

THE SOLUTION for Gathering Rotary Torque Sensor with Encoder Data

Rotary torque sensors with encoder options are common in test and measurement applications and present some unique challenges. Applications include power tool verification, motor testing and monitoring, robotics, and automatic test environments. Digital data is vital in refining and setting controls for these types of applications. But, how do you get that valuable data in the most accurate and efficient way to programs that can receive that data and analyze it? The FUTEK [USB520](#) is today's answer.

The USB520 answers today's challenge in industrial test and measurement environments for an all-in-one USB data-acquisition component for encoder, switchable profiles, multiple input options and added application compatibilities. Based on FUTEK's pioneering test and measurement solutions since 1988 and very popular USB solutions family, it is an exceptional all-in-one, USB data-acquisition solution for rotary torque sensors with encoder options.

End-users can pair the USB520 with any rotary torque sensor with encoder in the FUTEK product line for a turnkey, high-precision solution or can integrate it into any existing rotary torque application to improve data acquisition. It can monitor torque, speed, and power, as well as accepting encoder measurements. It does not compromise speed, taking up to 4800 samplings per second (SPS), nor accuracy at $\pm 0.005\%$ of full-scale range (FSR).

The USB520 can act as the power supply to the torque sensor within the allotted specifications of up to 24 VDC through the USB cable from the clean power source of the PC and can supply simultaneous 5 VDC to power an encoder. This eliminates the need for a power supply and bench-top or panel-mount equipment, which makes space constraints less of a challenge and allows a simple, plug-and-play connection to a PC for data acquisition.



In addition to power, the USB520 offers a solution that provides precise 4.6 VDC excitation while allowing the encoder to communicate digital data via its USB cable and 12-pin connector cable assembly. This cable provides the end to time-consuming wiring guides, and countless stray wires. It provides pins for \pm excitation, \pm signal, supply output, ground, 5V output, \pm voltage, and leading/lagging pulse.

The digitization of this USB solution significantly reduces the negatives of traditional platforms such as noise, low accuracy, temperature variation, and excitation. In fact, resolution for the USB520 is uncompromised and noteworthy. At 5 SPS, users can experience 18.2 noise-free bits. At 4800 SPS, resolution is rated at 13.9 noise-free bits making it a leader in its class. Its small size, integrated DIN rail clip, and aluminum enclosure are factors that contribute to convenience and durability in a rugged environment.

In addition to its three standard calibration profiles—mV/V, voltage, and current, the USB520 can save up to four different, customizable system calibrations locally on its internal memory. This feature allows multiple sensors to be paired with a single device, one at a time, giving the user the ability to choose the right sensor and profile for the right application. The seven calibration profiles that are available on the USB520 make it a cost-effective test and measurement solution.

The USB520 can communicate with a computer using FUTEK's [SENSIT™ Test and Measurement Software](#). This software suite collects, graphs, and interprets sensor data, and includes a dynamic library link (DLL). The associated DLL file can be used in various programs such as LabVIEW and Visual Studio to command the USB520. The DLL can be [downloaded](#) from the SENSIT™ page of the FUTEK website. It also provides ASCII output that can be read using programs such as Hyperterminal or programmed macros.

FUTEK Advanced Sensor Technology has demonstrated expertise and a reputation for quality test and measurement tools in US and overseas markets. Its aim is not only to develop quality products but to elevate the test and measure industry as a whole. "We came up with a solution for a general-purpose USB module to cover all sensors – strain gage, amplified, and encoder. This is a three-in-one product that aims to solve measurement challenges in the test industry as a whole. It is a valuable, cost-effective, turnkey solution for FUTEK sensor products and has benefits for exciting test and measure applications that make use of a variety of sensors from non-FUTEK manufactures." *Babak Fard Moghaddam, Senior Principal Electrical Engineer*

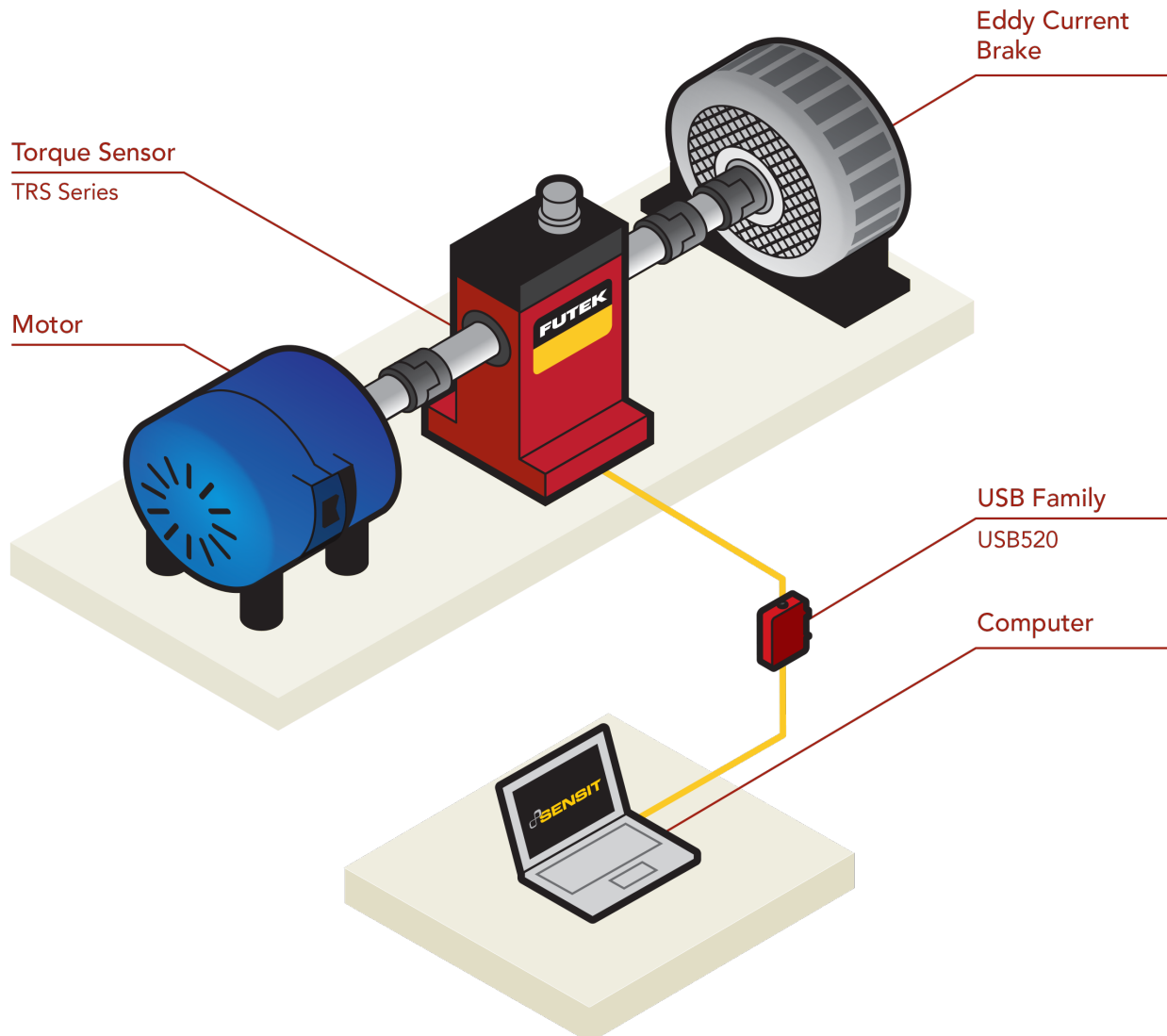


How It Works

Sample Torque/Motor Test Stand Application

Rotary torque sensors are frequently used as auditing tools for motors, power tools, turbines, and generators. This example shows a torque/motor test stand application using a FUTEK [TRS Series](#) rotary torque sensor paired with the USB520.

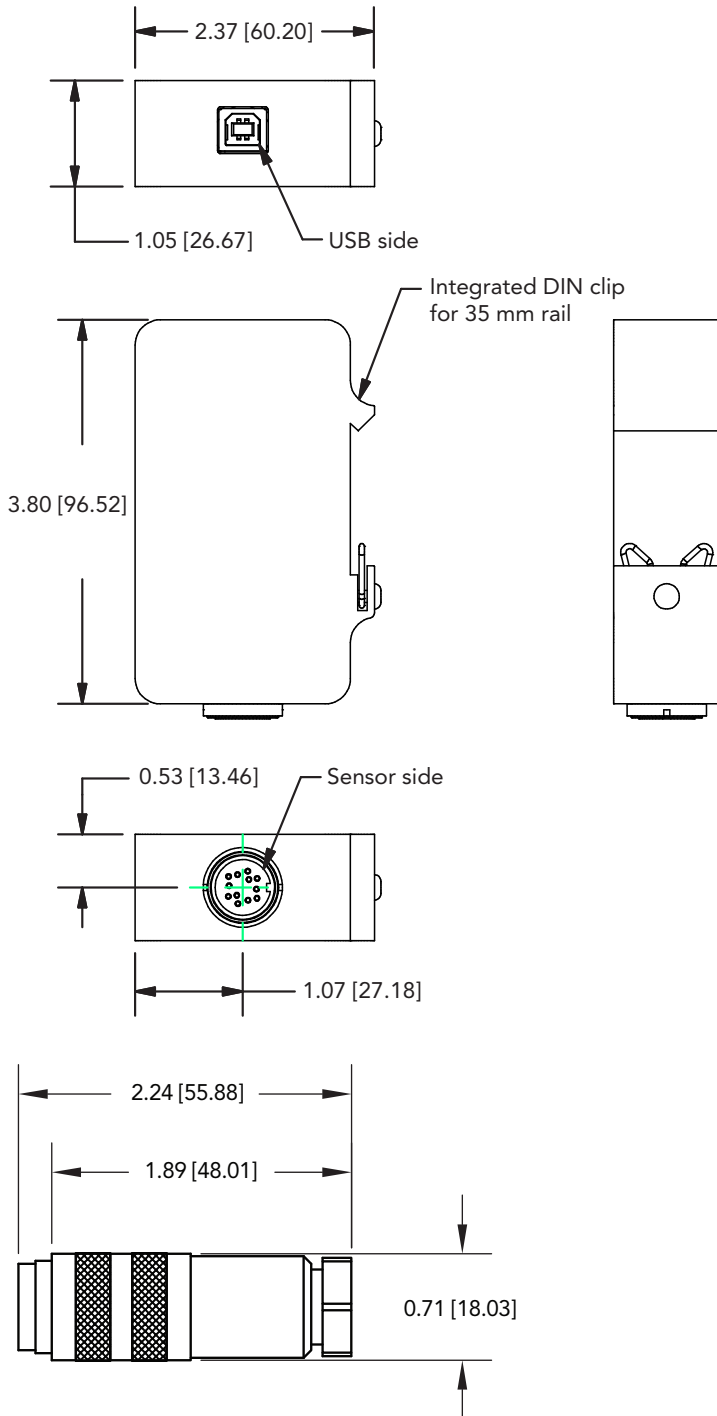
The TRS Series is an effective tool for motor testing/auditing, feedback control, monitoring torque, and analyzing the efficiency of test stands. The USB520 provides a simple, plug-and-play connection to a PC for data acquisition.



1. In this application, the TRS Rotary Torque Sensor is coupled between an eddy brake and motor.
2. As the motor rotates, the TRS Sensor measures the torque that the motor produces between couplings.
3. FUTEK developed certain models of the TRS Series with built-in encoders. These encoders measure the angle/speed produced during this test.
4. Torsion measurements are streamed to a PC using the USB520. It can monitor torque, speed, and power, as well as accepting encoder measurements.
5. Applying FUTEK's SENSIT Test and Measurement Software to this test platform will allow the operator to live graph and data log the results. The USB520 produces a DLL file and provides ASCII output that the operator can also use to analyze the data that is gathered in the application.

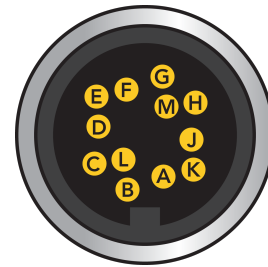
For more information on how the FUTEK USB520 could enhance your rotary torque with encoder application, please call our office at 949-465-0900. Our application engineers will be glad to help you. Or, visit www.futek.com for more information.

DIMENSIONS inches [mm]



SAMPLING RATE

SAMPLES PER SECOND (SPS)	mV/V RESOLUTION	mA & VDC INPUT RESOLUTION
5	18.2	20.5
50	16.8	19.5
100	16.5	19.2
300	16.0	18.2
1200	14.8	17.0
2400	13.9	16.0
4800	13.9	16.0



12-PIN BINDER MATING CONNECTOR (99 5129 00 12)

PIN	SIGNAL
A	+ EXCITATION / + SENSE
B	+ SIGNAL
C	- EXCITATION / - SENSE
D	- SIGNAL
F	SELECTABLE SUPPLY OUTPUT
G	GROUND
H	4.75V OUTPUT
J	-(RETURN) VOLTAGE INPUT / CURRENT RETURN
K	+ VOLTAGE INPUT / CURRENT INPUT
L	LEADING PULSE
M	LAGGING PULSE