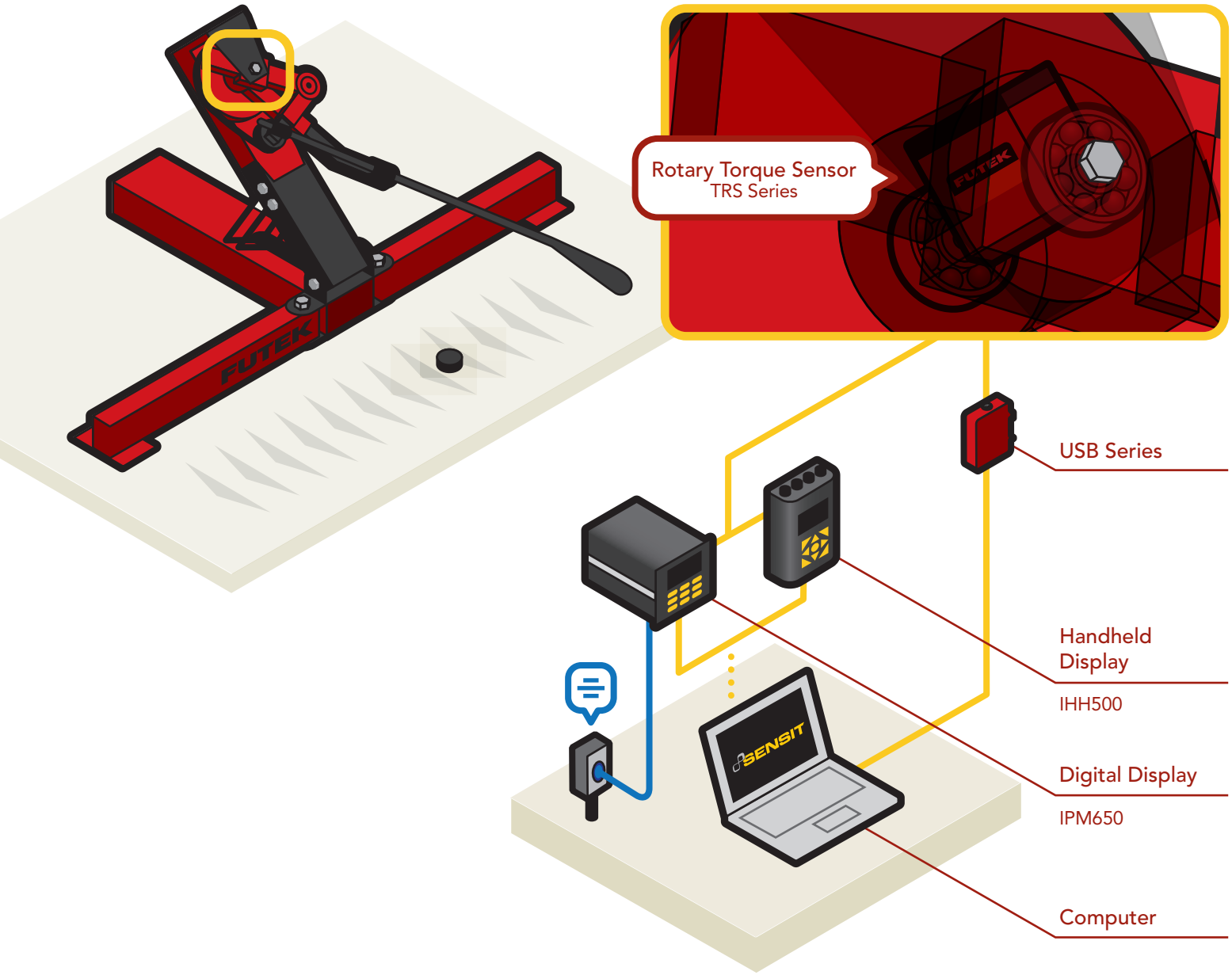
APPLICATION 308
Industrial Robotic Automation



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.

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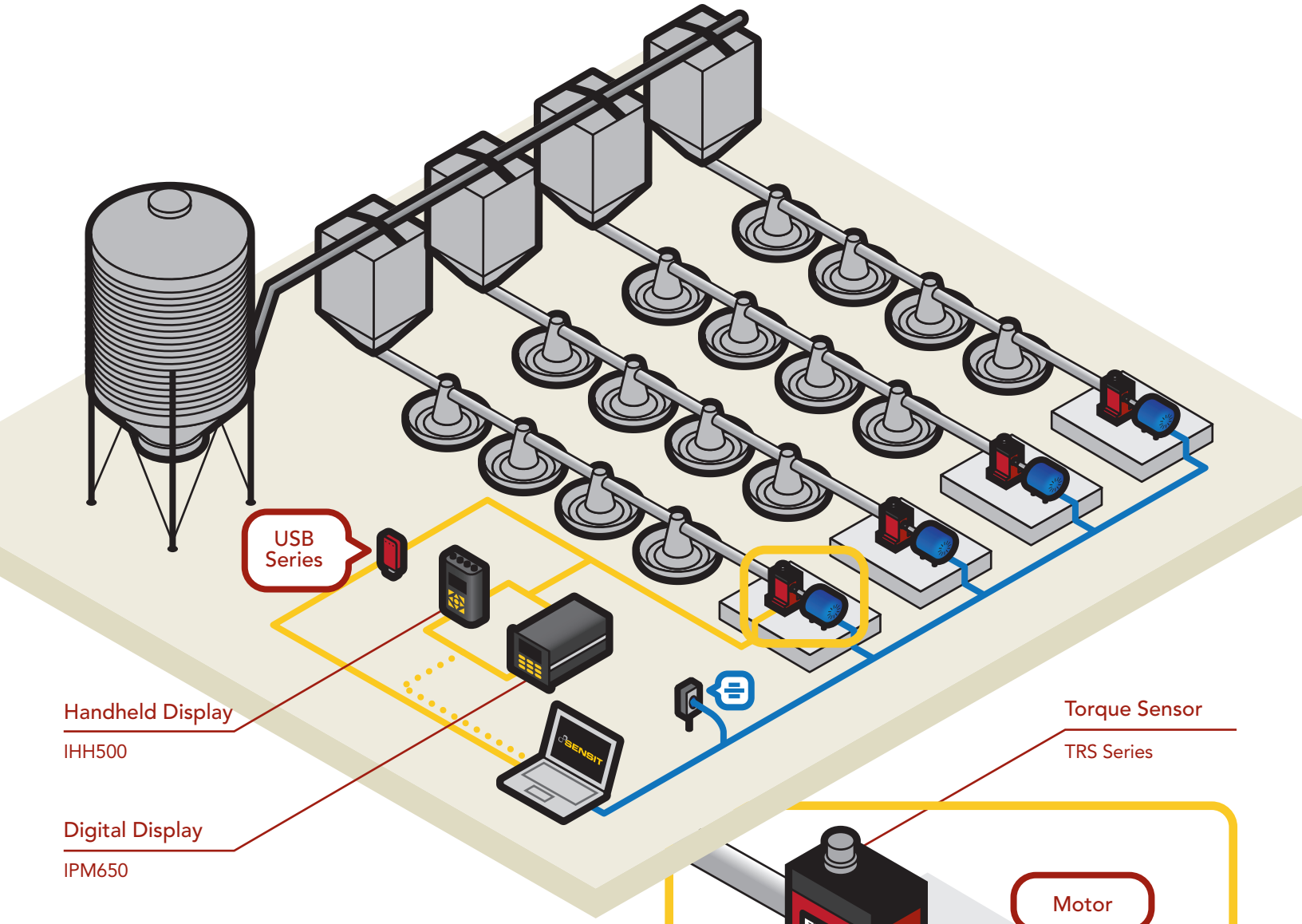
APPLICATION 309
Agricultural Feeder



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).

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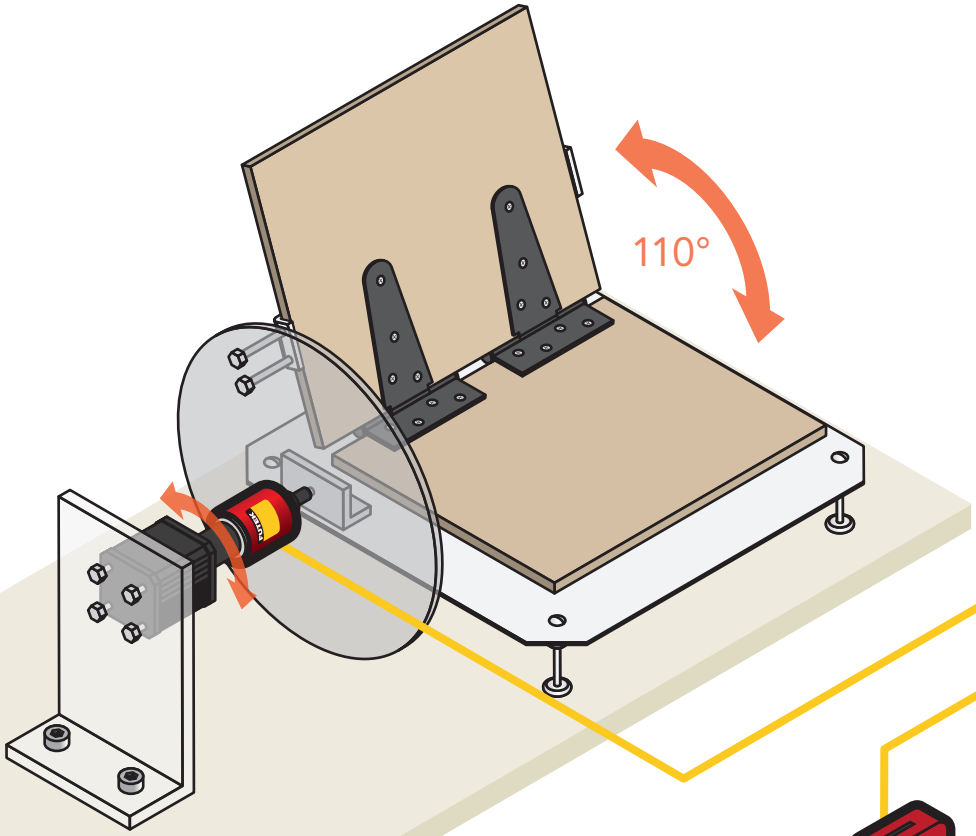
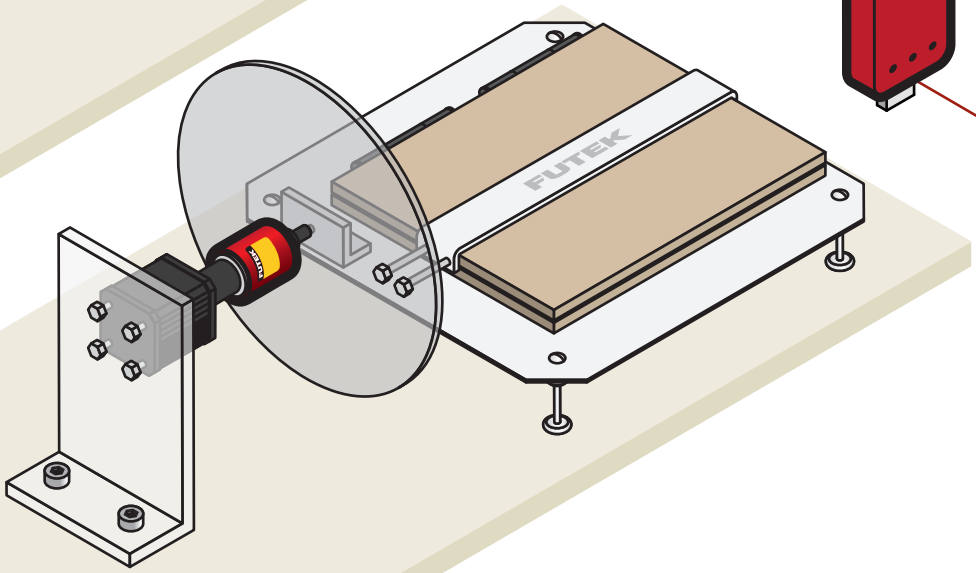
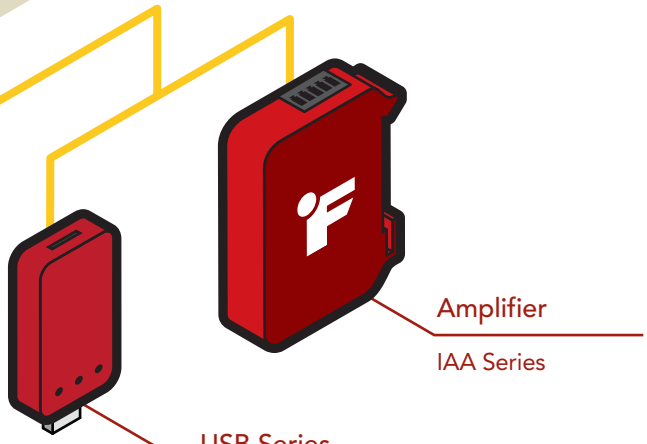
APPLICATION 314
Hinge Fatigue Testing



APPLICATION SUMMARY

Torque hinges, friction hinges, and position hinges are all synonyms for a type of hinge that allows two parts to rotate about one another when a load is applied. The hinge then returns to its original position when that load is removed due to its high torsional stiffness. Because of this property, they are used in everything, from cabinetry and car glove boxes to laptops and monitor stands. This wide range of uses requires that these hinges survive and very often exceed the lifetime of the product. To ensure this, fatigue and cycle testing must be performed to verify the hinge lifespan when integrated into the product.





Amplifier
IAA Series

USB Series
USB220

PRODUCTS IN USE

FUTEK's TFF400 Reaction Torque sensor paired with Instrumentation (USB220, IAA Amplifier). For more in-depth analysis of hinge performance, a TRS605 Rotary Torque Sensor with a built-in encoder paired with a USB520 can be used.

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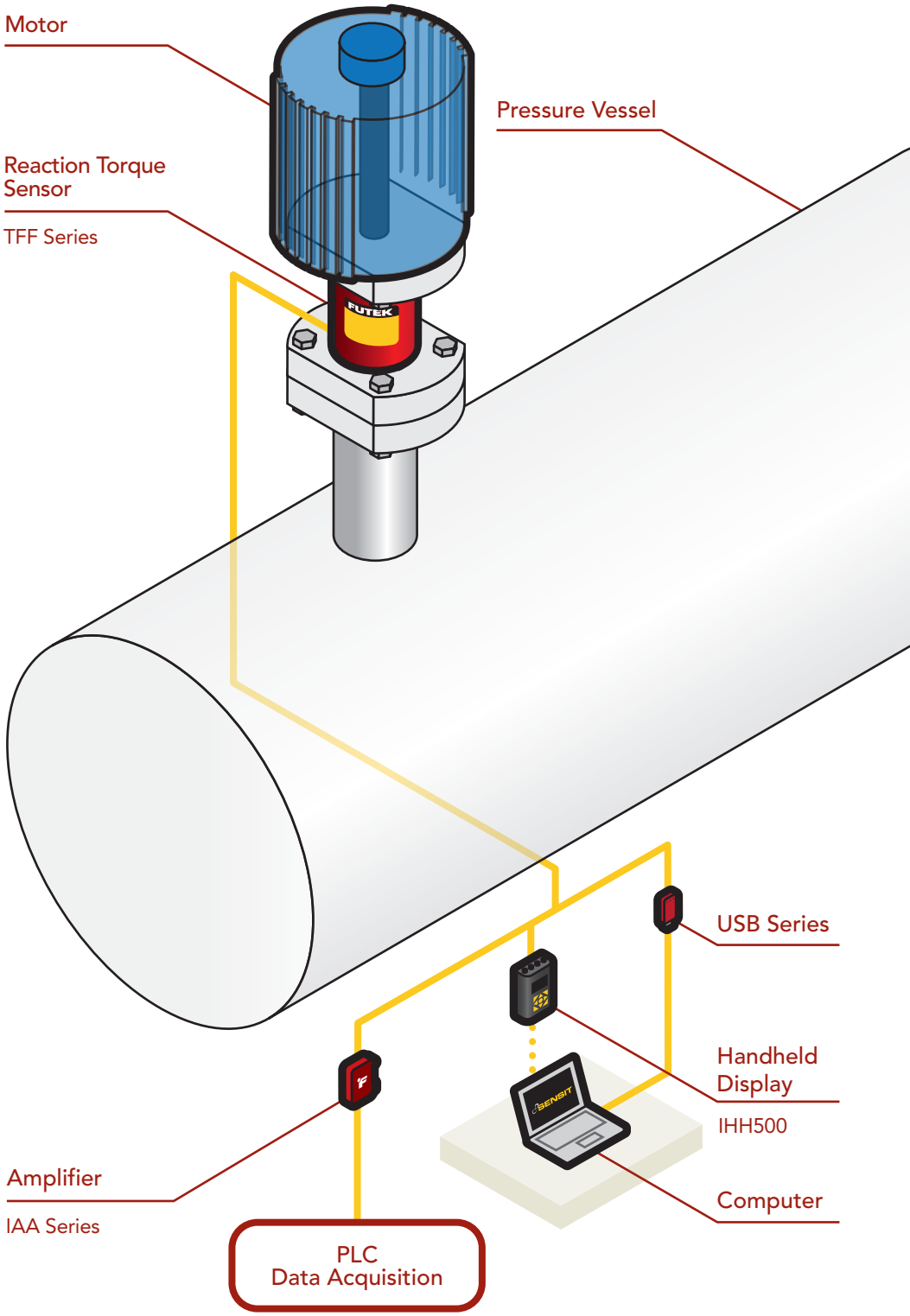
APPLICATION 312
Valve Torque Testing



APPLICATION SUMMARY

Reaction torque sensors are often used as auditing and monitoring tools. This application utilizes the TFF Series to measure the reaction torque required by an electric valve actuator/motor to operate a ball, plug, or butterfly valve.

PRODUCTS IN USE

FUTEK's Reaction Torque Flange-to-Flange Sensor (TFF Series) paired with instrumentation (IAA Series analog amplifiers, USB Solutions, and the IHH500 handheld display).

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

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APPLICATION 313

OEM Miniature Motor Test Stand

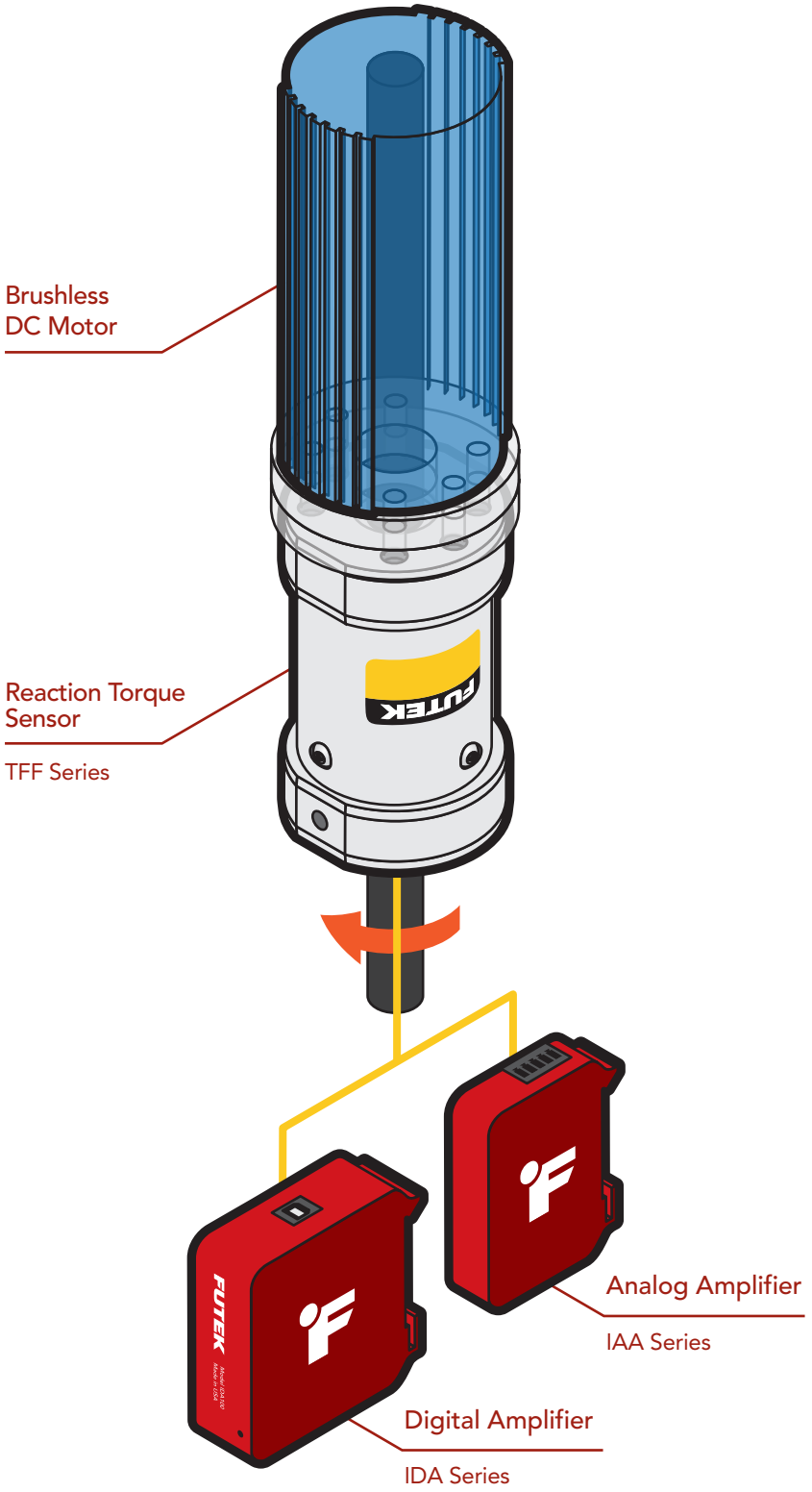
APPLICATION SUMMARY

Reaction torque sensors are often used as auditing and monitoring tools. This application utilizes the FUTEK TFF Series to measure the reaction torque produced by a miniature electric DC (brushed/brushless) or AC motor.

PRODUCTS IN USE

One Reaction Torque Sensor (TFF Series) paired with Instrumentation (IAA series analog amplifier or the IDA100 digital amplifier).

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



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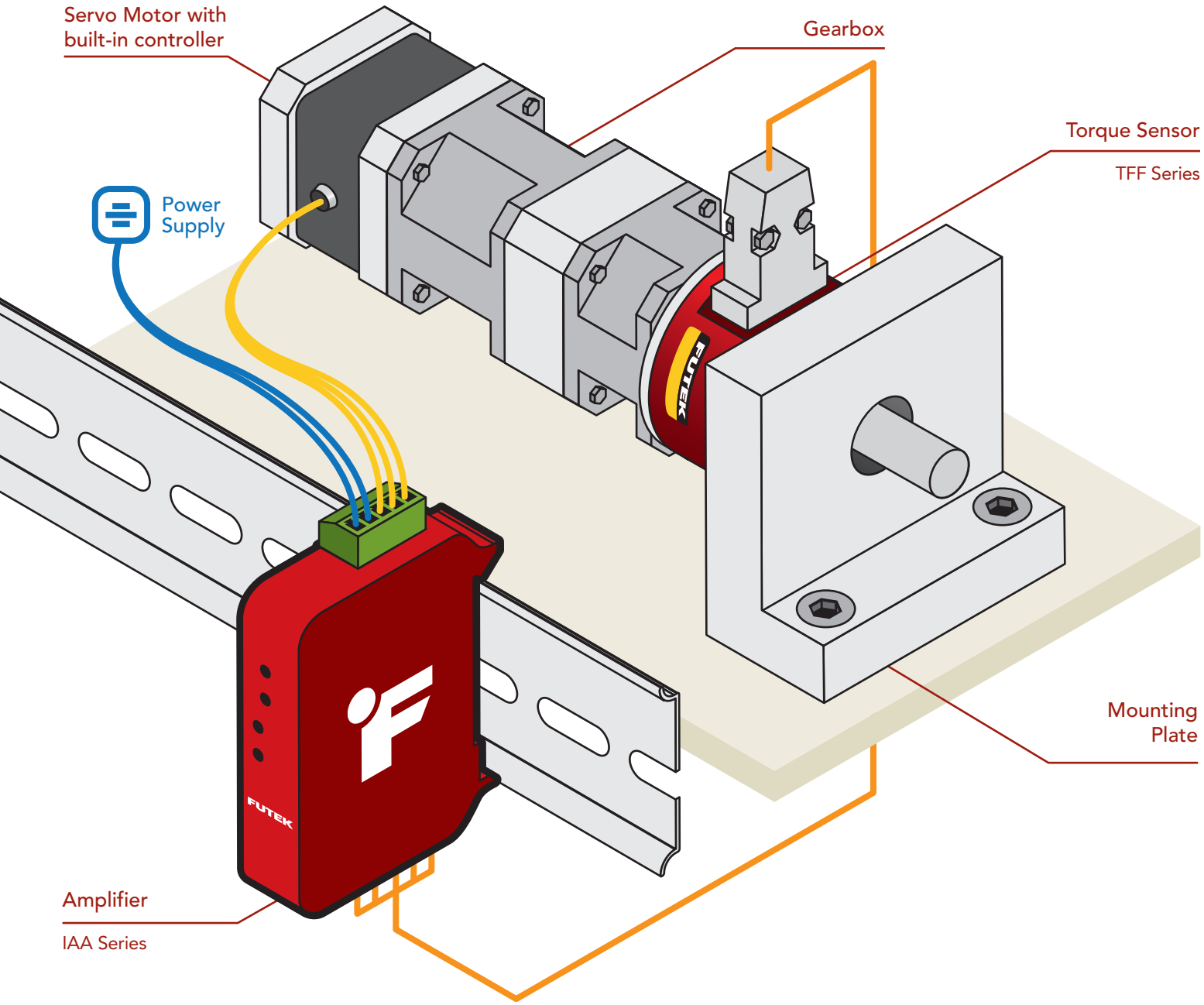
APPLICATION 315

Servo Motor Torque Control



APPLICATION SUMMARY

In certain applications, like managing constant tension while winding material onto a spool, it is necessary for the servo motor to generate a fixed amount of torque. Frictional loss and motor speed change necessitate the inclusion of a closed loop control system. To accomplish this, place a reaction torque sensor between the servo gearbox and its mounting location to measure the generated torque.

PRODUCTS IN USE

FUTEK's TFF500 Reaction Torque Sensor with Thru Hole Center paired with an IAA Series Analog Amplifier.

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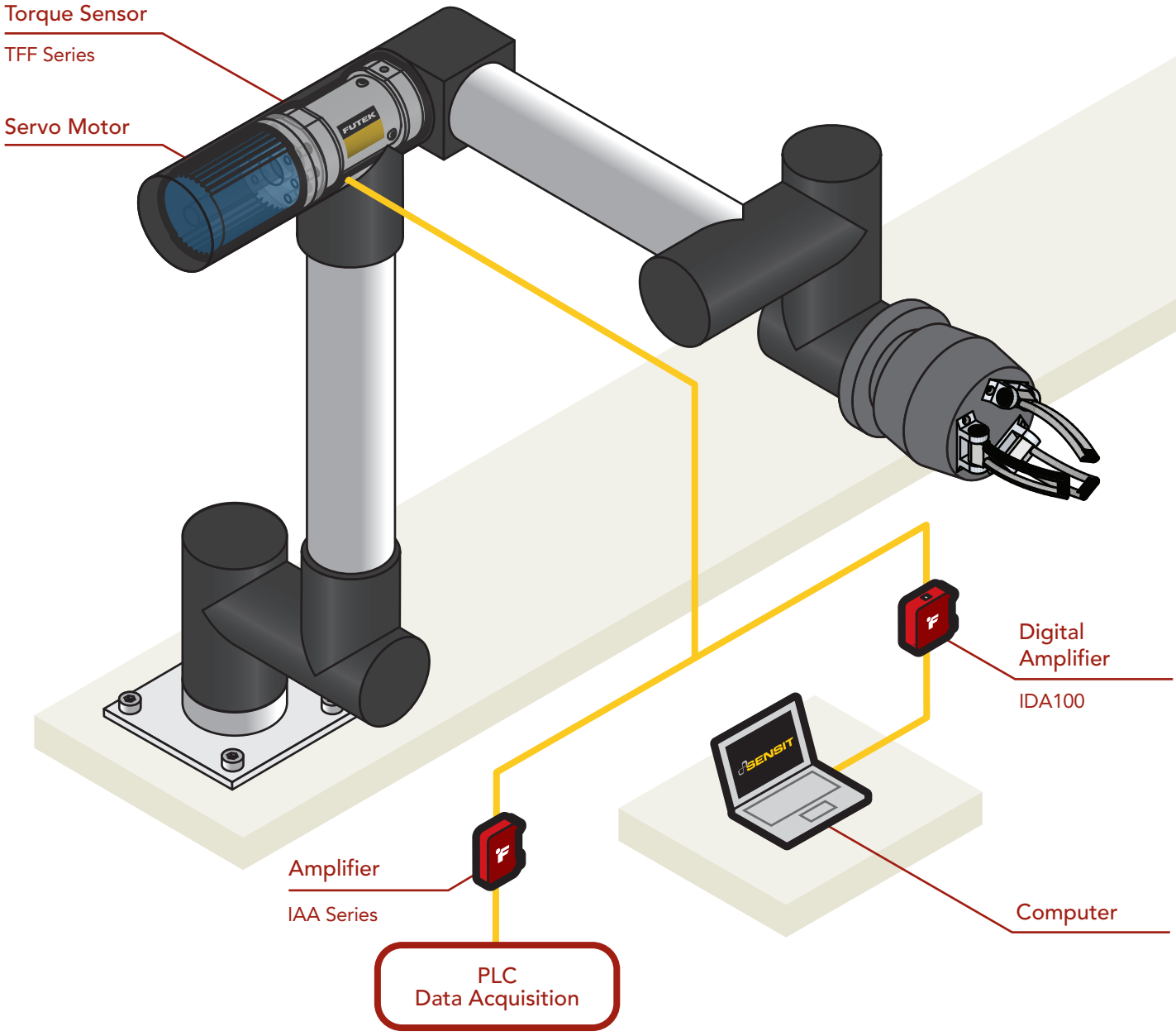
APPLICATION 315

Torque Sensors for Robot Joint Control



APPLICATION SUMMARY

Versatile and adaptive robotic armatures have the benefit of increasing manufacturing productivity by automating and performing complex, repetitive tasks 24×7. These arms are often designed to be trainable or operate as a team as cooperative robots (cobot/co-robot). Driving these arms in their joints are servo or stepper motors. In addition to monitoring shaft position, these arms need to monitor torque output for smooth, steady motion. By combining these motors with a reaction torque sensor, control loops can be developed for smooth, autonomous operation.

PRODUCTS IN USE

1 FUTEK TFF Series Reaction Torque Sensor paired with FUTEK Amplifiers (IAA Series or IDA100).

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

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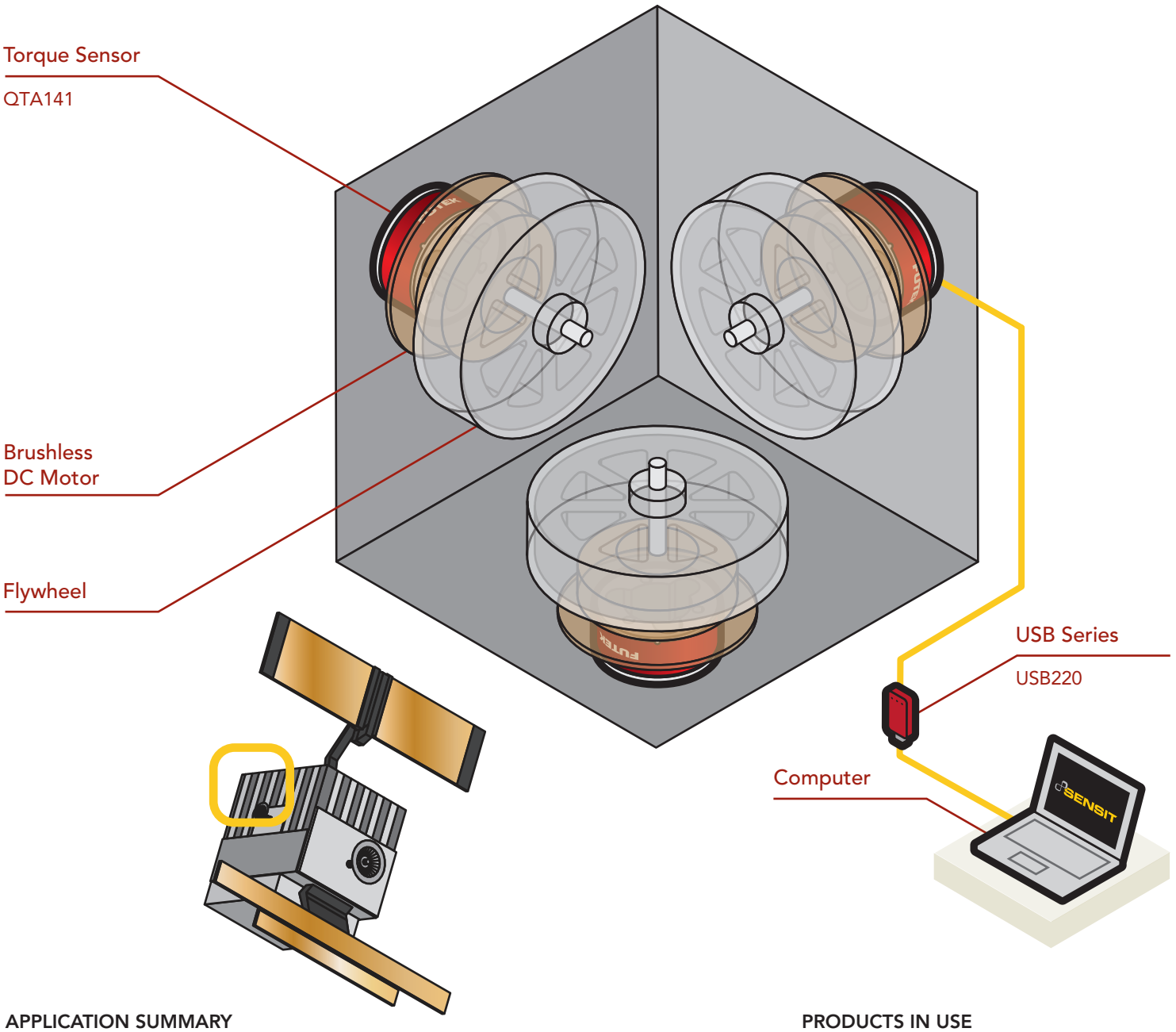
APPLICATION 317

Satellite Reaction Wheel Torque



APPLICATION SUMMARY

One of the more efficient means of satellite attitude control is using reaction wheels. Reaction wheels scale easily making them excellent candidates for attitude control systems in a CubeSat. They create small torque changes necessary to keep a communication antenna pointing at earth or a telescope pointing at a star. By utilizing a micro torque sensor, the response time and torque output of the motor/flywheel can be measured, allowing for precision control loop gains to be established for the PID balancing functions used to stabilize the spacecraft.

PRODUCTS IN USE

FUTEK's QTA141 Micro Reaction Torque sensor paired with the USB220 High Resolution USB Solution.

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APPLICATION 318

Rheometer Torque Measurement

APPLICATION SUMMARY

Determining the viscosity and rheological properties of a fluid, such as paints, oils, and adhesives, requires a rheometer. In this case, a rheometer with a rotational cylinder is used to measure material shear at various rotational velocities. Accomplishing this requires a torque sensor to measure torque generated as the fluid is spun.

PRODUCTS IN USE

One TFF425 Flange-to-Flange Reaction Torque Sensor paired with Instrumentation (USB220, USB520, IDA100, or IDC305)

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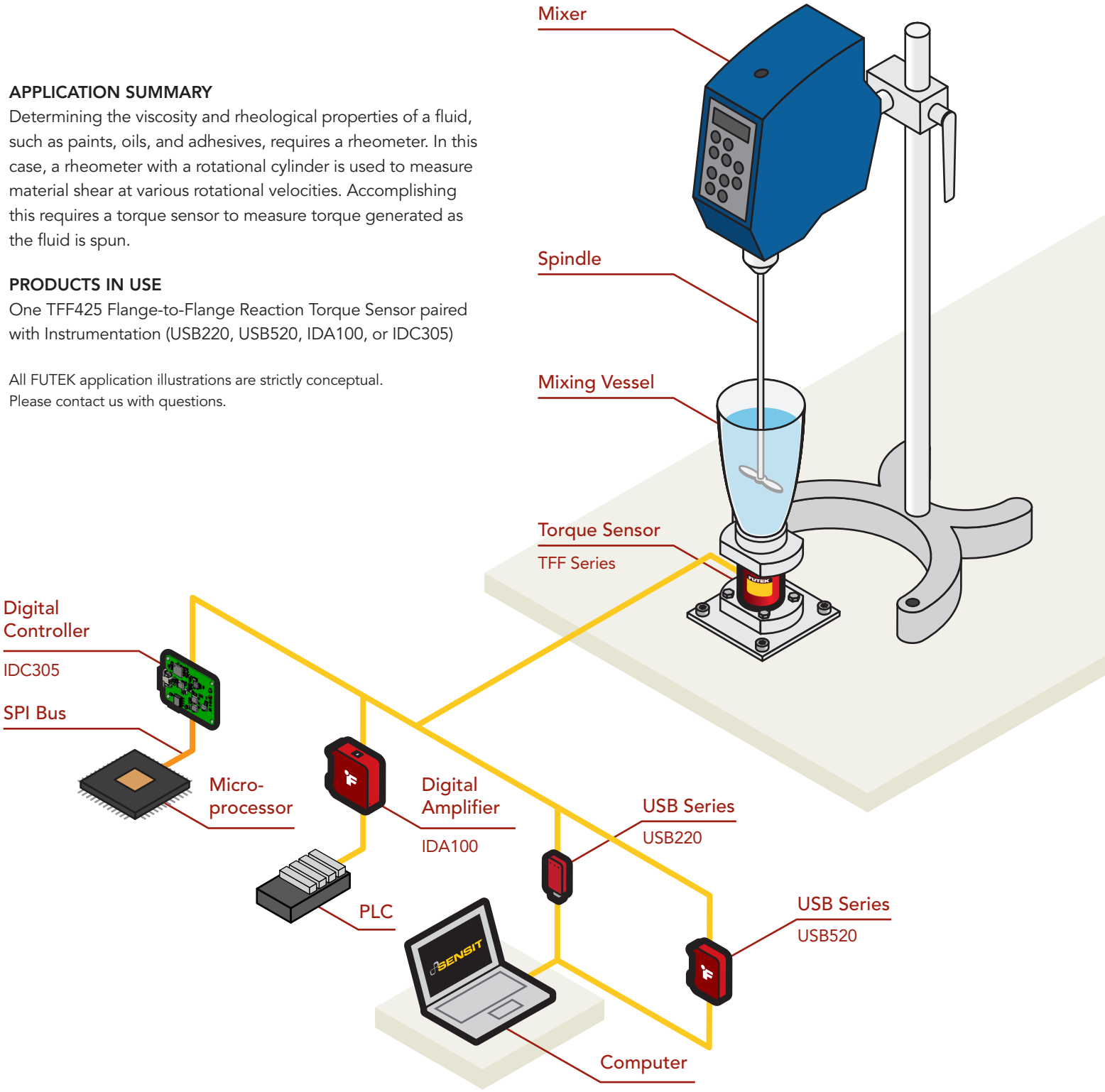
Please contact us with questions.



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