FREQUENTLY ASKED
Questions

HYBRID MACHINE

DAVENPORT MACHINE

Q: Why will Davenport's exciting new HYBRID machine improve your **production output** and improve your **return on investment** ?

Q: What is the HYBRID machine?

A: The Hybrid machine is the latest technology introduced by Davenport to improve machine accuracy, versatility and ease of operation. It incorporates the latest in CNC technology for all cross working slides while keeping traditional cam operated end working spindles.

Q: Can it make parts more accurately?

A: Yes. Multiple tests to evaluate the process capability using forming tools have demonstrated excellent results. Using a standard 8-SA (bronze box head) and a HP head as benchmarks, the new HYBRID machine can hold form tolerances approximately 5 times tighter than an HP machine, and 10 times tighter than an 8-SA machine. HYBRID part accuracies rival those of single spindle CNC lathes, combined with production speeds that are unmatched by ANY multi-spindle. ***You can compete with confidence against higher cost machine tools for a superior return on investment.***

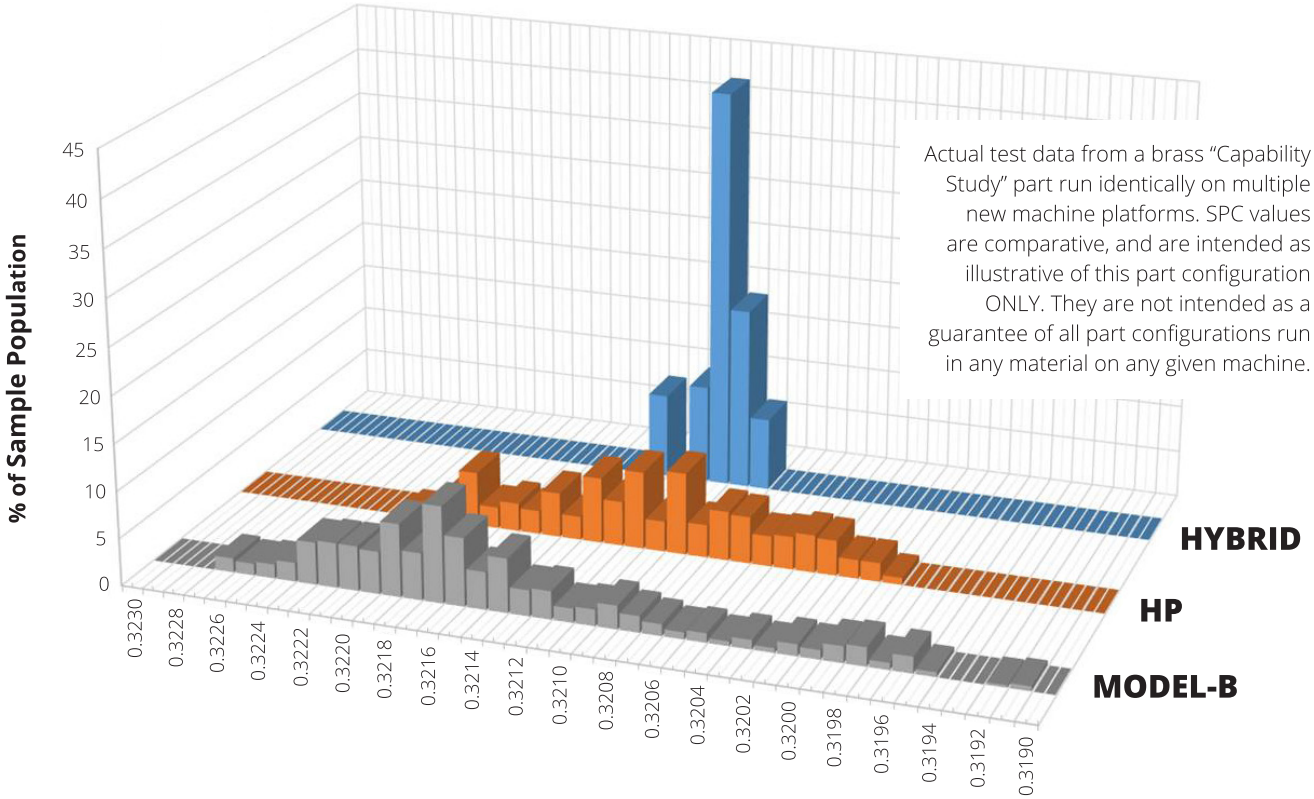
Q: What makes the Hybrid easier to operate?

A: The addition of CNC slides allows operators to make size/diameter adjustment via an onscreen display. No more turnbuckle adjustments or challenging shave tool adjustments. All can be accomplished on the fly without stopping the machine.

Q: With the New Hybrid, will I have the capability to machine tougher materials and still be able to hold tight tolerances?

A: Most certainly. ***Thorough testing has shown that the Hybrid can machine some of the toughest aerospace alloys, such as A286, as well as 316SS, 4140 and 400 series stainless. The Hybrid can repeatedly hold .0005 on diameter with form tools.*** While this can depend on setup and tooling, the Hybrid has shown Cpk levels in the 1.66 range. (See graphical representation for tested results).

Sample Size Distribution - Formed Diameters



Actual test data from a brass "Capability Study" part run identically on multiple new machine platforms. SPC values are comparative, and are intended as illustrative of this part configuration ONLY. They are not intended as a guarantee of all part configurations run in any material on any given machine.

HYBRID MACHINE
Range: 0.0004"
Std. Dev.: 0.0001"
1.66 CpK @ 0.0005" total tol.

HP MACHINE
Range: 0.0022"
Std. Dev.: 0.0005"
1.66 CpK @ 0.0027" total tol.

MODEL-B MACHINE
Range: 0.0036"
Std. Dev.: 0.0009"
1.66 CpK @ 0.0043" total tol.

Q: What about wear between the head and the bed? Won't that affect accuracy?

A: Not anymore. The revolving head is now rigidly supported in its own set of preloaded angular contact bearings. There is no play between the head and the bed, and as a result, spindle positions from index to index are held much more consistently. The accuracy of this machine will not degrade over time, but will hold tight tolerances until the end life of the bearings. Machine rebuilds will be less intrusive and expensive.

Q: What about length control? Doesn't my thrust ring still limit my over-all-length (OAL) accuracy?

A: Axial play of the head has been eliminated using the head-on-bearings concept. Now each spindle is held axially rigid, and the head in which they are mounted is also axially rigid, mounted in preloaded angular contact bearings. There is no more thrust ring, and no screws to adjust. OAL accuracy and the ability to "line up" tools in different tooling positions is drastically improved, cutting setup times and improving productivity.

Q: Why do the slides look different? Where are the cams, and turnbuckles?

A: All side working slides are completely redesigned. These slides now run on precision pre-loaded linear rails, and are driven by zero backlash ball screws and CNC servo drives. No cams, no turnbuckles, no pins and rollers, no linkages, no springs. The tools are positively positioned, and rigidly supported at all times.

Q: Will the new CNC slides accept my current tooling?

A: These slides will accept all Davenport tooling. They are also MODULAR, by allowing use of different mounting plates to accept a variety of CNC stick tools, and common 1 inch or smaller multi-spindle tools. ***Moving jobs from other platforms to a Davenport HYBRID will not require a complete re-tool, making the HYBRID a superior return on investment.***

Q: What other feature makes the Hybrid more effective?

A: During setup, an operator can easily adjust timing of any and all cross working positions through simple control adjustments. Cutting feed parameters can be adjusted in the same way. No more redesigning of cams to adjust timing and cutting feeds.

Q: Where are the tool post stop screws?

A: They have been eliminated. You now have electronic control over tool offsets at each spindle position in Ø.0001" increments, so the "virtual" tool post stop is far more accurate and repeatable than the mechanical one ever was.

Q: Is this machine built on the same bed casting?

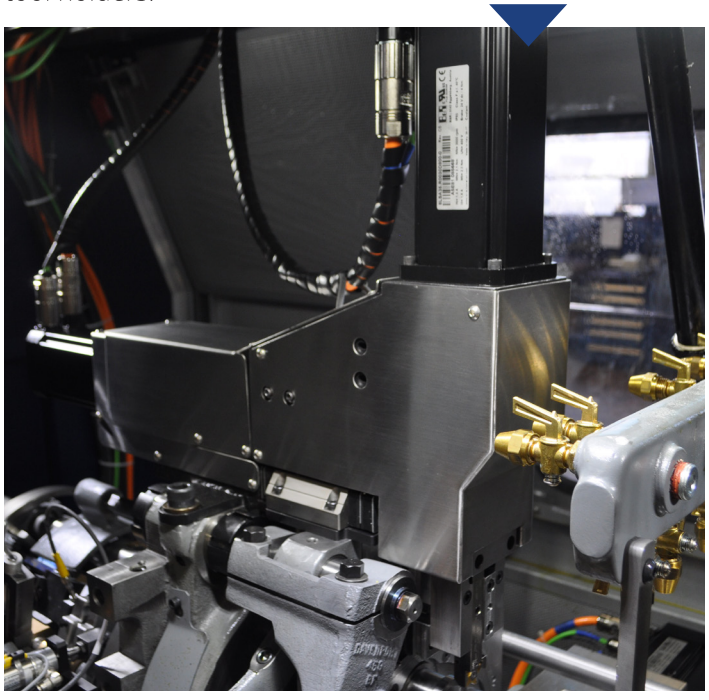
A: The casting is similar, but not the same. It has been upgraded in strategic areas to improve rigidity and toughness. We have also optimized the layout to make room for new items like the head bearings.

Q: With all these changes, will I still be able to use my existing Davenport attachments?

A: Nearly all Davenport attachments will be reverse compatible with the HYBRID machine, however some will become unnecessary due to the new features and capabilities of the base model HYBRID. What used to take a bolt-on mechanical attachment can be accomplished by electronically turning on or off an option.

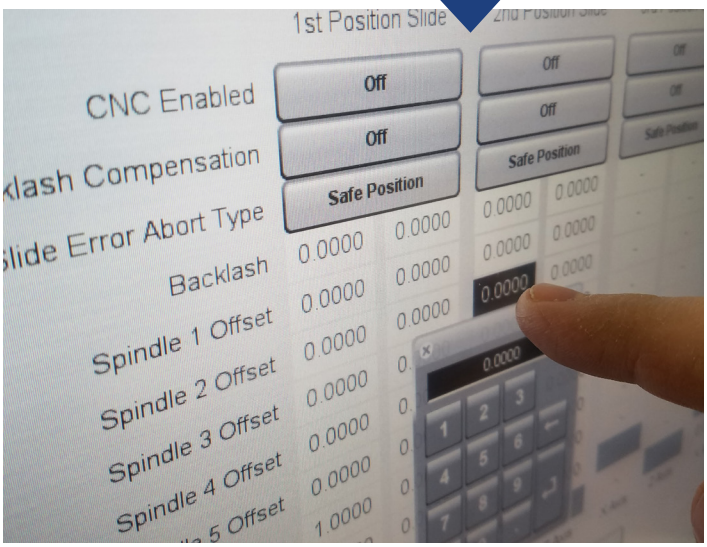
Q: Can I single point turn or single point thread?

A: Yes. The HYBRID has a 4th position 2-axis CNC slide that can single point profile, cut angular undercuts, thread, hold live milling tools, even do OD and ID work with multi-tool holders.



Q: How will I operate all these new CNC functions?

A: The new HYBRID machine has a state-of-the-art control package featuring a 15-inch color touchscreen monitor, full QWERTY keyboard, and hard-buttons for common machine functions like jog and cycle start/stop. The new graphical user interface has a more intuitive layout than previous controls. Traditional CNC operators will find the HYBRID control familiar, and Davenport operators will find it easy to use and master.



Q: What part size can I make?

A: Hybrid diameter configurations are the same as traditional davenports, featuring 5/8 inch regular capacity and 7/8 inch diameter oversized capacity. All hybrids are currently built on a long bed platform allowing for part lengths up to 4 ½ inches while allowing better chip control.

Q: Is the machine available with aligning gears or spindle-stopping clutches?

A: Both. The standard spindle drive system will support both of these options, and an optional independent spindle drive system will make these two options obsolete.

Q: What has been done to make Hybrid more versatile?

A: Davenport has designed and manufactured a line of dovetail tool holders whose rigidity and robustness provide a much better tooling solution than that of traditional davenport side working tools. The new tooling options can utilize off the shelf cutting inserts and holders that range from skive, form, stick tool, and round shank tools. The holders are also designed to accept high pressure coolant and deliver coolant at the tool tip when needed.

Q: Can I still use a shave tool?

A: You could, but with form tool control within a few tenths of an inch, the shave tool will likely become a thing of the past. Enjoy easier, shorter and less expensive set-ups.

Q: Does the HYBRID machine use HP spindles?

A: The spindles are essentially unchanged from the HP design. Each spindle is rigidly supported in a set of ABEC 7 angular contact bearings, with greater accuracy, and a proven track record of long life. The average HP spindle goes 8+ years between rebuilds, with better productivity and profitability.

Q: Can I get higher coolant pressure?

A: Yes. The machine is equipped with an 8-port programmable high-pressure manifold and can be equipped with up to a 1500 PSI pump at 10.5 GPM flow. We have high-pressure ready stationary and revolving spindles, form and cutoff tools.

Q: Can the HYBRID help me manage my chips better?

A: The HYBRID has a 2" longer work-zone for more chip space, has no center drive to eliminate a point of entanglement, a larger chip evacuation chute and wider chip conveyor, no tool-post for chips to catch on, and high pressure coolant to help evacuate chips from the drill flutes. Combined with rigid CNC slides with a variety chip-breaking options and the ability to use the best chip-breaking tool technology, chip management on a davenport has never been easier.

Q: How much room does a HYBRID machine take up on my factory floor?

A: The HYBRID, with its full enclosure, has a footprint nearly identical to Davenport Model-B and HP machines. The Davenport HYBRID is about half the size of other multi-spindle machines with 1" diameter part capability. Replacing those aging, larger machine tools with two brand-new HYBRIDS will more than double your plant output without adding 1 square foot of infrastructure. ***That will certainly lead to superior return on investment.***

Q: How will the Hybrid improve our shop's productivity?

A: Hybrid allows you to ***quickly*** setup and change machining parameters with digital inputs rather than turnbuckle/cam adjustments and finesse. It takes your machining process from art to science. More accurate. More repeatable.

DAVENPORT MACHINE

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