TRAK MACHINE TOOLS
SOUTHWESTERN INDUSTRIES, INC.

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White Paper

Cutting Precision Threads on the TRAK TRL 1440EX

There are different classes of threads that are commonly used. If a customer is going to produce threads using the Thread Event, we should look at what the customer requirements are. Depending on what class of thread the customer needs to produce could determine if the 1440EX is the proper machine. Below is a review of thread classification.

Thread Classes

A classification system exists for ease of manufacture and interchangeability of machined threads. Most threads are made to a classification standard called the Unified Screw Thread Standard Series.

As a general guideline, the higher the class number, the tighter the fit. For example, an assembly which mates class 1A and 1B threads will have a looser fit than an assembly having class 3A and 3B threads.

- Classes 1A and 1B are infrequently used, but they do have their applications. They are ideally suited when quick assembly and disassembly are a key consideration in a design.

- Classes 2A and 2B are the most common thread classes in use, offering a balance of ease of manufacture, cost and performance.

- Classes 3A and 3B are best suited where close tolerances, safety and strength are required, and thus are frequently specified for socket cap and socket set screws.

Thread class refers to the acceptable range of pitch diameter for any given thread.

When single point threading, it is common practice to "sneak up" on the thread when running single piece to small lot production runs. What this basically means is an operator will purposely run an outer diameter thread oversize. The operator will then stop the machine to measure the pitch diameter of the thread. Knowing how much the thread is oversized, the operator will then put in an X-axis modifier and rerun the threading event, bringing the thread to its proper size.

The 1440EX uses a proximity sensor to monitor spindle rpm's, not a spindle encoder. This sensor makes it more difficult for an operator to accurately retrace an existing thread. There is the possibility of having a following error when retracing existing threads. This following error can very quickly use up the total tolerance of a specific thread Class.

Retracing Class 1 threads is well within the capability of the 1440EX. Class 1 threads have the loosest tolerance of the 3 Classes.

Retracing Class 2 threads will be more difficult. The machine is capable of producing Class 2 threads, but the operator will have to take greater care and will more than likely use up the full tolerance that the Class 2 specification allows.

If the customer needs to produce Class 3 threads, the 1440EX may not be the right machine. When retracing a thread, the slightest amount of following error will produce a thread outside of the Class 3 tolerance range, producing a scrap part.

Understanding the customer's needs in terms of the Class of thread that needs to be produced is very important in deciding which machine is best suited for the application. If a majority of the threads the customer needs to make is in the Class 3 tolerance range, it may be in the customer's best interest to consider one of our other ProtoTRAK lathes which use a rotary spindle encoder that constantly monitors spindle rpm throughout the threading cycle. It should also be noted that the 1440EX cannot produce taper threads