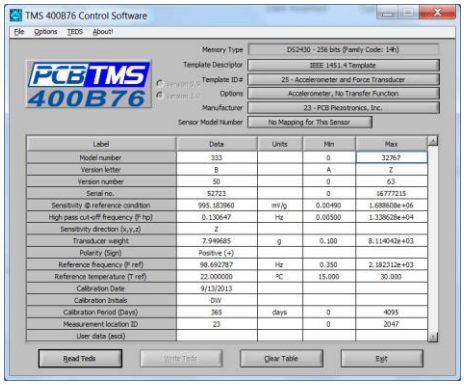
Sensor Database vs. TEDS

Sensor Integration methods for Data Acquisition

Customers frequently ask about the most efficient way to support our DAQ Systems, particularly when considering the use of an integrated sensor database versus TEDS (Transducer Electronic Datasheet) compliant transducers.



Example TEDS Datasheet

Background

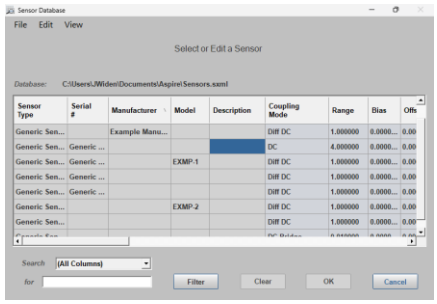
TEDS sensors were introduced in 1997 with IEEE standard 1451.1, enabling the storage and retrieval of sensor-specific information from a small, nonvolatile memory chip. Initially, TEDS stored only capability details, but later versions added calibration data, simplifying sensor configuration—especially in large-scale deployments. However, widespread adoption has fallen short of expectations due to inconsistent implementations across manufacturers, limiting interoperability and practical utility.

This issue is particularly evident in multi-arm, bridge-based sensors, where proprietary and non-standard approaches hinder compatibility. As a result, only a limited subset of sensors, such as IEPE accelerometers, have seen broad TEDS adoption. Additionally, calibration labs struggle with updating and verifying data due to variations in implementation. Beyond IEPE accelerometers, achieving full-scale adoption remains a challenge.

Cost is another barrier, as TEDS-compliant sensors and measurement systems carry a price premium, particularly when multiple sensor types are involved. Modern “Universal Input” modules, which support various sensor types, offer more flexibility and cost savings over single-type modules. Even if TEDS sensors were universally available, diverse implementations would require multiple communication paths per input channel, significantly increasing the complexity and cost of large-channel measurement systems.

Sensor Databases

An increasingly attractive alternative to the use of TEDS sensors is the implementation of an integrated sensor database such as that integrated into Hi-Techniques Aspire software. Similar to TEDS, a sensor database can be used to capture and store specific sensor information including sensor type, model, serial number, calibration information and calibration date / interval. The sensor can then be selected for use from the database by the end user with all relevant information included.



Example Sensor Database

Data can be modified within the database or through regular synchronization with a corporate sensor database maintained by the metrology group.

Advantages of a Sensor Database Include:

- Support for all sensors and sensor types, not only the few percent available with TEDS.
- Additional information such as notes can be added and stored with sensor data.
- Regular synchronization with a central metrology database ensures up to date calibration information, with easy detection of outdated or incomplete data.
- Eliminates the redundant verification of TEDS information by the end user to ensure each individual sensor's calibration information was properly stored and updated.
- All calibration data is stored with measurement results, ensuring full traceability.

Summary

Both the use of TEDS compliant sensors and a sensor database are attractive concepts as channel count requirements continue to rise. But which is best for you? Some simple questions may help with the process:

- Are the majority of your sensor requirements supported by TEDS compliant sensors?
- Does your company support the reprogramming of TEDS calibration data? Without this capability, calibration information cannot be maintained without expensive third-party calibration services.
- Does your company already have a dedicated metrology database? This may lend itself well to a sensor database approach.
- Are some of your sensors bridge-type devices such as load cells, pressure sensors, torque transducers, piezoresistive or MEMS accelerometers, etc.? When available in TEDS at all, these tend to be proprietary implementations that severely restrict your choice of sensors and of DAQ systems.

For more information on using the Aspire software integrated sensor database, please click the button below.

Get the Technical Note Here!

Hi-Techniques Inc.

Hi-Techniques has been a leader in **High Performance DAQ Systems** for over 40 years, specializing in transient recorders, data acquisition systems and high-resolution Digital Oscilloscope products for a variety of applications and markets. **Below are a few of our DAQ product offerings**.

Echelon Series

- Rugged IP67 DAQ System
- Lab quality input amplifiers and signal conditioning
- 1 MS/s per channel
- Integrated Universal signal conditioning
- Real-time display, control, and setup from any PC or mobile device

Synergy Series

- Multiple form factors, Lab & Portable
- DAQ with superior transient and streaming capabilities
- Integrated Universal signal conditioning
- Multi-Channel DSO
- Real-Time FFT Analysis

FreeStyle Series

- Rugged IP67 DAQ System
- Lower channel count & cost
- Fast & easy setup
- PC Tethered System
- 20 kS/s per channel
- Integrated Universal signal conditioning